MSBA Module 4 Schematic Design - SD Binder

Schematic Report:

Submitted to the Massachusetts School Building Authority:
February 20, 2019

Lowell High School

City of Lowell, Massachusetts
Lowell Public Schools

PERKINS EASTMAN

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SKANSKA

TRANSMITTAL

Shipped via:
First class mail
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To:	Ms. Jennifer Flynn
Company:	Massachusetts School Building Authority
Address:	40 Broad Street, Suite 500, Boston, MA 02109
Date:	**February 20, 2019**
Project:	Lowell High School
Re:	*Schematic Report (SD Submission)*

We are sending:
- [x] Herewith
- [ ] Separate cover
- [ ] Plans
- [ ] Shop drawings
- [ ] Samples
- [ ] Specifications
- [ ] Brochures

These are transmitted:
- [ ] For approval
- [ ] For your information
- [ ] At your request
- [ ] For job use
- [ ] For estimate
- [ ] Approved
- [ ] Approved as noted
- [ ] Resubmission not required
- [ ] Resubmission required
- [ ] Disapproved-resubmit
- [ ]

Quantity	Drawing no.	Latest date	Description	Pages
1 Electronic file PDF	N/A		***Lowell High School*** SD Submission	
2 Hard Copies			***Lowell High School*** SD Submission	
			2 Binders	
			2 Sets of Schematic Drawings	
			2 Schematic Design Project Manuals	

If enclosures are not as listed above, kindly notify us at once.

Signature: Mary Ann Williams, Skanska USA Building, Inc. 617-293-6869

101 Seaport Blvd. Suite 200
Boston, MA 02210
Tel 617 574-1400
Fax 617 574-1399

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SKANSKA

Mary Ann Williams
Project Executive
Skanska USA Building Inc.
101 Seaport Boulevard, Suite 200
Boston, MA 02210

February 20, 2019

Ms. Jennifer Flynn, Project Coordinator
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

RE: Lowell High School – Schematic Design Submission

Dear Ms. Flynn,

Please accept this Schematic Design Submission for the Renovations and Additions to the Lowell High School (LHS) Project for consideration of approval by the MSBA at their April 10, 2019 Board of Directors meeting. Pursuant to Module 4-Schematic Design requirements and in accordance with Section 8.1.1.2 of the OPM Contract, we have reviewed and coordinated the materials associated with the enclosed Schematic Design Binder. We certify, that (1) Skanska USA Building, the OPM, has reviewed and coordinated the required materials; (2) the submittal is complete; (3) the Proposed Project as documented within the Schematic Design Submittal is within the District's budget; and (4) The City of Lowell and District has approved the materials for submission to the MSBA. To the best of our knowledge, that the information is accurate, complete and in full compliance with MSBA's requirements.

We further certify that the District approved the Schematic Design for submission to the MSBA at its February 7, 2019 School Building Committee meeting where there was a vote on the Schematic Design and Estimate for submission; and at the February 12, 2019 City Council meeting a vote on the Schematic Design and Estimate for submission**.** Enclosed are two hard copies and one CD of the Schematic Design Binder, Project Manual and Schematic Design Drawings. We look forward to the opportunity to meet with the MSBA team on this matter in the near future.

Please contact us should you have any questions or concerns regarding this submission.

Sincerely,

Skanska USA Building, Inc.
Mary Ann Williams
Project Executive

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ACKNOWLEDGEMENTS

We wish to thank the following individuals for their assistance and their contributions to this schematic design study:

State Delegation

Edward J. Kennedy, Jr., State Senator
Thomas Golden, State Representative
Rady Mom, State Representative
David Nangle, State Representative

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Vesna Noun, Vice Chair
Karen Cirillo, Councilor
David Conway, Councilor
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Jackie Doherty, Vice Chair, Member
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Lowell School Building Committee

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James Cook, Executive Director of the Lowell Plan
Maryann Ballotta, Director of Public Safety R&D
Jay Mason, Active Member of the Community
Maria Sheehy, Active Member of the Community
Ben Opara, Active Member of the Community
Jeffrey Wilson, Member of Lowell Commission on Disability

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D.E.S.E. Submittal
SECTION 4.1.1

Lowell High School, Lowell MA
MSBA Module 4 Schematic Design
PERKINS EASTMAN

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Mary Ann Williams
Project Executive
Skanska USA Building Inc.
101 Seaport Boulevard, Suite 200
Boston, MA 02210

February 20, 2019

Ms. Mary Pichetti
Director of Capital Planning
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, Massachusetts 02109

Dear Ms. Pichetti:

The District is pursuing execution of a Project Scope and Budget Agreement for the MSBA approved preferred schematic for the proposed **622,777** gross square foot Renovation/Additions to the existing **Lowell High School,** located in Lowell, Massachusetts. The siting of the new school additions will be located (after the demolition of 75 Arcand Drive and Lowell High School Gymnasium) adjacent to the existing high school on property owned by the **City of Lowell** on the same campus as the existing facility. The existing facility will serve the program needs during construction.

The District's 2018 enrollment is **15,437** students, Lowell High School 2018 enrollment is **3,136** Students. The design enrollment for the proposed school project is **3,520** per the executed design enrollment certification.

The existing Lowell High School currently serves grades **9 – 12** and is proposed to serve grades **9 -12.**

The date of the MSBA Board of Directors' meeting at which the District anticipates Board Approval of a Project Scope and Budget is **April 10, 2019**.

In accordance with G.L. c. 70 B, MSBA staff has assembled the documents required for the review of the special education program at Lowell High School. The following are attached per the 'Submittal Requirements':

1. A letter from Jeannine M. Durkin, Acting Superintendent of Schools, Lowell Public School District describing its special education program.
2. Proposed space summary that includes the existing facility, proposed spaces, and MSBA guidelines based on the agreed upon design enrollment. The first page of this summary indicates a total of **40,440** square feet of space dedicated to the delivery of special education.
3. The floor plans for the proposed **622,777** square foot Lowell High School.
4. A completed Special Education Adjacency Table

I have reviewed the attached documents and confirm that the District's School Building Committee has officially approved the attached submittal on **February 7, 2019** and verify that the space summary match the floor plan and is complete and conform to the MSBA requirements as described in Module 4 –

Schematic Design Guidelines. Additionally at the **February 14, 2019** City Council meeting, a vote was taken authorizing the Schematic Design for submission.

Please contact us should you have any questions or concerns regarding this submission.

Sincerely,

Skanska USA Building, Inc.
Mary Ann Williams
Project Executive

LOWELL PUBLIC SCHOOLS
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February 1, 2019

Matthew Deninger
Resource Allocation Strategy and Planning
Massachusetts Department of Elementary and Secondary Education
75 Pleasant Street
Malden, MA 02148

Dear Director Deninger,

Lowell Public Schools is committed to provide all of our students with the best possible education. In support of this goal, we recognize that some students require additional strategies and assistance in order to reach their full potential. This report will explain the programs and methodologies currently offered in Lowell and the impact that this new building will have on improving the educational experience of our students.

4B.2.1 Current Programs

The Lowell Public Schools provide services for students identified with disabilities in accordance with the Federal Individuals with Disabilities Act (IDEA) and State Regulations (603CMR 28.00). Every effort is made to ensure that all students are educated in the least restrictive environment (LRE) and in accordance with FAPE. As of the October 1, 2018 report, 17% of the students within the district were identified as having a disability.

Total Enrollment	SWD Total	SWD %	Number of Disability Types	Most Common	Student %	Second Most Common	Student %	Third Most Common	Student %
14,436	2,420	17%	11	Communication	19%	Autism	18%	Specific Learning	17%

Lowell Public School provides a continuum of special education services for students based on individual needs and team recommendations. These services may include, but are not limited to, specially designed instruction for academics, speech/language, occupational therapy, physical therapy, social skills, and study skills which are provided to maximize learning and development. The table below illustrates programs currently offered in the district, grade levels to whom they are provided, and the number of students served. It is important to note that we have had a significant rise in the number of students with autism over the past five (5) years, necessitating the addition of a day school for students with autism. The district also operates two additional day schools.

Grade	Student Total	SWD Total	SWD %	Full Inclusion	Partial Inclusion	Substantially Separate	Day School Placement	2014	2018	5 Year Change
All	14,590	2,420	17%	1,335	308	524	253	2,136	2,420	13%
PreK	560	206	37%	121	1	70	14	184	206	22
K	1,141	154	13%	94	5	41	14	118	154	36
1	1,199	169	14%	119	10	29	11	138	169	31
2	1,171	203	17%	147	11	40	5	166	203	37
3	1,293	202	16%	136	16	42	8	141	202	61
4	1,249	203	16%	128	17	47	11	180	203	23
5	1,210	226	19%	138	25	41	22	202	226	24
6	1,216	220	18%	128	35	42	15	195	220	25
7	1,038	185	18%	99	49	26	11	187	185	-2
8	1,124	186	17%	82	47	38	19	196	186	-10
9	868	125	14%	57	25	25	18	161	125	-36
10	825	103	12%	36	19	23	25	100	103	3
11	837	106	13%	31	21	19	35	67	106	39
12	811	84	10%	18	24	13	29	77	84	7
SP	48	48		1	3	28	16	24	48	24

Program	Grade Levels Serviced	Number of Elementary School Students	Number of Middle School Students	Number of High School Students
LEAP	PreK - SP	35	54	62
CSA	PreK - SP	229 (PreK-4)	64	16
Adjustment	K - SP	52	64	57
DEP	PreK - SP	14	9	2
CALL	PreK - SP	9	21	N/A
Vision	PreK - SP	21	6	5
Fundamentals	6 - SP	-	-	73

Life Skills, Education and Planning (LEAP) Program:

Elementary School: Morey PreK - 4
Middle School: Daley 5 - 8

PreK - 8:	Bartlett PreK - 8
High School:	Grade 9 - Age 22

The LEAP (Life Skills, Education, and Planning) program is designed for students with intellectual disabilities and commensurate deficits in adaptive functioning. The program is a five day per week program with extended school year services at the team's recommendation. The LEAP program provides students with a structured learning environment in a small group setting, encourages independence and allows for individual success. Classrooms are staffed with highly qualified teachers providing students with rigorous academic instruction. Instruction includes small group instruction as well as individualized instruction when needed. Classroom supports include a full time paraprofessional for each classroom, as well as access to: a Special Education Social Worker, Behavior Specialist or BCBA, and Occupational Therapists, Physical Therapists, and Speech Language Therapists as recommended by the educational team. The program is also supported by the building based team, which includes a Psychologist and Evaluation Team Chairperson. The LEAP program works to provide opportunities for inclusion with same aged general education peers. This is done through goal development and scaffolded support.

The Bartlett Community Partnership School, as well as our program at Lowell High School, provide access to Special Education Nurses. Our students who also demonstrate medical needs beyond which the general School Nurse can care for are placed in these buildings to ensure their healthcare needs are met, while remaining in an in-district placement.

The foundation of our LEAP program is centered and grounded on teaching procedures based upon the Principles of Applied Behavior Analysis (ABA). ABA is the science of human behavior. ABA seeks to find ways of increasing behavior necessary for success (such as independence in academic and social skills) while decreasing behavior which interferes with independence and learning.

ABA utilizes a variety of evidence-based interventions. Evidence-based interventions are treatments that have been proven effective through outcome evaluations. There evidence-based interventions that staff utilizes in our LEAP program include:

- Prompting Hierarchies
- Discrete Trial Training
- Functional Communication Training
- Positive Reinforcement
- Negative Reinforcement
- Extinction
  - Response Cost
  - Time-out

Goals of the Program:
The goal of the program is to educate and support students to become independent and successful learners in the least restrictive environment needed to meet their individual needs. Such supports will help students to develop increased independence in all areas

of life including: academics, adaptive functioning skills, recreation and leisure skills, and vocational skills. As such, students will be prepared for adult life as functioning members of society with as much independence as possible. Our middle and high school programs incorporate vocational training and community access skills as well.

Teaching Methodologies:
Based upon research and best practices, a range of strategies are utilized depending upon the individual needs of the student. Methodologies and practices are based on ABA and include, but are not limited to:

- Developmental Approaches
- Peer Modeling through Integration
- Most to Least Prompting Strategies
- Task Analysis for Personal Care and Play Skills
- Visual Prompting Strategies

Instructional Approach:
The program utilizes teaching strategies based on the individual needs of the student. Individual program books enable classroom staff members to collect data and monitor student progress towards attainment of IEP goals and objectives. The program focuses on several areas of instruction including:

- Functional Communication
- Social Skills
- Teaching of Play Skills
- Instruction of Pre-Academic and Academic Skills
- Addressing Problem Behavior through Positive, Proactive Approaches
- Functional Academics which Align with the Common Core Standards

Positive Behavior Supports:
Positive Behavioral Interventions and Supports are used to assist students in learning appropriate social behavior within the classroom and school community. The LEAP classrooms utilize behavior support systems that are designed with individual needs in mind based on interfering behavior. Approaches such as point systems and token economies are utilized as needed in addition to other individualized supports.

Classroom for Students with Autism (CSA) Program:

PreK /Elementary:	Bailey, Cardinal, Greenhalge, McAvinnue, Pawtucket Memorial, Pyne/Arts, Rogers, Shaughnessy, and Washington
Middle School:	Daley, Pyne/Arts, Robinson, and Sullivan
High School:	Grade 9 - Age 22

The Program for Children with Autism (CSA Program) is a full day, five-day per week program during the school year with extended year services available with the team's recommendation. Instruction takes place in a small, highly structured environment with integrated therapeutic instruction embedded within the curriculum with goals established through assessment and data collection to reflect the individual needs of students. The

program offers a small staff to student ratio in which students are taught using a combination of small group and individualized instruction. Related support services include Speech and Language Therapy, Occupational Therapy and Physical Therapy as recommended by the Educational Team. Related service providers, building based teams (Social Worker, Psychologist, ETC), BCBAs, District Behavior Specialists and the Autism Support Specialist collaborate with classroom staff to support the development and integration of skills throughout the school day.

The District Autism Support Specialist and the BCBA/District Behavior Specialists consult to our programs, attend IEP meetings, provide home support, and consult with parents and outside providers. They provide on-going staff training and in class support through modeling and coaching techniques.

Home component services may be provided using a consultation or direct in home service method. Staff work collaboratively with families to determine which method of home component services will best meet the needs of the family and student to provide the greatest benefit.

Instructional Approach:
The program utilizes teaching strategies based on the individual needs of the student coupled with evidenced based practices in the field of autism. Each child has their own developmental profile identifying strengths as well as skill deficits. Individual program books enable classroom staff members to collect data and monitor student progress toward IEP goals and objectives. Using an individualized approach, intervention is matched to the child's specific social, language, cognitive, sensory and motor patterns. The program focuses on the following six areas of intervention.

- Functional Spontaneous Communications
- Social Skills/Social Cognition Skills
- Teaching of Play Skills
- Instruction of Pre-Academic and Academic Skills
- Addressing Problem Behaviors through Positive Proactive Approaches
- Functional Academics which Align with the Common Core Standards

The primary focus will vary as the students develop and transition through the grade levels. Services are based on individual student need.

Teaching Methodology:
Based upon research and best practices, a range of strategies are utilized depending upon the individual needs of the student. Methodologies and practices include, but are not limited to the following:

- Developmental Approaches
- Positive Behavior Support
- Principles of Sensory Integration
- Peer Modeling through Integration
- Preparation for Transitions to Post Academic Skills
- Social Cognition Training

- Principles of Applied Behavioral Analysis

The foundation of our CSA Program incorporates the use of procedures based upon the Principles of Applied Behavior Analysis (ABA). ABA is the science of human behavior. ABA uses systematic teaching procedures to increase behavior necessary for success (such as independence in academic and social skills), while decreasing behavior which interferes with independence.

ABA utilizes a variety of evidence-based interventions. Evidence-based interventions are treatments that have been proven effective through single subject research designs and outcome evaluations. The evidence-based interventions that are utilized in our CSA Programs include:

- Prompting Hierarchies
- Discrete Trial Training
- Functional Communication Training
- Reinforcement
- Extinction

Adjustment Program:

Elementary School:	Murkland, Pawtucketville Memorial, Reilly
Middle School:	Butler, Stoklosa, Sullivan, Wang
High School:	Grade 9 - Age 22

The Adjustment Program provides students with a structured, safe, and consistent environment that incorporates a therapeutic approach to addressing the emotional and behavioral needs of the students. Each classroom is staffed with a highly qualified teacher, providing students with rigorous academic instruction. Classroom supports include a full-time Paraprofessional, Special Education Social Worker, and a Board Certified Behavior Analyst (BCBA). The program is also supported by the building-based team, which includes a Psychologist and Evaluation Team Chairperson. In addition to academic support, students receive direct and explicit social skills instruction provided by a Social Worker in addition to consultation from the BCBA.

The foundation of our Adjustment Program is centered and grounded on procedures based upon the Principles of Applied Behavior Analysis (ABA). ABA is the science of human behavior. ABA improves important behaviors, which are behaviors that are of social significance and are targeted to impact change.

Goals of the Program:
The goal of the program is to educate and support students to become independent and successful learners in the least restrictive environment needed to meet their individual needs. Such supports will help students to develop self-regulation, positive socialization, self-advocacy, and coping skills. Through the use of Positive Behavioral Interventions and Supports and the development of mutual respect, students experience academic success.

Positive Behavioral Interventions and Supports are used to assist students in learning appropriate social behavior within the classroom and school community. The classroom utilizes a behavior modification system that allows students to earn incentives by staying focused, completing all class assignments, and making positive choices throughout the school day. The program utilizes a point-chart system or a token economy system. In both systems, students are able to earn points/tokens for demonstrating expected behaviors or demonstrating the strategies that they are learning.

Teaching Methodologies:
Based upon research and best practices, a range of strategies are utilized depending upon the individual needs of the student. Methodologies and practices are based on ABA and include, but are not limited to:

- Direct Instruction
- Peer Modeling through Integration
- Most to Least Prompting Strategies
- Incidental Teaching
- Coaching and Modeling

Instructional Approach:
The program utilizes teaching strategies based on the individual needs of the student. Individual student data binders enable classroom staff members to collect data and monitor student progress toward IEP goals and objectives. The program focuses on several areas of instruction including:

- Functional Communication
- Social Skills
- Instruction of Pre-Academic and Academic Skills
- Addressing Problem Behavior through Positive, Proactive Approaches
- Academics which Align with the Common Core Standards

Deaf Education Program (DEP) Program:

Elementary School:	McAuliffe School K-4
Middle School:	Robinson School 5-8
High School:	Grade 9 - Age 22

The Deaf Education Program (DEP) program supports students with hearing loss in accessing the school curriculum in the least restrictive environment. The program supports students in the development of language and academic skills. The program works closely with regular education teachers, families and community resources to support the language choices that the families have made. Students are provided individual therapy to target language development and learn about hearing loss. Students in the DEP program are currently supported by two teachers of the Deaf and a Speech Language Pathologist.

CALL - Language Based Program:

Elementary School:	McAuliffe K - 4
Middle School:	Robinson 5 - 8
High School:	9 - 12

The CALL Program provides students with highly structured, specialized, explicit, multi-sensory instruction, as well as on-going guided practice aimed at remediating their specific areas of weakness. Each classroom is staffed with a highly qualified teacher providing students with rigorous academic instruction. Classroom supports include full-time Paraprofessionals, Special Education Social Workers, and Speech and language Therapists. The program is also supported by the building-based Special Education Team, which includes a Psychologist and an Evaluation Team Chairperson.
The foundation of the program is built upon research-based curriculum and teaching techniques that are geared toward students who, after being provided systematic and tiered instruction, continue to demonstrate significant difficulties in the understanding and use of spoken and written language. Language-based learning disabilities are a common cause of student's academic struggles as weak language skills impede comprehension and communication, which are the foundations for most school activities.

Goals of the Program:
The goal of the CALL program is to provide students with the supports needed to gain the skills to become effective and independent thinkers and learners in the least restrictive environment. Supports help students develop their listening, speaking, reading and writing skills to enable their participation in grade level curriculum.

Teaching Methodologies:
Based on research and best practices, a range of strategies are utilized depending upon the individual needs of the student. Methodologies and practices include, but are not limited to the following:

- Highly Structured, Direct, Explicit, and Systematic Approach to Instruction
- Guided Practice with Gradual Release to Independence
- Opportunities for Students to Experience Success
- Automatization through Practice and Review
- Providing Models of Expected Outcomes
- Use of Multiple Modalities to Teach
- Connecting New Information to Student Knowledge

Instructional Approach:
The program utilizes teaching strategies based on the individual needs of the student coupled with research-based practices in the field of Special Education. Staff collects data and monitor student progress toward IEP goals and objectives. The program focuses on several areas of instruction including, but not limited to the following:

- Reading Foundation Skills: Instruction in phonemic awareness, decoding, fluency, and spelling.

- Reading Comprehension Skills: Instruction in recognizing and retaining specific details, summarizing, inferential reasoning, analysis of text, making connections to prior knowledge, making predictions, and finding the main idea.
- Written and Oral Expression Skills: Instruction in the use of vocabulary, paraphrasing, thematic development, organization of thought, single and multi paragraph development, grammar, semantics and syntax.

Vision Program:

Elementary School: 21 students
Middle School: 6 students
High School: 5 students

The Vision Program supports students with visual impairment to access the school curriculum in the least restrictive environment that supports students in the development of language and academic skills. The program works closely with regular education teachers, families and community resources to maximize independence. Students are provided support from the teacher for the visually impaired, orientation and mobility specialist, one to one Paraprofessionals trained to support children with visual impairment, Speech Language Pathologist, Occupational Therapist and Physical Therapist.

Fundamentals Program:

High School: Grade 9 – Age 22

The Fundamentals Program includes a series of substantially separate classes taught by Special Education staff. The curriculum is based on the Massachusetts Curriculum Frameworks and Common Core Standards. The pacing and delivery of instruction is modified to address individual student needs. Special Education teachers collaborate with General Education teachers to ensure that their classes are in alignment. Students in this program are expected to participate in standard MCAS testing.

Day School Program:

Lowell Public Schools currently has 115 students (121 in-district) enrolled in out of district/day school placements. The district operates three public day schools: Adie, Laura Lee, and Leblanc. The district is also a member of the CREST collaborative and participates as non-members at Valley, LABB, TECH and SEEM.

Type of Programming	Number of Students
Adie Day School for Students with Autism	53
Leblanc Therapeutic Day School	47
Laura Lee Therapeutic Day School	24
Collaboratives	53
Private Day Schools	44

Residential Programming	18 (10 are Advisory and only pay the Day rate)

Deficiencies:
The classrooms in Lowell High School are utilitarian, self-contained and offer limited adjacency, which are equally institutional in feel and offer no supplemental space for learning. Additionally, the students do not have easy access to bathrooms in close proximity if not in their classes. Due to increased enrollment, the Job Prep and Life Skills areas will need to be expanded. The learning environment is hampered by poor ventilation, inconsistent heating, and no de-humidification.

Rooms assigned to Special Education Teachers as academic support rooms do not have the flexibility to support tiered approaches to learning and space assigned to related service providers (OT, PT, and Speech) is undersized and inadequate. Small group spaces, including alcoves that can be monitored, are needed to support flexible learning. Classrooms are also isolated from core academic classes in many cases.

As noted, a small number of students require more intensive related services, including an array of physical and/or occupational therapy, sensory support, and speech services. There is no room within the current facility to provide dedicated, appropriately sized space for these purposes. Also, there is not a dedicated motor room for those students who need those supports. Although the fitness room, should be able to provide some supports for gross motor therapy (OT/PT), the equipment is outdated and not designed to be adapted to meet the needs of students with a variety of handicaps. Furthermore, the students in the LEAP and CSA Programs attend school on a varying schedule as there is not enough space for drop off/pick up.

4B2.2 Proposed Program:

All current programs will remain in the proposed project, and we are planning to enhance them with the addition of adequate and flexible space. There is no planned elimination of programs. The number of Special Education students served in this proposed project is expected to grow within the LEAP and CSA Programs. No Special Education Programs are expected to be moved to different locations.

The last State Coordinated Program Review (CPR) was in 2018-2019. There were no areas of finding; therefore no corrective action plans were needed as related specifically to the high school. The staff participated in a review of programs and facilities during the NEASC accreditation process in 2015. The staff also participated in visioning sessions and focus groups in the planning of a new/renovated high school.

Life Education and Planning (LEAP) Program Classrooms (4):
Presently in the 1922 building at Lowell High School, one of the Life Skills' classrooms houses a cooking area and a laundry area. This room is also the classroom for a group of 18-22 year old students. The facilities provided should be accessible to the entire Special Education Program and not limited to only specific classes. Although the two (2) class periods per day that are free can be utilized, it does not afford students the amount of time required to learn the skills needed to successfully transition to adult independent living. The

proposal is to have separate space for the kitchens, laundry, mail room, copy center, and other job prep areas allowing staff to sign up for the rooms. The proposal also has shared hygiene space between rooms.

Intensive Classrooms (2):
The Intensive Needs' classrooms house our neediest students in terms of physical, medical, and cognitive needs. Each class must be full sized to allow for wheelchairs, standing apparatus, swings, etc. The classrooms also need to have full size sinks with running hot water to clean the tubing and machinery (food processors, blenders, etc.) used to prepare food and feed students. Presently, there is one small room attached to room 118 that serves as a sensory room for the students. It is small and presents an issue of movement on some days; a larger room, though not full size, would alleviate the jams that can be created. In terms of personal needs, the high school has three (3) changing bathrooms for our students. There is one (1) in the 1980 building (near the Nurse's Office) and two (2) in the 1922 building (ground level and first floor). Staff is required to take students out of the classrooms in order to change students. A changing room/bathroom connected to the classrooms is ideal. These bathrooms need toilet facilities with handicap bars, changing tables, sinks, and Hoyer lifts.

Classrooms for Students with Autism (CSA) Classrooms (8):
The classrooms for students with autism also require a full-size classroom to allow for movement space and planning stations for students. Even in high school, we continue the process of toilet training some of our students so an attached single bathroom in each classroom is ideal. Presently, our 18-22 year old class has an attached bathroom. At times students need to be able to access a quiet area that is adjacent to the classroom. Currently, one (1) classroom has a separate backroom, which has been utilized consistently and effectively while in the other class there are partitions to allow for such a break space in the room. Based on the district student projections, LHS needs to add classrooms for students who require additional support in an environment that can address their specific needs that contain quiet spaces and easy access to bathroom facilities.

Adaptive PE (2):
Lowell High School services a diverse population of students, which includes students with disabilities that require a specialized program such as LEAP and CSA. All students need to learn about exercise, participate in exercise and adopt an active lifestyle. Some students are at greater risk for being sedentary and experiencing related health problems, therefore, LHS wants to ensure all students have appropriate access to physical education supports. The policy of the American Academy of Pediatrics Council on School Health (Active Healthy Living, 2006) states that physical education and other school-based physical activity opportunities are as important to a student's long-term productivity as are academics.

The importance of the public school in supporting increased physical activity levels for students with disabilities cannot be overstated. The facilities, staff, programming, and equipment required needs to be identified through collaboration between a certified adaptive physical education (PE) teacher, physical therapist, and teachers. Primary considerations include accessibility, adapted equipment, safety concerns for all students,

and the range of student abilities within a class. Adaptive PE activities warrant a large open area with tall space that should be able to accommodate twelve students in wheelchairs or other apparatus to participate in activities including: volleyball, basketball, floor hockey, etc. It is important to note that planning for storage of loose movable equipment is essential.

Students in the Intensive Special Needs Life Skills Program have complex medical and physical needs. They require highly specialized equipment and adequate space to accommodate the equipment including their wheelchairs. The students with complex medical needs, significant physical disabilities, and sensory processing deficits need daily access to a separate sensory motor room that is specifically designed to stimulate the senses of hearing, vision and touch and is a place for students to work on cause and effect through switch use as well as meaningful functional movement using equipment, such as, gait trainers, therapy platform mats, and hand-cycles. It would be optimal that acoustics be controlled in the space with an operable hard wall and overhead treatment.

We believe that it is important to have the adaptive PE program connected to the gymnasium space to ensure that these students feel that they are a part of the high school and engaging in the same types of activities of students outside their program. In some activities and uses, the partition-wall would remain open and connected to the gymnasium. In summary, considerations for meeting a subset of the needs of students with disabilities at LHS should include:

- Accessibility and inclusion in physical education.
- Adaptive equipment for participation in the physical education curriculum.
- A certified Adaptive Physical Education Teacher.
- A large Sensory Motor Room designed to accommodate positioning equipment in order to immerse the students in a multisensory environment and provide opportunities for meaningful functional movement and sensory stimulation.

Adjustment Program (8):
The Adjustment Program offers supports to students who have an emotional disability and require specially designed instruction. There is a full time Social Worker associated with the program to provide direct student support and case management. Presently, the Social Worker is housed central to those classrooms and has a two (2)-room suite to both counsel and provide students space as needed. This type of arrangement needs to continue in order to afford the students the services they require. Additionally, the classrooms need to be large to ensure the students have adequate space and the ability to work independently as needed.

Fundamental Program (10 half + 1 suite):
One of the course offerings in the Fundamentals Program is the Instructional Support Class, which services well over one hundred (100) students. In this class, we presently work on transitional skills, self-determination skills, and largely on academics from other classes. These subject area classes are using Google Classroom and students are regularly accessing information on Aspen. In order to provide optimal programming, a large classroom (larger than the average size) that can house up to 10-12 computers for students to regularly access would be required. Our Instructional Support (IS) Classroom -

solely dedicated to this class- presently houses as many as 12-16 students with 4 computers each. In order for student to have immediate access to the computer systems to complete their work or check in on their progress/work, additional computer stations would be required. In order to meet needs, we need a large space with many computers and study carrels for students to use when they require a separate testing location per their IEP. Due to current restrictions, it is difficult to acquire quiet space for students to work independently or take assessments. In addition, shelving is critical as the IS center should house textbooks from each class, as well as, space for every student to have an individualized binder to track their work and transitional planning.

Deaf Education Program (DEP) (1):
The DEP Program is presently housed at the Freshman Academy. It requires a half (½) size classroom with the typical classroom needs (i.e. whiteboard, computer, etc.).

The students follow a regular schedule with an Interpreter in general education classes or Special Education classes. For one or two periods per day, students are in a substantially separate classroom to address sign language acquisition and other study skills as outlined in the students' IEP.

Related Services:
Presently housed in two (2) smaller rooms in the back of a classroom (#305), the Speech and Language Pathologist, SLP-A, Occupational Therapist and Physical Therapist require office space, as well as, a teaching space. A half (½) size classroom would be sufficient for the teaching space, but an office area cannot be housed in the same location as student service delivery without a divider.

Administrative Needs:
The Special Education administrative team at LHS consists of the following: two (2) Evaluation Team Chairpersons (ETC), One (1) Social Worker (in addition to one (1) Adjustment Social Worker), two (2) Evaluators, two (2) Psychologists, one (1) BCBA, one (1) Department Chair and one (1) Clerk. The staff requires office space, meeting rooms and testing rooms to ensure a high functioning Special Education Team. As a frame of reference, the teams hold over 400 meetings a year so adequate conference room space is essential.

4B.2.3 Specialized Programs:

All specialized Special Education Programs have already been outlined in previous sections. In addition to the programs offered at LHS, the district operates three public day schools: Adie, Laura Lee, and Leblanc. The district is also a member of the CREST collaborative and participates as non-members at Valley, LABB, TECH and SEEM. All of the collaborative and district day school programs have their own space and will not be accessing additional space within LHS.

The District neither provides nor participates in any other alternative education programs. The district does have an alterative high school program, The Career Academy, however, it

is anticipated that the program will remain in its current location and not be included in the new high school.

The District offers Early Childhood Programing throughout the district. There are intergreated and substantially separate classrooms in many of the elementary schools in addition to an Early Childhood Center. Peer models have access to the programs and all students requiring Special Education supports are able to receive services as determined by their Individual Education Program (IEP).

This high school project does not include Pre-K or Early Childhood Special Education Programs. No other programs will need to be accommodated in this proposed project.

In conclusion, we remain committed to providing the highest quality education for all of our students and firmly believe that this building will enhance the education experience for all involved.

Very Truly Yours,

Jeannine Durkin
Acting Superintendent
Education

Marianne Busteed
Head of Schools

Jennifer McCrystal
Director of Special

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED: Existing to Remain/Renovated			PROPOSED: New			PROPOSED: Total				MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**136,088**			**114,400**			**47,870**			**162,270**	reduced 2,690 per relocations			**169,040**	
(List classrooms of different sizes separately)																	
	746	4	2,983														
	809	6	4,851														
	850	12	10,197														
	948	3	2,844														
	1,024	2	2,048														
Classroom - Freshmen SubTotal	849	27	Averaged	0	0	0	900	33	29,700	**900**	**33**	**29,700**	(8E,8S,8M,4W,1H,4EII)				
	592	2	1,184	800	6	4,800			0	**800**	**6**	**4,800**	(3E,3S)				
	724	33	23,903	850	18	15,300			0	**850**	**18**	**15,300**	(5E,5S,3M,1W,3H,1EII)				
	808	15	12,114	875	10	8,750			0	**875**	**10**	**8,750**	(6M,4EII)				
	850	18	15,301	900	3	2,700	900	3	2,700	**900**	**6**	**5,400**	(3M,3H)				
	898	10	8,975	950	27	25,650			0	**950**	**27**	**25,650**	(3E,3S,6M,10W,5EII)				
	964	7	6,749	975	6	5,850			0	**975**	**6**	**5,850**	(3E,3S)				
	992	8	7,936	1,000	6	6,000			0	**1,000**	**6**	**6,000**	(3E,3S)				
	1,017	1	1,017			0			0			**0**					
	1,184	1	1,184			0			0			**0**					
Classroom - Gr. 10-12 SubTotal	825	95	Averaged	909	76	Averaged	900	3	Averaged	**908**	**79**	**Averaged**	(17E,17S,18M,11WL,6H,10EII)				
Total Classroom - General		122			76			36			**112**			850	120	102,000	825 SF min - 950 SF max
Teacher Planning - Freshman	493	1	493			0	400	4	1,600	**400**	**4**	**1,600**					
Tchr Plng (Tch-Out, Lng, Ktch, Comp, Copy)	604	8	4,834	400	15	6,000			0	**400**	**15**	**6,000**	(6hum,6stm,1W,1H,1EII)				
Dept Off's (Eng, SS, Mth, Sci, WL/ELL, Instr)	112	6	671			0	150	5	750	**150**	**5**	**750**					
Teacher Develop/Training (Little Thtr + Cntrl)	3,568	1	3,568	3,650	1	3,650			0	**3,650**	**1**	**3,650**					
Total Teacher Planning		16			16			9			**25**			100	120	12,000	
Small Group Seminar (20-30 seats)				450	6	2,700			0	**450**	**6**	**2,700**	(1E,1S,2M,1W,1E	500	8	4,000	
Science Classroom / Lab - Freshman	978	7	6,849	0	0	0	1,440	8	11,520	**1,440**	**8**	**11,520**	(8frshmn)				
Science Classroom / Lab - Gr.10-12	900	19	17,100	1,440	20	28,800	0	0	0	**1,440**	**20**	**28,800**	(8chm,7bio,2bio/chm,4env,1micro,1bio-t,1hlth)				
Total Science Classroom / Lab		26			20			8			**28**			1,440	31	44,640	3 x85% ut=20 Seats-1 per /day/student
Prep Room	156	7	1,091	350	11	3,850	400	4	1,600	**363**	**15**	**5,450**		200	31	6,200	
Central Chemical Storage Rm				350	1	350			0	**350**	**1**	**350**		200	1	200	
Unassigned Green House/Growing Room	196	1	196						0	part of prep rooms above							
Clean Room (w/ Micro/Bio Tech Lab)									0	part of prep rooms above							
SPECIAL EDUCATION			**21,845**			**25,550**			**14,850**			**40,400**	increased 1,450 per relocations			**34,240**	
Self-Contained SPED														950	24	22,800	825-950 SF equal to surrounding classrooms
Self-Contained SPED Toilet														60	24	1,440	
Resource Room														500	10	5,000	1/2 size Genl. Clrm.
Small Group Room														500	10	5,000	1/2 size Genl. Clrm.
LIFE SKILLS (69 stu's =78 prorated)																	
Life Skills CRs (2 ages +Kitch/Laund/Mail)	968	4	3,870	1,200	4	4,800			0	**1,200**	**4**	**4,800**					
Life Skills Hygene (Wash/Changing Room)				225	2	450			0	**225**	**2**	**450**					
Life Skills Intensive CR +Tlt (2 age grps)	872	2	1,744	950	2	1,900			0	**950**	**2**	**1,900**					
Life Skills Sensory/Deescalation Room	344	1	344	375	2	750			0	**375**	**2**	**750**	(450+300)				
Life Skills (CSA) Autism CR + Tlt & Quiet	816	2	1,632	1,050	6	6,300	950	2	1,900	**1,025**	**8**	**8,200**					
Life Skills - AdaptivePE / Sensory-Motor						0	3,000	2	6,000	**3,000**	**2**	**6,000**					
ADJUSTMENTS (40 stu's =46 prorated)																	
Adjustments CR	738	7	5,169	950	4	3,800	950	4	3,800	**950**	**8**	**7,600**					
Adjust Social Worker	165	1	165	0	0	0	150	1	150	**150**	**1**	**150**					
Counseling Room				0	0	0	200	1	200	**200**	**1**	**200**					
Storage				0	0	0	100	1	100	**100**	**1**	**100**					
FUNDAMNTL (190 stu's =214 prorated)																	
Fundamentals - Freshman	810	2	1,619			0	450	4	1,800	**450**	**4**	**1,800**					
Fundamentals - Gr.10-12	545	7	3,812	450	4	1,800	450	2	900	**450**	**6**	**2,700**					
Fundamentals Instruct. Support CR (for 24+)				1,900	1	1,900			0	**1,900**	**1**	**1,900**					
OTHER SPECIAL NEEDS																	
OT/PT (part-time)										therapy occurs in CRs							
Deaf/Hearing Impared Suite	1,066	1	1,066	600	1	600			0	**600**	**1**	**600**					
Speech & OT/PT (Office for 3 + mtgs for 6)	178	3	534	450	1	450			0	**450**	**1**	**450**					
Psych + Evaluators/Testing (BCBA in rms)	299	2	598	150	4	600			0	**150**	**4**	**600**					
Social Worker	189	1	189	200	1	200			0	**200**	**1**	**200**					
PALS Mentoring Office/Conf	161	2	321							part of soc worker							
SPED Dept Chair	241	1	241	250	1	250			0	**250**	**1**	**250**					
SPED Eval Team Chair (for 2)	237	1	237	250	1	250			0	**250**	**1**	**250**					
SPED Office (Clerk/Waiting/Files)	304	1	304	300	1	300			0	**300**	**1**	**300**					
Conference (for 6, 12 & 20)				400	3	1,200			0	**400**	**3**	**1,200**	(600+450+150)				

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ART & MUSIC			**19,851**			**17,700**			**0**			**17,700**			**13,075**	
Art CR (incl. Photo/Anim, Graph, TV Prod)	1,301	6	7,803	1,350	6	8,100			0	**1,350**	**6**	**8,100**	1,200	6	7,200	Assumed use - 25% Population - 5 times/week
Art Workroom w/ Storage (kiln incl. in rm)	370	4	1,482	900	1	900			0	**900**	**1**	**900**	150	6	900	
Band - 50 - 100 seats	2,791	1	2,791	2,000	1	2,000			0	**2,000**	**1**	**2,000**	1,500	1	1,500	Assumed use - 25% Population - 5 times/week
Chorus - 50 - 100 seats (incl. Drama)	2,652	1	2,652	1,500	1	1,500			0	**1,500**	**1**	**1,500**	1,500	1	1,500	
Dance (also uses stage)	866	1	866	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Dance (changing)											incl. in rooms					
Ensemble						0			0		**0**	**0**	200	1	200	
Piano/Digital Lab	1,186	1	1,186	1,000	1	1,000			0	**1,000**	**1**	**1,000**				
Music Practice (incl. Guitar)	81	3	244	375	1	375			0	**375**	**1**	**375**	75	17	1,275	
Music Storage	256	7	1,789	200	5	1,000			0	**200**	**5**	**1,000**	500	1	500	
Fine Arts Dept Office	155	1	155	125	1	125			0	**125**	**1**	**125**				
Music Admin - Conf/ Off	183	4	731	300	1	300			0	**300**	**1**	**300**				
Dark Room	152	1	152			0			0		**0**	**0**				
VOCATIONS & TECHNOLOGY			**28,533**			**20,755**			**14,860**			**35,615**			**38,400**	
ROTC Classroom/PT (385 stu = 434 prorated)	955	4	3,819	900	5	4,500			0	**900**	**5**	**4,500**	5th Rm req'd @ 351			
Culinary Arts Classroom	1,163	2	2,325	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Business (Accounting/Pers-Finance/Law)	869	2	1,738			0	1,200	2	2,400	**1,200**	**2**	**2,400**				
Business (Mktg/Sports Mktg) **CH.74**	994	2	1,987								incl. below		Ch.74 calc's **NOT** in MSBA totals			Exist 281stu in 14.5sect 5x/wk of 35p cyc at 85% =2.4rms
Business (Retail Mktg - CR) **CH.74**	812	1	812			0	1,200	3	3,600	**1,200**	**3**	**3,600**	FTE	SF/stu.	SF Reg's	Adjust to 316 in 15.5sect x5/wk of 35p cyc at 85% =2.6 rms
Business (Retail Mktg - Store) **CH.74**	532	1	532								incl. above		**60**	**110**	**6,600**	20:1 stu/tchr ratio (2200sf min, 12' clear), 3 rm capacity = 60
Tech Clrm. - (E.G. Drafting, Business)		12			7						**12**		1,200	12	14,400	Assumed use - 50% Population - 5 times/week
ROTC MP/Gym w/ Stor (Drills/Band)	755	1	755			0	2,500	1	2,500	**2,500**	**1**	**2,500**				
Culinary Arts Kitch + Restaurant (for 25-30)	2,494	1	2,494	2,975	1	2,975			0	**2,975**	**1**	**2,975**				
Costume Shop w/ Sewing, Storage	727	1	727	1,440	1	1,440			0	**1,440**	**1**	**1,440**				
Scene Shop	future conversion of storage above			1,440	1	1,440			0	**1,440**	**1**	**1,440**				
TV Studio (w/ cntrl, edit/scrn, off/wait, equip)	3,882	1	3,882	4,000	1	4,000			0	**4,000**	**1**	**4,000**				
Robotics/CADD (w/ Engnr)	1,577	1	1,577			0	1,440	2	2,880	**1,440**	**2**	**2,880**				
Clean Enegry Lab (w/ Engnr)	1,577	1	1,577			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Maker Space (w/ Freshman Integr. Sci)	1,512	1	1,512			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Business (Bank/Credit Union)	287	1	287			0	400	1	400	**400**	**1**	**400**				
Tech Shop - (E.G. Consumer, Wood)		8			4			6			**10**		2,000	12	24,000	Assumed use - 50% Population - 5 times/week
ROTC Off/ Conf.	788	2	1,576	800	2	1,600			0	**800**	**2**	**1,600**				
ROTC Storage (4sf/cadet + mock weapons)	254	7	1,779	1,800	1	1,800			0	**1,800**	**1**	**1,800**	434x4 =1736+64			
Culinary Arts Storage	216	2	432	300	2	600			0	**300**	**2**	**600**				
Scene and Costume Storage	722	1	722						0		incl. in rooms					
Retail/Store Storage						0	200	1	200	**200**	**1**	**200**				
HEALTH & PHYSICAL EDUCATION			**46,121**			**0**			**41,600**			**41,600**	reduced 100		**35,912**	
Gymnasium (6 lane 134.1m trck, LJ, TJ, SP)	28,408	1	28,408			0	3,000	6	18,000	**3,000**	**6**	**18,000**		12,000	1	12,000	
PE Alternatives (Wrestling 42x84 req'd)	1,960	1	1,960			0	3,400	1	3,400	**3,400**	**1**	**3,400**	size correction	3,000	1	3,000	
Fitness & Functional Strngth	1,474	2	2,948			0	1,500	2	3,000	**1,500**	**2**	**3,000**				
Multi-Purpose (Gymnastics/Yoga/Cheering)	currently off-site					0	3,000	1	3,000	**3,000**	**1**	**3,000**				
Gym Storeroom (incl. Gymnastics w/ MP)	1,133	1	1,133			0	700	2	1,400	**700**	**2**	**1,400**	(500+900)	300	1	300	
Locker Rooms - Boys / Girls w/ Toilets	3,245	2	6,490			0	3,600	2	7,200	**3,600**	**2**	**7,200**		19,712	1	19,712	5.6 sf/student total
Varsity Lockers - Boys/ Girls w/ Toilets	870	2	1,740			0	800	3	2,400	**800**	**3**	**2,400**				
Phys. Ed. Storage (incl. Equip)	258	5	1,292			0	500	3	1,500	**500**	**3**	**1,500**	(750+500+250)	500	1	500	
Athletic Director's Office (Lord 1st fl -South)	185	1	185			0	150	1	150	**150**	**1**	**150**		150	1	150	
AD Secr, Bursor, Conf (Lord 1st fl - South)	155	3	464			0	150	3	450	**150**	**3**	**450**				
Health Instructor's Office w/ Shower & Toilet	170	5	852			0	125	4	500	**125**	**4**	**500**		250	1	250	
Trainers Room	216	3	649			0	600	1	600	**600**	**1**	**600**				
MEDIA CENTER			**13,164**			**13,100**			**8,800**			**21,900**			**21,900**	
Media Center / Reading Room	9,137	1	9,137	10,700	1	10,700	5,950	1	5,950	**8,325**	**2**	**16,650**		21,900	1	21,900	
Comp. Lab (tech ctr/trng lab incl. instr sp)	666	3	1,998	950	2	1,900	800	2	1,600	**875**	**4**	**3,500**				
Copy Center						0	800	1	800	**800**	**1**	**800**				
Data Processing + Scheduler	1,036	1	1,036			0	450	1	450	**450**	**1**	**450**				
Small Group				300	1	300			0	**300**	**1**	**300**				
MCAS/Testing Stor (incl instr specialist)	993	1	993	100	2	200			0	**100**	**2**	**200**				
AUDITORIUM / DRAMA			**20,192**			**15,500**			**0**			**15,500**	reduced 41sf		**10,400**	
Auditorium	11,600	1	11,600	11,600	1	11,600			0	**11,600**	**1**	**11,600**		7,500	1	7,500	2/3 Enrollment @ 10 SF/Seat - 750 seats MAX
Stage	2,600	1	2,600	2,600	1	2,600			0	**2,600**	**1**	**2,600**		1,600	1	1,600	
Auditorium Storage (incl Prop Storage)	598	2	1,196	166.7	3	500			0	**167**	**3**	**500**	(200+150+150)	500	1	500	
Make-up / Dressing Rooms				300	2	600			0	**300**	**2**	**600**		300	2	600	
Controls / Lighting / Projection	233	1	233	200	1	200			0	**200**	**1**	**200**		200	1	200	
Theater - Freshman	3,438	1	3,438													
Stage - Freshman	691	1	691													
Dressing/Storage	217	2	434													

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED										MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total							
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
DINING & FOOD SERVICE			**21,955**			**1,130**			**24,050**			**25,180**				**25,180**	
Cafeteria - Freshman	4,215	1	4,215			0	5,000	1	5,000	**5,000**	**1**	**5,000**					
Cafeteria / Student Lounge / Break-out	10,408	1	10,408			0	12,600	1	12,600	**12,600**	**1**	**12,600**		17,600	1	17,600	3 seatings - 15SF per seat
Chair / Table Storage	156	1	156			0	630	1	630	**630**	**1**	**630**		1,030	1	1,030	
Scramble Serving Area	2,486	1	2,486			0	1,800	1	1,800	**1,800**	**1**	**1,800**		600	1	600	
Kitchen - Freshman	466	1	466			0	1,800	1	1,800	**1,800**	**1**	**1,800**					
Kitchen	3,553	1	3,553			0	2,220	1	2,220	**2,220**	**1**	**2,220**		4,820	1	4,820	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	671	1	671	1,130	1	1,130			0	**1,130**	**1**	**1,130**		1,130	1	1,130	20 SF/Occupant
MEDICAL			**2,215**			**2,610**			**0**			**2,610**				**2,610**	
Medical Suite Toilet	62	2	124	65	4	260			0	**65**	**4**	**260**		60	1	60	
Nurses' Office / Waiting Room	217	2	434	550	1	550			0	**550**	**1**	**550**		250	1	250	
Interview Room				112.5	8	900			0	**112.5**	**8**	**900**		100	8	800	
Examination Room / Resting	103	8	820	800	1	800			0	**800**	**1**	**800**		100	15	1,500	
Medical Suite Toilet - Freshman	47	1	47								**0**	**0**					
Nurses' Office - Freshman	126	1	126								**0**	**0**					
Exam / Resting - Freshman	332	2	664								**0**	**0**					
Mother's Room				50	2	100			0	**50**	**2**	**100**					
ADMINISTRATION & GUIDANCE			**17,459**			**10,932**			**3,873**			**14,805**	increased 250			**10,685**	
General Office / Waiting Room / Toilet	231	1	231	300	1	300			0	**300**	**1**	**300**		1,760	1	1,760	
Teachers' Mail and Time Room	138	1	138	250	1	250			0	**250**	**1**	**250**		100	1	100	
Duplicating Room	178	2	355	200	1	200			0	**200**	**1**	**200**		200	1	200	
Records Room	58	2	115	200	1	200			0	**200**	**1**	**200**		200	1	200	
Principal's Office w/ Conference Area	305	1	305	375	1	375			0	**375**	**1**	**375**		375	1	375	
Principal's Secretary / Waiting	268	1	268	125	1	125			0	**125**	**1**	**125**		125	1	125	
Asst Principal's Office - AP1 (Discipl/Oper)	280	1	280	200	1	200			0	**200**	**1**	**200**		150	1	150	
Asst Principal's Office - AP2 (Dir.ofCurric)	541	1	541	200	1	200			0	**200**	**1**	**200**		150	7	1,050	
Supervisory / Spare Office (Accts Payable)	137	1	137	120	1	120			0	**120**	**1**	**120**		120	1	120	
Conference Room (Administration)	284	3	853	450	1	450			0	**450**	**1**	**450**		450	1	450	
Freshman Office / Waiting Rm / Tlt	793	1	793			0	200	1	200	**200**	**1**	**200**					
Principal's Office w/ Conf Area - Freshman	206	1	206			0	150	1	150	**150**	**1**	**150**					
Conference Room - Freshman	175	1	175			0	200	1	200	**200**	**1**	**200**					
Guidance Office - Freshman	187	3	562			0	150	3	450	**150**	**3**	**450**	3rd office req'd				
Social Worker Office - Freshman	129	1	129			0	150	1	150	**150**	**1**	**150**					
Guidance Waiting Room - Freshman	559	1	559				100	1	100	**100**	**1**	**100**					
Guidance Storeroom - Freshman	124	1	124				100	1	100	**100**	**1**	**100**					
Records Room - Freshman							93	1	93	**93**	**1**	**93**					
Kitchenette - Freshman	200	1	200			0	100	1	100	**100**	**1**	**100**					
House Office / Waiting Rm / Tlt (B,C,D,E)	509	3	1,527	293	4	1,172			0	**293**	**4**	**1,172**					
Asst Principal's Office (B,C,D,E)	265	4	1,058	150	4	600			0	**150**	**4**	**600**					
Guidance Office (B,C,D,E)	152	8	1,219	150	8	1,200			0	**150**	**8**	**1,200**		150	18	2,700	
Social Worker Office (B,C,D,E)	169	4	676	150	4	600			0	**150**	**4**	**600**					
Guidance Waiting Room - C House	292	1	292	100	4	400			0	**100**	**4**	**400**		100	1	100	
Guidance Storeroom				100	4	400			0	**100**	**4**	**400**		100	1	100	
Career Center	677	2	1,354			0	1,030	1	1,030	**1,030**	**1**	**1,030**		1,030	1	1,030	
Records Room	77	1	77			0			0	combined w/ House Office				465	1	465	
Student Support Offices - Freshman	115	2	229			0	150	1	150	**150**	**1**	**150**					
Student Support Conf. - Freshman	230	1	230			0	200	1	200	**200**	**1**	**200**					
Sudent Support Suite (incl. Safe Harbors)	1,183	1	1,183	1,200	1	1,200			0	**1,200**	**1**	**1,200**					
Student Support Offices - Gr.10-12	85	3	256	150	3	450			0	**150**	**3**	**450**					
Student Support Conf. Gr.10-12	140	1	140	150	1	150			0	**150**	**1**	**150**					
Dir of Students	278	1	278	200	1	200			0	**200**	**1**	**200**					
ELL Dept Head + Testing	81	2	161	120	2	240			0	**120**	**2**	**240**					
Teachers' Work Room - Freshman	386	2	772	250	4	1,000	250	1	250	**250**	**5**	**1,250**		1,760	1	1,760	
Trio - Gear Up/Talent/Upward - Freshman	473	1	473	900	1	900	700	1	700	**1,600**	**2**	**1,600**	+100 per location				
Trio - Upward	579	1	579							included above							
Trio - Suite (recept, wait, 2 offices, conf)	197	5	984							included above							
CUSTODIAL & MAINTENANCE			**6,775**			**2,010**			**3,580**			**5,590**	increased 150			**4,265**	
Custodian's Office + Lockers	77	3	232			0				combined w/ Recv'g/Supply				150	1	150	
Custodian's Workshop	525	1	525			0				combined w/ Recv'g/Supply				250	1	250	
Custodian's Storage	72	26	1,884			0				combined w/ Recv'g/Supply				375	1	375	
Recycling Room / Trash	85	1	85			0	400	1	400	**400**	**1**	**400**		400	1	400	
Receiving and General Supply	84	1	84			0	2,580	1	2,580	**2,580**	**1**	**2,580**		1,030	1	1,030	
Storeroom + Books	220	11	2,417	173	9	1,560	75	4	300	**143**	**13**	**1,860**	3*300+100,2*105,	1,860	1	1,860	
Network / Telecom Room	86	18	1,548	56	8	450	43	7	300	**50**	**15**	**750**	11*50, 2*25, 2*75	200	1	200	
OTHER			**24,875**			**5,150**			**150**			**5,300**				**0**	

Proposed Space Summary - High Schools v23

Date: 2/20/2019 **Schematic Design Submittal**

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
Unassigned Computer Lab - Freshman	868	2	1,736													
Unassigned Computer Lab - Gr.10-12	960	7	6,721													
Unassigned Science Lab - Freshman	1,385	1	1,385													
Unassigned Green House/Growing Room	207	2	413													
Spare Off, Wait, Conf (220A,B,C)	185	3	556													
Lowell Comm Hlth Center	608	1	608	1,500	1	1,500			0	**1,500**	**1**	**1,500**				
Lowell Comm Hlth Center - Exam	80	3	241							included above						
Lowell Comm Hlth Center - Office	103	2	205							included above						
Lowell Comm Hlth Center - File and Storage	146	3	437							included above						
Lowell Comm Hlth Center - Toilet	72	1	72							included above						
Catie's Closet - Freshman	225	1	225	800	1	800			0	**800**	**1**	**800**				
Catie's Closet - Gr.10-12	364	1	364							included above						
In School Suspension - Freshman	809	1	809	600	1	600				**600**	**1**	**600**				
In House Detention Gr.10-12	969	1	969	800	1	800			0	**800**	**1**	**800**				
Score Mediation (Office, Entry, Stor)	132	3	395	150	2	300				**150**	**2**	**300**				
Interactive Learning Center + Storage	995	1	995							use typ CRs/laptops						
Latino Connection	228	1	228	250	1	250				**250**	**1**	**250**				
Student Activities (Lord 1st fl - North)	284	1	284	300	1	300				**300**	**1**	**300**				
Substitute Teacher's Office	127	1	127			0	150	1	150	**150**	**1**	**150**				
Conseling Services	occurs in available space									use typ CRs/other space						
DARE Office & Security	233	3	700	150	2	300			0	**150**	**2**	**300**				
SRO Office & Entry (Lord 1st fl - North)	129	2	258	150	2	300			0	**150**	**2**	**300**				
Pool - 25 yd/8 lane (60'w x75'l, 10'clr +5'end)	6,895	1	6,895													
Pool + Towel Storage = Laundry	63	4	252													
Total Building Net Floor Area (NFA)			**359,072**			**228,837**			**159,633**			**388,470**	reduced 981sf per above notes		**365,707**	
Proposed Student Capacity / Enrollment			3,125									**3,520**			**3,520**	157
NON-PROGRAMMED SPACES					% of GFA	**159,426**		% of GFA	**74,882**		% of GFA	**234,308**				
Other Occupied Rooms (Mother's)					0%			0%			0%	100				Non-Programmed space areas are
Unoccupied MEP/FP Spaces					0%			0%			1%	8,447				Design Development Submittal
Rooms					0%			0%			0%	855				60% Construction Documents
Toilet Rooms					0%			0%			2%	11,707				90% Construction Documents
Circulation (corridors, stairs, ramps & elevators)					0%			0%			22%	136,009				Final Construction Documents
Remaining[3]					41%	**159,426**		32%	**74,882**		12%	**77,190**				
Total Building Gross Floor Area (GFA)[2]			**614,353**	was 628.6k per SOI		388,263			234,515			**622,778**	reduced 5,780sf per bldg scan		**552,640**	Note: MSBA does not incl. Ch.74 calc's
Grossing factor (GFA/NFA)			**1.71**			**1.70**			**1.47**			**1.60**			**1.51**	

[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

[3] **Remaining** Includes exterior walls, interior partitions, chases, and other areas not listed above. Do not calculate this area, it is assumed to equal the difference between the Total Building Gross Floor Area and area not accounted for above.

Architect Certification

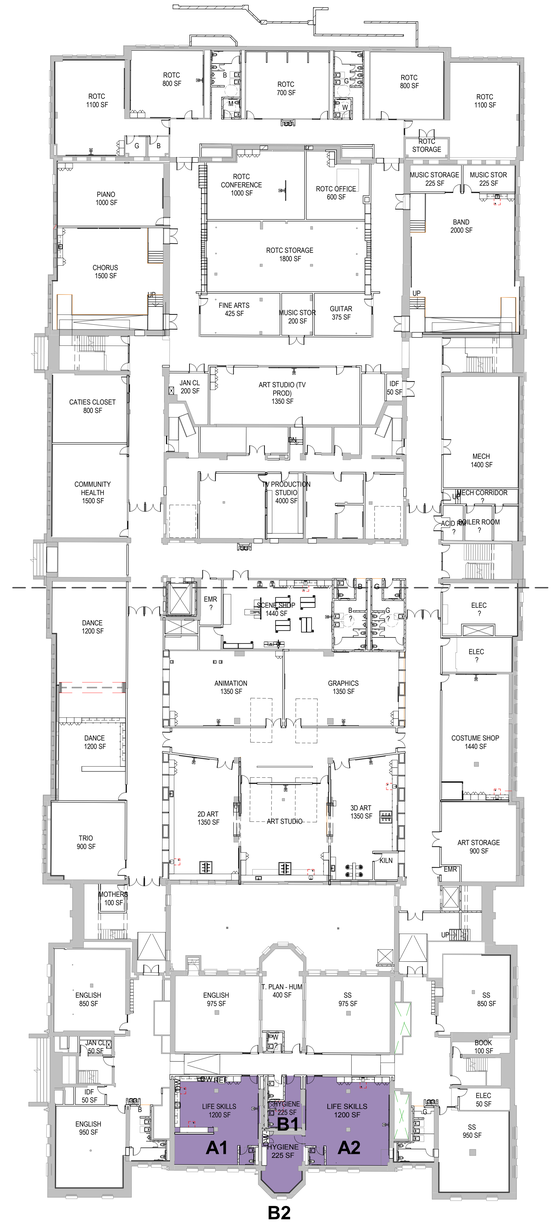
I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architect Firm: **Perkins Eastman / DPC**

Name of Principal Architect: **Robert Bell**

Signature of Principal Architect:

Date: **20th February 2019**

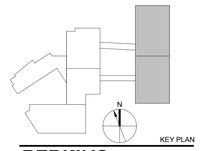


1 **DESE - BASEMENT**

3/64" = 1'-0"

NO. DATE ISSUE

SEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:

155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:

LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:

BASEMENT FLOOR PLAN

SCALE: 3/64" = 1'-0"

DESE-00

SCHEMATIC DESIGN SUBMISSION

02/20/2018

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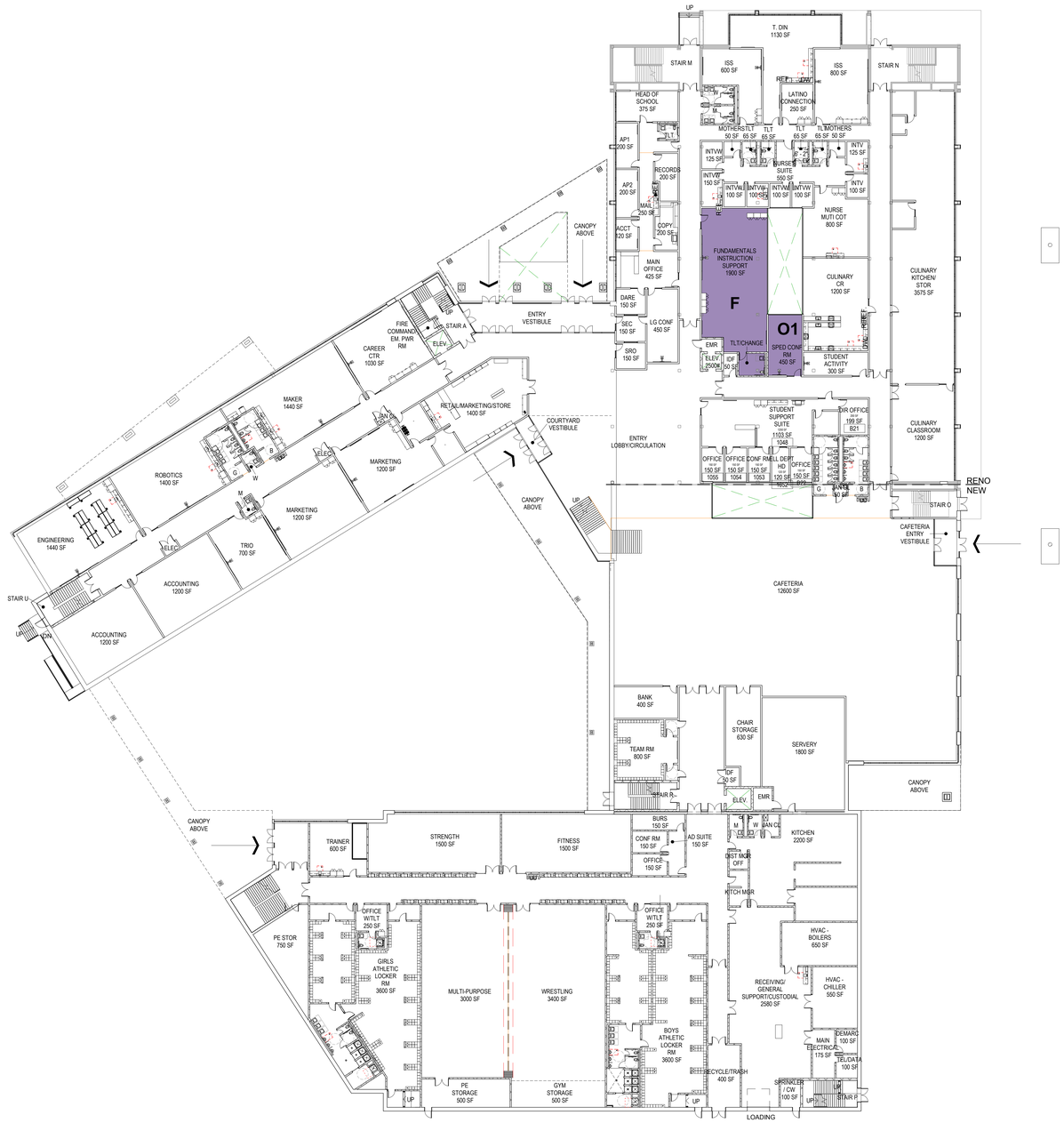

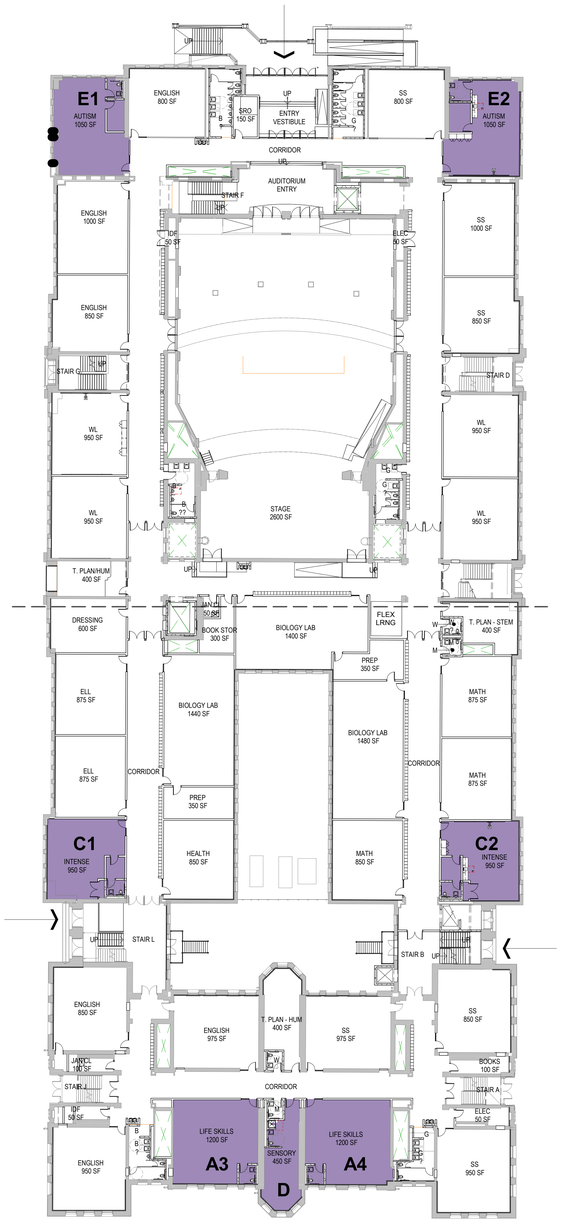

1 **DESE - FIRST FLOOR**
3/64" = 1'-0"

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NO.	DATE	ISSUE

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PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR PLAN

SCALE: 3/64" = 1'-0"

DESE-01

SCHEMATIC DESIGN SUBMISSION

02/20/2018

1 **DESE - SECOND FLOOR**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

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PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SECOND FLOOR PLAN

SCALE: 3/64" = 1'-0"

DESE-02

SCHEMATIC DESIGN SUBMISSION

02/20/2018

1 **DESE - THIRD FLOOR**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

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PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
THIRD FLOOR PLAN

SCALE: 3/64" = 1'-0"

DESE-03

SCHEMATIC DESIGN SUBMISSION

02/20/2018

2 **DESE - FIFTH FLOOR**
3/64" = 1'-0"

1 **DESE - FOURTH FLOOR**
3/64" = 1'-0"

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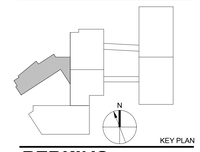
NO.	DATE	ISSUE

SEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FOURTH & FIFTH FLOOR PLANS

SCALE: 3/64" = 1'-0"

DESE-04

SCHEMATIC DESIGN SUBMISSION

02/20/2018

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20-Feb-19

MSBA Guidelines Space	MSBA Guidelines SF	Proposed Room Name	Floor Plan Designation (A-Z)	Proposed SF	Proposed Space Description and Reasoning for Adjacencies
Basement					
*Unique to District	-	Life Skills (LEAP) Classooms	**A1 & 2**	2400	(2) 1200sf classrooms for **14-17yr old students** who engage in academic and domestic learning activities. Rooms are paired to function as a suite of domestic life environments, including cooking, laundry, sleeping, living and mail with access to hygene space. Students also engage in a variety of jobs, including use of the Laundry, Copy Center and Retail.
*Unique to District	-	Life Skills (LEAP) Hygene	**B1 & 2**	450	(2) 225sf toilet/shower wash rooms sized for student with assistants and large mobility equipment. Hygene rooms are directly connected to Life Skills or accessed from the corridor for use by other SPED programs
Floor 1					
*Unique to District	-	Life Skills (LEAP) Classooms	**A3 & 4**	2400	(2) 1200sf classrooms for **18-22yr old students** who engage in academic and domestic learning activities. Rooms are paired to function as a suite of domestic life environments, including cooking, laundry, sleeping, living and mail with access to hygene space. Students also engage in a variety of jobs, including use of the Laundry, Copy Center and Retail.
Self-Contained Sped	950	Life Skills (LEAP) Intensive	**C1 & 2**	1900	(2) 950sf classrooms with toilet rooms, each for up to 10 students with significant mobility equipment needs. The classoom requires overhead beams/hooks and toilet room needs a Hoyer-style lift and separate changing table. The Intensive room needs nearby access to the Sensory Space and would benefit from nearby hygene
Small Group Room/ Reading	500	Sensory Space	**D**	450	Pull-our space for up to 8 students, with mats, bean-bags, specialty lighting and controls and a sound-system. This needs to be connected or nearby Intensive Rooms
Self-Contained Sped	950	Autism (CSA)	**E1 & 2**	2100	(2) 1050sf classrooms for 8 students each; **14-17yr olds**. Classrooms need to be located in 'quiet corners' of the school and need space within for movement, a quiet area and toilet room (still potty training).
*Unique to District	-	Fundamentals Instruct. Support	**F**	1900	This room is set-up for multi-class tutoring and support, accommodating as much as 22 students with multiple teachers and many resources, including a 'learning career enrichment center.' This room can be located independently, but somewhat central to all students.
*Unique to District	-	Conference	**O1**	450	This is one of three Special Education Conference spaces of varied size; this one for 12 and used for a variety of small group, testing, IEP conferences, and meetings
Floor 2					
Self-Contained Sped	950	Autism (CSA)	**E3 & 4**	2100	(2) 1050sf classrooms for 8 students each; for **18-22yr olds**. Classrooms need to be located in 'quiet corners' of the school and need space within for movement, a quiet area and toilet room (still potty training).
Small Group Room/ Reading	500	Fundamentals Classroom	**G1 & 2**	900	(2) 450sf half classrooms, typically for 8, but sometimes up to 12 students. These rooms should be dispersed with general academic classrooms, but ideally in groups of 2 for dual support and long-term flexibility on creating full-size classrooms
Self-Contained Sped	950	Adjustments	**H1 to 5**	4750	(5) 950sf classrooms for 12 students each, having emotional or behavioral disabilities. Rooms are set up similar to general classrooms, with 1:1 work space. The rooms are ideally clustered in proximity to each other for good communication and located in pairs for dual assistance when needed, adjacent stairwells for shorter travel in/out and nearby House Admin areas for proximity to Social Workers and Counselors. De-escalation space should be located nearby
*Unique to District	-	Adaptive PE	**I**	6000	(2) 3000sf stations are provided and scheduled for students with disabilities to participate in large group exercise and fitness activities, including volleyball, basketball, floor hockey, trikes and scooters. The majority of the space should be open floor (gym), with ancillary space for fixed or specialized equipment and storage. This space should be connected to the general gymnasium to provide an inclusive amosphere, but allow for sub-division and separation
*Unique to District	-	Adjustments Counseling	**J**	200	The Adjustments Program has a dedicated Social Worker. The work space is set-up as a 3-room suite with Counseling space for 8-10, co-located with Social Worker Office and Storage. The suite needs to be located central to Adjustments Classrooms
*Unique to District	-	Adjustments Social Worker	**K**	150	The Adjustments Program has a dedicated Social Worker. The work space is set-up as a 3-room suite with the Social Worker Office co-located with Counseling space and Storage. The suite needs to be located central to Adjustments Classrooms
*Unique to District	-	Adjustments Storage	**L**	100	The Adjustments Program has a dedicated Social Worker. The work space is set-up as a 3-room suite with Storage co-located with the Social Worker Office and Counseling space. The suite needs to be located central to Adjustments Classrooms
*Unique to District	-	Speech & Language (SPL)/OT	**M**	450	The Speech and Language (SPL) therapist requires a half-classroom size space for teaching 6-8 students with an assistant, a meeting space for 6 and a little space for Occupational Therapist and Physical Therapist to do work. The room would be beneficially located with the Special Education Administration Team
*Unique to District	-	SPED Office	**N**	300	The Special Education Administrative team includes an office/waiting space with a clerk. The office is to be part of a suite that includes the Dept Chair, Social Worker, Psych/Testing, Evaluators, Conference.
*Unique to District	-	Conference	**O2**	600	This is one of three Special Education Conference spaces of varied size; this one for 20 and used for a variety of small group, testing, IEP conferences, and meetings

*Unique to District	-	Evaluators	**P**	250	2 Evaluation Team Chairpersons (ETC) share one office and are part of the Special Education Admin team and to be co-located within the designiated administration suite. The ETC's need access to nearby Testing space
*Unique to District	-	Psych/Testing	**Q1 to 4**	600	(4) 150sf offices are provided for 2 Psychologists and 2 Evaluator Testing spaces. These spaces are part of the Special Education team and to be co-located within the Special Education Admin suite.
*Unique to District	-	Social Worker	**R**	200	1 Social Worker (in addition to the Adjustments Social Worker) is part of the Special Education team and to be co-located within the Special Education Admin suite. The office is sized for office and meeting space for 4-6
*Unique to District	-	Department Chair	**S**	250	The Department Chair is part of the Special Education team and to be co-located within the Special Education Admin suite. The office is sized for office and meeting space for 4-6
Floor 3					
Self-Contained Sped	950	Autism (CSA)	**E5 & 6**	2100	(2) 1050sf classrooms for 8 students each; **18-22 yr olds**. Classrooms need to be located in 'quiet corners' of the school and need space within for movement, a quiet area and toilet room (still potty training).
Small Group Room/ Reading	500	Fundamentals Classroom	**G3 to 10**	3600	(8) 450sf half classrooms, typically for 8, but sometimes up to 12 students. These rooms should be dispersed with general academic classrooms, but ideally in groups of 2 for dual support and long-term flexibility on creating full-size classrooms
Self-Contained Sped	950	Adjustments	**H6 to 8**	2850	(3) 950sf classrooms for 12 students each, having emotional or behavioral disabilities. Rooms are set up similar to general classrooms, with 1:1 work space. The rooms are ideally clustered in proximity to each other for good communication and located in pairs for dual assistance when needed, adjacent stairwells for shorter travel in/out and nearby House Admin areas for proximity to Social Workers and Counselors. De-escalation space should be located nearby
*Unique to District	-	Conference	**O3**	150	This is one of three Special Education Conference spaces of varied size; this one for 6 and used for a variety of small group, testing, IEP conferences, and meetings
*Unique to District	-	De-Escalation	**T**	300	This is a pull-out space for students needing to calm or de-escalate from emotional or behavioral issues. It is to be located central ro Adjustments Classrooms.
*Unique to District	-	Deaf (DHOH)	**U**	600	This is a half-classroom type space. It can be located independently, but should be somewhat central for all students.
Floor 4					
Self-Contained Sped	950	Autism (CSA)	**E7**	950	Classroom is for 8 **students age 14-17**. Classrooms need to be located in 'quiet corners' of the school and need space within for movement, a quiet area and toilet room (still potty training).
Floor 5					
Self-Contained Sped	950	Autism (CSA)	**E8**	950	Classroom is for 8 **students age 14-17**. Classrooms need to be located in 'quiet corners' of the school and need space within for movement, a quiet area and toilet room (still potty training).
			Total	40,400	

Square Footage Summary:

The proposed overall gross square footage of the new building is xx; Average square feet of General Classrooms is xx

MSBA guidelines include x,xxx net square feet of dedicated special education space. The proposed program is x,xxx nsf below/in excess of the guidelines.

***Indicates that space is unique to District's program and does not appear in MSBA space guidelines.**

Schematic Design Binder
SECTION 4.1.2

Lowell High School, Lowell MA
MSBA Module 4 Schematic Design
PERKINS EASTMAN

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4.1.2.A – INTRODUCTION

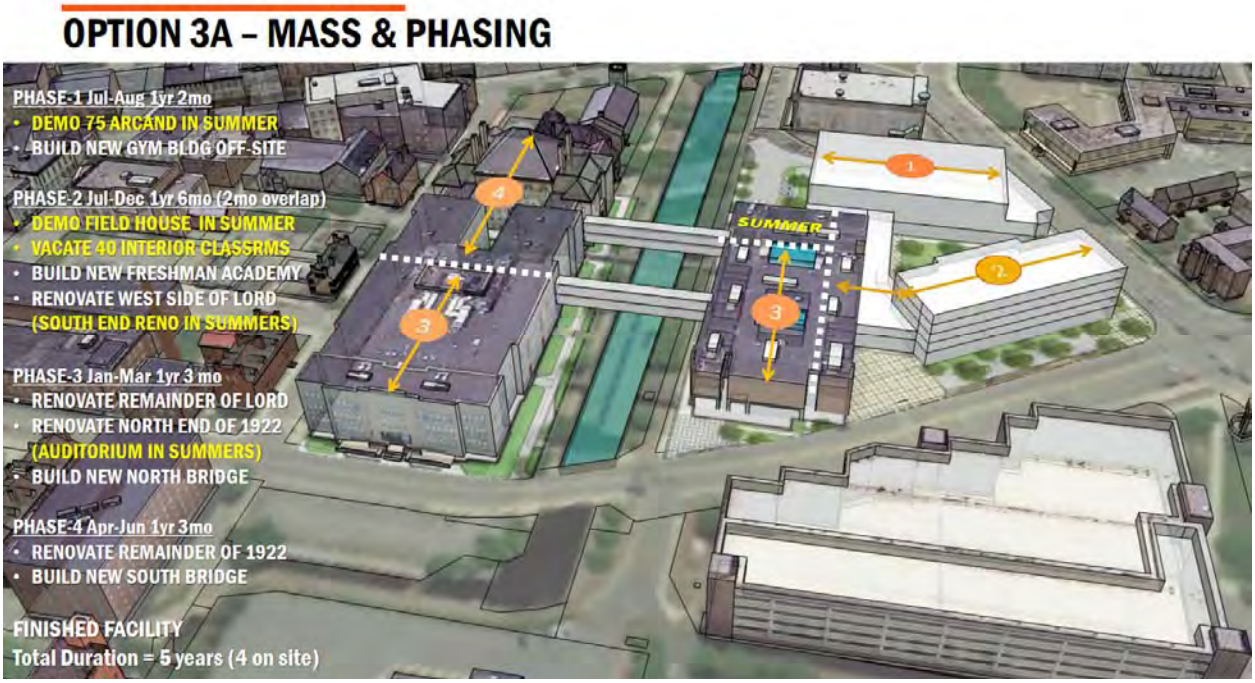
SUMMARY OF PREFERRED SOLUTION

The Preferred Option addresses virtually all the educational and community objectives for the City of Lowell. The change from the Cawley site to Downtown addressed the concerns about both traffic and downtown connectivity of many members of the school and community.

The Preferred Solution is an Addition/Renovation project that constructs a new gymnasium building on an adjacent property behind the fully occupied and operational Lowell High School (refer to section 3.3.3 B for a detailed description of construction impact). Once complete, the current gymnasium will be removed and a new five-story addition will be constructed in the current gymnasium location parallel to Father Morissette Blvd which will serve as swing space throughout the duration of construction. Phased occupied renovation will then occur throughout the balance two existing buildings, in turn, through the duration of the project.

The new 5-story Freshman Academy has good solar orientation for the new academic classrooms. A "heart of the school" will be created on the west campus to connect the main entry/lobby to the cafeteria with views and connections to both the existing canal as well as the Quad. The building is organized around clear community/large activity areas vs academic zones, which helps to separate the building acoustically. The Gym and Cafeteria are close to the west campus main entry and can be easily accessed by the Community and Visitors. The Auditorium is just off the east building's main entry lobby and it will also be available for public and community events. Both east and west main entries will be safe and secure; staffed with a School Resource Officer.

The four general classroom floors of the freshman academy wing are organized around a cluster of classrooms and special education space with a central, shared flexible learning area. The flexible learning serves as an identifying space for each cluster and offers good visibility among the rooms.



COMMUNITY PROCESS OVERVIEW

The Lowell School Building Committee (SBC) has conducted public meetings to review the project throughout the Schematic Design phase, which began with the May 9, 2018, FAS Meeting and MSBA Board approval on June 27, 2018. The Lowell High School project was openly discussed and votes were taken to confirm project scope, educational program and key design decisions throughout the process.

School Building Committee Meeting Schedule at Lowell City Hall

- Thursday September 6, 2018
- Thursday October 4, 2018
- Thursday November 1, 2018
- Thursday December 6, 2018
- Thursday, February 7, 2019: SD Submission and Total Project Budget Presentation

Additional Meetings for Lowell – Module 4 Execution Schedule:

Educational Leadership Team (ELT/Working Group/City) Meetings

- August 14, 2018: ELT review of plan refinements
- August 30, 2018: Discussion on exterior materials/massing
- September 11, 2018: Outline sustainability priorities
- September 25, 2018: Discuss building systems & interior materials
- October 4, 2018: City Manager Overview Meeting

- October 9, 2018: Landscape Architecture Meetings with City Staff (Steve Stowell)
- October 9, 2018: Landscape Architecture Meetings with City Staff (Trolley and Capital Improvement Projects)
- October 9, 2018: Landscape Architecture Meetings with City Staff (Traffic)
- October 9, 2018: Landscape Architecture Meetings with City Staff (NPS)
- October 18, 2018: LHS Project Meeting with Nitsch Engineering
- October 29, 2018: National Grid Meeting
- October 29, 2018: Site and Mechanical Systems
- November 7, 2018: LHS Faculty Focus Group
- November 7, 2018: SD Review w/ Inspectional Services/Fire/Police/Traffic
- November 15, 2018: Historic Meeting (Steve Stowell, Peter Aucella) to review the updated PNF
- November 15, 2018: Planning Dept meeting update on design status, and any variances that would be required for parking etc.; "Site Plan Review" meeting for SD.
- November 15, 2018: City of Lowell – DPD
- December 10, 2018: Security Meeting
- January 10, 2019: City Manager Overview Meeting
- January 22, 2019: City Council Design Presentation
- February 14, 2019: City Council SD Submission and Total Project Budget Presentation

LHS Focus Group Meetings

- September 18, 2018: LHS Focus 1
- December 6, 2018: LHS Focus 2

Agenda: Presentation of Schematic Design, Estimates and Budget review.

The School Building Committee voted to recommend approval to the City Council. The City Council authorized the OPM to submit the Schematic Design related submittals to the MSBA by February 20, 2019.

District Activities included:

- Issued news releases prior to every presentation
- Generated newspaper articles on the building project
- Made calls and sent emails to students, parents, community members, business leaders, and alumni
- Posted building committee agendas, minutes, and other documents on the school's website

DISTRICT'S TOTAL PROJECT BUDGET & STEPS TO LOCAL FUNDING

During the Schematic Design phase, the SBC voted to recommend approval a Project Budget of $343,399,220. Perkins Eastman and Skanska have worked to develop the overall building square footage to 622,777 GSF and the total construction cost to approximately $270.5 Million (Building Permit waived) for a Total Project Cost of $343,399,220.

The City Council is planning for a vote to be held on April 23, 2019.

UPDATED DESCRIPTION OF THE PROJECT

The proposed Lowell High School project currently in schematic design is an addition/renovation to the existing campus. It does not include reuse of the existing Freshman Academy building or the existing Steam Plant, currently used by Lowell High School. These facilities will be turned over to the City of Lowell for a use to be determined.

Lowell High School (LHS) currently educates over 3,100 students in grades nine through twelve (9 – 12). The high school reflects the great diversity of the City of Lowell with students representing over 50 countries from all over the world. LHS provides a comprehensive high school offering of programs for all Lowell Public School students in grade 9 – 12, as well as ROTC, and Culinary Arts. The facility also houses city-wide services programmed for the students including a community health center, bank, CCTV, DARE, UP, and a thrift shop.

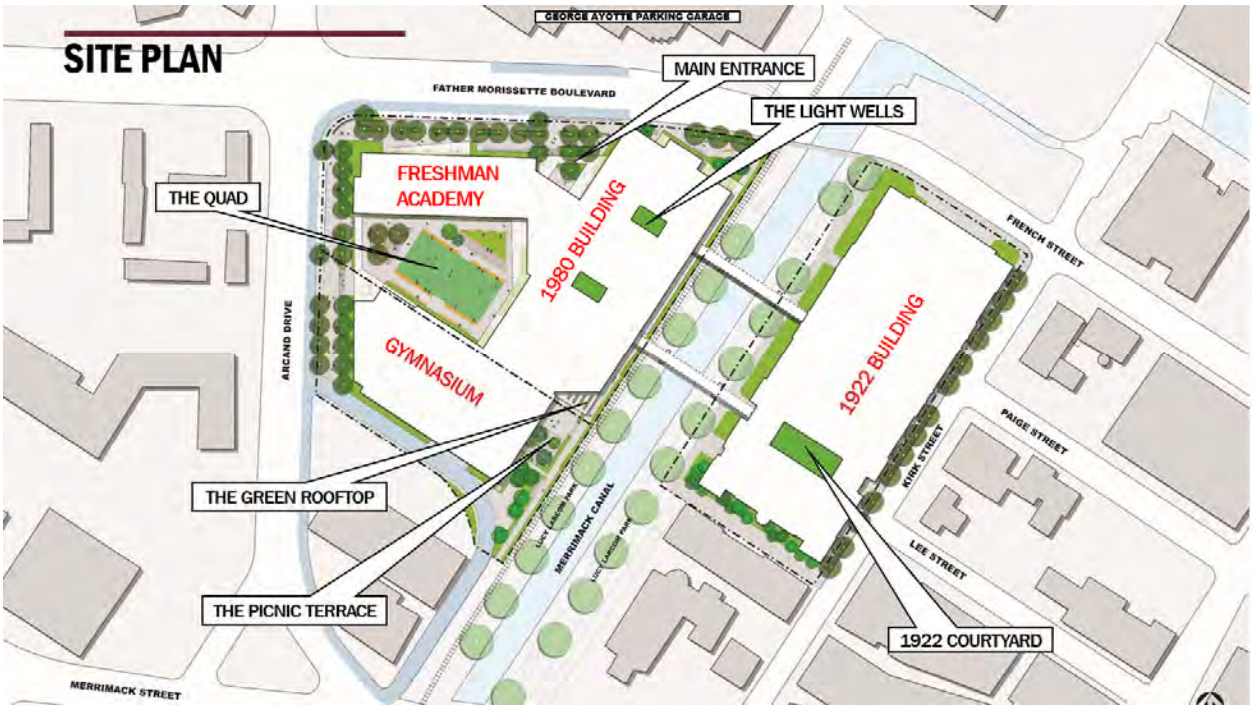
The existing Lowell High School complex consists of the following components: The original high school building of 1892 with additions from 1922 and 1997 (collectively referred to as the "1922 Building") and two structures added to the complex in 1980 (the Lord and Field House buildings collectively referred to as the 1980's Building) located across the canal from the original high school and connected to the 1922 Building with pedestrian bridges. The attached schematic design document refers to all renovated existing and new construction on the west side of the canal as the "West Building" and the renovated 1922 building as the "East Building".

There is a city owned parking garage across Father Morissette Boulevard that serves both staff and students. Visitors to the school utilize on street metered parking. There are approximately 3 onsite parking spaces. There are a number of paved courtyards and walks adjacent to the main entrance and the cafeteria. The Merrimack canal runs between the 1922 building on the east side and the Lord Building and Field House on the west side of the canal. The space between is landscaped on each side and provides for a pleasant urban park-like atmosphere. There is also a Trolley for tourist and visitors to the Lowell Historic Park that parallels the west side of the canal and further divides and separates the main campus. There are two connecting enclosed bridges at the second floor that span the trolley tracks and the canal to accommodate pedestrian traffic between the two buildings. The constrained site does not provide for any outside athletic or physical education opportunities, with the exception of a small irregular shaped green space adjacent to the city parking garage which is used for outside physical education classes.

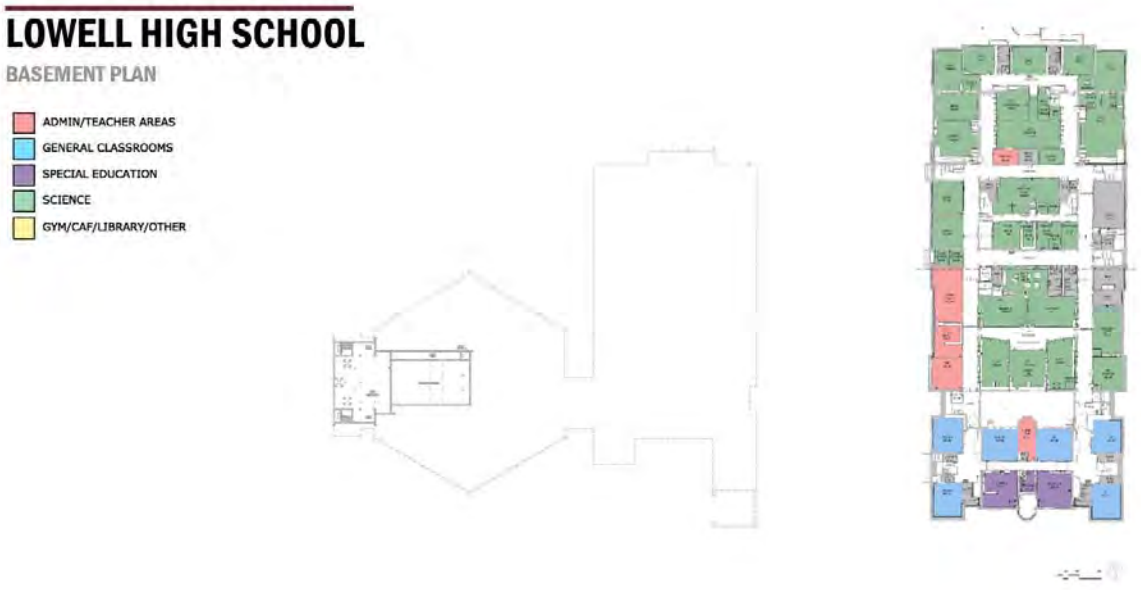
The proposed project entails exterior and interior renovations to the existing 1922 Building and the West Building, as well as the demolition of the two existing one-story bridges, and construction of two new one-story bridges to connect the West and 1922 Buildings. An adjacent lot, 75 Arcand Drive, is being added to the high school property. The existing Field House, and the existing Medical Office building at 75 Arcand Drive, will be fully demolished and a portions of the 1980's building will also be demolished. The proposed additions to the remaining portion of the 1980 building will include: a new main entry, a new Gymnasium Wing, a new 5-story Freshman Academy, and a new southern end to the West Building where it connects to the new Gymnasium.

IMAGES OF THE DISTRICT'S PREFERRED SOLUTION

SITE PLAN



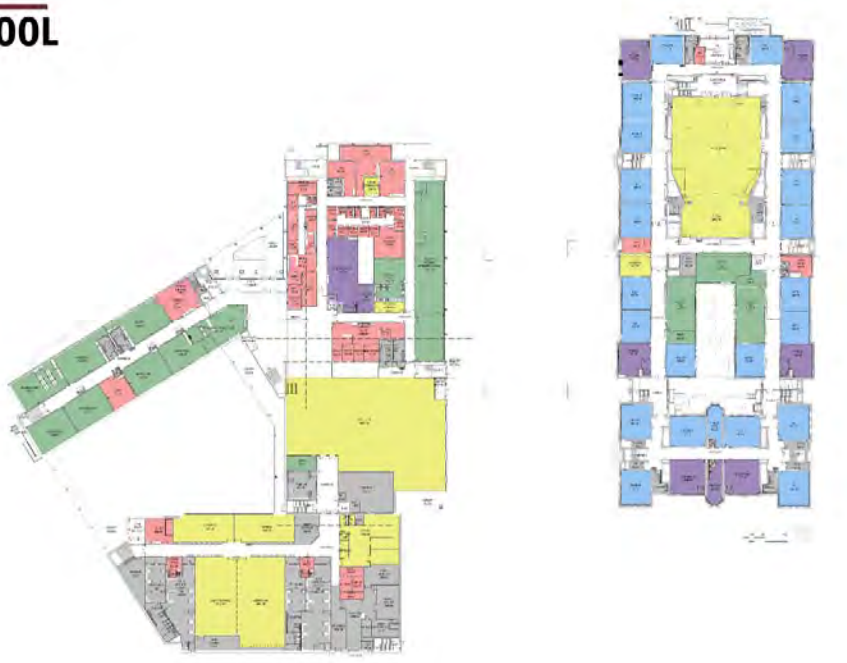
FLOOR PLANS



LOWELL HIGH SCHOOL

LEVEL 1 PLAN

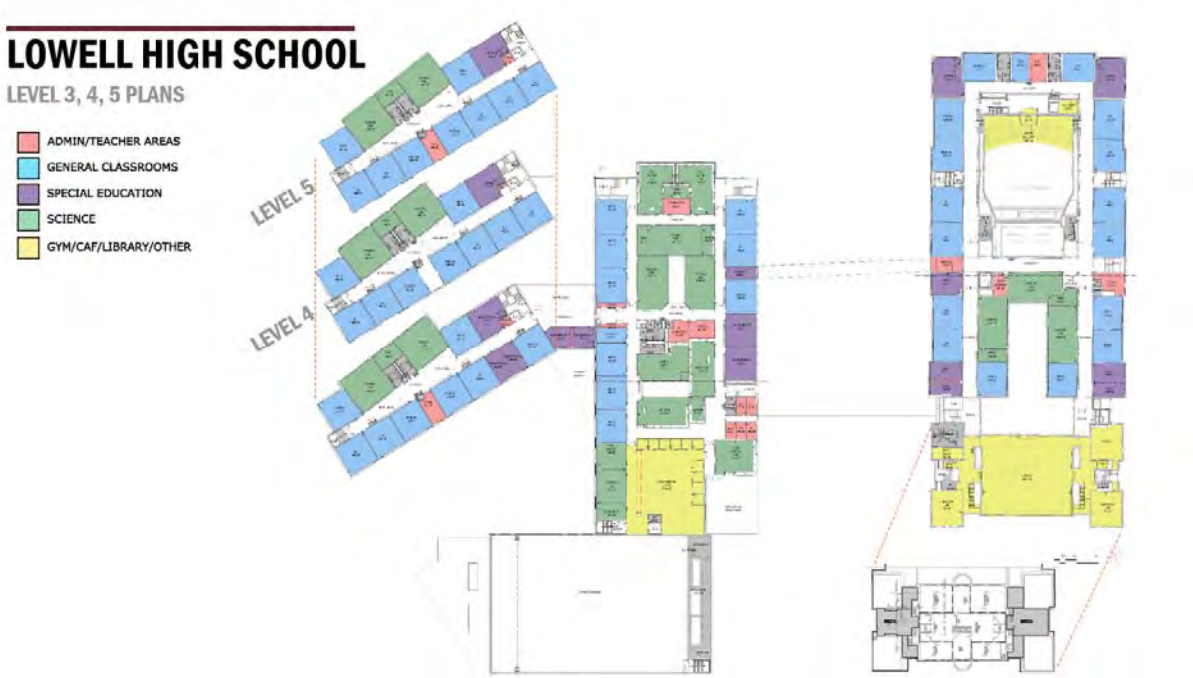
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



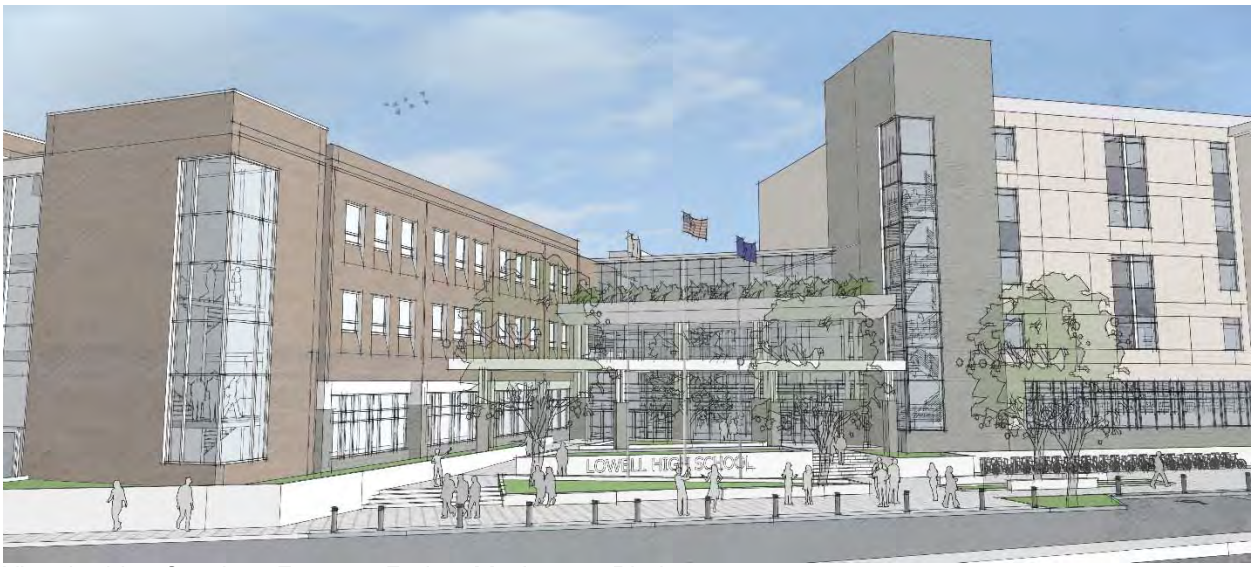
LOWELL HIGH SCHOOL

LEVEL 2 PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



PERSPECTIVES



View looking South at Entry on Father Morissette Blvd.

View looking East on Father Morissette Blvd

View Looking East toward the Quad from Arcand Drive

View looking North on Arcand Drive

Perspective looking North- West Campus on left, East Campus on right

COPY OF PREFERRED SCHEMATIC REPORT REVIEW/RESPONSE

See the Appendix for the MSBA's Preferred Schematic Design Review and the District's Response.

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4.1.2.B – FINAL DESIGN PROGRAM

ARCHITECTURAL CHARACTERISTICS

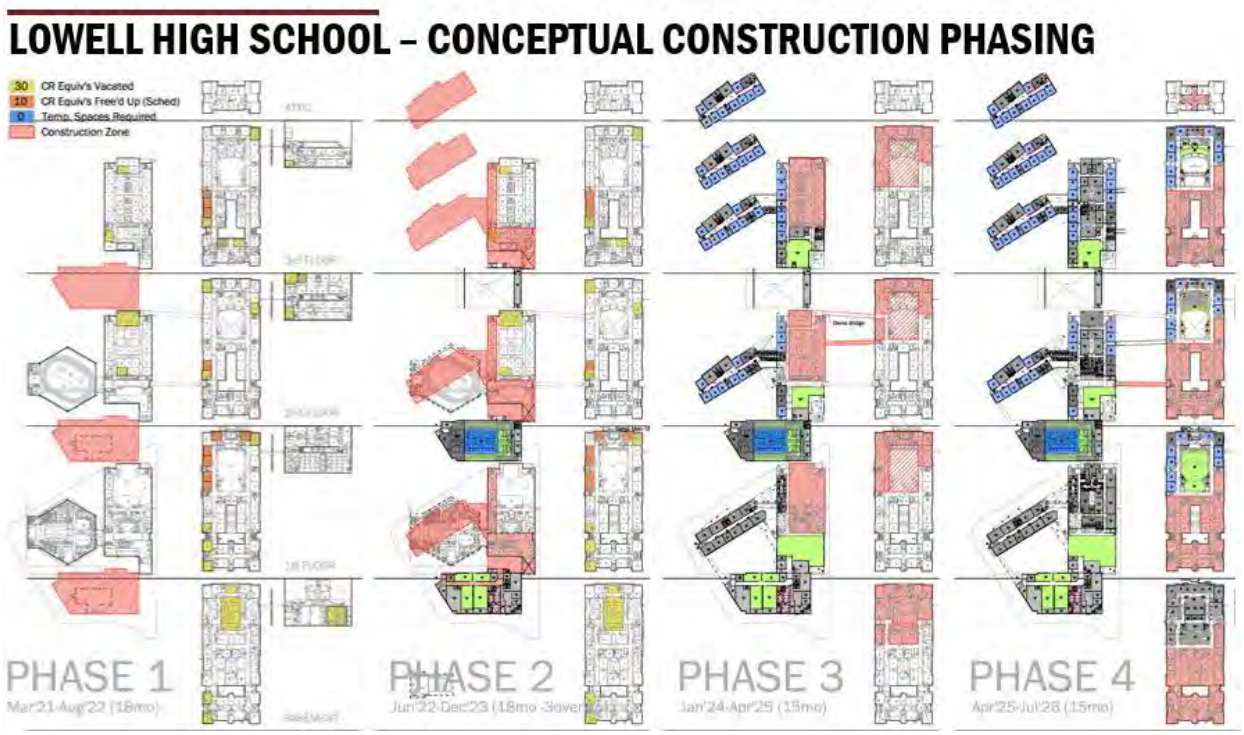
The Visioning and Programming Process conducted at the start of the Feasibility Study defined several key design objectives for this project. Among the goals established were to connect the freshman students onsite for a more integrated Freshman Academy, create a dynamic space that is active identifiable by all students as a true "heart of the school" in this large campus, zone the building for community use and safe lock-off, organize classrooms in clusters for interdisciplinary opportunities and collaboration, locate admin/support spaces for easy access but dispersed into each building and lastly build the project in a manner that minimizes educational disruption.

The following key components of the Educational Program and overall Goals/Objectives include;

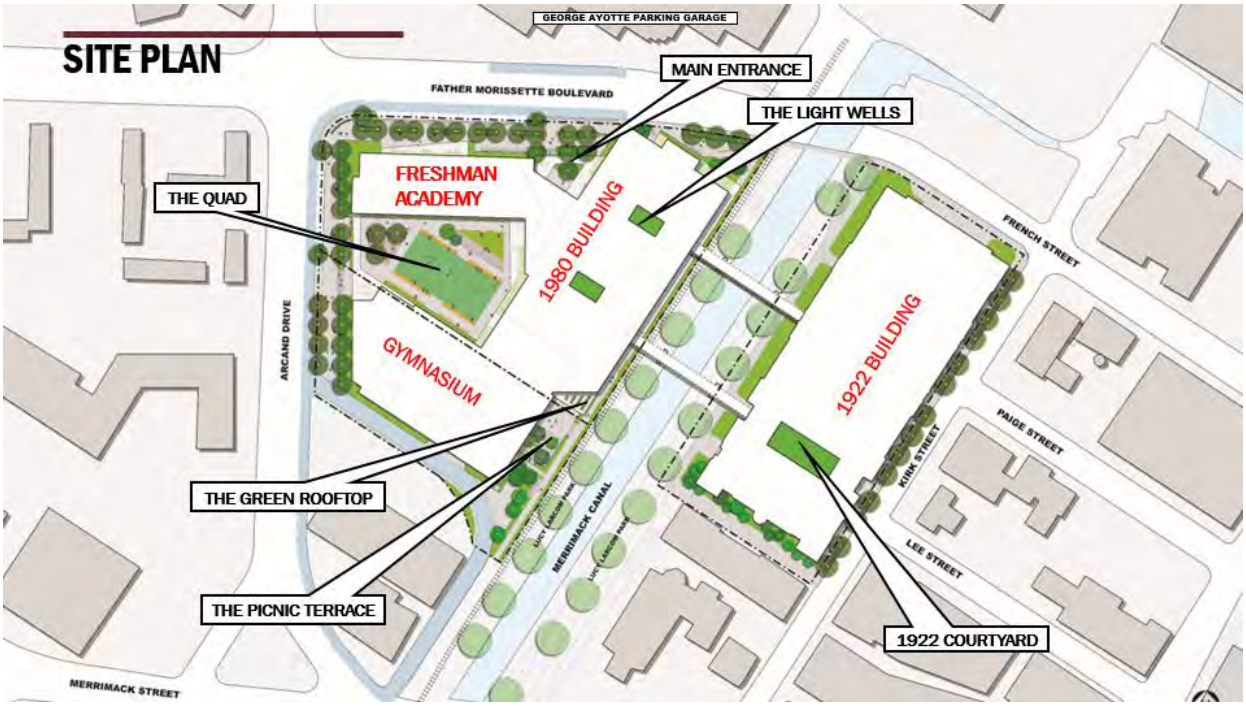
- Connected Freshman Academy while also zoned as a separate small learning community. The upper four floors of the new academic wing house the Freshman Academy and connect them to the larger LHS campus.
- Zone for Community Use – The overall building plan is laid out with intentional zones for community use. On the west campus the gymnasium building can be used in isolation or as a connected integral building on campus. The "heart of the school" is a large lobby space that celebrates the diversity of the student of Lowell High and serves as a conduit to the culinary restaurant, school bank, and school store. The west campus provides community access to the Irish Auditorium in improved ways that allow access for all abilities. The Fine Arts Department on the Lower Level houses the TV Studio as well as music rooms, dance and art studios that may be available to the Community at times.
- Create a Heart to the School –The main entry/lobby and a main stair open up to the main cafeteria at the first floor and the freshman cafeteria above. This space is where the intersection of the 1980's building, the gymnasium building and the academic wing/freshman academy occurs and becomes a "hub" or a "heart" of the school. This space connects both visually and physically to the canal and quad creating a light-filled space active space through which most students will experience.
- Organize for Interdisciplinary Collaboration - STEM and Humanities clusters are organized for faculty collaboration rather than a cohort of students being assigned as a team. The Add/Reno classrooms have clusters spread out a bit further, but still in proximity to foster teacher planning groups and the new construction freshman academy has the ability to create team-like clusters with good visibility between and into shared pull-out/flexible learning spaces.
- House Model for Administrative/Support – due to the overall large number of students, the case load and interaction among support staff, students and families is broken down into smaller suites. The suites are semi-dispersed for adult presence in both side of the campus; these house suites should be near the main lobby to limit visitors from having to navigate deep into the school.
- Good Daylight and Orientation – the new construction academic wing is the only area of the building where we can control the building orientation and have classrooms face north or south. The Add/Reno classrooms will seek to use window treatments to better mitigate low light into the rooms. With the addition of the light-wells in the 1980's renovation, all core academic spaces will have access to natural daylight in each space.

- Minimize Educational Disruption – The preferred solution proved to be the least disruptive downtown option with no temporary spaces required. The new gymnasium will be built first to be able to take down the existing gym causing to interruption of the PE/Athletics programs. +/- 40 classrooms are freed-up inside the existing building and 64 more created with the new Freshman Academy construction to give a total of 104 rooms of swing space which allows the large phases of renovation to occur. Each phase is set up to ensure corridor and stairwell buffer space between construction zones and education.

Phasing for this project is planned to be approximately 5 years, with 4 years on the current school property. The new five-story Academic Wing/Freshman Academy building will be approximately 72' tall and the new two-story gymnasium building will be approximately 60' tall.
Please refer to the appendix of this report for enlarged site and building plans.



The existing Lowell High School site (LHS) is located along Father Morissette Boulevard and Arcand Drive. The two main high school structures are the 1980 building (1980's) and the 1922 Building (1922) which span a segment of the National Historic Park's Merrimack Canal & Lucy Larcom Park.



The current LHS site transportation and access is a combination of walkers, car drops-offs, public transportation and special education buses. Due to the urban nature of the site and location of bus stops, pedestrian circulation and drop off locations are spread around the site with students funneling towards the main entrance. These patterns have been considered and a large entrance plaza suitable for use by a student body of this size has been created. This entrance plaza is located directly across from the George Ayotte parking facility and connected by a crosswalk. This entrance plaza will be partially covered by building overhangs and will be populated by site furnishings, street trees and lighting. An additional student entry has been designed via the quad recognizing not all students park in the garage or get dropped off on Father Morissette. The quad entry is a more direct. All parking is located off site in the George Ayotte Parking Garage, Joe Downes Garage or on street. HC Parking is on street parallel parking on Father Morissette or on Arcand Drive.

The centerpiece of the new school is a large campus quad surrounded by a combination of hardscape and planting. The green space is approximately 15,000 sf. This area is surrounded on three sides by building and visually opened to Arcand Drive but secured with an ornamental fence and gate. The green quad created in this plan is slightly larger than the space being used now across the street and will be large enough for use by physical education classes, marching band and any number of activities. Creation of this space will eliminate the need for physical education classes to leave the school site. The hardscape area abutting this space will have integrated rain gardens and more intimate spaces for smaller groups with tables, chairs and benches.

EDUCATIONAL SPACE SUMMARY (SEE APPENDIX FOR THE FULL FORM)

The Educational Space Summary for Lowell High School is based the agreed upon enrollment of 3,520 students. The sheer size of this school generates needs that do not fit within conventional formulas and defaults found in the Space Summary Guidelines and therefore had to be justified via an extensive series of programming steps, including data gathering, meetings with the Educational Leadership Team, faculty and staff, scheduling and utilization calculations and confirmation via the School Committee, DESE and MSBA.

Since the PSR submission, the existing structures have been professionally scanned to ensure a higher level of accuracy, particularly as adequate documents/drawings of the older facilities were not available through the City or Mass Archives. As a result, the existing and new net and gross SF numbers have changed.

PREVIOUSLY REVIEWED PROGRAM VARIANTS (PDP AND PSR SUBMISSIONS):

The Space Summary submissions for Lowell High School during the PDP and PSR phases highlighted the sheer size of the school, which eclipses norms and conventions and would need special consideration for Guidelines that although may be adequate for high schools up to 1800 students, did not scale with the school sized for 3520.

The gymnasium is one such space. Guidelines defaulted to a 12k sf gym + 3k alternative space (the equivalent of 5 PE teaching stations) and although the MSBA's cap increased to allow 18k gym + 3k (7 PE stations), 9 stations at 85% use were justified for LHS. Some other increases due to the sheer size of the school, included SPED (+4.7k), Admin (+3.5k) & Custodial (+1k) and the Auditorium (+5.1k) and some other programs that are considered highly valuable in serving the students (+14k of other spaces).

In the course of programming we found fewer academic classrooms & labs were needed vs Guidelines (140 proposed vs 151) due primarily to larger class size averages, but also because it was counter-balanced by greater needs in Art & Music (12 vs 8) and PE (9 vs 5).

Between the PDP and prior PSR submissions, Freshmen Science Labs were increased along with prep rooms and a Special Education small group room was added, all totaling 5,170 net sf. This increase was offset at the time with modest reductions to some of the peripheral performing arts, workrooms, custodial and 'other' programs. Since the initial PSR, the only change to the Space Summary is removal of the pool. It is also worth noting that the prior submission had an Auditorium that exceeded the MSBA's upper limit as new construction. The current submission includes the similar size, but as an existing-to-remain space.

The Space Template was also updated when the project revisited the preferred site/location to down-town and ultimately the swimming pool was removed from the program.

Other modifications highlighted in the Response to the PSR Submission included:

- **Core Academics** were updated & itemized resulting in an increase of 3,340nsf due to the reuse of existing space. The new total of 164,960nsf moved closer to Guidelines (-4,080 vs MSBA) and was otherwise accepted.
- **Special Education** remained the same at 38,950nsf (+4710 vs MSBA) and subject to DESE review
- The combination of **Art/Music & Tech** remained the same at 53,315nsf (+1,840 vs MSBA), noting Marketing (Ch.74) was subject to DESE review and the 400sf Bank + 200sf Store were ineligible
- **Health & PE** remained at 41,700nsf as accepted (+5,788 vs MSBA)
- **Media Center** remained at 21,900sf as accepted, meeting MSBA Guidelines
- **Auditorium/Drama** increased (25sf) per a minor correction. The 15,541nsf was +5,141 vs MSBA
- **Dining and Food Service** remained the same at 25,180nsf as accepted, meeting MSBA Guides
- **Medical** remained at 2,610nsf as accepted, meeting MSBA Guidelines
- **Admin and Guidance** increased 1,500sf due to listing the Trio program as directed by the MSBA, otherwise remaining the same as accepted. The new size of 14,555nsf (+3,870 vs MSBA)
- **Custodial and Maintenance** remained at 5,440sf as accepted (+1,175sf vs MSBA)
- **Other Spaces** reduced 1,500sf due to listing Trio with Guidance. Of the remaining 5,300nsf, 3,100sf was accepted and 2,200sf (Community Health and Catie's Closet) are ineligible
- **Total Net** was updated from 386,086 to 389,451 (+3,365 was Core Academics + 25sf Auditorium)
- **Total Gross** was updated from 622,200 to 628,558 (+6,358, holding a 1.5 grossing factor at new)

VARIANTS SINCE THE PSR SUBMISSION AND RESPONSE COMMENTS (6/'17):

Since the Response to the PSR Submission, professional laser scanning was conducted on-site to determine actual spaces and square footage. The outcome of the scans required modifications throughout all categories of the Space Summary's renovated areas and resulted in an overall reduction in net and gross areas, as well as more efficient use of space.

- **Core Academics** were updated and reduced 2,690nsf now at 162,270sf (-6,770 vs MSBA), with no change to the count of rooms and nominal sizes, as otherwise accepted previously.
- **Special Education** increased 1,450nsf with a 300sf de-escalation room added per follow-up conversations with specialists. Other adjustments are the result of the reuse of existing spaces. The revised total of 40,400nsf (+6,160 vs MSBA) is subject to DESE approval.
- The combination of **Art/Music & Tech** remained the same at 53,315nsf (+1,840 vs MSBA), noting Marketing (Ch.74) was subject to DESE review and the 400sf Bank + 200sf Store were ineligible
- **Health & PE** reduced 100sf with wrestling returning to the target size of 3,400sf. The new total of 41,600nsf (+5,688 vs MSBA) was otherwise accepted previously
- **Media Center** remained at 21,900sf as accepted, meeting MSBA Guidelines
- **Auditorium/Drama** reduced 41sf per re-measured spaces, now at 15,500nsf (+5,100 vs MSBA)
- **Dining and Food Service** remained the same at 25,180nsf as accepted, meeting MSBA Guides
- **Medical** remained at 2,610nsf as accepted, meeting MSBA Guidelines
- **Admin and Guidance** increased 250sf due to 1 additional guidance office required for freshmen and Trio fitting into existing space, otherwise remaining the same as accepted. The new size of 14,805nsf (+4,120 vs MSBA)
- **Custodial and Maintenance** increased 150sf to 5,590sf (+1,325sf vs MSBA) due to additional IDF closet requirements, but otherwise accepted
- **Other Spaces** remain at 5,300nsf, with 3,000sf accepted and 2,300sf ineligible (Community Health and Catie's Closet)
- **Total Net** was reduced 981sf from 389,451 to 388,470 due to more accurate existing conditions
- **Total Gross** reduced 5,780sf from 628,558 to 622,778 due to more accurate existing conditions and illustrating a 1.47 grossing factor for new, while reno is 1.70 and the overall averages 1.60

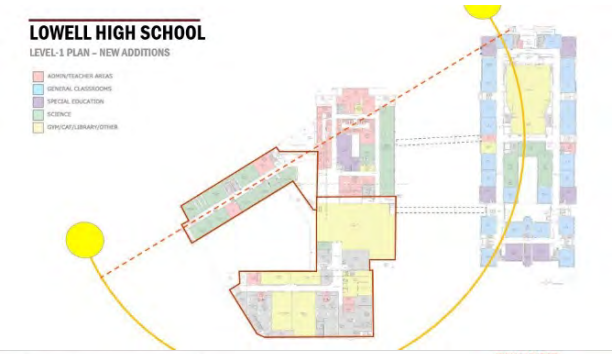
HOW THE DESIGN SUPPORTS THE DISTRICT'S EDUCATIONAL PROGRAM

The current design renovates the historically prominent and valuable academic buildings on the East side of the canal, while building a new Freshman Academy (FA) with Business/Technology Wing and Gymnasium facility on the West side. The sequence of construction does not require modular classrooms and helps to minimizes disruption, which was one of the Educational Program objectives. A key to the sequence is expanding the site onto an adjacent parcel, allowing the construction of major new wings prior to demolition or renovation of others, in-effect creating new swing-space. The expanded site also results in providing much needed outdoor green space.

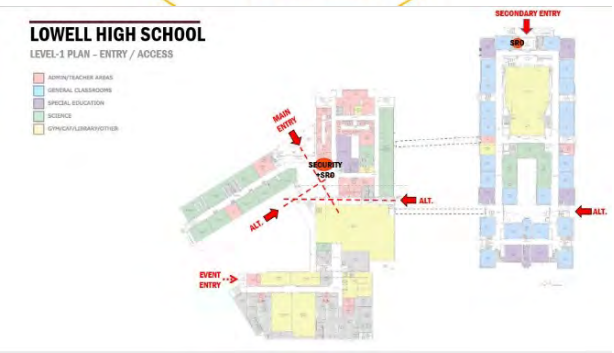
Academically this solution brings the freshman on site from the existing building a block away, which was one of the primary educational objectives. The freshman are organized in clusters of 8 academic rooms surrounding a teacher planning and flexible pull-out space. These clusters are stacked on 4

floors and have inter-dispersed Special Education, ELL, World Language and Health rooms, creating a semi-contained small learning environment as an introduction into the larger school. Freshman are intended to mix with the greater population for specialty programs, fine-arts, physical education and athletics, but do have their own Dining Commons for scaled social interaction.

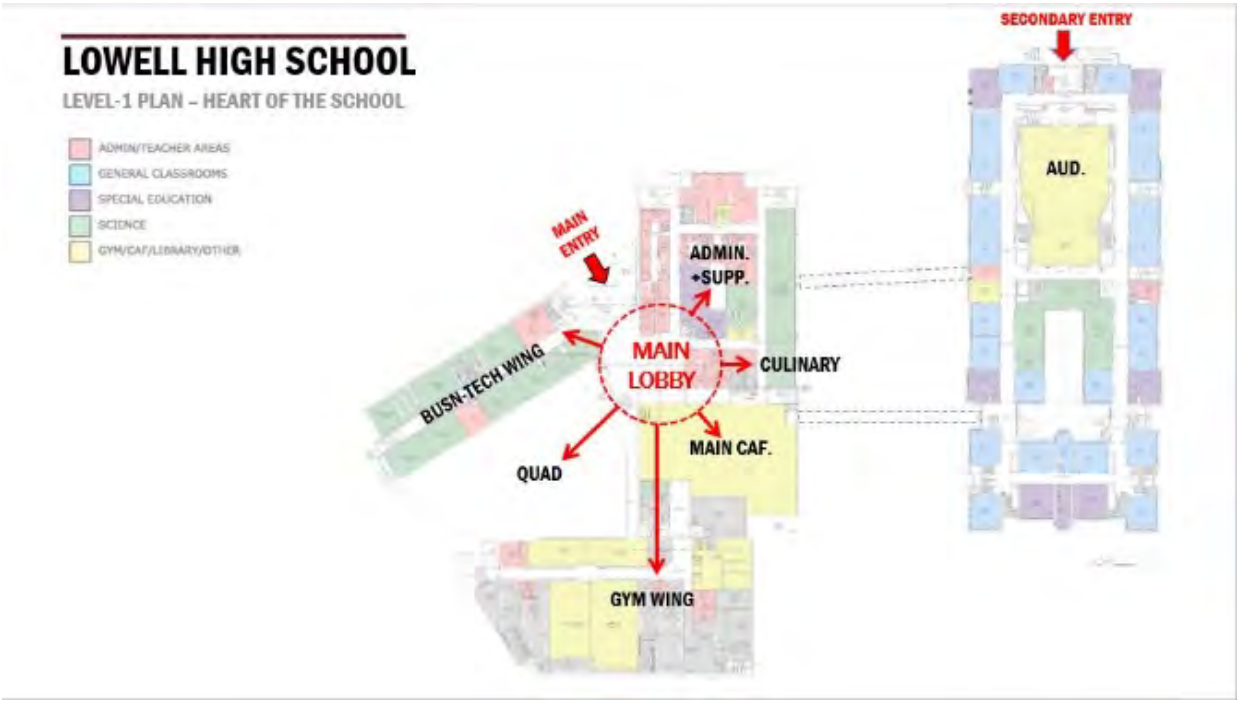
As is the priority with any new academic space, the Freshman Academy is aligned for ideal solar orientation with classrooms facing North & South providing consistent controllable daylighting throughout the school day and a more energy efficient building.



Providing quality daylight and good solar orientation was another critical educational objective. In addition to the FA orientation, the design restores and builds new light-wells The interior organization is zoned for community use and operational lock-off (incrementally) of academic areas. The ground floor includes the majority of shared program and specialty spaces and the heart of the school is formed by an open cafeteria connected to the main lobby as a social hub and is vertically open to the media center above as the technology hub. House Admin. & Support suites are centrally located on the mid floor near the core.

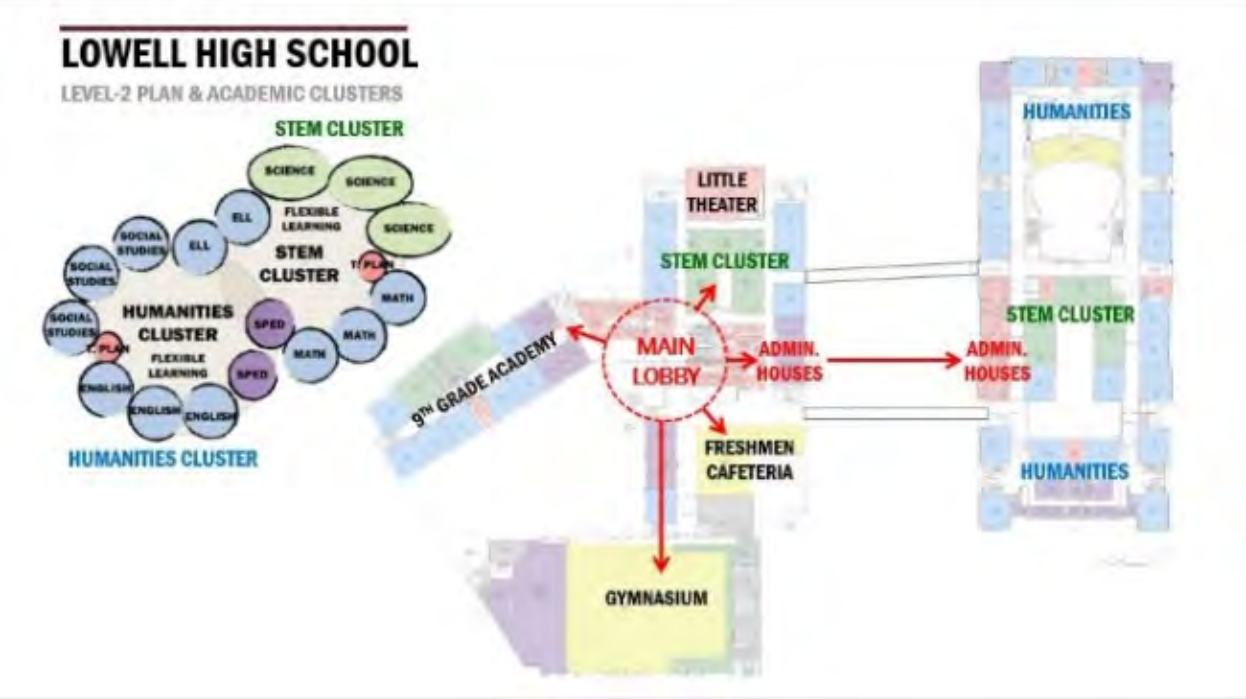


A key component to the design is the creation of a “heart of the school” a place where students can congregate, socialize, see/be seen and create a positive energy throughout the school. This space will connect major educational and community spaces within the school; like the hub of a bicycle wheel and become the connection through which most students pass through to travel from one part of the building to another. The space is intended to connect students, community and history.



The plan allows for layered lock-off of buildings, wings and hallways as part of a secure facility, but also to manage community access and events. This includes the outdoor quad that is gated with covered canopy structure to allow managed access and separate school areas from public.

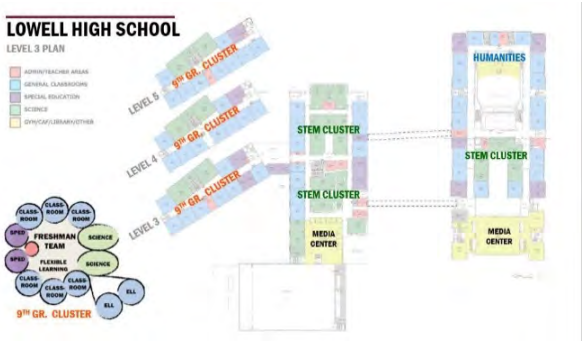
Another important educational objective was to make House Administration areas centrally located, easily accessed by parents/visitors and semi-dispersed to provide an administrative presence in each academic building. The solution was to keep the Main Office & Student Support at the entry level, near the Main Lobby, which connects to the Upper Lobby, where House Admin Offices are located. One House Admin is for the Freshman Academy, which starts on floor 2, the other four are dispersed in two's on each side of the canal on floor 2 where the bridges link both sides.



The plans also focus on the key educational goals of creating classroom clusters for optimal collaboration among the 9th grade core academic teams. The renovation of the 1980 and 1922 buildings will allow for STEM (3 Science + 3 Math) and Humanities (3 ELA + 3 Social Studies) Planning Clusters with nearby Special Education, ELL and Health classrooms that are dispersed throughout in groups of 2.

The Freshman Academy is all new construction allowing for an ideal layout of 4 Teams of 8, including 2 Science, Math, ELA & Social Studies stacked on each floor with inter-dispersed Special Education and Health classrooms.

Grades 10-12 are organized throughout the renovated 1980s and 1922 building therefore creating unique clusters with preferred adjacencies while reusing and renovating existing spaces.



The Schematic Plan instills all the significant features born out of the Visioning and outlined in the Educational Program, providing cutting-edge new space, coupled with historic restoration

FUNCTIONAL RELATIONSHIPS AND ADJACENCIES

The Preferred Option meets all the functional and spatial relationships required in the educational program:

- The **Freshman Academy** is grouped intentionally into its own wing in order to incorporate all freshman students onto campus. The proposed design creates a distinct Freshman Academy as a small learning community within the school, but not completely isolated, as students will utilize shared programs, such as World Language Classrooms, Library/Media Center, Gymnasium and Arts/Tech programs. Class scheduling may be used to keep shared programs distinctly separate, but also intentionally mixed to expose new students to the larger high school community in a deliberate manner.
- **Academic Classrooms** are distributed in clusters throughout all the 10-12 classrooms on the upper floors of both renovated buildings to encourage cross-discipline collaboration amongst the teachers. Each STEM/Humanities academic cluster has a teacher planning space at its center and integrated SPED classrooms.
- **Administration Offices** are distributed throughout the campus
    a. The Main Office is located directly adjacent to the main entrance on the West Campus with Security and SRO offices nearby. The Nurse's Suite is across the hall in this location as well.
    b. The five House Offices are strategically located on the second floor (easily accessed from the Main Entry via the main stair in the lobby or the main elevator) The Freshman House Office is at the entrance to the FA, two House Offices are on the West Campus and two are on the East Campus adjacent to both pedestrian bridges.
    c. Department Offices are located on the 3rd Floor of the West Campus.
    d. Teacher Planning Rooms are distributed on all floors on both Campuses for passive and active supervision throughout the school.
- One project goal is to provide all core educational spaces with **natural light**; something the current school does not have. This is accomplished through reconfiguration of spaces as well as insertion of light-wells on the West Campus.
- The first floor "**Heart of the School**" is connected to the Cafeteria, Gymnasium, School Store, Quad and Canal to create a flexible zone that will promote a connected community and welcome visitors without disrupting the school day.
- It was important for the entire **Fine Arts Department** to be together. They prioritized connectivity over location. The Fine Arts Department will be in the lowest level of the East Campus. This floor has some floor level changes that allow for volume in a few spaces that require additional height (Band, Chorus, TV Studio.)
- The "heart of the school" is the central hub that connects the main entry, entrance to the Academic Wing/Freshman Academy, the Cafeteria(s), the Gymnasium, the Quad, the Canal, the School Store, Bank and Restaurant these central adjacencies become critical to the liveliness of this space.

SECURITY AND VISUAL ACCESS REQUIREMENTS

The design Team explored safety and security objectives as part of the early Visioning and Programming process with a wide variety of educational leaders, teachers students and parents. These meetings were supplemented by direct discussions with Lowell Public Schools, Police and Fire Department. In addition to the Design Team's security consultant assessment/recommendations, Lowell Public Schools hired an independent security consulting firm to assess the high school and provide recommendations. These recommendations are being cross-coordinated with the Design Teams, including:

- Personnel, Liaisons and Supporting Procedures
- Visitor Screening Measures
- Video Surveillance Measures
- Access Control Measures
- Natural Surveillance and CPTED measures
- Internal and External Response Measures
- Existing Systems Integration and Function (Hardware, Software, IT and Networking)
- Parking Lots and General Site Security

Main Entry/Access Controls
The District intends on having managed entry through 5 locations upon student arrival. After the start of the school day, all doors are kept locked and access would be through the Main Entry/Security with supplemental access on the opposite side of the canal, manned by an SRO. Both entries will have a secure vestibule with direct engagement to the Security or SRO.

Signage/First Responder Wayfinding
The entry doors around the facility will be numbered as per the request of the Lowell Fire Department, additionally, AI Phones will be provided at all 5 Entry Points, the Kitchen/Receiving, and Gymnasium (side entrance) to allow for emergency entrance to the facility at alternative access points controlled by the administration.

Layers of Lock-Off
Corridor and Stairwell doors will be on hold-opens to allow fluid circulation throughout the day but can be controlled in the event of an emergency to limit public access into entire buildings, floors or wings. The Gymnasium is designed to be opened independently or separately from the rest of the school. The existing Auditorium will have improved access and event management/control via reconfigured stairs, elevators and lock-off lines to limit access into other areas. The lobby, cafeteria zone is also able to be opened while connecting to the school store, bank, restaurant and student support areas, while limiting access elsewhere.

Classrooms/Controls
It was confirmed that the proposed sidelights at classrooms doors provide desired connections, awareness and visibility out to corridors, but that rooms would be designed for controlled visibility in, either through interior shades or, preferably, out-of-sight space within the rooms.

Surveillance Systems
Security cameras will be positioned throughout the building and around the campus, with display screens and console located with security and potentially available to administrators via secure network. The ability to have communication, detection and tracking ability is being explored.

Other Safety/Security
Numerous drop-off locations are provided, with safe pedestrian walkways and minimal crossings on-site. An emergency access drive will be provided along the service side of the new Gymnasium wing.

- Safe pathways for pedestrians and bicyclists, including on-site storage
- Safe and appropriate access to the perimeter of the building and outdoor spaces
- The building is designed to provide clear visual connections throughout the school minimizing hidden alcoves and blind spots around the campus exterior and internally. This is supplemented by strategically locating administration on the first and second floors and distributing school resource officers, administration and teacher planning rooms so that natural supervision can occur.
- Toilet rooms are designed 'airport' style, without doors to provide natural surveillance and open acoustic communication and awareness.
- At its current site the high school has a nearby facility that is of adequate size to house students in an emergency/evacuation situation.
-

SITE DEVELOPMENT REQUIREMENTS

SITE ACCESS AND CIRCULATION

VEHICULAR CIRCULATION

Lowell High School occupies both the east and west side of the canal. The East portion of the campus (noted as the East Campus) is bordered by the Merrimack Canal to the west, French Street to the north, Kirk Street to the east and a narrow cobble paper road to the south. The am and pm traffic patterns on Kirk Street is and will continue to be reversed. This allows special education vehicles to stack along Kirk Street and drop students off on the passenger side. Nearby Paige Street is used for stacking of LRTA buses.

The West Campus is bordered by Father Morissette Boulevard to the north, the Merrimack Canal to the east, Arcand Drive to the west and a service drive to the south. The service drive is an extension of the existing Dutton Street roadway. Proposed circulation is to create a dedicated parent drop off lane along Father Morissette Boulevard extending from the intersection of Arcand Drive to the main entrance plaza. A separate bus pull off has been created on the east side of Arcand Drive with the ability to stack up to 4 buses. It is important to note that the high school is exclusively serviced by LRTA buses with the only exception being 3 after school buses that transport students to Shedd Park and Cawley Stadium. The Arcand Drive drop off will be available to both morning drop off by LRTA buses, afternoon pick up by up to (4) LRTA buses and for stacking for the (3) afterschool buses. Arrival of the after school buses are staggered by approximately 15 minutes from the LRTA buses.

Pedestrian Circulation: Pedestrian Circulation is located around the entirety of the site including between the east and west campus along both sides of the canal. The George Ayotte parking garage provides the majority of parking for the school and a large pedestrian crosswalk is proposed connecting the garage to the main entrance plaza.

PARKING AND PAVING

PARKING

The school currently utilizes the George Ayotte Parking Garage which has the capacity of 1200 spaces and is located approximately 120' from the school. Staff, students and visitors also utilize the Joe Downes Garage. All parking garages are owned and managed by the City of Lowell. New parking will be created along Father Morissette Boulevard at the main entrance. This on street parking will

include (2) HC Spaces and (7) temporary/short term parking spaces. Additional on street parking currently exists and will be re-created along Arcand Drive. These spaced are located directly in front of the gym entrance and include a total of (5) Spaces.

PAVING

The main entrance to the school will be improved by an expansive plaza space. Integrated into this area will be bio-retention areas, plantings, sloped walkways and stairs. Ample space will be shaded and protected by building overhangs and provide a much improved streetscape frontage to the school.

EMERGENCY VEHICLE ACCESS/ SAFETY AND SECURITY REQUIREMENTS

On the East Campus emergency and fire access wraps the school to both the north, south and east sides of the site. On the West Campus fire and emergency access is provided along the north, west and south sides of the building.

TRASH REMOVAL, DELIVERIES & MAINTENANCE STORAGE

The service area is located in the West Campus along the south side of the building. The service area is accessed by a new service road which connects Dutton Street and Arcand drive. This service drive is approximately 20' wide and allows for the service area to be utilized by smaller box trucks as well as larger delivery vehicles. Dumpsters can be accessed with either a front or rear loading trash truck. The service area will be fenced for safety and visual screening. The transformer will be surrounded by s.s. safety bollards. Service area will include the following:

- (2) 7.5' x14' Dumpsters with 10 yard capacity for recycling
- 8'x22' Dumpster with a 20 yard capacity
- 6'x12' Oil tanks for transformers separated by a CMU non-combustible barrier.
- 10'x35' Loading bays located parallel to the building along the service drive

ORIENTATION/LOCATION CONSIDERATIONS

A priority throughout the early planning process has been to maintain ideal north-south facing classrooms. This is seen as a critical component to creating high-performance educational spaces that can both improve learning and save energy through the controlled use of daylight.

OUTDOOR PROGRAM/ATHLETICS

In many ways Lowell High School is the "Center" of Lowell, not just geographically, but as a hub of education, growth and community. The new campus will offer a wide variety of spaces both intimate and open. The site will support everyday use and enjoyment while also providing spaces that bring together cutting-edge educational and social programming within a diverse group of students and community members. Our objective is to create a holistic sense-of-place, unique to the Campus and the City of Lowell.

The following spaces have been developed to meet that objective.

- The front plaza and Father Morissette streetscape: As the main entrance to the school the front plaza has been designed to accommodate the daily use of thousands of students by acting as a accessible route to direct students and staff from the parking garage, parent drop off and surrounding streets into the building. To navigate a 3' grade change this plaza includes two sets of graciously sized stairs and a sloped walkway. Separating these spaces are raised planters with built in wood seating and planting. Bio-retention areas are included throughout the plaza. Site furnishings include LED illuminated railings, Structural Light Bollards, bike racks, trash and recycling receptacles and benches. Paving includes a

combination of broom finish concrete accented by ornamental trench drains and granite banding. There will be three up-lit 25'-35' flagpoles with internal halyards.

- The "Quad": Located at the heart of the school the quad space is an integral part of the exterior program. Proposed to be used from everything from gym classes to marching band, the space is approximately 70'x130' and proposed to be synthetic turf with a detention/retention drainage system underneath. Built in two-sided concrete benches with wood slat toppers are created around the green to provide bleacher like seating. The quad is surrounded by broom finish walks with native foundation plantings and two small seating areas. The first seating area is created by terraced walls and the second is a more intimate space with ornamental trees and movable furniture. The quad will have one up- lit 25' flagpole with an internal halyard.
- The "Promenade": Running the length of the canal along the west side of the new building this will be a 6' wide broom finish concrete walkway accented by built in benches and wall mounted ornamental lights.
- The Arcand Drive Drop Off and Gym Entrance: Located at the entrance to the quad this area is the interface between the public streetscape and school. Plaza space is a combination of concrete pavers and broom finish concrete. Sloped walks and stairs provide access to the gym entrance. An ornamental metal screen and ornamental gates secures the school area and provides select points of entry.
- The "Picnic Terrace": Located adjacent to the cafeteria is an open plaza space with specialty paving, movable furniture and raised planters with ornamental trees. This area will be secured with ornamental fencing and an ornamental gate.
- The "Courtyard": Designed as a therapeutic landscape this space includes native shade tolerant vegetation and ornamental trees, movable furniture and specialty paving.
- The "Light Wells": Located in two locations within the 1980's building and will be comprised of specialty paving, green walls, columns and potential art installations.
- The "Roof Deck"" Located on the third floor will be a combination of wood tiles and concrete pavers on a pedestal base. Planters will be wood or aluminum and programed for urban agriculture/vegetable gardens. Planters will have drip irrigation and movable seating will be included for use as an outdoor classroom.
- The 1922 building entrance: Located on the East Campus

ATHLETIC USES

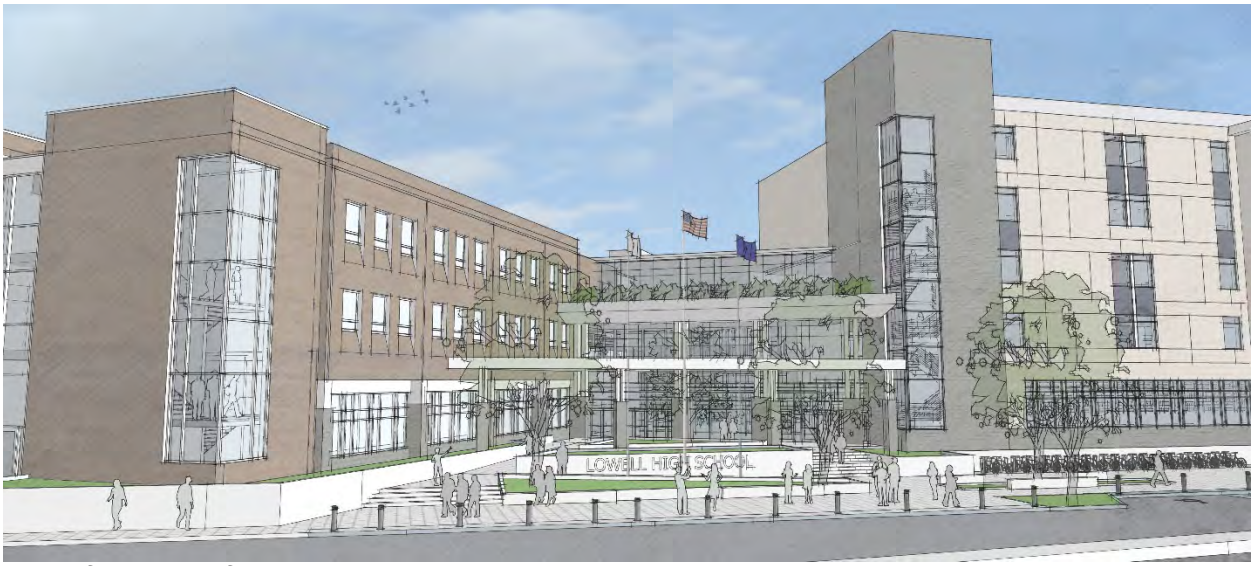
LHS uses two City-owned facilities- Shedd Park and Martin Cawley Athletic Complex. These two complexes accommodate the majority of the high school's athletic programs. Both complexes are maintained by the City and students are bused to them. The Crew team uses Lowell UMass facilities and Hockey utilizes the Tsonga Center. The schools use of facilities would remain the same in all existing site options and no additional field space fits on the site.

DESIRED VISUAL FOCAL POINTS AND FEATURES

The LHS campus is highly visible from a few major roadways in downtown Lowell. Father Morissette Boulevard from the West, Dutton Street from the South and French Street from the East. The almost 360 degree visibility leaves the building(s) with almost no "back" therefore putting all elevations and corners on display. A major visual focal point is the corner of Father Morissette and Arcand. Where the end of the new academic wing/freshman academy will be on display. The working group asked that we have windows on that elevation despite that being west facing. They recognize that all vehicles come downtown from the west/UMass Lowell will see that elevation as they approach the campus and want it to be a beacon for the school.

View of corner- Father Morissette and Arcand

Another focal point for the project is the front entry. The existing front entry is in a similar location, but set back deep between two building elevations and facing north which leaves a very unwelcoming cavernous feel to the entrance of the school. The improved design keeps the front entry location only it will move forward, closer to the street yet still providing a generous, welcoming plaza, and it will be sheltered with a canopy which will open up to allow natural daylight to flood the plaza. This improved entry will truly be source of pride for all the students as they come to their new school every day.



View of proposed front entry

Rendering of front entry plaza with precedent images

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4.1.2.C – TRAFFIC ANALYSIS

A traffic impact analysis was conducted by Bryant Associates to evaluate the impacts on surrounding roadways and intersections due to the renovations to the Lowell High School building site in Lowell, Massachusetts.

The Lowell High School is currently functioning with a large existing student and staff population. The proposed increase in the student and staff population is relatively small in comparison to the existing populations. Traffic impacts are expected on the surrounding roadway network when the majority of the 4,000 people estimated to use the facility will arrive and depart within a short time frame.

The unsignalized and signalized intersection capacity analysis shows that the proposed Lowell High School under build conditions will continue to operate at equivalent levels of services and similar delays as experienced under no-build conditions during both the school A.M. and school P.M. peak hours.

There are no existing unsafe conditions in the vicinity of the development that might be worsened by the design alternatives proposed for the existing school campus.

Based upon the analyses, traffic operations on the surrounding roadways and intersections in the area will experience minimal change with the proposed school renovation alternatives. No reduction in safety will occur due to the renovated school alternatives as proposed.

The next steps for the project in regard to traffic include:

- Review and recommendation of revisions to the signal timings for the morning and afternoon school peaks for the for the intersections of Father Morissette Boulevard and Arcand Drive; Arcand Drive, Dutton Street, and Merrimack Street; and Bridge Street and French Street.
- Review and recommendation of various options for potential locations for parent queueing at pick-up and drop-off will be developed.
- Review and comment on the proposed site plan for conformance with the City's ordinances and with accepted traffic engineering principles. This review will include site circulation, parking, and site access.
- Review LRTA operations to determine if revisions should be recommended as it relates to the high school.

See the Appendix for meeting notes on discussions with the city transportation staff.

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4.1.2.D – ENVIRONMENTAL AND EXISTING BUILDING ANALYSIS

ENVIRONMENTAL

In December 2018, Nobis Group (d/b/a Nobis Engineering) conducted a Phase II Investigation of 75 Arcand Drive to address the recommendations provided by Nobis in a Phase I Environmental Site Assessment (ESA) prepared in January 2017 which identified Recognized Environmental Conditions (RECs) associated with the historical use of the property that could potentially have resulted in the release of contaminants to the environment.

The objective of the Phase II was to characterize soils at 75 Arcand Drive for the potential expansion of Lowell High School so that soil management procedures could be developed for the project and potential cost impacts from soil remediation could be evaluated. Therefore, the scope of the Phase II investigation was limited to 75 Arcand Drive. RECs that were identified on the property included a railroad spur present along the southern border of the property from the early 1900s until at least 1952.

Nobis advanced four soil borings at the Site in areas potentially impacted by historical industrial use. Geological descriptions of soil cores indicated that historical fill overlies native soils at the Site. The presence of historical fill material in the top 4 to 6 feet of soil suggests that any soils removed or displaced during future earthwork activities should be considered potentially contaminated with urban fill constituents such as polycyclic aromatic hydrocarbons (PAHs) and metals.

Ten soil samples were collected for laboratory analysis during the Phase II investigation. Lead was detected in two soil samples at concentrations above Massachusetts Contingency Plan (MCP) "reportable concentrations" for an RCS-1 soil, triggering a 120-day notification obligation for the owner or other responsible party. The City is in the process of notifying MassDEP.

Soil contamination observed during the Phase II may be related to historical fill placed in the area. Potential remedial alternatives range from excavation and off-site disposal to on-site management of the contaminated soil through using construction of new building slabs or parking areas as effective horizontal barriers to exposure. Additional characterization will be necessary to refine the estimated extent of contamination and associated remedial costs.

No immediate remedial actions are recommended by Nobis but Nobis does recommend that the contaminated soil be managed during construction under the MCP Release Abatement Measure (RAM) process.

Refer to the Geoenvironmental report in the Appendix for more detailed information.

HAZARDOUS MATERIAL

In January 2019, Universal Environmental Consultants, conducted a hazardous material identification survey of 75 Arcand Drive. The scope of work was limited to investigation of accessible asbestos containing material (ACM). The survey found ACM in joint compound, coatings, ceiling tiles, adhesives, flooring, roofing tar, flashings, and caulking. Remediation shall be conducted prior to the demolition of the building. A full list of the material tested, testing results and a cost estimate for removal and disposal can be found in the Appendix.

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4.1.2.E - GEOTECHNICAL ANALYSIS

In November 2018, Geotechnical Partnership, Inc. (GPI) reviewed the limited existing site information and drilled seven borings at 75 Arcand Street. Groundwater was reached at 12-14 feet. Since the existing weak upper level subsoils are not suitable to support conventional shallow foundations, GPI offers the following as foundation alternatives: driven piles, drilled concrete micropiles and ground improvement with aggregate piers at new construction at this site. The current structural design for the new construction is based on piles based on recommendations by the geotechnical engineer.

Refer to the amended Geotechnical report in the Appendix for more detailed information.

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4.1.2.F – CODE / PERMITTING ANALYSIS

SCHEMATIC DESIGN CODE REPORT

The building code analysis was prepared by Hasting Consulting. Highlights include:

- The Freshman Academy five story academic wing is now being designed under the requirements of a High-Rise due to its height exceeding 70 feet.
- The renovated portion of the 1980s building will have its existing structure fire protected.
- The renovated portion and the new construction wings of the 1980s building will be separated from each other with an expansion joint.
- The gymnasium and the 1980s building will be separated with a fire wall.
- All public entries are to be made accessible.
- The East Building will not undergo an addition or change in use and thus is not required to comply with the height and area limitations for new construction.

Refer to the code report in the Appendix for more detailed information.

PERMITTING CONSIDERATIONS

On behalf of the City of Lowell, Building Conservation Associates has submitted a PNF to the Massachusetts Historical Commission and have received a response. A copy of the documents are included in the Appendix.

Updates on the status of the eminent domain process regarding 75 Arcand, Article 97 regarding the pedestrian bridges, and railroad easement are included in the Appendix.

At this time, there are no such conditions present within the scope of the project that requires a zoning variance. A copy of a letter by the city regarding the use of the adjacent public garage for parking is included in the Appendix.

PERMITTING TABLE

Permit	Permitting Authority/ Reviewing Agency	Anticipated Filing Date	Anticipated Approval Date
FEDERAL			
Air Rights Easement for Pedestrian Bridges over Railroad & Trolley Track Article 97	Air Rights over the trolley tracks are currently owned by the United States National Park Service (NPS). NPS's air rights are subject in applicable part to "Easement to maintain overhead bridge".	In progress	
Section 106 of the National Historic Preservation Act of 1966 (NHPA)	Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP. Section 106 review made be needed for any proposed storm drain outfalls into the Merrimack Canal since LHS is located in a National Register Historic District. This may also traverse Federal land (trolley tracks) for the outfall that could trigger a full NEPA review of the project. Consulting with the National Park Service for clearer guidance on this is recommended. As with Enel, the National Park Service prefers that storm drain outfall tie into existing outfalls, as opposed to creating new outfalls.	From SD to DD	Up to 6 months+
Historic	National Park Service		
Discharge Elimination System (NPDES) with EPA Notice of Intent (NOI)	Environmental Protection Agency (EPA)	Completion of CD	
STATE			
Article 97 of the Massachusetts Constitution	Executive Office of Environmental Affairs (EOEA), National Parks, Conservation Commission	In progress	
Air Rights Easement for Pedestrian Bridges over	Air Rights over the Merrimack Canal are currently owned by the Massachusetts	In progress	

Canals /Lucy Larcam Park	Department of Conservation and Recreation (DCR).		
Permit Application for Construction and/or Associated Access to DCR Park Lands & Roadways	The Department of Conservation & Recreation (DCR) owns the air rights over the Merrimack Canal and any proposed work (including the demolition and construction of the bridges) would require the filing of a Permit Application for Construction and/or Associated Access to DCR Park Lands & Roadways.	From SD to DD	
Project Notification Form (PNF)	Massachusetts Historic Commission	SD review complete	-
Infiltration and Inflow (I/I) Removal Program	Mass DEP/Lowell Regional Wastewater Utility	During DD	2-3 months
MGL Chapter 40 §54A	MassDOT and coordination with the Lowell Building Inspector. Permits for Construction on Railroad Rights-of-Way from MA Department of Transportation Rail and Transit Division (MassDOT), in accordance with MA General Law Chapter 40.	After 100 % DD	2-3 months
<u>LOCAL</u>			
Certificate of Appropriateness	Lowell Historic Board	DD	
Notice of Intent (Order of Conditions)	City of Lowell Conservation Commission. The Canals would be considered in a Floodplain per the latest Flood Insurance Rate Map (FIRM) and as such, any work within and over the canal would be under the jurisdiction of the Lowell Conservation Commission and would require the filing of a Notice of Intent. Portions of the demolition and proposed additions will be within 100' of the Merrimack Canal on the Eastern side. This would minimally require an RDA, but a Notice of Intent may need to be filed per local Wetland Ordinance (Ch. 280 Sect. 1-14).	During DD	2-3 months
Request for Determination of Applicability (RDA)	Lowell Conservation Commission. If storm drainage from the site(s) is directed into the canal as suggested by City in the October 18, 2018, meeting, then the project	During DD	2-3 months

	would need to file a Notice of Intent (NOI) rather than the RDA with LCC.		
Site Plan Review	City of Lowell Planning Board	DD	Up to 6 months+
OTHER			
General License w/ Enel	Ownership of the Merrimack Canal is by Enel GreenPower North America. Nitsch Engineering understands that any proposed work within Merrimack Canal walls would require the filing of a General License and supporting documents, including new storm drain outfalls into the canal. Enel will determine whether or not the proposed outfall will impact their use of the water. They generally prefer that you tie into existing outfalls, as opposed to creating new outfalls.	From SD to DD	

CONSTRUCTION PERMITS/ NOTIFICATIONS TABLE

Permits to be filed by contractor may be available within 2 to 30 days of submission of application, depending on Authority Having Jurisdiction (AHJ).

Approval/Permit	Permitting Authority/ Reviewing Agency
FEDERAL	
Dewatering Permit	EPA
Discharge Elimination System (NPDES) with EPA Notice of Intent (NOI)	Environmental Protection Agency (EPA)
STATE	
AQ 06 Construction/ Demolition Notification	MassDEP
Notice of Abatement	Mass DEP
Construction Stormwater Discharge Permit	Mass. Department of Environmental Protection (Bureau of Resource Protection)
Infiltration and Inflow (I/I) Removal Program	Mass DEP/Lowell Regional Wastewater Utility
LOCAL	
Building Demolition Permit	Lowell Development Services/ISD, Lowell Fire Department
Building Permit	Lowell Development Services/ISD
Construction Management Plan	Lowell Development Services/ISD, Lowell Traffic and Transportation Department
Driveway Permit	Lowell Engineering Department
Electrical Make Safe Permit	Lowell Development Services/ISD
Electrical Permit	Lowell Development Services/ ISD

Emergency Responder Review	Lowell Fire Department, Lowell Police Department
Fire Alarm Permit	Lowell Fire Department (Fire Prevention Bureau)
Fire Pipe Shut off Permit	Lowell Fire Department
Food Establishment Permit, Certifications	Lowell Health Dept., Lowell Dept. Planning / Division of Development Services
Health Department	Health Dept. via Division of Lowell Development Services
Hydrant Metering Permit	Lowell Regional Water Utility
LFD Demo Permit	Lowell Fire Department
Paving/ Street Opening Permit	Lowell Department Public Works
Plumbing Make-safe Permit	Lowell Division of Development Services/ISD
Plumbing Permit	Lowell Development Services/ISD
Sewer Demolition Permit	Lowell Regional Water Utility
Sewer New Services Permit	Lowell Regional Wastewater Utility
Sprinkler (Fire Protection) Permit	Lowell Fire Department (Fire Prevention Bureau)
Stormwater Connection Permit	Lowell City Services / Lowell Regional Water Utility
Water Demolition Permit	Lowell Regional Water Utility
Water, Domestic and Fire Protection New Service Permit	Lowell Regional Water Utility
NON-GOVERNMENT	
Electric Utility Shut Off Notice	National Grid
Gas Utility Shut Off Notice	National Grid

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4.1.2.G – UTILITY AND SOILS ANALYSIS

UTILITIY ANALYSIS

Based on Nitsch Engineering's knowledge and the review of the existing conditions survey of the project site, it appears that all required utilities to service the proposed project are available and there appears to be sufficient capacity in the utility systems to adequately serve the proposed project.

STORM DRAINAGE

The proposed stormwater system will consist of updating the existing drainage system and installing a new closed drainage system incorporating deep-sump hooded catch basins and as many Low Impact Development (LID) Best Management Practices (BMPs) as possible, such as grassed swales, porous pavement, and biofiltration (if appropriate). A retention/detention storm drain system will be required to be included as part of the proposed stormwater design. This could be in the form of a subsurface infiltration system consisting of pipes/arch chambers. Water Quality will also need to be addressed as part of the stormwater design. Proprietary Units such as Stormceptor or Vortechnics can be used or more site integrated water quality options can be implemented as part of the stormwater design. Discharge points for stormwater will continue to be the existing drainage system in Father Morissette Boulevard, though if needed, the existing Merrimack Canal could also be a viable discharge point.

The existing site offers little to no water quantity or water quality mitigation. The proposed stormwater management system will be designed according to Massachusetts Department of Environmental Protection (MassDEP) Stormwater Standards, which require reductions in both stormwater discharge rates and volumes for the 2-year, 10-year, 25-year, and 100-year 24-hour rainfall events. As such, the proposed work is expected to improve drainage conditions for the high school site, which will result in better drainage and quality of stormwater eventually flowing to the Merrimack River.

WATER

An existing 20-inch water main in Father Morissette Boulevard and French Street and a 6-inch water main in Kirk Street and the former Anne Street and a 16-inch water main in Arcand Drive will provide water for the new school. New cement-lined ductile iron water services will be provided for both fire service water (indoor sprinkler systems and outdoor hydrants) as well as domestic water service. Based on the hydrant flow tests performed last year, the plumbing engineer and the fire protection engineer has confirmed that the flows are acceptable. Each Building will have a 6" Fire Protection Service and a 4" Domestic water service. The water flows are sufficient based on recent flow tests.

SEWER

Sanitary sewer service is provided by an 18-inch municipal sewer main in Father Morissette Boulevard and combined sewer lines in the former Anne Street, Dutton Street, Kirk Street and French Street. The new project will require construction of new PVC sanitary sewer mains (to replace the combined sewer lines in Kirk Street, the former Anne Street, and the former Dutton Street) and sanitary services from the site to this main. The East Building will have three sanitary services matching the existing service locations. In the west, the Gym Building will have one new 6" sanitary service, Freshman Academy will have one new sanitary service and the 1980s Building will have a new 6" service matching location of the existing.

Two exterior grease traps (based on # of seats in cafeteria(s)) will be required for the sanitary sewer connections to culinary and kitchen waste lines. Acidic wastes from chemistry labs or other uses such as MEP systems will require neutralization prior to discharge into the main, and any interior floor drains will be directed to this system.

The existing 15-inch sewer line in the 10-foot sewer easement of the abutting property does not appear that it will be affected by the new gym.

While there is an increase in the number of staff and students over existing conditions being planned, water-conserving plumbing fixtures may mean that the sanitary loads to the existing systems in this area may not increase. This will be further reviewed as the design process.

NATURAL GAS

Gas service is available and currently supplied from gas mains in Arcand Drive, Father Morissette Boulevard, Kirk Street, French Street, Paige Street and the former Anne Street and the former Dutton Street. A new gas service(s) will be required for the proposed addition/renovation. National Grid Gas provides service for this area.

UNDERGROUND/ABOVE GROUND FUEL TANKS

No new underground storage tanks are anticipated.

ELECTRICAL, TELEPHONE, AND CABLE

Electrical, telephone, and cable service will be provided from underground lines in Arcand Drive, Father Morissette Boulevard, Kirk Street, French Street, and Paige Street. New transformers for electrical service will be required on each side of the campus and all services will be provided in underground ductbanks and/or conduit similar to existing conditions.

SOILS ANALYSIS

In November 2018, Nitsch Engineering performed four test pits at 75 Arcand Drive. Fill material was observed in each test pit at varying depths. No groundwater/seepage or redox was visible. Nitsch Engineering recommends that additional test pits in order to finalize the location and design of the drainage recharge system in order to comply with the Wetlands Protection Act and the MA Stormwater Handbook.

Refer to the Civil Engineering reports in the Appendix for more detailed information.

4.1.2.H – MASSING STUDY

BUILDING INTEGRATION INTO CONTEXT OF DOWNTOWN LOWELL

The existing High School site is a tight urban campus in downtown Lowell. This project will increase the size of the campus by adding the adjacent 75 Arcand property. The surrounding buildings range in size from small historic buildings, a stone church, the HH Richardson City Hall, and the Tsongas Arena. The diversity of the city and downtown Lowell is reflected in the few blocks that encompass the campus. Another unique quality of Lowell High is the division of the campus by an existing canal and historic trolley route. These features serve as constant reminder about the history of Lowell but are constraints in that they force the students to connect on campus via bridges over these features.

The existing building massing will mostly remain the same. The east campus historic 1922 3 ½ story building massing (approx. 63' tall) will remain unchanged with only moderate envelope improvements (windows, rooftop HVAC and some roof repairs) to alter the look. The front entry stairs and ramp will be rebuilt and improved for better access. The two connecting bridges will be replaced and improved with single story bridges with similar footprints (one location being moved south for better connectivity and movement within the buildings.)

The west campus will change with the added two story new gymnasium building (approx. 60' tall) to the south and the new five-story academic wing (approx. 72' tall in the current gymnasium location) which will better define the corner at Arcand & Father Morisette Blvd. This new construction will be the tallest building on campus. The renovated west campus 1980s building will be partially rebuilt with a larger three story addition to connect to the new gymnasium.

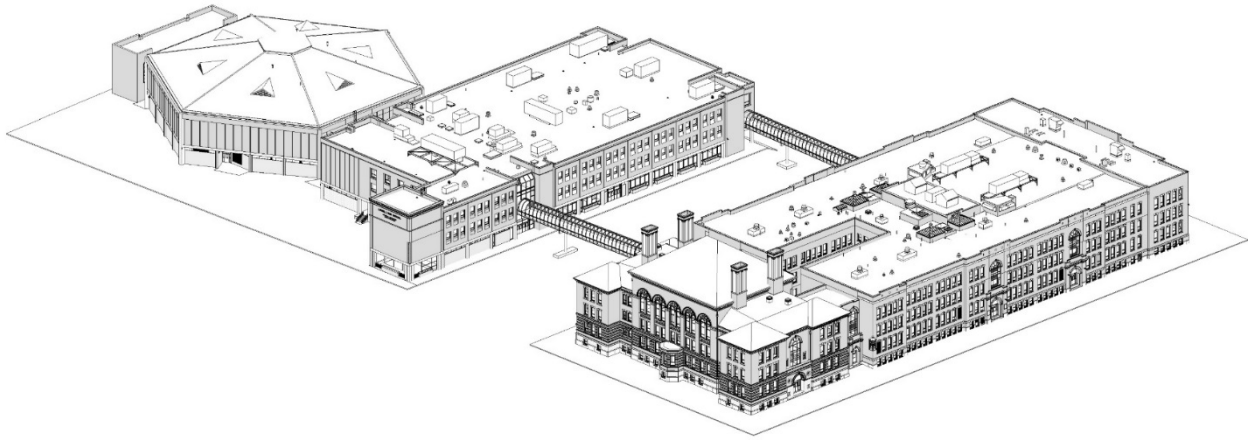
It is important to note the site improvements as they relate to massing- one project goal is to have better connections to the outdoors. Part of this is achieved by having windows/natural light into all core learning spaces; the other is achieved by creating and improving exterior spaces on campus. There is currently a lack of "green space" and this coupled with the density of the buildings on site crates a less than ideal campus setting. One proposed improvement is adding a substantial new "Quad" between the new Academic Wing (approx. 72' tall) and Gymnasium building (approx. 60' tall.) This Quad will face Arcand and become a secondary entry for students who enter the lobby from Arcand Drive. This Quad will serve as a useable outdoor space for learning, public farmer's markets, movies projected on the gymnasium wall, ROTC ceremonies and many other events the school can imagine. This space will be coveted as well as the existing canal "promenade" which will see improvements in the form of a plaza and outdoor eating area off the Cafeteria.

The materials palette is currently being developed; the existing materials will remain and be cleaned, repointed and fixed if required in portions of the building. The existing palette is yellow brick and stone base on the east campus and brown brick on the west campus. One goal of this project is to knit together these materials to give the campus an overall cohesive feel. The selection of materials is based on durability, maintenance and longevity of the materials. With that in mind, the proposed durable base is planned to be a polished CMU. This material has the look and feel of stone without the cost and is durable enough to withstand 50+ years in downtown Lowell. The height of this material is as low as 2'-8" in areas with first floor windows and as high as 10'-0" in areas such as the gymnasium building.

The upper material selection is also durable and will give the building a very civic feel. A light colored brick will be a neutral solution to knit the existing brick colors together. The durability of brick was a

leading factor in the decision as well as the low maintenance required became leading factors in the materials decision.

Existing Massing



Existing Massing (Birdseye)

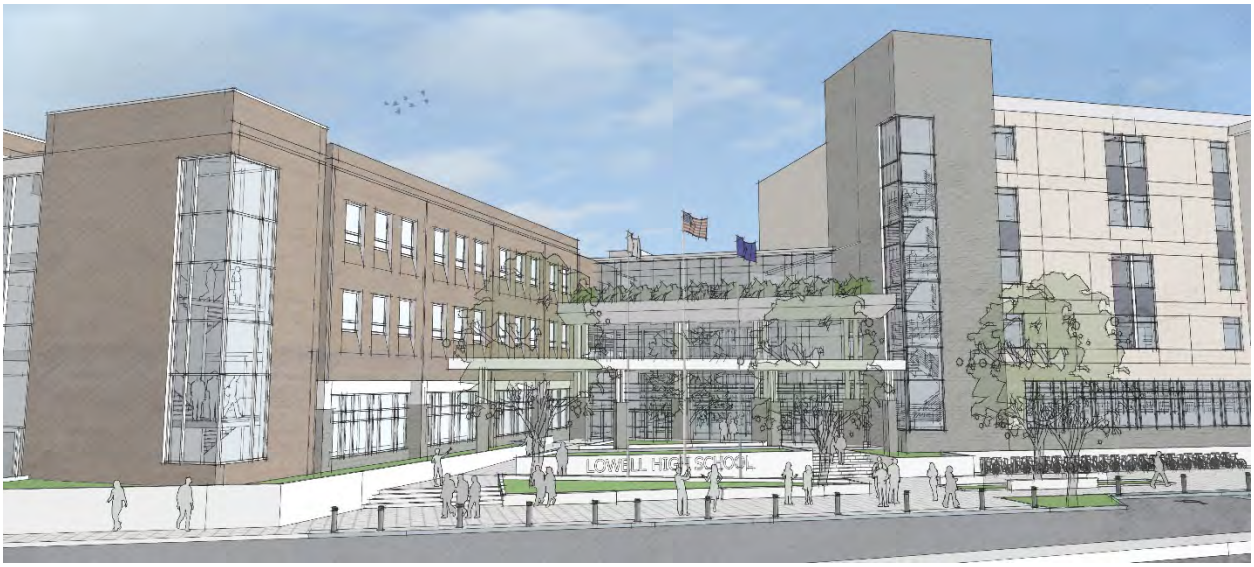
Proposed Massing (Birdseye)

View of five-story new construction academic wing

View of five-story new construction academic wing (left) & gymnasium (right)

View of two-story new construction gymnasium

View of entry with existing 1980's building (left) and five-story new construction academic wing (right)



Birdseye view of west campus (left) & east campus (right) connected by new bridges

View of the Historic 1922 Building from Father Morissette

View of the Historic 1922 Building from Kirk Street

LOWELL HIGH SCHOOL

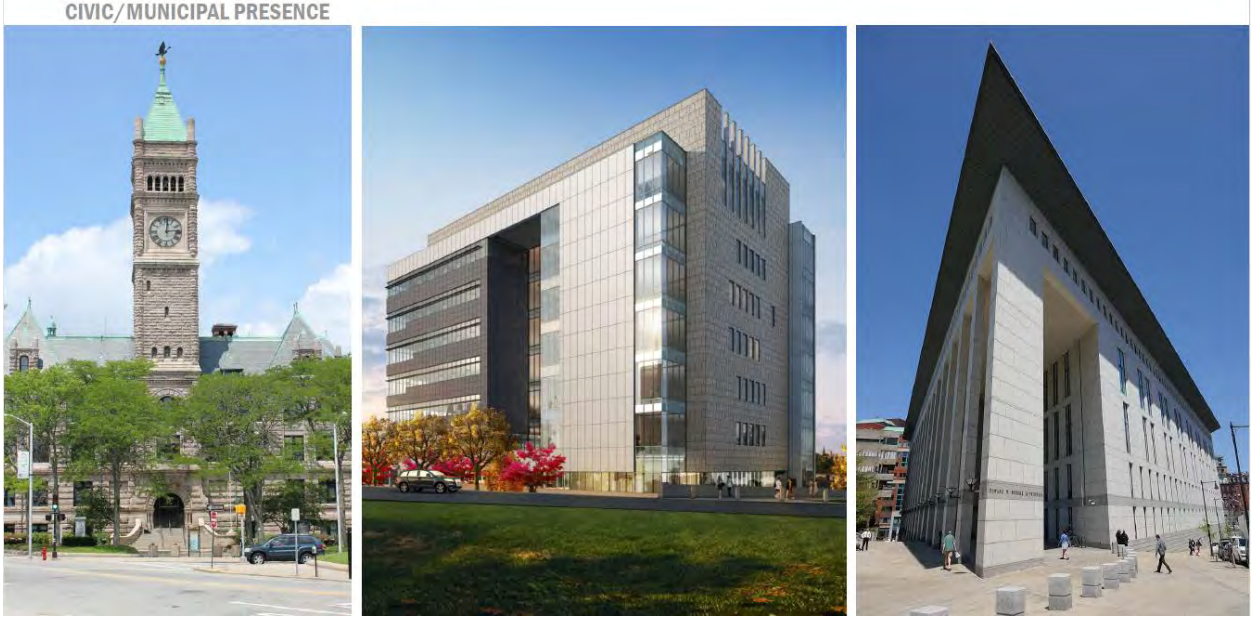
DOWNTOWN LOWELL ARCHITECTURE

LOWELL HIGH SCHOOL

KNITTING TOGETHER MATERIALS

LOWELL HIGH SCHOOL

CIVIC/MUNICIPAL PRESENCE

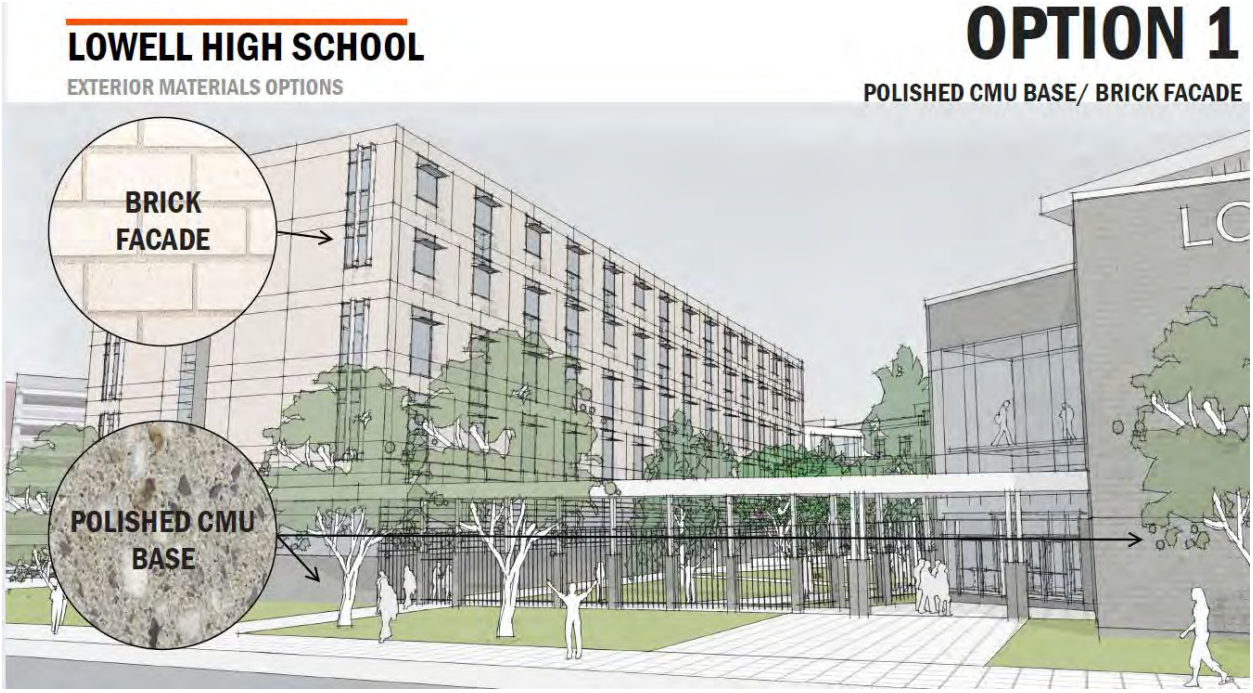


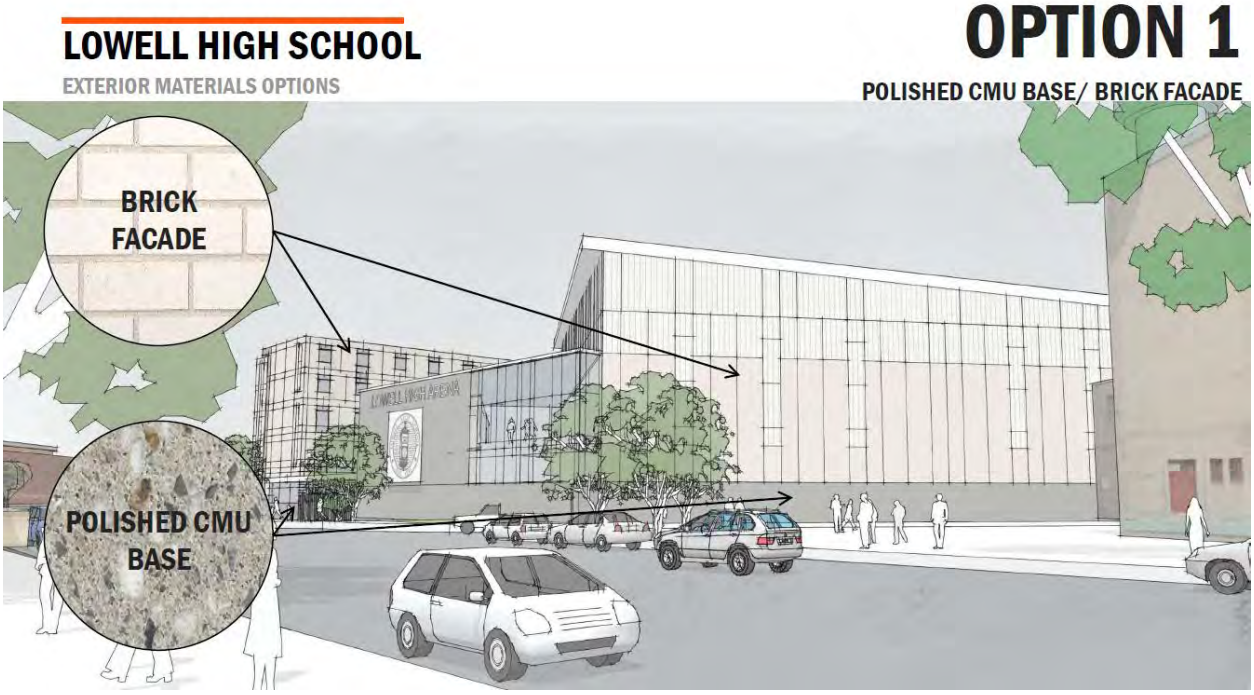
LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 1

POLISHED CMU BASE/ BRICK FACADE


LOWELL HIGH SCHOOL
EXTERIOR MATERIALS OPTIONS
OPTION 1
POLISHED CMU BASE/ BRICK FACADE
BRICK FACADE
POLISHED CMU BASE


LOWELL HIGH SCHOOL
EXTERIOR MATERIALS OPTIONS
OPTION 1
POLISHED CMU BASE/ BRICK FACADE
BRICK FACADE
POLISHED CMU BASE

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4.1.2.I – NARRATIVE BUILDING SYSTEMS DESCRIPTIONS

(Refer to room data sheets for additional information)

ARCHITECTURAL DESIGN

GENERAL

- Interior Doors – Solid core, clear finish quarter sawn white oak types as follows:
  - Fire Doors– stairs 60 minute
  - Fire Doors at assembly spaces –45 min rating
  - Solid Doors (glass sidelites as shown in plans) – typical classrooms, cross corridors,
  - Flush doors – electrical/mechanical, IDF, storage
  - Acoustical Gaskets as noted on Room Data Sheets
  - Provide threshold at all doors from the corridor into room at the east between columns 3-25
- Exterior Doors
  - Doors at West Entry, Auditorium Entry, Lobby, Cafeteria, Gym Vestibule Entry, all West Side entries – standard Kawneer Heavy Wall Doors – insulated glass top and bottom lites
  - Typical single and double doors – insulated G60 galvanized HM doors and frames
  - Each entry
    - At all vestibules –provide Mats, Inc "Advanced Track" metal/ carpet / recessed for full vestibule- no drain –provide recessed walk-off carpet for 10'-0" length.
- Hardware
  - Exterior doors – alum continuous hinges, Von Duprin rim type exit devices, keyed removable mullions, LCN closers
  - Heavy duty butt hinges, mortise lockset similar/equal to Sargent 8200 series with Monroe Handle, LCN 4011 series closers
  - All cross-corridor, stairwells, admin and student support suite entry doors to be on magnetic hold opens tied to Fire Alarm.
- Glass
  - Exterior – exterior lite PPG ¼" Heat strengthened Solexia – ½" air space – ¼"clear with Solarban 60 on surface # 3 – all glass within 42 inches of finished floor tempered or laminated safety glass
  - Interior – Fire rated glass at all rated locations, ¼" tempered / laminated safety glass. All Classrooms/labs, arts, tech, Sped, and admin spaces have 3'-0" x 7'-0"
  - Kalwall at upper gymnasium. Vision glass at lower north elevation openings only.
  - Ballistic glass to be used at both East and West Campus main entry vestibules, all admin/waiting, student support, all conference rooms, and all SRO Offices.
  - Fully fritted glass at East Campus exterior walls at bathrooms as noted on drawings.
  - Film applied letters/logos for 5% of exterior glazing and 5% of interior
  - Provide 1 way mirror glass at exterior glass up to 7' AFF at main admin, teacher dining, culinary kitchen/restaurant and cafeteria.
- Windows
  - East Campus: Historic Replacement Windows to be Pella Monumental Window (or similar) single-hung aluminum clad wood windows with mullions and metal mesh insect screens as indicated on elevations–assume white oak interior sills
  - West Campus: Aluminum-framed windows; 3-coat fluoropolymer finish, awning out/fixed types, metal mesh insect screens with full wicket.
- Storefront

  - Storefront EFCO 403 T – custom color
- Curtainwall
  - EFCO 5600 – custom color
- Window Treatment
  - Rolling mesh shades (3% open area) at all exterior windows in non-circulation spaces.
  - Roller Shades at all interior borrowed lights in classrooms and office spaces.
- Toilet Room Accessories (Product Standard – Bobrick brushed stainless)
  - Toilet Paper Dispenser – B-2892
  - Sanitary Napkin Dispensers, (1) in each women's room - B-370634
  - Sanitary Napkin Disposal – B-270
  - Grab Bars – B-6806.99 x 42 (2) per HC Stall
  - Mirror – B1658 1830 (no mirrors in gang toilets in 3-story classroom wing)
  - Soap Dispenser – B-2111
  - Hook (back of door at each single user restroom) – B-682
  - HC Shower seat – B-518/519 (right/left designation)
  - HC Shower grab bar – B-68616.99
  - Shower curtain/rod/hook – B-207, 204-1, 204-2
  - Mop Rack, (1) at each Janitorial Closet – B-239x34
  - HDPE – Floor mounted/overhead braced all 1" solid with raised dot texture – (2) colors required.
- Signage
  - Room Signs – Magnesium signs – 2 lines text each size 8 x 8 with inserts
  - 6 stainless steel plaques (18" x 24") – LHS, Arena, Auditorium, (2) Media Center, Television Studio
  - Interior brushed aluminum stand-off letter (8" tall) text – (2) Cafeteria (2) Gymnasium, (2)Media Center, (6) Administration, Student Support , Business & Engineering, Culinary Wing, Restaurant, School Store, Bank, Irish Auditorium, (2) Little Theater, Lowell Community Health Center, (2) Visual Art, (2) Colleen Creegan Media Studio, (2) Performing Art, (2) Freshman Academy
  - Exterior- Back Lit Post 24" high Letters- LHS ARENA, (2) LOWELL HIGH SCHOOL, LHS FRESHMAN ACADEMY, LHS AUDITORIUM, (2) METAL SCHOOL LOGOS
  - (20) Exterior Banner stanchions 12'wx24'h for banners
  - (18) Removal and Reinstallation of existing wood panels with plaques
- Casework
  - Institutional grade – Campbell Rhea solid white oak wood base and upper cabinets with solid surface countertops. Refer to Room Data Sheets for layouts and Quantity
- Custom Architectural Millwork
  - Solid white Oak wood, quarter sawn veneer over recycled MDF
- Acoustical Wall Treatments
  - Tectum – Fabri-tough wall panels size 2'0" x 6'0" assume 15% of wall surfaces in rooms that specify the finish- See Room Data Sheets
  - Tectum at Gymnasium Spaces
- Lockers
  - 15"w x15"d x 60" high custom color 2-tier heavy duty metal lockers on solid 4" high CMU Base, total of 3,800 lockers.
  - Athletic Lockers in Gymnasium First Floor Corridor. Equal amounts of 24"w x72"h x 18"d single tier, 18"w x36"h x 18"d 2-tier, and 18"w x 72"h x 18"d custom color heavy duty metal lockers on solid 4" high CMU Base.
  - Athletic Lockers in Team Rooms & Locker Rooms custom color heavy duty metal lockers on solid 4" high CMU Base.

- Elevators
    - See chart for all Elevator and LU/LA information.

Elevator Label	Bldg	Location	Opening Type	Flights	# of Landings	Size	Notes
A	East 1922	East side	Front-Back	Basement to 3rd Floor	5	3,000#	Piano access
B	East 1922	East side	Front-Back	1st to 3rd Floor	6	2,500#	
C	East 1922	East side	Front	Basement to Roof	4	4,000#	Theatre sets access
D	East 1922	Courtyard	Front-Back	1st to Courtyard	2	2,500#	LU/LA
E	West	1980s	Front-Back	1st to 3rd Floor	3	2,500#	
F	West	West	Front-Back	1st to Roof	4	3,000#	Kitchen use
G	West FA	FA	Front	1st to Roof	6	2,500#	

- Ramps
    - Anti-slip rubber flooring over CIP concrete (U.N.O.)
    - Stainless steel 1 ½"dia double handrails each side.

- Fireproofing
    - (West Side- ETR 1980's building) existing structure to be encapsulated with 2 hour rated GWB enclosures.
    - (West Side- New Construction- not including Gymnasium Building) 2 hour rated spray fire proofing throughout
- Fire Extinguishers
    - Carry 200 Fully recessed FE Cabinets throughout the building.
- Solar Shades
    - Horizontal and Vertical Fixed Aluminum Solar Fins (West Side) similar to Colt Solarfin system. See exterior 3d renderings and Room Data Sheets
- Light Shelves
    - Interior light selves at all typical classrooms.
- Display/Trophy Cases
    - 7'x18" lighted, 24 lf Main Lobby, 8 lf Career Center, 8 fl (6) Admins, 48 lf Gymnasium, 2x24 lf (2) Media Center, see plans at Visual Arts, 8 lf (6) Performance Arts, 24 lf ROTC, 48 lf Engineering

INDIVIDUAL SPACES

MAIN LOBBY WEST SIDE ("HEART OF THE SCHOOL")

- Walls –Wainscot – 4" thick Polished CMU to 5'-4" high, painted hardware wood cap + GWB above and Glass Curtainwall
- Floor- Linoleum Tile w/ waterjet cut design of graphic logo
- Ceiling- Metal Beam & Baffle Hunter Douglas Tavola (or sim) with linear LED lights, 20% GWB soffits

- Railings at Monumental Stair- Glass with Stainless Steel Handrails. 42" high GWB Kneewall at "open to above" areas with 30" high glass on top of kneewall
- (12) Aircraft cable wire suspended battens for banners, provide canvas placeholders

CORRIDORS – CLASSROOM WING (INCL. FLEX LEARNING)

- 2x4 ACT sim to Armstrong Ultima #1914 beveled tegular in 15/16" grid- See RCP markups for heights throughout
- Gypsum soffit assemblies at all flex learning
- Walls- Wainscot at corridor wall – 2 5/8" thick Polished CMU to 5'-4" high, painted hardwood wood cap + GWB above
- Base – Rubber Base
- Floors – (West Side) Linoleum Tile
    - (East Side) – Existing Terrazzo (all corridors between column lines 3-25) to remain, existing integral terrazzo base to be cut and demo'd with corridor wall. New Corridor wall to overlap cut line and new threshold installed.
- All non-terrazzo areas to be leveled and finished with Linoleum Tile.
- CMU wainscot terminates where display cases or lockers
- 50LF of wood built-in benches in Corridors.

TYPICAL CLASSROOMS/LABS (INCL. ALL SPED)

- Ceilings – 2x4 ACT sim to Armstrong Ultima #1914 beveled tegular in 15/16" (see Ceiling Plans for heights)
- Interior walls – Multi-layer gypsum wall board painted typical with accent color below 8'-0" datum – datum ½" Fry Reglet reveal joint at all walls.
- Base – Rubber Cove
- Floors- Linoleum Tile- Forbo MCT or sim
- 30'-0" marker board – 20'-0" tack board (see room data sheet)
- HM frames and side lights see plan
- Science labs to have epoxy resin tops

HOUSE SUITES (5), DEPT. OFFICE SUITE & SPED OFFICE SUITES

- Ceiling - 2x4 ACT sim to Armstrong #1915 Ultima beveled tegular 15/16" grid
- Base – rubber base
- Floors- Linoleum
- See plan for MB and TB; sizes vary

MEDIA CENTER (2 LOCATIONS)

- Ceiling – 2x4 ACT sim to Armstrong Ultima #1914 beveled tegular in 15/16" grid; restored wood coffers and crown- painted.
- Ceiling – 20% GWB Soffit
- Base – Rubber Straight
- Floor – Synthetic Carpet
- Circulation desk – custom millwork 15 LF with solid surface top
- Motorized shades
- See plan for MB and TB; sizes vary

TEACHER PLANNING ROOMS

- Same as classroom except as follows:

- See Room Data Sheet 4'-0" MB and 4'-0" TB

CUSTODIAL (C), STORAGE (S), ELECTRICAL (ELEC), ELEVATOR MACHINE ROOM (EMR) & MECHANICAL (MECH)

- Ceilings –Exposed structure and MEP (GWB ceiling at Rated rooms)
- Walls – Paint CMU or GWB (see plan)
- Base – Poured epoxy
- Floor – Poured epoxy

MUSIC (BAND, CHORUS)

- Same as Classrooms except:
- Fabric Wrapped Acoustical Wall Panels for 35% of the rooms wall surfaces
- Ceiling- Sloping Acoustical Ceiling- 50% high light reflectance ceiling tile (.90 LRV); 50% 2x2 Lay-in "wedge" acoustical tiles
- Floor – New LGMF floor w/ new subfloor as indicated on plans. Synthetic carpet tiles /rubber base- new stair and ramp as shown; rubber treads/risers and linoleum landings.
- Motorized shades

ART

- Same as Classroom except:
- Ceilings- exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid.
- Floors
    - 2D, 3D and Art Studio to be poured epoxy with integral base
    - Animation and Graphics to be Linoleum with RB

IDF / MDF

- Ceiling – Exposed structure and MEP (GWB ceiling at Rated rooms)
- Floor – Sealed concrete
- Walls – Painted CMU / Drywall or Painted CMU (See interior partition type plans)

GYMNASIUM

- Ceilings – Paint exposed structure and MEP components
- Acoustic deck and Tectum wall treatments (custom color panels)
- Walls – CMU painted
- Wall pads – provide 250 LF
- Floor – Athletic Wood competition court, Synthetic Athletic Floor side courts and track
- (10) Fabric gym divider curtains
- (1) hard panel divider curtain
- (10) Acrylic Backboards retractable- adjustable height
- (8) adjustable chin up bar
- sets of ceiling mounted climbing ropes
- sets of carbon fiber insets volleyball sleeves
- Full pit for long jump and triple jump
- center digital 4-sided scoreboard + (4) sets wall mounted scoreboards
- Provide (8) ceiling mounted de-stratification fans
- Bleachers- Fixed (5) 18LF x 7 tiers high, and Moveable- (9) 20LF x 7 tiers high

- Banners- mounting for existing 4'x8' Banners + own (12) additional large 8'x16' Athletic banners and mounting
- Motorized shades
- Perimeter tectum
- Traverse wall (structural reinforcement)
- Drop down batting cage
- Shot put cage

NURSE SUITE

- Ceiling - 2x4 ACT sim to Armstrong #1915 Ultima beveled tegular 15/16" grid
- Base – Rubber Cove
- Floors- Linoleum Tile

KITCHEN

- Ceiling – 2x4 – Armstrong Ultima #1937 Health Zone
- Walls – Multi-layer gypsum wall board painted with full height FRP throughout
- Base – integral poured epoxy with Schluter edges
- Floor – poured epoxy with Schluter edges

CAFETERIA

- Ceiling- Metal Beam & Baffle Hunter Douglas Tavola (or sim) with linear LED lights, 20% GWB soffits
- Provide OH door security grilles at POS openings – model #670
- Tectum wall treatment- 10% of Wall Area
- Walls –Wainscot – 4" thick Polished CMU to 5'-4" high, painted wood cap + GWB above and Glass Curtainwall
- Base – Rubber Base
- Floor- Linoleum Tile w/ waterjet cut design
- (75) Aircraft cable wire suspended battens for banners
- (4) Custom Millwork double sided built-in seating booths.
- Motorized shades

STAIRS

- At all NEW stairs (East Campus and West Campus) Misc. Metal/concrete filled pan stairs – Guardrails - 2x3 Tube Steel intermediates, 1x2 Steel bar top and bottom with 2x3 painted steel tube, inset ½ x ½ vertical steel pickets – handrails both sides 1-1/2" o.d. stainless steel handrails (U.N.O)
- At all RENO Stairs (East and West Campus) patch/repair damaged concrete treads; install bent steel infill at riser to meet MAAB nosing regulations. Rubber tread/Risers as indicated below. Repair all damaged steel guardrails and paint. Install new Stainless Steel railings both sides.
- Main lobby New Stair (East Campus and West Campus) – stainless steel handrails and prefabricated stainless steel guardrail system with ½" glass panel inserts.
- Upper level, Under stairs and landings – paint underside of stair assembly
- Treads –NORAMENT 825 series, landings sealed concrete – provide alternate color grit strip at uppermost tread of each run
- Walls – Epoxy Paint on CMU walls (U.N.O)
- Ceiling at uppermost level- 2x4 ACT Ultima

- See chart for all interior stair information.

Stair Label	Bldg	Location	Scope of Work	Flights	Notes
A	East 1890s	SE Corner	Renovation	Basement to 3rd Floor	
B	East 1922	East side	New	Basement to 3rd Floor	
C	East 1922	East side	Renovation	Basement to 3rd Floor	
D	East 1922	East side	Renovation (B-3), New (3-Attic)	Basement to Attic	
E	Not used				
F	East 1922	West side	New	1st to Attic	
G	East 1922	West side	New (1-3) & Renovation (B – 1)	Basement to 3rd Floor	
H	Not used				
I	East 1922		New	Basement to 3rd Floor	
J	East 1890s	SW Corner	Renovation	Basement to 3rd Floor	
K	East		New		
L	Not used				
M	West 1980	NW Corner	Renovation	1st to 3rd Floor	
N	West 1980	NE Corner	Renovation	1st to 3rd Floor	
O	West	East Side	New	1st to 3rd Floor	
P	West Gym	SE Side	New	1st to 3rd Floor	
Q	West Gym	SW Side	New	1st to 2nd Floor	
R	West	West side	New	1st to Roof	
S	West	Main Entry	New	1st to 2nd Floor	
T	West FA	NE corner	New	1st to Roof	
U	West FA	West	New	1st to 5th Floor	

ALL STUDENT & STAFF TOILETS

- Ceilings – MR GWB, assume one access panel per room
- Floors – poured epoxy with Schluter edges
- Base – integral poured epoxy with Schluter edges
- Walls – Epoxy paint on CMU Block Walls

LOCKER/TEAM ROOMS

- Ceilings – Techum ceilings, assume one access panel per room
- Floors – poured epoxy with Schluter edges

- Base – integral poured epoxy with Schluter edges
- Walls – Epoxy paint on CMU Block Walls
- Lockers
- Built-in benches

STRUCTURAL DESIGN:

INTRODUCTION

Foley Buhl Roberts & Associates, Inc. (FBRA) is collaborating with Perkins Eastman (PE) in the design of renovations and additions to the Lowell High School in Lowell, Massachusetts.

The new facility will be designed and constructed under the provisions of the Massachusetts State Building Code (780 CMR - Ninth Edition).

The purpose of this narrative is to summarize the basis of the structural design, describe the primary structural systems and provide structural quantities to be used in the preparation of the Schematic Design cost estimate. Outline Structural Specifications have also been included. This narrative should be used in conjunction with the Schematic Design Structural Drawings and the Schematic Design Documents of the other disciplines.

GENERAL DESCRIPTION

Proposed renovations and additions to the Lowell High School will include: renovations to the existing 1980 (west) and 1922 (east) buildings, complete demolition of the existing Fieldhouse and construction of a new five-story addition (which will house the Freshman Academy) in its place, partial demolition of the southern section of the 1980 building where a new three-story addition, demolition of the existing building at 75 Arcand Drive where the new Gymnasium will be constructed, and the demolition and reconstruction of the two elevated pedestrian bridges that connect the buildings to the east and west of the canal. The total area of new construction is approximately 230,000 gross square feet. The renovated existing buildings are approximately 300,000 square feet (1922 building), 92,000 gross square feet (1980 building), and 4,000 gross square feet (pedestrian bridges). The total area of the completed facility will be approximately 626,000 gross square feet.

New construction will be steel framed, for reasons of economy, performance, flexibility and speed of construction. Steel framing will be fire protected, as required to meet the requirements of Type IIA construction, with the exception of the Gymnasium, where Type IIB construction will be provided. All steel framed construction is considered to be restrained. The portion of the existing 1980 building to remain will be fire protected as required to meet the requirements of Type IIA construction. The existing 1922 building is not rated for fire protection.

The new Freshman Academy and adjacent lobby will be isolated from the existing 1980 building by a seismic/expansion joint as will the three-story addition to the south. An expansion joint and firewall will also be provided between the three-story addition to the 1980 building and the new Gymnasium to the south.

Based on the March 28, 2018 Geotechnical PSR Pricing Narrative by Geotechnical Engineering Services for New England (GPI), foundations are expected to be driven steel piles. The First Floor slab will be a reinforced concrete structural slab on grade supported by piles. No new Basement areas are proposed. Existing utilities and foundations, if present within the building footprint, will be removed and relocated to accommodate the new construction.

Typical floor construction will be a concrete slab on composite steel deck, supported by composite, structural steel beams and girders.

Typical roof areas will be framed with steel roof deck supported by structural steel beams and girders. The Gymnasium roof will be constructed with cellular acoustic roof deck supported by deep,

long span bar joists and steel girders. Portions of the new roof structure will be designed to accommodate green roof systems or photovoltaic (PV) panels. A concrete slab on composite steel floor deck will be provided below rooftop equipment and at proposed green roof areas. Where required, rooftop equipment will be surrounded by, visual/acoustic screens, structured with horizontal and vertical, galvanized HSS (tube) steel members, braced down to the main roof structure. Roof framing will be pitched for drainage, where practical.

Typical floor and roof steel framing will be surface prepped and be left unpainted, except where exposed steel is desired by the Architect, in which case steel members will receive one shop coat of primer, compatible with the finish paint or intumescent paint, where rated construction is required.

Typical columns will be wide flange sections or hollow steel tubes (HSS). Lateral stability for wind and seismic loads will typically be provided by steel bracing in each direction; rigid steel moment frames will be utilized in areas where bracing is not feasible (e.g. at the Freshman Academy lobby/connector).

Exterior walls will be a combination of glazing, architectural wall panels or masonry backed up with a steel stud cavity wall. Galvanized steel loose lintels will be provided at the heads of typical punched window openings at brick veneer conditions. Continuous galvanized relieving angles will be provided at each floor of the Freshman Academy.

Pending review and evaluation by the Construction Manager, demolition of the existing buildings and the abatement of hazardous materials may be conducted under a separate contract, prior to the construction of the new additions.

BASIS OF STRUCTURAL DESIGN

CODES AND DESIGN STANDARDS:

Building Code: Massachusetts Building Code - Ninth Edition (2015 IBC with Massachusetts Amendments)
Massachusetts Existing Building Code - Ninth Edition (2015 IEBC with Massachusetts Amendments)

Concrete: ACI 318 and ACI 301; listed standards, latest editions.

Structural Steel Standard: AISC "Specification for Structural Steel Buildings" and AISC "Code of Practice".

Steel Deck: Steel Deck Institute (SDI); listed standards, latest editions.

DESIGN LOADS/PARAMETERS:

Live Loads:

Classrooms/Offices	65 psf (including partitions)
Corridors (above the First Floor)	80 psf
Flexible, Open Plan Areas (including the Gym)	100 psf
Accessible Roofs:	100 psf
Stairs	100 psf
Mechanical Equipment Rooms	150 psf

Snow Loads:

Basic Ground Snow Load (Lowell)	50 psf (38.5 psf Flat Roof Design Snow Load)
Drifted Snow	Per code
Wind Loads:	
Basic Wind Speed (Ultimate):	134 mph
Wind Exposure Category:	Category C
Seismic Parameters:	
Short Period Spectral Response Acceleration (Ss):	0.235
1.0 Second Spectral Response Acceleration (S1):	0.074
Seismic Occupancy Category:	III
Seismic Design Category:	B
Site Class:	D
Structural System:	Building Frame System Concentrically Braced Frames (Not Specifically Detailed for Seismic Resistance)
Response Modification Coefficient (R):	3.0
System Overstrength Factor (Ω0):	3.0
Deflection Amplification Factor (Cd):	3.0

FOUNDATIONS:

The preliminary foundation design is based on driven conical point pipe piles; 10.75" diameter with a 190 Kip (95 Ton) capacity, driven to bear in the dense glacial till, weathered rock or on bedrock (30 to 50 feet long).

CONSTRUCTION CLASSIFICATION:

New construction (except for the Gymnasium Addition) will be classified as Type IIA (Noncombustible, Protected). Typical steel floor and roof members, except secondary structural members located 20 feet or more above the adjacent floor and steel roof deck require fire protection. All steel framed construction is considered to be restrained. The Gymnasium addition will be classified as Type IIB where steel floor and roof members do not require fire protection. Refer to the Architectural Drawings for additional fire rating requirements at Stairs, Electrical Rooms, etc.

STRUCTURAL SYSTEMS DESCRIPTION

(Refer to the Schematic Design Structural Drawings for additional information)

NEW CONSTRUCTION

Structural systems for new construction are described in this section. The anticipated scope of structural work in the existing buildings is described in a later Section of this narrative.

A Substructure

A10 Foundations

(Refer to the Preliminary Geotechnical Engineering Report):

As noted earlier in this report, the new buildings will be supported on 190 Kip capacity, conical point pipe piles approximately 30 to 50 feet long. At the foundation level, wind and seismic (lateral) loads will be resisted by passive pressure or by battered piles, if inadequate passive pressure exists.

Individual columns (at the building interior and perimeter) will be supported by conical point piles with reinforced concrete pile caps. At the building perimeter, reinforced concrete grade beams will span between pile caps, supporting the exterior walls and the edge of the First Floor slab. Interior sections of the First Floor slab will typically be supported at column locations; single, intermediate slab support piles will be required at larger, atypical structural bays. A thickened, reinforced concrete slab/beam (18" deep) will be provided to brace/tie typical pile caps (refer to plans). Pile caps for columns in lateral bracing bays will be tied together with a reinforced concrete grade beam. The need for perimeter foundation drainage will be evaluated by the Geotechnical Engineer (not anticipated).

A1010 – Standard Foundations

- 18" thick, 4'-6" deep continuous grade beams (no footings), including an 8" wide masonry shelf, with continuous top and bottom reinforcing (90.0+/- plf), spanning to pile caps. The outside surface of perimeter grade beams will receive a troweled-on bituminous mastic. The bottom of the grade beam will be a minimum of 4'- 0" minimum below the exterior finish grade for frost protection. Pilasters at perimeter column locations/pile caps will be 24 inches square, with 40 plf reinforcing.
- Typical perimeter piles and reinforced concrete pile caps: Refer to the Schematic Design Structural Drawings. The bottom of all perimeter pile caps will be located a minimum of 4'-6" below the exterior finished grade.
- Typical interior piles and reinforced concrete pile caps: Refer to the Schematic Design Structural Drawings.
- Typical piers/pilasters at interior/perimeter columns: 24 inches square, reinforced concrete with 50 plf reinforcing.
- Typical intermediate slab support piles: one (1), 95 ton, conical point pipe pile per 800± sf of the First Floor slab. Locally thicken the structural slab on grade to 18" deep at each slab support pile.
- Typical grade beams interconnecting footings in bracing bays: 2'-0" wide by 2'-6" deep with 75 pounds per linear feet of reinforcing.
- Anchor Rods: Anchor rods at column base plates shall conform to ASTM F1554 – Grade 36 and shall be headed type. Provide a minimum of four (4), ¾" diameter anchor rods at all columns; additional anchor rods and/or larger diameter rods will be required at bracing locations.

A1020 – Special Foundations

- Elevator pits: Elevator pit construction will consist of 12" thick, reinforced concrete walls and an 18" thick, reinforced concrete foundation mat with an integral sump pit, supported on conical point pipe piles. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevator shaft walls will be 100% solid grouted, reinforced CMU construction (12" thick).
- Pedestrian Bridges: 8'-0" wide x 16'-0" long x 3'-0" deep foundation mat with 4,000 pounds of reinforcing, supported on eight (8), 60 ton, conical point pipe piles.

A1030 - First Floor Structural Slabs

First Floor construction will typically be a 10" thick, reinforced concrete structural slab on grade (7.0 pounds of reinforcing per square foot), supported by interior pile caps at columns (and at mid-bay at

some locations) and by reinforced concrete grade beams at the building perimeter. The slab will be underlain by a vapor barrier and rigid insulation. The First Floor slab may need to be depressed in certain areas, to receive flooring materials. Sub-slab utilities will be hung from the underside of the slab.

B Shell

B10 Superstructure

Structural Bays/Spans: Refer to the Schematic Design Structural Drawings.

Story Heights/Floor Elevations:
Refer to the Schematic Design Structural and Architectural Drawings.
Steel Framing Connections: Type 2 simple framing connections (shear only); double clip angles typically.
Columns: Typical columns will be wide flange steel sections or steel tubes (HSS). Refer to the Schematic Design Structural Drawings.

Lateral Force Resisting System:
Lateral (wind and seismic) forces will be resisted by steel bracing, for reasons of economy, stiffness, reduced structural depth and smaller column sizes. Bracing members will be square or rectangular HSS sections. Brace configurations may include chevrons, inverted chevrons ("V"), or single diagonals in short bays, as required by structural and architectural considerations. Rigid steel moment frames will be provided in locations where bracing is not feasible (Freshman Academy lobby/connector).

Expansion (Seismic) Joints:
Three major expansion joint locations are proposed. One will be located on the west side of the 1980 building, isolating the new Freshman Academy and lobby from the existing structure. A second joint will be located at the south side of the existing to remain portion of the 1980 building, separating the new three story addition from the existing structure. The last will be located between the new Gymnasium Addition and the south side of the new three story addition. A firewall will also be provided at this location. In addition, the two pedestrian bridges will be isolated from the existing buildings and new additions at each end. Refer to the Schematic Design Structural Drawings.

Fire protection:
As previously noted, new construction at the five- and three-story additions is classified at Type IIA Construction (Noncombustible, Protected). Typical steel floor and roof members (beams, columns and bracing, except secondary structural members located 20 feet or more above the adjacent floor) and steel roof deck require applied fire protection for a 1 hour rating. Steel members (beams and columns) supporting 2 hour rated fire separation walls will have a 2 hour rating. All steel framed construction is considered to be restrained. Exposed, structural steel roof framing will require intumescent paint to achieve the required fire rating. The Gymnasium addition is classified as Type IIB (unprotected). Diagonal members in lateral bracing frames do not require applied fire protection.

Pedestrian Bridges:
The two bridges will be steel framed, with supports on the east and west sides of the canal (creating three (3) spans). An expansion joint will be provided at each end of each bridge at each level. The new bridges will have a pile foundation.

Elevator Shafts:

New elevator shafts will be 12" thick, 100% solid grouted, reinforced concrete masonry unit (CMU) construction, supported on 12" thick reinforced concrete elevator pit walls and a 2'-0" thick reinforced concrete elevator pit mat.

Stair Shafts:
Stair enclosures will be 12" thick, 100% solid grouted, reinforced concrete masonry unit (CMU) construction.

B1010 Floor Construction

Typical Upper Level Floor Construction:
3½" thick (minimum), normal weight concrete topping slab on a 2" deep, 18 gauge, composite type, galvanized steel floor deck (5½" minimum total slab thickness), reinforced with welded wire fabric, spanning to composite wide flange steel beams. Steel beams span to composite wide flange steel girders that are supported by wide flange steel columns or HSS (tube) steel columns. All composite steel beams and girders will be unshored. Composite action will be achieved by field welding ¾" diameter x 4" long headed shear studs through the deck, to the top flanges of the beams and girders. To avoid compromising composite action, conduit or other, similar embedded items should not be placed in the concrete slab on steel deck construction. Slabs on composite steel floor deck will be placed at the required elevation, adding concrete to compensate for the deflection of the (unshored) steel framing (assume an approximate average of ¾" additional concrete required over the bay area).

The estimated total weight of structural steel for the various, steel framed areas of new construction (including beams, columns, joists, bracing, plates, angles, miscellaneous frames, galvanized equipment screens (assuming 660 linear feet), connections, etc., but excluding loose lintels, secondary exterior wall framing, entry canopies, etc.) is as follows:

Freshman Academy Addition:	785 Tons
Gymnasium Addition:	250 Tons (Bar Joists), 490 Tons (All other steel)
1980 Addition:	395 Tons
Bridges:	120 Tons (Total)

B1020 Roof Construction

Typical Roof Construction: 1½" deep, 18 gauge, galvanized steel roof deck spanning to wide flange steel beams. Steel beams are typically supported by wide flange steel girders, which span to wide flange steel columns or HSS (tube) steel columns. As noise and vibration will be a concern where roof top mechanical equipment is located, these sections of the roof will be framed with a 3½" (minimum) deep, regular weight concrete topping slab on a 1½" deep, 18 gauge, composite type galvanized steel floor deck (5" minimum total slab thickness), supported by composite, wide flange steel beams and girders. Green roof areas will be framed similarly. Galvanized steel frames, constructed with HSS members and field bolted connections, will support acoustic/visual screens around rooftop equipment where desired. The cooling tower will be supported on a galvanized steel frame.

Gymnasium Roof Construction: 3" deep, 18/20 gauge, galvanized cellular acoustic roof deck supported by clear-spanning, deep long span bar joists and steel girders.

Where practical, roof drainage will be achieved by sloping the steel to the internal drains. Some areas of tapered insulation should be anticipated, at locations where it is not practical to slope the steel.

Refer to Floor Construction above for Estimated Weight of Structural Steel

B20 Exterior Enclosure

B2010 Exterior Walls

Exterior walls will typically be masonry veneer (cavity wall construction), with areas of glazed curtainwall and architectural panels. A galvanized, light gauge steel stud backup wall (16 gauge minimum thickness) will be constructed at masonry veneer areas. Vertical slip joints will be provided in the metal stud backup system at each level. Due to the height of the proposed Freshman Academy addition, continuous galvanized steel relieving angles will be provided at each floor level to limit the height of masonry veneer to 30 feet or less. Intermediate, HSS Steel girts will be provided at the Gymnasium exterior walls, to laterally support the wall construction at mid-height.

ANTICIPATED SCOPE OF STRUCTURAL WORK – EXISTING BUILDING RENOVATIONS

Comments relating to proposed renovations, alterations and additions to Lowell High School are presented in this section. Renovations, alterations, repairs and additions to existing buildings in Massachusetts are governed by the provisions of the Massachusetts State Building Code (MSBC - 9th Edition) and the Massachusetts Existing Building Code (MEBC). These documents are based on amended versions of the 2015 International Building Code (IBC) and the 2015 International Existing Building Code (IEBC), respectively.

This project involves the renovation of three structurally separate buildings: the 1980 Building that is north of an existing expansion joint, the original 1890's Coburn Hall and 1922 Addition (which act together since there is no structural joint), and the 1995 addition to the 1922 Building (which is structurally separated with an expansion joint). For each of these structurally separate buildings, the proposed renovations will be classified as Level 3 Alterations. As such, seismic hazards such as anchorage of floor and roof diaphragms to masonry walls, bracing of chimneys and parapets, etc. will need to be addressed by code.

1922 Building

Building Exterior:

In general, the existing yellow brick and mortar around the building's exterior are in satisfactory condition, with a few exceptions:

- In a several locations, steel lintels over punched windows are showing signs of distress (lintel is sagging, rust is present, brick above is displaced, etc.); specifically those over the lower level basement windows. Assume approximately 10% lintel replacement; the balance of lintels should be cleaned and coated.
- There are open joints in the brick and stone in limited areas, where repointing is required. Assume that less than 10% of the façade area requires repointing.
- Remove and replace existing concrete ramp and stairs at Auditorium entrance. Refer to the Architectural SD Drawings for additional information.
- Sections of the masonry cornice around the perimeter of the building were damaged or missing in some locations. Further evaluate the condition of the cornice around the building perimeter; repair/reset cornice units as required.
- Downspouts from roof gutters discharge directly adjacent to the basement walls of the 1892 building. All downspouts should be properly piped away from the building (to a drainage structure), to eliminate roof rainwater from being discharged adjacent to basement walls.
- Efflorescence was observed on the north façade of the 1997 addition. Clean/restore exterior masonry surfaces.

Roof:

- Gale Associates, Inc. has prepared roof replacement documents for the 1922 and 1995 additions; refer to the Roof Replacement and Associated Work (Drawings and Specifications, 100% Submission dated August 3, 2018). Both additions will be re-roofed though existing unreinforced masonry parapets will not be braced as part of that project. As such, masonry parapets will be need to braced as part of the LHS project. Refer to the Schematic Design Structural Drawings for parapet locations in need of bracing. No other roof repair work will be required other than that which is required to accommodate rooftop work associated with the proposed renovations (new mechanical units, screens, etc.)
- A package mechanical room platform is proposed at the roof above the classrooms just south of the existing Auditorium. Install galvanized steel frames for supporting this platform with new rooftop MEP/FP equipment. Frames must span to existing column or masonry bearing wall locations.
- Provide galvanized steel frames to support new rooftop equipment that is not part of the package mechanical room platform. Refer to the Schematic Design Structural Drawings for roof equipment locations. Frames must span to existing column or masonry bearing wall locations. There are no visual/acoustic screens being proposed at the 1922 Building.

Masonry Walls:

- Interior masonry walls: Most interior brick masonry walls are load-bearing, and they also provide lateral force resistance. As such, demolition of interior masonry walls (or portions thereof) will be minimized. The anchorage/bracing of interior masonry bearing walls and the remaining (non-structural) masonry partitions to the floor and roof construction, as well as the evaluation of height-to-thickness ratios will be required. The preliminary cost estimate should include an allowance to anchor/brace the tops of all perimeter and interior masonry walls and interior masonry partitions (approximately 4'-0" o.c. spacing of anchors/braces).
- Exterior masonry walls: The anchorage of these walls to the floor and roof construction will need to be evaluated. The preliminary cost estimate should include an allowance to anchor all exterior masonry walls (approximately 4'-0" o.c. spacing of anchors.
- Modifications to interior masonry bearing walls: Several walls are proposed to be removed to accommodate larger classrooms and new conference rooms. The walls that are proposed to be removed support floor structure. The demolition of these walls will require temporary shoring of the floor structure and installation of new steel beams and columns. New openings in the existing masonry bearing walls for new MEP/FP services will be minimized. Where new openings are required in the existing wall construction, new lintels will be installed above.
- Corridor walls: The interior 2'-10" wide corridor double walls comprised of 4" gypsum tile walls on each side, with cross walls at vent locations, will be demolished and replaced with a thinner, single wall to gain space on the classroom side typically. The brick masonry encasing the steel columns within these corridor walls will also be demolished. Existing steel columns will need to be protected with applied fireproofing. Existing slab openings at the corridor wall vent locations will be infilled with a 3½" thick, normal weight concrete topping on a 2" deep composite type, galvanized steel floor deck, supported by new steel angles (fireproofed) anchored into existing concrete encased steel beams.
- New concrete masonry walls are proposed at bathroom locations at the basement level and elevated floors. At the basement of the 1890's building and 1922 building, the existing slab on grade will be demolished and replaced at new concrete masonry wall locations. At the elevated floors, Refer to the Schematic Design Structural Drawings for locations where reinforcement of the existing structure is anticipated.

Elevators:

- The existing elevators in the original Coburn Hall and in the 1922 addition will be demolished. Where necessary, the existing slab opening will be infilled with a 3½" thick, normal weight concrete topping on a 2" deep composite type, galvanized steel floor deck, supported by new beams attached back to existing masonry bearing walls.
- Two new elevators are proposed in the 1922 Addition. These new elevators will require new pits, the construction of which will require underpinning of the existing foundations (existing slab and foundation construction to be verified). Elevator pit construction will consist of 12" thick, reinforced concrete walls and a 2'-0" thick, reinforced concrete elevator pit mat with an integral sump pit. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevators will be supported on all floors by new steel beams attached back to existing masonry bearing walls.
- One new elevator is proposed at the existing stairs adjacent to Coburn Hall. This new elevator will require a new pit, the construction of which will require underpinning of the existing foundations (existing slab and foundation construction to be verified). Elevator pit construction will consist of 12" thick, reinforced concrete walls and a 2'-0" thick, reinforced concrete elevator pit mat with an integral sump pit. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevators will be supported on all floors by new steel beams attached back to existing masonry bearing walls.
- A new elevator is proposed in the existing courtyard between the 1890's Coburn Hall and the 1922 Addition. This elevator will only service the courtyard level and first floor. Elevator pit construction will consist of 12" thick, reinforced concrete walls and a 2'-0" thick, reinforced concrete elevator pit mat with an integral sump pit. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevator shaft walls will be new 12" thick, 100% solid grouted, reinforced concrete masonry unit (CMU) construction.

Auditorium:

- The main entrance to the auditorium is being modified - the floor elevation will be altered, as well as locations of steps and ramps. Install new structure and reinforce existing structure as required to accommodate new entrance design.
- The existing auditorium floor is warped in some locations (i.e. the ramp at the entrance doors, handicap seats). The existing built-up wood floor at these locations will be removed and replaced in order to create a code-compliant floor slope. The existing auditorium floor structure will be reinforced locally as required.
- New ramps will be constructed from the stage floor to the auditorium floor and from the stage floor to the first floor corridor behind the stage. These ramps will be light frame construction in order to minimize the additional weight on the existing floor structure.
- The existing structure above the stage is not standard for a theater counterweight rigging system. As such, the existing beams will be removed and replaced with new steel beams.
- A new catwalk will be installed at the interstitial attic space between the third floor ceiling and roof. The catwalk will be located between and supported off of the existing roof trusses. Two new openings in the existing auditorium side walls will be required for access to the catwalk.
- The railing at the front of the Auditorium Balcony is only 33" +/- high and does not meet current code requirements. *Remove the existing railing and install a new, code compliant railing system.*

Basement:

- Install a new self-leveling topping at the basement to improve the appearance and imperfections of the existing slab.
- New concrete ramps will be constructed at various basement rooms that are at different elevations.

Floor/Roof Modifications:

- Infill the existing slab openings at the stair where the new bridge will be located. Slab infill to be 3½" thick, normal weight concrete topping on a 2" deep composite type, galvanized steel floor deck, supported by new beams attached back to existing masonry bearing walls.
- Infill the existing slab opening at the southeast lightwell on all floors. Slab infill to be 3½" thick, normal weight concrete topping on a 2" deep composite type, galvanized steel floor deck, supported by new beams attached back to existing masonry bearing walls. Maintain existing masonry wall piers but open up wall below existing lintel at two sides.
- Infill existing openings, chases, etc. in the floor and roof construction, as required. Slab infill to be 3½" thick, normal weight concrete topping on a 2" deep composite type, galvanized steel floor deck, supported by new steel beams in the 1922 building. Floor infills within the existing Coburn building shall be plywood over engineered lumber to match the existing floor construction.
- The centrally located Attic Level Mezzanine addition in the original 1892 building will be removed. Existing Attic Floor spaces on the east and west sides of the building will be utilized for MEP/FP purposes. Preliminary cost estimates should carry an allowance to reinforce these areas to support new equipment ($5.00/SF +/-).
- Create new openings, chases, etc. in the floor and roof construction, as required to accommodate new MEP/FP services. Wherever possible, reuse existing openings for new MEP/FP services.
- Core existing slabs for MEP/FP services, as required.
- Terrazzo flooring has cracked in some areas; elsewhere (tile) flooring has failed (potentially due sub-slab to moisture conditions). Repair areas of damaged and/or deteriorated flooring as required.
- Provide floor slab or decking over LGMF infill floors at proposed Music, Chorus, Piano, and adjacent stair runs below basement corridor.

1980 Building

Building Exterior:

- Horizontal cracks in the face brick soldier course at the precast lintels (below the steel relieving angle) at the second and third floors were observed. This condition represents a potentially hazardous situation. The Schematic Design cost estimate should include costs to replace the precast lintel at all windows (the hung relieving angle system does not appear in need of repair).
- Cement board panels around the building are in various stages of deterioration (broken, detached, missing, open joints, etc.). Repair/replacement of panels required.
- Some cracks were observed in exposed foundation walls; including one location at the northwest corner of the Academic Wing. Repair by epoxy injection recommended, to prevent further freeze-thaw deterioration.
- Lateral Load Resisting System: As a number of existing shear walls are being demolished to accommodate the new program, a new steel braced frame system will be installed in both directions. Many of the new braced frame locations coincide with locations of existing shear walls. It is currently anticipated that most existing steel column and beam sizes at these locations will be adequate with minimal reinforcing (to be confirmed). Refer to the Schematic

Design Structural Drawings (Brace Frame Elevations) for locations where existing beams will need to be reinforced or replaced. Similarly, minimal impact to the existing grade beams and pile caps/piles is expected. At locations where a new braced frame is being added and there is not currently a shear wall, the existing structural slab will be demolished in order to install a new grade beam between existing pile caps. New grade beams are to be 2'-0" wide x 2'-6" deep with 75 pounds per linear feet of reinforcing. The existing slab is to be replaced above new grade beams.

- The estimated total weight of structural steel in the renovated portion of the 1980 building for new bracing and reinforcing of any existing beams and columns is: 110 Tons.

Masonry Walls:

- Interior masonry shear walls: As noted above, a number of walls will be demolished to accommodate the proposed Architectural layout. The few that are remaining will need to be evaluated for anchorage/bracing at the floor and roof construction as well as height-to-thickness ratios. The preliminary cost estimate should include an allowance to anchor/brace the tops of all remaining, (non-structural) interior masonry partitions (approximately 4'-0" o.c. spacing of anchors/braces).
- Exterior masonry walls: The anchorage of these walls to the floor and roof construction will be evaluated. The preliminary cost estimate should include an allowance to anchor all exterior masonry walls (approximately 4'-0" o.c. spacing of anchors). New windows are proposed in the north existing masonry wall at classroom spaces. Install new lintels to support the existing brick above the new windows. New openings are proposed in the northwest and northeast stairwell corner walls. (New braced frame diagonals mentioned above will be exposed in these new glazing). Install additional new steel above and below openings as required to support the existing masonry above, and the new glazing.
- New interior partitions at bathrooms will be reinforced CMU construction (8" thick). In order to support the added weight, the existing framing members and connections will be reinforced as required.

Floor/Roof Modifications:

- Install galvanized steel frames for new rooftop MEP/FP equipment, as required. Refer to the Schematic Design Structural Drawings for roof equipment locations. Frames must span to existing column locations.
- Provide galvanized steel frames to support visual/acoustic screens around some rooftop units. Refer to the Schematic Design Structural Drawings for roof screen locations. Frames must span to existing column locations.
- The estimated total weight of structural steel for the galvanized equipment screen in the renovated portion of the 1980 building is: 4 Tons.
- A new opening in the steel framed floor and roof construction is planned to create a new light well through the building. At the second and third floors, the opening will require the demolition of the existing slab and existing open web steel joists. Existing steel girders at column lines are to remain. At the roof, the opening will require the demolition of 1½" deep roof deck and of open web steel bar joists. Similar to the floors, the existing steel girders at column lines are to remain. Above the lightwell, a roof monitor will be added. Steel posts will be added to existing steel columns and steel roof beams will frame out the sloped roof.
- Core existing slabs for MEP/FP services, as required.
- Create new openings, chases, etc. in floor and roof construction as required to accommodate new MEP/FP services.
- Infill existing openings, chases, etc. in the floor and roof construction as required. At the second and third floors, slab infill to be 3½" thick, normal weight concrete topping on a 2"

deep composite type, galvanized steel floor deck, supported by new steel beams. New concrete slabs will be doweled into the existing concrete. Roof openings will be infilled with 1½" deep roof deck, supported by steel angles or channels.

- At the two-story space by the main entry, the existing slab on the second floor will be demolished. Existing open web steel joists will be cut and removed. Existing girders on column lines are to remain.
- Where the new bridge interfaces with the existing building at the second and third floors, the existing slab will need to be modified in order to accommodate a slip connection. The existing exterior masonry wall at the bridge location will be demolished.
- A new ramp is proposed in the seminar room on the second floor. Ramp construction to be 5" normal weight concrete on top of polystyrene voided forms.
- At the culinary rooms, new kitchen equipment will require slab depressions on the order of 4" to 7". There will also be new piping under the slab. The existing structural slab at the affected column bays will be demolished and replaced in order to accommodate this work.

Elevators:

- A new elevator is proposed near the center of the building. The elevator will be located so as to avoid the existing pile caps. Elevator pit construction will consist of 12" thick, reinforced concrete walls and an 18" thick, reinforced concrete foundation mat with an integral sump pit, supported on drilled mini-piles. Waterstops will be provided at all construction joints and all interior surfaces of the elevator pit will be waterproofed. Elevator shaft walls will be 100% solid grouted, reinforced CMU construction (12" thick).
- At the second floor and third floors, the existing slab will need to be demolished to create the slab opening for the new elevator. Existing open web steel joists and steel beams/girders will be sawcut and headed off with new structure.
- At the roof, the existing 1½" deep roof deck will need to be demolished to create the slab opening for the new elevator. Existing open web steel joists and steel beams/girders will be sawcut and headed off with new structure.

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FIRE PROTECTION DESIGN:

INTRODUCTION

All new fire protection system will be provided for the entire school. East and West campus will have separate fire protection systems.

SYSTEM DESCRIPTION

EAST CAMPUS FIRE PROTECTION SYSTEM:

1. New 6" sprinkler service with double check valve assembly will enter at water room located in the Basement.
2. A fire pump is not required for the East Campus.
3. Provide 4" standpipes with fire department valves at all stairs. Drain riser will be provide at combination standpipe/sprinkler riser.
4. Sprinkler system will be zoned per floor for a total of 3 zones. First Floor, Second Floor and third floor.
5. Provide a roof hydrant.
6. Dry system will need to be provided for combustible attic space.
7. Two Fire department valves to be provided at stage.
8. Two fire department connections to be provided. FDC type per Lowell Fire Department.
9. Since the East campus renovation will be phased, existing fire protection system will need to remain active in areas that are being occupied.

WEST CAMPUS FIRE PROTECTION SYSTEM:

New 1,000 GPM fire pump to serve the west campus based on Freshman Academy being classified as a high-rise building. Fire Pump, Jockey pump, fire pump control panel and jockey pump control panel shall be located in 2-hour rated room with direct access to the outside. This room will be located at new 2-Story Gym Building.

Gym Building:

1. 6" fire service with double check valve assembly will enter new fire pump room. Fire department connection (FDC) and fire pump test header will be provided on exterior wall of the fire pump room.
2. Provide 4" Standpipe with fire department valves at west stair.
3. Provide 4" Combination Standpipe with fire department valves and drain riser at east stair. Building will be zoned per floor for a total of 3 zones. First Floor, Second Floor & Mezzanine Level.
4. Kitchen Hoods to be provided with Ansul System.
5. Dry Heads provided for walk-in freezers and coolers.
6. Provide capped 6" standpipe feed for future extension to Freshman Academy and 1980's Building.
7. Provide Roof Hydrant.

Freshman Academy:

1. In order to build new Freshman Academy, the existing Field House needs to be demolished. The Sprinkler service that feeds the existing 1980's building originates from the Field House.
2. Prior to Field House being demolished, 6" standpipe feed will need to be back-fed into 1980's Fire Protection system to keep in active during construction of the Freshman Academy. Once the 1980's sprinkler system is back-fed, the sprinkler service at the field house can be demolished and removed.

3. Extend 6" standpipe feed from Gym building to new Freshman Academy.
4. Provide 4" Standpipe with fire department valves at west stair.
5. Provide 6" Combination Standpipe/sprinkler riser with fire department valves and drain riser at east stair. Building will be zoned per floor for a total of 5 Sprinkler Zones. First floor, Second Floor, Third Floor, Fourth Floor and Fifth Floor.
6. Provide Roof Hydrant.

1980's Building:

1. Once Freshman Academy is built, existing sprinkler system can be demolished in the 1980's building.
2. Provide 4" Standpipe with fire department valves at each floor for all stairs. A combination standpipe/sprinkler riser with drain riser and fire departments valves on each floor will be provide at one stair for zoning.
3. Building will be zoned per floor for a total of 3 zones. First Floor, Second Floor and Third Floor.
4. Fire Department connection will be provided at main entrance.
5. Culinary Kitchen hoods will be provided with an Ansul System.
6. Dry Heads provided for walk-in freezers and coolers.
7. Bridges will be sprinkler protected and fed from West campus sprinkler system.
8. Roof Hydrant to be provided.

GENERAL

STANDPIPES

Standpipes shall be supplied in all required egress stairs. Standpipes would be designed in accordance with NFPA Standard 14, 2013, and Lowell Fire Department requirements. Standpipes shall be located in each required egress stairway, and adjacent to the Stage. Additionally, standpipes shall be located so that no part of the building is more than 200 feet from a standpipe valve. Each standpipe shall be equipped with a 2 1/2" fire department hose valve with 1 1/2" reducer at the stair floor landing. At the Stage, fire department valves shall be provided on each side of the stage. These shall be in recessed cabinets.

Design Criteria:

- Maximum square footage per zone will be 50,000 SF.
- Mechanical rooms, kitchen, science and chemistry labs and storage rooms shall be hydraulically calculated in accordance with NFPA 13 (2013 Edition) for an Ordinary Hazard Group I occupancy. The system shall be capable of providing a discharge density of 0.15 GPM/sf over a hydraulically remote area of 1500 SF and include an outside hose stream allowance of 250 GPM.
- Classrooms, offices and remaining areas shall be hydraulically calculated in accordance with NFPA 13 (2013 Edition) for a Light Hazard occupancy. The system shall be capable of providing a discharge density of 0.1 GPM/sf over a hydraulically remote area of 1500 SF and include an outside hose stream allowance of 100 GPM.
- All electrical rooms will be 2-hour rated and not provided with sprinkler protection.
- Elevator Machine room will not be provided with sprinkler protection.

Material:

- All 1" wet sprinkler piping shall be Schedule 40 steel pipe with threaded fittings.
- All 1-1/4" to 2" wet sprinkler piping may be either Schedule 40 steel piping with threaded fittings or Schedule 10 steel piping with grooved couplings.

- All 2-1/2" and larger wet sprinkler piping shall be Schedule 10 steel piping with grooved couplings.
- All sprinkler heads shall be quick-response, glass-bulb type heads.
- Sprinkler heads to be semi-recessed style in areas with suspended ceilings.
- Sprinkler heads in mechanical rooms and other spaces without hung ceilings shall be upright or pendent, as required by location.
- Sprinkler heads in gym and mechanical areas to be provided with cages.

Phasing

1. The project will be constructed in multiple phases in accordance with the Architect's phasing plans.
2. Demolition: Existing fire protection systems shall be demolished in a phased manner consistent with the Architect's project Phasing Plans.
3. Existing Fire Protection systems in occupied areas will need to remain active during construction.

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PLUMBING DESIGN:

INTRODUCTION

The following is the Plumbing Systems narrative, which defines the scope of work and capacities of the Plumbing Systems. The Plumbing Systems shall be designed and constructed for LEED for Schools v4 where indicated on this narrative.

SYSTEMS DESCRIPTION

EAST CAMPUS PLUMBING SYSTEMS:

Domestic Hot Water:

1. New Domestic hot water plant will be provided in the basement and will serve the entire east campus. Domestic hot water plant will consist of 650 MBH high efficiency gas-fired boiler mated with one 260 Gallon storage tank. Run domestic hot water piping to each plumbing fixture as required. The domestic hot water system will have a recirculation system, piping will extend to each fixture with no dead leg more than 12" in length.
2. New Non-potable hot water loop will be created for Science and Chemistry Labs. Extend non-potable hot water to each lab sink, fume hood cup sink and science lab dishwasher as required. Non-potable hot water will be provided with a heat trace system instead of a recirculation system to prevent cross contamination with the potable hot water.

Domestic Cold Water:

1. New 4" water domestic water service with reduced pressure backflow preventer will enter the water room in the basement. Domestic cold water will extend to each plumbing fixture as required.
2. New Non-potable cold-water system will be created for Science and Chemistry Labs. Extend non-potable cold water to each lab sink and fume hood cup sink as required.

Sanitary Waste:

1. Multiple new 4" sanitary services will be utilized for the east campus to facilitate with phasing.
2. New 125 Gallon Acid neutralization tank with PH monitoring system will be installed to serve science and chemistry labs.

Storm Water:

1. Roof Drain system will carry rainwater away from the flat roof of each building with conventional primary roof drains. Overflow drains will also be required, they will run independently from primary roof drainage and terminate to daylight via wall scuppers. Rain water piping and the system will be sized to handle a rainfall rate of 4 inches per hour, with a total runoff from the main roof and the roof deck of just under 1 cubic foot per second. The storm system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit the building in multiple locations.

Gas Service:

1. New gas service will enter the basement to serve the east campus and will be sized for new building load. The gas pressure will be regulated to low pressure (14" W.C) inside the building. The exterior pressure regulator will be by the gas utility. The new gas supply inside

the building will be piped to the heating boilers, gas-fired water heater and science labs as required. Estimated gas load will be 18,650 MBH.

Plumbing Fixtures:

Plumbing fixtures will be equipped with the following water conserving features (for indoor water use reduction-LEED v4- WE Credit 2 & 4) Refer to Architects drawings for fixture counts. Refer to Plumbing Narrative for additional fixture information.

Water Closet	Urinals	Lavatory
1.28 gpf High Efficiency Toilet, 1.28 gpf, Hardwired w/ Sensor Activated Flush Valve and manual override option. Equal to Sloan WETS 2050	0.125 gpf Ultra High Efficiency Sensor Activated Urinal Flushometer. Equal to Sloan Model 186 ES-S.	Sloan Optima ETF-600 sensor activated, hand washing faucet with integral spout temperature mixer, 0.35 to 0.5 gpm flow restricting aerator.

Science and Chemistry Labs:

1. All science labs with gas turrets will be provided with an emergency gas shut-off located at exit door.
2. Each lab bench should also be provided with a local shut-off valve.
3. All science labs utilizing chemicals will be provided with an emergency eyewash/shower station located as close to the exit door as possible. Each emergency station will be provided with a mixing valve to create tempered water. Emergency stations will spill to the floor.

Phasing:

1. The project will be constructed in multiple phases in accordance with the Architect's phasing plans.
2. Demolition: Existing plumbing systems and equipment shall be demolished in a phased manner consistent with the Architect's project Phasing Plans.
3. Plumbing systems in occupied areas will need to remain active during construction.

<u>WEST CAMPUS PLUMBING SYSTEMS:</u>

Domestic Hot Water:

1. New Domestic hot water plant will be provided in the Gym building and will be sized to serve the Gym, Freshman Academy and 1980's building. Domestic hot water plant will consist of 850 MBH high efficiency gas-fired boiler mated with (2) 260 Gallon storage tanks. Run domestic hot water piping to each plumbing fixture as required. The domestic hot water system will have a recirculation system, piping will extend to each fixture with no dead leg more than 12" in length. Capped hot water and hot water recirculation lines will be provided at gym building for extension to Freshman Academy and 1980's building.
2. Each kitchen will have a separate 119 Gallon High Efficiency Gas-fired hot water heater with 285 MBH input. Run hot water to each kitchen fixtures as required. Hot water recirculation system will be provided for each hot water heater.
3. New Non-potable hot water loop will be created for science and chemistry labs. Extend non-potable hot water to each lab sink, fume hood cup sink and science lab dishwasher as required. Non-potable hot water piping will be provided with a heat trace system instead of a recirculation system to prevent cross contamination with potable hot water system.

Domestic Cold Water:

1. New 6" water domestic water service with reduced pressure backflow preventer will enter the water room at the new gym building. Domestic cold water will extend to each plumbing fixture as required. Capped cold water will be provided at gym building for extension to Freshman Academy and 1980's building.
2. New Non-potable cold-water system will be created for science and chemistry labs. Extend non-potable cold water to each lab sink and fume hood cup sink as required.

Sanitary Waste:

1. New 5" sanitary service will be provided at Gym building to serve the Gym building. Extend waste piping to each plumbing fixture in Gym building as required.
2. New 5" sanitary service will be provided to serve the Freshman Academy. Extend waste piping to each plumbing fixture in Freshman Academy as required.
3. New 5" sanitary service will be provided to serve the 1980's building. Extend waste piping to each plumbing fixture in 1980's building as required.
4. A dedicated 4" grease waste line will be installed for each kitchen to collect grease laden waste water from each appliances and fixtures. The grease line will exit the building and will be connected to an exterior grease trap outside the building. A dedicated chamber vent will be provided and will run back to building and terminate independently through the roof. Pot sinks and dishwasher will be provided with grease traps at the source as well per 248 CMR.
5. Two new 125 gallon acid neutralization tank with PH monitoring system will be installed to serve science and chemistry labs. One for the Freshman Academy and one for the West Building.

Storm Water:

1. Roof drain system will carry rainwater away from the flat roof of each building with conventional primary roof drains. Overflow drains will also be required, they will run independently from primary roof drainage and terminate to daylight via wall scuppers. Rain water piping and the system will be sized to handle a rainfall rate of 4 inches per hour, with a total runoff from the main roof and the roof deck of just under 1 cubic foot per second. The storm system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit the building in multiple locations.

Gas Service:

1. New gas service will enter the Gym building to serve west campus and will be sized for new building load. The gas pressure will be regulated to low pressure (14" W.C) inside the building. The exterior pressure regulator will be by the gas utility. The new gas supply inside the building will be piped to the heating boilers, gas-fired water heaters and food service equipment in the kitchen area. Estimated gas load will be 20,520 MBH.

Plumbing Fixtures:

Plumbing fixtures will be equipped with the following water conserving features (for indoor water use reduction-LEED v4- WE Credit 2 & 4) Refer to Architects drawings for fixture counts. Refer to Plumbing Narrative for additional fixture information.

Water Closet	Urinals	Lavatory

1.28 gpf High Efficiency Toilet, 1.28 gpf, Hardwired w/ Sensor Activated Flush Valve and manual override option. Equal to Sloan WETS 2460	0.125 gpf Ultra High Efficiency Sensor Activated Urinal Flushometer. Equal to Sloan Model 195 ESS.	Sloan Optima ETF-600 sensor activated, hand washing faucet with integral spout temperature mixer, 0.35 to 0.5 gpm flow restricting aerator.

Science and Chemistry Labs:

1. All science labs with gas turrets will be provided with an emergency gas shut-off located at exit door.
2. Each lab bench should also be provided with a local shut-off valve.
3. All science labs utilizing chemicals will be provided with an emergency eyewash/shower station located as close to the exit door as possible. Each emergency station will be provided with a mixing valve to create tempered water. Emergency stations will spill to the floor.

Phasing:

1. The project will be constructed in multiple phases in accordance with the Architect's phasing plans.
2. Demolition: Existing plumbing systems and equipment shall be demolished in a phased manner consistent with the Architect's project Phasing Plans.
3. Plumbing systems in occupied areas will need to remain active during construction.

MECHANICAL DESIGN:

INTRODUCTION

The following is the HVAC Systems narrative, which defines the scope of work and capacities of the HVAC Systems, as well as, the Basis of Design. The HVAC Systems shall be designed and constructed for LEED for Schools v4 where indicated on this narrative.

CODES:

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2015, IMC 2015 county, and federal codes, laws, statutes, and authorities having jurisdiction.

DESIGN INTENT:

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating, and Air Conditioning work and all items incidental thereto, including commissioning and testing.

Basis of Design:

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code 2015.

- Outside: Winter 5 deg. F, Summer 88 deg. F DB, 74 deg. F WB
- Inside: 70 deg. F +/- 2 deg. F for heating, 75 deg. F +/- 2 deg. F (55% RH) for cooling. Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).
- Outside air shall be provided at the rate in accordance with ASHRAE guide 62.1-2013 and the International Mechanical Code 2015 as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

SYSTEM DESCRIPTION:

Displacement ventilation and passive chilled beams serving classroom and administration areas

EAST BUILDING:

Central Heating Plants: LEED for Schools v4 Credit Ep2 & Ec2

Heating for the 1922 Building will be through the use of a high efficiency gas-fired condensing boiler plant located within a factory fabricated mechanical room rooftop enclosure.

The new boiler plant shall be provided with (3) 6,000 MBH input (5,600 MBH output) boilers and (2) end suction base mounted primary and standby pumps, each will be located in the mechanical room. Boilers shall each be sized for approximately 50% of the building heating load. In addition to the new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system.

The boiler plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

Central Cooling Plant: LEED for Schools v4 Credit Ep2 & 4, Ec2

A high efficiency central chilled water cooling plant consisting of a two (2) 220 ton high efficiency water cooled chillers, roof mounted induced draft cooling tower with filtration system, primary and standby chilled water and condenser water pumps with VFDs, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the 1922 building. Each chiller shall be sized at approximately 50% of the total cooling load with 85% diversity factor applied. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided. The chiller plant shall be located within a factory fabricated mechanical room rooftop enclosure.

The chiller plant shall serve the air handling units throughout the building and radiant chilled beams units located in the Classroom, Teacher Planning, Administration and Office areas of the building.

Classroom Heating, Ventilation & Air Conditioning (General Classrooms, Learning Commons/Circulation Areas, Art/Music/Drama Rooms, ROTC, Science Classrooms, SPED, ELL & Life Skills): LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Classroom areas are to be served by new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

New air handling units with supply and return fan with VFDs, dual energy (energy recovery and reheat) wheels, hot water heating and chilled water cooling with modulating capacity control, and MERV 13 filtration will be provided to serve the new fully air-conditioned displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution systems and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. A combination of light shelf and ceiling mounted radiant cooling and heating panels will be provided along exterior walls to provide supplemental and nightback heating and cooling.

Each classroom and support area will be provided with a variable air volume terminal box and CO2 sensor for demand ventilation control.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

AHU-1: Air handling unit with a capacity of 19,000 CFM (70 tons cooling, 760 MBH heating output), to serve the Classrooms (North) including; ROTC Classroom, Community Health and Office areas.

AHU-2: Air handling unit with a capacity of 19,000 CFM (70 tons cooling, 760 MBH heating output), to serve the Classrooms (North) including; Music, Band, Chorus, Dance Classroom and Scene Shop areas.

AHU-3: Air handling unit with a capacity of 24,000 CFM (85 tons cooling, 960 MBH heating output), to serve the Classrooms (Central) including; Art Classroom areas (Basement, Level 1, 2 & 3).

AHU-4: Air handling unit with a capacity of 24,000 CFM (85 tons cooling, 960 MBH heating output), to serve the Classrooms (Central) (Basement & Level 1, 2 & 3).

AHU-5: Air handling unit with a capacity of 18,000 CFM (65 tons cooling, 720 MBH heating output), to serve the Classrooms (South) (Basement, Level 1, 2 & 3).

Auditorium and Stage: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The auditorium, stage, and dressing room areas will be provided with new air handling units of the recirculation type design providing a fully air conditioned variable volume air distribution system.

AHU-7 & 8: The Auditorium unit will be served by two (2) units, each at approximately 11,000 CFM and will include supply and return fans with VFDs, 440 MBH output hot water heating coil with modulating capacity control, 40 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration.

AHU-9: The stage and dressing room unit will be approximately 4,000 CFM and will include supply and return fans with VFD's, 160 MBH hot water heating section with modulating capacity control, 15 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration.

Supply air ventilation to the auditorium will be provided to the space through a galvanized steel supply duct distribution system that will connect to overhead diffusers. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population, the air handling unit outside air damper will modulate to reduce air flow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by return air registers located within the space.

Administration and Media Center Areas: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

Spatial heating and air-conditioning for the Administration and Media Center areas will be new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

The administration areas of the building will be served by the adjacent Classroom air handling unit.

Media Center and TV Studio: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

Spatial heating and air-conditioning for the Media Center and TV Studio areas will be served new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

AHU-6: The ventilation air handling will serve the Media Center area of the building. The unit capacity will be approximately 7,500 CFM and will include supply and return fan with VFDs, 300 MBH output hot water heating section with modulating capacity control, MERV 13 filtration, 30 ton capacity chilled water cooling coil with modulating capacity control, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

Courtyard Snow Melting System:

A radiant snow melt heating system shall be installed for the 1922 building's central courtyard. A dedicated hot water heat exchanger, associated pumps, piping, valves, manifolds and controls shall be provided. The radiant heating loop piping shall be constructed of HDPE underground piping. It is estimated that the system capacity shall be 240,000 MBH.

WEST BUILDING:

Central Heating Plants: LEED for Schools v4 Credit Ep2 & Ec2

Heating for the 1980 building, new gymnasium wing addition, and freshman academy addition will be through the use of a high efficiency gas-fired condensing boiler plant located within the new Gymnasium Building.
The new boiler plant shall be provided with three (3) 5,600 MBH input (5,000 MBH output) boilers and (2) end suction base mounted primary and standby pumps, each will be located in the mechanical room. Boilers shall each be sized for approximately 50% of the building heating load. In addition to the new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system.

The boiler plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

Central Cooling Plant: LEED for Schools v4 Credit Ep2 & 4, Ec2

Cooling for the 1980 building, new gymnasium wing addition and freshman academy addition shall be provided by a high efficiency central chilled water cooling plant consisting of a two (2) 275 ton high efficiency water cooled chillers, roof mounted induced draft cooling tower with filtration system, primary and standby chilled water and condenser water pumps with VFDs, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building. Each chiller shall be sized at approximately 50% of the

total cooling load with 85% diversity factor applied. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

The chiller plant shall serve the air handling units located throughout the building and active chilled beam induction units located in the Administration and Media Center areas of the building.

Classroom Heating, Ventilation & Air Conditioning (General Classrooms, Learning Commons/Circulation Areas, Art/Music/Drama Rooms, ROTC, Science Classrooms, SPED, ELL & Life Skills): LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Classroom areas are to be served by new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

New air handling units with supply and return fan with VFDs, dual energy (energy recovery and reheat) wheels, hot water heating and chilled water cooling with modulating capacity control, and MERV 13 filtration will be provided to serve the new fully air-conditioned displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution systems and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. A combination of light shelf and ceiling mounted radiant cooling and heating panels will be provided along exterior walls to provide supplemental and night setback heating and cooling.

Each classroom and support area will be provided with a variable air volume terminal box and CO2 sensor for demand ventilation control.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

AHU-19: Air handling unit with a capacity of 9,000 CFM (35 tons cooling, 360 MBH heating output), to serve the Classroom and Teacher Planning areas.

AHU-20: Air handling unit with a capacity of 9,500 CFM (35 tons cooling, 380 MBH heating output), to serve the Classroom and Teacher Planning areas.

AHU-21: Air handling unit with a capacity of 10,500 CFM (40 tons cooling, 420 MBH heating output), to serve the Classroom and Teacher Planning areas.

AHU-22: Air handling unit with a capacity of 10,500 CFM (40 tons cooling, 420 MBH heating output), to serve the Classroom and Teacher Planning areas. The unit will also serve adjacent First Floor Admin and adjacent office areas of the building.

Kitchen, Custodial Support, Receiving: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Kitchen, Custodial Support, and Receiving areas will be provided with an air handling unit of the recirculation type design with energy recovery.

AHU-14: The unit serving the Kitchen, Custodial Support, and Receiving areas will be approximately 6,000 CFM and will include supply and return fans with VFDs, 240 MBH output hot water heating

section with modulating capacity control, 25 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration.

Supply air ventilation will be provided to each space through new galvanized supply duct which will travel throughout each area to a series of ceiling mounted supply registers. Each space shall be provided with a variable volume (VAV) terminal box with combination temperature/CO2 sensor controls. The controls will reduce outside air as allowed to maintain a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of each space. As the VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) on the air handling unit will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. New exhaust air ductwork and air distribution devices shall be installed and shall be routed from each space to the new air handling unit.

MAU-1: The Kitchen area shall be provided with a new kitchen exhaust air fan and make-up air unit. Make-up air shall be provided by a heating and ventilation air handling unit with modulating hot water heating. Kitchen hood and dishwasher exhaust fan systems will be provided.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the Kitchen Equipment Vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

Cafeteria: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Cafeteria area will be provided with a new air handling unit of the recirculation type design providing a fully air conditioned variable volume displacement ventilation air distribution system.

AHU-15: The unit serving the Cafeteria area will be approximately 17,000 CFM and will include supply and return fans with VFDs, 680 MBH output hot water heating section with modulating capacity control, 60 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration. Supply air will be provided to the space through a new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within each space. Return air will be drawn back to the unit by ceiling return air registers located within each space and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

AHU-16: The unit serving the Freshman Cafeteria area will be approximately 12,000 CFM and will include supply and return fans with VFDs, 480 MBH output hot water heating section with modulating capacity control, 45 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration. Supply air will be provided to the space through a new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within each space. Return air will be drawn back to the unit by ceiling return air registers located within each space and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

Culinary Arts Kitchen: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

MAU-2: The Kitchen area shall be provided with a new kitchen exhaust air fan and make-up air unit. Make-up air shall be provided by a heating, ventilation and air conditioning air handling unit with

modulating hot water heating and chilled water cooling. Kitchen hood and dishwasher exhaust fan systems will be provided.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the Kitchen Equipment Vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

Culinary Arts Classrooms/Kitchen, Restaurant: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Culinary Arts Classroom and Restaurant areas will be provided with a new air handling unit of the recirculation type design providing a fully air conditioned variable volume displacement ventilation air distribution system.

AHU-18: The unit serving these areas will be approximately 6,500 CFM and will include supply and return fans with VFDs, 260 MBH output hot water heating section with modulating capacity control, 25 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration. Supply air will be provided to the space through a new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within each space. Return air will be drawn back to the unit by ceiling return air registers located within each space and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

Administration, Business/Bank/Student Activities: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

Spatial heating and air-conditioning for the Administration, Business/Bank/Student Activities and Media Center areas will be served Spatial heating and air-conditioning for the Administration and Media Center areas will be new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

AHU-17: The unit capacity will be approximately 12,000 CFM and will include supply and return fan with VFDs, 480 MBH output hot water heating section with modulating capacity control, MERV 13 filtration, 45-ton capacity chilled water cooling coil with modulating capacity control, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.
Second and Third Floor Lightwells:

Hot water radiant heating panels shall be provided along the perimeter of the light wells at the ceiling of each floor.
Green House: The Green House shall be heated by ceiling suspended hot water unit heaters and ventilated by a combination of wall mounted louvers and exhaust air fans.

NEW WINGS:

Freshman Academy:

The Classroom areas are to be served by new air handling units of the 100% outside air design with recirculating capability to serve a variable volume displacement ventilation air distribution and passive radiant cooling and heating panels full air conditioning system.

New air handling units with supply and return fan with VFDs, dual energy (energy recovery and reheat) wheels, hot water heating and chilled water cooling with modulating capacity control, and MERV 13 filtration will be provided to serve the new fully air-conditioned displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution systems and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. A combination of light shelf and ceiling mounted radiant cooling and heating panels will be provided along exterior walls to provide supplemental and night setback heating and cooling.

Each classroom and support area will be provided with a variable air volume terminal box and CO2 sensor for demand ventilation control.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

AHU-23, 24, & 25: Three (3) air handling units, each with a capacity of 18,000 CFM (65 tons cooling, 720 MBH heating) each to serve the Freshman Academy Addition.

All rooftop air handling units and exhaust air fans serving the Freshman Academy shall be provided with H-O-A switches that shall be installed in a designated fire command center room. These fan switches shall be capable of controlling rooftop unit supply and exhaust fan operation for testing and post event smoke purge/removal.

New Gymnasium Wing:

Gym: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The Gym will be served by two (2) air-handling units of the recirculation type design providing a variable volume fully air-conditioned displacement ventilation air distribution system. Each unit will be provided with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through a galvanized steel supply duct distribution system that will connect to displacement diffusers. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population, the air handling unit outside air damper will modulate to reduce air flow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by return air registers located high on walls within the space or near the ceiling of the space.

It is estimated that the air handling equipment serving the Gymnasium will have the following capacities:

AHU-10: Air handling unit with a capacity of 15,000 CFM (55 tons cooling, 600 MBH heating output).

AHU-11: Air handling unit with a capacity of 15,000 CFM (55 tons cooling, 600 MBH heating output).

ROTC PE/Wrestling/Functional Strength/Multipurpose: LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4

The ROTC PE/Wrestling/Functional Strength/Multipurpose areas will be served by two (2) air-handling units of the recirculation type design providing a variable volume fully air-conditioned displacement ventilation air distribution system. Each unit will be provided with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through a galvanized steel supply duct distribution system that will connect to displacement diffusers. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population, the air handling unit outside air damper will modulate to reduce air flow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by return air registers located high on walls within the space or near the ceiling of the space.

It is estimated that the air handling equipment serving these areas will have the following capacities:

AHU-12: Multipurpose/Wresting/Functional Strength/ROTC PE - Air handling unit with a capacity of 15,000 CFM (55 tons cooling, 600 MBH heating output).

Locker and Team Rooms: *LEED for Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4*

The Locker Rooms, Team Rooms, and adjacent PE Office areas will be provided with a dedicated outside dehumidification air handling unit of the 100% outside air design with static plate energy recovery.

AHU-13: The unit serving Locker Rooms, Team Rooms, and adjacent PE Office areas will be approximately 14,000 CFM and will include supply and return fans with VFDs, 560 MBH output hot water heating coil with modulating capacity control, 50 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration.

Supply air ventilation will be provided to each space through new galvanized supply duct which will travel throughout each area to a series of ceiling mounted supply registers. Each space shall be provided with a variable volume (VAV) terminal box with combination temperature/CO2 sensor controls. The controls will reduce outside air as allowed to maintain a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of each space. As the VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) on the air handling unit will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. New exhaust air ductwork and air distribution devices shall be installed and shall be routed from each space to the new air handling unit.

New Bridge Connectors:

The new bridge connectors shall be heated by hot water fin tube radiation or radiant panel heating systems. The connectors shall be ventilated by adjacent area air handling unit systems.

COMMON BUILDING HVAC SYSTEM REQUIREMENTS

Provide a single switch shut-off of all air intake systems per security recommendation.

LOBBY, CORRIDOR, AND ENTRY WAY HEATING:

New hot water ceiling mounted radiant panels, cabinet unit heaters and/or fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from the adjacent area air handling unit systems.

BUILDING CONNECTOR:

Building connector areas between 1980 building and both the new Gymnasium and Freshman Academy addition. These connector areas shall be provided with hot water radiation heating and dehumidified ventilation air from adjacent air handling systems.

CUSTODIAL SUPPORT AREAS:

Custodial support areas will be heated and ventilated by air handling unit systems. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. The loading dock and all custodial closets will be exhausted by dedicated exhaust air fan systems.

UTILITY AREAS:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main IDF room will be air conditioned by high efficiency ductless AC cooling units approximately (2) Three Ton units.

SCIENCE CLASSROOMS:

Science Classrooms shall be provided with fume hood exhaust air fan systems and associated exhaust air ductwork which shall terminate above the roof and a minimum of 25 feet away from intake openings fume hood exhaust ductwork shall be constructed of stainless steel.

SPECIALTY EXHAUST SYSTEMS:

Exhaust air systems shall be provided for dust collectors, kilns, science fume hoods (where ductless fume hoods are not provided, 3-D printing/CNC machines, painting and welding stations).

EMERGENCY GENERATOR FUEL OIL SYSTEM AND VENTILATION REQUIREMENTS:

A 2,500 gallon above ground double wall UL listed fuel oil tank shall be provided to service the Emergency Generator. Double wall containment fuel oil piping, tank fill monitoring and alarm controls shall also be provided. HVAC contractor shall provide all required generator high temperature exhaust venting, and mechanical ventilation for the generator room.

TESTING, ADJUSTING, BALANCING & COMMISSIONING:

All new HVAC systems shall be tested, adjusted, balanced, and commissioned as part of the project scope.

AUTOMATIC TEMPERATURE CONTROLS – BUILDING ENERGY MANAGEMENT SYSTEM:

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

PHASING:

The project will be constructed in multiple phases in accordance with the Architect's phasing plans.

DEMOLITION:

Existing heating, ventilation and air conditioning systems and equipment shall be demolished in a phased manner consistent with the Architect's project Phasing Plans.

CONSTRUCTION:

During all Phases of Construction, the following SMACNA IAQ Guidelines for Occupied Building Under Construction, 2007 shall be met to maintain proper indoor air quality with in the occupied areas. Areas to remain occupied shall be positively pressured in relationship to the construction zone to prevent constitution debris from entering the occupied areas. Construction areas shall be exhausted to prevent construction debris from entering the occupied areas. All return grilles shall be covered with MERV-8 filter media, all fresh air supply units shall be provided with MERV-13 media and all filter media shall be changed on a regular basis in accordance with SMACNA IAQ Guidelines to maintain the IAQ with in the occupied areas.

All new ductwork shall be installed per SMACNA guidelines for "Duct Cleanliness for New Construction Guidelines". A high level of indoor air quality shall be maintained throughout the duration of the project renovation construction phase.

TESTING, BALANCING AND COMMISSIONING:

A complete HVAC system Testing and Balancing, encompassing all HVAC systems and equipment installed during that phase, shall be performed at the completion of each phase.

TESTING REQUIREMENTS:

The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

1. Boiler plant system
2. Chilled water plant system
3. Air handling unit systems including all supply, return and exhaust air systems
4. Terminal heating and cooling devices
5. Automatic temperature control and building energy management system

Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

OPERATION MANUALS AND MAINTENANCE MANUALS:

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the Owner.

RECORD DRAWINGS AND CONTROL DOCUMENTS:

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the Owner.

COMMISSIONING

The project shall be commissioned per Section 018000 of the specifications.

ELECTRICAL DESIGN:

INTRODUCTION

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Electrical Systems, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for LEED for Schools v4 where indicated on this narrative.

CODES

All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

DESIGN INTENT

The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

SEQUENCE OF OPERATIONS AND INTERACTIONS

Classroom and Corridor lighting will be controlled via "addressable relays", which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit LEED credit IEQC 6.1.

Exterior lighting will be controlled by photocell "ON" and "scheduled" for "OFF" operation. The parking area lighting will be controlled by "zones" with dimmable capability.

Emergency and Exit lighting will be run through life safety panels and will be "ON" during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are "ON" only when building is occupied.

DESCRIPTION OF THE SYSTEMS

ELECTRICAL DISTRIBUTION SYSTEM:

Service ratings are designed for a connected load of 10 watts/s.f. There will be multiple services rated at 277/480V, 3∅, 4 wire with 100% rated main breakers as follows:

- "1922 Building" (Original 1892 Coburn/1922 Sullivan Addition/1997 Addition) – new 4,000 ampere service.
- "West" Lord Addition – (2) 2,500 ampere services

New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

INTERIOR LIGHTING SYSTEM:

Classroom lighting fixtures will consist of recessed mounted direct luminaries with LED lamps and electronic dimmable drivers in the 1922 Building. Pendant direct/indirect will be used in West/Addition Building. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Two daylight dimming zones will be provided in each classroom.

Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching in the 1922 Building. Pendant direct/indirect will be used in West/Addition Building. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

In general, lighting power density will be 20% less than IECC-2015. The power density reduction relates to LEED credit EAC.1.

Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with LEED Credit IEQC 6.1.

Gymnasium lighting will be comprised of direct fixtures with LED source and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 50 foot candles. Multi-level switching will be provided.

Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20 foot candles. Corridor lighting will be schedule control and only “ON” during occupied hours. The Corridor lighting will be controlled by schedule, and occupancy sensors.

Cafeteria lighting will be pendant direct/indirect fixtures with LED source and electronic drivers. The light levels will be designed for approximately 30 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing.

Stage and Auditorium Theatrical Lights:

- LED-based lighting system consisting of switched power and Ethernet control distributed to devices mounted lighting positions in the house, stage, balcony and side lighting positions.
- Flexible, Ethernet-based control system with either hard-wired DMX or Ethernet port at every position.
- Control of architectural lighting fixtures through entry stations and a portable touch panel.
- Computerized control console with Ethernet connection and touch panel monitors
- Compliment of LED lighting fixtures including ellipsoidal, PAR and cyclorama fixtures
- Wireless remote for console
- Power, data and fixtures accessories
- Support for moving lights and other DMX-controlled lighting accessories

Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50 foot candles.

Library lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30 foot candles.

Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied. Manual switching will be provided in each space. Classrooms and offices will have manual dimming capability.

Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with LEED credit IEQC 6.1.

The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights "on and off". Lighting control system will be interfaced with DDC system.

EMERGENCY STANDBY SYSTEM:

An exterior 600 kW diesel emergency generators with sound attenuated enclosures and a 72 hour base tanks with alarms will be provided at the 1922 Building; the West/Addition Building. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

The generator loads will include fire safety systems, boilers and circulating pumps, elevator, kitchen equipment, and communications and security systems.

The generator loads will also include HVAC equipment serving gymnasium, cafeteria, kitchen, main administration offices, and nurse's suite.

SITE LIGHTING SYSTEM: LEED CREDIT SSC8

Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

WIRING DEVICES:

Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit. Provide USB charging at all outlets.

Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

Corridors will have a cleaning receptacle at approximately 25-40 foot intervals. Provide additional outlets at all flex learning alcoves, cafeterias, gymnasium, upper/lower main lobby at the West, and media centers for student charging.

Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors. Provide supplemental exterior GFCI outlets at exterior Quad seatwalls

A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed in public spaces.

At all science, tech, and engineering labs, culinary spaces, art, makers spaces, and costume and scene shops, provide central shut off in each room to outlets and equipment.

FIRE ALARM SYSTEM:

A fire alarm and detection system with networked panels will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. The fire command center shall be located in the West Building.

Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

The sprinkler system will be supervised for water flow and tampering with valves.

Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

Manual pull stations will be provided at Exit discharge doors and at each egress stairwell not located at grade level.

The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

The generator status panel shall be located at the fire command center.

A mass notification system will be provided with separate strobes from fire alarm system. Audible tone shall be through fire alarm speakers. System activation shall be through panic buttons and card readers with dedicated lockdown key fob.

UNINTERRUPTIBLE POWER SUPPLY (UPS):

Two (2) 45 kW, three phase centralized UPS system will be provided with seven minutes of battery back-up, one per building.

The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

The UPS system will also be connected to the stand-by generator.

Provide single switch HVAC shutoff at main mechanical rooms for East and West.

LIGHTNING PROTECTION SYSTEM:

A system of lightning protection devices will be provided.
The lightning protection equipment will include air terminals, roof main conductors and down conductors, conduits, fasteners, connectors, ground rods, etc.
The facility will be issued a UL Master Label Certificate.

RENEWABLE ENERGY SYSTEM PROVISIONS:

Electrical provisions will be made for a roof mounted renewable energy system consisting of 100 kw grid per building connected photovoltaic PV system intended to reduce the facilities demand for power.

INTERIOR SCOREBOARD:

See Architectural Narrative

TWO-WAY COMMUNICATIONS SYSTEM:

Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

DISTRIBUTION ANTENNAE SYSTEM (DAS):

A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication. Frequencies for Fire, Police, and School shall be included in DAS system headend.

Frequencies:

2 – Fire Department
2 – Channels Police
1 – For School Department
Trinity EMS
Lowell Medics

SECURITY AND COMMUNICATIONS SYSTEM PROVISIONS:

Electrical Contractor will provide Integrated Security System and Technology System provisions including outlet boxes, empty raceways, 120 volt power, cable trays, and grounding.

PHASING:

The Work will be conducted in phases to provide the least possible interference to the activities of the existing School.

SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. Two exterior pad mounted transformers will be provided by the utility company.

TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator system.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Uninterruptible Power System, UPS.
- Lightning protection system.
- Two-way communication system.
- Distributed Antennae system.

Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

Operation Manual and Maintenance Manuals

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

Record Drawings and Control Documents

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

Commissioning

The project shall be commissioned per Commissioning Section of the specifications.

SECURITY SYSTEMS:

INTRODUCTION

The following is the Security System narrative, which defines the scope of work and capacities of the Security system infrastructure as well as the Basis of Design.

CODES

All work installed under Section 280000 shall comply with the Massachusetts Building Code, IBC 2015 and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

DESIGN INTENT

All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Security work and all items incidental thereto, including commissioning and testing.

CCTV (PROPRIETARY AVIGILON)

1. A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time). The CCTV VMS will be an expansion of the city Standard which is Avigilon.
2. The location of the cameras is generally on exterior building perimeter. The exterior cameras are multi-sensor type on the corners and single sensor fixed at access control entry points.
3. The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.
4. Avigilon software is equipped with video analytics.

INTRUSION SYSTEM

1. An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.
2. The system will include a digital transmitter to summons the central station in the event of an alarm condition.
3. The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

System Description

IP Network Compatible Video Intercom System: A network-based communication and security system featuring video entry security, internal communication, emergency stations, and paging. All units and app in the systems shall be able to unlock doors remotely on a network, assist onsite visitors from an offsite location, broadcast emergency announcements, and communicate using a PoE network.

1. Power Source: Power over Ethernet (802.3af).
2. Network Interface: 10 BASE-T / 100 BASE-TX Ethernet (RJ-45).
3. Network Protocols: IPv4, IPv6, TCP, UDP, SIP, HTTP, HTTPS, MJPEG, RTSP, RTP, RTCP, IGMP, MLD, SMTP, DHCP, NTP, DNS.
4. Bandwidth Usage:

   a. G.711: 64Kbps x 2 per video call.
   b. 64Kbps per monitor.
   c. H.264: 24Kbps ~ 2,048Kbps.
5. Communication: Hands-free (VOX), push-to-talk (simplex), or handset (full-duplex).
6. Video Display: 3-1/2 inches (89 mm) color LCD.
7. Camera: Type:
   a. 1/4 inch (6 mm) color CMOS.
   b. View Area: 2 feet 2 inches (660 mm) vertical x 3 feet 1 inch (940 mm) horizontal at 20 inches (508 mm).
   c. Video Stream: ONVIF Profile S.
8. Door Release: Programmable Form C dry contact, 24V AC/ DC, 500mA - use EL-12S (use RY-24L for larger contact rating, which requires 24V DC power supply) or use RY-IP44 with 4 multipurpose relays.
9. Wire Type: CAT-5e or CAT-6.
10. Distance:
    a. Door Station or RA Station to Network Node: 330 feet (100 meters).
    b. Master Station to Network Node: 330 feet (100 meters).

IESS Integration

Interface and Integration between Access Control, CCTV, Intrusion Alarm, Public Address, and Telephone System.

1. Access Control System Keypads, Readers, etc. shall provide ability to Arm and Disarm the entire Intrusion Alarm System or specific zones.
2. Access Control System Keypads, Readers, etc. shall provide ability to Arm and Disarm any individual areas in the Intrusion Alarm System.
3. Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc.) shall be graphically displayed on the Access Controls System's browser based Graphical Designer software for display on associated PC Workstation.
4. Arm, Disarm & Alarm status condition of the Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc..), shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
5. When Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc.) are in alarm, provide ability to turn-on or go to full motion video, the CCTV Camera Recorder in associated area.
6. Activate alarm siren signal over Public Address speakers when Intrusion Alarm System is in alarm by providing line level output for Public Address System.
7. When Access Control System Keypads, Readers, etc. are used, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
8. When door release is detected on entry or exit, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
9. CCTV Camera devices and locations shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
10. When exterior door intercom station is activated, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
11. Access Control System Keypads, Readers, Door Lock, etc. locations shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
12. Special Entry: If a person needs a one-time entry to the facility for a particular time and day, a Access Control Keypad entry code number can be given to that person that will only work for

the specific time frame; in addition, the code can automatically disarm associated intrusion alarm zone or zones in the system.

13. Emergency Codes can be used via Access Control System Keypad Entry, with capabilities to automatically notify authorities of an emergency situation, a hostage type entry, etc.
14. Photo ID Bagging Capabilities Built-in to Access Control System, allowing owners the capability to develop their own Photo ID Badges.
15. Access Control Systems can interface with LAN's & WAN's to provide seamlessly integrated solutions when additional facilities add access control solutions.
16. When Exterior Door Intercom Stations are properly interfaced to the Telephone System Display Telephones for unique call-in ID and two-way communications, and the telephone system provides output closures (one for each controlled door) when "door release codes" are entered via the telephone's keypad, provide ability to interface these door release code closures to Access Control System for release of each associated door.
17. The CCTV system shall provide "Recording-on-Motion" feature for every camera in the CCTV System. Only recording when the system detects motion in the view of each camera.
18. Provide interface port for interfacing to Fire Alarm System.
19. Provide interface port for interfacing to Elevator Door Access.

Card Access

1. A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.
2. The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.
3. The system is modular and may be easily expanded to accommodate any additional devices.

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TECHNOLOGY DESIGN:

INTRODUCTION

The following is the Technology System narrative, which defines the scope of work and capacities of the Technology system infrastructure as well as the Basis of Design. The Technology Systems shall be designed and constructed for LEED for Schools v4 where indicated on this narrative.

CODES

All work installed under Section 270000 shall comply with the Massachusetts Building Code, IBC 2009 and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

DESIGN INTENT

All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Technology work and all items incidental thereto, including commissioning and testing.

TECHNOLOGY

The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate VOIP based voice systems. A new IP telephone system will be used.

Each classroom will have four (4) data outlets for student computers. Two data, one voice with video and audio connections to a wall mounted projector will be provided at the teacher's station with interconnectivity to an interactive whiteboard. A wall phone outlet with 2-way ceiling speaker will be provided for communications with administration. Wireless access points will be provided in all classrooms and other spaces with two (2) CAT6A cables with (2) strands of single mode fiber.

A central paging system will be provided and integrated with the telephone system.

A wireless GPS/LAN based master clock system will be provided with 120V wireless remote clocks that act as transceivers.

The Main Distribution Frame (MDF) will contain all core network switching and IP voice switch. Intermediate Distribution Frames (IDFs) will serve each floor/wing of the school. A fiber optic backbone will be provided from each IDF to MDF. The backbone will be designed for 10 Gbps Ethernet.

PHASING

The existing telephone, internet and cable-TV services will be impacted by phasing. The impact will be minimal as the existing service is present but will need to be relocated to head end room. The temporary services shall be relocated to a new head end room in Phase 1 portion of the building to remain. New 12 strand multi-mode fiber and back bone 50 copper pairs will be run from head end room to each remaining IDF room.

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ACOUSTICAL DESIGN:

RECOMMENDATIONS:

This report contains review and recommendations in the areas of HVAC noise control, exterior site sound control, room reverberation and room-to-room sound isolation based on review of drawings sent to our offices. The design for this school is to conform to the LEED v4 standard as applicable for Schools. We understand that the LEED v4 acoustical pre-requisite level will be required for the school, and the recommendations in this report follow those requirements. We have also included sections in this report pertaining to additional requirements if the acoustical credit will be pursued or otherwise for good design practice. The standard defines "core learning spaces" as follows:

The ANSI S12.60-2010 (the "ANSI" standard) school acoustic standard notes "*core learning spaces*" as "*spaces for educational activities where the primary functions are teaching and learning and where good speech communication is critical to a student's academic achievement." These spaces include, but are not limited to, "classrooms (enclosed or open plan), instructional pods or activity areas, group instruction rooms, libraries, offices used for educational purposes, therapy rooms and music rooms for instruction or practice*."

LEED V4 STEP 1: IDENTIFICATION OF ALL "CORE LEARNING SPACES":

From review of drawings, it appears that the following room designations are to be considered "core" learning spaces identified by drawing, and east/west project areas.

East Building Group:

A-100A:

ROTC Rooms (5)
Piano
Chorus
Dance (2)
Guitar
Art Studio (TV Prod)
TV Studio
Band

A-100B:

English (3)
Animation
Graphics
2D Art
Art Studio
3D Art
Social Studies (SS) (3)
Life Skills (2)
Art Studio

A-101A:

Autism (2)
English (3)
World Language (WL) (4)
Social Studies (SS) (3)

A-101B:

ELL (2)
Intense (2)
English (3)
Life Skills (2)
Social Studies (3)
Math (3)
Science Lab (3)
Health

A-102A:

Autism (2)
English (2)
ELL (2)
World Language (WL) (3)
Social Studies (SS) (3)

A-102B:
ELL/TST/Score
English (3)
Speech
SPD (?)
Social Studies (SS) (3)
Science Lab (3)
Health
Math (4)

A-103A:

Autism (2)
English (3)
World Language (WL) (4)
Social Studies (SS) (3)

West Building Group:

A-101C:

Culinary Classroom (2)
Fundamentals

A-101D:

None Found

A-101E:

None Found

A-101F:

Engineering
Robotics
Maker

Business (4)

A-102C:

Seminar (Little Theater)
Math (3)
Science Lab (3)
ELL (2)
Fund (2)
ADJ (2)

A-102D:

ADJ
Health (2)

A-102E:

None Found

A-102F:

Math (2)
Science Lab (2)
ADJ (2)
Social Science (SS) (2)
World Language (WL)
English (2)

A-102G:

None Found

A-103C:

Math (3)
ELL (4)
Science Lab (5)
Fund (2)
ADJ

A-103D:

Math (3)
Tech Center
Science Lab (3)
ADJ
Clean Energy Lab
Training Lab
Library/Media Center

A-103E:

None Found

A-103F:

Math (2)
Science Lab (2)

Fund (2)
World Language (WL)
Social Science (SS) (2)
English (2)
Health (2)
ADJ

A104F:

Math (3)
Science Lab (2)
World Language (WL)
Social Studies (SS) (2)
English (2)
ADJ
Intense

A-105F:

Math (2)
Science Lab (2)
Autism
World Language (WL)
Social Studies (SS) (2)
English (2)
ELL (2)

LEED V4 STEP 2: REVIEW ACOUSTIC CRITERIA - LEED V4 PRE-REQUISITE (AND ACOUSTICAL CREDIT) REQUIREMENTS*:*

The overall requirements of the LEED v4 pre-req and LEED v4 acoustical credit level for acoustical performance level for core learning spaces (as listed above in LEED v4 Step 1) are as follow. We also note the methodology used in our review of this project, in order of the sections as called out in this report.

Section 1 (pre-req):

Room background sound levels must be no greater than 40 dBA (levels contributed by HVAC equipment serving the room). We have used the LEED v4 option to "*calculate sound pressure levels per 2011 HVAC Applications ASHRAE Handbook, Chapter 48, Sound and Vibration Control. Follow the steps in the HVAC Noise-Reduction Design Procedures section of the handbook (pages 48.38-48.41)*". Calculations will be based on HVAC drawings when substantially complete, mechanical equipment sound data as provided by the project MEP, and will be performed during the design phase. Noise and vibration control recommendations will be provided to the architect and the project MEP, and our firm will confirm that all recommendations are included in project drawings and specifications.

Section 2 (acoustical credit only):

Design classrooms and other core learning spaces to meet the sound transmission class (STC) listed in ANSI S12.60-2010 Part 1. Exterior windows must have an STC rating of at least 35, unless outdoor and indoor noise levels can be verified to justify a lower rating (see Section 3). This is not strictly required for this project, though our firm is providing good design practice recommendations for sound/impact isolation generally based on the ANSI S12.60-2010 standard.

Section 3 (pre-req or acoustical credit):

Exterior site sound levels must be assessed to inform on required exterior building shell design. The LEED v4 standard notes that if a project site locates the school building further than ½ mile from a noise source such as major transit corridors, industrial manufacturing facilities, outdoor concert or sports venues, rail lines and air traffic lines that no exterior noise evaluation/measurements are required. Because this project site is greater than ½-mile from the noise sources as listed, no exterior measurements or review of building exterior construction is required for control of exterior sound to the interior of the building.

Section 4 (pre-req and acoustical credit):

Room reverberation must conform to the limits contained in the LEED standard (0.60 second reverberation time in spaces up to 10,000 cu. ft. volume, and 0.70 second reverberation time in spaces 10,000 to 20,000 cu.ft. for octave band center frequencies of 500-Hz, 1-kHz, and 2-kHz). For this project, the design team has used the Option 1: Total Compliant Acoustic Finish Area Exceeds Ceiling Area design option as listed on Page 639 of the LEED v4 standard. This requires that the project be designed such that "the total area of compliant sound absorbing treatment [minimum NRC rating of 0.70] must equal or exceed the total ceiling area calculated." We will complete the LEED v4 reverberation spreadsheet to confirm all core learning spaces meet the reverberation requirements. For core learning spaces 20,000 cu. ft. and larger, we will calculate reverberation time and provide recommendations following the procedures described in NRC-CNRC Construction Technology Update No. 51, Acoustical Design of Rooms for Speech (2002).

SECTION 1: ROOM BACKGROUND SOUND LEVELS:

LEED V4 STEPS 3 AND 4 (ADDRESS HVAC BACKGROUND NOISE / VERIFY HVAC BACKGROUND NOISE):

Detailed recommendations will be provided when formal review has been performed (once HVAC sound data are provided to us for review during a later design phase). The following items are general placeholder recommendations for the project for noise and vibration control (all represent good design practice for noise/vibration control, with some comments/recommendations in bold print):

- The general design includes rooftop air-handler units (units with no internal compressor/condenser sections) mounted on steel roof dunnage support, with vertical support tied into building columns for the east building. We recommend the rooftop air-handler units include 2-inch internal spring isolation for fans. No further external vibration isolation will be required.

- If any packaged RTU's are planned for the project (those with internal compressor/condenser sections) and will be located above (or near) noise sensitive spaces, we recommend concrete roof pours below and beyond the footprint of the RTU's (a 6-inch overall thickness normal weight concrete pour extending a minimum of 4-ft. beyond the unit footprint is typically recommended). In addition, we recommend restrained spring isolation between the units and the roof steel dunnage (or spring vibration isolation curbs) with 2-inch static deflection spring rating. This recommendation will apply to insulated metal deck roof areas, not areas of the buildings which already include concrete roofs (for those areas with concrete roof, only the external spring isolation recommendation would apply).

- We understand that cooling towers are planned with interior chillers. The cooling towers will be supported on steel dunnage, and we recommend the restrained spring isolators with 3-

inch static deflection be included (if not already planned) between the cooling tower and the dunnage. For interior chillers, we will review the planned chiller type, though expect that they will require external restrained spring+neoprene floor/pad support, rated for 2-inch static deflection.

- For any above-grade base mounted pumps, we recommend the pumps be mounted on concrete inertia bases with spring isolators (between base and pad) selected for 2-inch static deflection (if not already planned).

- As the project design progresses, we will review the planned overall vibration isolation for various components and provide comment as needed. We note that vibration isolation is currently included for main HVAC units, as well as those localized to rooms served.

- We note that sound attenuators and or duct lining is currently planned for rooftop air-handling units, ERU's, etc. For budgeting, we recommend elbow type sound attenuators be included for all rooftop unit discharge and inlet paths (the attenuators should be approximately 5-ft. overall midline length). During later design phases, the specific unit selections will be reviewed based on computer modeling of duct paths, and specific noise control recommendations will be provided.

- We note that roof mounted energy recovery units will be used to provide outside air to the buildings. Based on equipment sound data, we recommend for budget purposes that a sound attenuation hood be used at the exhaust fan path to the exterior. This may be available from the equipment manufacturer, or may be fabricated of a metal, 90-degree duct elbow, opening down toward the roof. All interior surfaces of the elbow/hood should include 1-inch thick duct liner, such as Manville Permacote Linacoustic, or similar.

- We will review manufacturers' NC (noise criterion) ratings for supply diffusers and return grilles when selected. For the core learning spaces, we recommend manufacturers NC ratings no greater than NC-20. We note that core learning spaces are generally served by displacement diffusers, which are inherently quiet based on very low face air velocity.

- A duct air velocity chart is attached, showing recommended duct maximum air velocities to meet specific background sound (NC) ratings. We recommend that this table be followed for highly noise-sensitive spaces, such as the Auditorium and Stage areas. The following are recommended NC ratings for various space types:
    - Auditorium/Stage: NC-25 (NC-30 Maximum)
    - Conference Rooms: NC-30
    - Core Classrooms: NC-30 (40 dBA maximum required by LEED)
    - Private Offices: NC-35
    - Cafeteria: NC-35
    - Gymnasium: NC-40
    - Open Plan Office Areas: NC-40
    - Corridors (for Circulation): NC-40

- We note that chilled beams will be used in the majority of the academic and support spaces. The chilled beams should be selected such that the total sound level (produced by multiple units serving specific use spaces) not exceed the recommend maximum NC levels noted above.

SECTION 2: EXTERIOR NOISE:

LEED V4 STEPS 5 AND 6 (DETERMINE PRESENCE OF EXTERIOR NOISE SOURCES / FOR HIGH NOISE SITES, IMPLEMENT MEASURES TO MINIMIZE EXTERIOR NOISE INTRUSION)

- The LEED v4 standard notes that if a project site locates the school building further than ½ mile from a noise source such as major transit corridors, industrial manufacturing facilities, outdoor concert or sports venues, rail lines and air traffic lines. Because it appears that this project site is greater than ½-mile from the noise sources as listed, no exterior measurements or review of building exterior construction is required for control of exterior sound to the interior of the building. We will confirm with the LEED consultant that no exterior measurements or review are required.

SECTION 3: ROOM REVERBERATION

LEED V4 STEPS 7, 8, AND 9 (DESIGN FOR OPTIMUM REVERBERATION TIMES / CALCULATE ROOM VOLUME / SELECT OPTION FOR CLASSROOMS AND CORE LEARNING SPACES LESS THAN 20,000 CUBIC FEET):

CORE LEARNING CLASSROOMS (TYPICAL):

We understand that the base acoustical ceiling tile for core learning classrooms will have an NRC rating of 0.80 and a CAC rating of 35. Both of these are as recommended. To meet the LEED v4 reverberation requirements, we recommend that the full ceiling area (less lighting, diffusers, grilles, etc.) include acoustical tile. If there are significant areas of the ceiling that will be a material other than ACT (such as gypsum areas, radiant panels, etc.) we recommend any non-ACT area of the ceiling be included as wall treatment with a minimum NRC of 0.70 (for the same area as the non-ACT treatments). We can review further as the design progressed (by calculation or other means) if the wall treatment will be needed to conform to the LEED v4 limits. If the full ceiling area (less lighting, diffusers, grilles, etc.) will include ACT, LEED v4 allows a shortcut method to note this in their spreadsheet (which we would complete and submit).

OTHER SPACE TYPES (FROM REVIEW OF ROOM DETAIL SHEETS):

From review of the room detail sheets provided, we find in general that acoustical ceiling tiles are planned with NRC of 0.70 or higher (NRC 0.80 is generally called out) and the ceiling tiles also have a CAC rating of 35. Both are acceptable ratings for the project.

ROOM ACOUSTICS - LARGER VOLUME AREAS / SPECIALTY AREAS:

This section will be further developed as the design progresses. We list below various acoustical treatment equipment/types and then the recommended scope of treatments to include in the project at this stage. As drawings are furthered, we will provide additional information. Not all of these treatments are called out for the specific areas noted below.

ACOUSTICAL TREATMENT/EQUIPMENT TYPES:

- Type “A”: 2-inch thick core sound absorption fabric-covered treatment with impact-resistant panel behind fabric, with minimum NRC 0.90, such as: http://conweddesignscape.com/products/wall-panels/.

- Type “B”: 2-inch thick compressed wood fiber panels with sound absorption media behind panel, min. NRC 0.85, such as: https://www.armstrongceilings.com/commercial/en-us/commercial-ceilings-walls/custom-tectum-wall-panels/tectum-finale-wall-panels.html. These are standard rectangular shaped panels.

- Type “C”: Overhead stage reflectors, such as Wenger “Maestro”: https://www.wengercorp.com/acoustics/maestro-acoustical-shells.php

- Type “D”: Stage shell towers, such as Wenger “Maestro”: https://www.wengercorp.com/acoustics/maestro-acoustical-shells.php

- Type “E”: Acoustical Diffusers, such as Kinetics “Hightones”: http://kineticsnoise.com/interiors/hightones.html.

- Type “F”: Auditorium house reflectors, such as Kinetics “Ovation”: http://kineticsnoise.com/interiors/ovation.html.

- Type “G”: Sound absorption material (for atop auditorium house ceiling panels): https://dcpd6wotaa0mb.cloudfront.net/mdms/dms/EIS/44089/44089-SelectSound-Black-Acoustic-Blanket-Product-Data-Sheet.pdf.

- Type “H”: Pyramidal ceiling acoustical diffusers, such as: http://kineticsnoise.com/interiors/geometric.html. 2X2 lay-in diffusers.

- Type “I”: Acoustical ceiling tile with NRC 0.90+ in suspended grid.

- Type “J”: Tectum “Finale” panels attached to underside of gypsum isolation ceiling.

- Type “K”: Gypsum isolation ceiling, to consist of two layers 5/8-inch gypsum on drywall grid, supported by wire hangers with resilient hanger, with 6-inch batt insulation in the cavity.

- Type “L”: Acoustical ceiling tile (mineral fiber) with NRC 0.80+ and CAC 35+.

- Type “M”: 3-inch deep acoustical deck, with minimum NRC of 0.80.

The following lists recommended scope of treatments at this stage of design:

East Campus:

A-100A:

Chorus:

- 600 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- 60% of ceiling area type “J” absorption panels.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Piano:

- 500 sq. ft. type “A” wall treatment.

- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- 60% of ceiling area type “J” absorption panels.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Band:

- 800 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- 60% of ceiling area type “J” absorption panels.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Guitar:

- 220 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ACT type “I” ceiling.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Art Studio / TV Production:

- 900 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “J” treatment.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Control Room:

- 200 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “J” treatment.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked.

Sound Edit:

- 200 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “J” treatment.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked

Video Edit:

- 220 sq. ft. type “A” wall treatment.
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).

- Full ceiling area type “J” treatment.
- Hard (VCT, etc.) floor.
- For room acoustics, all major interior wall surfaces should be two layers 5/8-inch gypsum, stacked

Dance (two rooms):
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “L” treatment suspended below isolation ceiling.
- Hard (VCT, etc.) floor.

Mechanical:
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity). When information is available on planned equipment in the room, we will review to confirm the isolation ceiling is needed.

A-100B:

Scene Shop:
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “L” treatment suspended below isolation ceiling.

A-101A:

Auditorium:
This space will be primarily renovation, and our theater group has provided information for stage acoustics. The following are for budget, to be furthered in later design phases.
- 1,000 sq. ft. type “A” wall treatment.
- 800 sq. ft. type “E” acoustical diffusers, for use on lower house side wall areas.

West Campus:

A-101D and A-102D:

Cafeteria:
- 1,200 sq. ft. type “A” or “B” wall treatment.
- Type “I” acoustical tile ceiling with NRC 0.90+ (high NRC glass fiber based tiles) for approximately minimum of 80%+ of the ceiling area.
- For areas of the cafeteria located below noise-sensitive spaces (core learning spaces, etc.) include type “K” gypsum isolation ceiling above the type “I” finish ceiling (for the scope of the ceiling area defined by the floor area of the noise-sensitive spaces above).
- VCT or other hard floor.

A-101E:

Noise-Sensitive Spaces Below the Gymnasium:
For any spaces considered noise-sensitive below the gymnasium, such as the Multipurpose, Wrestling, Trainer, Strength, Fitness, Offices, Conference Room, etc. we recommend the following be included in project scope:
- Full type “K” gypsum isolation ceiling suspended from deck (min. 1-ft. air cavity).
- Full ceiling area type “L” treatment suspended below isolation ceiling.

A-102E:

Gymnasium:

We used an average mid-frequency reverberation limit of 1.5 seconds for the gymnasium, to provide good control of overall noise buildup, and good control of room echo. Based on the very large volume of the gym, the following is recommended for project scope:

- Acoustic roof deck type "M".
- Acoustical wall panels type "B" for an area of 4,000 sq. Ft. (distributed at mid-height of wall as feasible).
- Athletic flooring.

SECTION 4: SOUND ISOLATION REQUIREMENTS (ACOUSTIC CREDIT LEVEL ONLY):

Design classrooms and other core learning spaces to meet the sound transmission class (STC) of ANSI S12.60-2010 Part 1. This is not technically required for the LEED v4 acoustic pre-requisite level, though is good design practice. We list areas where departure from the ANSI standard requirements (to which LEED v4 uses as basis of design) is reasonable (such as pass doors between classrooms, corridor entries to classrooms, etc.).

SPECIFIC ACOUSTICAL DOOR TYPES:

The following table notes specific door types as included in this report:

Table 1: Door Types

Door Type	Door Panel STC Rating	Perimeter Gasket	Astragal Gasket (where applicable)	Door Drop Seal	Notes
G-30	STC 30	Yes, field-installed	Yes, field-installed	Yes, field-installed	1
G-40	STC 40	Yes, field-installed	Yes, field-installed	Yes, field-installed	1
AR-47	STC 47 with frame	Factory installed	Factory installed	Factory installed	2

Note 1: The intent is for the door panel/slab STC rating to be listed in the door schedule sheet, and be specified as an STC requirement for the door manufacturer to provide a panel/slab with the minimum STC rating. The door hardware specification must include the acoustical gaskets as listed for each acoustically rated door panel/slab.

Note 2: The intent is to include an acoustically rated door/frame/gasket assembly which has been acoustically tested to meet the minimum STC rating, in a separate specification section. The door type and STC rating should be called out where required in the door schedule sheet.

ISOLATION RATINGS OF PARTITIONS (PERKINS EASTMAN PARTITIONS (DRAWING A-003 WEST CAMPUS) AND ADDITIONAL RECOMMENDED PARTITIONS):

- STC-45+: Type "A", "K" and "M" (3-5/8" or 6" framing)
- STC-50+: Type "C" (6-inch framing)
- STC-53+: Type "B" and "L" (6-inch framing)
- STC-60+: Type "CT-1"

Type "CT-1": Two rows of 3-5/8-inch framing or 6-inch framing separated by 1-inch air space (no bracing) with two layers 5/8-inch gypsum on each outside face of framing (total four layers gypsum)

with two layers of 3-1/2-inch+ batt insulation in the cavity. Partition to continue to deck with non-hardening sealant at base and head. Recessed boxes offset three framing bays, or if closer, or within the same framing bay, use a back-box sealant putty at both boxes, such as Kinetics IsoBacker: https://kineticsnoise.com/arch/pdf/isobacker.pdf.

RECOMMENDED PARTITION TYPES FOR TYPICAL ADJACENCIES:

The following table provides sound isolation recommendations for general core learning space adjacencies that occur in a number of areas of the project as listed in the ANSI standard. These ratings are considered minimum requirements as good design practice.

Table 2: Recommended Partition STC Ratings / General Adjacencies

Room	Adjacent Room	Recommended STC/IIC Rating of Fixed Partition	Recommended Door Type (LEED pre-req level)	Notes
Core Classroom (no pass door)	Core Classroom	STC 50	NA	1
Core Classroom (with pass door)	Core Classroom	STC 50	G-30	2
Core Classroom (with pass door)	Corridor	STC 45	G-30	3
Core Classroom (no pass door)	Stair	STC 45	NA	4
Core Classroom (no pass door)	Common-Use and Public-Use Toilet Room	STC 53	NA	
Core Classroom (no pass door)	Office, Conference Room	STC 45	NA	5
Core Classroom (no pass door)	Music Room, Auditorium, Mechanical Room, Gymnasium, Cafeteria	60	NA	6, 9
Office, Conference Room (with pass door)	Corridor, Circulation	STC 45	See Note 7	7
Core Classroom (impact isolation)	Regularly Occupied Space Above	IIC 45	NA	8

Note 1: Standard designs to meet this rating include 6-inch framing with three layers 5/8-inch gypsum (two layers gypsum on one side of framing, one layer on the other side of framing), with 3-1/2-inch or thicker batt insulation or 3-5/8-inch framing with two layers 5/8-inch gypsum on each side of framing, with 3-1/2-inch or thicker batt insulation. Type “C” meets this rating, and type “A” (6-inch framing) is reasonable to use for this adjacency (it is very close to an STC 50 rating).

Note 2: To meet the ANSI standard, the overall rating for the partition/door is STC 50 or higher, which would require an acoustically rated door/frame/gasket assembly (type “G-47”) in an STC 53 rated fixed partition. With the G-30 door, the overall partition/door rating will not meet the STC 50 rating (it is predicted at or close to STC 40), though reasonable attenuation of speech sound will result from room to room (from past project experience).

Note 3: The G-30 type door is required to meet the ANSI requirements. For the pre-requisite LEED v4 level, the door gasket set is not strictly required, though if the classroom will be located next to an active/noisy corridor area or other active circulation area (or other noise source during classroom use) the gasket set is recommended. If the corridor/circulation area adjacent to the classroom will be generally quiet during classroom use, the gasket set and STC rating is optional.

Note 4: If the stair will be regularly used during times of classroom use, we recommend a partition with a rating of STC 50 or higher.

Note 5: If very high speech privacy is required for any classroom to office adjacencies, we recommend a partition with a rating of STC 50 or higher.

Note 6: If, based on review of planned equipment in the mechanical room, it is determined that a lower STC rating is acceptable, we would provide criteria. Currently, we recommend a partition with an STC 60 rating, which will typically provide excellent control of typical air-handler (and pumps, etc.) sound to noise-sensitive spaces.

Note 7: If moderate speech privacy is expected for general offices and conference rooms to corridor/circulation zones we recommend the door type G-30.

Note 8: The IIC 45 rating is to be achieved with no carpet or other soft finish floor (which would typically increase the IIC rating). With standard steel/concrete composite constructions (VCT finish flooring, etc.) the receiving room would require a full ceiling of mineral fiber ACT, gypsum, or other finish material that would provide an isolation rating equivalent to CAC 35 or higher. Open or partially-open ceilings would require floor construction upgrades or other means to achieve the IIC 45 rating.

Note 9: The entry doors to all music rehearsal and performance rooms should be type G-40. Entry doors to the Auditorium/Stage should all be type G-40.

RECOMMENDATIONS FOR SPECIFIC SPACE ADJACENCIES:

The following recommendations are for any spaces that do not fall under the spaces included in Table 2. These recommendations follow the ANSI school acoustic standard:

East Building:

1. (General) Doors that lead from classrooms to interstitial spaces (such as Science Labs to Prep Rooms) should be type G-30 to maintain good levels of sound isolation between the Science Labs.
2. (A-100A): The partition between the two Dance rooms should have an STC 60+ rating. The doors from corridor to these rooms should be type G-40. The dance floor should terminate within the partitions of each room, to minimize vibration transfer laterally.
3. (A-100A): The wall between the TV Studio and the adjacent enclosed rooms should have an STC 60 partition.
4. (A-100A, etc.): Entry doors to mechanical rooms with significant noise sources in the room should be type G-40.
5. (A-100A): Entry doors to the rooms in the Video Edit suite should be type G-40. Partitions in this area can be discussed. For project scope, directly demising partitions should have an STC 60 rating.
6. (A-100B): The partition between the Scene Shop and the Animation and Graphics rooms should have an STC 60 rating.

West Building:

1. (A-102C): The movable partition in the Seminar room should have an STC 53 rating.

AUDIO VISUAL/ THEATRE DESIGN:

IRISH AUDITORIUM

AUDIOVISUAL SYSTEM

- Wireless microphones
- Automatic microphone mixer
- Digital mixing console
- Digital signal processor
- CD/media player
- Permanent loudspeakers
- Portable loudspeakers
- Backstage audio monitoring and paging
- Audio recording system, simple
- Production intercom system
- Digital audio network
- Roll-down projection screen
- Video inputs at stage and booth
- Audiovisual switcher
- Video projector
- Touch panel control system
- Video, audio and category tie line systems
- Pan/tilt/zoom camera
- IP streaming (connection to TV Studio)

THEATRICAL LIGHTING

- LED-based lighting system
- Motorized circuit breaker panel
- Ethernet-based control system
- Architectural lighting control
- Switched power distribution
- Control console with touch monitors
- Wireless remote control for console
- Lighting fixture and accessory package

THEATRICAL RIGGING SYSTEM

- Counterweight rigging system with pipes 9 to 12 inches on center
- Stage curtains
- Cyclorama
- Scrim
- Flown acoustic ceiling panels, folding
- Remove existing front-of-house lighting truss, replace with catwalk

TEACHER PLANNING/SEMINAR

AUDIOVISUAL SYSTEM

- Wireless microphones
- Automatic microphone mixer
- Digital signal processor
- CD/media player
- Permanent loudspeakers
- Roll-down projection screens
- Video inputs at presentation locations
- Audiovisual switcher
- Video projectors
- Touch panel control system

CHORAL AND BAND CLASSROOMS

AUDIOVISUAL SYSTEM

- CD/media playback
- Permanent loudspeakers
- Equipment housed in millwork cabinet
- Audio recording system
- Overhead stereo microphone
- Video display system – similar to classroom system - carried under FF&E/Technology

DANCE STUDIOS

AUDIOVISUAL SYSTEM

- CD/media playback
- Permanent loudspeakers
- Equipment housed in millwork cabinet
- USB extender to allow portable USB camera to be placed in front of room and connected to instructor computer
- Video display system – similar to classroom system - carried under FF&E/Technology

GYMNASIUM

AUDIOVISUAL SYSTEM

- Wireless microphones
- Automatic microphone mixer
- Digital signal processor
- CD/media player
- Auxiliary inputs
- Permanent overhead loudspeakers
- Portable equipment rack for game announcer

WRESTLING, FITNESS, MULTI-PURPOSE AND STRENGTH ROOMS

AUDIOVISUAL SYSTEM

- CD/media player
- Auxiliary inputs
- Permanent loudspeakers

TELEVSION STUDIO

AUDIOVISUAL SYSTEM

- IP-based high-definition studio, maximum of 10 people in front of camera
- Three operator cameras on pedestals
- Production video switcher with graphics and keying capability
- Multiple video monitors
- Solid-stage video recording
- Remote input and control of pan/tilt/zoom cameras in Irish Auditorium, Gymnasium, Little Theater
- Broadcast through private IP network to Comcast
- Head end for 24-hour television station
- Playout video server system
- Wired and wireless microphone
- Digital audio mixing console
- Production intercom with IFB
- Field production equipment under FF&E/Technology

LIGHTING SYSTEM

- LE-based lighting system
- Motorized circuit breaker panel
- Ethernet-based control system
- Switched power distribution
- Control console with touch monitors
- Wireless remote control for console
- Lighting fixture and accessory package
- Grip equipment

RIGGING SYSTEM

- Pipe grid
- Key wall with corner sweep
- Studio drapery track and drapes

CAFETERIA

AUDIOVISUAL SYSTEM

- Wireless microphones
- Automatic microphone mixer
- Digital signal processor
- CD/media player

- Permanent loudspeakers
- Roll-down projection screen for use with portable video projector (under FF&E/Technology)
- Simple control system

OUTDOOR QUAD

AUDIOVISUAL SYSTEM

- Wireless microphones
- Automatic microphone mixer
- Auxiliary inputs
- Digital signal processor
- Stereo program playback system
- Analog input for use with portable video projector (under FF&E/Technology)

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4.1.2.J – SUSTAINABLE BUILDING DESIGN GUIDELINES

During the schematic design phase, the design team continued meetings and workshops with the LHS Working Group to establish sustainable priorities, evaluate HVAC systems, study the feasibility of photovoltaic arrays on the building, and complete a second iteration of energy modeling.

SUSTAINABILITY PRIORITIES

The design team will work with the "Sustainable Lowell 2025" program and meet Lowell's commitment as a Green Community (including the associated stretch code objectives).

The following sustainability priorities for the Lowell High School project were identified and ranked in order of highest priority to lower priority by the LHS Working Group at the Green Charrette:

1. Air quality
2. Curriculum/building interaction
3. Quality of natural light
4. Durability
5. Systems monitoring/control

Additional sustainable features of interest by include:

- Site & Transportation
    - Multi-use green space for stormwater management, teaching space, and security
    - Green roof for insulation, habitable, stormwater
    - Beautiful courtyard spaces
    - Urban connection – bike parking
    - Building waiting areas with cover
    - Building storage for future
    - Electric charging stations
    - Address heat island effect with minimized dark surfaces/asphalt
- Water Efficiency
    - Water stations – bottle fillers – filter changed
    - Capture rainwater for reuse- even rain barrels
    - Low flow fixtures
    - Efficient kitchen equipment
- Energy Atmosphere
    - Decidious plants for shading
    - First and operational costs with 10-20 year horizon
    - Efficient façade materials
    - Accessible equipment
    - Solar power and/or wind
    - White Roof
    - Occupancy Sensors
    - Energy metering
    - Look at ground source v. VAV
    - Micro-grid
    - Plenty of glass – visibility & connection to city and front city view of school as active hub
- Materials & Resources

  - Durable/maintainable
  - Recycled content materials
  - Recycling stations – well located
  - Local materials
  - Long lasting
  - Reclaimed materials – wood, slate, concrete
- Indoor Environmental Quality
  - "Perfect" air quality- air qualify – filter, volume, humidity, temperature
  - Quality natural light
  - Filters – easily maintained and reusable
  - Natural ventilation – classrooms and light wells
  - Avoid off-gassing materials
- Education & Innovation
  - Dashboard (energy/gas/water)
  - Align systems with staff (training)
  - Recycling protocol
  - Tie curriculum to facilities/feature & school as teaching tool
  - Design for natural safety
  - Bike alternate considerations (storage for scooters, BDs…)
  - Equipment on display
  - Integrating local artist/art

SYSTEMS

HVAC SYSTEM

Options for the HVAC system were studied and evaluated based on a life cycle economic analysis and features. HVAC systems evaluated for this project were:

Baseline system: Overhead Variable Air Volume (VAV) system

Option 1: Displacement system with radiant cooling and heating and high efficiency hot water and chilled water plant

Option 2: Active chilled beams with high efficiency hot water and chilled water plant

Option 3: Air-source electric variable refrigerant flow (VRF)

Option 4: Water-source VRF

Commons features between the HVAC options include:

- Improved Air Quality
- Improved Level of Filtration
- High Energy Efficiency
- High Level of Thermal Comfort
- Low Noise Operation
- New Automatic Temperature Control and Building Energy Management System

The SBC directed the design team to proceed with option 1, the displaced system with radiant cooling and heating. This system was seen as desirable to keep short term and immediate costs down.

PHOTOVOLTAIC SYSTEM

The feasibility of providing rooftop mounted photovoltaic array (PV) systems were evaluated by looking at the structural installation on the existing and new buildings and performance output. It was found that the new portions of the west building, the new Freshman Academy, and the sloped portion of the gymnasium building are viable locations. The existing structures of the east and west buildings cannot support PV systems without additional structural support. Other areas of the roofs are not recommended to have PVs because equipment and adjacent building will shade the panels.

ENERGY MODELING

Whole building analysis was completed by Thornton Tomasetti to evaluate the relative energy performance of the proposed design case against several energy conversation measures (ECMs). The east and west sides of the campus were evaluated separately because of their existing and proposed conditions vary greatly. The cumulative savings of ECM energy savings on the east campus is an estimated 11.9% annual energy use savings and 15.6% at the west if all of the ECMs are able to be incorporated in the final project. Immediate costs will be considered in determining what ECMs will be incorporated. The complete energy analysis report can be found in the Appendix.

LEED

Since the last submission only few updates have been made to the LEED checklist, however this will continue to be refined as the project progresses. The project is on target to meet at least LEED Silver. The checklist currently has this project achieving the high range of LEED Silver with the possibility of achieving Gold.

See the Appendix for the sustainability letter and LEED score card.

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4.1.2.K – ADA AND MAAB ANALYSIS

The accessibility analysis was prepared by Hastings Consulting and is enclosed with in their Code Report (Refer to Section 4.1.2.f). All areas open to the general public are required to comply with the requirements of the Massachusetts Architectural Access Board (MAAB) Regulations (521 CMR). Renovated portions of the existing buildings must be made to ensure that, to the maximum extent feasible, the altered portions are readily accessible to and usable by individuals with disability per the American with Disabilities Act (ADA) (28 CFR Part 36 §36.402(a).

Increased accessibility improvements with the existing 1922 (East) Building include a new accessible public entrance on Kirk Street, improved accessible public entrance at Father Morissette Boulevard, and accessible audience access to the stage directly from the Auditorium.

It is the design team's intent to only apply for a variance from the AAB in a case where there is a condition that is 'technologically infeasible'. At this time, there are no such conditions present within the scope of the project.

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4.1.2.L – ROOM DATA SHEETS

See Appendix for Room Data Sheets.

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4.1.2.M – CONSTRUCTION METHODOLOGY

Skanska USA Inc. described the criteria and analysis used by the Owner's Project Manager, in conjunction with the Designer, to compare the construction delivery methods provided in M.G.L. Chapters 149 and 149A for the Proposed Project.

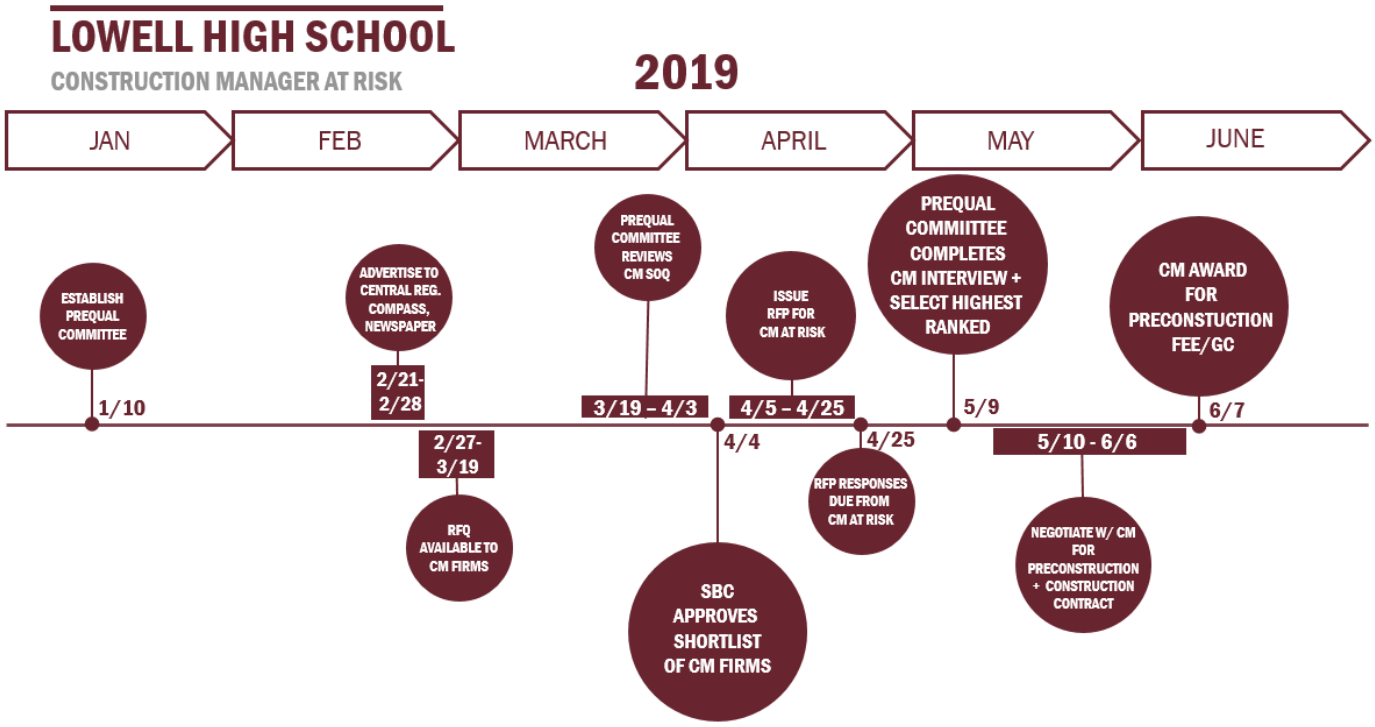
This project requires rigorous planning and daily communications that is well-coordinated to keep the school fully operational during this phased occupied renovation and construction. Getting the Construction Manager under contract sooner and immediately engaged with planning is one of the most critical items of the Project and requires input, development and buy-in by the construction manager prior to buyout of the other trades, which is only possible with the CM at Risk delivery method. Early development of the phasing plan by the CM, as opposed to by the AE and OPM will reduce potential change orders and have the contractor executing "their" plan.

The scale and scope of this project requires flexibility for changes in phasing and logistics that are more suited to the CM at risk contract method. Given the nature of the work and the potential for unforeseen site and building conditions which will most likely be encountered the contractor requires the flexibility to adjust the phasing and logistics to the conditions encountered which the CM at Risk contractual method allows for. The CM-at-risk method is also a more cost effective approach to addressing unforeseen conditions and an aggressive schedule.

A PowerPoint presentation included in the Appendices was made to the School Building Committee on November 1, 2018 reviewing the relative advantages and disadvantages associated with each of the construction delivery methods. Further discussions continued at the next School Building Committee on December 6, 2018, where a motion was made and seconded and the District elected to proceed under the CM at Risk construction delivery methodology, and passed unanimously. A copy of the certified vote is included in the Appendices.

The application for authorization to proceed with the CM at Risk construction delivery method was submitted to the Office of The Inspector General on December 24, 2018. The Massachusetts Office of the Inspector General has found that Lowell has met the statutory requirements for using the CM at-risk delivery method and approves the use of it as of January 24, 2019. The OPM Confirms that cost estimates, proposed project schedule, estimated reimbursement rate, and Total Project Budget Spreadsheet reflect the selected construction delivery method.

The proposal schedule for procurement of the CM is as follows:


LOWELL HIGH SCHOOL
CONSTRUCTION MANAGER AT RISK
2019
JAN
FEB
MARCH
APRIL
MAY
JUNE
ESTABLISH PREQUAL COMMITTEE
1/10
ADVERTISE TO CENTRAL REG. COMPASS, NEWSPAPER
2/21-2/28
2/27-3/19
RFQ AVAILABLE TO CM FIRMS
PREQUAL COMMITTEE REVIEWS CM SOQ
3/19 – 4/3
4/4
SBC APPROVES SHORTLIST OF CM FIRMS
ISSUE RFP FOR CM AT RISK
4/5 – 4/25
4/25
RFP RESPONSES DUE FROM CM AT RISK
PREQUAL COMMIITTEE COMPLETES CM INTERVIEW + SELECT HIGHEST RANKED
5/9
5/10 - 6/6
NEGOTIATE W/ CM FOR PRECONSTRUCTION + CONSTRUCTION CONTRACT
CM AWARD FOR PRECONSTUCTION FEE/GC
6/7

The Commonwealth of Massachusetts
Office of the Inspector General

GLENN A. CUNHA
INSPECTOR GENERAL

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ONE ASHBURTON PLACE
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FAX: (617) 723-2334

January 24, 2019

Eileen Donoghue, City Manager
City of Lowell
Lowell City Hall
375 Merrimack Street
Lowell, MA 01852

Re: Application to Use the Construction Management At-Risk Alternative Delivery Method for the Lowell High School Project

Dear Ms. Donoghue:

On January 2, 2019, pursuant to M.G.L. c. 149A and 945 CMR 2.00, the city of Lowell ("Lowell") submitted an application to use the construction management at-risk ("CM at-risk") alternative delivery method for the Lowell High School project.

Based on all the information provided, Lowell has met the statutory requirements for using the CM at-risk delivery method. Accordingly, the Office of the Inspector General ("Office") is issuing this notice to proceed to use the CM at-risk delivery method as specified in M.G.L. c. 149A, §§ 1-13, and to use the plan and procedures submitted.

This approval is conditioned on Lowell using a CM at-risk firm that the Division of Capital Asset Management and Maintenance ("DCAMM") has certified, as well as DCAMM-certified trade contractors. Therefore, Lowell must require each CM at-risk firm to supply both a certificate of eligibility and an update statement during both the prequalification phase and the technical proposal phase of the selection process. In addition, Lowell must require each trade contractor to supply a certificate of eligibility and an update statement during the prequalification phase and again at the bidding phase of the selection process. Lowell must reject as invalid all contractors' statements of qualifications, proposals and bids that do not provide such certificates of eligibility or update statements.

If, during the course of the project, Lowell changes its owner's project manager or designer, please submit information about the new project manager or designer to the Office. Also, if Lowell decides not to proceed with the CM at-risk delivery method, please notify the Office.

Please feel free to contact me or Kerri-Anne Hollingshead, Policy Analyst, if you have any questions or concerns.

Sincerely,

Glenn A. Cunha
Inspector General

cc: Mary Ann Williams, Skanska USA

4.1.2.N - LOWELL HIGH SCHOOL – DISTRICT REIMBURSEMENT RATE

Category	Reimbursement Points
Reimbursement Rate before Incentives (refer to the District's executed Feasibility Study Agreement)	78.95%
Maintenance (contact the MSBA project manager) -	1.40%
CM @ Risk -	1%
Newly Formed Regional School District	
Major Reconstruction or Reno/Reuse -	3.48%
Overlay Zoning District – c. 40R or c. 40S -	-
Overlay Zoning 100 Units or 50% units for 1, 2, 3 family units -	-
Energy Efficiency – "Green Schools" 2.00	2%
Model Schools - 5	-
Total Incentive Points 7.88%	
Anticipated MSBA Reimbursement Rate with Incentives	**80.00%**

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4.1.2.0 – TOTAL PROJECT BUDGET SPREADSHEET

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Lowell High School
SD
Preliminary Design Pricing Table

= Formula do not edit

Option (Description)	Total Gross Square Feet	Square Feet of Renovated Space ($*/SF)	Square Feet of New Construction ($*/SF)	Site, Building Takedown, Haz Mat Etc. ($*)	Estimated Total Construction** ($*)	Estimated Total Project Costs ($)
Schematic Design	622,777 sf	388,262 sf	234,515 sf	$ 17,423,246	$ 270,444,856	$ 343,339,220
		$ 358.55 $/sf	$ 485.29 $/sf		$ 434.26 $/sf	

* Marked Up Construction Costs

** Does not include Construction Contingency

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Total Project Budget
Test Form February 2019

City of Lowell/Lowell Public Schools
Lowell High School DRAFT

February 14, 2019

Total Project Budget: All costs associated with the project are subject to 963 CMR 2.16(5)	Estimated Budget	Scope Items Excluded from the Estimated Basis of Maximum Facilities Grant or Otherwise Ineligible	Estimated Basis of Maximum Total Facilities Grant[1]	Estimated Maximum Total Facilities Grant[1]
Feasibility Study Agreement				
OPM Feasibility Study	$555,560	$0	$555,560	
A&E Feasibility Study	$1,622,687	$0	$1,622,687	
Environmental & Site	$398,597	$0	$398,597	
Other	$23,157	$0	$23,157	
Feasibility Study Agreement Subtotal	**$2,600,000**	**$0**	**$2,600,000**	**$2,080,000**
Administration				
Legal Fees	$0	$0	$0	**$0**
Owner's Project Manager				
Design Development	$729,750	$0	$729,750	
Construction Contract Documents	$1,244,505	$0	$1,244,505	
Bidding	$477,080	$0	$477,080	
Construction Contract Administration	$6,187,485	$0	$6,187,485	
Closeout	$271,190	$0	$271,190	
Extra Services	$0	$0	$0	
Reimbursable & Other Services	$0	$0	$0	
Cost Estimates	$0	$0	$0	
Advertising	$0	$0	$0	
Permitting	$0	$0	$0	
Owner's Insurance	$0	$0	$0	
Other Administrative Costs	$0	$0	$0	
Administration Subtotal	**$8,910,010**	**$0**	**$8,910,010**	**$7,128,008**
Architecture and Engineering				
Basic Services				
Design Development	$6,256,000	$0	$6,256,000	
Construction Contract Documents	$8,758,400	$0	$8,758,400	
Bidding	$1,751,680	$0	$1,751,680	
Construction Contract Administration	$7,507,200	$0	$7,507,200	
Closeout	$750,720	$0	$750,720	
Other Basic Services: FF+E Equip Procurement and installation. Tech Equip Procurement and installation.	$221,782	$0	$221,782	
Basic Services Subtotal	**$25,245,782**	**$0**	**$25,245,782**	
Reimbursable Services				
Construction Testing	$0	$0	$0	
Printing (over minimum)	$75,000	$0	$75,000	
Other Reimbursable Costs	$390,000	$0	$390,000	
Hazardous Materials	$409,750	$0	$409,750	
Geotechnical & Geo-Environmental	$379,090	$0	$379,090	
Site Survey	$20,450	$0	$20,450	
Wetlands	$35,000	$0	$35,000	
Traffic Studies	$80,000	$0	$80,000	
Architectural/Engineering Subtotal	**$26,635,072**	**$0**	**$26,635,072**	**$21,308,058**
CM at Risk Preconstruction Services				
Pre-Construction Services and Existing Conditions Investigations	$800,000	**$0**	$800,000	**$640,000**
Site Acquisition				
Land / Building Purchase	$0	$0	$0	
Appraisal Fees	$0	$0	$0	
Recording fees	$0	$0	$0	
Site Acquisition Subtotal	**$0**	**$0**	**$0**	**$0**
Construction Costs				
SUBSTRUCTURE				
Foundations	$8,821,761			
Basement Construction	$0			
SHELL				
Super Structure	$16,763,727			
Exterior Closure	$0			
Exterior Walls	$10,053,749			
Exterior Windows	$11,262,654			
Exterior Doors	$439,272			
Roofing	$4,686,190			
INTERIORS				
Interior Construction	$21,467,433			
Staircases	$1,473,360			
Interior Finishes	$15,250,517			
SERVICES				
Conveying Systems	$1,305,000			
Plumbing	$9,392,145			
HVAC	$31,917,803			
Fire Protection	$3,255,044			
Electrical	$21,215,387			
EQUIPMENT & FURNISHINGS				
Equipment	$4,903,600			
Furnishings	$5,403,830			
SPECIAL CONSTRUCTION & DEMOLITION				
Special Construction - Phasing and enabling	$11,773,919			
Existing and Selective Building Demolition 1922/1980 Reno	$5,267,156			
In-Building Hazardous Material Abatement (Asbestos Flooring $553,500)	$3,632,110	$553,500		
BUILDING SITEWORK				
Site Preparation	$1,533,100	$0		
Site Improvements	$3,726,267			
Site Civil / Mechanical Utilities	$601,120			
Site Electrical Utilities	$1,142,760			
Scope Exclude Site Construction	$0	$0		
Construction Trades	$195,287,904	**Eligible Construction Cost**		
Contingencies (Design and Pricing)	$18,351,399			
D/B/B Sub-Contractor Bonds	$0			
D/B/B Insurance	$0			
General Conditions	$23,698,563	Eligible Demolition and Abatement	**$11,557,651**	
D/B/B Overhead & Profit	$0			
GMP Insurance	$4,023,086	Eligible Building Gross Floor Area	618,155 gsf	
GMP Fee	$6,129,643	Eligible Building and Site Cost per sf	$333 /sf	
GMP Contingency	$7,355,572	Eligible Building and Site Cost	**$205,845,615**	
Escalation to Mid-Point of Construction	$15,598,689			
Construction Budget	**$270,444,856**	**$53,041,590**	**$217,403,266**	**$173,922,613**
Ineligible Marked Up Construction Cost Breakdown				
Scope Excluded Site Work		$0		
Site Cost Cap Exclusion		$0		
Ineligible Demolition & Abatement		$766,516		
Ineligible Excess Auditorium and PE Areas		0		
Other Ineligible Building Areas		$2,007,150		
Construction Cost Cap Exclusion		$50,267,924		
Alternates				
Ineligible Work Included in the Base Project	$0	$0	$0	
Alternates Included in the Total Project Budget	$0	$0	$0	
Alternates Excluded from the Total Project Budget	$0		$0	
Subtotal to be Included in Total Project Budget	**$0**	**$0**	**$0**	**$0**
Miscellaneous Project Costs				
Utility Company Fees	$200,000	$0	$200,000	
Testing Services	$540,912	$0	$540,912	
Swing Space / Modulars	$0	$0	$0	
Other Project Costs (Mailing & Moving)	$1,350,000	$1,350,000	$0	
Misc. Project Costs Subtotal	**$2,090,912**	**$1,350,000**	**$740,912**	**$592,730**
Furnishings and Equipment				
Furniture, Fixtures, and Equipment	$6,112,825	$1,888,825	$4,224,000	
Technology	$4,821,950	$597,950	$4,224,000	
FF&E Subtotal	**$10,934,775**	**$2,486,775**	**$8,448,000**	**$6,758,400**
Soft Costs that exceed 20% of Construction Cost			$0	
Project Budget	**$322,415,625**	**$56,878,365**	**$265,537,260**	**$212,429,808**

Soft Cost Reimbursement

Estimated Budget	Excluded	Eligible Soft Costs	Category
$9,488,727	$0	$9,488,727	-Administration
$28,656,356	$0	$28,656,356	-A/E Services
		Ineligible therefore not included in calculation	-Site Acquisition
$2,090,912	$1,350,000	$740,912	-Miscellaneous Proj Costs
$10,934,775	$2,486,775	$8,448,000	FFE
		Not included in this calculation	Owners Contingency
		$47,333,994	Total Eligible Soft Costs

ProRated 20% Exclusion

$0	-Administration
$0	-A/E Services
$0	-Miscellaneous Proj Costs
$38,885,994	Sum of Three Soft Costs

Construction Costs associated with Soft Cost Cap Calculation

Estimated Budget	Construction Costs	Category
$800,000	$800,000	-CM Preconstruction services
$270,444,856	$270,444,856	-Construction Cost
	Not included in this calculation	-Construction Contingency
	$271,244,856	Total Construction Cost
	20%	Soft Cost Allowance
	$54,248,971	Reimbursable Soft Cost
	-$6,914,977	Eligible minus Reimbursable

-If Eligible minus Reimbursable is negative OK.
-If Eligible minus Reimbursable is positive enter value into Soft Costs that exceed 20% of Construction Cost below in the Ineligible column.

Construction Budget	$270,444,856	
Construction Cost of Excess Aud & PE	$0	
Construction Budget Minus Excess PE & Gym	$270,444,856	

OPM Services

		Eligible Fees	% of Total	OPM Value @ 3.50%	Value > 3.5%
Basic Services	$9,465,570	$9,465,570	3.50%	$9,465,570	$0
Extra Services	$23,157		0.01%		

Designer Services

				Designer Value @ 10.00%	Value > 10%
Basic Services	$26,868,469	$26,868,469	9.93%	$27,044,486	-$176,017
Extra Services	$1,787,887		0.66%		

Ineligible Construction Cost Calculations

Construction Budget	$270,444,856	1.384852059	= Markup Ratio
Construction Trades	$195,287,904		

		Markup Ratio	Marked Up Bldg Cost
Direct Building Cost	$167,611,472	1.384852059	$232,117,092
		Site Cost Cap Percentage	8.00%
		Eligible Marked Up Site Costs	$18,569,367

UST Removal/Soils abatement	$0	1.384852059	$0	Marked Up Costs
Scope Excluded Site Amenities	$0	1.384852059	$0	Marked Up Costs
		Scope Excluded Site Cost	$0	

Proposed Direct Site Cost	$7,003,247	1.384852059	$9,698,461	Marked Up Site Costs
		Scope Excluded Site Cost	$0	
		Eligible Marked Up Site Costs	$18,569,367	
		Site Cost Cap Exclusion	$0	

		Markup Ratio	Marked Up Demo & Abate
Direct Demo and Abatement	$8,899,266	1.384852059	$12,324,167
Scope Excluded Demo	$0	1.384852059	$0
Scope Excluded Abatement	$553,500	1.384852059	$766,516
		Eligible Demolition & Abatement	$11,557,651

INELIGIBLE SPACES

Spaces that are not included in the MSBA guidelines

NAME	NSF	GSF	COMMENTS
BANK/Credit Union	400	588	NEW - 1.47% Grossing Factor
Retail/Store	200	294	NEW - 1.47% Grossing Factor
CATIE'S CLOSET	700	1,190	Existing to remain/Reno 1.7% Grossing Factor
LOWELL COMMUNITY HEALTH	1,500	2,550	Existing to remain/Reno 1.7% Grossing Factor
TOTAL	**2,800**	**4,622**	

GROSSING FACTORS:

Existing to remain/Renovations	1.70 %
New	1.47 %
Proposed Blended Rate	**1.60 %**

	$217,403,266	Check	
Construction Budget ($/sf)	$434.26		
Total Building Area	622,777		
Ineligible Aud & Gym	0		
Other Ineligible Areas	4,622		
Eligible Building Area	618,155		

Ineligible spaces Cx Recovery @ .78 psf

	2,800	**4,622**	
$	0.78	4,622	$ 3,605

Construction Budget	$270,444,856
Eligible Construction Budget	-$217,403,266
Ineligible Site Work	$0
Ineligible Demolition & Abatement	-$766,516
Ineligible Excess Auditorium and PE Areas	$0
Other Ineligible Building Area	-$2,007,150
Construction Cost Cap Exclusion	$50,267,924

FFE Reimbursement

Funding Limits	Enrollment	Reimbursable Amour	Est'd Budget	Ineligible*
$1,200 /student	3,520	$4,224,000	$6,112,825	$1,888,825
$1,200 /student	3,520	$4,224,000	$4,821,950	$597,950

* If Ineligible is $0 or negative OK. No ineligible entry needed.
* If Ineligible is positive enter value for each into scope excluded costs.

	1.40	(0-2) Maintenance
	1.00	(0-1) CM @ Risk **If invited to EP after Jan 1, 2017 Not Applicable**
	0.00	(0-6) Newly Formed Regional School District
	3.48	(0-5) Major Reconstruction or Reno/Reuse type in rounded to 2 decimal plac
0.00%	0.00	0 gsf Renovated or Existing to Re
		1 gsf Total at Conclusion of Proje
	0.00	(0-1) Overly Zoning 40R and 40S
	0.00	(0-0.5) Overlay Zoning 100 units or 50% of units 1,2, or 3 family structures
	2.00	(0-2) Energy Efficiency - "Green Schools"
	0.00	(5) Model Schools **If invited to EP after Jan 1, 2016 Not Applicable**
	7.88	**Total Incentive Points** 86.83%

Board Authorization	
Design Enrollment	3,520
Total Building Gross Floor Area (GSF)	622,777
Total Project Budget (excluding Contingencies)	$322,415,625
Scope Items Excluded or Otherwise Ineligible	$56,878,365
Third Party Funding (Ineligible)	$0
Estimated Basis of Maximum Total Facilities Grant[1]	$265,537,260
Reimbursement Rate[3, 4]	80.00%
Est. Max. Total Facilities Grant (before recovery)[1]	$212,429,808
Cost Recovery[5]	$3,605
Estimated Maximum Total Facilities Grant[1]	$212,426,203

Construction Contingency[2]	$18,930,780
Ineligible Construction Contingency[2]	$16,226,331
"Potentially Eligible" Construction Contingency[2]	$2,704,449
Owner's Contingency[2]	$2,052,815
Ineligible Owner's Contingency[2]	$0
"Potentially Eligible" Owner's Contingency[2]	$2,052,815
Total Potentially Eligible Contingency[2]	$4,757,264
Reimbursement Rate[3, 4]	80.00%
Potential Additional Contingency Grant Funds[2]	$3,805,811
Maximum Total Facilities Grant	$216,232,014
Total Project Budget	$343,399,220

78.95	Reimbursement Rate Before Incentive Points	
7.88	Total Incentive Points[3, 4]	
80.00%	MSBA Reimbursement Rate	

NOTES
This document was prepared by the MSBA based on a preliminary review of information and estimates provided by the _____ of _____ for the _____ School project. Based on this preliminary review, certain budget, cost and scope items have been determined to be ineligible for reimbursement, however, this document does not contain a final, exhaustive list of all budget, cost and scope items which may be ineligible for reimbursement by the MSBA. Nor is it intended to be a final determination of which budget, cost and scope items may be eligible for reimbursement by the MSBA. All project budget, cost and scope items shall be subject to review and audit by the Authority, and the Authority shall determine, in its sole discretion whether any such budget, cost and scope items are eligible for reimbursement. The MSBA may determine that certain additional budget, cost and scope items are ineligible for reimbursement.

1 - The Estimated Basis of Total Facilities Grant and Estimated Maximum Facilities Grant amounts appearing in the "MSBA Board Approved Budget" column do not include any potentially eligible contingency funds and are subject to review and audit by the MSBA. The Estimated Basis of Total Facilities Grant, Estimated Maximum Facilities Grant, and Maximum Total Facilities Grant amounts appearing in the "Proposed Revised PFA Budget" column have been adjusted to account for construction bids received in accordance with Section 2.2 of the PFA and any budget revision requests submitted and approved by the MSBA as of the Date noted in the Proposed Revised Budget PFA column of the PFA Amendment. These amounts are also subject to further review and audit by the MSBA.

2 - Pursuant to Section 3.20 of the Project Funding Agreement and the applicable policies and guidelines of the Authority, any project costs associated with the reallocation or transfer of funds from either the Owner's contingency or the Construction contingency to other budget line items shall be subject to review by the Authority to determine whether any such costs are eligible for reimbursement by the Authority. All costs are subject to review and audit by the MSBA.

3 - The MSBA has provisionally included two (2) incentive points for energy efficiency, subject to the District meeting certain sustainability requirements for the project. If the District does not meet the requirements for the energy efficiency, the District will not qualify for these incentive points and the MSBA will adjust the reimbursement rate accordingly.

4 - The MSBA has provisionally included one (1) incentive point for the Construction Manager at Risk construction delivery method, subject to the District receiving approval from the Office of the Inspector General to utilize this method. If the District does not receive approval for the Construction Manager at Risk delivery method, the District will not qualify for these incentive points and the MSBA will adjust the reimbursement rate accordingly.

5. The proposed demolition of the _____ School will result in the MSBA recovering a portion of state funds previously paid to the District for the _____ project at the existing facilities completed in ____. The MSBA has calculated this recovery of funds to be $_____ and this amount has been deducted from the Estimated Maximum Total Facilities Grant and the Maximum Total Facilities Grant.

Total Project Budget	Minus Maximum Total Facilities Grant	Equals City's Likely Share

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Williams, Mary Ann

From: Williams, Mary Ann
Sent: Monday, February 04, 2019 12:03 PM
To: Jennifer Flynn (Jennifer.Flynn@massschoolbuildings.org)
Cc: Karl Brown; Joseph Drown (j.drown@perkinseastman.com); Dowd, Jim
Subject: Appendix 4C OPM SD Submittal Notification
Attachments: Appendix 4C OPM SD Submittal Notification.pdf

Dear Ms. Jennifer Flynn, Project Coordinator:

The Owner's Project Manager ("the OPM") Skanska USA Building has received the two *Schematic Design* construction cost estimates for the Lowell High School, school project (the "Project"), and offers the following:

Preferred Schematic Report:
Preliminary Design Pricing Construction Cost: **$270,456,023**
Preliminary Design Pricing Construction Cost: $/sf **$434.86**
Preliminary Design Pricing Project Cost: **$345,399,220**

Schematic Design:
Designer's Estimated Construction Cost: $ **$270,444,856**
Designer's Estimated Construction Cost: $/sf **$434.26**

OPM's Independent Estimated Construction Cost: **$268,678,430**
OPM's Independent Estimated Construction Cost: $/sf **$431.42**
OPM's Estimate of Project Cost: **$343,399,220**

District's Project Budget: **$343,399,220**

The estimated project cost is within the District's project budget and the District and its consultant will be forwarding a reconciled and complete Schematic Design Submittal, for which the Total Project Budget is based, on the schematic design documentation to the MSBA on **February 20, 2019**, in anticipation of consideration at the MSBA Board of Directors Meeting scheduled for **April 10, 2019**.

The District and its consultants understand that the MSBA will not accept Schematic Design Submittals for which the estimated project costs exceed the District's budget or Total Project Budget updates that do not reflect the project scope included in the Schematic Design Submittal documentation. The District and its consultants further understand that all value engineering activities must be complete and the results incorporated into all of the Schematic Design Submittal documentation prior to submitting to the MSBA.

Sincerely,

Mary Ann Williams
Program Executive

Skanska USA Building
usa.skanska.com
101 Seaport Boulevard, Suite 200
Boston, MA 02210, United States

Mobile +1 617 293 6869

Appendix 4C

Schematic Design Submittal Notification Template

Instructions: Compose an email containing the following statement:

Dear Ms. Jennifer Flynn, Project Coordinator:

The Owner's Project Manager ("the OPM") Skanska USA Building has received the two *Schematic Design* construction cost estimates for the Lowell High School, school project (the "Project"), and offers the following:

Preferred Schematic Report:
Preliminary Design Pricing Construction Cost: **$270,456,023**
Preliminary Design Pricing Construction Cost: $/sf **$434.86**
Preliminary Design Pricing Project Cost: **$345,399,220**

Schematic Design:
Designer's Estimated Construction Cost: $ **$270,444,856**
Designer's Estimated Construction Cost: $/sf **$434.26**

OPM's Independent Estimated Construction Cost: **$268,678,430**
OPM's Independent Estimated Construction Cost: $/sf **$431.42**

OPM's Estimate of Project Cost: **$343,399,220**

District's Project Budget: **$343,399,220**

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The District and its consultants understand that the MSBA will not accept Schematic Design Submittals for which the estimated project costs exceed the District's budget or Total Project Budget updates that do not reflect the project scope included in the Schematic Design Submittal documentation. The District and its consultants further understand that all value engineering activities must be complete and the results incorporated into all of the Schematic Design Submittal documentation prior to submitting to the MSBA.

4.1.2.P – DESIGNER'S RECONCILED CONSTRUCTION COST ESTIMATE

As required, Perkins Eastman retained, Project Management & Cost (PM&C) to develop a construction cost estimate based on a Schematic Design Pricing Set issued December 17, 2018, with addenda. The submission included drawings, outline specification, building system narratives, and various reports. Copies of these various elements are included within this submission. In addition to the estimate developed by PM&C, the OPM also developed an independent estimate based on the same materials.

After developing the two cost estimates, the Design team and OPM reviewed the draft estimates for scope. Meeting to reconcile the two estimates was held on January 23 and 25, 2019. Adjustments were made to reconcile the estimates and to keep the project in budget. The total construction cost is $270,444,856. The reconciled estimate was presented to the City Council at their February 14, 2019, meeting.

The full estimates and the estimate summary can be found in the Appendix.

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4.1.2.Q – OWNER'S PROJECT MANAGER'S CONSTRUCTION COST ESTIMATE

The full estimate can be found in the Appendix.

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4.1.2.R – PROJECT WORK PLAN

The Project Work Plan that follows anticipates early bid packages for portions of the project. Early Bid Package 1 is identified as the demolition and abatement of the office building at 75 Arcand Drive. Early Bid Package 2 is for the gymnasium site, civil and foundations. Early Bid Package 3 is for the gymnasium structural steel. The early bid packages are identified as to be determine (TBD) and will be coordinated with the construction manager's schedule once they are on board. We expect the ability of the structural engineer to complete the structural steel package will drive the other early bid packages which will allow the CM to provide continued on site presence once started.

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Lowell High School

Project Work Plan DD-CA

2/19/2019

Version 02

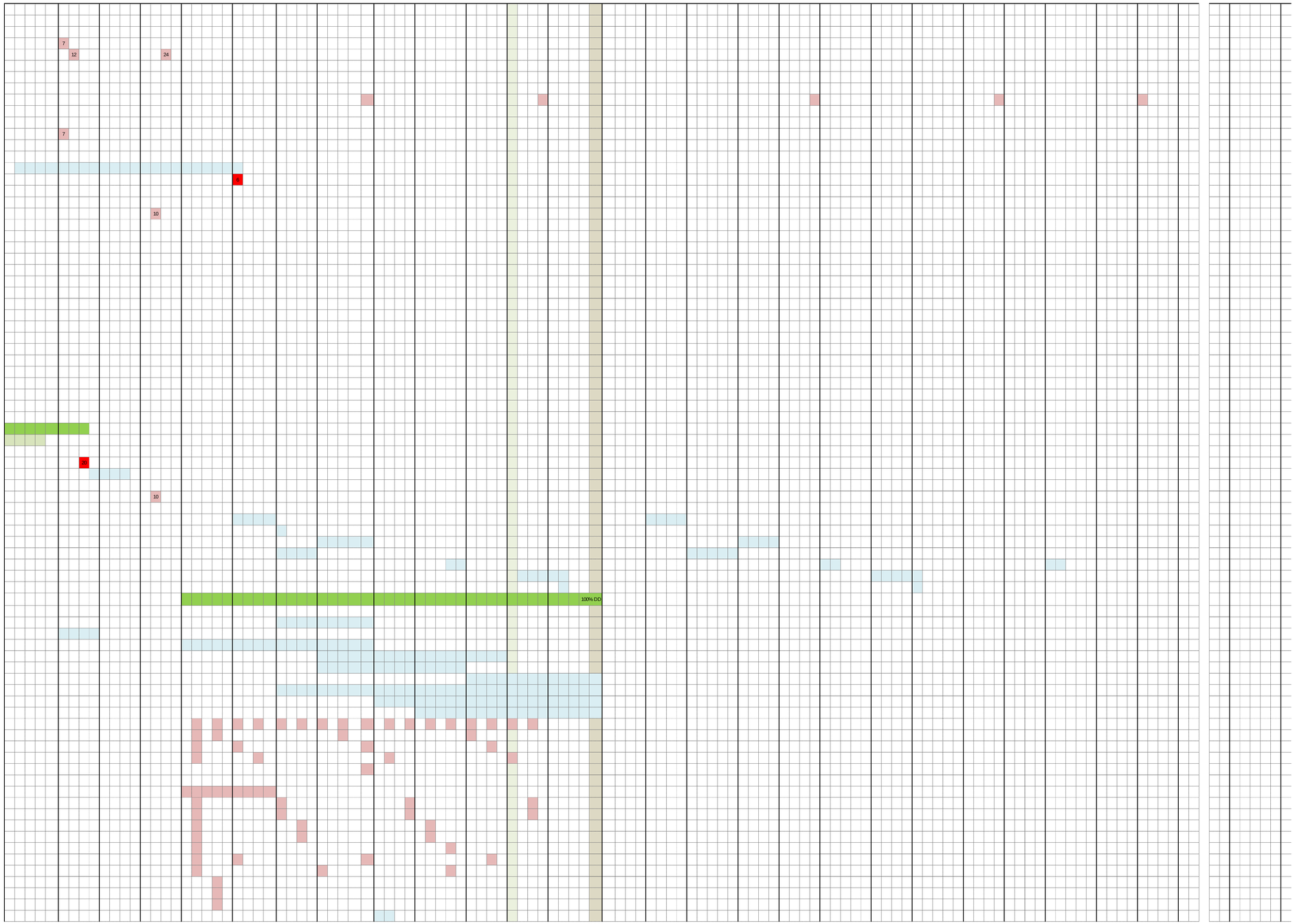
2019: January, February, March, April, May, June, July, August, September, October, November, December

2020: January, February, March, April, May, June, July, August, September, October, November, December

2021: January, February

2026: July

Meetings
ELT/Working Group
Focus Group Meeting
School Building Committee
City Council
Sustainable Design
Public Meeting
National Grid Energy Conservation Meeting
Community Health Center City Consultant Coordination
DESE Ch. 74 Programs & Safety mtg.
Neighborhood Meetings
The Lowell Plan
CM at Risk
CM Advertise/Prequal/Interview/Negotiate/Award
CM Award
Regulatory Agencies
Project Scope and Budget Meeting TBD
MSBA Board Meeting
Planning
Traffic
Lowell Historic / National Parks
Public Works Department
Planning Board Review
Accessibility Commission
Conservation Commission
Building Department
Electrical
Plumbing
Health Division
DPH Review
Police & Fire Department
Public Utilities
Gas - Engagement
Electric - Engagement
Telephone
IP
SCHEMATIC DESIGN
Cost Estimate
Reconcilation / VE
Submit SD to MSBA
MSBA Review
Project Scope and Budget Meeting
MSBA Board Meeting
SUSTAINABILITY
Refinement
USGBC Registration
Building Systems
Daylight/Building Envelope
Energy Model Update
Cost Benefit Analysis
Update LEED Checklist
DESIGN DEVELOPMENT
Refine Design
Field Investigations
Renderings
Plan Refinement
Exterior Design Refinement
Structural Grid
Exterior Skin Refinement and Materials
Building Section Development
Interior Development and Finishes
Detail Development
Consultant Meetings
Structural
HVAC / Electrical / IT
Plumbing / Fire Protection
Hardware
Security
Traffic
Civil/Site
Landscape
Acoustical
Auditorium Lighting / Rigging / Sound
Elevator
FF&E
Food Service
Geotechnical
Geoenvironmental
Hazmat
Code Review

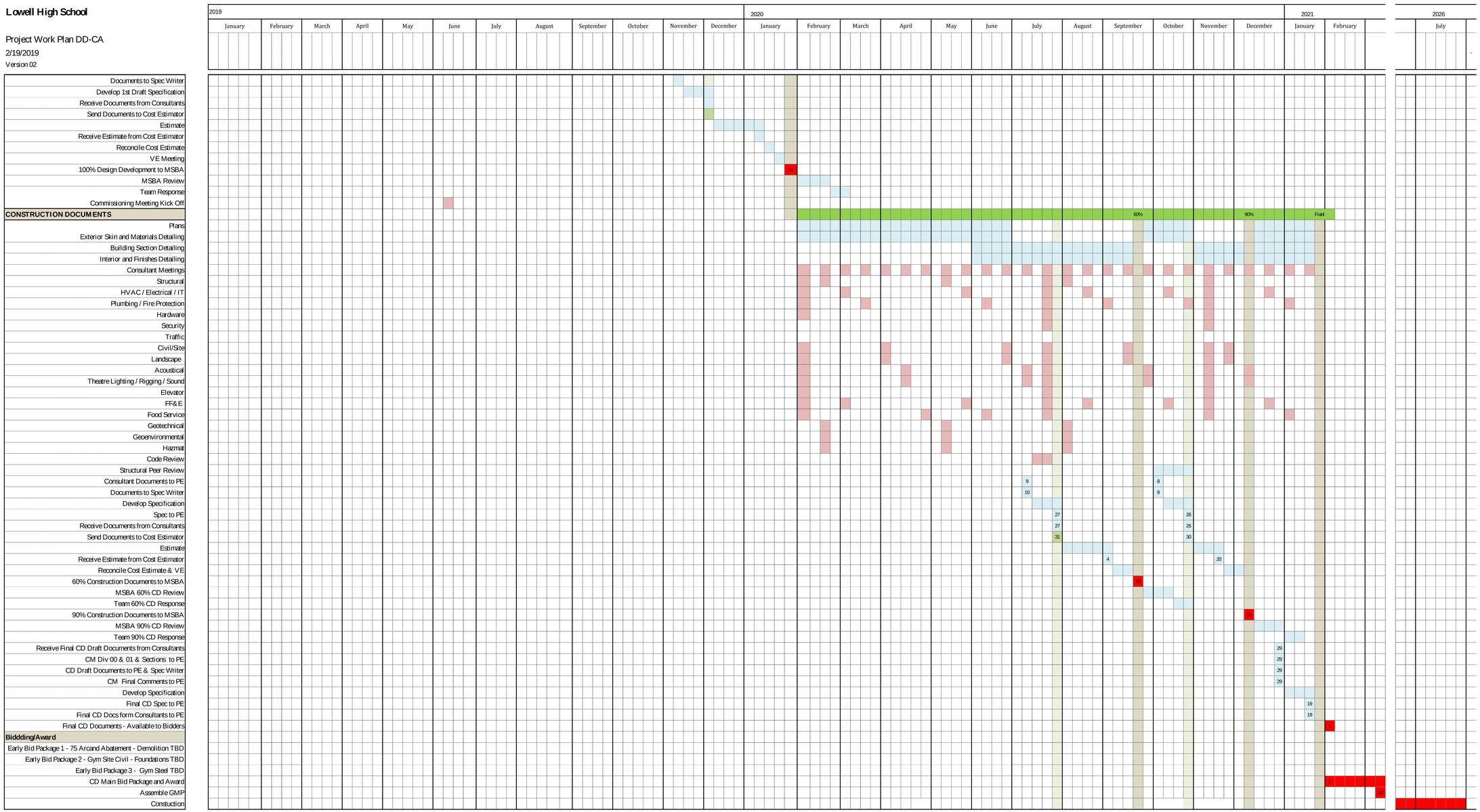


Lowell High School

Project Work Plan DD-CA

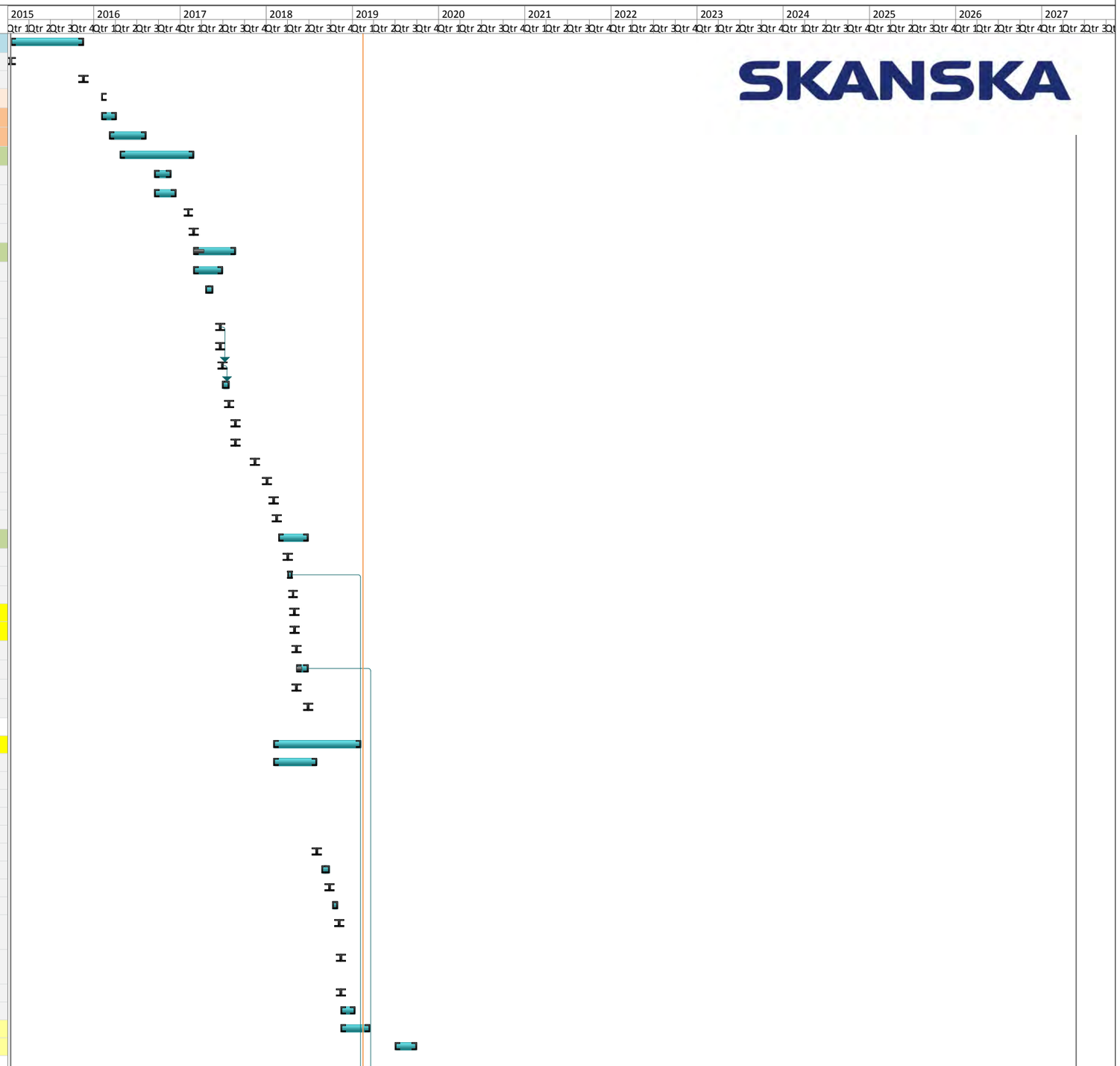
2/19/2019

Version 02



LOWELL HIGH SCHOOL PROJECT - SCHEMATIC DESIGN SCHEDULE (MODULE 4)

ID	Task Name	Start	Finish	Duration
1	**Module 1 - Eligibility Period Activity**	**Wed 1/14/15**	**Wed 11/18/15**	**221 days**
2	**Invite to Eligibility Period**	**Wed 1/14/15**	**Wed 1/14/15**	**1 day**
3	**Invite to Feasibility Study**	**Wed 11/18/15**	**Wed 11/18/15**	**1 day**
4	**Module 2 - Forming the Project Team**	**Wed 2/3/16**		
5	**Owners Project Manager Selection**	**Wed 2/3/16**	**Tue 4/5/16**	**45 days**
6	**Designer Selection**	**Mon 3/7/16**	**Tue 8/9/16**	**112 days**
7	**Preliminary Design Program (Module 3.1)**	**Thu 4/21/16**	**Mon 2/27/17**	**223 days**
8	**Educational Planner: Visioning Sessions**	**Wed 9/14/16**	**Wed 11/23/16**	**51 days**
9	**PDP Submittal Development**	**Wed 9/14/16**	**Wed 12/14/16**	**66 days**
10	**SBC Recommend to City Council - Approval of PDP**	**Thu 2/2/17**	**Tue 2/7/17**	**4 days**
11	**PDP Submittal Date to MSBA (At least 8 weeks before PSR date)**	**Mon 2/27/17**	**Mon 2/27/17**	**1 day**
12	**Preferred Schematic Report (Module 3.2)**	**Mon 2/27/17**	**Wed 8/23/17**	**128 days**
13	PSR Submittal Development	Mon 2/27/17	Thu 6/29/17	89 days
14	**Massachusetts Historical Commission (MHC) File Project Notification Form (PNF) - Additional Submissions required**	**Wed 4/19/17**	**Fri 5/19/17**	**23 days**
15	**SBC Recommend to City Council Approval of PSR Submission**	**Tue 6/20/17**	**Tue 6/20/17**	**1 day**
16	City Council Approve PSR Submission	Tue 6/20/17	Tue 6/20/17	1 day
17	**PSR Submittal Date to MSBA**	**Thu 6/29/17**	**Thu 6/29/17**	**1 day**
18	MSBA Review of PSR	Thu 6/29/17	Thu 7/27/17	21 days
19	**Meet Facility Assessment Subcommittee (FAS) 7/27**	**Thu 7/27/17**	**Thu 7/27/17**	**1 day**
20	**MSBA Board Meeting - PSR Approval - VOTE TABLED**	**Wed 8/23/17**	**Wed 8/23/17**	**1 day**
21	**PSR Section 3.3.4 Resubmission on 10/13/17 - ALL WORK ON HOLD**	**Wed 8/23/17**	**Wed 8/23/17**	**1 day**
22	**Letter to MSBA to Advise City is reconsidering a Downtown Option**	**Tue 11/14/17**	**Tue 11/14/17**	**1 day**
23	Letter to MSBA: Confirm intent to change PSR Submitted	Thu 1/4/18	Thu 1/4/18	1 day
24	MSBA/ City of Lowell Meeting - Request for Extension FSA Agreement to 8/30/19	Thu 2/1/18	Thu 2/1/18	1 day
25	**MSBA Board Meeting - Approval to Extend Feasibility Study**	**Wed 2/14/18**	**Wed 2/14/18**	**1 day**
26	**Preferred Schematic Report - PSR (Module 3.2) - Revise and update**	**Thu 2/22/18**	**Wed 6/27/18**	**90 days**
27	Documents to Estimators	Mon 4/2/18	Mon 4/2/18	1 day
28	Cost Estimate (3 wks) /Reconciliation/VE if Required (4 Weeks)	Mon 4/2/18	Fri 4/20/18	15 days
29	City Review PSR	Mon 4/23/18	Thu 4/26/18	4 days
30	**SBC Presentation costs/SBC Vote Recommendation Preferred option**	**Mon 4/30/18**	**Mon 4/30/18**	**1 day**
31	**Approval of Preferred Schematic Option & Budget (City Council)**	**Tue 5/1/18**	**Tue 5/1/18**	**1 day**
32	**PSR Section 3.3.4 Resubmission**	**Wed 5/9/18**	**Wed 5/9/18**	**1 day**
33	MSBA PSR Review	Wed 5/9/18	Wed 6/27/18	36 days
34	**Meet Facility Assessment Subcommittee (FAS) 5/9/18**	**Wed 5/9/18**	**Wed 5/9/18**	**1 day**
35	**MSBA Board Meeting - PSR Approval - NEW TARGET DATE**	**Wed 6/27/18**	**Wed 6/27/18**	**1 day**
36				
37	***75 ARCAND DRIVE ACQUISITION or EMINENT DOMAIN***	***Thu 2/1/18***	***Tue 2/5/19***	***264 days***
38	City to effectuate an eminent domain taking	Thu 2/1/18	Fri 8/3/18	132 days
39	*City issues MGL c. 30B bids for independent appraisers			
40	*City Departments perform pretaking research on property			
41	*City contacts Bureau of Relocation			
42	*City Secures Necessary Funds			
43	Bureau of Relocation Plan (Submit at least 45 days before property acquisition)	Fri 8/3/18	Fri 8/3/18	1 day
44	Notice of Public Meeting to all affected parties	Fri 8/24/18	Tue 9/25/18	23 days
45	City Council First Readng of the Loan Order to Fund 27 Arcand Land Acquisition	Wed 9/26/18	Wed 9/26/18	1 day
46	City Council Vote to approve the Loan Order at Public Hearing + 20 Day period	Tue 10/9/18	Tue 10/30/18	16 days
47	**Order of Taking: City Council holds public hearing and vote on Order of Taking (by Eminent Domain) /Pro Tanto Award of Damages**	**Tue 11/6/18**	**Tue 11/6/18**	**1 day**
48	City to record certified copy of Order of Taking with Registry of Deeds - City Ownership of 75 Arcand Drive vested	Tue 11/13/18	Tue 11/13/18	1 day
49	City must provide notice of Eminent Domain Taking and award of Damages	Tue 11/13/18	Tue 11/13/18	1 day
50	City must provide any payment of damages (60 days after record of taking)	Tue 11/13/18	Sat 1/12/19	45 days
51	4 month period where tenants are not required to vacate	Tue 11/13/18	Sat 3/16/19	90 days
52	**City anticipates all tenants relocated**	**Mon 7/1/19**	**Mon 9/30/19**	**66 days**
53				

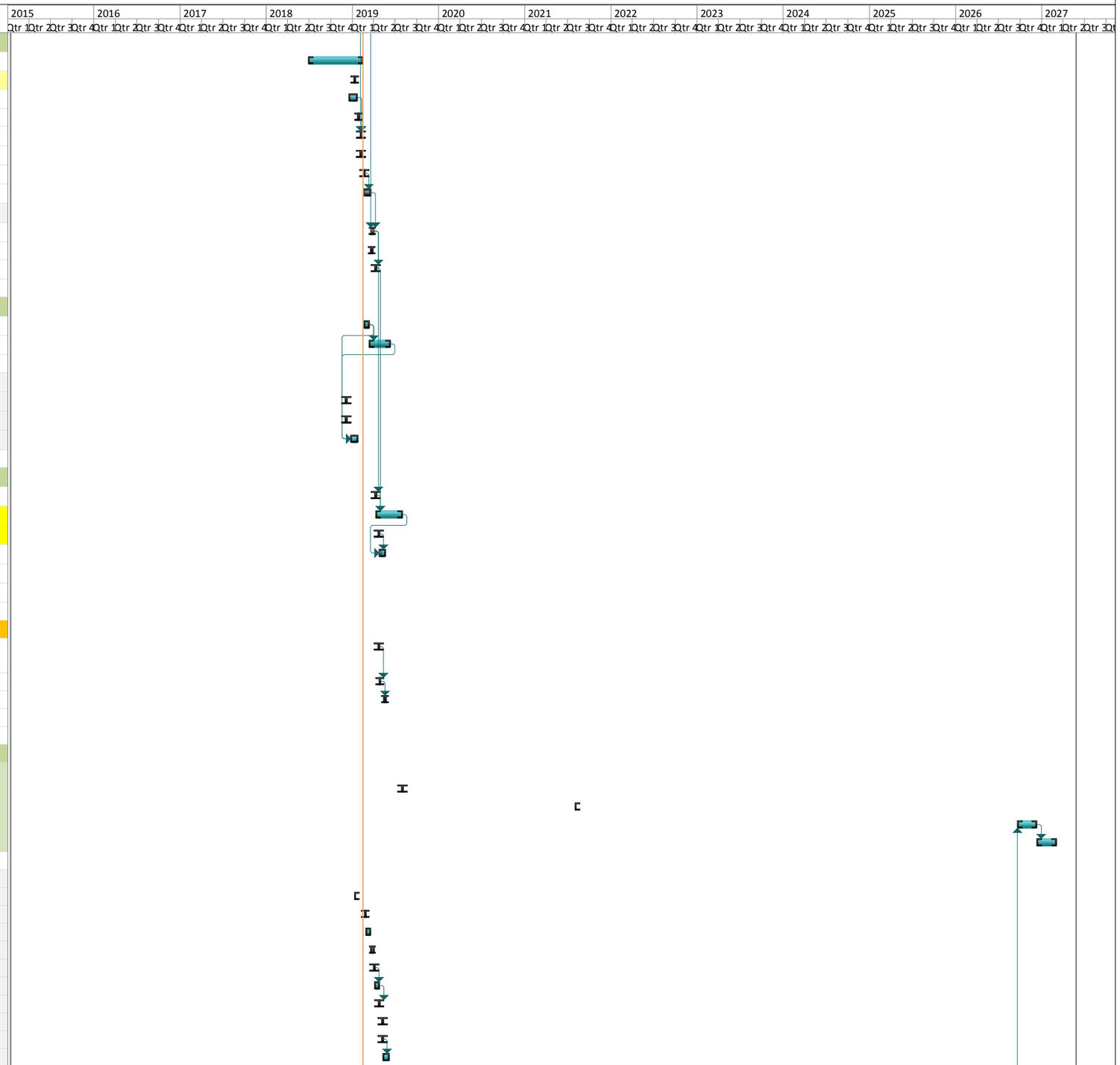


Project: Lowell High School
Date: Fri 2/15/19

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Deadline
Progress

LOWELL HIGH SCHOOL PROJECT - SCHEMATIC DESIGN SCHEDULE (MODULE 4)

ID	Task Name	Start	Finish	Duration
54	**Schematic Design (Module 4) - Preferred Option**			
55	Schematic Design (SD)	Thu 6/28/18	Fri 2/15/19	167 days
56	**On-site Investigations OF 75 ARCAND and Report to Estimators**	**Mon 1/7/19**	**Mon 1/14/19**	**6 days**
57	Cost Estimate (5 wks)	Mon 12/17/18	Mon 1/21/19	26 days
58	Cost Estimate Reconciliation/VE (8 days)	Tue 1/22/19	Thu 1/31/19	8 days
59	**Approval of Schematic Design & Budget (SBC & City Council)**	**Tue 2/5/19**	**Thu 2/7/19**	**3 days**
60	OPM SD Notification Email to MSBA 10 Days Prior to SD Submission	Wed 2/6/19	Wed 2/6/19	1 day
61	**SD Submittal Date to MSBA**	**Wed 2/20/19**	**Wed 2/20/19**	**1 day**
62	MSBA SD Review	Wed 2/20/19	Wed 3/20/19	21 days
63	**Meet Facility Assessment Sub. (FAS) NOT REQUIRED**			
64	Address SD Comments	Wed 3/20/19	Tue 4/2/19	10 days
65	MSBA/CITY: Project Scope and Budget Conference/PS&B Agreement Executed	Mon 3/18/19	Fri 3/29/19	10 days
66	**MSBA Board Meeting - PS&B Approval - MSBA 2019 Schedule**	**Wed 4/10/19**	**Wed 4/10/19**	**1 day**
67				
68	**DESE Review**			
69	MSBA Review of DESE Submittal	Wed 2/20/19	Wed 3/13/19	16 days
70	DESE Review and Approval	Wed 3/13/19	Tue 6/11/19	65 days
71				
72	**CM at Risk Application to Office of Inspector General**			
73	Establish Prequal Committee for CM	Thu 12/6/18	Thu 12/6/18	1 day
74	**SBC Authorize CMr Submission To Inspector General**	**Thu 12/6/18**	**Thu 12/6/18**	**1 day**
75	Submission of CMr Application to IG Office (up to 60 days)	Mon 12/24/18	Thu 1/24/19	24 days
76				
77	**Project Funding Appropriation (Module 5) District Driven Schedule**			
78	**MSBA Board Meeting - PS&B Approval - MSBA 2019 Schedule**	**Wed 4/10/19**	**Wed 4/10/19**	**1 day**
79	**120 Day Period allowed Local Actions & Approvals (MSBA BOD date)**	**Wed 4/10/19**	**Thu 8/1/19**	**82 days**
80	**Approval from District/City Council**	**Tue 4/23/19**	**Tue 4/23/19**	**1 day**
81	**Certificate of Vote Sent to the MSBA**	**Wed 4/24/19**	**Tue 5/21/19**	**20 days**
82	Project Funding Agreement Sent			
83	Project Funding Agreement Executed			
84				
85	**Module 6 Kick-off Activities**			
86	**Vote to Amend OPM and Designer Contracts /Issue Amendments Notice to Proceed with Design Development**	**Tue 4/23/19**	**Tue 4/23/19**	**1 day**
87	**Send Amended OPM and Designer Contracts to MSBA**	**Wed 4/24/19**	**Tue 4/30/19**	**5 days**
88	Schedule MSBA Kick-off Meeting	Mon 5/13/19	Fri 5/24/19	10 days
89	Engage Cx and distribute schedule and workplan			
90				
91	**Sustainable Design Milestones**			
92	Green Charette - Basis of Design			
93	Substainable Design, LEED Silver Project Registration	Thu 8/1/19	Thu 8/1/19	1 day
94	Provisional Review Submittal 3 Months After Bidding	Mon 8/2/21		
95	USGBC Final Review Submission 3 Mos after Substantial Complete	Sun 9/20/26	Thu 12/10/26	60 days
96	Green School Program Certification Letter	Fri 12/11/26	Thu 3/4/27	60 days
97				
98	**CM Selection Procurement CM at Risk**			
99	SBC Establish Prequalifications Committee	Thu 1/10/19		
100	Advertisement to Central Register/COMPass/Newspaper	Thu 2/21/19	Thu 2/28/19	6 days
101	RFQ available to CM Firms	Wed 2/27/19	Tue 3/19/19	15 days
102	Prequal Committee reviews CM SOQs	Tue 3/19/19	Wed 4/3/19	12 days
103	**SBC Approve shortlist of CM Firms**	**Thu 4/4/19**	**Thu 4/4/19**	**1 day**
104	Issue RFP for CM at Risk	Fri 4/5/19	Thu 4/25/19	15 days
105	RFP responses due from CM at Risk	Thu 4/25/19	Thu 4/25/19	1 day
106	Prequal Committee Completes CM Interviews	Thu 5/9/19	Thu 5/9/19	1 day
107	**Select Highest Ranked CM Firm**	**Thu 5/9/19**	**Thu 5/9/19**	**1 day**
108	Negotiate with CM for Precontruction and Construction Contract (Fee/GC)	Fri 5/10/19	Thu 6/6/19	20 days

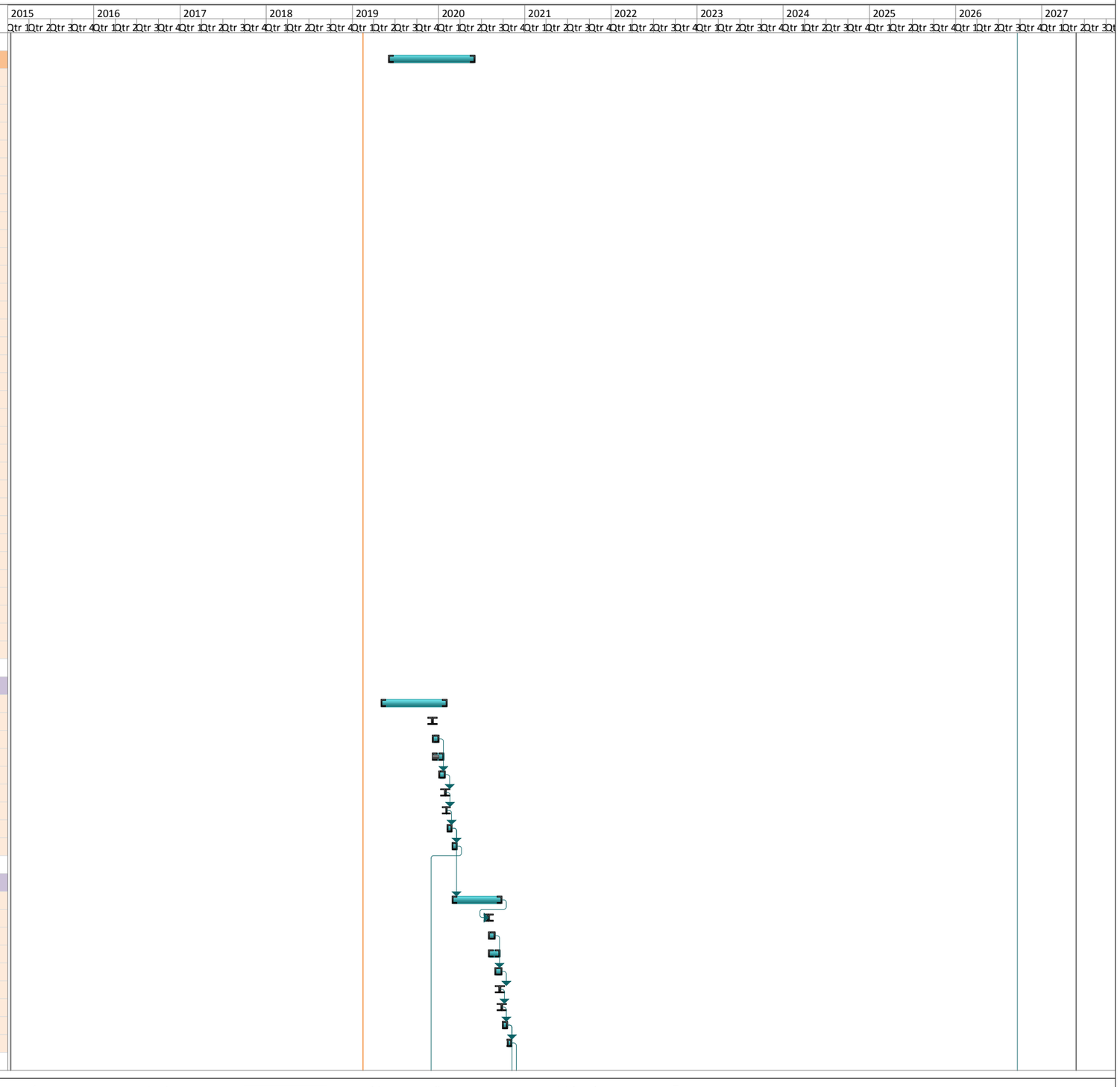


Project: Lowell High School
Date: Fri 2/15/19

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | Deadline | Progress

LOWELL HIGH SCHOOL PROJECT - SCHEMATIC DESIGN SCHEDULE (MODULE 4)

ID	Task Name	Start	Finish	Duration
109				
110	**Approvals**	**Mon 6/3/19**	**Wed 6/3/20**	**263 days**
111	ZBA Variance - 6 months (if applicable)			
112	Site Plan Review 6 months			
113	NPDES			
114	Air rights at Canal/Article 97 Approval			
115	MA_DEP Notice of Abatement - 10 working Days			
116	DEP Demo Permit (in addition to the ACM permit)			
117	LT&TD Construction Management Plan - 30 Days			
118	Public Way Occupancy (lane closure)			
119	Gas Utility Shut Off Notice - 30 Days			
120	Electric Utility Shut Off Notice - 30 Days			
121	ISD Electrical Make-safe Permit - 2 Days			
122	LFD Demo Permit - 30 Days			
123	ISD Plumbing Make-safe Permit - 2 Days			
124	ISD Building Demolition Permit - 30 Days			
125	LRWWU Sewer Demolition Permit - 2 Days			
126	LRWU Water Demolition Permit - 2 Days			
127	Notice of Intent - 2 months (if applicable)			
128	Request for Determination of Applicability - 1 month			
129	**Precursor to ZBA, Plan Bd. And ConCom**			
130	**Environmental Notification Form / Determination - 6 months (if applicable)**			
131	**Applicability / Environmental Impact Report**			
132	LRWU Hydrant Metering Permit - 2 weeks			
133	LDPW Storm Water New Connection Permit driven by discharge permit			
134	LDPW Street Opening Permit - 2 Days			
135	ISD Building Permit - 30 Days			
136	ISD Electrical Permit - 30 Days			
137	ISD Plumbing Permit - 30 Days			
138	Street Opening Permit - 2 Days			
139	Driveway Permit - 2 Days			
140	Emergency Responder Review - 30 Days/ ongoing during design			
141	Health Department - 5 Days			
142	Lowell Historic / National Park - 2 months			
143	DEP Fossil Fuel (if facility uses 40,000,000 +BTU or emerg generator 3,000,000 +BTU)			
144				
145	**Design Development (DD)**			
146	DD Documents	Thu 5/2/19	Thu 2/6/20	201 days
147	80% Design Development (DD) – documents to Estimators	Fri 12/6/19	Fri 12/6/19	1 day
148	Commissioning Agent Comments on 80% DD	Fri 12/6/19	Thu 1/2/20	20 days
149	**Cost Estimate/Reconciliation/VE if Required CM/AE**	**Fri 12/6/19**	**Thu 1/23/20**	**35 days**
150	Team Respond to Commissioning Agent's Comments and Finalize 100% DD	Thu 1/2/20	Wed 1/29/20	20 days
151	**Authorize - 100% DD Submission to MSBA**	**Thu 1/30/20**	**Thu 1/30/20**	**1 day**
152	**100% DD Submission Date to MSBA**	**Fri 1/31/20**	**Thu 2/6/20**	**5 days**
153	MSBA DD review (21 days)	Thu 2/6/20	Thu 2/27/20	16 days
154	Address DD Review Comments (21 days)	Thu 2/27/20	Thu 3/19/20	16 days
155				
156	**60% Construction Documents (CD)**			
157	60% CD Documents	Fri 2/28/20	Fri 9/25/20	151 days
158	**60% CDs – documents to Estimators**	**Fri 7/31/20**	**Fri 7/31/20**	**1 day**
159	CM/Commissioning agent comments on 60%CD	Fri 7/31/20	Thu 8/27/20	20 days
160	Cost Estimate/Reconciliation/VE if Required	Fri 7/31/20	Thu 9/17/20	35 days
161	Team Respond to Commissioning Agent's Comments	Thu 8/27/20	Fri 9/25/20	22 days
162	**SBC - Authorize - 60% CD Submission to MSBA**	**Thu 9/17/20**	**Thu 9/17/20**	**1 day**
163	**60% CD Submission Date to MSBA - Update when MSBA Schedule published**	**Fri 9/25/20**	**Fri 9/25/20**	**1 day**
164	MSBA 60% CD Review Comments (21 days)	Mon 9/28/20	Mon 10/19/20	16 days
165	Address 60% Review Comments (21 days)	Mon 10/19/20	Fri 11/6/20	15 days
166				



Project: Lowell High School
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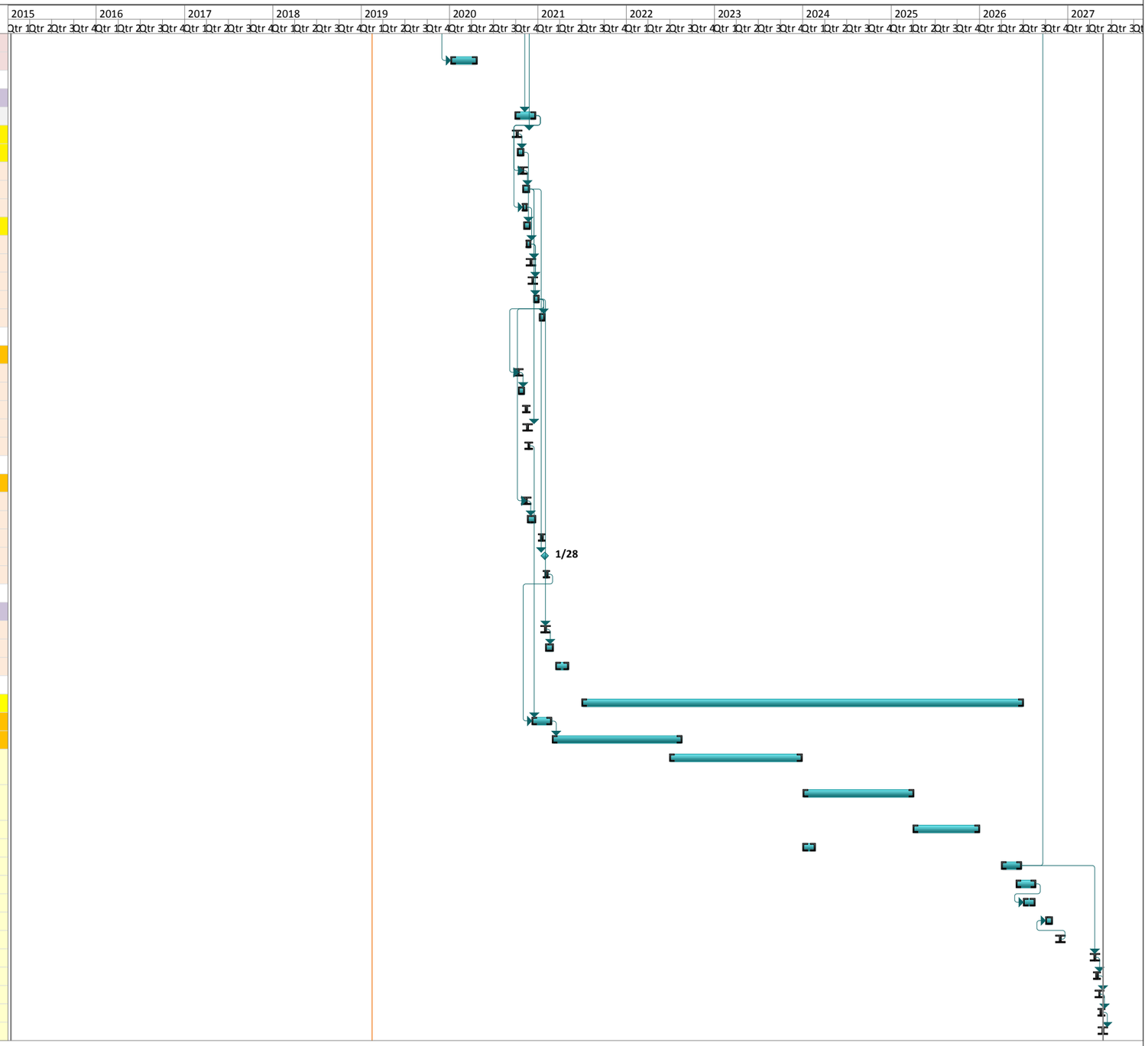
LOWELL HIGH SCHOOL PROJECT - SCHEMATIC DESIGN SCHEDULE (MODULE 4)

ID	Task Name	Start	Finish	Duration
167	**Prequalify Filed Sub Bidders**			
168	Prequalify Filed Sub Bidders (FSB)	Mon 1/6/20	Fri 4/24/20	80 days
169				
170	**90% CD Development**			
171	90% CD Documents	Mon 9/28/20	Tue 12/22/20	62 days
172	**Issue 90% CDs Structural Steel to Peer Reviewer and CM**	**Wed 10/7/20**	**Wed 10/7/20**	**1 day**
173	**Structural Steel Peer Review on 90% CDs**	**Wed 10/7/20**	**Tue 11/3/20**	**20 days**
174	**90% CDs – documents to Estimators**	**Fri 10/30/20**	**Fri 10/30/20**	**1 day**
175	Cost Estimate Reconciliation/VE if Required	Fri 10/30/20	Thu 11/26/20	20 days
176	CM/Commissioning Agent Comments on 90%CD's	Fri 10/30/20	Mon 11/16/20	12 days
177	**Incorporate Structural Peer Review Comments complete design**	**Tue 11/3/20**	**Mon 11/30/20**	**20 days**
178	Team Respond to Commissioning Agent's Comments	Fri 11/13/20	Wed 12/2/20	14 days
179	**SBC - Authorize - 90% CD Submission to MSBA**	**Thu 12/3/20**	**Thu 12/3/20**	**1 day**
180	**90% CD Submission Date to MSBA - Update when MSBA Schedule published**	**Fri 12/11/20**	**Fri 12/11/20**	**1 day**
181	MSBA 90% CD Review Comments (21 days)	Mon 12/14/20	Tue 1/5/21	17 days
182	Address 90% Review Comments (21 days)	Wed 1/6/21	Thu 1/28/21	17 days
183				
184	**Phase 1: Early Abate/Demo Enabling Bid Packages - 75 Arcand Drive**			
185	100% CD Documents	Mon 10/12/20	Mon 10/12/20	1 day
186	Bidding and Bids due	Mon 10/12/20	Fri 11/6/20	20 days
187	RTA to Design Team and OPM for Review	Mon 11/9/20	Wed 11/18/20	8 days
188	**City/SBC - Authorize - RTA Recommendation to Award**	**Thu 11/19/20**	**Thu 11/19/20**	**1 day**
189	Bid Awards	Fri 11/20/20	Fri 11/27/20	6 days
190				
191	**Phase 1: Gymnasium Wing Bid Packages**			
192	100% CD Documents	Fri 11/13/20	Fri 11/13/20	1 day
193	Bidding and Bids due	Wed 11/18/20	Tue 12/22/20	25 days
194	RTA to Design Team and OPM for Review	Mon 1/11/21	Fri 1/22/21	10 days
195	**City/SBC - Authorize - RTA Recommendation to Award**	**Thu 1/28/21**	**Thu 1/28/21**	**0 days**
196	Bid Awards	Fri 1/29/21	Thu 2/11/21	10 days
197				
198	**100% CD / Bid Package**			
199	100% CD Documents	Mon 2/1/21	Mon 2/1/21	1 day
200	Bidding and Bids due	Mon 2/1/21	Fri 3/5/21	25 days
201	Bid Awards	Mon 3/15/21	Fri 5/7/21	40 days
202				
203	**Construction Duration ADD/RENO 3A EXPANDED SITE (60 Months) - PREFERRED**	**Thu 7/1/21**	**Wed 7/1/26**	**1305 days**
204	**Phase 1: Demolition and abatement of 75 Arcand Drive**	**Mon 12/7/20**	**Fri 2/26/21**	**60 days**
205	**Build New Gymnasium Wing**	**Mon 3/1/21**	**Fri 8/19/22**	**385 days**
206	Phase 2: Demo Gym/Vacate interior classrooms/Build New Freshman Wing - Reno West Side Lord	Wed 6/29/22	Fri 12/29/23	393 days
207	Phase 3: Renovate remainder of Lord Building and Renovate North End of 1922 Buildings/Build new North Bridge	Tue 1/2/24	Fri 4/4/25	329 days
208	Phase 4: Renovate remainder of 1922 Bldg and Build New South Bridge	Tue 4/1/25	Thu 1/1/26	198 days
209	**50% DCAMM Notification**	**Mon 1/1/24**	**Wed 2/21/24**	**38 days**
210	Substantial Completion and C of O Finalized	Wed 4/1/26	Tue 6/23/26	60 days
211	Punchlist	Mon 6/1/26	Fri 8/21/26	60 days
212	Move-In and full Occupancy	Wed 7/1/26	Tue 8/18/26	35 days
213	100% DCAMM Notification	Thu 10/1/26	Thu 10/29/26	21 days
214	GC/CM Request for Final Payment	Tue 12/1/26	Tue 12/1/26	1 day
215	Commissioning Consultant Inspection (10 Months after Substantial Completion)	Fri 4/23/27	Fri 4/23/27	1 day
216	Submittal of Final Commissioning Report to MSBA	Mon 4/26/27	Fri 5/7/27	10 days
217	Submittal Date of Commissioning Certificate of Commissioning	Mon 5/10/27	Thu 5/13/27	4 days
218	Final Completion / Project Closeout	Fri 5/14/27	Tue 5/25/27	8 days
219	Submittal Date to MSBA of Final Reimbursement Request	Wed 5/26/27	Wed 5/26/27	1 day



Project: Lowell High School
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Communications Plan

City of Lowell and Lowell School District
Lowell High School Project
Lowell, Massachusetts
February 20, 2019

Summary

The purpose of this document is to outline the proper communication procedures between all parties involved with the Lowell High School Project.

Key Personnel

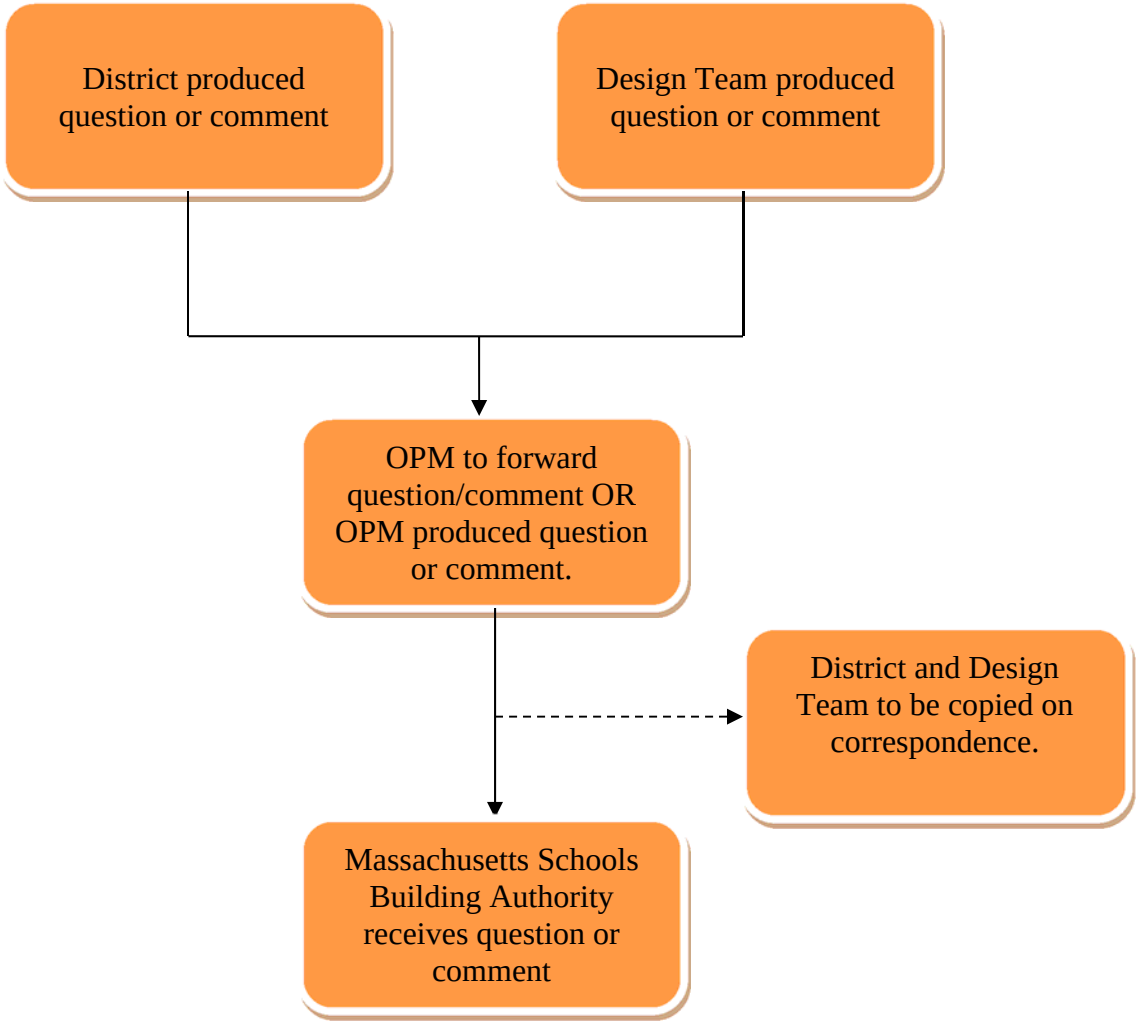
Name	Title	Affiliation	Email
District			
Eileen Donoghue	City Manager SBC Chair	City of Lowell	EDonoghue@lowellma.gov
Jeannine Durkin	Acting Superintendent	Lowell Public Schools	JDurkin@lowell.k12.ma.us
Kara Keefe Mullin	Asst. City Mgr.	City of Lowell	KKeefeMullin@lowellma.gov
Massachusetts School Building Authority			
Karl Brown	Project Manager	MSBA	Karl.Brown@MassSchoolBuildings.org
Jennifer Flynn	Project Coordinator	MSBA	Jennifer.Flynn@massschoolbuildings.org
Design Team			
Joseph Drown	Principle in Charge	Perkins Eastman	J.Drown@perkinseastman.com
Dawn Guarriello	Project Architect	Perkins Eastman	D.Guarriello@perkinseastman.com
Owner's Project Manager			
Mary Ann Williams	Project Director	Skanska	Maryann.Williams@skanska.com
Jim Dowd	Sr. Project Mgr.	Skanska	Jim.Dowd@skanska.com
Dale Caldwell	Project Exec.	Skanska	Dale.Caldwell@skanska.com

Communication Strategy

The following diagrams represent the flow of communication between the personnel identified through the Schematic Design Phase. This document will be updated when the Project Team expands to include a general contractor and subcontractors during the construction phase.

Communication to the Massachusetts School Building Authority

The Owner's Project Manager (OPM) is responsible for being the conduit to the Massachusetts School Building Authority (MSBA). Any questions or comments directed to the MSBA should be issued through the OPM. In the event that the OPM Team is aware of the discussion point, the District and the Design Team can communicate directly with the MSBA while copying the OPM on the correspondents.



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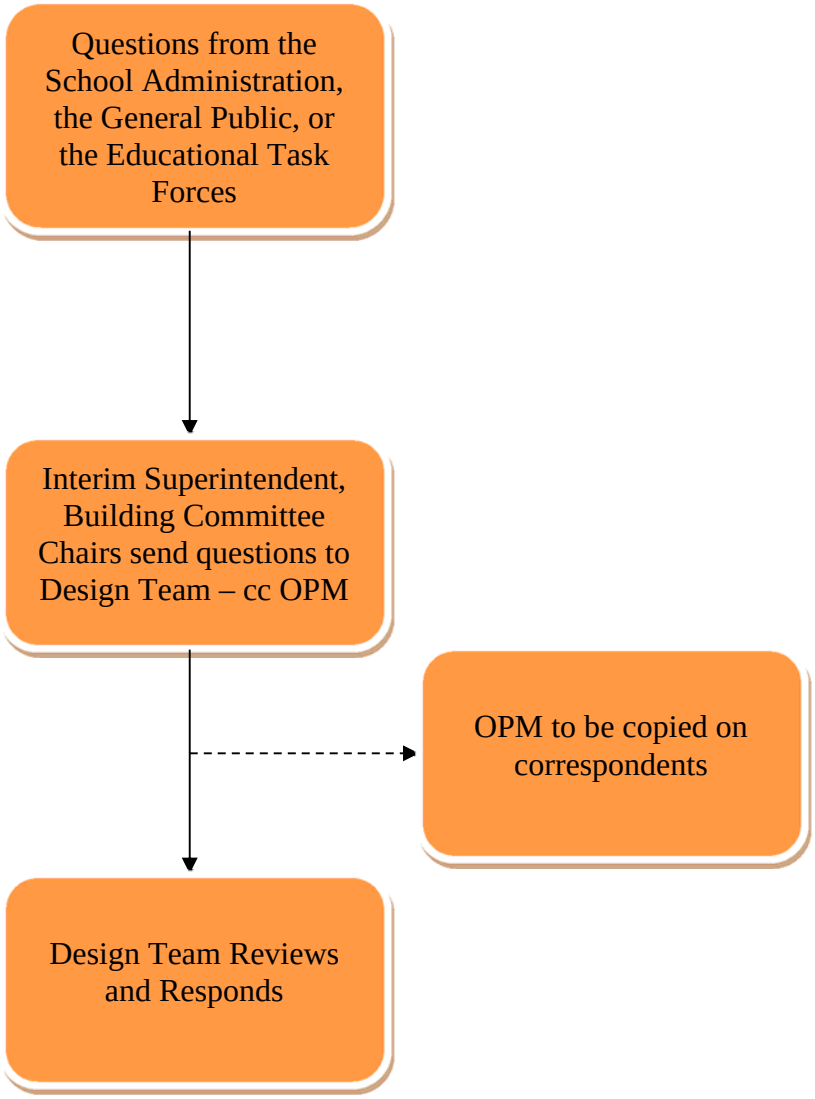
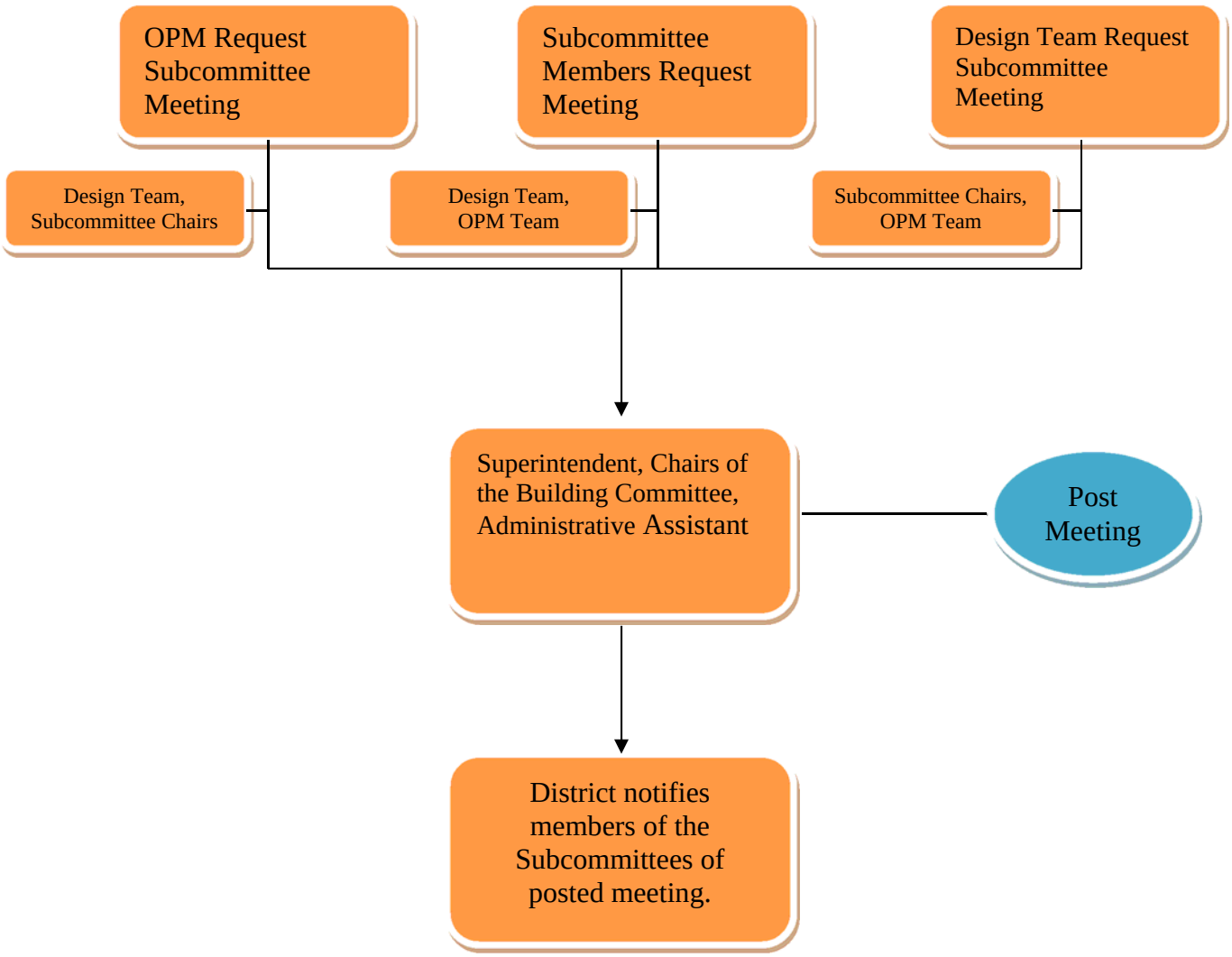
Communication to the Design Team

All design related questions from the School Administration, Educational Task Forces, and the General Public should be filtered through the Acting Superintendent and the Building Committee Chairs. These questions should then be directed to the Design Team while notifying the Owner's Project Manager. All responses should filter back through the District the same way before being distributed to the appropriate parties.



Scheduling Subcommittee Meetings

Subcommittee Meetings should be scheduled by the Subcommittee Chair at the end of the each meeting. The time and location decided upon should be sent to the members of the district identified in the Key Personnel Table. These meetings should be posted on the Lowell High School Project website. In the event that another meeting needs to be scheduled, the procedure outlined below should be followed.



4.1.2.R – COMMUNICATION AND DOCUMENT PROCEDURES

Document Control Methods

For purposes of communications and document control, Skanska utilizes tools such as project websites and/or Prolog Project Management or Submittal Exchange software, which is considered to be the most powerful document tracking systems in the Architecture/ Engineering/ Construction (AEC) industry.

Weekly and Monthly Reports: Providing Information for Discussion and Decision-Making

Another key communications task will be preparing weekly and monthly progress reports summarizing the status of the entire project.

Communication/Project Team Site

Communication between all project team members, contractors, and the public is critical for performing work in a safe, efficient, and non-disruptive manner. In addition to traditional communications methods, e.g. telephone conversations, face to-face meetings, e-mails, etc.

Skanska with the district can develop and manage a Project Website that will serve the specific communications needs of the district and community at large. This website will be populated with relevant links providing shortcuts to various types of reports. Real time access to critical information will enable interested parties to gather information and to make informed decisions and commitments. This tool can provide significant savings in response time, improve the project schedule and maximize convenience for all project team members.

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4.1.2.S – LOCAL ACTIONS AND APPROVALS

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City of Lowell – Office of the City Manager
375 Merrimack Street, Room 43 – Lowell, MA 01852
P: 978.674.4400 – F: 978.970.4044
www.LowellMA.gov

Eileen Donoghue
City Manager

February 15, 2019

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street, Suite 500
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The City of Lowell, City Council and the School Building Committee ("SBC") has completed review of the Schematic Design Submittal for the Lowell High School, school project and voted to approve and authorize the OPM to submit the Schematic Design related submittals to the MSBA for consideration on February 7, 2019 School Building Committee meeting where there was a vote on the Schematic Design and Estimate for submission; and at the February 12, 2019 City Council meeting a vote on the Schematic Design and Estimate for submission. A certified copy of the SBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed and abstained, are attached.

The SBC held 6 meetings regarding the Lowell High school project since the MSBA Board of Directors approved the District to proceed into Schematic Design on June 27, 2018.

- SBC Meeting August 2, 2018
- SBC Meeting September 6, 2018
- SBC Meeting October 4, 2018
- SBC Meeting November 1, 2018
- SBC Meeting December 6, 2018
- SBC Meeting February 7, 2019

In addition to the SBC meetings listed above, the District held 2 public meetings, which were posted in compliance with the Open Meeting Law, at which the Lowell High School project was discussed.

- City Council Meeting January 22, 2019

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Eileen Donoghue
City Manager

- City Council Meeting February 12, 2019

The meeting presentation materials, meeting minutes and summary materials as they relate to the Lowell High School project are available locally for public review at www.lowellma.gov and/or www.lowellhsproject.com.

To the best of my knowledge the meetings listed above comply with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§18-25 and 940 CMR 29.00: Open Meetings.

The District has named (*insert name and title*) as the local point of contact to receive questions.

By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.	By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.	By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.
By: Eileen Donoghue	**By:** Jeannine Durkin	**By:** William Samaras
Title: Chief Executive Officer	**Title: Superintendent of Schools**	**Title: Chair of the School Committee**
Date: 2/15/2019	**Date:** 2/15/2019	**Date:** 2/15/2019

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www.LowellMA.gov

City Council

Roll Call Vote to Approve Submission to MSBA High School Project

Vote upon in 2/14/ 19 | City Council Meeting

	City Council Members	In Meeting	Remote	Not Present	For	Against	Abstain
1	William Samaras			X			
2	Vesna Nuon	X			X		
3	Karen Cirillo	X			X		
4	David Conway	X			X		
5	Rodney Elliott	X			X		
6	Edward Kennedy	X			X		
7	John Leahy	X			X		
8	James Milinazzo	X			X		
9	Rita Mercier	X			X		
				Totals:	8	0	0

Vote: "Authorizing the submission of the Schematic Design to the Massachusetts School Building Authority relative to the Lowell High School project.

VOTE: FOR: 8 AGAINST: 0 ABSTAIN: 0

CERTIFICATION OF VOTE:

2/19/19

Michael Geary, City Clerk Date

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COMMONWEALTH OF MASSACHUSETTS

CITY OF LOWELL

In City Council

VOTE

Authorizing the submission of the Schematic Design to the Massachusetts School Building Authority relative to the Lowell High School Project.

The City Council has completed its review of the Schematic Design Submittal (SD) for the Lowell High School Project, on February 12, 2019; and

The City Council approves and authorizes the Owner's Project Manager, Skanska USA Building, to submit the Schematic Design submission to the MSBA for its consideration on or before February 20, 2019.

BE IT VOTED BY THE CITY COUNCIL OF THE CITY OF LOWELL, as follows:

That the City Council of the City of Lowell hereby authorizes the submission of the Schematic Design to the Massachusetts School Building Authority relative to the Lowell High School Project by the Owner's Project Manager, Skanska USA Building, for consideration on or before February 20, 2019.

In City Council February 14, 2019, Read twice and adopted on roll call vote 8 yeas, 1 absent (M. Samaras). So Voted./s/Michael Q. Geary, City Clerk

Approved by City Manager Eileen M. Donoghue February 15, 2019.

A true copy
ATTEST:

Michael Q. Geary
City Clerk

A TRUE COPY ATTEST

Michael Q. Geary
City Clerk, Lowell, MA

V:msba:submission of schematicdesign

City of Lowell – Office of the City Manager
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P: 978.674.4400 – F: 978.970.4044
www.LowellMA.gov

Eileen Donoghue
City Manager

February 15, 2019

Mr. John K. McCarthy
Massachusetts School Building Authority
40 Broad St., Suite 500
Boston, MA 02109

Dear Mr. McCarthy,

Attached are the relevant certified meeting minutes from our City Council and School Building Committee meetings where discussion of the Lowell High School building project has taken place during the Schematic Design Phase.

Please note that the minutes from the February 7, 2019 School Building Committee and the February 14th, 2019 City Council meeting have not yet been accepted by those bodies. City Clerk Michael Geary, who attended both meetings, certified the minutes of each meeting which are attached to this letter. Updated copies of the February 7th and 14th will be sent along if they are not accepted in their current form by those bodies at their next scheduled meeting, but I anticipate they will both be accepted as written.

Please let me know if you have any questions or concerns regarding these matters.

Sincerely,

Eileen Donoghue

Schematic Design Project Manual
SECTION 4.1.3

Lowell High School, Lowell MA
MSBA Module 4 Schematic Design
PERKINS EASTMAN

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LOWELL HIGH SCHOOL

SCHEMATIC DESIGN PROJECT MANUAL
(UNIFORMAT)

SCHEMATIC DESIGN SPECIFICATIONS ORGANIZATION

INTRODUCTION

10 PROJECT DESCRIPTION

1010 Project Summary

- The project consists of the renovation of the existing Lowell High School at 155 Merrimack Street, Lowell, MA.

1030 Project Criteria

1030.50 Sustainable Design Requirements

- LEED Version 4 for Building Design and Construction (LEED v4 BD+C) Silver certification based on USGBC's LEED v4 BD+C.

1030.70 Historic Restoration Requirements

- Historic removal and dismantling.
- Historic masonry cleaning.
- Historic brick unit masonry repair.
- Historic brick unit masonry repointing.
- Historic terra cotta unit masonry repair.
- Historic terra cotta unit masonry repointing.
- Historic stone masonry repair.
- Historic stone masonry repointing.
- Historic stone consolidation treatment.

1090 Funding

- Budget; Elemental Cost Estimate: $270,456,023.
- Assumptions and Qualifications: Not yet determined.

20 OWNER DEVELOPMENT

2080 Budget Project Contingencies

- Alternates: Not yet determined.
- Unit Prices: Not yet determined.
- Proprietary Products: Not yet determined.

30 PROCUREMENT REQUIREMENTS

3010 Project Delivery

3010.10 Project Delivery Method

- Construction Manager at Risk as Constructor, with prequalified Filed Sub-Bid (Trade) Contracts in accordance with the provisions of Massachusetts General Laws (Ter. Ed), including without limitation; MGL c149A, §§ 1 through 11 inclusive; and MGL c149, §§ 26 through 27D inclusive; MGL c30, § 39M as amended.

3010.30 Number of Construction Contracts

- Single Contract for General Construction with a Construction Manager, and Filed Sub-Bid (Trade) Contracts in accordance with MGL c149A Section 8 for the following Filed Sub-Bid (Trade) categories of work:
  - Masonry.
  - Miscellaneous And Ornamental Iron.
  - Waterproofing, Dampproofing And Caulking.
  - Roofing And Flashing.
  - Metal Windows.
  - Glass And Glazing.
  - Lathing and Plastering.
  - Tile.
  - Acoustical Tile.
  - Resilient Floors.
  - Terrazzo.
  - Painting.
  - Elevators.
  - Fire Protection.
  - Plumbing.
  - Heating, Ventilating, and Air-Conditioning
  - Electrical.

3020 Solicitation

- Qualification Requirements: Filed Sub-Bidders (Trade Contractors) shall be pre-qualified according to Massachusetts Public Bid Laws and shall be DCAMM certified for their category of work.
- Bid Requirements: Bidding procedures according to Massachusetts Public Bid Laws.
- Contracting Requirements: Contracting procedures according to Massachusetts Public Bid Laws.

40 CONTRACTING REQUIREMENTS

4010 Contracting Forms and Supplements

- Contracting Requirements: Contracting procedures according to Massachusetts Public Bid Laws.

ELEMENT A - SUBSTRUCTURE

A10 FOUNDATIONS

A1010 Standard Foundations

A1010.10 Wall Foundations

- All concrete shall be normal weight, 4,000 psi at 28 days, except foundation walls and footings, which shall be normal weight, 3,000 psi and exterior (exposed) concrete

(paving) which shall be normal weight, 4,500 psi.

- Portland Cement: ASTM C150, Type I or II.
- Fly Ash: ASTM C618, Class F. Replacement of cement content with fly ash is limited to 20 percent (by weight). Fly ash is not permitted in exterior, exposed concrete, slabs on grade or slabs on steel deck.
- All concrete shall be proportioned with ¾" maximum aggregate, ASTM C 33, except 3/8" maximum aggregate shall be used at toppings less than 2" thick (e.g. metal pan stairs).
- All reinforcing shall be ASTM A615 deformed bars, Grade 60.
- All welded wire fabric shall conform to ASTM A185.
- Reinforcing bars, steel wire, welded wire fabric, and miscellaneous steel accessories shall contain post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.
- Concrete products manufactured within 100 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.
- Cure all concrete by moisture retention methods, approved by Architect; curing compounds shall not be used.

ELEMENT B - SHELL

B10 SUPERSTRUCTURE

B1010 Floor Construction

B1010.10 Floor Structural Frame

- Structural steel shapes shall conform to ASTM A992, Fy = 50 ksi.
- Steel tubes (HSS) shall conform to ASTM A500, Grade C, Fy = 50 ksi.
- Structural steel plates and bars shall conform to ASTM A36, Fy = 36 ksi.
- Steel members shall contain (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
- Steel extracted/harvested and manufactured within 100 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
- Anchor Bolts: Anchor bolts at column base plates shall conform to ASTM F1554 – Grade 36 and shall be headed type. Provide a minimum of four (4), ¾" diameter anchor bolts at all columns; additional bolts and/or larger diameter will be required at bracing locations.
- Bolted connections shall be ASTM A325, Type N (bearing) bolts, except slip-critical bolts shall be used at lateral brace beam connections.
- Shear connectors shall be ¾" diameter, 4" long, headed Nelson studs conforming to ASTM A108. Assume that 25 shear connectors are required for every 100 square feet of floor area.
- Shop and field welding shall be AWS D1.1 E70XX electrodes.
- Surface treatment for typical structural steel: SSPC Surface Preparation No. 3 (Power Tool Cleaning). Structural steel shall be left unprimed.
- Surface treatment for exposed Structural Steel shall be SSPC Surface Preparation No. 6 (Commercial Blast Cleaning). Structural steel shall receive one coat of shop primer that is compatible with the finish paint.
- All exterior, exposed structural steel shall be hot-dipped galvanized.

B1020 Roof Construction

B1020.20 Roof Decks

- Typical steel roof deck shall be 1 ½"deep, 18 gauge, Type B, conforming to ASTM A653, Grade 33 (minimum), galvanized in accordance with ASTM A 653, coating class G60.
- Acoustic steel roof deck (Gymnasium) shall be 3" deep, 18/20 gauge cellular type, conforming to ASTM A653, Grade 33 (minimum), galvanized in accordance with ASTM A653, coating class G60. Acoustic steel deck shall be shop treated and painted with a primer that is compatible with the finish paint.
- Composite steel floor deck shall be 2" deep, 18 Gauge, composite type, conforming to ASTM A653, Grade 40, galvanized in accordance with ASTM A 653, coating class G60.
- All steel floor deck and roof deck accessories (pour stops, finish strips, closures, etc.) shall be the same finish as the deck; 18 gauge minimum.
- Steel deck shall contain (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
- Steel deck extracted/harvested and manufactured within 100 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
- Provide 14 gauge sump pans at roof drains.

B1080 Stairs

B1080.10 Stair Construction

- Cast-In-Place Concrete Stairs: Cast-in-place concrete stairs.
- Metal Stairs: Concrete filled steel pans stairs.
- Light-gauge cold formed metal framed stairs at music rooms.

B1080.30 Stair Soffits

- Gypsum Board.

B1080.50 Stair Railings

- Interior Metal Railings: Galvanized steel pipe railings.
- Exterior Metal Railings: Stainless steel.
- Decorative metal railings at east main entry at auditorium and west main entry: stainless steel.

B1080.70 Metal Walkways

- Formed metal grating for catwalks in Auditorium.
- Metal bar gratings, hot-dip galvanized.

B1080.80 Ladders

- Interior steel ladders, shop primed.
- Exterior steel ladders, hot-dip galvanized and shop-finished with epoxy-urethane high performance coating.

B20 EXTERIOR VERTICAL ENCLOSURES

B2010 Exterior Walls

B2010.10 Exterior Wall Veneer

Unit Masonry: Ground-face (polished) CMU and brick.

B2010.20 Exterior Wall Interior Skin

- Gypsum board.

B2010.40 Fabricated Exterior Wall Assemblies

- Aluminum and glass curtain wall assemblies.
- Translucent wall assemblies.
- Aluminum and glass storefront.
- Metal wall panel assemblies.

B2010.60 Equipment Screens

- Rooftop equipment enclosures.

B2010.80 Exterior Wall Supplementary Components

- Vapor retarders.
- Weather barriers.
- Air barriers.
- Insulation
- Expansion joint covers.

B2010.90 Exterior Wall Opening Supplementary Components

- Lintels.
- Joint sealants.
- Flashing.
- Sills.

B2020 Exterior Windows

B2020.10 Exterior Operating Windows

- Aluminum Windows at West: High performance aluminum framed windows; awning/fixed types; factory-glazed; 3-coat fluoropolymer finish, custom color.
- Aluminum-Clad Windows at East: High performance aluminum-clad framed windows; single-hung and fixed types; factory-glazed; 3-coat fluoropolymer finish, custom color.
- High-Performance Glazing: Clear, Low-E triple-glazed insulating glass units with argon.

B2020.30 Exterior Window Wall

- Storefront: 2 by 4-1/2-inch aluminum storefront framing, field glazed; 3-coat fluoropolymer finish.
- Curtain Wall: 6-inch and 8-inch deep aluminum framing, field glazed with insulating glass; 3-coat fluoropolymer finish. Spandrel glass at indicated locations.
- Glazing at Gym: Translucent fiberglass-sandwich-panel assemblies.
- High-Performance Glazing: Clear, Low-E triple-glazed insulating glass units with argon.
    - Insulating spandrel glass at indicated locations

B2050 Exterior Doors and Grilles

B2050.10 Exterior Entrance Doors

- Stile-and-rail aluminum and glass doors with aluminum frames

B2050.20 Exterior Utility Doors

- Insulated steel doors and frames, galvanized, welded frames

B2050.30 Exterior Oversize Doors

- Overhead coiling doors, insulated steel curtain, electrically operated
- Sectional overhead doors, insulated steel curtain, electrically operated

B2070 Exterior Louvers and Vents

B2070.10 Exterior Louvers

- Extruded aluminum louvers, storm resistant, with 3-coat fluoropolymer finish

B2080 Exterior Wall Appurtenances

B2080.30 Exterior Opening Protection Devices

- Aluminum sunscreen and light shelves with 3-coat fluoropolymer finish

B30 EXTERIOR HORIZONTAL ENCLOSURES

B3010 Roofing

B3010.10 Steep Slope Roofing

- Standing seem metal roofing.

B3010.50 Low-Slope Roofing

- Low-Slope Roofing Membrane: Fully adhered TPO roofing at roofs and canopies.

B3010.90 Roofing Supplementary Components

- Substrate board.
- Vapor retarder.
- Roof insulation.
- Cover board.
- Sheet metal flashing and trim.
- Counterflashing systems.
- Metal copings and fasciae.
- Expansion joint covers.

B3020 Roof Appurtenances

B3020.10 Roof Accessories

- Roof ladders.
- Roof curbs.
- Roof walkways.

B3020.70 Rainwater Management

- Gutters.
- Downspouts.
- Conductor heads.
- Scuppers.

B3060 Horizontal Openings

B3060.10 Roof Windows And Skylights

- Metal-framed skylights.

B3060.50 Vents and Hatches

- Roof hatches.
- Heat and smoke vents.

ELEMENT C - INTERIORS

C10 INTERIOR CONSTRUCTION

C1010 Interior Partitions

C1010.10 Interior Fixed Partitions

Reinforced Concrete Masonry (Elevator and Stair Shaft Walls):

- Masonry construction shall conform to ACI 530/ASCE 5/TMS 402 “Building Code Requirements for Masonry Structures”, latest edition.
- Masonry strength, f’m shall not be less than 1350 psi.

- Requirements for load bearing block strength shall be as required for specified masonry strength (f'm) but shall not be less than 2000 psi on the net area of the block.
- Grout shall conform to ASTM C476, Type Fine, and shall be of strength required for specified masonry strength (f'm) but not less than 3000 psi.
- Mortar for reinforced masonry shall conform to ASTM C270 Type S and shall be of strength required for specified masonry strength (f'm) but not less than 1800 psi.
- Reinforcing bars shall conform to ASTM A615, Grade 60 deformed bars. Lap all continuous bars 48 diameters and provide bar positioners. Assume No. 5 bars at 2'-8" o.c. vertically and horizontal bond beams with 2 – No. 5 continuous at 4'-0" o.c.
- Joint reinforcing shall be 9 gauge Ladder Type conforming to ASTM A82. Provide prefabricated corners and tees. Walls shall be reinforced horizontally with joint reinforcing at 16 inches on centers unless otherwise noted.
- Reinforcing bars, steel wire, and miscellaneous accessories shall contain (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.
- Elevator and stair shaft walls shall be 100% solid grouted (all cores); low lift grouting.
- Masonry products extracted/harvested and manufactured within 100 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.

Gypsum Board Partitions:

- Gypsum Board; Gypsum board on steel studs, typical; impact resistant gypsum board in corridors; moisture and mold resistant wallboard in wet areas; shaftwall; acoustically rated partitions where indicated.

Plaster Partitions:

- Cutting, patching and repair of existing plaster partitions at Auditorium.

Wire Mesh Partitions.

C1010.50 Interior Operable Partitions

- Acoustical folding panel partitions. Mirrored faced at dance studio.

C1010.90 Interior Partition Supplementary Components

- Sound isolation.
- Acoustic insulation.
- Firestopping.
- Expansion control.

C1010.20 Interior Glazed Partitions

- Storefront; aluminum and glass storefront.

C1020 Interior Windows

C1020.20 Interior Fixed Windows

- Fixed interior borrowed light frames.

C1020.50 Interior Special Function Windows

- Interior sound control windows.
- Interior pass windows.

C1020.90 Interior Window Supplementary Components

- Frames and sills.
- Hardware.
- Glazing: Fully-tempered float glass; fire-resistance-rated glazing at fire rated partitions; security glazing (Ballistic Resistance, Level 2 according to UL 752) at major entry vestibules and select office suites.

C1030 Interior Doors

C1030.10 Interior Swinging Doors

- Hollow metal doors and frames, fire-rated and non fire-rated.
- Solid-core flush-faced wood doors, transparent factory-finish, hardwood veneer, with factory-glazed vision lights where indicated.

C1030.40 Interior Coiling Doors

- Overhead coiling doors.

C1030.50 Interior Panel Doors

- Interior multi-leaf vertical lift glazed door at art room.

C1030.70 Interior Special Function Doors

- Sound Control Doors: Wood doors with metal frames and hardware.

C1030.80 Interior Access Doors and Panels

- Metal access doors and frames, fire-rated and non fire-rated.

C1030.90 Interior Door Supplementary Components

- Hardware; Institutional grade hardware.
- Glazing: Fully-tempered float glass in metal frames; fire-resistance-rated glazing in fire-rated door assemblies.

C1040 Interior Grilles and Gates

C1040.40 Interior Grilles

- Interior coiling counter grilles.

C1070 Suspended Ceiling Construction

C1070.10 Acoustical Suspended Ceilings

- Acoustical lay-in panel ceilings.
- Acoustical metal pan ceilings.
- Linear metal ceilings.

C1070.20 Suspended Plaster and Gypsum Board Ceilings

- Suspended gypsum board ceilings and soffits.

C1070.50 Specialty Suspended Ceilings

- Suspended acoustic “clouds” in Auditorium.
- Suspended acoustic metal baffle ceilings.
- Suspended acoustic wood slat ceilings.

C1070.90 Ceiling Suspension Components

- Suspension systems.
- Suspended ceiling sound isolation.

C1090 Interior Specialties

C1090.10 Interior Railings and Handrails

- Metal railings.
- Decorative metal railings.
- Glazed decorative metal railings.

C1090.20 Information Specialties

- Visual Display Units.
  - Markerboards.
  - Tackboards.
  - Visual display rails.
- Display cases.

- Interior signage.

C1090.25 Compartments and Cubicles

- Toilet Compartments: Floor-mounted phenolic-core toilet partitions.
- Shower and Dressing Compartments: Floor-mounted phenolic-core toilet partitions.
- Cubicles: Cubicle curtains and track.

C1090.35 Wall and Door Protection

- Corner guards.
- Protective wall coverings.

C1090.40 Toilet, Bath, and Laundry Accessories

- Toilet, bath and laundry accessories.

C1090.70 Storage Specialties

- Lockers: Metal corridor lockers lockers and athletic lockers.
  - Locker room benches.
- Closet and utility shelving.

C1090.90 Other Interior Specialties

- Defibrillator cabinets.
- Fire extinguishers and cabinets.
- Unframed glass mirrors

C20 INTERIOR FINISHES

C2010 Wall Finishes

C2010.10 Tile Wall Finish

- Ceramic wall tile.
- Porcelain wall tile.

C2010.20 Wall Paneling

- Wood paneling.

C2010.30 Wall Coverings

- Vinyl wall covering.
- Glass-fiber-reinforced plastic paneling (FRP).

C2010.60 Special Wall Surfacing

- Fabric-wrapped panels.

C2010.70 Wall Painting and Coating

- Water-based latex paint system, typical; primer and two finish coats.
- High-performance painting system for stairways and railings, toilet rooms, steel frames and steel doors; epoxy primer with two polyurethane finish coats.

C2010.80 Acoustical Wall Treatment

- Acoustic wall panels in Gymnasium, Music Rooms, Cafeteria, and where indicated.
- Acoustical wood wall paneling and acoustical fabric-wrapped paneling in Theater.

C2020 Interior Fabrications

- Architectural Woodwork: Custom millwork.

C2030 Flooring

C2030.10 Flooring Treatment

- Polished concrete

C2030.60 Terrazzo Flooring

- Cutting, patching and repair of existing terrazzo flooring.

C2030.70 Specialty Flooring

- Epoxy flooring in Kitchens.
- Epoxy flooring in toilet rooms and locker rooms.

C2030.45 Wood Flooring

- Wood-strip flooring.
- Tempered hardboard flooring at Auditorium stage.
- Resilient wood dance floor assemblies.

C2030.50 Resilient Flooring

- Resilient Base And Accessories
  - Rubber base.
  - Rubber stair treads and accessories.
  - Rubber molding accessories.
- Linoleum Flooring
  - Linoleum floor tile.
  - Linoleum sheet flooring.

C2030.70 Fluid-Applied Flooring

- Resinous flooring.

C2030.75 Carpeting

- Tile carpeting.
- Sheet carpeting.

C2030.80 Athletic Flooring

- Wood athletic flooring.
- Resilient athletic flooring.
  - Rubber floor tile.
  - Rubber sheet flooring.

C2030.85 Entrance Flooring

- Entrance Floor Mats and Frames: Recessed foot grille with carpet treads and a non-drained pit in the vestibule.

C2040 Stair Finishes

C2040.50 Resilient Stair Finish

- Rubber treads and risers with matching rubber tiles at stair landings.

C2050 Ceiling Finishes

C2050.10 Plaster and Gypsum Board Finish

- Plaster Ceilings: Cutting, patching and repair of existing plaster ceilings in Auditorium.

C2050.70 Ceiling Painting and Coating

- Painted exposed steel structure (at Gymnasium and Physical Education.)
- Painted gypsum board and plaster ceilings and soffits.

C2050.80 Acoustical Ceiling Treatment

- Acoustical ceiling coating.
- Acoustic room components.
  - Sound-absorbing ceiling units.
  - Sound-diffusing ceiling panel units.

C2050.90 Ceiling Finish Supplementary Components

- Ceiling sound isolation.

ELEMENT D - SERVICES

D10 CONVEYING

D1010 Vertical Conveying Systems

D1010.10 Elevators

- Freight elevators.
- Passenger elevators.
- Limited-use/limited-application elevators.

D20 PLUMBING

D2010 - Domestic Water Distribution

- Piping and Fitting: Potable and Non-Potable cold and hot water system water piping shall be Type 'L' hard tempered copper tubing with wrought copper fittings and silverbrite lead-free solder joints.
- Valves: Locate all valves so as to isolate all parts of the system. Shutoff valves 3 inch and smaller shall be ball valves, solder end or screwed. Valves shall be by Apollo, Nibco, or Watts.
- Insulation: Insulation for all water piping and all horizontal roof leaders whether concealed or exposed shall be 1 inch thick, heavy density, preformed snap-on insulation equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system, Owens Corning or Knauf. Insulation for cold water piping shall have a factory applied vapor barrier with ends and butts sealed with overlapping 4 inch sealing strips. Valves, fittings, and the underside of roof drain bodies shall be insulated with pre-formed fiberglass fitting insulation cut from dense fiberglass blanket and covered with pre-molded P.V.C. fitting covers. All insulation shall have self-sealing type, all service jacket (ASJ-SSL) factory applied. At exposed piping areas in locker room or gymnasium cover jacket with continuous P.V.C. jacket.
- Wall Hydrant & Hose Bibb: Wall hydrants shall be Zurn Series Z-1310-PB Ecolotrol cast brass 3/4 inch non-freeze wall hydrant with integral backflow preventer, 3/4 inch hose connections, polished nickel bronze face, loose key handle, brass wall sleeve, and fitted with brass locknut. Hose bibb shall be T & S Brass or equal model #B-720 modified, chrome plated, 3/4 inch hose end, integral stop, vacuum breaker, modified with lock shield and loose tee handle.

Domestic Hot Water Distribution

- Domestic Water Heating: Furnish and install condensing gas water heaters. The water heater will have an efficiency of at least 92 percent. The complete water heating system will comply with all current ASHRAE 90.1 requirements for thermal efficiency and standby heat losses. Provide hot water recirculation pump, mixing valve & expansion tank. Lochinvar, LAARS, PVI or approved equal.
- Hot water recirculation pump, Grundfos Alpha, or equal.

D2010.60 - Plumbing Fixtures

- Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.
- Fixtures shall bear the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Toto. Supports shall be Zurn, Smith, or Josam. All fixtures shall be white. Faucets shall be Toto, Speakman, Symmons, or Chicago.
- Fixtures shall be as scheduled on drawings and as follows:
  - 1.28 GPF, wall hung, vitreous china, siphon jet, sensor operated sensor flush

valve.
- Urinal: Sensor flush valve for 0.125 gal. flush and vitreous china wall hung urinal.
- Lavatory: Wall mounted 22" x 21-1/4" or per sizes shown on architectural drawings, vitreous china lavatory, single hole, punched for concealed armchair carrier. Regenerating battery powered, single hole, sensor faucet, 0.35 GPM rose spray, adjustable thermostatic mixing valve located under lavatory complete with in-line check stops.
- Mop Receptor: 24” x 24” x 10”, mop service basin with stainless steel rim guard on exposed sides, 3" caulk connection, stainless steel strainer. Include caulking and sealant to seal between unit and finished wall and floor. Furnish and install service sink fitting. Fiat Model MSB2424, or equal.
- Electric Water Cooler: Barrier Free Hi-Lo Electric Water Cooler with bottle filler, 8.0 GPH capacity, tandem mounting, #4 satin finish stainless steel bowls, flex-guard bubbler, push button actuator, ADA compliant. Furnish and install cane touch skirt. Elkay Model LZSTL8WSLP, or equal.
- Stainless Steel Sinks: Single bowl, 19" x 21" x 5-1/2” deep or as dimension indicated on architectural drawings, self rimming countertop mounted, 18 GA type 304 stainless steel sink with offset rear outlet; three (3) hole punched faucet ledge & quick clip mounting system, sound deadening underside. Concealed deck faucet with 8" swing gooseneck spout, bubbler spouts, 4" wrist blade handles, 0.5 GPM aerator.
- Shower: Showers will be CMU walls with epoxy coating on walls and floors. Provide floor drain with tamper-resistant screws. Symmons mixing valve with single blade lever handle and hand-held shower and 72” stainless steel hose.
- Each multi-stall bathroom should be provided with a floor drain and hose bibb.
- Provide floor drains for indirect waste in kitchen per kitchen drawings.
- Provide floor drains/floor sinks in mechanical room and fire protection room.

D2010.90 - Domestic Water Distribution Supplementary Components

- Workmanship and Installation Methods: All work shall be installed in a first-class manner consistent with the best current practices. All piping shall be installed true to line and grade, shall be grouped together, be parallel to each other. Utilize gang hangers wherever feasible. Group all valves together where feasible.
- Cleaning and Protection: Protect all materials and equipment during shipment and installation, and properly handle and store at the job site so as to prevent damage, and upon completion of this work, clean all fixtures and equipment and replace damaged parts.
- Sleeves and Escutcheons: Furnish and install in masonry walls and floors, galvanized steel sleeves as required.
- Testing: Test all work in the presence of the Architect and/or Engineer and as required by local codes.
- Chlorination: Upon completion of the plumbing work, thoroughly chlorinate the entire domestic water system before putting same in service.
- Access Doors: Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

D2020 - Sanitary Drainage

- Piping and Fitting: Soil, Waste and Vent, Kitchen Waste and Vent piping to 10 feet outside shall be hubbless cast iron pipe and fittings for 2 inch and above and shall be Type 'L' copper with cast D.W.V. type fittings for 1-1/2 inch and smaller.
- Lab Waste Piping shall be Schedule 40 polypropylene with electrical heat fusion type fittings.
- Drains: Drains shall be cast iron, caulked outlets, nickel alloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead

flashings to bond 9 inches in all directions. Drains shall be Smith, Zurn, or Josam.
- Cleanouts: Cleanouts shall be full size up to 4 inches; threaded bronze plugs located as indicated on the drawings and/or where required in soil, waste and storm pipes.
- Floor drains shall be equal to Zurn Z415.
- Floor sink shall be equal to Zurn Z-1950.

D2020.90 - Sanitary Drainage Supplementary Components

- Sleeves and Escutcheons: Furnish and install in masonry walls and floors, galvanized steel sleeves as required.
- Testing: Test all work in the presence of the Architect and/or Engineer and as required by local codes.
- Access Doors: Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.
- Interior Grease Trap:
  - Interior grease trap shall be Schier GB-2, or approved equal, rated for 35 gpm flow rate and provided with an acid resistant coating and receiving cradle for floor recessed installation.
- Solids Interceptor: All art room sinks to be provided with Inline solid interceptor. Striem HLT-117602, or equal. Acid Resistant.
- Acid Tank:
  - All new work to be furnished and installed per 248.CMR 10.13 and MWRA requirements.
  - Furnish & install Acid Neutralization Tank for Labs of the sizes and capacities indicated on the drawings. Tank dimensions shall match the dimensions indicated on the drawings including inlet and outlet elevations.
  - Acid Neutralization Tank shall be equal to Striem company.
  - Tanks shall be constructed of high density polyethylene (HDPE) conforming to ASTMD-1248, free-standing and self-supporting. Tank shall be provided with 3/4" thick bolted and gasketed polyethylene cover. Nuts and bolts shall be stainless steel. Tank shall be supplied with 2” or 3” female threaded inlets, outlet and vent connections as indicated on the drawings.
  - Tanks shall be provided with high purity limestone (calcium carbonate) chips, 1-3” in size and irregular pattern to facilitate percolation throughout the limestone bed.
  - Provide a continuous pH monitoring system at each tank. Monitoring system shall be equal to Orion Fittings, Inc. NeutraGuard Data Logging Model M01-1-01-001 with digital control panel, outlet pH probe assembly and sampling tank, high/low pH alarm, continuous electronic data logging with extra set of dry contacts for connection to BMS. This contractor shall furnish and install a complete and operable system including control wiring between the control panel and probe.

D2030 - Building Support Plumbing Systems

D2030.10 - Storm Drainage

- Piping and Fitting: Storm drainage to 10 feet outside shall be hubbless cast iron pipe and fittings.
- Cleanouts: Cleanouts shall be full size up to 4 inches; threaded bronze plugs located as indicated on the drawings and/or where required in storm pipes.
- Roof Drains shall be equal to Zurn Z-100. Storm drainage will run to multiple storm services. Refer to DC G2- Site Services criterial for more information.
- Overflow drains shall be equal to Zurn Z-100, overflow drains to run independently from the primary drainage and terminate to daylight with wall scupper.

D2060 - Process Support Plumbing Systems

D2060.30 - Gas Systems

- Fuel Gas System: Furnish and install a complete Natural Gas Supply System including pipe, fittings, valves, connections to all gas fired equipment requiring gas, and all accessories and incidentals as indicated or specified. Installation shall be made in accordance with the State Gas Code requirements. Piping shall be installed with an 8 in. long sediment leg at the base of all risers. All changes in direction shall be made with plugged tees for cleaning piping out. Gas piping shall be black steel pipe ASTM A-53 Schedule 40.
- Fuel gas valves shall be ball valves with tee handle, screwed end for 2-1/2 inch and smaller, and lubricated iron body plug cocks for 3 inch and larger. Valves shall be by Apollo, Nibco, Watts or Rockwell.
- New gas service and gas meter by gas company. Gas distribution to serve, hot water heaters, kitchen equipment, science labs and HVAC equipment as required. Gas piping to kitchen equipment to be provided with solenoid valves interlocked with CO detectors and ANSUL system. Science labs will be provided with emergency shut-off located at door and local shut-offs at each lab bench.

D30 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

D3020 - Heating Systems

Boilers:

- High efficiency gas fired condensing hot water boilers. Power burners shall be fully modulating. Boiler shall have a minimum efficiency of 93% per DOE 10 CFR 431.86 testing procedures for commercial packaged boilers

Auxiliary Equipment:

- Pumps:
  - Base mounted bronze fitted with high efficiency electric motor. Provide primary and stand-by pump for each system with automatic alternator and VFDs.
- Piping and Fittings**:**
  - Hydronic piping shall be Schedule 40 ASTM A-53, black steel pipe with butt welded ends and fittings on 3" and above and threaded ends and fittings on 2-1/2" and smaller. At the contractor option type "L" copper may be used on all 2-1/2" and smaller. At the contractor option type, Victaulic mechanical grooved piping shall be acceptable for 2-1/2” pipe sizes and large, and Pro-Press mechanical coupling piping fitting shall be acceptable for piping sizes 2” and smaller.
- Valves:
  - All valves shall be bronze, brass, or cast iron as system design requires. Locate all valves so as to isolate all parts of the system and as required for normal system operation.
- System Identification:
  - Provide markers on all piping, equipment, and ductwork. Tag all valves in system with corresponding valve lists.
- Insulation:
  - All piping shall be insulated with snap-on fiberglass insulation with all service jacket. Fittings shall be insulated with snap on pre-molded covers with loose fill fiberglass insulation.
  - All HVAC hot water piping 1-1/2” size and under shall be insulated with 1-1/2” fiberglass insulation with all service jacket; hot water piping over 1-1/2” size shall be insulated with 2” fiberglass insulation with all service jacket. Hot water equipment shall be insulated with 1-1/2” fiberglass insulation with all service jacket.

D3030 - Cooling Systems

Water Cooled Chillers:

- High efficiency oil-less compress design Mag-Lev/TurboCor or equal compressor design chillers with turn down to 15% of cooling load.

Cooling Towers:

- High efficiency two cell induced draft with low noise fans, intake sound attenuators and tapered discharge hoods. Cooling towers shall be stainless steel construction, and equipped with OSHA approved guardrails, platforms and stairs for service.

Auxiliary Equipment:

- Pumps:
  - Base mounted bronze fitted with high efficiency electric motor. Provide primary and stand-by pump for each system with automatic alternator and VFDs.
- Piping and Fittings**:**
  - Hydronic piping shall be Schedule 40 ASTM A-53, black steel pipe with butt welded ends and fittings on 3" and above and threaded ends and fittings on 2-1/2" and smaller. At the contractor option type "L" copper may be used on all 2-1/2" and smaller.
- Valves:
  - All valves shall be bronze, brass, or cast iron as system design requires. Locate all valves to isolate all parts of the system and as required for normal system operation.
- System Identification:
  - Provide markers on all piping, equipment, and ductwork. Tag all valves in system with corresponding valve lists.
- Insulation:
  - All piping shall be insulated with snap-on fiberglass insulation with all service jacket.
  - HVAC chilled, condenser and make-up water piping shall be insulated with minimum 1” fiberglass insulation with all service jacket and vapor barrier. Fittings shall be insulated with snap on pre-molded covers with loose fill fiberglass insulation.

D3050 - Facility HVAC Distribution Systems

D3035 - Mechanical Equipment Rooftop Enclosure (East Building)

- The Hot water heating and chilled water cooling plants including all boilers, chillers, pumps, air separator, expansion tanks, accessories and plant controllers shall be installed in a factory fabricated mechanical equipment rooftop enclosure.
- Refer to HVAC Outline specifications and narratives for specific equipment and material product and installation requirements.
- The mechanical enclosure shall meet the following requirements:
  - All mechanical and related electrical equipment shall be housed inside a factory fabricated double wall enclosure that incorporates a structural steel base, wall and roof framework.
- The components of the enclosure shall meet the following requirements:
  - Floor: shall be a minimum of 3/16 in. steel checker plate.
  - Exterior Panels: Wall and roof panels shall be fabricated from 16ga. satin coat steel and sealed with an individual strip of ½ in. x 3/8 in. tape sealer. Wall panel shall be 2 in. thick with seams turned inward to provide flush exterior finish. Exterior roof panels shall be 4 in. thick. Wall and roof exterior panels shall wrap around wall and roof structural framework to ensure thermal break.
  - Structural Steel Base: When used with an enclosure, the perimeter members shall be, at a minimum, 8 in.x6 in.x0.188 in. hollow structural steel tube (HSS) and shall enable the installing contractor to shim the unit at 12 foot spans on site.

The use of a c-channel or flanged steel perimeter is permitted provided the base is at least 12 in. deep.

- Wall and Roof Structural Steel Framework: an integral structural steel framework of hollow structural steel shall support the walls and roof. The framework members shall be, at a minimum, 3 in.x3 in.x0.188 in. HSS at 10-foot centers. The roof steel shall also support all pipe in the Packaged System higher than four feet from the floor or base level. The framework shall be primed and finish painted using the paint system described in this section. Color selection by architect. Color as selected by Architect
- Roof Mounted Lifting Lugs: If an enclosure is required and the package is to be split for shipping, then the wall and roof structural steel framework will be extended through the roof of the enclosure and incorporate lifting lugs so that the entire package can be lifted from the roof – no exceptions.
- Interior Wall Panels: Interior walls panels shall be a minimum of 2 in. thick fabricated from a minimum of 22 ga. galvanized steel. The wall interior panel joints shall run horizontal (or 90 deg. to the exterior panels) to provide an acoustic break, and overlapped to be suitable for washing with a pressure washer or steam cleaned without risk of wetting the insulation. The wall panel shall be installed over top of the floor water dam such that any water run-off will drip onto the water-tight floor.
- Insulation: Wall and roof shall be insulated with no less than 4 in. of 4.5 Lb/cu.ft density rigid or semi-rigid board type insulation equivalent to R-16. Floor insulation thickness will be no less than (i) the smallest structural steel member used to support the floor or (ii) 4 in., and shall have a minimum insulating valve of R-16. All insulation shall be rated non-combustible for continuous service at 1200F and shall be non-wicking with a moisture absorption rating of <1 percent.
- Roof Covering: The roof covering shall be standing seam panels.
- The enclosure shall have the following structural ratings:
  A minimum snow/ sand load rating of 40 pounds per square foot.
  A minimum wind load rating of 150MPH.
- The enclosure panels shall be acoustically designed with a sound Transmission Loss (TL) rating. The TL values must be rated across the eight octave bands. Sound pressure levels shall be predictable from any distance from the enclosure when sound power levels from the sound generating equipment are known. Calculations that support the sound data shall be provided on request.
- All bases, enclosure floors and exteriors are to be factory painted. Enclosure paint shall have weather resistant finish that will withstand 500 hour exposure to the salt spray test specified in ASTM B 117. Paint shall be applied and allowed to dry for a sufficient amount of time before shipping. The paint shall be a non-isocyanate enamel that produces a durable, chemically resistant coating similar to urethane. The vehicle type shall be a cross-linked acrylic with an oxygenated and aromatic hydrocarbon solvent. All exterior surfaces shall be wiped down with thinners and prepared with a zero induction epoxy primer before applying paint. All interior surfaces shall be prepared with a high build epoxy primer before applying paint.
- Ventilation louver and damper: Install stationary, storm proof louver and motorized damper for forced ventilation of the enclosure. Louvers shall be 6 inches deep with extruded aluminum blades and frame and 19 gauge galvanized ½ in. x ½ in. bird screen. Damper blades shall be 4 inches deep, thermally broken with high-density polyurethane CFC injected insulation. Air leakage through a 48 in. x 48 in. damper shall not exceed 10.5 CFM/SQFT against 4 in. w.g. differential static pressure at standard air. Operating temperature range shall be -40 deg. to +200 deg.F. Supply an actuator to modulate the damper open or close.

- Exhaust Fan: Exhaust fan system shall be installed for proper enclosure ventilation. Fan shall be enclosed in minimum 18 gauge galvanized steel wall housing with factory installed shutter and inlet guard.
- Unit Heater: A hot water unit heater(s) shall be installed to maintain a minimum enclosure temperature of 70 deg F (adj) on a design heating day of 5 deg F.

Automated Control System

- Provide clearance for ATC control panels.
- ATC contractor shall furnish control valves, isolation valves, and bypass valves mounted in piping to enclosure manufacturer. Enclosure manufacturer shall install valves provided by ATC contractor.
- ATC contractor to coordinate location of thermo wells. Enclosure manufacturer shall provide thermo wells at location determined by the ATC contractor.

D3040 - Distribution Systems

Air Distribution Systems

Ductwork:

- All ductwork shall be galvanized steel with all seams sealed. Entire ductwork system shall be fabricated and installed per SMACNA LOW PRESSURE DUCT CONSTRUCTION STANDARDS. All medium or high velocity ductwork, between air handling unit and VAV box (where applicable), shall constructed and sealed in accordance with SMACNA medium or high pressure ductwork construction requirements.
- All science fume hood and kitchen dishwasher exhaust air systems shall be stainless steel construction.
- All locker room exhaust located within 20 ft of showers shall be pitched and shall be stainless steel construction.
- All kitchen exhaust air ductwork shall be black iron or stainless steel construction in accordance with IMC and NFPA 96 requirements. Kitchen exhaust ductwork shall be provided with 2 hour rated fire blanket covering.

Displacement Diffusers:

- All devices shall be steel welded construction with perforated face and intermittent baffle for equalization and shall have a baked enamel finish.

Exhaust Fans:

- Exhaust fans shall be galvanized steel construction with centrifugal fan and belt or direct drive motor. Each roof unit shall be provided with 24" high pre-fab curb with motor operated damper in curb. Science fume hood exhaust fans shall be AMCA B heresite costed with spark resistant construction.

Insulation:

- All HVAC supply and return ductwork shall be insulated with 1.5" thick fiberglass blanket (min. R-5 insulation) with a foil vapor barrier. All outside air intake ductwork shall be insulated with 2" (min. R-8 insulation) rigid fiberglass with foil vapor barrier. All ductwork located outdoors shall be insulated with 2-1/2" (min. R-12 insulation) rigid fiberglass with foil vapor barrier and ultraviolent and weather resistant jacketing.

D3045 – Air Handling Units

Indoor and Rooftop Air Handling Units (HVAC 100% O.A.)

- All units shall be of the draw thru 100% outdoor air design and shall be provided with hot water heating coil, chilled water cooling coil, static plate type total energy recovery section, static plate type reheat section, filters (MERV-14), dampers, and centrifugal supply and return air fan with motor.
- Outdoor units shall be provided with a pre-fabricated penthouse with service corridor manufactured by the unit manufacturer.

Make-Up Air Units:

- All units shall be of the draw thru 100% outdoor air design and shall be provided with

filters (MERV-13), dampers, and centrifugal supply and return air fan with motor.

D3050 - Terminal And Package Units

VAV (Variable Air Volume) Terminal Boxes:

- VAV Terminal Boxes shall be single duct style with three foot sound trap.

Radiant Heating Panels:

- Radiant panel shall be manufactured utilizing extruded aluminum strips of approximately 0.115 overall thickness. The strips shall have a minimum 0.495 I.D. copper tube firmly attached to aluminum extrusion under all operating temperature conditions. Ends of tubes shall be swaged to 0.569 I.D. for proper soldering fit of ½ inch Type "L" soft copper tubing.

Radiant Heating/Cooling Panels:

- Radiant panel shall be manufactured utilizing extruded aluminum strips of approximately 0.115 overall thickness. The strips shall have a minimum 0.495 I.D. copper tube firmly attached to aluminum extrusion under all operating temperature conditions. Ends of tubes shall be swaged to 0.569 I.D. for proper soldering fit of ½ inch Type "L" soft copper tubing. The radiant panels will have a minimum heating output of 55 Btu/Hour/Square Foot at 110°F mean water temperature when the room air temperature is 70°F and a minimum cooling output of 30 Btu/Hour/Square Foot at 60°F mean water temperature when the room air temperature is 75°F. The roof is of medium insulation value, and natural convection prevails in the room. Panels' widths shall be as indicated or scheduled on the drawings.

Unit Heaters:

- Horizontal or cabinet type with exact locations to be determined. All units shall be provided with fan and aquastat control.

Wall Mounted Radiators:

- Commercial radiators are manufactured of cold rolled low carbon steel, fully welded and consisting of header pipes at each end, connected by flat oval water tubes. Radiator shall have a baked enamel factory finish. All units shall be provided with end covers, and splice pieces for a complete installation.

Fin Tube Radiation:

- Available Manufacturers: Subject to compliance with the requirements of the contract documents provide fin-tube radiation of the following manufacturer:
  - Vulcan
  - Sterling
  - Rittling
  - Or equal

D3055 - Fuel Oil Systems and Specialties

- The fuel oil system shall required to support the emergency generator shall consists of necessary components, tank level monitoring, tank leak monitoring, fuel dispensing control system, double wall containment piping, fuel oil transfer pumps, and double wall fuel oil storage tank with 110% containment.
- Available Manufacturers: Subject to compliance with the requirements of the contract documents provide fuel oil specialties of the following manufacturer:
  - Tanks:
    Preferred Utilities
    Highland Tank
    Safe-T-Tank
    Or Equal
  - Fuel Oil Pumps and Controls
    Preferred Utilities
    Hayes
    Geiger
    Or Equal

D3060 - HVAC Instrumentation & Controls

Automatic Temperature Controls:

- System shall be an open protocol (BACNet based), we accessible, direct digital control and building energy management system with front end to provide complete automatic temperature control and monitoring of newly installed HVAC system with integration into the City's School building energy management system
    - Available Manufacturers: Subject to compliance with the requirements of the contract documents provide automatic temperature controls of the following manufacturer:

        Components (Honeywell, Distech, or Equal)
        BMS System (American Energy Management, or Equal)
        Or Equal

D3070 - Systems Testing & Balancing

Testing, Adjusting, Commissioning, and Balancing:

- Requirements include measurement and establishment of the quantities of the mechanical systems as required to meet specifications, and recording and reporting the results. Test, adjust and balance the following mechanical systems:
    - Supply air systems.
    - Return air systems.
    - Exhaust air systems.
    - Outside air systems.
    - Hydronic heating systems.
    - Verify temperature control system operation.
- Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders.
- An independent testing, adjusting, and balancing agency certified by the AABC or NEBB as a Test and Balance Engineer in those testing and balancing disciplines required for this project.

D3090 - Other Special HVAC Systems and Equipment

Workmanship and Installation Methods

- All work shall be installed in a first-class manner consistent with the best current practices.
- All piping shall be installed with slope for proper drainage shall be grouped together, and be parallel to each other. Utilize gang hangers wherever feasible. Group all valves together where feasible.

Cleaning and Protection

- Protect all materials and equipment during shipment and installation, and properly handle and store at the job site so as to prevent damage, and upon completion of this work, clean all fixtures and equipment and replace damaged parts.

Sleeves and Escutcheons

- Furnish and install in masonry walls and floors, galvanized steel sleeves as required. Provide escutcheons where sleeves and pipe penetrations are exposed to view.

Firesafing

- At all sleeved walls and floors provide firesafe caulking, packing, blanket etc., for a completely tight system to prevent the passage of smoke and fire.

Operation Manuals and Maintenance Manuals:

- Refer to the contract specifications for a complete outline of all requirements of operations and maintenance data.

Record Drawings and Control Documents:

- Refer to the contract specifications project record documents for a complete description of all requirements of recording as built record documents.

D40 FIRE PROTECTION

D4010 - Fire Suppression

General: All materials and equipment furnished under this Subcontract shall be new, unused, first quality of a manufacturer of established reputation. Each valve, fitting, section of pipe, piece of equipment shall have cast or indelibly stamped thereon the manufacturer's name, pressure rating where applicable. Drains and test connections shall be provided in the systems.

D4010.10 - Water-Based Fire Suppression

Quality Assurance: Quality Standards: NFPA 13, NFPA 24 and NFPA 70.

Piping Materials

- Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved-end fittings.
- Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2” and Smaller: Schedule 40 black-steel pipe with cut-or roll-grooved ends and uncoated fittings.
- Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2-1/2” and Larger: Schedule 10 black-steel pipe with roll-grooved ends and uncoated fittings.

Sprinkler Materials:

- Sprinkler Types:
  - All sprinkler heads shall be quick-response.
  - Rooms without Ceilings: Upright sprinklers.
  - Rooms with Suspended Ceilings: Semi-recessed or concealed sprinklers as indicated.
  - Wall Mounting: Sidewall sprinklers.
  - Spaces Subject to Freezing: Pendent, dry sprinklers; and sidewall, dry sprinklers as indicated.
  - Special Applications: Extended-coverage where indicated.
- Sprinkler Finishes:
  - Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
  - Flush Sprinklers: Bright chrome, with painted white escutcheon.
  - Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
  - Upright, Pendent and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.
  - Sprinkler cages provided for gym and mechanical rooms.
- Listed Fire Protection Valves:
  - Ball Valves:
    Valves NPS 1-1/2” and Smaller: Bronze body with threaded ends.
    Valves NPS 2” and NPS 2-1/2”: Bronze body with threaded ends or ductile-iron body with grooved ends.
    Valves NPS 3”: Ductile-iron body with grooved ends.
  - Bronze butterfly valves.
  - Iron butterfly valves.
  - Check valves.
  - Bronze OS&Y gate valves.
  - Iron OS&Y gate valves.
  - Indicating-type butterfly valves.
  - Valves NPS 2” and Smaller: Ball or butterfly.
  - Valves NPS 2-1/2” and Larger: Butterfly.
  - Valve Operation: Integral electrical, 115-V ac, prewired, two-circuit, supervisory switch visual indicating device.
  - Indicator Posts: Wrench operated.

Trim and Drain Valves

- Angle valves.
- Ball valves.
- Globe valves.
- Plug valves.

Specialty Valves
- Alarm valves.
- Automatic (ball drip) drain valves.

Fire Department Connections
- Flush type with horizontal body style, two inlets, brass with polished chrome-plated finish and NPS 4” outlet. Provide two for each building (East & West). Coordinate exact location with fire department.

Sprinkler Specialty Pipe Fittings
- Branch outlet fittings.
- Flow detection and test assemblies.
- Branch line testers.
- Sprinkler inspector's test fittings.
- Adjustable drop nipples.
- Flexible, sprinkler hose fittings.
- Sprinkler guards at gyms and mechanical rooms.

Alarm Devices
- Water-motor-operated alarm.
- Electrically operated alarm bell.
- Water-flow indicators.
- Pressure switches.
- Valve supervisory switches.
- Indicator-post supervisory switches.

Manual Control Stations
- Hydraulic operation.

Control Panels
- Single-area, two-area, or single-area cross-zoned control panel with electric-operation, manual control stations.

Pressure Gauges: 0- to 250-psig range.

D4010.20 - Facility Fire-Suppression Water-Service Piping

Quality Assurance: Quality Standards: NFPA 24 and NFPA 70.
- Products: Listing in "Approval Guide," published by FM Global, or UL's "Fire Protection Equipment Directory" for fire-service-main products.
  - Underslab Piping NPS 3” and Larger: Grooved-end, ductile-iron pipe; appurtenances; and fittings.
  - Underground Shutoff Valves NPS 3” and Larger: 175-psig, UL-listed or FM-approved, iron, nonrising-stem gate valves.
- Check Valves NPS 3” and Larger:
  - UL-listed or FM-approved check valves.
  - UL-listed or FM-approved detector check valves.
- New 8” sprinkler service, refer to DC G2 – Site services criteria.

D4030 - Fire Protection Specialties

D4030.10 - Fire Protection Cabinets
- Recessed fire protection cabinets.
- Semi-recessed fire protection cabinets.

D4030.30 - Fire Extinguishers
- Portable, hand-carried fire extinguishers and mounting brackets.

D4040 - Fire-Suppression Standpipes

Quality Standards: NFPA 14 and NFPA 70.

Materials:

- Piping between Fire-Department connections and Check Valves: Galvanized, standard-weight steel pipe with grooved-end fittings and couplings.
- Standard-Pressure, Wet-Type Piping, NPS 4" and Smaller:
- Retain one or more of nine subparagraphs below.
- Schedule 10 black-steel pipe with roll-grooved ends; and uncoated, grooved-end fittings and couplings.

Hose Connections

- Adjustable-Valve Hose Stations: Angle, pressure reducing, rough brass or bronze finish.
- Nonadjustable-Valve Hose Stations: Angle, rough brass or bronze finish.

Monitors: Stationary with single NPS 2-1/2" waterway; 500 gpm water-stream flow, wheel] operation, NPS 2-1/2" base inlet size.

Fire Department Connections: Flush type with horizontal body style, two inlets, polished chrome-plated finish, and NPS 4" outlet.

Alarm Devices

- Water-motor-operated alarm.
- Electrically operated alarm bell.
- Water-flow indicators.
- Pressure switches.
- Valve supervisory switches.
- Indicator-post supervisory switches.

Manual Control Stations: Hydraulic operation.

Control Panels: Single-area, two-area, or single-area cross-zoned control panel with electric-operation, manual control stations.

Pressure Gages: 0- to 300-psig range.

D4050 - Electric-Drive, Centrifugal Fire Pumps

Performance Requirements, Minimum Working-Pressure Rating: 175 psig

Quality Standards: NFPA 20 and NFPA 70.

Products:

- Horizontally Mounted, Single-Stage, Split-Case Fire Pumps:
- Standard: UL 448.
- Casing: Axially split case, cast iron.
- Impeller: Cast bronze.
- Wear Rings: Replaceable bronze.
- Shaft and Sleeve: Steel shaft with bronze sleeve.
- Shaft Bearings: Grease-lubricated ball bearings.
- Seals: Stuffing box.
- Mounting: Pump and driver on same base, with horizontal shafts.
- Coupling: Flexible, with metal guard.
- Inlet Flange: Class 250.
- Outlet Flange: Class 250.
- Volts: 460.
- Phase: Three.

Fire-Pump Accessories and Specialties:

- Circulation Relief Valves: Brass.
- Relief Valves: Bronze or cast iron.
- Inlet Fitting: Eccentric tapered reducer.
- Outlet Fitting: Concentric tapered reducer.
- Discharge Cone: Open type.

- Hose Valve Manifold: Body Exposed type, brass with rough brass finish on exposed parts.

Flowmeter Systems:

- UL listed or FM Approved.
- Pressure Rating: 250 psig.
- Sensor: Annubar Probe, Orifice Plate, or Venturi.
- Permanently mounted.

D50 ELECTRICAL

D5020 - Electrical Service And Distribution

D5020.10 - Electrical Service

Electrical Power Equipment:

Motors: Each motor shall have disconnect switch and starter provided under this section. Starters which are a part of "factory assembled" control panel will be provided under section supplying equipment to be controlled but connected under this section. Provide motor terminal boxes for each motor not furnished with same.

Disconnect Switches:

- Disconnect (safety) switches shall conform to industrial standards of NEMA, be UL listed and shall be heavy duty type, quick-make, quick-break type with interlocking cover mechanism and provisions for padlocking switch handle in "OFF" position. Three pole toggle switches are not acceptable as substitute for disconnect switches.

Fuses:

- Provide a complete set of fuses for each item of fusible type equipment. Fusible equipment furnished by other contractors will be complete with fuses, unless noted otherwise on electrical drawings.

Building Switchboards:

- Building switchboards shall be constructed in accordance with UL 891 and ANSI standards and of the required number of vertical sections bolted together to form one metal enclosed rigid structure. The front shall be accessible. Buses shall be aluminum.
- Switchboards shall be arranged for operation as follows:
  Voltage - 480Y/277 volts
  Frequency - 60 cycles
  Service - 3 phase, 4 wire, ampere capacity as indicated on drawings.
  Neutral - full capacity
  Available short circuit current at line terminals - 65,000 RMS amperes symmetrical.
  Integrated equipment rating - 65,000 AIC
  Copper ground bus, full length
  UL service entrance label

Panelboards:

- Panelboards shall be dead-front, door in door safety type equipped with single or multi-pole circuit breakers suitable for 120/208 volt or 277/480 volt, 3 phase, 4 wire operation.
- Buses shall be copper. Panelboards shall have a circuit directory card mounted in a frame with plastic cover on inside of door. Panelboards to have a copper ground bus with terminals for each circuit. Panelboards serving isolated ground receptacles shall have a separate ground bus for terminations of the isolated grounds. The isolated ground bus shall be mounted to the panel tub via non-conducting means with a separate grounding conductor run to the normal panel ground bus.

- Panelboards and distribution panels shall be of same manufacturer as switchboard.

Dry-Type Transformers:

- Dry-type transformers shall be 480 volt, 3 phase, delta connected primary and 120/208 volt, 3 phase, 4 wire wye connected secondary with grounded neutral. They shall be of the KVA size, voltage rating, and characteristics as shown on the drawings. Transformers 75KVA and larger shall have minimum impedance of 4-1/2%. Transformers feeding panels with surge suppressors shall be K-13 rated.
- Provide grounding of separately derived systems in accordance with Code Article 250-26.
- Transformers shall be of same manufacturer as switchboard.

Electric Service:

- Primary, secondary and low tension ductbanks, manholes, handholes.
- Secondary distribution equipment, including secondary switchboard and metering, motor controls, dry-type transformers, distribution panels, and panelboards, including feeders and subfeeders.
- Excavation and backfill within building foundation walls for any underground raceways.
- Coordinate and cooperate with Utility Co., with respect to providing service and metering.
- Provide all primary system raceways, elbows, pull wires and all pad grounding. Utility company will provide vault type transformers and primary conductors including making up of all terminations and connections.
- Metering: All usage will be on one secondary meter. Utility Company will furnish current transformers and potential transformers to be installed in switchboard by contractor. Empty raceway with pull wire from the C/T compartment to the meter backboard shall be provided. Meter shall have KYZ output.

Raceways and Fittings

Raceways - General:

- No raceway shall be used smaller than 3/4" diameter and shall have no more than four (4) 90 deg. bends in any one run, and where necessary, pull boxes shall be provided. Only rigid metal conduit or intermediate metal conduit is allowed for in-slab work. Cable systems, if allowed to be used by other sections of this specification, shall not be used exposed or in slabs, whether listed by "UL" for such use or not.
- Rigid metal conduit, may be used for service work, exterior work, slab work, and below grade level slab, wet locations, and in penthouse for drops down to equipment from elevations above eight feet and also where raceway may be subject to mechanical damage.
- Electrical Metallic Tubing (EMT), may be used in masonry block walls, stud partitions, above furred ceilings, where exposed but not subject to mechanical damage, and shall be used for fire alarm work.
- Surface metal raceways shall be used where raceways cannot be run concealed.
- Flexible metal conduit shall be used for final connections to recessed lighting fixtures from above ceiling junction boxes and for final flexible connections to motors and other rotating or vibrating equipment. Liquid tight flexible metal conduit shall be used for the above connections which are located in moist locations. All flexible connections shall include an insulated grounding conductor.
- Rigid non-metallic conduit may be used at the contractors option for underground electric and telephone services outside the foundation wall and shall be polyvinyl chloride (PVC) schedule 40, 90oC. If option of rigid non-metallic conduit is

exercised, underground runs outside the foundation wall shall be concrete encased at electrical contractors expense.

- PVC Schedule 40 may also be used for below slab circuits within building confines and site lighting branch circuits. Below slab rigid non-metallic conduits do not require concrete encasement. Rigid non-metallic conduits shall not be used for exterior feeders, in slabs, nor for elbows which penetrate slabs. Raceways and fittings shall be produced by same manufacturer.

Outlets, Pull and Junction Boxes:

Outlets:

- Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations or surface mounted shall be of the cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps not allowed in new construction. Thru the wall boxes are not permitted.

Pull and Junction Boxes:

- Where indicated on plans, and where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish, and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code.

Conductors:

- All conductors shall be a minimum size of #12 AWG except for control wiring and fire alarm wiring where #14 AWG may be used. For all exit sign circuits, normal/emergency and/or emergency only circuits, exterior lighting circuits, and also where distance from panelboard to first outlet exceeds 80' for 120 volts and 150’ for 277 volts, #10 AWG shall be minimum size wire allowed. All feeder and branch circuit conductor shall be color coded as follows:

1.	208Y/120V	Phase A	Black
2.	208Y/120V	Phase B	Red
3.	208Y/120V	Phase C	Blue
4.	480Y/277V	Phase A	Brown
5.	480Y/277V	Phase B	Orange
6.	480Y/277V	Phase C	Yellow
7.	Grounded Conductor	120/208	White
		277/480	Grey
8.	Equipment Ground	120/208	Green
		277/480	Green with Yellow Trace

- All conductors not installed in accordance with color scheme shall be replaced. All conductors larger than #6 AWG must be identified with colored tape.
- Connections throughout the entire job shall be made with solderless type devices.
  1. For #10 AWG and smaller: spring type.
  2. For #8 AWG and larger: circumferential compression type.
  3. Any splices made up in ground mounted pull boxes shall be resin cast waterproof type or waterproof pressure type, as manufactured by King Technology, St. Louis, MO.
- Conductors shall be copper, soft drawn, and annealed of 98% conductivity. Conductors larger than #10 AWG shall be stranded; #10 AWG and smaller shall be solid. Conductors shall be insulated for 600 volts and be of following types:
  1. All conductors shall have heat/moisture resistant thermoplastic insulation type THHN/THWN (75^{o}C) except as follows:
     - In sizes #1 AWG and larger: Crosslinked polyethylene insulation type XHHW (75 deg. C – 90 deg. C) may be used.

- Fire alarm system conductors shall be #14 AWG, type THHN, solid. Color coding of fire alarm conductors shall be in accordance with fire codes.
- Fixture whips #16AWG type "SF".

- Stranded conductors for all wiring systems except fire alarm will be allowed if installed and terminated as specified under Execution Section.
- Mineral-Insulated Metal-Sheathed Fire-Resistive Cables (Type MI) - Cables shall consist of a factory assembly of one or more solid copper conductors insulated with highly-compressed magnesium oxide and enclosed in a seamless, liquid-and-gas-tight continuous copper sheath. Cables shall be rated for 600 volts and less. Cables shall comply with Article 330 of the National Electrical Code. Cables shall be classified by Underwriters Laboratories, Inc. as having a 2-hour fire resistive rating. Cable terminations shall be made with UL listed mineral-insulated cable fittings. Approved Manufacturer - Pyrotenax USA, Inc., or equal.
- Type MC cable may be used for concealed branch circuits in hollow spaces where allowed by code if installed and terminated as specified under Execution Section. Armor to be galvanized steel, and shall be UL listed for 2 hour thru-wall fire penetration.

D5040 - Lighting

Sleeves, Inserts, and Openings:

- Sleeves: Provide sleeves of proper sizes for all openings required in concrete floors and walls. Sleeves passing through floors shall be set with top of sleeve 1" above finished floor. Core drilling will also be acceptable if in accordance with any structural standards. Any unsleeved openings shall be waterproofed.

Floor Outlets (Flush Type):

- All flush floor outlets shall be Steel City 640 or 840 series cast iron, watertight type. The 640 series shall be used generally, and the 840 series used where shallow depth is required.
- Whenever floor outlets for different services are indicated in the same location, they shall be ganged together.
- Covers shall be brass series P64. Duplex receptacle covers shall be lift lid type P64DS. Low tension covers shall be series P64 3/4 2 with 3/4" diameter and 2" diameter plugs. Flush floor outlets located in carpeted areas shall be provided with P64 CP carpet plates of the number of gangs required.

Wiring Devices:

- Receptacles: Receptacles shall be flush mounted. All standard 20 ampere devices to be of same manufacturer
  - Twenty (20) ampere duplex grounding type NEMA 5-20R,
  - Thirty (30) ampere, 250 volt NEMA 10-30R complete with plate,
- Switches: 20 ampere,
- Composition material of wiring devices to be nylon with white finish.
- Coverplates: Brushed US 302 stainless steel.
  Provide gaskets on all wiring device plates where devices are on walls separating conditioned and non-conditioned spaces.
- Blank coverplates shall be steel, paintable.
- Dimmer Controls:
  - All devices shall be UL listed specifically for the required loads (i.e., incandescent, fluorescent, magnetic low voltage, electronic low voltage). Manufacturer shall provide file card upon request. Universal dimmers are not acceptable.

Lighting Fixtures:

- Provide lighting fixtures complete with LED sources, drivers, and other devices as required for a first class installation. Furnish Ceiling Subcontractor with

instructions concerning openings necessary, and provide frames for NEMA standard ceiling types or special mounting frames, as may be required. Fixtures shall be supported independently of hung ceiling construction.

- LED Assemblies
  - LED luminaires shall conform to UL 1598 and to UL 8250 – Safety Standard for Light-Emitting Diode (LED) Light Sources for Use in Lighting Products.
  - Products shall be lead and mercury free.
  - Photometric characteristics shall be established using IESNA LM-79-08, IESNA Approved Method for the Electrical and Photometric Measurement of Solid-State Lighting Products.
  - Color characteristics of LED luminaires shall be as follows in accordance with ANSI C78.377 – Specifications for the Chromaticity of Solid State Lighting Products.
  - LED and driver cooling system shall be passive and shall resist the buildup of debris.
  - LED luminaire output after 50,000 hours of operation shall be not less than 70 percent of the initial lumen output when determined in accordance with IESNA LM-80-08 – IESNA approved Method for Measuring Lumen Maintenance of LED Lighting Sources
- Provide universal arrows on all exit signs and punch out directions as shown on floor plans.
- Pendant mounted fixtures shall be suspended by means of air craft cable with aligner and canopy in finished areas or threaded rods in non-public areas. Length of suspension method to be as required to mount fixtures at the elevations called for or as otherwise shown on drawings or architectural elevations.
- Fixture types shall be as scheduled.

Automated Lighting Control System:

- The lighting control “system” shall include a fully distributed WAN/LAN network of global controller/routers, individually addressable System Field Devices, sensors, switches, relays and other ancillary devices required for a complete and operable system.
- The basis of system design shall utilize non-propriety industry standard 0-10V dimming or fixed output ballasts and/or 0-10V LED drivers, occupancy sensors, and daylight sensors
- Shall provide an Interactive, Web-based graphical user interface (GUI) showing floor plans and lighting layouts that are native to the lighting control software. The only means required to program and operate the lighting control system shall be programmed and operated from a user interface that is based on a plan view graphical screen on the user’s computer or the lighting control system’s main computer
- All programming, assignments of lighting loads to control strategies, lighting status and lighting energy reporting shall be native to the software and executed from this GUI. Editing shall be available from this GUI in a drag and drop format or from drop down menus without the need for any third party software. The GUI shall continuously indicate the status of each connected device on the system and a warning indicator on the software if a device goes offline.
- The system software shall provide a web based energy dashboard to show real time energy savings data and carbon footprint reductions

Dual Technology Ceiling Occupancy Sensors:

- Dual technology occupancy sensors shall be capable of detecting occupants within the coverage area designated via detection of a doppler shift in the transmitted ultrasonic sound wave and a change in the infrared heat present.

Major motion and minor motion shall cause the controlled load to switch to the "ON" mode.

- The dual technology passive infrared sensor shall use a multi-level 100 segment Fresnel lens and four pyroelectric detectors to insure adequate PIR coverage of the intended area.
- Dual technology sensors shall have on override to "ON" bypass logic key in the event of sensor failure.
- Sensors are to be ceiling mounted using a back mounting plate and standard electrical outlet boxes.
- Dual technology sensors shall cover up to 2000 sq. ft. for walking motion, with a field of view of 360 degrees.
- Dual technology sensors shall be compatible with electronic ballasts, compact fluorescent, and inductive loads.

D5050 - Electrical System Controls and Instruments

- Provide a complete power system consisting of branch circuits, motor disconnect switches, pushbutton stations, motor starters, and other devices to connect up and leave in operating condition each piece of electrically operated equipment provided either under this section or other Divisions.
- All control wiring not indicated in the electrical specifications or not shown on electrical drawings will be provided by Temperature Control Subcontractor.

D5090 - Other Electrical Systems

General: Connections for all building equipment, including mechanical, plumbing, fire protection, elevator, and the like.

- Drilling, coring, and cutting of holes (where the largest dimension thereof does not exceed 12 inches) for electrical conduit systems, and equipment.
- Systems Identification.
- Scaffolding, Rigging, and Staging required for all Electrical Work.
- Fire stopping shall be performed by this contractor.
- Provide Seismic Restraints for all Electrical Systems conforming to the requirements of State Code.
- Coordination Drawings.
- Provide cable tray, 120 volt power sources, raceways and backboxes for Paging System, Clock System, Voice, Data and Video Systems, etc. as specified in Section 270000 and 120 volt power sources, raceways and backboxes for Security/Intrusion System, Closed Circuit TV (CCTV) System, Card Access System, etc.
- Temporary Power and Lighting.

Identification: Equipment shall be marked for ease of identification as follows.

- Provide screw-on nameplates on switchboards, panelboards, F.A. terminal cabinets, starters, and disconnect switches. Nameplates to be of black phenolic with white engraving. For starters and disconnect switches lettering shall be minimum of 1/4" high.
- Space neatly typed directory cards listing circuit designations shall be fastened inside the cover of panelboards. Spare circuits shall be penciled.
- Wiring device plates on devices connected to normal-emergency circuits shall be red in color.
- All conductors in boxes larger than standard outlet boxes, in all wireways, trench headers, etc. shall be grouped logically and be identified.
- Grounding conductors and neutrals shall be labeled in panels, wireways, etc. as to circuits associated with.

Grounding System:

- All equipment and systems shall be grounded. Refer especially to NEC Section 250 Requiring Connections to Building Steel, Foundation, Water Service, and Interior

Piping. Provide transformer pad grounding to be in accordance with utility company standards.

Standby Electrical System

- Provide one 600 KW, 750 KVA at .8 PF standby power rated diesel generator set mounted in perfect alignment on an all welded, fabricated steel sub-base which shall allow for attachment of all necessary engine and generator accessories.
- Generator: 600 KW, 750 KVA, 277/480 volt, 3 phase, 4 wire, 60 Hz, 1800 RPM revolving field type main generator with brushless exciter.
- Voltage regulation +1%.
- Generator Control Panel: To completely control operation of engine generator set. Panel to have automatic start control, AC volt meter, AC ammeter, pointer type frequency meter, volt meter, ammeter and selector switch.

Automatic Transfer Switch: Provide automatic transfer switches for operation on 277/480 volts, 3 phase, 4 wire operation. Unit to be housed in a NEMA 1 enclosure. Entire switch shall be listed under UL 1008.

- Remote Annunciator Panel: A flush mounted panel shall include a visual signal that battery charger is functioning properly and both audible and visual signals. Annunciator shall meet NFPA 110 Standards.
- Generator shall be housed in a weatherproof sound attenuated aluminum enclosure.

Access Panels:

- Provide access panels for access to concealed junction boxes and to other concealed parts of system that require accessibility for operation and maintenance. In general, electrical work shall be laid out so access panels are not required.
- Access panels shall be prime painted and equipped with screwdriver operated cam locks.
- Specific types:
  - Acoustical Tile Ceiling "Milcor Type AT"
  - Plastered Surfaces “Milcor Type K"
  - Masonry Construction "Milcor Type M"
  - Drywall Construction "Milcor Type DW”

Fire Alarm and Detection System: (Voice evacuation required with integral amplifiers, signal circuits and power supplies – no remote booster panels). System design is based on a main FACP serving multiple floors with local mode transponders remotely located, also serving multiple floors. Refer to system riser diagram. System specification is based upon the Notifier NFS640 panel.

- This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Fire Alarm Control Panel (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.
- The fire alarm system shall comply with requirements of latest NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.
- The fire alarm manufacturer shall be of the highest caliber and insist on the highest quality. The system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.
- The FACP and peripheral devices shall be manufactured 100 percent by a single U.S. manufacturer (or division thereof) wherever possible.
- The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and shall be in compliance with the UL listing.

- Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication
- The system supplier shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out, perform all head end panel connections and to ensure the systems integrity.
- FACP shall contain digital amplifiers for proper voice message requirements.

Surge Protective Devices:

- Furnish and install surge protective devices with ratings of 120,000 amperes on the secondary side of the main service overcurrent device and 80,000 amperes on panelboards feeding computer equipment.

Ladder Tray:

- Provide 12" wide aluminum ladder tray with 9" rung spacing with 6" side rail. Ladder tray shall be as manufactured by B-Line. “Ladder Type”. Provide all hangers required.

Lightning Protection System:

- General: Provide all labor, material, equipment, and services required for the complete lightning protection system in accordance with NFPA 780, UL96A and applicable contract drawings for the Building. System shall receive UL Master Label.
- Standards of Quality:
  - All materials shall be the product of a manufacturer regularly engaged in the production of lightning protection equipment.
  - All material shall be manufactured by Heary Bros. Lightning Protection Co, Thompson Lightning Protection, Harger, or East Coast Lightning Equipment.
- Master Label:
  - Submit factory certified tests.
  - Submit guarantee for installation and range of lightning protection.

Public Safety Radio Distribution Antennae System (DAS)

- This specification describes the criteria for deploying an Public Safety Radio Distributed Antenna System (DAS). The DAS components specified in this document include: Bi-Directional Amplifiers (BDA), Donor Antennas, Coverage Antennas, Coax Cable, Coax Connectors, Splitters, Combiners and Couplers. These devices shall be used as part of a system, by the DAS integrator, experienced with designing projects for in-building, public safety, 2-way radio systems.
- The system specified is based upon TX/RX Systems Bird Technologies Group RescueLine Signal Booster and represents the performance standard upon which any equivalent solution shall be based. It shall be the integrator’s responsibility to base the design on the frequency ranges used by and the Fire department. The system provided shall meet IFC 2009 and NFPA 1 2009 codes and shall be designed as such. It shall include a true, integrated battery backup unit which is serially connected to the main BDA system. A remote monitor display panel shall also be included and shall be located in the emergency command center to annunciate all 5 potential conditions of the BDA system. The 5 conditions to be monitored include: Nornal AC Power, Signal Booster Trouble, Loss of Normal AC Power, Failure of Battery Charger, Low Battery Power.
- Frequencies:
  - 2 – Fire Department
  - 2 – Channels Police
  - 1 – For School Department
  - Trinity EMS
  - Lowell Medics

Electronic Scoreboard and Shot Clocks:

- Furnish and install, as hereinafter specified, Fair-Play Electronic Scoreboard, as

Manufactured by Fairtron Corporation and distributed by Hampden Engineering Corporation, East Longmeadow, Massachusetts.

- The scoreboard shall include all equipment as hereinafter specified and shall be Model BB-6620, with metric clock. Provide remote shot clocks.
- The Electrical Subcontractor shall be responsible for structural support including all anchor bolts, hangers, support shall be provided as recommended by scoreboard manufacturer.

Stage Lighting and Dimming System

- Provide all labor, material, equipment and services for a full dimming system for the auditorium including theatrical lighting. System shall include dimming racks, control console, connector strips, emergency transfer cabinet, light fixtures.
- Refer to section describing Theatrical Dimming for Theatrical Dimming Requirements.

D5095 - General Construction Items

Portable or Detachable Parts:

- Retain possession of and be responsible for spare parts, portable and detachable parts, and other removable portions of installation including fuses, keys, locks, blocking clips, inserts, lamps, instructions, drawings, and other devices or materials that are relative to and necessary for proper operation and maintenance of the system until final acceptance, at which time such parts shall be installed or turned over to the Owner, as the case may be.

Safety Precautions:

- Provide proper guards, signage, and other necessary construction required for prevention of accidents and to insure safety of life and property. Remove any temporary safety precautions at completion.

Mounting Heights:

- All electrical equipment shall be mounted at the following heights unless noted or detailed otherwise on drawings. Notes on architectural drawings shall supersede those noted below or detailed on the electrical drawings. If mounting height of an electrical component is questionable, obtain clarification from Architect before installation.
  - Duplex convenience outlets, microphone outlets, and telephone outlets - 18 inches.
  - Light switches, pushbutton stations, HOA switches, and all other toggle or control switches for the operation of heating, ventilating, and air conditioning, plumbing, and general service - 48 inches.
  - Clock outlets - 84 inches.
  - Fire alarm pullstations - 48 inches.
  - Fire alarm audio visual signals - 80 inches or 6 inches below ceiling, whichever is lower.
  - Panelboards for lighting, power, telephone, and other auxiliary systems - 78" to top.
- Mounting heights given are from finished floor to centerline. In the case of a raised floor, surface of raised floor is the finished floor.

Workmanship and Installation Methods:

- Fastenings:
  - Fasten electric work to building structure in accordance with the best industry practice.
- General Raceway Installation:
  - Install the various types of raceways in permitted locations as previously specified. All raceways shall be run concealed. Consult Architect for instruction for raceways which must be exposed in public spaces.

Branch Circuits:

- Provide all branch circuit wiring and outlets for a complete and operating system. The system shall consist of insulated conductors connected to the panelboards and run in raceways or as cable systems if permitted under products section, as required to the final outlet and shall include outlet boxes, supports, fittings, receptacles, plates, fuses, etc.

Fireproofing and Waterproofing:

- Fireproof and waterproof all openings in slabs and walls to maintain the original rating of same.

Cutting and Patching:

- All cutting of surfaces, including core drilling of walls and slabs, shall be done by Electrical Subcontractor. Openings through new wall surfaces will be provided by General Contractor if Electrical Subcontractor gives suitable notice as erection of surface proceeds. If suitable notice is not given, Electrical Subcontractor shall then be responsible for cost of corrective work required.

Elevator Coordination:

- Elevator Electrical Work:
  - Several items pertaining to elevator electrical system shall be provided by Electrical Subcontractor as follows:
    - Power source to elevator machine room including fused disconnect switch and wiring between disconnect switch and controller for each elevator fused disconnect switch (120 volt) for elevator signal system and cab light for each cab light, switch, and GFCI receptacle in each pit and machine room.
    - Control modules from fire alarm system for elevator recall to prevent cab opening on a fire floor.
    - Junction box in machine room for cab telephone and paging system.

Mechanical System Coordination:

- The Mechanical System Subcontractor will be providing various items of mechanical services equipment and control apparatus. In general, Electrical Subcontractor shall connect up power wiring to this equipment. Equipment provided by Mechanical System Subcontractors will include built-in disconnecting means and overcurrent protection unless shown otherwise on drawings. This does not include terminal boxes.

Distribution Equipment Testing:

- All dry type transformers, individual motor starters, switchboard and main distribution panels, motor controls, motor control centers, feeder conductors, and emergency systems shall be tested in accordance with the following. In general, all tests shall be done in accordance with the 1995 Acceptance Testing Specifications of the International Electrical Testing Association.
- Grounding Grids or Electrodes: Measurement of resistance from ground grids or electrodes to earth to determine adequacy of grounding system in building and compliance with specifications and/or electrical code.
- Settings of Adjustable Devices: Using the result of the fault current and coordination study specified hereinafter, the Testing Contractor shall set all adjustable devices.

D60 - COMMUNICATIONS AND SECURITY

D5030 – Communications & Security

Security System:

- Furnish a complete addressable Security and Detection and Alerting system to be connected, tested and left in first-class operating condition.

- The security alarm system shall monitor the integrity of all alarm initiating circuits.
- System Operation:
  - The system shall be completely addressable. System shall be continually supervised by a microprocessor.
  - The system shall be armed, disarmed, reset, monitored and altered by the use of the remote multiplexed type alpha numeric keypads. The system shall be capable of arming or disarming by zone/partition.
  - Actuation of any device shall cause the following to occur.
    - Activate telephone dialer, seize the protected premises telephone line and automatically report the alarm to a remote location.
    - Indicate the alarm condition at the remote keypad.
    - Record device alarm on the access control computer and activate the sound system for alarm tones over the entire PA System.
    - Call up the closed circuit camera in the area and record at 30 frames per second.
- Provide equipment of Detection Systems, Inc. or equal.

Closed Circuit Television (CCTV) (Proprietary Avigilon):

- Provide a complete UL Listed CCTV system as shown on drawings and herein specified. All system components shall be from a single manufacturer.
- Cameras: Camera installations shall be securely attached to mounting surface.
- The Closed Circuit TV System shall consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end MDF room and will be rack mounted. The system will be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders NVR's will record all cameras and store information for 45 days at 30 images per second (virtual real time). The CCTV VMS will be an expansion of the city Standard which is Avigilon.
- The location of the cameras is generally on exterior building perimeter. The exterior cameras are multi-sensor type on the corners and single sensor fixed at access control entry points.
- Cameras shall be solid state and have automatic iris control and shall be for interior or exterior use under normal and low light conditions of illumination and shall be provided with a weatherproof or tamper-proof housing as specified.
- Weatherproof-tamper proof housing for fixed cameras shall be constructed of aluminum and finished with a weatherproof, heat reflecting paint. Housing shall be internally insulated. Hinged cover shall be secured in place with tamper proof bolts.
- Interface system with card access, intrusion and intercom systems. Activation of system alarms shall call up the appropriate camera. Activation of a door intercom station shall also call up the appropriate camera.
- Avigilon software is equipped with video analytics.

Intrusion System

- GENERAL
  a. Section Includes:
     1) Video security communication system. Basis of specification is the Aiphone IX Series IP Security Intercom.
     2) Acceptable manufacturers:

a) Aiphone IX Series
b) Zenitel
c) Or equal

b. References
1) American National Standards Institute (ANSI): ANSI/TIA/EIA 568 - Commercial Building Telecommunications Cabling Standard.
2) International Organization for Standards (ISO): ISO 9001:2000 - Quality Management Systems - Requirements.

c. SYSTEM DESCRIPTION
1) IP Network Compatible Video Intercom System: A network-based communication and security system featuring video entry security, internal communication, emergency stations, and paging. All units and app in the systems shall be able to unlock doors remotely on a network, assist onsite visitors from an offsite location, broadcast emergency announcements, and communicate using a PoE network.
a) Power Source: Power over Ethernet (802.3af).
b) Network Interface: 10 BASE-T / 100 BASE-TX Ethernet (RJ-45).
c) Network Protocols: IPv4, IPv6, TCP, UDP, SIP, HTTP, HTTPS, MJPEG, RTSP, RTP, RTCP, IGMP, MLD, SMTP, DHCP, NTP, DNS.
d) Bandwidth Usage:
- G.711: 64Kbps x 2 per video call.
- 64Kbps per monitor.
- H.264: 24Kbps ~ 2,048Kbps.
e) Communication: Hands-free (VOX), push-to-talk (simplex), or handset (full-duplex).
f) Video Display: 3-1/2 inches (89 mm) color LCD.
g) Camera: Type:
- 1/4 inch (6 mm) color CMOS.
- View Area: 2 feet 2 inches (660 mm) vertical x 3 feet 1 inch (940 mm) horizontal at 20 inches (508 mm).
h) Video Stream: ONVIF Profile S.
i) Door Release: Programmable Form C dry contact, 24V AC/ DC, 500mA - use EL-12S (use RY-24L for larger contact rating, which requires 24V DC power supply) or use RY-IP44 with 4 multipurpose relays.
j) Wire Type: CAT-5e or CAT-6.
k) Distance:
- Door Station or RA Station to Network Node: 330 feet (100 meters).
- Master Station to Network Node: 330 feet (100 meters).

d. SUBMITTALS
1) Submit under provisions of Section 01 33 00 – Submittal Procedures.
2) Product Data: Manufacturer's data sheets on each product to be used, including:
a) Preparation instructions and recommendations.
b) Storage and handling requirements and recommendations.
c) Installation methods.
3) Shop Drawings: Submit the following:
a) Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
b) Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
4) Installation and Operation Manuals:

5) Submit manufacturer's installation and operation manual, including operation instructions and component wiring diagrams.
6) Provide detailed information required for Owner to properly operate equipment.

e. Warranty: Submit manufacturer's standard warranty.
f. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
g. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

IESS Integration

- Interface and Integration between Access Control, CCTV, Intrusion Alarm, Public Address, and Telephone System.
  a. Access Control System Keypads, Readers, etc. shall provide ability to Arm and Disarm the entire Intrusion Alarm System or specific zones.
  b. Access Control System Keypads, Readers, etc. shall provide ability to Arm and Disarm any individual areas in the Intrusion Alarm System.
  c. Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc.) shall be graphically displayed on the Access Controls System's browser based Graphical Designer software for display on associated PC Workstation.
  d. Arm, Disarm & Alarm status condition of the Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc..), shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
  e. When Intrusion Alarm System devices (i.e. motion sensors, door contacts, glass break detectors, etc.) are in alarm, provide ability to turn-on or go to full motion video, the CCTV Camera Recorder in associated area.
  f. Activate alarm siren signal over Public Address speakers when Intrusion Alarm System is in alarm by providing line level output for Public Address System.
  g. When Access Control System Keypads, Readers, etc. are used, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
  h. When door release is detected on entry or exit, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
  i. CCTV Camera devices and locations shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
  j. When exterior door intercom station is activated, provide ability to turn-on or go to full motion video, the associated CCTV Camera Recorder.
  k. Access Control System Keypads, Readers, Door Lock, etc.. locations shall be graphically displayed on the Access Controls System's built-in Graphical Designer software for display on associated PC Workstation.
  l. Special Entry: If a person needs a one-time entry to the facility for a particular time and day, a Access Control Keypad entry code number can be given to that person that will only work for the specific time frame; in addition, the code can automatically disarm associated intrusion alarm zone or zones in the system.
  m. Emergency Codes can be used via Access Control System Keypad Entry, with capabilities to automatically notify authorities of a emergency situation, a hostage type entry, etc.

n. Photo ID Bagging Capabilities Built-in to Access Control System, allowing owners the capability to develop their own Photo ID Badges.
o. Access Control Systems can interface with LAN's & WAN's to provide seamlessly integrated solutions when additional facilities add access control solutions.
p. When Exterior Door Intercom Stations are properly interfaced to the Telephone System Display Telephones for unique call-in ID and two-way communications, and the telephone system provides output closures (one for each controlled door) when “door release codes” are entered via the telephone’s keypad, provide ability to interface these door release code closures to Access Control System for release of each associated door.
q. The CCTV system shall provide “Recording-on-Motion” feature for every camera in the CCTV System. Only recording when the system detects motion in the view of each camera.
r. Provide interface port for interfacing to Fire Alarm System.
s. Provide interface port for interfacing to Elevator Door Access.

Other:

- Electrical Contractor will provide Integrated Security System and Technology System provisions including outlet boxes, empty raceways, 120 volt power, cable trays, and grounding.
- Provide alarm connection to the security system connected to the doors at the AED cabinets.
- Provide duress buttons at least in SRO office, DARE office, and one in each admin suite.

Card Access:

- Furnish and install a complete access control system as specified herein and shown on the drawings. The system shall include a head end computer with 17” monitor, keyboard, mouse and printer. Furnish and install access door controllers with 4 hour battery backup.
- Controller: Unit shall be able to accept 16 doors complete with card reader request to exit and door position switch. Controllers shall provide 400 event buffer.
- Card Readers: Furnish and install proximity readers as shown on drawings. Devices shall have a 6” – 10” read range. Devices shall be flush mounted.
- Cards: Provide 250 proximity cards. Cards shall be the size of a standard credit card in both thickness and dimension.
- Interface the access control system with the closed circuit TV system for alarm call up and allow for CCTV images to be viewed from the access control computer. Interface system with the intrusion alarm system to annunciate alarms (by device) on the access control computer. All intrusion alarms shall be recorded on the access computer and printed on system printer.

Closed Circuit Television (CCTV) and Card Access Provisions:

- Electrical Contractor will provide Closed Circuit Televisions (CCTV) and Card Access Provisions including outlet boxes, empty raceways, 120 volt power, cable trays and grounding.
- Proprietary Avigilon existing system to be expanded.

Telephone/Data Systems

- Telephone system instruments and interconnecting wiring will be provided by the ITS Contractor. Data system outlets and interconnecting wiring will be provided by the ITS Contractor.
- For each telephone outlet or data outlet indicated on the drawings, provide a 4” square flush outlet box. In insulated partitions, provide a 1" raceway stubup terminating with bushing to above nearest accessible hung ceiling.

Fiber Innerduct:

- DESCRIPTION: From the MDF to IDF, segments of optical fiber innerduct shall be installed.
    - Quantities Required: Innerduct runs do not have to be continuous throughout, breaks are expected at the pull boxes. Contractor is responsible for determination of actual lengths of innerduct required. Enough innerduct shall be provided and installed to extend from the fiber service loop in the MDF to the fiber service loop in each IDF. If the route passes through a pull box, the segments of innerduct shall extend twelve inches into the pull box. If the route passes through an enroute HC, each segment of innerduct shall extend at least twelve inches beyond the end of the service conduit.

Fiber Distribution:

- DESCRIPTION: From the MDF to each IDF a continuous segment of fiber cable shall be provided.
    - Product: 12 strands multi-mode 50/125 UM and 6 strands single-mode 8.3/125 UM.
    - Quantities Required: The contractor is responsible for determination of actual segment lengths.

Work Station Cable:

- DESCRIPTION: From each MDF or IDF, 4-pair enhanced Category 6 cables shall be routed to each work station (data outlets). Category 6A shall be provided for wireless access points.

Intermediate Distribution Facilities:

- DESCRIPTION: Products and Quantities:
    - Equipment Rack: Panduit CMR19x84, 19 X 84", floor-mounted.
    - Fiber Interconnect: Panduit FRME2, 12 Port Rack Mount Fiber Patch Panel.
    - Modular Patch Panels: Panduit DP48688TG, 48-port Category 6 Patch Panel. One (1) Port for each workstation served from the MC with a minimum of 12 spare ports are required. If the number of workstation cables, plus required spare count (12) is greater than 48, then a second 48 port patch panel is required.
    - Manufacturers: Hubbell, Ostronics, Panduit or equal.

Testing and Documentation:

- TESTING: Contractor shall test each fiber strand and each pair of each twisted-pair copper cable. The Owner reserves the right to have a representative present during all or a portion of the testing process. If the Owner elects to be present during testing, test results will only be acceptable when conducted in the presence of the Owner.
- DOCUMENTATION: Contractor shall provide documentation to include test results and as-built drawings.
    - Fiber Test Results: The results of the fiber testing shall be entered into the attached form "10 Fiber Attenuation Test Results". Hand written results are acceptable provided the text is neat and legible. Copies of test results are not acceptable. Only original signed copies will be acceptable.
    - Work Station Cable: The results of the work station cable tests shall be provided in the form of print-outs from the test equipment.

Integrated Sound, Public Address, & Wireless Master Clock System:

- General: Provide all equipment, accessories, and materials in accordance with these specifications and related documents to provide a complete and operating Integrated, Sound, Intercom and Master Clock System. General paging shall include IP speakers in corridors. Paging in all rooms shall be done through phone system.
- System Description: This Section includes requirements for programmable Integrated and Video System components including, but not limited to, the following:
    - Integrated Communications System Computer and Software.
    - Telephone System Integration Requirements.

- Controls, Amplifiers, and Terminal Equipment.
- Power Supplies: Battery Backup for System Programming.
- Accessories: Wireless Master and Secondary Clock Systems

ELEMENT E - EQUIPMENT AND FURNISHINGS

E10 EQUIPMENT

E1030 Commercial Equipment

E1030.80 Foodservice Equipment

Functional Requirements: Equipment shall be of the latest design; new and unused, unless indicated otherwise in the Item Specifications, complete with all standard parts for normal operations and including such accessories or materials as may be required to comply with these Specifications.

Performance Requirements:

- Electric equipment and accessories shall conform to the standards of the National Electric Manufacturers Association (NEMA), Underwriters Laboratories, Inc. (UL) or Electrical Testing Station (ETS).
- Steam generating equipment and accessories shall conform to the standards of the American Society of Mechanical Engineers (ASME).
- Energy Star - Specified Energy Star rated equipment and appliances shall serve as the standard for all types of equipment and appliances whenever possible.

Design Requirements:

- Work shall be in accordance with the governing health, building and safety, and fire protection codes and regulations.
- Standards of the National Sanitation Foundation (NSF) shall serve as guidelines for the work of this Section.

Refrigeration:

- Fabricated walk-in rooms
- Refrigerated display cases
- Commercial refrigerators
- Mobile milk coolers

Freezers:

- Fabricated walk-in rooms
- Commercial freezers

Food Storage Shelving:

- Stainless steel wire
- Open grid polymer mats on enamel steel wire supports
- Aluminum dunnage racks

Work Tables and Preparation:

- Stainless steel tables and sinks
- Food slicer
- Food processor

Cooking Equipment:

- Range
- Ovens
- Tilt kettles with floor troughs
- Steamers
- Exhaust hood with Utility distribution system

Serving Equipment:

- Drop-in mechanical cold-pans
- Drop-in hot wells

- Food shields
- Stainless steel counters
- Hot holding cabinets

Sinks:

- Hand washing sinks
- Three compartment wash sink
- Mop sink

Miscellaneous:

- Trash bins
- Mobile carts
- Condiment counters

E1040 Institutional Equipment

E1040.10 Educational and Scientific Equipment

- Laboratory fume hoods, 2 sided demonstration type fume hoods.
- Kilns.

E1060 Residential Equipment

E1060.10 Residential Appliances

- Cooking appliances.
- Kitchen exhaust ventilation.
- Refrigeration appliances.
- Cleaning appliances.

E1070 Entertainment and Recreational Equipment

E1070.10 Theater and Stage Equipment

- Rigging systems and controls.
- Stage curtains.

E1070.50 Athletic Equipment

Gymnasium Equipment:

- Basketball equipment.
- Volleyball equipment.
- Protective wall and corner padding.

Gymnasium Dividers.

Interior Electronic Scoreboard And Shot Clocks:

- Fair-Play Electronic Scoreboard, 4 sided with metric clock, by Fairtron Corporation and distributed by Hampden Engineering Corporation or equal. Provide two remote shot clocks per scoreboard.

E20 FURNISHINGS

E2010 Fixed Furnishings

E2010.20 Window Treatments

- Curtains and drapes.
- Roller window shades, Mecho solid, color: charcoal grey, manual and motorized.

E2010.30 Casework

- Manufactured wood-veneer-faced casework.

E2010.70 Fixed Multiple Seating

- Fixed audience seating.
- Telescoping stands at gym.
- Telescoping chair platforms at stage and chorus.

ELEMENT F - SPECIAL CONSTRUCTION AND DEMOLITION

F10 SPECIAL CONSTRUCTION

F1030 Special Function Construction

F1030.10 Sound And Vibration Control

F1030.30 Seismic Control

F20 FACILITY REMEDIATION

F2010 Hazardous Materials Remediation

F2010.10 Transportation and Disposal of Hazardous Materials

F2010.20 Asbestos Remediation

- Asbestos abatement

F2010.30 Lead Remediation

- Lead-based paint remediation

F2010.40 Polychlorinate Biphenyl Remediation

- Handling of lighting ballasts and lamps
- Removal and disposal of polychlorinate

F30 DEMOLITION

F3030 Selective Demolition

F3030.30 Selective Interior Demolition

F3030.70 Selective Historic Demolition

ELEMENT G - SITEWORK

G10 SITE PREPARATION

G1010 Site Clearing

- Protecting existing trees and vegetation to remain, including temporary fencing for trees in close proximity to construction operations;
- Removing existing trees and vegetation indicated to be removed;
- Clearing and grubbing;
- Stripping and stockpiling topsoil;
- Removing above and below grade site improvements; and
- Disconnecting and capping (sealing) of utilities as required.

G1037 - Erosion Control

- Control measures to prevent all erosion, siltation, and sedimentation of wetlands, waterways, construction areas, adjacent areas, and offsite areas.
- Control measures shall be accomplished at all areas subject to erosion adjacent to or in the following work areas:
  - Soil stockpiles and onsite storage and staging areas.
  - Cut and fill slopes and other stripped and graded areas.
  - Constructed and existing swales and ditches.
  - Existing and proposed drain inlets, including catch basins, area drains, and trench drains.
  - At the edge of the project area/limit of work.
- Additional means of protection shall be provided by the Contractor as required for

continued or unforeseen erosion problems, at no additional cost to the Owner. The Contract Drawings indicate the minimum requirements for erosion and sedimentation control. The Contractor shall install all measures needed to control sediment and erosion as required by the Contractor's and Subcontractor's construction methods and operations, the weather conditions, and as directed by the Engineer.

- Periodic maintenance of all erosion and sediment control measures shall be provided to ensure intended purpose is accomplished. Erosion and sedimentation control measures shall be in working condition at the end of each day.
- After any significant rainfall (0.25 inches), erosion and sediment control measures shall be inspected for integrity. Any damaged measures shall be corrected immediately.
- Removal of all erosion and sediment control measures after the completion of work and the establishment of lawns and plantings.

G20 SITE IMPROVEMENTS

G2020 Parking Lots

- Vertical Granite Curb (VGC): type VA-4, light gray color, free from seams and other structural imperfections, min. length shall be 6' unless otherwise specified on plan.
- Radial Curb: Type VA4 shall be used on all curves with a radius of 100' or less, where vertical granite curb is indicated.
- Vertical to Flush Transition Curb: Furnish vertical to flush transition curbs of same material as adjacent curb where shown on the drawings, to taper the reveal of the reveal of the curb from 6 inches to 0 inches. Transition curb along a curve shall be of the same radius. The curb shall be manufactured for the purpose intended at the plant and shall not be field cut.
- Sloped Granite Edge (SGE): Sloped granite edging, Type SB as described in Section M9.04.2 of the MassDOT SSHB. Where shown on plan.
- Bituminous Concrete Paving: 12 inch compacted processed gravel , min. 2-1/2 inch binder course, 1-½ inch top course type i-1
- Pavement Markings: Reflectorized traffic paint. 2 component epoxy adhesive at non-pedestrian areas. Acrylic traffic paint at handicapped markings and drop off zones. Paint shall be applied with mechanical equipment to produce uniform straight edges, in two coats, at manufacturer's recommended rates.
- Concrete Vehicular Paving: medium broom finish 6" depth w/ reinforced welded wire mesh, 12" compacted processed gravel, type B.
- Regulatory Parking Signs, reflectorized aluminum, galvanized steel sq. post.

G2030 Pedestrian Plazas and Walkways

- Bituminous Concrete Pedestrian Paving: 8" compacted gravel borrow, min. 1 1/2" binder course, 1" top course type i-1.
- Concrete Pedestrian Paving: medium broom finish 4" depth w/ reinforced welded wire mesh 8" compacted gravel borrow. Tooled isolation joints maximum 30' O.C., control joints maximum 10' O.C.
- Exposed Aggregate concrete Paving: 4" depth/ w reinforces welded wire mesh 8" compacted gravel borrow. Sawn isolation joints maximum 20' O.C. Sawn control joints maximum of 10 O.C.
- Bonded aggregate: 3" deep aggregate with polymer sealant. 1" washed sand setting bed over 4" compacted gravel.
- Granite inlays 12" wide by 2" thick Woodbury gray color with sawn sides and thermal finish top. 4" 4000 psi concrete base with sand setting bed.
- Accessible Curb Ramps: Wheelchair Ramps shall be provided at all pedestrian crossings in compliance with the Americans with Disabilities Act (ADA). Ramps and landings shall be 4-inch concrete, air-entrained, 4,000 psi at 28 days. Ramps and landings shall be a minimum of 4-feet and transition slopes shall be a maximum of 12:1 and include ADA compliant granite detectable warnings with truncated domes.

- Reinforced concrete stairs and ramps with associated fabricated metal handrails and guardrails conforming to MAAB/ ADA regulations. Provide full-depth, precast concrete stair treads where shown on plans. Stainless steel handrails for exterior stairs and ramps shall be specified under Misc. Metals.

G2040 Unit Pavements

- Concrete Unit Pavers: 4x8x3 ¼" concrete unit paver 8000 PSI min., on 8 inch reinforced concrete base with 1" sand setting bed with weep holes.
- Granite Cobble Unit Pavers: 9x5x4 granite cobble paver on stone dust setting bed with stabilized stone dust joints on a 8" inch reinforced concrete base and sand-gravel subbase and weep holes.
- Pervious concrete unit pavers: 4x8x3 ¼" interlocking concrete unit paver 8000 PSI min., On 1 ½" permeable setting bed and 12" gradated aggregate base with geotextile and permeable join openings. Restrained by 12"x6" flush granite curb.

G2060 Site Development

- Flagpole: Two 35' and two 25' high fiberglass flagpole with internal halyards.
- 6" dia. concrete filled steel bollards with welded cap reflective bands at service area specified under misc. metals.
- Ornamental 30" high stainless steel 6" dia bollards with structural steel core and LED light top. Basis for design forms and surfaces.
- Cast-in-place Concrete Retaining/20" high seat walls with sand blast finish and integral color. Walls shall have s.s. skate stops installed at regular intervals. Walls shall IPE slat benches mounted to top of wall with S.S. Strap. See plan for locations.
- Granite landscape curb, 18"x 6" with thermal top, sides and sawn bottom. Color woodbury gray mounted on a 4,000 psi concrete foundation.
- Stainless steel hand rail and ADA ramp rail with integral led light
- Stainless Steel Pedestrian Guardrail: 42" height with vertical pickets 4" o.c. and continuous top rail. Stainless steel guardrails for exterior conditions shall be specified under Misc. Metals.
- Chain link Fence & Gates: Schedule 40 galvanized pipe, hot dipped per ASTM standards, black vinyl coated, thermally fused.
- Steel Mesh Wire Fence, single and double Gate: Basis of Design is Omega Fence Elite with heavy duty brackets. Powder coated color by architect.
- Ornamental Aluminum fence panels with laser cut patterning. 6' high mounted to 2"x2" s.s. posts powder coated and painted.
- Vegetated Screen: Welded wire pant support system. Panels shall be rigid, three dimensional welded wire grid fabricated of 14 gage galvanized steel wire. Basis for design: Greenscreen freestanding and wall mounted Modular Panel.
- Drinking Fountains with Bottle Filling Station for exterior use: Steel outdoor drinking fountains/bottle filling stations. Securely attached to concrete pad. Basis of Design Halsey Taylor Endura 2.
- Backless Bench: 6' FSC certified IPE wood slat bench, surface mounted. Basis of Design: Forms + Surfaces Hudson Bench.
- Modular Bench: 2',4',6', angled benches with aluminum powdercoated frame and FSC Jatoba Hardwood Slates. Basis for design: Forms + Surfaces vector Seating System.
- Backed Bench: 6' Backed bench with cast aluminum frames with powder coat finish, surface mounted. Basis of Design: Forms + Surfaces Balance Bench.
- Pre-cast concrete custom bench with 2 sided IPE seat topper with integral light.
- Table: Round 45" diameter table with 29" height and cast aluminum base attached to cast aluminum support tube. Support tube bolted to cast aluminum frame supporting a steel sheet top. Polyester powerdercoat finish. Freestanding mount. Basis of Design: Landscape Forms Chipman Table.
- Chair: Frame formed of aluminum castings welded together. Polyester powdercoat

finish, armless. Basis of Design: Landscape Forms Chipman Chair.
- Trash & Recycling Container: Triple-unit with sheet steel body and cast iron base. Body and doors all perforated with polyester powderdercoat finish. Basis of Design: Landscape Forms Select Recycling System.
- Bicycle Rack: Cast aluminum frame with cast aluminum cover plate and polyester powdercoat finish. Embedded mount. Basis of Design: Landscape Forms Emerson Bike Rack.
- Bicycle Shelter: Cantilevered structural steel framework with extruded aluminum cladding and wood slat LED soffit. Basis of Design: LMG (Lucid Mgmt Group) Woodlands T-Series – Bike Shelter.
- Ornamental Trench Drain: 5"x20" Cast Iron with baked on oil finish with associated frame and NDS drain channel. Basis for Design Iron age Interlaken trench drain.
- Tree Grate: 4'x6' heel proof cast iron tree grate with frame. Basis for Design Iron Age Interlaken Tree grate.
- Entry Sign: Cast-in-place concrete sign wall, 3' height, with 1" wood panel inset flush (IPE) and ¼" brushed aluminum letters set in flush.

G2070 Green Roof
- Wood Deck planters: Square, commercial grade IPE wood planters: Basis for design: Bison Ipe wood Cube
- Aluminum Deck Planters: Rectangular, Commercial Grade Aluminum Planters with powder coated finish. Basis for Design Bison, Powder coat aluminum planter.
- Wood Deck Tiles: 2'x2' and 2'x4' FSC IPE wood tiles. Basis for design Bison IPE wood tile.
- Roof Top Paver: 2'x2' concrete roof top paver. Basis for design Unilock, Umbriano paver.
- Pedestal System: Industrial grade pedestal deck supports. Basis for design: Bison Versadjust Pedestals
- Vegetated Roof Modules: 1′ x 2′ x 3-1/4″ (soil height appx. 6″) black 100% recycled polypropylene (avg. 10% post-consumer, 90% post-industrial) 100 mil. thick walls. Vegetated panels. Basis for Design: Live Roof Deep vegetated module.

G2090 Landscaping
- Topsoil at general lawn areas: fertile, friable, natural, loam, amend existing topsoil to meet organic and ph requirements. 6 inch depth min.
- Topsoil at planting beds: fertile, friable, natural, loam, amend existing topsoil to meet organic and ph requirements. 12 inch depth min.
- Sand-based structural soil under pavements within tree root-zones. Planting mix of 1/3 loam, 1/3 sand and 1/3 compost.
- Bioretention soil media within bioretention areas shall comply with DEQ guidelines. Apply biofilter soil media from a qualified vendor in 12" lifts to the desired elevation of the bioretention.
- Planting mix for raised planters: Soil-less organic potting mix. Basis for design: Live Earth Engineered Green Roof Soil.
- General Seeded Lawns: Premium quality 50-30-20 Kentucky Blue Grass/Fescue/Perennial Rye. Maintenance period 3 growing seasons to final acceptance of general seeded lawns. Maintenance includes fertilizer, mowing, watering, weed control, aeration, reseeding, regrading.
- Erosion Control Mats on all slopes 3:1 or greater.
- Deciduous Trees: Standard nursery stock, 21/2"-3" Cal min1 year warranty. Tree guying, tree water bags.
- Evergreen Trees: 7'-8' mon height, Standard nursery stock, 1 year warranty
- Deciduous & Evergreen Shrubs: #3 min container size, standard nursery stock, 1 year warranty

- Ground Cover: #1 min container size, Standard nursery stock, container grown, 1 year warranty

G2110 Synthetic Turf

- Provide equipment and materials, and do work necessary to construct the filled synthetic turf grass surfacing, with impermeable base, and drainage structures.
- Work shall include but shall not be limited to:
  - Subgrade preparation, crushed stone base, finishing stone, impervious geotextile fabric and required drainage structures similar to Permavoid or approved equivalent.
  - Synthetic turf surface, with alternative infill such as Envirofill or approved equivalent.
  - Synthetic Turf Carpet: A synthetic turf carpet consisting of nominal 1-1/2" woven nylon turf with min. 75oz. total weight with a 15 year warranty.
  - Synthetic Turf Cast-In-Place Concrete Anchor Curb.
  - Underground detention/retentions drainage system similar to Permavoid or approved equal.
  - Impervious Geotextile Fabric.

G30 LIQUID AND GAS SITE UTILITIES

G3010 Water Utilities

Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

- Installation of ductile iron pipe, fittings, accessories, and appurtenant work, at the locations and to the lines and grades indicated on the Contract Drawings.
- The installation of hydrants, gate valves and boxes, and concrete thrust blocks; and
- Furnishing and installation of all materials required to connect to existing water mains, replace existing services, new gate valves, tapping sleeves, removal of existing gate valves, corporation cocks, saddles, curb stops, service boxes, and abandoning of the existing water system (if applicable), all as shown on the Contract Drawings. All abandoned pipes shall be plugged and capped with concrete.

Ductile Iron Pipe and Fittings for Water Distribution

- All ductile iron water pipe shall conform to American Water Works Association (AWWA) C150 and AWWA C151. Water distributions systems shall be Class 52 ductile iron pipe with push-on or mechanical joints with gaskets conforming to AWWA C111. Ductile iron water pipe shall be double cement lined inside and asphalt seal coated in accordance with AWWA C104. The pipe shall be furnished with necessary materials and equipment recommended by the manufacturer for use in joining pipe lengths and fittings conforming to ANSI Specifications.

Resilient Wedge Gate Valves

- Resilient wedge gate valves shall be iron body, resilient seated type. The valves shall be designed for 250 psi working pressure and 400 psi test pressure. Valves are to have O-ring seals and a non-rising stem. Valves shall have a 2-inch operating nut. Resilient gate valves shall meet the most recent version of the AWWA standard specification AWWA C509. Resilient wedge valves shall have mechanical joint ends. Valve boxes shall be cast iron, asphalt coated, sliding, heavy pattern type, consisting of three (3) pieces; a flanged bottom piece, a flanged top piece, and a cover with two (2) lifting holes and the word "water" cast on the top. A minimum 6-inch overlap is required between sliding sections. The valve box shall be designed and constructed to prevent direct transmission of traffic loads to the pipe or valve. The inside diameter of boxes shall be at least 4 1/2-inches and lengths shall be as necessary to suit ground elevation. The top of the cover shall be flush with the top of the box rim. Box covers shall be round frame and cover.

Hydrants

- Fire hydrants shall have 6-inch mechanical joint inlet connections to the main, two 2 ½-inch hose connections, 180-degrees apart, and one 4 ½-inch steamer connection with valve openings 5 ¼-inches in diameter minimum in the valve seat. The standpipe shall have an 8 ½-inch minimum diameter. Hydrants shall have mechanical joint shoes, 5-feet 6-inches bury, 5 ¼-inch valve, and conform to the most recent revision of AWWA Specification C-502. Hydrants shall be thoroughly cleaned and given two shop or field coats of paint in accordance with AWWA C502. Hydrants shall be installed in conformance to AWWA C600 Section 11 using thrust blocks and restrained joints.

Disinfection of Water Mains and Appurtenances

- All pipelines shall be disinfected, after testing and prior to being placed into service, in accordance with the AWWA Standard C651.

Hydrostatic Tests

- After the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of water supply lines or water service piping shall, unless otherwise specified, be subject for 2 hours to a hydrostatic pressure test of 200 psi as specified in AWWA Standards.

G3020 Sanitary Sewerage Utilities

Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

- Sanitary sewage system piping, structures and appurtenances from a point ten (10) feet outside the building to the point of disposal.

Polyvinyl Chloride (PVC) Gravity Sewer Pipe

- Sanitary sewage pipe shall be type PSM, SDR-35 PVC pipe conforming to the requirements of American Society for Testing and Materials (ASTM) D3034, current edition. Joints shall be elastomeric, oil resistant gasket joints conforming to the requirements of ASTM D3212, current edition, push-on type. Tee branches, wyes, and fittings shall be type PSM SDR-35 PVC pipe, conforming to ASTM D3034, current edition.

Cleanouts

- Cleanouts shall be cast iron with a heavy-duty brass top. Cleanout frame and cover shall be set in concrete 12 by 12 by 6-inches deep, except where location is in bituminous paving. Set top of cleanout 1-inch above surrounding earth grade or flush with grade when installed in paving.

Tap Connections

- Branch connections to existing pipes shall be made by installing a saddle or wye connection.

Sanitary Sewer Manholes

- Precast reinforced concrete manhole structures shall comply with material, design, and construction standards specified under ASTM C478. Manholes shall be 4-foot diameter. Manhole tops shall be precast concrete designed to meet American Association of Standard Highway and Transportation Officials (AASHTO) H20 loadings. Frames and covers shall be of cast iron conforming to the requirements of ASTM A48, Class No. 30. Cement for manholes shall be Type II and concrete shall have a minimum strength of 5,000 psi. Joints between sections of concrete structures shall be sealed with a self-sealing butyl rubber based flexible joint sealant gasket complying with ASTM C443. Manhole Steps and reinforcing rods shall conform to ASTM A615. Manhole frames shall be adjusted to finish course with brick masonry.

G3030 Storm Drainage Utilities

Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

- Corrugated polyethylene pipe;
- Drainage catch basins and manholes;

- Underground detention/recharge systems;
- Water quality structures;
- Area drains;
- Bioretention basins; and
- Rainwater reuse storage tank.

Corrugated Polyethylene Pipe

- Stormwater collected by area drains, catch basins, and on rooftops shall be conveyed through a closed drainage system using corrugated polyethylene pipe (CPP). The CPP pipe shall be sized utilizing accepted engineering practices for closed drainage systems. CPP pipe shall conform to AASHTO M-294, AASHTO M242, or AASHTO MP6, Type S depending upon the diameter of the pipe.

Storm Drain Manholes

- Precast reinforced concrete manhole structures shall comply with material, design, and construction standards specified under ASTM C478. Manholes shall be 4-foot diameter. Manhole tops shall be precast concrete designed to meet H20 loadings. Frames and covers shall be of cast iron conforming to the requirements of ASTM A48, Class No. 30. Cement for manholes shall be Type II and concrete shall have a minimum strength of 4,000 psi. Joints between sections of concrete structures shall be sealed with a self-sealing butyl rubber based flexible joint sealant gasket complying with ASTM C443. Manhole Steps and reinforcing rods shall conform to ASTM A615. Manhole frames shall be adjusted to finish course with brick masonry.

Catch Basins

- Precast reinforced concrete catch basins shall comply with material, design, and construction standards specified under ASTM C478. Frames and grates shall be of 4-flange cast iron. Catch basins shall have removable hoods and a minimum 4-foot deep sump.

Corrugated Polyethylene Pipe for Underground Detention/Recharge Systems

- Corrugated polyethylene pipe (CPP) shall conform to AASHTO M-294, AASHTO M242, or AASHTO MP6, Type S depending upon the diameter of the pipe. CPP pipe shall have an interior surface that is smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. Pipe and pipe fittings shall be high-density polyethylene meeting the requirements of ASTM D3350. Pipe shall be installed with a minimum 12-inch cover for AASHTO H-20 loading. For recharge systems pipe shall be perforated per the manufacturer's standard perforation pattern.

Underground Detention/Recharge Systems

- Underground detention/recharge systems shall be composed of solid (for detention) or perforated (for recharge) Corrugated Polyethylene Pipe (CPP) set in 1-1/2-inch crushed stone (double washed for recharge) complying with MaDOT M2.01.1. The pipe shall be placed within the crushed stone so that it is a minimum of 6 inches above the suitable base and has a minimum 6 inches of cover. The top and sides of the crushed stone shall be wrapped in geotextile fabric with a 12-inch overlap. The crushed stone shall be covered with 6 inches of gravel borrow (MaDOT M1.03.0 Type A), ordinary borrow (MaDOT M1.01.0), and either 12 inches of gravel subbase (MaDOT M1.03.0 Type B) beneath paved surfaces or 4 inches of loam (MaDOT M1.07.0) beneath pervious surfaces. Access manholes shall be provided at the four corners of the basin and inspection ports shall be provided for each pipe run.

Water Quality Structures

- The water quality structure shall have a proven record of having the capability to remove a minimum of 80% of the sediment load from the low-flow storm conditions from the total catchment area of the drainage system. The structure must be capable of removing the silt and clay-sized particles. The water quality structure shall be installed underground as part of the stormwater system and be designed to accept AASHTO H-20 loading. The water quality structure shall be equipped with a high flow bypass and without backwater conditions so as to prevent resuspension of material.

The structure shall be maintainable from the surface.

Area Drains

- Area drains required for this contract shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The pipe bell spigot shall be joined to the main body of the area drain. A PVC cap shall be installed at the bottom of the area drain sump. The pipe stock used to manufacture the main body and pipe stubs of the surface drainage inlets shall meet the mechanical property requirements for fabricated fittings as described by ASTM D3034, Standard for Sewer PVC Pipe and Fittings: ASTM F1336, Standard for PVC Gasketed Sewer Fittings. The grates furnished for all area drains shall be ductile iron grates and shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for area drains shall be capable of supporting H-25-wheel loading for heavy-duty traffic or H-10 loading for pedestrian traffic. Metal used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron. Grates shall be provided painted black. Grates in walkways shall meet ADA requirements. Grates in planting beds shall be domed grates.

Bioretention Basins

- Bioretention basins shall be planted depressions underlain with well-drained planting soils and a stone underdrain system. The surface depression is sized to contain the water quality volume for the runoff directed to the basins. The following materials are used in a bioretention basin:
  - Planting Soil – The depth of the planting soil shall be 24” to 48” and be placed over the sand filter layer. The planting soil shall be a mixture of sand, compost, and topsoil to the following proportions by volume: 40% Sand, 20-30% topsoil, and 30-40% compost. The infiltration rate of the planting soil layer within the bioretention areas after installation shall be between 4 in/hr and 10 in/hr. The planting soil shall be a uniform mix, free of plant residue, stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the bioretention area that may be harmful to plant growth or prove a hindrance to the planting or maintenance operations.
  - Course Sand – The depth of the sand filter layer shall be 12-inches and placed over the pea gravel layer. The infiltration rate of the sand filter layer within the bioretention areas after installation shall be 8 in/hr or greater. The sand filter layer shall consist of clean inert, hard, durable grains of quartz or other hard durable rock, free from clay, organics, surface coatings or other deleterious material. Sand shall meet ASTM C-33 (Fine Aggregate), with a Fines Modulus Index of 2.75 or greater.
  - Pea Gravel – The depth of pea gravel shall be 4” and be placed over the crushed stone layer. Pea gravel shall consist of durable crushed rock or durable crushed gravel stone free from ice and snow, sand, clay, loam, or other deleterious or organic material. The pea gravel shall be double washed and shall be 1/4 to 3/8 inch in size or equivalent to #9 double washed crushed stone.
  - Crushed Stone – The depth of crushed stone shall be 12” and placed at the bottom of the bioretention basin. The crushed stone in the bioretention basin shall be clean double-washed crushed aggregate, free of rock dust, fines or soil particles. Crushed stone shall consist of durable crushed rock or durable crushed gravel stone, free from ice and snow, sand, clay, loam, or other deleterious or organic material.
  - Underdrain Piping – Underdrain piping shall be used in the drainage crushed

stone layer of the bioretention facilities. Cleanout pipes shall be provided at the ends of each underdrain pipe. Underdrain piping shall be 4" CPP or 4" Schedule 40 PVC pipe and shall be perforated.

ELEMENT Z - GENERAL

Z10 GENERAL REQUIREMENTS

G1020 Administrative Requirements

- Hazard Material Procedures
- Indoor Air Quality Procedures

END OF DOCUMENT

SECTION F2010.20
ASBESTOS REMEDIATION

PART I - GENERAL

1.01 GENERAL PROVISIONS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this specification and the Contractor shall consult them in detail for instructions.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 RELATED WORK UNDER OTHER SECTIONS

A. Environmental Procedures

B. Indoor Air Quality Procedures

1.03 DESCRIPTION OF WORK:

A. The work includes the complete removal and disposal of all asbestos containing materials (ACM) as indicated in Part 3 of this Section.

B. The C.M at Risk or Demolition Contractor shall include in his/her scope of work all required services included in Part 3.

1.04 POTENTIAL ASBESTOS HAZARD & DEBRIS

A. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

B. If the Contractor failed to comply with the requirements of the specifications, the Owner's Representative (Industrial Hygienist) may present a written stop of work order. The Contractor must immediately and automatically stop all work until authorized in writing by the Industrial Hygienist to commence work. All costs related to delays shall be at the Contractor’s expense.

1.05 DEFINITIONS

A. Abatement: Procedures to control fiber release from ACM. Includes encapsulation, enclosure, and removal.

B. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time.

C. Area Monitoring: Sampling of asbestos fiber concentrations within the asbestos control area and outside the asbestos control area, which is representative of the airborne concentrations of asbestos fibers, which may reach the breathing zone.

D. Asbestos: The name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure are incombustible and are separable into fibers. Asbestos includes Chrysotile, Crocidolite, Amosite, Anthophyllite, and Actinolite.

E. ACM: Any material containing more than 1% or greater by weight of asbestos of any type or mixture of types. State laws may vary in their definition of asbestos containing material.

F. Barrier: Any surface that seals off the work area to inhibit the movement of fibers.

G. Critical Barrier: A solid, asbestos impermeable partition erected so as to constitute a work area closure; the outer perimeter of an asbestos work area, usually erected across corridors or other open spaces to complete containment.

H. Designer: Commonwealth of Massachusetts licensed Designer Ammar Dieb, Universal Environmental Consultants (AD-900326), and Expiring 3/2019.

I. Enclosure: All herein specified procedures necessary to complete enclosure of all ACM behind airtight, impermeable, permanent barriers.

J. Friable Asbestos Material: Material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

K. HEPA Filter: A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.

L. Industrial Hygienist: An industrial hygienist certified in the Commonwealth of Massachusetts to perform air monitoring.

M. Removal: All herein specified procedures necessary to strip all ACM from the designated areas and to dispose of these materials at an acceptable site.

N. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

O. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

P. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as asbestos contaminated waste.

Q. Work Area: Any area indicated on the Drawings as asbestos abatement areas or as areas containing friable asbestos material.

R. Worker Decontamination Enclosure System: A decontamination enclosure system for workers, typically consisting of a clean room, a shower room, and an equipment room.

1.06 STOP WORK:

A. If the Owner or the Industrial Hygienist presents a written stop work order, immediately and automatically stop all work. Do not recommence work until authorized in writing by the Industrial Hygienist and or Designer.

1.07. CONTRACTOR'S USE OF THE EXISTING BUILDING

A. Keep existing driveways and entrances serving the premises clear and available to the Owner and his employees at all times. Do not use these areas for parking or storage of materials, unless authorized in writing by the Owner.

B. Smoking or open fires will not be permitted within the building enclosure or on the premises.

1.08 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Provide a full time Site Supervisor for work under this Section with all appropriate state licenses, who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel and disposal procedures. This person is the Competent Person in accordance with 29 CFR 1926 for the Contractor and is the Contractor's representative responsible for compliance with all applicable federal, state and local regulations, particularly those relating to ACM. This person shall have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures, have had a minimum of two years on the job training and meet all additional requirements set forth in 29 CFR 1926 for a Competent Person.

B. The Site Supervisor must be certified by the State of Massachusetts. Asbestos Contractor shall provide proof of such certification to the Industrial Hygienist not less than 10 days prior to commencing any work.

1.09 SPECIAL REPORTS

A. Except as otherwise indicated, submit special reports directly to the Industrial Hygienist within one day of occurrence requiring special report, with copies to all others affected by the occurrence.

B. When an event of unusual and significant nature occurs at the site (examples: failure of negative pressure system, rupture of temporary enclosures, unauthorized entry into work areas), prepare and submit a special report listing date and time of event, chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise the Industrial Hygienist in advance at earliest possible date.

C. Prepare and submit special reports of significant accidents, at the site and anywhere else work is in progress related to this project. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

1.10 CONTINGENCY PLAN

A. Prepare a contingency plan for emergencies including fire, accident, power failure or any other event that may require modification of decontamination or work area isolation procedures. Include in the plan specific procedures for decontamination or work area isolation. A copy of the plan shall be submitted to and approved by the Industrial Hygienist prior to any work being done.

B. Post in the clean room of the decontamination unit and in the Contractor's office trailer telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital and police.

1.11 PERMITS AND NOTIFICATIONS

A. Secure necessary permits in conjunction with asbestos removal, hauling, and disposition and provide timely notification as may be required by federal, state, regional, and local authorities. Notify the Department of Environmental Protection (DEP) and the Massachusetts Department of Labor Standards (DLS) and provide copies of the notification to the Industrial Hygienist, Industrial Hygienist and the State Environmental Regulatory Agency 10 working days (Document Submission Date) prior to commencement of the work.

B. No later than the Document Submission Date, notify the local fire, police and Health Departments, in writing, of proposed asbestos abatement work. Advise the fire department of the nature of the asbestos abatement work, and the necessity that all firefighting personnel who may enter the work site in the case of fire wear self-contained breathing apparatus. Provide one copy of the notices to the Industrial Hygienist prior to commencing the work.

C. No later than the Document Submission Date, submit proof satisfactory to the Industrial Hygienist that all required permits, site location, and arrangements for transport and disposal of asbestos containing or contaminated materials, supplies, and the like have been obtained.

1.12 SAFETY COMPLIANCE

A. Comply with laws, ordinances, rules, and regulations of federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials.

B. Comply with the applicable requirements of the current issue of 29CFR 1926.1101 and 40CFR 61, Subparts A and B. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work.

1.13 RESPIRATOR PROGRAM

A. Establish a respirator program by ANSI Z88.2 and 29 CFR l926.1101 (h), l926.l03, and l9l0.l34.

1.14 PERSONNEL PROTECTION

A. Prior to commencement of work, workers shall be instructed in and shall be knowledgeable of the hazards of asbestos exposure; use and fitting of respirators; use of showers; entry and exit from work areas, and all aspects of work procedures and protective measures.

B. All asbestos abatement workers shall receive training and shall be accredited per 40 CFR 763.90(g). Training and accreditation shall be in accordance with 40 CFR 763, Appendix C to Subpart E. Training shall also be provided to meet the requirements of OSHA Regulations contained in 29 CFR l926.

C. Prior to the start of work, the Asbestos Contractor shall provide medical examinations for all employees in accordance with 29CFR l926.1101 (m). All employees hired by the Asbestos Contractor after start of work shall have medical examinations in accordance with this paragraph before being put to work.

D. Maintain complete and accurate records of employee's medical examinations, during employment and make records of the required medical examinations available for inspection and copying to: The Assistant Secretary of OSHA, the Director of The National Institute for Occupation Safety and Health (NIOSH), authorized representatives of either of them, and an employee's physician upon the request of the employee or former employee.

E. Provide personnel exposed to airborne concentrations of asbestos fibers with fire retardant disposable protective whole body clothing, head coverings, gloves, and foot coverings. Provide gloves to protect hands. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape. Asbestos Contractor shall require and monitor the use of complete protective clothing. A competent person designated by the Asbestos Contractor in accordance with 29CFR l926.1101 shall periodically examine protective clothing worn by employees in the work area for rips or tears. When rips or tears are detected, they shall be immediately mended or replaced.

F. Provide goggles to personnel engaged in asbestos operations when the use of a full-face respirator is not required.

G. Provide authorized visitors with suitable protective clothing, headgear, eye protection and footwear, whenever they are required to enter the work area, to a maximum of 3 changes for 3 visitors per day. One of the sets of protective clothing shall be available for full time use by the Industrial Hygienist.

H. Provide all persons with personally issued and marked respiratory equipment approved by NIOSH and OSHA. The appropriate respiratory protection shall be selected according to the most recent Massachusetts regulations.

I. Once all visible asbestos material has been removed during decontamination, cartridge type respirators will be allowed during the final cleanup provided the measured airborne concentrations do not exceed 0.1 fibers per cubic centimeter. Where respirators with disposable filters are employed, provide sufficient filters for replacement to the worker or applicable regulation.

J. If the permissible respirators fail to provide sufficient protection against volatile emitted by any sealant used, the services of a qualified industrial hygienist will be procured, at the Asbestos Contractor's expense, to determine proper respiratory protection. The Owner and Industrial Hygienist will not be liable for the cost of increased respiratory protection.

K. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), Department of Labor, or the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services. All personnel wearing negative pressure respirators shall have respirator fit tests within the last six months and signed statements shall be available.

1.15 REFERENCE STANDARDS

A. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Requirements of this Section shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified. Where conflict among requirements or with this Section exists, the more stringent requirements shall apply.

B. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials.

C. U.S. Environmental Protection Agency (EPA) requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials.

D. U.S. Department of Environmental Protection (DEP) and the Massachusetts Department of Labor Standards (DLS).

1.16 SUBMITTALS

A. No work shall commence until the Contractor submit an emailed completed submittals not less 10-working days prior to commencement of the work. The submittals shall include the following:

1. Submit all licenses and certification required.

2. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the EPA.

3. Submit all required items previously listed.

4. Secure necessary permits in conjunction with asbestos removal, hauling, and disposition and provide timely notification as may be required by federal, state, regional, and local authorities. Notify the Department of Environmental Protection (DEP) and the Massachusetts Department of Labor Standards (DLS) and provide copies of the notification.

5. Notify the local fire, police and Health Departments, in writing, of proposed asbestos abatement work. Advise the fire department of the nature of the asbestos abatement work, and the necessity that all firefighting personnel who may enter the work site in the case of fire wear self-contained breathing apparatus. Provide one copy of the notices.

6. Submit proof that all required permits, site location, and arrangements for transport and disposal of asbestos containing or contaminated materials, supplies, and the like have been obtained.

7. The Contractor shall submit a plan for managing the waste including all collection, storage, disposal and decontamination practices/waste disposal.

8. Submit medical examinations for all employees in accordance with 29CFR l926.1101 (m). All employees hired by the Asbestos Contractor after start of work shall have medical examinations in accordance with this paragraph before being put to work.

9. Provide MSDS for all used products on this Project.

10. Submit the negative pressure system. Do not begin work until the Designer approves the submittal. Include in the submittal at a minimum:

    a. Number of negative air machines required and the calculations necessary to determine the number of machines.

    b. Description of projected airflow within the work area and methods required providing adequate airflow in all portions of the work area.

    c. Location of machines in the work area.

    d. Location of pressure differential measurement equipment.

    e. Manufacturers product data on equipment used to monitor pressure differential.

11. Submit for approval the form of security and safety log, which will be maintained on the project.

12. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the Department of Environmental Protection.

13. Submit proof that training requirements as specified in 29CFR l926.1101 (k) (3) and by appropriate state agencies has been complied with.

14. Submit a description of the plans for construction of decontamination enclosure systems and for isolation of the work areas in compliance with this specification and all applicable regulations.

15. Submit a detailed schedule including work dates, work shift time, number of employees, dates of start and completion of all work activities (including mobilization, work area preparation, asbestos abatement, inspection and clearance monitoring, each phase of refinishing, and final inspections). Schedule shall be updated with each partial payment request.

1.17 REPORTING

A. Maintain on site a daily log documenting the dates and time of the following items, as well as other significant events:

1. Minutes of meetings: purpose, attendees, and brief discussion

2. Visitations: authorized and unauthorized

3. Personnel: by name, entering and leaving the work area

4. Special or unusual events

5. Personnel air monitoring tests and results

B. Documentation with confirmation signature of the Industrial Hygienist of the following:

1. Inspection of work area preparation prior to start of removal and daily thereafter.

2. Removal of any polyethylene barriers.

3. Removal of waste materials from work area and transport and disposal at approved site.

4. Decontamination of equipment.

5. Waste Shipment Records. No final payment will be approved until all above documents have been submitted.

C. Provide two bound copies of this log to the Industrial Hygienist with the application for final payment.

1.18 AIR MONITORING

A. Throughout the entire removal and cleaning operations, air monitoring will be conducted to ensure that the Asbestos Contractor is complying with the EPA and OSHA regulations and any applicable state and local government regulations. The Owner will provide an Industrial Hygienist (Universal Environmental Consultants) to take air samples at the job site at no cost to the Asbestos Contractor.

B. The purpose of the Industrial Hygienist's air monitoring will be to detect faults in the work area isolation such as:

1. Contamination of the building outside of the work area with airborne asbestos fibers,

2. Failure of filtration or rupture in the negative pressure system,

3. Contamination of the exterior of the building with airborne asbestos fibers.

4. Should any of the above occur the Asbestos Contractor should immediately cease asbestos abatement activities until the fault is corrected! Work shall not recommence until authorized by the Industrial Hygienist.

C. The Industrial Hygienist will monitor airborne fiber counts in the work area. The purpose of this air monitoring will be to detect airborne fiber counts higher than the Action Level of 0.1-f/cc which may significantly challenge the ability of the work area isolation procedures to protect the balance of the building from contamination by airborne fibers.

D. The Asbestos Contractor shall be responsible for providing his/her own personnel monitoring within the work area in accordance with CFR l926.1101.

1.19 AIRBORNE FIBER COUNTS

A. If any air sample taken outside of the work area exceeds the base line (background) conducted by UEC? Immediately and automatically stop all work. If this air sample was taken inside the building and outside of critical barriers around the work area, immediately erect new critical barriers to isolate the affected area from the balance of the building.

1. Respiratory protection shall be worn in affected area.

2. Leave critical barriers in place until completion of work and ensure that the operation of the negative pressure system in the work area results in a flow of air from the balance of the building into the affected area.

3. After certification of visual inspection in the work area, remove critical barriers separating the work area from the affected area.

4. A final inspection after removal of poly shall be completed by the Asbestos Contractor's Supervisor and the Industrial Hygienist.

B. The following procedure shall be used to resolve any disputes regarding fiber types when work has been stopped due to excessive airborne fiber counts. "Airborne Fibers" referred to above include all fibers regardless of composition as counted in the NIOSH 7400 Procedure. If work has stopped due to high airborne fiber counts, air samples will be secured in the same area by the Industrial Hygienist for analysis by Transmission Electron microscopy (TEM). Airborne Fibers counted in samples analyzed by TEM shall be only asbestos fibers, but of any diameter and length. Subsequent to analysis by TEM the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by the NIOSH 7400 procedure by a number equal to asbestos fibers counted divided by all fibers counted in the TEM analysis.

C. If TEM is used to arrive at the basis for determining "Airborne Fiber" counts in accordance with the above paragraph, and if the average of airborne asbestos fibers in all samples taken outside the work area exceeds the base line, then the cost of such sampling and analysis will be born by the Asbestos Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Sheet: 6 mil minimum thickness, unless otherwise specified.

B. Tape: Capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water. Provide tape, which minimizes damage to surface finishes.

C. Cleaning Materials: Use materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

2.02 EQUIPMENT

A. Supply the required number of asbestos air filtration units to the site in accordance with these specifications.

2.03 DANGER SIGNS AND LABELS

A. Display danger signs at each location where airborne concentrations of asbestos fibers may be in excess of 0.0l fibers/cc. Post signs at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

B. The sign shall also contain a pictorial representation of possible danger or hazard, such as a skull and cross bone, or other suitable warning as approved by the Industrial Hygienist. Sign shall meet the requirements of 29CFR l926.200. A sample of the signs to be used shall be submitted to the Industrial Hygienist for approval prior to beginning work area preparation.

C. Affix danger labels to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers.

2.04 PERSONNEL DECONTAMINATION UNIT

A. Prior to any asbestos abatement work, including placement of plastic on walls that will contact or disturb asbestos containing surfaces, or removal of light fixtures or any items on asbestos containing surfaces, construct a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Shower Room, and Equipment Room. Require all persons without exception to pass through this decontamination unit for entry into and exiting from the work area for any purpose.

B. Build suitable framing or use existing rooms, with the Industrial Hygienist written approval, connected with framed in tunnels if necessary; line with 6 mil plastic; seal with tape at all lap joints in the plastic for all enclosures and decontamination enclosure system rooms. Decontamination units and access tunnels constructed outside shall be constructed with tops made of 5/8" plywood, or approved equal. In all cases, access between contaminated and uncontaminated rooms or areas shall be through an airlock. In all cases, access between any two rooms within the decontamination enclosure systems shall be through a curtained doorway.

C. Provide a changing (clean) room for the purpose of changing into protective clothing. Construct using polyethylene sheeting, at least 6-mil in thickness, to provide an airtight seal between the Clean Room and the rest of the building. Locate so that access to work area from Clean Room is through Shower Room. Separate Clean Room from the building by a sheet polyethylene flapped doorway.

D. Require workers to remove all street clothes in this room, dress in clean disposable coveralls, and don respiratory protection equipment. Do not allow asbestos contaminated items to enter this room. Require workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.

E. An existing room may be utilized as the changing room if it is suitably located and of a configuration whereby workmen may enter the Clean Room directly from the Shower Room. Protect all surfaces of room with sheet plastic. Authorization for this shall be obtained from the Industrial Hygienist in writing prior to start of construction.

1. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in Changing Room.

2. Damp wipe all surfaces twice after each shift change with a disinfectant solution.

3. Provide a continuously adequate supply of disposable bath towels.

4. Provide posted information for all emergency phone numbers and procedures.

5. Provide l storage locker per employee.

6. Provide all other components indicated on the Contract drawings.

F. Provide a completely water tight operational shower to be used for transit by cleanly dressed workers heading for the work area from the changing room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.

G. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.

1. Separate this room from the rest of the building with airtight walls fabricated of 6-mil polyethylene.

2. Separate this room from the Clean and Equipment Rooms with airtight walls fabricated of 6-mil polyethylene.

3. Provide showerhead and controls.

4. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.

5. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.

6. Arrange so that water from showering does not splash into the Clean or Equipment Rooms.

7. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.

8. Provide flexible hose shower head.

9. Pump wastewater to drain and provide 20 micron and 5-micron wastewater filters in line to drain or waste water storage. Locate filter hose inside shower unit so that water lost during filter changes is caught by shower pan and pumped to exterior filtering system.

H. Provide equipment room for contaminated area; work equipment, footwear and additional contaminated work clothing are to be left here. This is a change and transit area for workers. Separate this room from the work area by a 6-mil polyethylene flap doorway.

1. Separate this room from the rest of the building with airtight walls fabricated of 6-mil polyethylene.

2. Separate this room from the Shower Room and work area with airtight walls fabricated of 6-mil polyethylene.

I. Separate work area from the equipment Room by polyethylene barriers. If the airborne asbestos level in the work area is expected to be high, add an intermediate cleaning space between the Equipment room and the work area. Damp wipe clean all surfaces after each shift change.

2.05 EQUIPMENT DECONTAMINATION UNITS

A. In areas with only one access, it may be impossible to utilize a separate Equipment Decontamination Unit. In this case, all equipment and waste materials will exit through the Personnel Decontamination Chambers.

B. When two accesses to the work area are available, provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from work area. Do not allow personnel to enter or exit work area through Equipment Decontamination Unit.

C. Provide an enclosed shower unit located in work area just outside Wash Room as an equipment, bag and container cleaning station.

D. Provide Wash Room for cleaning of bagged or containered asbestos containing waste materials passed from the work area. Construct Wash Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and located so that packaged materials, after being wiped clean can be passed to the Holding Room. Separate this room from the work area by flaps of 6-mil polyethylene sheeting, or rigid self-closing doors.

E. Provide Holding Room as a drop location for bagged ACM passed from the Wash Room. Construct Holding Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.

F. Provide Clean Room to isolate the Holding Room from the building exterior. Construct Clean Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and locate to provide access to the Holding Room from the building exterior. Separate this room from the exterior by flaps of 6 mil polyethylene sheeting, or rigid self-closing doors.

PART 3 - EXECUTION

3.01 SCOPE OF WORK:

It is anticipated that the asbestos abatement project will be performed in many phases. It is the asbestos contractor's responsibility to comply with the phasing schedule prepared by the Architect and shall comply with the commencement and completion dates allocated. Changing, decreasing and increasing of phases, size, location and scope of work shall not constitute compensation by the Owner or any of his representatives.

The project monitor(s) will record on a daily basis all quantities removed. The asbestos contractor will be required to do the same. Both the contractor and the monitor must sign all daily logs. No work will continue until all logs are signed daily. At the completion of the total project, should quantities removed were found to be less than the listed below, the asbestos contractor will be required to issue a credit to the owner based on unit prices or will be paid at the unit prices should quantities removed were found to be greater than the listed above.

Location	Type of ACM	Approximate Quantities
Kouloheras/Coburn/1997 Addition:		
	Glue Daub on Ceiling Plaster	4,000 SF
	Borrowed lite	500 Total
	Vision Lite Windows in Doors	125 Total
	Flooring Materials and Mastic	43,000 SF
	Chalkboards	500 Total
	Hidden Pipe and Hard Joint Insulation	1,000 LF
	Walls and Ceiling Demolition to Access ACM	6,500.00
	Light Fixtures Tubes	6,500 Total
Bridges	Transite Panels	1,600 SF
Stage	Fire Curtain	1 Total
Science Rooms	Transite Tables	25 Total
Basement Fan Room	Pipe Insulation	50 LF
Exterior	Doors	30 Total
Lord Building/Field House:		
	Borrowed lite	425 Total
	Interior Vertical Caulking in CMU	3,500 LF
	Various Types of Flooring Materials and Mastic	95,000 SF
	Tectum Deck and Glue	7,500 SF
	Chalkboards	125 Total
	Hidden Pipe and Hard Joint Insulation	1,000 LF
	Walls and Ceiling Demolition to Access ACM	6,500.00
	Light Fixtures Tubes	6,500 Total
Gymnasium/Ramp	Rubber Flooring/Cement	25,000 SF
Exterior	Windows	550 Total
	Transite Panels	8,000 SF

	Caulking on Transite Panels	5,000 LF
Site	Transite Sewer Pipes	1,500 LF

Kouloheras/Coburn/1997 Addition:

Specific Notes:

1. It's the Asbestos Contractor's responsibility to inspect the site and confirm condition prior to the submission of his/her bid package. It is also the Asbestos Contractor's responsibility to review the demolition drawings, notes and phasing configurations. Not all ACM found in the building are listed on the plans and are for informational purpose only. The Asbestos Contractor shall refer and fully comply with the Hazardous Materials Sections.
2. Perform all required demolition, disconnection and retain the services of electricians and plumbers if needed to perform the work at no additional cost to the owner.
3. In all areas where ACM pipe and hard joint insulation has to be removed, ACM debris is included in the scope of work and has to be removed and disposed of as ACM at no extra cost to the Owner.
4. Remove and dispose as ACM of all ACM pipe and hard joint insulation found in the building and ACM that might be found in concealed and hidden locations including all ACM debris that might be found.
5. Remove and dispose as ACM of all types/layers of flooring materials, including but not limited to multiple layers of vinyl floor tiles, linoleum, carpet, resilient baseboard, stair treads, transition strips, leveling compound, cementious leveler, hardwood, plywood, paper and mastic under all above items. Removal must be done which leave substrate smooth (in similar condition to that which existed prior to Mastic application). Use of Chemicals will be permitted. Once all mastic has been removed, the Asbestos Contractor shall shot blast the concrete floors. Should wood flooring is present the Asbestos Contractor shall remove the wood flooring. The Asbestos Contractor will be required to disconnect services (gas, water, etc.) and remove and dispose of fixed objects to access to ACM. Should ACM found underneath objects not previously removed, the Asbestos Contractor will be required to perform abatement at no additional cost to the owner for re-mobilization. Multiple layers are found. The Asbestos Contractor shall remove all layers at no additional cost to the owner. The Asbestos Contractor may obtain a waiver from the DEP to utilize shot blasting for mastic removal.
6. The Asbestos Contractor shall make spot demolition in walls/ceilings to uncover hidden ACM that may be found prior to the demolition activities. The Asbestos Contractor shall perform needed demolition at no additional cost to the owner to remove all ACM (Walls and Ceilings Demolition to Access ACM). Refer to Section 01 35 43 regarding Silica Dust.
7. Remove and properly dispose of interior windows (Borrowed lite) and doors with windows (Vision Lite Windows in Doors) including but not limited to windows, doors, glass, glass blocks, transom, caulking and all related attachments. Caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
8. Remove and dispose as ACM of chalkboards, blackboards, chalkboard, tack board, marker board, display boards, Cementitious wood fiberboard including frame, wood strapping fasteners and ACM glue daub and metal framed chalkboard found behind the wooden chalkboard.
9. Disconnect, remove and properly dispose of light fixtures. Ballasts assumed to contain PCB's and tunes assumed to contain mercury. Retain the services of a licensed electrician.
10. Remove and dispose as ACM of the glue daubs found on ceiling. Remove any ceiling system to access ACM.
11. Remove and dispose as ACM of the transite panels and all related attachment.
12. Remove and dispose as ACM of the transite tables and all related attachment.
13. Remove and dispose as ACM of fire curtain and all related attachments.

14. Remove and properly dispose of all window wall systems, including but not limited to skylights, screens, windows, doors, panels, glass, glass blocks, multiple layer of frames, sash, casings, sills, louvers, unit vents grille, shims, fasteners, anchors, sealant, flashing, etc. Wire-brush all adjacent surfaces to insure the complete removal of caulking. Framing and glazing caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
15. Remove and properly dispose of exterior caulking/expansion joints. Caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.

Lord Building/Field House:

Specific Notes:

16. It's the Asbestos Contractor's responsibility to inspect the site and confirm condition prior to the submission of his/her bid package. It is also the Asbestos Contractor's responsibility to review the demolition drawings, notes and phasing configurations. Not all ACM found in the building are listed on the plans and are for informational purpose only. The Asbestos Contractor shall refer and fully comply with the Hazardous Materials Sections.
17. Perform all required demolition, disconnection and retain the services of electricians and plumbers if needed to perform the work at no additional cost to the owner.
18. In all areas where ACM pipe and hard joint insulation has to be removed, ACM debris is included in the scope of work and has to be removed and disposed of as ACM at no extra cost to the Owner.
19. Remove and dispose as ACM of all ACM pipe and hard joint insulation that might be found in concealed and hidden locations including all ACM debris that might be found.
20. The Asbestos Contractor shall make spot demolition in walls/ceilings to uncover hidden ACM that may be found prior to the demolition activities. The Asbestos Contractor shall perform needed demolition at no additional cost to the owner to remove all ACM (Walls and Ceilings Demolition to Access ACM). Refer to Section 01 35 43 regarding Silica Dust.
21. Remove and properly dispose of interior windows (Borrowed lite) and doors with windows (Vision Lite Windows in Doors) including but not limited to windows, doors, glass, glass blocks, transom, caulking and all related attachments. Caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
22. Remove and dispose as ACM of all types/layers of flooring materials, including but not limited to multiple layers of vinyl floor tiles, linoleum, carpet, resilient baseboard, stair treads, transition strips, leveling compound, cementious leveler, hardwood, plywood, paper and mastic under all above items. Removal must be done which leave substrate smooth (in similar condition to that which existed prior to Mastic application). Use of Chemicals will be permitted. Once all mastic has been removed, the Asbestos Contractor shall shot blast the concrete floors. Should wood flooring is present the Asbestos Contractor shall remove the wood flooring. The Asbestos Contractor will be required to disconnect services (gas, water, etc.) and remove and dispose of fixed objects to access to ACM. Should ACM found underneath objects not previously removed, the Asbestos Contractor will be required to perform abatement at no additional cost to the owner for re-mobilization. Multiple layers are found. The Asbestos Contractor shall remove all layers at no additional cost to the owner. The Asbestos Contractor may obtain a waiver from the DEP to utilize shot blasting for mastic removal.
23. Remove and dispose as ACM of the tectum deck and glue daubs and all related attachment.
24. Remove and dispose as ACM of chalkboards, blackboards, chalkboard, tack board, marker board, display boards, Cementitious wood fiberboard including frame, wood strapping fasteners and ACM glue daub and metal framed chalkboard found behind the wooden chalkboard.
25. Disconnect, remove and properly dispose of light fixtures. Ballasts assumed to contain PCB's and tunes assumed to contain mercury. Retain the services of a licensed electrician.
26. Remove and dispose as ACM of the transite panels, caulking and all related attachment.

27. Remove and properly dispose of all window wall systems, including but not limited to skylights, screens, windows, doors, panels, glass, glass blocks, multiple layer of frames, sash, casings, sills, louvers, unit vents grille, shims, fasteners, anchors, sealant, flashing, etc. Wire-brush all adjacent surfaces to insure the complete removal of caulking. Framing and glazing caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
28. Remove and properly dispose of exterior caulking/expansion joints. Caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
29. Remove and dispose as ACM of transite and ACM insulated pipe and debris that might be found during excavation/demolition. The Site/Demolition Contractor will perform excavation as needed to expose the pipe. The Asbestos Contractor will be required to perform additional excavation (if needed) to remove the ACM.
30. Remove and properly dispose of the rubber flooring and related system. Remove and dispose of a minimum of 2 inch deep of the concrete floor. Rubber was found to contain mercury and assumed to have leached into the concrete flooring. Testing will be performed to determine if additional concrete will be needed to be removed. If needed remove another 2 inch of the concrete flooring at no additional cost to the owner. It is the Contractor's responsibility to perform required characterization prior to disposal at no additional cost to the owner.

Site:

Specific Notes:

31. Remove and dispose as ACM of transite and ACM insulated pipe and debris that might be found during excavation/demolition. The Site/Demolition Contractor will perform excavation as needed to expose the pipe. The Asbestos Contractor will be required to perform additional excavation (if needed) to remove the ACM.

3.02 JOB CONDITIONS

A. Do not commence asbestos abatement work until:

I. Arrangements have been made for disposal of waste at an acceptable site. Submittal shall be made no later than the Document Submission Date.

2. Arrangements have been made for containing and disposal of wastewater resulting from wet stripping or filtering through a 5-micron filter.

B. All materials resulting from abatement work, except as specified otherwise shall become the property of the Asbestos Contractor and shall be disposed of as specified herein.

C. Pre-clean all areas prior to commencement of any work.

D. Clean all routes used to transport waste.

3.03 INSPECTION AND PREPARATION

A. Examine the areas and conditions under which asbestos will be abated and notify the Industrial Hygienist in writing of conditions detrimental to the proper and timely completion of the work.

B. Before any work commences, post danger signs in and around the Work Area to comply with 29 CFR l926.1101 (k) (l) per federal and state regulations.

3.04 WORK PROCEDURE

A. Perform asbestos related work in accordance with 29CFR l926.1101 and as specified herein. Use wet removal procedures. Personnel shall wear and utilize protective clothing and equipment as specified herein. Personnel of other trades not engaged in the removal and demolition of asbestos shall not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection provisions of this specification are complied with by the trade personnel. Provide and post, in the Equipment Room and the Clean Room, the decontamination and work procedures to be followed by workers, as described hereinafter.

B. Each worker and authorized visitor shall, upon entering the job site, remove street clothes in the Clean Change Room and put on a respirator and clean protective clothing before entering the equipment room or the work area. All workers shall remove gross contamination before leaving the work area. All clothing such as coveralls, head covers, boots shall be removed and properly disposed of before leaving equipment room. With the exception of bathing suites and respirators, the workers shall proceed to the Shower Room. Under the shower, respirators shall be removed and cleaned. Cleaned respirators shall be placed in suitable clean plastic bags and carried by employees to Clean Room. Soap, towels shall be furnished by the Asbestos Contractor. The Asbestos Contractor shall maintain proper sanitary conditions. The Asbestos Contractor's designated competent person shall insure that these practices are being adhered to.

C. Following showering and drying off, each worker and authorized visitor shall dispose of towels as contaminated waste, and proceed directly to the Clean Change Room and dress in clean clothes at the end of each day's work, or before eating, smoking, or drinking. Before re-entering the work area from the Clean Change Room, each worker and authorized visitor shall put on the applicable respirator and shall dress in clean protective clothing. Contaminated work footwear shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, dispose of footwear as contaminated waste.

D. Contaminated work footwear shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or double bag for use at next site.

E. Workers removing waste containers from the Equipment Decontamination Enclosure shall enter the holding area from outside wearing a respirator and dressed in clean coveralls. No worker shall use this system as a means to leave or enter the washroom or the work area.

F. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or contaminated materials and until final cleanup is completed. This includes the removal of any equipment in contact with ACM such as lights, HVAC grills and other related structures.

3.05 PREPARATION OF THE WORK AREA

A. Seal off the work area by sealing large openings such as open doors, elevator doors, and passageways with a critical barrier. The critical barrier shall constitute the outermost boundary of the asbestos abatement project work area. Plastic sheeting on open framing is not a suitable critical barrier. Critical barriers may be erected of a suitable solid construction material such as plywood, sheet-rock, gypsum board, or other related materials.

B. Prior to any asbestos abatement work, clean the proposed work areas using HEPA filtered vacuum equipment and wet cleaning methods as appropriate. Methods that raise dust, such as dry seeping or vacuuming with equipment not equipped with HEPA filters will not be permitted. Dispose of all cloths, which are used for cleaning as contaminated waste.

C. Place all tools, scaffolding and staging necessary for the work in the area to be isolated prior to erection of plastic sheeting temporary enclosure.

D. Shut down electric power. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment per applicable electrical code requirements. Provide 24 volt safety lighting and provide ground-fault interrupter circuits as power source for lights and electrical equipment.

E. Seal off all openings, including but not limited to corridors, doorways, windows, skylights, ducts, grills, diffusers, and any other penetrations of the work areas, with 6-mil plastic sheeting and sealed with tape.

F. Prior to any abatement activities seal all floor and ceiling openings or penetrations that have not already been sealed. This includes penetrations through ceiling and floor slabs, both empty holes and holes accommodating items such as cables, pipes, ducts, conduit and expansion joints in floors and wall and floor slab assemblies.

G. Use combination fire stop foam and fire stop sealant equivalent to Dow Corning Fire Stop Foam and Dow Corning Fire Stop Sealant. Material shall be applied in accordance with manufacturer's recommendations.

H. Maintain emergency and fire exits from the work areas, or establish alternative exits satisfactory to the local fire officials. Coordinate work with local fire and police departments, and Industrial Hygienist.

I. Shut down and isolate heating, cooling, ventilating air systems in the contaminated areas to prevent contamination and fiber dispersal to other areas of the structure. During the work, seal vents within the work area with solid barriers, such as plywood and tape and plastic sheeting, or as indicated on the drawings.

J. Remove all HVAC system filters. Pack disposable filters in sealable double 6 mil plastic bags for burial in the approved waste disposal site; replace with new filters after final cleanup. Wet clean permanent filters; reinstall after final cleanup.

K. Before work is begun, clean all items, which can be removed without disrupting the asbestos material. Pre-clean movable furniture, [carpeting, clocks, speakers, books, and other objects] within the proposed areas using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate; remove such objects from work areas to a temporary location.

L. Pre-clean non-removable furniture, book shelving, equipment, heat fans, fire alarms, pipes, ductwork, wires and conduits, lockers, skylights, speakers, and other fixed objects within the proposed work areas, using HEPA filtered vacuum equipment and wet cleaning methods as appropriate prior to abatement activities, and enclose with minimum 6 mil plastic sheeting sealed with tape.

M. Remove and clean all ceiling mounted objects, such as lights, HVAC grills and other items not previously sealed off, that interfere with asbestos abatement. Use localized water spraying or HEPA filtered vacuum equipment during fixture removal to reduce fiber dispersal.

N. The Asbestos Contractor will be required to supply a certified plumber to be available should any questions or problems arise.

3.06 MAINTENANCE OF ENCLOSURE SYSTEMS

A. Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.

B. Use smoke methods to test effectiveness of barriers when directed by the Industrial Hygienist.

3.07 CONTROL ACCESS:

A. Permit access to the work area only through the Decontamination Unit. All other means of access shall be closed off, warning signs displayed on the clean side of the sealed access.

B. Large openings such as open doorways and passageways shall be sealed as a critical barrier. The critical barrier shall constitute the outmost boundary of the asbestos abatement work area.

C. Plastic sheeting on open framing is not a suitable critical barrier. All cracks, seams, and openings in critical barriers shall be caulked or otherwise sealed, so as to prevent the movement of asbestos fibers out.

3.08 ISOLATION OF WORK AREA:

A. Completely separate the work area from other portions of the building and the outside by sheet plastic barriers at least 6 mil in thickness.

B. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the work area with duct tape alone or with polyethylene sheeting at least 6 mil in thickness, taped securely in place with duct tape. Maintain seal until all work including work area decontamination is completed. All lighting fixtures shall have had power shut off.

C. Provide sheet plastic barriers at least 6-mil in thickness needed to complete seal openings from the work area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape.

3.09 COVERING OF FLOOR AND WALL SURFACES

A. Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning prior to being moved or covered. All equipment, furniture, stored items in work area is to be deemed contaminated unless specifically declared as uncontaminated on the Drawings or in writing by the Industrial Hygienist. Clean all surfaces in work area with a HEPA filtered vacuum of by wet wiping prior to the installation of any sheet plastic.

B. Cover floor of work area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil in thickness, turned up walls at least 12 inches. Form sharp right angle-bend at junction of floor and wall so that there is no radius, which could be stepped on causing the wall attachment to be pulled loose. Duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

C. Remove all general construction items such as cabinets, casework, doors and window trim, moldings, ceilings and trim which cover the surface of the work to prevent interference with the work. Clean, decontaminate and reinstall, unless otherwise indicated, all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.

D. Cover all walls in work area with two (2) layers of polyethylene sheeting, at least 6- mil in thickness, mechanically supported and sealed with duct tape. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract documents or in writing by the Industrial Hygienist. There shall be no seams in the plastic sheet at wall to floor joints.

E. If the enclosure barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the work area, enclose it and decontaminate it.

3.10 NEGATIVE PRESSURE

A. Establish negative pressure in the work area by installation of High Efficiency Particulate Air (HEPA) filter air-purifying devices. Comply with ANSI Z9.2, Local Exhaust Ventilation Requirements. Maintain system in operation 24 hours per day until decontamination of the work area is completed and area has been certified clean by air monitoring tests and visual inspections. Discharge of asbestos fibers to the outside of the building will not be permitted.

B. Size negative air pressure system(s) to provide a minimum of one air change every l5 minutes for the area under negative pressure. Locate the exhaust unit(s) so that makeup air enters the work area primarily through the decontamination unit and traverses the work area as much as possible. The intent is to provide the air change specified in each work area (room), not just the specified negative pressure. Place the end of the unit or its exhaust duct through an opening in the plastic barrier or wall covering. Seal the plastic around the unit or duct with tape.

C. The system shall maintain an air pressure differential of minus 0.02 inch of water. Test the negative pressure system prior to any abatement actions to insure that the 0.02-inch differential is present. The Industrial Hygienist may require the use of ventilation smoke tubes to check the system performance.

3.11 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. Thoroughly wet ACM to be removed prior to stripping to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal Encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water or removal Encapsulant to penetrate material thoroughly. If a removal Encapsulant is used, apply in strict accordance with manufacturer's written instructions.

B. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.

C. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to wash down station adjacent to material decontamination unit.

D For the removal of pipe and joint insulation, the density of asbestos containing pipe covering seldom allows the material to be removed in a completely wet state. However, every attempt should be made to keep the insulation material as wet as possible to prevent release of asbestos fibers.

E. Cut the cloth covering on the pipe insulation along the top seam to allow wetting of the asbestos insulation. Do not allow the pipe insulation to fall to the ground or adjacent surfaces. Wet the insulation material and immediately place in a double 6 mil, minimum thickness labeled plastic bag.

F. In certain areas, asbestos pipe insulation will be removed with glove-bags (with prior approval by the Industrial Hygienist).

1. Seal all critical barriers.

2. Pre-clean if necessary and place one layer of polyethylene under the pipe to be removed.

3. Negative air machines with HEPA filtration will be used in the area.

4. Glove bags will be smoke tested.

5. Place necessary tools into pouch located inside glove-bag. This will usually include: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-wetted cloth.

6. Place one strip of duct tape along the edge of the open top slit of glove-bag for reinforcement.

7. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Next, duct tape the ends of glove-bag to pipe itself, where previously covered with plastic or duct tape.

8. Place additional layers of tape along the top of the glove-bag to seal the staple holes and to securely support the bag on the pipe.

9. Fill each bag with 2 inches of water to thoroughly wet the removed insulation.

10. Attach vacuum hose through port in bag and tape tightly to prevent leakage.

11. Insert spray nozzle into bag and tape tightly to prevent leakage.

12. One person places his hands into the long-sleeved gloves while the second person directs garden sprayer at the work.

13. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy gauge wire with ring-type handles at each end. Throughout this process, spray amended water or removal Encapsulant on the cutting area to keep dust to a minimum.

14. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping.

15. Using nylon scrub brush, rags, and water scrub and wipe down the exposed pipe.

16. Wipe down the inside of the bag with the rags. Remove the water nozzle and tape shut.

17. Encapsulate the exposed ends and cover any exposed ends of pipe insulation with the re-wettable clothe. This shall be done prior to removing the bag.

18. Place the cleaned tools either into the next glove bag or put into the glove and pulled out. Twist the glove, tape at least twice and cut through the tape. The tools can be dropped into a bucket of water to clean them.

19. Twist the bag several times and turn on HEPA vacuum to remove the air. Tape the twist several times.

20. Slip a 6-mil disposal bag under the glove-bag and while running the vacuum sufficiently to collapse the bag, cut the glove-bag off.

21. Encapsulate all exposed pipe and elbows to lock down any remaining fibers.

22. Remove disposable suits and place these into bag with waste.

23. Collapse the disposal bag with a HEPA vacuum, twist top of bag, seal with at least 3 wraps of duct tape, bend over and seal again with at least 3 wraps of duct tape.

3.12 DECONTAMINATION OF WORK AREA

A. Maintain premises and public properties free from accumulation of waste, debris, and rubbish, caused by operations. Remove visible accumulations of asbestos material and debris. Wet clean all surfaces within the work area.

B. Remove the plastic sheets from walls and floors only. Take proper care in folding up plastic sheeting to minimize dispersal of residual asbestos containing debris.

C. Leave the windows, doors, and HVAC vents sealed. Maintain HEPA filtered negative air pressure systems, air filtration and decontamination enclosure systems in service.

D. Remove all debris from floor of work area. This includes all trash, scraps of lumber, pipes and all visible asbestos debris. The asbestos debris is primarily deteriorated pipe insulation that has fallen to the ground. Dispose of all debris removed as asbestos contaminated waste. HEPA vacuum the entire floor.

E. Clean all surfaces in the work area and any other contaminated areas with water and with HEPA filtered vacuum equipment. After cleaning the work area, wait 24 hours to allow for settlement of dust, and again wet clean and clean with HEPA filtered vacuum equipment all surfaces in the work area. After completion of the second cleaning operation, perform a complete visual inspection of the work area to ensure that the work area is free of visible asbestos debris. The negative pressure system may be shut down only after clean air has been achieved.

F. Include sealed drums and all equipment used in the work area in the cleanup and remove from work areas, via the equipment decontamination enclosure system, at an appropriate time in the clean sequence.

G. Conduct cleaning and disposal operations to comply with applicable ordinances and antipollution laws. Do not burn or bury rubbish and waste materials on job site. Do not dispose of volatile wastes in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

H. Store volatile wastes in covered metal containers during work hours and remove from premises at end of workday. Prevent accumulation of wastes, which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.

I. If the Industrial Hygienist, within 24 hours after the second cleaning, finds visible accumulations of asbestos debris in the work area, repeat the wet cleaning until the work area is in compliance, at no additional expense to the Owner.

J. Remove the first layer of plastic sheet from walls and floors only. Take proper care in folding up plastic sheeting to minimize dispersal of residual asbestos containing debris.

K. Leave the windows, doors, and HVAC vents sealed. Maintain HEPA filtered negative air pressure systems, air filtration and decontamination enclosure systems in service.

L. Following the final visual inspection by the IH, after the removal of asbestos-containing materials and decontamination of work areas, and while space enclosures systems remain in place, seal all surfaces from which asbestos-containing material have been removed to assure immobilization of any remaining fibers. Use a colored sealant so that complete coverage may be ensured by a visible inspection by the IH to verify that asbestos-containing material has been adequately removed. Apply sealer in accordance with manufacturer's recommendations using airless spray equipment.

M. Clearance air samples will be taken by the IH using aggressive air sampling. Analysis will be made using Phase Contrast Microscopy or Transmission Electron Microscopy.

N. Clean all access routes used to transport ACM.

3.13 WORK AREA CLEARANCE

A. The work is complete when the work area is visually clean and airborne fiber levels have been reduced to the level specified below. When this has occurred, the Asbestos Contractor will notify the Industrial Hygienist that the area is ready for clearance.

B. The number and volume of air samples taken and analytical methods used by the Industrial Hygienist will be in accordance with applicable regulations.

C. **The Owner will pay for the initial testing required for clearance. Should the initial testing fail, the Contractor will reimburse the Owner for the cost of all additional testing based on $90.00 per hour for project monitor, $30.00 per each PCM.**

3.14 DISPOSAL OF ACM AND ASBESTOS CONTAMINATED WASTE

A. To prevent exceeding available storage capacity on site, remove sealed and labeled containers of asbestos waste and dispose of such containers at an authorized disposal site in accordance with the requirements of disposal authority.

B. Comply with 29 CFR l926.1101.

C. Seal all asbestos and asbestos contaminated waste material with double thickness 6-mil, sealable plastic bags. Label the bags; transport and dispose of all in accordance with the applicable OSHA and EPA regulations. At the conclusion of the job, place all polyethylene material, tape, cleaning material and clothing in the plastic lined drum. Seal, correctly label, and dispose of as asbestos waste material.

D. Transport the bags to the approved waste disposal site. Asbestos Contractor shall obtain trip tickets at the landfill to document disposal of asbestos containing materials. A form shall be signed, not initialed, by all parties. Copies of all trip tickets shall be submitted to the Industrial Hygienist.

E. If a rental vehicle is used to transport asbestos waste, Asbestos Contractor shall provide to the vehicle's owner a written statement as to the intended use of the vehicle. A copy of such notice, signed by the vehicle owner, shall be provided to the Industrial Hygienist prior to transporting materials in the vehicle. Two layers of 6-mil plastic sheet shall be placed on the floor and walls of the rental vehicle prior to loading any containers of asbestos waste.

F. Consider wastewater from showers and sinks to be contaminated waste and dispose of in accordance with this Section, unless water has been filtered through a 5 micron filter.

3.15 DISPOSAL OF NON-CONTAMINATED WASTE:

A. Remove from the site all non-contaminated debris and rubbish resulting from demolition operations. Transport materials removed from demolished areas and dispose of off site in a legal manner.

B. During progress of work, clean site and public properties, and dispose of waste materials, debris, and rubbish. Provide on-site containers for collection of waste materials, debris, and rubbish. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.

3.16 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

A. After asbestos abatement work and decontamination is complete, relocate objects moved to temporary locations in the course of the work to their former positions. Re-secure mounted objects removed in the course of the work in their former positions and assure that they are in working order.

3.17 FINAL CLEAN UP

A. Employ experienced workers or professional cleaners for final cleaning. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from exposed to view interior and exterior finished surfaces. Polish surfaces so designated.

3.18 ALTERNATE CONTAINMENT SYSTEM

A. In lieu of the containment system previously described consisting of a decontamination enclosure system utilizing curtained doorway, and a negative air system to exhaust sufficient air to achieve one air change every 15 minutes, the following system will be allowed:

B. Construct a decontamination unit consisting of a totally enclosed Equipment Room, Shower Room, Air Locks, and Clean Room as described above except that instead of curtained doorways between rooms, doorways shall be solid core rigid wooden or fiberglass doors. Door at entrance into Clean Room from the uncontaminated area shall contain a HEPA filter. This doorway shall have gasketted seals around the HEPA filter and the edges of the door to provide a tight seal. HEPA filter shall be mounted in the door securely using a mechanical fastening system. Each door shall be equipped with a self-closing mechanism.

C. Negative pressure units as described previously shall be utilized to create a pressure differential of 0.02 inches of water between the work area and the outside uncontaminated area. Only the required air volume to create the negative pressure shall be exhausted through the HEPA filter unit outside the work area. Additional HEPA filter units shall be located within the work area to provide for air circulation.

END OF SECTION

SECTION Z1020.10

ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this specification and the Contractor shall consult them in detail for instructions.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 RELATED WORK UNDER OTHER SECTIONS

A. Asbestos Remediation

B. Indoor Air Quality Procedures

1.03 HAZARDOUS MATERIALS PROCEDURE

A. Asbestos:
1. Asbestos Materials Exist On-Site: There are accessible and inaccessible asbestos containing materials (ACM) in the existing buildings. ACM affected by the Demolition and Renovation project are included under this contract. The Asbestos/Demolition Contractor shall refer to items below for proper procedures regarding removal and disposal of Roofing, Damproofing, building flashing and transite pipes. The Asbestos/Demolition Contractor shall formally notify each subcontractor that there are ACM existing in the buildings. Hidden ACM may only be found during Demolition. Refer to items 2 and 3 below.

2. Unknown and inaccessible ACM: During the Demolition work of the Contract, it is possible that previously unknown asbestos materials may be discovered in currently concealed locations.

3. Notification: If the Asbestos/Demolition Contractor discover or encounter any ACM during the performance of the work, the Asbestos/Demolition Contractor shall immediately:
   a. Stop work, notify the Owner and Clerk of the Works about the presence of suspect ACM and request instructions for proper action, and
   b. Take whatever steps and measures are necessary to reduce, control or eliminate the risk of exposure of workers and the public to the ACM.
   c. Every effort will be made to obtain DEP (12 working day notification period) waivers to remove hidden or unforeseen ACM by the asbestos contractor. The Asbestos/Demolition Contractor shall allow sufficient time for the removal of the ACM at no additional charges to the owner for delays and should waivers are denied.
4. Responsible Person On-Site: The Asbestos/Demolition Contractor shall designate one of its senior on-site employees to be in charge of coordination between the Architect,

the C.M At Risk Contractor, and all subcontractors with respect to hazardous materials issues.

5. Responsibility for Hazardous Material Discovery: It is the sole responsibility of the Asbestos/Demolition Contractor and its Subcontractors to undertake whatever measures, methods of procedures are necessary, required or otherwise appropriate to safeguard the health and safety of all workers and members of the public with respect to identification and discovery of previously unknown hazardous materials during the work of the Project.

6. Foundation and buildings flashing (including under window systems, door systems and walls) were found to exist and assumed to contain asbestos. If it is needed, the Demolition Contractor shall retain the services of a licensed asbestos abatement contractor for proper removal and disposal at no additional cost to the Owner in accordance with all federal and state regulations. The Demolition/Asbestos Contractor is solely responsible for means and methods and techniques used to properly remove and dispose of the ACM and shall comply with all federal, state and OSHA regulations. The Demolition Contractor shall include in his bid the disposal of 500 ton of the ACM. UEC will record on a daily basis all quantities removed. The Demolition Contractor will be required to do the same. At the completion of the Demolition project, should quantities of ACM removed were found to be less than 500 ton, the Demolition Contractor will be required to issue a credit to the owner based on $125.00 per ton or will be paid $140.00 per ton should quantities of ACM coated walls removed were found to be greater than the listed above. The unit price includes all applicable costs. It is also the Asbestos/Demolition Contractor's responsibility to comply with DEP Policy Statement BWP-96-012 and DEP 310CMR 7.15. Refer to item 9 below.

7. Damproofing, including but not limited to paper, glue, glue daubs on Styrofoam (Coated Walls) were found to contain asbestos and were found to exist throughout the buildings on walls and possibly on the interior of the foundation walls. The ACM was also found sandwiched between the outside walls. It is the Asbestos/Demolition Contractor's responsibility to own the removal and disposal of all ACM coated walls. The Asbestos/Demolition Contractor shall separate/segregate ACM coated walls and to perform the removal work at no additional cost to the Owner in accordance with all federal and state regulations. The Asbestos/Demolition Contractor is solely responsible for means and methods and techniques used to properly remove and dispose of the ACM and shall comply with all federal, state and OSHA regulations. The Asbestos/Demolition Contractor shall include in his bid the disposal of 3,500 ton of ACM coated walls. UEC on-site project monitor will record on a daily basis all quantities removed. The Asbestos/Demolition Contractor will be required to do the same. At the completion of the Demolition project, should quantities of ACM coated walls removed were found to be less than 3,500 ton, the Asbestos/Demolition Contractor will be required to issue a credit to the owner based on $125.00 per ton or will be paid $140.00 per ton should quantities of ACM coated walls removed were found to be greater than the listed above. The unit price includes all applicable costs. It is also the Asbestos/Demolition Contractor's responsibility to comply with DEP Policy Statement BWP-96-012 and DEP 310CMR 7.15. At no additional cost to the owner, the Asbestos/Demolition Contractor will be required to separate ACM coated walls from non ACM coated walls. Only ACM coated walls will be included for proper disposal by

the Asbestos/Demolition Contractor. Certain interior walls (previously exterior due to additions) might be coated with ACM and shall be properly removed and disposed. Refer to item 9 below.

8. Quantities for materials included above in items 7 and 8 are in an addition to the scope required to demolish/dispose of the buildings per the demolition sections and only to be used for additions and deduction. Credit shall be given to the owner for all quantities listed above multiplying by the credit prices should less ACM was found. The Asbestos/Demolition Contractor shall carry all costs related to demolition and disposal in his bid as non-ACM and all scope and quantities listed above in items 7 and 8.

9. UEC will prepare and submit to the DEP for approval Non-Traditional Work Plans (NTWP) at no additional cost to the contractor in accordance with DEP 310CMR 7.15. UEC will be providing on-site air monitoring during demolition per DEP requirements at no additional cost to the Contractor. Contractor shall fully comply with the plan at no additional cost to the owner.

10. Transite and ACM insulated pipes were assumed to exist underground. The Asbestos/Demolition Contractor and/or site contractor shall excavate around the pipes to expose the pipes at no additional cost to the owner for removal by the asbestos contractor.

11. The Asbestos/Demolition Contractor will not be allowed to charge for any lose value should ACM coated columns or beams are found and shall dispose per item 8 above.

12. Indemnification: To the fullest extent permitted by law, the C.M at Risk Contractor and Asbestos/Demolition Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including, but not limited to, attorneys' fees arising out of or relating to the performance of the Work, including the discovery or identification of any hazardous materials, provided that any such claim, damage, loss or expense if attributable to bodily injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the lose of use resulting therefrom; and is caused in whole or in part by any negligent act or omission of the C.M at Risk Contractor and Asbestos/Demolition Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

B. Lead:

1. The C.M At Risk Contractor and all Trades shall be made aware that Lead Based Paint exists on painted surfaces throughout the buildings.
2. It is the C.M At Risk Contractor and all Trades responsibility to either test painted surfaces or assume that all existing painted surfaces are coated with Lead Paint. All costs for testing shall be the responsibility of the C.M At Risk Contractor and all Trades at no additional cost to the Owner.
3. All the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance and guidelines in such from in which they

exist at the time of the work on the Contract and as may be required by subsequent regulations.

4. The C.M At Risk Contractor shall retain the services of a Massachusetts licensed lead abatement contractor to remove/de-lead painted surfaces as needed during the project.
5. The C.M At Risk Contractor and all Trades are solely responsible for means and methods, and techniques used for demolition and lead control. The C.M At Risk Contractor and all Trades shall collect and control lead contaminated debris and to properly remove and dispose of lead contaminated soil around each buildings due to demolition activities.
6. The C.M At Risk Contractor and all Trades shall at his own cost and expense comply with all laws, ordinance, rules and regulations of Federal, State, Regional and Local authorities during demolition, prepping, sanding, cutting, burning, scraping, painting over, grinding and regarding handling, storing and disposing of lead and lead contaminated waste material.

7. The C.M At Risk Contractor and all Trades shall submit to the Architect prior to commencing of work the following:

   a. Written respiratory and notification program
   b. Written lead compliance program in accordance with OSHA regulations including:
      1. Training requirement certifications.
      2. Supervisor qualifications.
      3. Written compliance program specific to this project
      4. Respirators fit test records.
      5. Medical surveillance certificates.

8. The EPA and the DEP require demolition debris with lead to be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine the potential for significant amounts of lead to leach out of the waste. If the results are below the DEP standard (5.0 ppm), the waste may be disposed of in a conventional landfill for demolition debris. If, however, the TCLP results are above the DEP standard, the waste must be disposed of in a DEP approved, hazardous waste landfill. The C.M At Risk Contractor and all Trades shall at own cost and expense perform all required testing of waste by the TCLP. The C.M At Risk Contractor and all Trades must submit to the Owner copy of tests performed and all waste shipment records prior to disposing of debris. The Owner reserves the right to have own TCLP samples collected to verify results. All disposal costs shall be at the C.M At Risk Contractor and all Trades responsibility.
9. The following references are cited as current applicable publications. This project is subject to compliance with the all regulations including but not limited to:

   a. Commonwealth of Massachusetts, Department of Labor and Work Force Development 454 CMR 11.00, Structural Painting Safety Code, as currently amended.

   b. Commonwealth of Massachusetts, Department of Environmental Protection, and Hazardous Materials Regulations at 310 CMR 30.00 as currently amended.

   c. U. S. Department of Labor, Occupational Safety and Health Administration Title 29 CFR 1910.1025 and 29 CFR Part 1926.62.
   d. U. S Department of Environmental Protection, Resources Conservation and Recovery Act.

e. Commonwealth of Massachusetts, Department of Labor and Work Force Development 454 CMR 22.00.
f. Commonwealth of Massachusetts, Department of Environmental Protection, 310 CMR 6.0-8.0.
g. Commonwealth of Massachusetts, Department of Environmental Protection ABC rubble rules.

10. All above regulations are applicable to this project. Where there is a conflict between this section and the applicable regulations, the more stringent requirement shall prevail.

C. Other Hazardous Materials:

1. The C.M At Risk Contractor and all Trades shall be made aware that other hazardous materials are found inside/outside the buildings.
2. The C.M At Risk Contractor and all Trades shall be responsible for quantifying, removal and proper disposal of all remaining hazardous materials in/out the buildings, including but not limited to batteries and related electrolytic material, PCB's, mercury and Freon inside air conditioners, switches, exit signs, thermostats and other items.

D. PCB's:

1. The C.M At Risk Contractor and all Trades shall be made aware that building materials (Material) including but not limited to painted surfaces, glue, roofing, coatings, caulking and other building materials are likely to contain >1 ppm of Polychlorinated Biphenyls PCB's.
2. Due to the difficulty associated with exhaustive testing of all surfaces, glue, and coatings within the building, the Owner has elected to direct the C.M At Risk Contractor and all Trades to assume that these surfaces do, in fact, contain PCB's and to take all necessary steps for their compliant removal and disposal.
3. EPA does not require testing and therefore, testing will not be permitted.
4. All of the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance and guidelines.
5. The C.M At Risk Contractor and all Trades are solely responsible for means and methods, and techniques used for demolition and control. The C.M At Risk Contractor and all Trades shall collect and control PCB's contaminated debris and soil.
6. The C.M At Risk Contractor and all Trades shall at its own cost and expense comply with all laws, ordinance, rules and regulations of Federal, State, Regional and Local authorities during prepping, sanding, cutting, burning, scraping, painting over, grinding and regarding handling, storing and disposing of contaminated waste material and during demolition of the building.

E. Silica Dust:

1. The C.M At Risk Contractor and all Trades shall be made aware that building materials (Material) may contain Silica.
2. Due to the difficulty associated with exhaustive testing, the Owner has elected to direct the C.M At Risk Contractor and all Trades to assume that Silica was found.
3. The C.M At Risk Contractor and all Trades shall review and comply with most recent US Department of Labor Final Rule and shall take extra precautions to protect workers and other personnel on site.

PART 2 – (PRODUCTS) **Not Used**

PART 3 – (EXECUTION) **Not Used**

END OF SECTION

SECTION Z1020.20
INDOOR AIR QUALITY PROCEDURES

PART I - GENERAL

1.01 GENERAL PROVISIONS

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this specification and the Contractor shall consult them in detail for instructions.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 RELATED WORK UNDER OTHER SECTIONS

A. Asbestos Remediation

B. Environmental Procedures

1.03 DESCRIPTION OF WORK

A. This Section shall include, but not be limited, to the following as they relate to IAQ:
1. Maintaining indoor air quality.
2. Selection of products.
3. Work procedures.
4. Dust control.
5. Isolation of work area.
6. Air-out (off-gassing) period.
7. Mold requirements.

1.04 INTENT

A. The Contractor's attention is directed to the provisions throughout the Contract Documents, which are intended to maintain air quality to the strictest of published levels. The Contractor provisions will be strictly enforced. The Contractor and Filed Sub-Bid Contractors shall notify and require each Subcontractor, and materials vendor to comply with such provisions.

B. It is the intent of the Owner to maintain a healthy environment for occupants of the school during construction. As such, the Contractor shall conduct the work in such a way as to avoid creating indoor air quality problems. This includes limiting use of products, which may contribute to such problems and maintaining work procedures, which contain and alleviate dusts and odors and airborne Contaminants.

1.05 USE CHARGES

A. Unless otherwise indicated, Cost or use charges for these services are not chargeable to the Owner or Architect and will not be accepted as a basis of claims for a Change Order. The C.M At Risk Contractor ("Contractor") shall pay for all applicable costs.

1.06 MAINTAINING INDOOR AIR QUALITY

A. The Owner has engaged the services of an Industrial Hygienist (IH) whose responsibilities will include review of construction materials and methods with the intent to maintain Indoor Air Quality. The Contractor shall cooperate with the Owner's Industrial Hygienist by providing information about materials and methods as requested, and by selecting products and utilizing work activities as recommended which will reduce Indoor Air Quality problems. This will in now way alleviate the responsibilities of the Contractor to use means, methods, equipment and materials that do not adversely affect the Indoor Air Quality of the school, and comply with the contract documents and specifications.

B. Comply with specified requirements of this Section and of other individual sections of the specifications for restrictions on use of materials and work processes.

C. Comply with more restrictive requirements where specified during times of Active Use.

1. Where specified, certain materials may not be applied and certain activities may not take place when the building is in Active Use.
2. Where specified, materials must be applied with a minimum time allowed for curing and airing-out prior to the work Areas being returned to the Owner for Active Use.

D. Where specified provisions cannot be accomplished, notify the Architect and the Owner's Industrial Hygienist. Suggest alternative provisions to be approved by the Architect and the Industrial Hygienist.

E. Protect existing outdoor air intakes during construction and prevent ingestion of outdoor pollutants, contaminants and dust into air intakes as well as unit ventilators, window intake or air conditioning or similar equipment of the existing school.

1.07 SUBMITTALS

A. Prior to commencement of work, the Contractor shall submit to the Architect, a Site Specific Health and Safety Plan (SSHSP) for protection of the occupants. No work may commence until the Owner's Industrial Hygienist has reviewed and approved this SSHSP.

B. The SSHSP shall be prepared and signed by an ABIH (American Board of Industrial Hygiene), CIH (Certified Industrial Hygienist). The name, company name, qualifications and insurance coverage of the CIH shall be designated in the Contractor's initial submittal package prior to mobilization and shall not be changed without prior written consent from the Architect. The CIH shall not designate his or her duties to other parties, personnel or sub-contractors without the prior written consent of the Architect. All laboratories to be used by the CIH shall be clearly identified as AIHA (American Industrial Hygiene Association) accredited, with copies of the certificates in the submittals.

C. The SSHSP shall be based on the EPA (Environmental Protection Agency) IAQ (Indoor Air Quality) Tools for Schools program, as well as the ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Indoor Air Quality Standards, DPH (Massachusetts Department of Public Health), NIOSH (National Institute for Occupational Safety and Health), ACGIH (American Conference of Governmental Industrial Hygienists) and SMACNA's (Sheet Metal and Air Conditioning Contractors' National Association) IAQ Guidelines for Occupied Buildings Under Construction.

D. This plan shall include, but not be limited to:

1. A written on-site IAQ organizational structure to include assigned personnel and response protocols.

2. Designation of a full-time on-site IAQ Coordinator responsible for implementation and oversight of the plan. The lines, form and frequency of communication by the IAQ Coordinator to the Owner, Architect or other party shall be clearly defined in the SSHSP and adhered to.

E. Prior to bringing any material to the site, investigate each material and determine all possible negative qualities including, without limitation, "off-gassing" odors, fumes, and other objectionable or harmful conditions. Provide an "Executive Summary" in the form of a matrix of all materials, their possible negative qualities, and proposed mitigating actions. The "Executive Summary" shall be supported by MSDS information. Raw MSDS information without the "Executive Summary" is not acceptable.

1.08 STANDARDS

A. Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition". Comply with Occupational and Safety Health Act of 1970, latest revision. Comply with EPA IAQ Tools for Schools program [http://www.epa.gov/iedweb00/schools/tools4s2.html]. Comply with ASHRAE Standard 62.1-2004 – Ventilation for Acceptable Indoor Air Quality. Comply with SMACNA's IAQ Guidelines for Occupied Buildings under Construction. Comply with all other applicable safety standards and regulations.

B. The following additional references shall be also be used in compiling the SSHSP and defining potential pollutant or irritant test levels to be achieved, which shall be adjusted as necessary for exposure by school age children.
1. "Indoor Air Quality: Position Paper, (Approved by ASHRAE Board of Directors August 11, 1987; Reaffirmed by ASHRAE Board of Directors February 10, 2000)." [http://www.ashrae.org/ABOUT/iaq_papr.htm].
2. ACGIH (American Conference of Governmental Industrial Hygienists) TLV (Threshold Limit Values), TWA (Time Weighted Average) and STEL (Short Term Exposure Limits) and CEIL (Ceiling Limits), most current published limits.
3. NIOSH (National Institute for Occupational Safety and Health) REL (Recommended Exposure limits), TWA and STEL/CEIL, most current published limits.
4. DPH BEHA (Massachusetts Department of Public Health Bureau of Environmental Health Assessment) publication updated February 2004 entitled "Environmental Health & Safety Issues in Massachusetts' Schools", particularly the section "Renovations in buildings while occupied (or adjacent to occupied areas)."

1.09 TESTING

A. Air Quality Testing: Prior to commencement of construction, during construction and at the completion of work and prior to Owner's occupancy of the new school, the Owner's IH will conduct tests and provide test reports. Testing will be done for airborne volatile organic compounds, dust particle counts, carbon dioxide, carbon monoxide, airborne and surface mold, relative humidity, temperature, formaldehyde and other characteristics deemed appropriate. Testing will be conducted in quantity and locations deemed adequate by the IH to characterize the air quality in the areas of interest with reference to the Standards in

article 1.08 above.

B. Owner occupancy is contingent upon acceptable air quality. Owner‘s occupancy shall not occur until satisfactory results of the air quality testing are obtained at least in accordance with the strictest of the standards and guidelines.

C. On a quarterly basis or as needed, the Contractor’s CIH will be required to conduct tests at the existing school and provide test reports. Testing shall be done for airborne volatile organic compounds, dust particle counts, carbon dioxide, carbon monoxide, relative humidity, temperature, formaldehyde and other characteristics deemed appropriate. Testing areas must be reviewed in locations deemed acceptable by the Owner’s IH.

D. Signed by the Contractor’s CIH, submit reports of tests and inspections performed within 1 (one) calendar day of the results becoming known. Sample analyses that are conducted off site at an approved laboratory shall be available within 24-hours of collection of the samples unless otherwise agreed upon in writing. Report immediately where immediate health and safety of the Owner’s building occupants may be affected.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Throughout the Work, use products and materials which contribute the minimum practicable dust, odors and contaminates to the indoor environment.

B. Use products with maximum Volatile Organic Compound (VOC) content of 7% by volume.
1. Where proposed materials exceed this standard, submit Product Data, Material Safety Data Sheet, and description of use of product to the Architect for review by the Owner’s Industrial Hygienist for approval. Products may be approved with limitations, or alternative products may be required or recommended. Comply with requirements of the Industrial Hygienist for these items.
2. If products exceeding 7% VOC are permitted by the Owner, Contractor shall submit a plan to address air quality, fire hazards, and other related issues. Provide ventilation sufficient to remove odors from the building.
3. During periods of Active Use, comply with additional provisions as established by the Owner’s Industrial Hygienist in cooperation with the Contractor.
4. Comply with air-out provisions of this Section for the use of solvent-containing products.

C. Select water-based and low-VOC products in each case where such materials are available.

D. Select products with low formaldehyde content where available. Seal particleboard on all surfaces, or use other type of board in place of particleboard with alternative non-formaldehyde containing adhesives, as approved by the Owner’s Industrial Hygienist.

PART 3 - EXECUTION

3.01 WORK PROCEDURES

A. Provide controls as specified to reduce potential for odors, dust, and fumes from affecting occupants of the existing school.

B. Conduct work producing excessive odors and dust during off hours, nights and weekends at no additional cost to the Owner.

C. When necessary to conduct welding operations, advise the Owner and the Owner's Industrial Hygienist 24 hours in advance. Provide temporary, specialized portable ventilation units which vent to the exterior of the building, away from open windows or vents of the existing school. Comply with all OSHA requirements including personal and respirator protection.

D. Do not operate any vehicle, machinery, or Engines Noise and Exhaust Fumes engine less than 50 feet from the school, except where specific prior written permission has been obtained from the Owner or Architect. Ensure exhaust fumes do not migrate to the existing school.

3.02 VENTILATION

A. Prevent dust and odors from entering the existing school.

B. Continuously ventilate the new school building during installation of products or materials that emit VOC.

3.03 DUST CONTROL AND MIGRATION OF AIR OR CONTAMINANTS FROM WORK AREAS

A. Generally, take steps as necessary to prevent construction dust and contaminants from entering the existing school during construction of the new school.

B. Maintain tight barriers during duration of the work that prevent any dust and contaminant migration to the existing school.

C. Levels of airborne respirable dust in the existing school during active use resulting from construction activities, which are in excess of the Total dust limit of 10 mg/m^3 and the Respirable limit of 3 mg/m^3, (TLV of the ACGIH) shall be deemed excessive. The SSHSP shall specify a real-time sampling schedule and protocol with confirmation NIOSH 0500 method (Total dust) and NIOSH 0600 method (Respirable dust) sampling and analysis to be implemented by the Contractor to verify no dust migration to the existing school that is acceptable to the Owner. The Owner's IH may undertake confirmation sampling, which shall be at the Contractor's expense if the results are found to exceed these limits.

1. Should such level occur, immediately stop activities which are creating dust, and take such steps as required to reducing the level of dust to acceptable limits.

E. If not previously performed by the file sub-bidder, use HEPA vacuums to clean all carpets, surfaces and duct exteriors prior to Owner's occupancy of the new school. All duct interiors shall also be clean and free of debris, dust, water or condensation and mold growth, or the Contractor will have the duct interiors cleaned in accordance with SMACNA guidelines by

an experienced duct-cleaning contractor approved by the Owner. All such vacuuming and cleaning shall be undertaken at no cost to the owner. Contractor shall submit to Owner for approval prior to use, specifications for all HEPA vacuums and HEPA filters to be used, which shall all be brand new and never used prior to this project. No rental units shall be used. At the end of the project, these HEPA vacuums shall be cleaned, the HEPA and all other filters replaced with new filters and returned to the Owner as property of the Owner.

3.04 WATER DAMAGE

A. To prevent growth of harmful fungus, mold, and similar biological activity take precaution to prevent porous materials such a gypsum board, insulation, ceiling tile, wood, and similar products from becoming wet.

B. Remove and replace within 24-48 hours of construction, materials which become wet, or which show evidence of biological growth due to the presence of moisture, or which as determined by the owner's IH to be water-damaged and may compromise air quality, in accordance with EPA guidelines and at no cost to the Owner.

3.05 OFF-GASSING PERIOD

A. Complete work requiring use of products exceeding 7% VOC at least 21 calendar days prior to Owner's scheduled use of the new school.

B. Complete work requiring use of products manufactured with urea-formaldehyde adhesive at least 21 calendar days prior to Owner's occupancy of the new school and coordinate with Owner.

C. Complete all Work with solvent-containing materials which exceed 7% VOC by volume and work creating excess fumes and dust at least 21 calendar days prior to Owner's occupancy of the new school.

D. During the period prior to the Owner's occupancy of the new school ventilate work areas with maximum possible volume of outside air for a continuous period of 7 days. Maintain normal room temperature during this period. To the extent possible, provide ventilation after installations of furnishings.

3.06 WORK PLAN

A. In Addition to the above requirements, during construction, meet or exceed all of the following minimum requirements: Temporary construction ventilation - Continuously ventilate during installation of materials that emit Volatile Organic Compound (VOC) and after installation until emissions dissipate. Follow the recommended ventilation times in the MA-CHPS Specifications or ventilate 72 hours. Ventilate areas directly to outside areas; do not ventilate to other enclosed spaces. If continuous ventilation is not possible via the building's HVAC system(s), then ventilate via open windows and temporary fans that provide no less than three air changes per hour and ensure exhaust to the outside of the building.

B. Dust protection: Turn the ventilation system off, and protect HVAC supply and return openings from dust infiltration during dust producing activities (e.g. drywall installation and finishing). Provide temporary ventilation as required.

C. HEPA vacuuming and dust cleaning: Vacuum surfaces with a high efficiency particulate arrestor (HEPA) vacuum. If ducts contain dust and dirt, clean them using a HEPA vacuum immediately prior to substantial completion and prior to using the ducts to circulate air (refer to article 3.03 E above).

D. Oil film on interior of sheet metal should be removed before shipment to site. The duct must be inspected by the Contractor to confirm that no oil film is present inside the duct. The Contractor shall remove any oil.

3.07 TESTING EQUIPMENT

The following or approved equivalent testing equipment specifications shall be met.

A. VOC - Screening measurements
Real-time direct reading measurements for VOC shall be performed using a PID (Photo-ionization detector) as follows.

Detector	Photo-ionization with 10.6 eV lamp
Battery	Rechargeable with capability for 10 hours of continuous operation
Direct read-out	Instantaneous digital display
Range	0 – 200 ppmv
Resolution	0.1 ppmv
Response time	10 seconds
Calibration	Two-point calibration for fresh air or standard VOC-free gas (nitrogen or pure air) and standard isobutylene reference gas (50 ppmv or 100 ppmv), performed at each use.
Sampling pump	Internal integrated with 150 cc/min flow rate
Maintenance	Certificate indicating that the instrument has received factory service within one year of anticipated duration of use for the project.

B. Particulate - Screening measurements
Airborne Total and Respirable dust shall be monitored using a real-time, direct reading, data logging instrument such as a Micro dust Pro Aerosol Photometer (manufactured by casella Ltd.) or equivalent that provides mass concentrations of airborne dust by using a light-scattering photometer, with conversions of the particles measured to mg/m^3 units in accordance with factory calibration using standard Arizona Road Dust as follows. Printed graphs with numerical summaries for logged data for each testing day shall be submitted to the Owner.

Detector	Near forward light-scattering – 880 nm in infrared
Battery	AC adapter, battery operated or rechargeable with capability for 8 hours of continuous operation
Direct read-out	Instantaneous digital display
Range	0.001 to 250 mg/m^3 (over 4 reading ranges)
Resolution	0.001 mg/m^3
Zero stability	Typically <2 $\mu m^3/^oC$
Span stability	±0.7% of reading/ºC
Logging interval	15 seconds
Calibration and maintenance	Certificate indicating that the instrument has received factory service or calibration within one year of anticipated duration of use for the project
Sampling pump and cyclone	External pump capable of up to 3.0 L/min constant flow rate with a cyclone and pre-weighed 37-mm filter cassette attached to meet NIOSH 0600 (for respirable dust) and NIOSH 0500 (for total dust) without cyclone.

C. CO_2 - Screening measurements
CO_2 (Carbon Dioxide) shall be monitored using a real-time direct reading instrument equipped with an infrared detector as follows.

Detector	Non-Dispersive Infrared (NDIR)
Battery	AC adapter, battery operated or rechargeable with capability for 8 hours of continuous operation
Direct read-out	Instantaneous digital display (ppmv)
Range	0 – 5,000 ppmv
Accuracy	± 3% of reading; ± 50 ppmv at 25 ºC (77 ºF) plus ± 0.36% uncertainty per ºC change in temperature.
Resolution	1 ppmv
Response time	20 seconds (for 63% of final value for 500 ppm step change)
Calibration and	Two-point calibration for standard CO_2-free gas (pure air) and standard CO_2 reference gas (1,000 ppmv),

maintenance	performed at each use. Certificate indicating that the instrument has received factory service or calibration within one year of anticipated duration of use for the project.

D. CO - Screening measurements
CO (Carbon Monoxide) shall be monitored using a real-time direct reading instrument equipped with an electro-chemical sensor as follows.

Detector	Electro-chemical
Battery	AC adapter, battery operated or rechargeable with capability for 8 hours of continuous operation
Direct read-out	Instantaneous digital display (ppmv)
Range	0 – 500 ppmv
Accuracy	± 3% of reading or 3 ppmv, whichever is greater, plus ± 0.5% uncertainty per ºC (± 0.28% uncertainty per ºF) away from calibration temperature.
Resolution	0.1 ppmv
Response time	< 60 seconds to 90% of final value
Calibration and maintenance	Two-point calibration for standard CO-free gas (pure air) and standard CO reference gas (35 or 50 ppmv), performed at each use. Certificate indicating that the instrument has received factory service or calibration within one year of anticipated duration of use for the project.

E. Temperature and relative humidity - Screening measurements: Temperature and relative humidity measurements shall be performed using an instrument equipped with electronic sensors as follows.

Detector	Temperature – ther-mister Relative humidity – thin-film capacitive
Battery	Battery operated or rechargeable with capability for 8 hours of continuous operation
Direct read-out	Instantaneous digital display (ºF for temperature and % for relative humidity)
Range	32 to 122 ºF temperature; and 5 to 95% relative humidity

Accuracy	± 1 ºF temperature; ± 3% relative humidity
Resolution	0.1 ºF temperature; 0.1% relative humidity
Response time	< 60 seconds to 90% of final value
Calibration and maintenance	Certificate indicating that the instrument has received factory service or calibration within one year of anticipated duration of use for the project.

3.08 SCREENING MEASUREMENTS

A. General: Throughout the work activities the Contractor shall perform monthly inspections for visible signs of dust migration and noticeable odors, as well as screening measurements for indoor air quality parameters including, VOC, airborne particulates using direct-reading instrumentation. These inspections and measurements shall be used to (i) monitor air quality during construction work activities and to alert Contractor to institute corrective measures, if needed, to maintain acceptable indoor air quality; and (ii) to ensure that air quality parameters in the existing school are at acceptable levels.

A. Action Level: Action Levels are established to monitor air quality during construction work activities and to alert Contractor to institute corrective measures, if needed, to maintain acceptable indoor air quality.

1. VOC Action Level: The Action Level for screening measurements for VOC in a given test location shall be a measurement of 2 ppmv (parts per million of air) or greater, of approximately one minute duration or longer. If the Action Level is exceeded, the Contractor shall repeat the measurement in the same test location 15 minutes later. If the Action Level is exceeded twice in the 15 minute period, or a persistent (15 minute duration or longer) noticeable organic solvent or “mothball” odor is present, the Contractor shall report the test results to the Owner and identify the source of the VOC, organic solvent or “mothball” odor and take immediate action to eliminate or reduce the source.
2. Particulate (Dust) Action Level: The Action Level for airborne dust in a given test location shall be a measurement of dust limit of 10 mg/m^3 and the Respirable limit of 3 mg/m^3 (milligrams per cubic meter) or greater, of approximately one minute duration or longer. If the Action Level is exceeded, the Contractor shall repeat the measurement in the same test location 15 minutes later. If the Action Level is exceeded twice in the 15-minute period, the Contractor shall report the test results to the Owner and identify the source of the particulate and take immediate action to eliminate or reduce the source.
3. CO Action Level: The Action Level for CO (Carbon Monoxide) in a given test location shall be a measurement of 2 ppmv or greater, of approximately one minute duration or longer. If the Action Level is exceeded, the Contractor shall repeat the measurement in the same test location 15 minutes later. If the Action Level is exceeded twice in the 15-minute period, the Contractor shall report the test results to the Owner and identify the source of the particulate and take immediate action to eliminate or reduce the source.

4. CO_2 Action Level: The Action Level for CO_2 (Carbon Dioxide) in a given test location shall be a measurement of 1,000 ppmv or greater, of approximately one minute duration or longer. If the Action Level is exceeded, the Contractor shall repeat the measurement in the same test location 15 minutes later. If the Action Level is exceeded twice in the 15-minute period, the Contractor shall report the test results to the Owner and identify the source of the particulate and take immediate action to eliminate or reduce the source.

B. Specified locations, frequency and types of screening measurements. Screening measurements shall include representative areas of the occupied areas of the building close to the adjacent work areas, selected by the Contractor's IH and as agreed to by the Owner's IH and shall take into consideration wind speed and direction, odors reported, locations and types of construction activities, possible points of entry and migration of air (such as barriers, ducts and pipes common to occupied and work areas, air intakes, elevator shafts, stairwells, pipe chases). Frequencies of testing shall be identified in SSHSP.

C. Acceptable end of shift concentrations. The following concentrations shall be considered as acceptable limits at the ends of each work shift.
- Total dust of 10 mg/m^3 and Respirable dust of 3 mg/m^3
- VOC of < 0.5 ppmv
- CO of 0.0 ppmv

3.11 OCCUPANCY CRITERIA

A. General: The new school shall be vacuum cleaned using HEPA vacuums in accordance with article 3.03 above. The areas shall be free of all stored items, chemicals and products, contain no wet materials and shall meet the air testing criteria indicated below.

B. Occupancy air test criteria: The following concentrations shall be considered as acceptable limits prior to occupancy of the new school.
- Total dust of 10 mg/m^3 and Respirable dust of 3 mg/m^3.
- Total VOC of < 250 $\mu g/m^3$ (referenced to Toluene) for sample period of not less than 480 minutes each.
- CO of 0.0 ppmv.
- CO_2 of < 500 ppmv.
- Full Aldehyde scan including Formaldehyde of < 0.002 ppmv for sample period of not less than 480 minutes each.

Testing for VOC and Aldehydes shall be conducted with the HVAC systems switched off for at least 12 hours prior to commencement of testing as well as being off during the test period.

END OF SECTION

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Schematic Design Drawings
SECTION 4.1.4

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4.1.4 – DRAWINGS

The Schematic Design Drawings set consists of the following sheets. The drawings are included as a separate stand-alone volume.

GENERAL
G-000 COVER SHEET & SHEET INDEX
G-300 PROJECT PHASING PLANS

SURVEY
EX-1 EXISTING CONDITIONS SURVEY
EX-2 EXISTING CONDITIONS SURVEY
EX-3 EXISTING CONDITIONS SURVEY
EX-4 EXISTING CONDITIONS SURVEY

CIVIL
C-000 CIVIL NOTES, LEGEND AND ABBREVIATIONS
C-100 OVERALL SITE DEMOLITION PLAN
C-101 SITE DEMOLITION PLAN I
C-102 SITE DEMOLITION PLAN II
C-103 SITE DEMOLITION PLAN III
C-104 SITE DEMOLITION PLAN IV
C-200 OVERALL SITE EROSION AND SEDIMENTATION CONTROL PLAN
C-201 SITE EROSION AND SEDIMENTATION CONTROL PLAN I
C-202 SITE EROSION AND SEDIMENTATION CONTROL PLAN II
C-203 SITE EROSION AND SEDIMENTATION CONTROL PLAN III
C-204 SITE EROSION AND SEDIMENTATION CONTROL PLAN IV
C-300 OVERALL SITE UTILITY PLAN
C-301 SITE UTILITY PLAN I
C-302 SITE UTILITY PLAN II
C-303 SITE UTILITY PLAN III
C-304 SITE UTILITY PLAN IV
C-400 SITE EROSION AND SEDIMENTATIONS CONTROL DETAILS
C-401 SITE LAYOUT DETAILS
C-402 SITE UTILITY DETAILS I
C-403 SITE UTILITY DETAILS II

LANDSCAPE
L-1.0 OVERALL HARDSCAPE PLAN
L-1.1 HARDSCAPE PLAN 1
L-1.2 HARDSCAPE PLAN 2
L-1.3 HARDSCAPE PLAN 3
L-1.4 HARDSCAPE PLAN 4
L-1.7 OVERALL HARDSCAPE ROOF PLAN
LP-2.0 OVERALL PLANTING PLAN
LP-2.1 PLANTING PLAN 1
LP-2.2 PLANTING PLAN 2
LP-2.3 PLANTING PLAN 3
LP-2.4 PLANTING PLAN 4
LP-2.7 OVERALL PLANTING ROOF PLAN

STRUCTURAL

S-000	STRUCTURAL FRAMING MODEL
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S-100A	BASEMENT FOUNDATION PLAN - PART A
S-100B	BASEMENT FOUNDATION PLAN - PART B
S-101	OVERALL FIRST FLOOR PLAN
S-101A	FIRST FLOOR FRAMING PLAN - PART A
S-101B	FIRST FLOOR FRAMING PLAN - PART B
S-101C	FIRST FLOOR FRAMING PLAN - PART C
S-101D	FIRST FLOOR / FOUNDATION PLAN -PART D
S-101E	FIRST FLOOR/FOUNDATION PLAN - PART E
S-101F	FIRST FLOOR/FOUNDATION PLAN - PART F
S-101G	FOUNDATION PLAN - PART G
S-102	OVERALL SECOND FLOOR PLAN
S-102A	SECOND FLOOR FRAMING PLAN - PART A
S-102B	SECOND FLOOR FRAMING PLAN - PART B
S-102C	SECOND FLOOR FRAMING PLAN - PLAN C
S-102D	SECOND FLOOR FRAMING PLAN - PART D
S-102E	SECOND FLOOR FRAMING PLAN - PART E
S-102F	SECOND FLOOR FRAMING PLAN - PART F
S-102G	SECOND FLOOR FRAMING PLAN - PART G
S-103	OVERALL THIRD FLOOR PLAN
S-103A	THIRD FLOOR FRAMING PLAN - PART A
S-103B	THIRD FLOOR FRAMING PLAN - PART B
S-103C	THIRD FLOOR FRAMING PLAN - PART C
S-103D	THIRD FLOOR FRAMING PLAN - PART D
S-103E	THIRD FLOOR FRAMING PLAN - PART E
S-103F	THIRD FLOOR FRAMING PLAN - PART F
S-103G	ROOF FRAMING PLAN - PART G
S-104	OVERALL FOURTH FLOOR / ATTIC PLAN
S-104B	ATTIC FRAMING PLAN - PART B
S-104C	ROOF FRAMING PLAN - PART C
S-104D	ROOF FRAMING PLAN -PART D
S-104E	FOURTH FLOOR FRAMING PLAN - PART E
S-104F	FOURTH FLOOR FRAMING PLAN - PART F
S-105	OVERALL FIFTH FLOOR / ROOF PLAN
S-105A	ROOF FRAMING PLAN - PART A
S-105B	ROOF FRAMING PLAN - PART B
S-105E	ROOF FRAMING PLAN - PART E
S-105F	FIFTH FLOOR FRAMING PLAN - PART F
S-106	OVERALL ROOF PLAN
S-106F	ROOF FRAMING PLAN - PART F
S-201C.1	BRACE FRAME ELEVATIONS I - PART C
S-201C.2	BRACE FRAME ELEVATIONS II - PART C
S-201D	BRACE FRAME ELEVATIONS - PART D
S-201E	BRACE FRAME ELEVATIONS - PART E
S-201F	BRACE FRAME ELEVATIONS - PART F

ARCHITECTURAL

AS-000	SITE PLAN

AD-100A	BASEMENT DEMO PLAN - EAST BLDG - PART A
AD-100B	BASEMENT DEMO PLAN - EAST BLDG - PART B
AD-100C	BASEMENT DEMO PLAN - WEST BLDG & FIELD HOUSE
AD-101A	FIRST FLOOR DEMO PLAN - EAST BLDG - PART A
AD-101B	FIRST FLOOR DEMO PLAN - EAST BLDG - PART B
AD-101C	FIRST FLOOR DEMO PLAN - WEST BLDG - PART C
AD-101D	FIRST FLOOR DEMO PLAN - WEST BLDG - PART D
AD-101E	FIRST FLOOR DEMO PLAN - FIELD HOUSE
AD-102F	SECOND FLOOR DEMO PLAN - BRIDGES
AD-102A	SECOND FLOOR DEMO PLAN - EAST BLDG - PART A
AD-102B	SECOND FLOOR DEMO PLAN - EAST BLDG - PART B
AD-102E	SECOND FLOOR DEMO PLAN - FIELD HOUSE
AD-102C	SECOND FLOOR DEMO PLAN - WEST BLDG - PART A
AD-102D	SECOND FLOOR DEMO PLAN - WEST BLDG - PART B
AD-103A	THIRD FLOOR DEMO PLAN - EAST BLDG - PART A
AD-103B	THIRD FLOOR DEMO PLAN - EAST BLDG - PART B
AD-103C	THIRD FLOOR DEMO PLAN - WEST BLDG - PART C
AD-103D	THIRD FLOOR DEMO PLAN - WEST BLDG - PART C
AD-104A	ATTIC DEMO PLAN - EAST BLDG - PART A
AD-104B	ATTIC DEMO PLAN - EAST BLDG - PART B
AD-106A	ROOF DEMO PLAN - EAST BLDG - PART A
AD-106B	ROOF DEMO PLAN - EAST BLDG - PART B
AD-106C	ROOF DEMO PLAN - WEST BLDG - PART C
AD-106C	ROOF DEMO PLAN - WEST BLDG - PART D
AD-106E	ROOF DEMO PLAN - FIELD HOUSE
AD-201	EXTERIOR DEMO ELEVATIONS - EAST BLDG
AD-202	EXTERIOR DEMO ELEVATIONS - EAST BLDG
AD-203	EXTERIOR DEMO ELEVATIONS - EAST BLDG
AD-204	EXTERIOR DEMO ELEVATIONS - EAST BLDG
AD-205	EXTERIOR DEMO ELEVATIONS - WEST BLDG
AD-206	EXTERIOR DEMO ELEVATIONS - WEST BLDG

A-000	CODE REVIEW
A-001	NOTES, ABBREVIATIONS, LEGENDS
A-002	PARTITION TYPES
A-100	OVERALL BASEMENT PLAN
A-106	OVERALL ROOF PLAN
A-100A	BASEMENT FLOOR PLAN - EAST BLDG - PART A
A-100B	BASEMENT FLOOR PLAN - EAST BLDG - PART B
A-101	OVERALL FIRST FLOOR PLAN
A-101A	FIRST FLOOR FLOOR PLAN - EAST BLDG - PART A
A-101B	FIRST FLOOR FLOOR PLAN - EAST BLDG - PART B
A-101C	FIRST FLOOR FLOOR PLAN - WEST BLDG - PART C
A-101D	FIRST FLOOR FLOOR PLAN - WEST BLDG PART D
A-101E	FIRST FLOOR FLOOR PLAN - GYM
A-101F	FIRST FLOOR FLOOR PLAN - FRESHMAN ACADEMY
A-102	OVERALL SECOND FLOOR PLAN
A-102A	SECOND FLOOR FLOOR PLAN - EAST BLDG - PART A
A-102B	SECOND FLOOR FLOOR PLAN - EAST BLDG S- PART B
A-102C	SECOND FLOOR FLOOR PLAN - WEST BLDG - PLAN C

A-102D	SECOND FLOOR FLOOR PLAN - WEST BLDG - PART D
A-102E	SECOND FLOOR FLOOR PLAN - GYM
A-102F	SECOND FLOOR FLOOR PLAN - FRESHMAN ACADEMY
A-102G	SECOND FLOOR FLOOR PLAN - BRIDGES
A-103	OVERALL THIRD FLOOR PLAN
A-103A	ATTIC FLOOR PLAN - EAST BLDG - PART B
A-103B	THIRD FLOOR FLOOR PLAN - EAST BLDG - PART B
A-103C	THIRD FLOOR FLOOR PLAN - WEST BLDG - PART C
A-103D	THIRD FLOOR FLOOR PLAN - WEST BLDG - PART D
A-103E	THIRD FLOOR FLOOR PLAN - GYM
A-103F	THIRD FLOOR FLOOR PLAN - FRESHMAN ACADEMY
A-104	OVERALL ATTIC, FOURTH & FIFTH FLOOR PLANS
A-104B	ATTIC FLOOR PLAN - EAST BLDG - PART B
A-104F	FOURTH FLOOR FLOOR PLAN - FRESHMAN ACADEMY
A-105F	FIFTH FLOOR FLOOR PLAN - FRESHMAN ACADEMY
A-106	OVERALL ROOF PLAN
A-106A	ROOF PLAN - EAST BLDG - PART A
A-106B	ROOF PLAN - EAST BLDG - PART B
A-106C	ROOF PLAN - WEST BLDG - PART C
A-106D	ROOF PLAN - WEST BLDG - PART D
A-106E	ROOF PLAN - GYM
A-106F	ROOF PLAN - FRESHMAN ACADEMY
A-106G	ROOF PLAN - BRIDGES
A-150E	OVERALL BASEMENT RCP -EAST
A-151E	OVERALL FIRST FLOOR RCP - EAST
A-152E	OVERALL SECOND FLOOR RCP -EAST
A-153E	OVERALL THIRD FLOOR RCP - EAST
A-151W	OVERALL FIRST FLOOR RCP - WEST
A-152W	OVERALL SECOND FLOOR RCP -WEST
A-153W	OVERALL THIRD FLOOR RCP -WEST
A-154W	OVERALL FOURTH & FIFTH FLOOR RCP -WEST
A-200	EXTERIOR ELEVATIONS - OVERALL EAST BLDG
A-201	EXTERIOR ELEVATIONS - EAST BLDG
A-202	EXTERIOR ELEVATIONS - EAST BLDG
A-203	EXTERIOR ELEVATIONS - EAST BLDG
A-204	EXTERIOR ELEVATIONS - EAST BLDG
A-205	EXTERIOR ELEVATIONS - OVERALL WEST BLDG
A-206	EXTERIOR ELEVATIONS - WEST BLDG
A-207	EXTERIOR ELEVATIONS - WEST BLDG
A-208	EXTERIOR ELEVATIONS - GYM
A-209	EXTERIOR ELEVATIONS - GYM
A-210	EXTERIOR ELEVATIONS - FRESHMAN ACADEMY
A-211	EXTERIOR ELEVATIONS - FRESHMAN ACADEMY
A-212	EXTERIOR ELEVATIONS - BRIDGES
A-301	BUILDING SECTIONS - EAST BLDG
A-302	BUILDING SECTIONS - WEST BLDG
A-303	BUILDING SECTIONS - GYM
A-304	BUILDING SECTIONS - FRESHMAN ACADEMY
A-351	WALL SECTIONS - EAST
A-352	WALL SECTIONS - WEST
A-401	AUDITORIUM PLANS - LEVELS 1 & 3

A-402 AUDITORIUM RCP
A-403 AUDITORIUM INTERIOR ELEVATIONS
A-403 GENERAL CLASSROOM COMPILATION
A-402 SCIENCE LAB COMPILATION
A-403 GYMNASIUM
A-620 WINDOW TYPES - EAST BUILDING
A-901 3D REPRESENTATIONS

FOOD SERVICE
K101 FOODSERVICE EQUIPMENT PLAN
K102 CULINARY ARTS FOODSERVICE EQUIPMENT PLAN

FIRE PROTECTION
FP0.0 FIRE PROTECTION RISE DIAGRAM WEST BUILDING
FP0.1 FIRE PROTECTION RISE DIAGRAM WEST BUILDING
FP0.3 FIRE PROTECTION RISE DIAGRAM EAST BUILDING

MECHANICAL
M1-1 HVAC BASEMENT FLOOR PLAN - EAST BUILDING
M1-2 HVAC FIRST FLOOR PLAN - EAST BUILDING
M1-3 HVAC SECOND FLOOR PLAN - EAST BUILDING
M1-4 HVAC THIRD FLOOR PLAN - EAST BUILDING
M1-5 HVAC ROOF PLAN - EAST BUILDING
M2-1 HVAC FIRST FLOOR PLAN - WEST BUILDING
M2-2 HVAC SECOND FLOOR PLAN - WEST BUILDING
M2-3 HVAC THIRD FLOOR PLANS - WEST BUILDING
M2-4 HVAC FOURTH AND FIFTH FLOOR PLANS - WEST BUILDING
M2-5 HVAC ROOF PLAN - WEST BUILDING
M3-1 HVAC AIRFLOW RISER DIAGRAMS - EAST BUILDING
M3-2 HVAC HOT WATER FLOW DIAGRAMS - EAST BUILDING
M3-3 HVAC CHILLED WATER FLOW DIAGRAMS - EAST BUILDINGS
M3-4 HVAC AIRFLOW RISER DIAGRAMS - WEST BUILDING
M3-5 HVAC HOT WATER FLOW DIAGRAMS - WEST BUILDING
M3-6 HVAC CHILLED WATER FLOW DIAGRAMS - WEST BUILDINGS

ELECTRICAL
E001 ELECTRICAL SYMBOL LIST
E002 LIGHTING FIXTURE SCHEDULE AND DETAILS
E003 ELECTRICAL SITE PLAN - POWER
E004 ELECTRICAL SITE DETAILS
E005 ELECTRICAL SITE DETAILS
E110E BASEMENT FLOOR PLAN - EAST BLDG - ELECTRICAL
E111E FIRST FLOOR PLAN - EAST BLDG - ELECTRICAL
E111W FIRST FLOOR PLAN - WEST BLDG - ELECTRICAL
E112E SECOND FLOOR PLAN - EAST BLDG - ELECTRICAL
E112W SECOND FLOOR PLAN - WEST BLDG - ELECTRICAL
E113E THIRD FLOOR PLAN - EAST BLDG - ELECTRICAL
E113W THIRD FLOOR PLAN - WEST BLDG - ELECTRICAL
E114W FOURTH FLOOR PLAN - WEST BLDG - ELECTRICAL
E115W FIFTH FLOOR PLAN - WEST BLDG - ELECTRICAL
E301 ONE-LINE POWER RISER

E400 FIRE ALARM RISER

Appendix
SECTION 4.1.5

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APPENDIX

A. Preferred Schematic Report Comments and District Responses
B. Educational Space Summary - Signed
C. Sustainability & Energy
    i. Signed Sustainability Letter
    ii. LEED Scorecard
    iii. Energy Analysis Report
D. Regulatory
    i. Schematic Design Code Report
    ii. Project Notification Form Submission & MHC Response
    iii. Eminent Domain
    iv. Article 97/ Pedestrian Bridge Approvals
    v. Abandoned Railroad Easement Letter (NPS)
E. Testing & Investigations
    i. Flow Test Results & Response by Plumbing Engineer
    ii. Geoenviromental Cover Letter and Report of 75 Arcand Drive
    iii. Geotechnical Report of 75 Arcand Drive
    iv. Soil Analysis (Test Pit Report) of 75 Arcand Drive
    v. Hazardous Materials Identification Survey of 75 Arcand Drive
F. Meeting Minutes
    i. School Building Committee
    ii. City Council & Community Forums
    iii. Regulatory/City Departments
    iv. Working Group
    v. Focus Groups
    vi. Student Forum
    vii. Lowell Plan
G. Supplemental Materials
    i. Hazardous Materials Survey Plans
    ii. Proposed Architectural Wall Types Floor Plans
    iii. Proposed Architectural Program Plans
    iv. Proposed Life Safety Floor Plans
    v. Proposed Furniture, Furnishings & Equipment and Technology Equipment Budgets
H. Room Data Sheets
I. Estimating
    i. Designer's Estimate (PM&C)
    ii. OPM's Estimate (SKANSKA)
    iii. Value Engineering Summary

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APPENDIX A – PREFERRED SCHEMATIC REPORT REVIEW COMMENTS & DISTRICT RESPONSES

- MSBA'S PSR Review Comments & District Responses
- MSBA's Space Summary Review & District Responses

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ATTACHMENT A
MODULE 3 – PREFERRED SCHEMATIC REPORT REVIEW COMMENTS
Response to Review Comments

District: City of Lowell
School: Lowell High School
Owner's Project Manager: Skanska USA Building, Inc.
Designer Firm: Perkins Eastman
Submittal Due Date: May 9, 2018
Submittal Received Date: May 9, 2018
Review Date: May 9-18, 2018
Reviewed by: K.Brown, J. Jumpe

MSBA REVIEW COMMENTS

The following comments[1] on the Preferred Schematic Report submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

3.3 PREFERRED SCHEMATIC REPORT

Overview of Preferred Schematic Submittal	Complete	Provided; *Refer to comments following each section*	Not Provided; *Refer to comments following each section*	Receipt of District's Response; *To be filled out by MSBA Staff*
OPM Certification of Completeness and Conformity	☒	☐	☐	☐
Table of Contents	☒	☐	☐	☐
3.3.1 Introduction	☐	☒	☐	☐
3.3.2 Evaluation of Existing Conditions	☐	☒	☐	☐
3.3.3 Final Evaluation of Alternatives	☐	☒	☐	☐
3.3.4 Preferred Solution	☐	☒	☐	☐
3.3.5 Local Actions and Approval Certification	☐	☒	☐	☐

[1] The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

3.3.1 INTRODUCTION

	Provide the following Items	Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
1	Overview of the process undertaken since submittal of the Preliminary Design Program that concludes with submittal of the Preferred Schematic Report, including any new information and changes to previously submitted information	☒	☐	☐	☐
2	Summary of updated project schedule, including				
	a) Projected MSBA Board of Directors Meeting for approval of Project Scope and Budget Agreement	☐	☒	☐	☐
	b) Projected Town/City vote for Project Scope and Budget Agreement	☒	☐	☐	☐
	c) Anticipated start of construction	☒	☐	☐	☐
	d) Target move in date	☒	☐	☐	☐
3	Summary of the final evaluation of existing conditions	☒	☐	☐	☐
4	Summary of final evaluation of alternatives	☒	☐	☐	☐
5	Summary of District's preferred solution	☒	☐	☐	☐
6	A copy of the MSBA Preliminary Design Program project review and corresponding District response	☒	☐	☐	☐

MSBA Review Comments:

1) New information and changes to previously submitted information include the District removing the pool from the project, and limiting the options studied in the revised PSR to Option 2A (Addition/Renovation on the existing site), Option 3A (Addition/Renovation on the expanded site), and New Option A (New Construction on the expanded site). No response required.

2a) The revised project schedule shows the Lowell HS project going to the MSBA Board of Director's on June 27, 2018 for consideration of the Preferred Schematic Report, and April 10, 2019 for consideration of Project Scope and Budget approval. Note that this project is not scheduled to attend additional FAS meetings, as indicated in the submitted schedule (please confirm).

Response: The City acknowledges that the MSBA 2019 Schedule has not been published and the Lowell High School project schedule for the Schematic Design submission to the MSBA will be adjusted accordingly when the MSBA 2019 schedule is available. The City further acknowledges that this project is not required or scheduled to attend additional FAS meetings. The project schedule has been adjusted accordingly and is attached.

No further review comments for this section.

3.3.2 EVALUATION OF EXISTING CONDITIONS

	Provide the following Items	Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
1	A narrative of any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions and its impact on the final evaluation of alternatives	☐	☒	☐	☐
2	If changes are substantive, provide an updated Evaluation of Existing Conditions and identify as final. Identify additional testing that is recommended during future phases of the proposed project and indicate when the investigations and analysis will be completed	☒	☐	☐	☐

MSBA Review Comments:

1) *The submittal notes that, due to ongoing roof leaks, the District will replace the roofing on the existing 1922 "Coburn Hall" portion of the building and the adjacent 1997 addition, to be completed October 2018 by an outside contract at the District's sole expense, prior to the commencement of work for the Lowell High School addition / renovation project. Confirm that no work from outside contractors will be in progress during any construction of the Lowell High School project. In addition, please clarify the extent of the proposed new roofing area in relation to the re-roof of the Coburn Hall building that was partially funded by MSBA in 2012, or 6 years ago as of 2018 (refer to the "Regarding past projects" comments below). If the new roofing to be installed in 2018 is the same area of roofing that was installed in 2012, provide an explanation why this roofing has not performed as warrantied.*

   Response: Please note that District has requested that the Project Team refer to the entire building on the east side of the canal as the "1922 Building", which is comprised of: the original 1892 Coburn Hall building at the south, the 1922 addition in the center of the building, and the 1997 addition at the north of the building. PSR Section 3.3.2 – Executive Summary states that "the High School has experienced ongoing roof leaks in the flat roof sections of the 1922 and 1997 additions in the "1922 Building".

   The City confirms that no work from outside contractors will be in progress during any construction of the Lowell High School project.

   The proposed replacement roof project to be installed in 2018 is not the same roof project that was funded by the MSBA in 2012. The 2018 roof project is located on the 1922 addition of what is commonly referred to as the "1922 Building". The 2012 MSBA roof project is a separate section located on the Coburn Hall building. The 2012 Coburn Hall roof is not failing and will not be replaced as part of the 2018 1922 project

No further review comments for this section.

3.3.3 FINAL EVALUATION OF ALTERNATIVES

Include at least three potential alternatives, with at least one renovation and/or addition option. Include the following for each alternative where appropriate:

	Provide the following Items	Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
1	An analysis of each prospective site including:				
	a) Natural site limitations	☒	☐	☐	☐
	b) Building footprint(s)	☒	☐	☐	☐
	c) Athletic fields	☒	☐	☐	☐
	d) Parking areas and drives	☒	☐	☐	☐
	e) Bus and parent drop-off areas	☒	☐	☐	☐
	f) Site access and surrounding site features.	☒	☐	☐	☐
2	Evaluation of the potential impact that construction of each option will have on students and measures recommended to mitigate impact	☒	☐	☐	☐
3	Conceptual architectural and site drawings that satisfy the requirements of the education program	☒	☐	☐	☐
4	An outline of the major building structural systems	☒	☐	☐	☐
5	The source, capacities, and method of obtaining all utilities	☒	☐	☐	☐
6	A narrative of the major building systems	☐	☒	☐	☐
7	A proposed total project budget and a construction cost estimate using the Uniformat II Elemental Classification format (to as much detail as the drawings and descriptions permit, but no less than Level 2)	☐	☒	☐	☐
8	Permitting requirements and associated approval schedule	☐	☒	☐	☐
9	Proposed project design and construction schedule including consideration of phasing	☒	☐	☐	☐
10	Completed Table 1 – MSBA Summary of Preliminary Design Pricing spreadsheet	☒	☐	☐	☐

MSBA Review Comments:

6) The Plumbing narrative notes that a fire pump may be required for the existing building addition/renovation options, and that this will be confirmed during the design phase of the project with a hydrant flow test. MSBA notes that the project budget, including the associated MSBA grant, is determined based on the District's Schematic Design submittal. Therefore any costs associated with

this potential fire pump, including space requirements in the proposed building, should be identified prior to MSBA establishing its grant. Unidentified scope of work, additional space requirements in the building, and any costs associated with this fire pump that are not accounted for in the total project budget will not be eligible for MSBA reimbursement. Please acknowledge.

Response: Nitsch Engineering, the Civil Engineer, will coordinate with the City to perform a hydrant flow test during the Schematic Design phase to determine if a fire pump is required. Any potential associated costs or space requirements for the fire pump will be included in the Schematic Design submission in order to be eligible for reimbursement.

7) Cost estimates for the three proposed options include a construction cost of $262m and a project cost of $333m for Option 2A (Addition/Renovation on the existing site), a construction cost of $270m and a project cost of $345m for Option 3A (Addition/Renovation on the expanded site), and a construction cost of $289m and a project cost of $362m for New Option A (New Construction on the expanded site).

Budget costs for contaminated soils abatement at the existing site are estimated at $90k -$180k for the preferred option. The Phase 1 and Phase 2 reports detail numerous recommendations regarding further site development for this project. Describe any updates or further investigations based on these reports and comment on each of these recommendations in the response to this review.

Response: Since completion of the Phase I and Phase II investigations, Nobis completed Immediate Response Actions (IRA) and Release Abatement Measures (RAM) on a tract of land located east of the Lord Building and west of the active trolley line along the Merrimack Canal. Nobis performed these actions in response to the Imminent Hazard condition and elevated metals concentrations identified during Phase II activities. IRA and RAM activities were required as per the Massachusetts Contingency Plan (310 CMR 40.0000), and activities were conducted outside of the PSR by the City of Lowell.

In August 2017, Nobis oversaw the excavation of approximately 100 cubic yards of PAH, arsenic, and lead impacted soils in the above -referenced portion of the Site. A total of 125 tons of contaminated soils were removed and disposed of off-site. In recognition of the fact that historical fill is presumed to be present throughout the Disposal Site, a Permanent Solution with Conditions, pursuant to 310 CMR 10.1013(1)(b) was implemented even though the exposure point concentrations for all contaminants are below the Method 1 risk assessment standards. The following is the rationale for the Permanent Solution with Conditions:

- A level of No Significant Risk (NSR - as per the MCP) to human health, public welfare, safety, and the environment has been achieved.
- A level of NSR will be maintained for current and foreseeable future uses of the Site without relying upon assumed limitations on current or future site activities, uses or conditions, which require an Activity and Use Limitation (AUL).
- OHM concentrations do not exceed an applicable Upper Concentration Limit (UCL) in Soil or Groundwater listed at 310 CMR 40.0996(6).

- All sources of OHM contamination have been eliminated.
- The level of oil and hazardous materials (OHM) concentrations in the environment have been reduced such that they are consistent with the background levels established in Table 1 of the MassDEP "Technical Update: Historical Fill/Anthropogenic Background" dated May 24, 2016. There are concentrations of poly aromatic hydrocarbons (PAHs) and lead in Disposal Site soils that exceed applicable Reportable Concentrations at discrete locations and evidence of historical fill was observed in soil borings advanced throughout the Site. Therefore, any future activities that will involve handling of Site soils (i.e. excavation, construction, subsurface investigations) should include provisions to manage soil in accordance with 310 CMR 40.0030 (Management Procedure for Remediation Waste).

Contractors should presume that Site soils contain contaminants consistent with Historical Fill/anthropogenic background levels. Soil handling and disposal should be performed in accordance with 310 CMR 40.0030 (Management Procedures for Remediation Waste).

It should be noted that work proposed to identify the former underground storage tank (UST) identified during the Phase I in the area of the Steam Plant was declined because the UST (if present) is likely outside of the proposed work area. Based on Phase I findings, Nobis cannot confirm that the UST still exists at the Site.

Estimates as quoted in the MSBA Updated PSR comment above remain reasonable; however, Nobis assumes that:

- Site contaminant levels remain consistent with anthropogenic fill and materials encountered during construction are not classified as a hazardous waste (HW) or trigger additional Imminent Hazard (IH) conditions.
- Some of the excavated material will be reused on-site to mitigate disposal costs. Soil that remains consistent with urban fill background concentrations may be able to be re-used on-site without environmental controls (provided they are suitable for reuse from a geotechnical standpoint). Excess soil slated to leave the site will require special handling and disposal since it is not classified as "clean" fill.
- Data collected from the current High School Site is consistent with what would be found at 75 Arcand Drive.
- Elevated costs to handle HW or IHs will exceed the estimated cost.

Additional site investigations (likely both Phase I and Phase II assessments) are required to characterize specific environmental conditions at this neighboring site at 75 Arcand Drive. This work is targeted to be done once the City has Ownership of the property and site access is possible so that the updated information and any associated costs will be included in the Schematic Design submission / budget.

MSBA notes that all costs associated with abatement of contaminated soil from any source must be itemized in the cost estimates for the following Schematic Design submittal as ineligible for MSBA reimbursement. Please acknowledge.

Response: The District acknowledges that estimated costs associated with abatement of contaminated soil from any source must be itemized in the cost estimates included in the Schematic Design submittal as ineligible for MSBA reimbursement.

The Hazardous Materials Identification Study provided a preliminary hazardous materials abatement cost estimate for this project totaling $3.8m (including the 75 Arcand st building), including $802,000 for abatement of flooring and flooring mastic. MSBA notes that all costs associated with the removal of asbestos containing flooring and ceiling tiles must be itemized in the cost estimates in the following Schematic Design submittal as ineligible for MSBA reimbursement. Please acknowledge.

Response: The District acknowledges that all costs associated with the removal of asbestos containing flooring and ceiling tiles must be itemized in the cost estimates in the following Schematic Design submittal as ineligible for MSBA reimbursement.

8) The submittal notes various local, state and Federal historical approvals required for the proposed project on the existing site (see the notes below regarding the status of Massachusetts Historic Commission approvals). The submittal also suggests that an Article 97 Land Disposition Act "land swap" approval may be required if the northern pedestrian bridge is relocated; please clarify. In addition, the District is in the process to take the adjacent 75 Arcand property using eminent domain. Given these currently unresolved land use restrictions, MSBA's staff recommendation for approval of the District's preferred option will be conditional upon the District's ability to secure and document local access and control of the land associated with the District's preferred option prior to MSBA execution of the Project Funding Agreement. The MSBA will not sign a Project Funding Agreement and will not reimburse the District for any costs incurred beyond the Feasibility Study Agreement without all land use issues being resolved. Refer to MSBA Project Advisory #45 for MSBA policy regarding Requirements for Land Use. Please acknowledge.

Response: The anticipated timeline for the historical review will be reviewed with the Historic commission during Schematic Design and included in the Schematic Design submission. See the response to comment 3.3.4. 7a for additional information regarding the anticipated Historical approval timeline.

The City acknowledges that an Article 97 Land Disposition Act "land swap" approval may be required if the northern pedestrian bridge is relocated, please see attached Article 97 Air Rights letter outlining the Art. 97 process from the City of Lowell - Law Department.

The City is in the process to take the adjacent 75 Arcand Drive property using eminent domain. It is understood that the MSBA will not sign a Project Funding Agreement and will not reimburse the District for any costs incurred beyond the Feasibility Study Agreement without all land use issues being resolved. The City has updated Appendix Z, Eminent Domain Timeline, see attached Eminent Domain Timeline letter from City of Lowell – Law Department dated 6/4/18. The City has reviewed MSBA Project Advisory #45 for MSBA policy regarding Requirements for Land Use.

No further review comments for this section.

3.3.4 PREFERRED SOLUTION

Provide the following Items		Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
1	Educational Program				
	a) Summary of key components and how the preferred solution fulfills the educational program	☒	☐	☐	☐
	b) Design responses including desired features and/or layout considerations	☒	☐	☐	☐
	c) Proposed variances to, and benefits of, any changes to the current grade configuration (if any) and a related transition plan - *NA*	☒	☐	☐	☐
2	Preferred Solution Space Summary				
	a) Updated MSBA Space Summary spreadsheet	☐	☒	☐	☐
	b) Itemization and explanation of variations from the initial space summary (and MSBA review) included in the Preliminary Design Program	☐	☒	☐	☐
3	Preliminary NE-CHPS or LEED-S scorecard	☐	☒	☐	☐
4	Conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces	☒	☐	☐	☐
5	Clearly labeled site plans of the preferred solution including, but not limited to:				
	a) Structures and boundaries	☒	☐	☐	☐
	b) Site access and circulation	☒	☐	☐	☐
	c) Parking and paving	☒	☐	☐	☐
	d) Zoning setbacks and limitations	☒	☐	☐	☐
	e) Easements and environmental buffers	☒	☐	☐	☐
	f) Emergency vehicle access	☒	☐	☐	☐
	g) Safety and security features	☒	☐	☐	☐
	h) Utilities	☒	☐	☐	☐
	i) Athletic fields and outdoor educational spaces (existing and proposed)	☒	☐	☐	☐

Provide the following Items		Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
	j) Site orientation	☒	☐	☐	☐
6	An overview of the Total Project Budget and local funding including the following:				
	a) Estimated total construction cost	☒	☐	☐	☐
	b) Estimated total project cost	☒	☐	☐	☐
	c) Estimated funding capacity	☒	☐	☐	☐
	d) List of other municipal projects currently planned or in progress	☒	☐	☐	☐
	e) District's not-to-exceed Total Project Budget	☒	☐	☐	☐
	f) Brief description of the local process for authorization and funding of the proposed project	☒	☐	☐	☐
	g) Estimated impact to local property tax, if applicable	☒	☐	☐	☐
	h) Completed MSBA Budget Statement	☒	☐	☐	☐
7	Updated Project Schedule including the following projected dates:				
	a) Massachusetts Historical Commission Project Notification Form	☐	☒	☐	☐
	b) MSBA Board of Directors meeting for approval to proceed into Schematic Design	☒	☐	☐	☐
	c) MSBA Board of Directors meeting for approval of project scope and budget agreement and project funding agreement	☒	☐	☐	☐
	d) Town/City vote for project scope and budget agreement	☒	☐	☐	☐
	e) Design Development submittal date	☒	☐	☐	☐
	f) MSBA Design Development Submittal Review (include required 21-day duration)	☒	☐	☐	☐
	g) 60% Construction Documents submittal date	☒	☐	☐	☐
	h) MSBA 60% Construction Documents Submittal Review (include required 21-day duration)	☒	☐	☐	☐
	i) 90% Construction Documents submittal date	☒	☐	☐	☐
	j) MSBA 90% Construction Documents Submittal Review (include required 21-day duration)	☒	☐	☐	☐
	k) Anticipated bid date/GMP execution date	☒	☐	☐	☐

Provide the following Items		Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*
	l) Construction start	☒	☐	☐	☐
	m) Move-in date	☒	☐	☐	☐
	n) Substantial completion	☒	☐	☐	☐

MSBA Review Comments:

2a & b) Refer to Attachment B for MSBA space summary review comments.

Response: Refer to Attachment B responses and the revised Space summary (pdf and Excel files) showing the breakdown of renovated vs new classroom sizes and the Trio program moved to the guidance category. The updated Summary also corrects a minor discrepancy between the existing and renovated auditorium and shows the existing pool line items (previously hidden). Changes are shown highlighted (yellow).

3) The District has indicated intent to achieve the 2% additional reimbursement through the MSBA Green School Program. The submittal indicates a total goal of 55 points using USGBC LEED-V4, including 13 points in Energy & Atmosphere "Optimize Energy Performance" category. In the District's response to this review, confirm that the levels of energy performance indicated meet or exceed the current Massachusetts (base) energy code by 20%, or, the extent that the existing portions of the building are required to comply with the current energy code standards (refer to the February 15, 2017 MSBA Board Memo regarding Sustainable Design Policy, and MSBA Project Advisory #41 for additional information).

Response: The existing building code (IEBC) and energy code (IEBC) only require new or altered elements in existing buildings to comply with the energy code requirements for new construction (IEBC Section 908.1). Existing elements that will remain are not required to comply. In accordance with the MSBA Project Advisory #41 Sustainable Design Policy, the level of energy performance is intended to achieve 13 points in the LEED, Energy & Atmosphere Optimize Energy Performance category, which uses a baseline of ASHRAE 90.1-2010. It is also the intent that the project's energy performance will also meet or exceed 20% energy savings versus current energy code standards (IECC 2015, ASHRAE 90.1-2013).

6a & b) The submittal indicates a construction cost for the preferred option is currently estimated to be $270,456,023, and a project cost of $345,399,220. No response required.

7a) The submittal includes a March 28, 2018 letter from the design team that updates the MHC regarding supplemental information requested by Massachusetts Historic Commission ("MHC") regarding the proposed project. This supplemental information request by MHC was in response to the original PNF submitted in April 2017. No response from MHC was included in the submittal. In the District's response to these review comments, please provide any further updates regarding the MHC approval (if any) and an anticipated timeline for approval. The District should keep the MSBA

informed of any decisions and/or proposed actions and should confirm that the proposed project is in conformance with Massachusetts General Law 950, CRM 71.00.106

Response: The updated PNF submission dated March 28, 2018 encompassed the 3 options under consideration for the PSR Preferred Option. Now that a Preferred Option has been selected, a new Project Notification Form (PNF) will be submitted to the Massachusetts Historical Commission (MHC) in late December/early January for the design developed during the Schematic Design process. This submission will include the existing and proposed project elevations requested by the MHC in their April 26, 2017 letter. The MHC will review this submission within 30 days and reply with their comments via mail. They may request additional information about the project or may make a determination regarding the project, which may or may not involve additional MHC design review. The future level of involvement of the MHC in the project is dependent on the proposed changes to the project's historic buildings and landscape shown in the Schematic Design PNF.

In addition, provide a schedule and process by the City to determine future plans for the existing Freshman Academy and steam plant buildings. Provide any updates regarding the re-use of these buildings in the District's response to this review (see comments below regarding past MSBA funded projects).

Response: The City of Lowell will work with the Lowell School Department to determine future use of the Freshman Academy and Steam Plant buildings. In a letter dated October 19, 2017, addressing a similar question regarding the 1922 Lowell High School Building, Superintendent Khelfaoui anticipated a task force being put in place to explore the best way to utilize the facilities in order to reduce costs and alleviate anticipated capacity challenges. Possible uses of the Freshman Academy include:

- Central Office,
- CSA Day School
- Alternative School
- STEM Middle School expansion
- Early Childhood Center.

The Freshman Academy is currently primarily heated by the central steam plant in the adjacent Steam Plant building.

No further review comments for this section.

3.3.5 LOCAL ACTIONS AND APPROVALS

Provide the following Items	Complete; *No response required*	Provided; *District's response required*	Not Provided; *District's response required*	Receipt of District's Response; *To be filled out by MSBA Staff*

1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials.	☐	☒	☐	☐
2	Signed Local Actions and Approvals Certification(s):				
	a) Submittal approval certificate	☐	☒	☐	☐
	b) Grade reconfiguration and/or redistricting approval certificate (if applicable) - *NA*	☒	☐	☐	☐
3	Provide the following to document approval and public notification of school configuration changes associated with the proposed project: - *NA*				
	a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	☒	☐	☐	☐
	b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials	☒	☐	☐	☐
	c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally	☒	☐	☐	☐
	d) A certification from the Superintendent stating the District's intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee.	☒	☐	☐	☐

MSBA Review Comments:

As noted in the May 15, 2018 cursory review email, provide the following items:

1) MSBA notes that the May 1, 2018 City Council meeting minutes approving the School Building Committee and the consultant team to submit the updated Preferred Schematic Report are in draft form. Please submit the approved/finalized meeting minutes when available; and,

Response: May 1, 2018 City Council approved/finalized meeting minutes approving the School Building Committee and the consultant team to submit the updated Preferred Schematic Report are attached and the City notes that hard copies were sent on May 4, 2018.

As discussed with Mayor Samaras on May 14, 2018, a vote by School Committee will be taken on May 16 to retroactively vote to approve the updated Preferred Schematic Report submission to the MSBA. Please ask that your OPM provide an email after that School Committee meeting noting the outcome of the vote.

Response: The approved/finalized vote by School Committee scheduled to be taken on May 16th, and subsequently May 23rd to retroactively vote to approve the updated Preferred Schematic Report submission to the MSBA did not occur. The next meeting will be June 6, 2018, but that is the same day as LHS graduation, so the School Committee may cancel. The next meeting after that would be on June 20, 2018. The vote to approve the Preferred Option will be included in the next School Committee meeting agenda and approved meeting minutes will be forwarded to the MSBA prior to the June 27th MSBA Board meeting.

2a) Please update the Local Actions and Approvals Certification to indicate that the School Building Committee as well as the City Council voted to approve its consultants to submit the Preferred Schematic Report to the MSBA on April 30, 2018. Once completed, please send an original, updated document to MSBA.

Response: Updated Local Actions and Approvals Certification attached. The City confirmed that this original letter was mailed to the MSBA on May 17, 2018.

No further review comments for this section.

Additional Comments:

- *The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers ("OPM"), and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

  Response: The District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.

- *The MSBA offers the following information to assist the District and its Owner's Project Manager in completing the total project budget template that is required as part of its Schematic Design Submittal:*
  - *The District must include negotiated costs for OPM and Designer fees for the remainder of the project as part of their Total Project Budget. In response to these review comments, please confirm that the District and its consultants will negotiate fees for the remainder of the project that are to be included in the District's Schematic Design documents to the MSBA.*

    Response: The City will include negotiated costs for OPM and Designer fees for the remainder of the project as part of their Total Project Budget.

  - *The PSR indicates the District is targeting MSBA approval of its proposed project scope and budget at the April, 2019 board meeting. The District's reimbursement rate for calendar year 2019 is unknown at this time. The MSBA will forward this*

information to the District of its reimbursement rate when this information is available. Please note that the MSBA updates district reimbursement rates annually and applies the reimbursement in effect at the time the MSBA Board of Directors approves a district's proposed project scope and budget. The reimbursement rate is established based on statutory requirements and information provided by the Departments of Revenue and Elementary and Secondary Education.

- ***Maintenance*** *(0-2) - 1.40%. This value is based on MSBA review of district provided materials regarding routine and capital maintenance programs during Eligibility Period at which time the value is finalized.*
- ***CM@Risk*** *(0 or 1) – 1.00%. Because the District was invited to the MSBA Capital Pipeline before January 2, 2017 it would be eligible to conditionally receive one incentive point subject to the approval of the Office of the Inspector General for the District's use of the Construction Manager at Risk construction delivery method for the Proposed Project and that the District actually uses that construction delivery method for the Proposed Project.*
- ***Newly Formed Regional School District*** *(0-6) – The District is not a newly formed or expanded regional school district as a result of working with the MSBA, therefore these incentive points do not apply.*
- ***Major Reconstruction or Reno/Reuse*** *(0-5) – The District's preferred solution of an addition/renovation project proposes 432,600 gsf of renovated space in a 622,200 gsf facility, therefore the estimated value of incentive points for the preferred solution is 3.48. Please note that this will be updated based on MSBA's review of the City's Schematic Design Submittal.*
- ***Overlay Zoning 40R & 40S*** *(0 or 1) – Refer to Module 4, appendix 4E to review documentation requirements and to determine if this incentive point may be applicable. Please note that required authorizations must be documented prior to MSBA approval of the District's proposed project scope and budget to be eligible to receive this incentive point.*

  Response: The City will confirm if this applies, prior required authorizations will be documented prior to the Schematic Submission if these incentive points are being pursued.
- ***Overlay Zoning 100 units or 50% of units for 1, 2 or 3 family structures*** *(0 or 0.5) – Refer to Module 4, appendix 4E to review documentation requirements and to determine if this incentive point may be applicable. Please note that required authorizations must be documented prior to MSBA approval of the District's proposed project scope and budget to be eligible to receive this incentive point.*

  Response: The City will confirm if this applies, prior required authorizations will be documented prior to the Schematic Submission if these incentive points are being pursued.
- ***Energy Efficiency*** *– "Green Schools" (0 or 2) – The PSR indicates the District's intent to achieve the 2% additional reimbursement through the MSBA Green School Program. Please note, subject to the District's intention to meet certain energy efficiency sustainability requirements for the Proposed Project, the MSBA will*

provisionally include two (2) incentive points, however if the District does not ultimately qualify for some or all of these incentive points the MSBA will adjust the District's reimbursement rate, accordingly.

- *Additional observations regarding the District's Preferred Solution were discussed in the May 9, 2018 Facilities Assessment Subcommittee meeting, including the following comments for the District (please provide a brief response to each item):*
    - *Travel time required within the building for the mobility challenged individual;*

      Response: Travel within the school, particularly for those with mobility challenges, has been substantially improved in several ways; first by planning for relatively contained programs (Freshmen & ROTC) and large venues (Gym & Auditorium) to fringe areas, thereby centralizing the bulk of core academic & special education. The plans show relocation and supplemental elevators for more convenient and centralized access to major thorough-fares, such as the bridges, lobby and freshmen academy. The bridges themselves are currently planned as 2-story connections, to improve travel. Additional study and development will ensue to mitigate current floor level changes between buildings, the auditorium and entry stairwells in the 1922 building.
    - *Design of the bridges over the canal;*

      Response: During Schematic Design, the Project Team will work with the Local Historic Commission, Lowell National Historic Parks and other reviewing agencies to ensure that their requirements are incorporated into the design of the bridges over the canal.
    - *Separation and security of the building during community after-hours use;*

      Response: The school is being zoned for community and after-hours use or separation, including incremental access and lock-off throughout the multi- building facility. This includes reconsideration of the House Administration area locations that should be somewhat near the academic classrooms, but often have parents and outside specialists visiting. The schematic plans will show refined House locations. Another significant challenge built into the reuse of the 1922 building is the Auditorium itself and containment of public access; solutions for this will evolve during schematic design.
    - *Opportunities for daylight within internal spaces;*

      Response: The biggest challenge with daylight of the existing facilities is the solar orientation, but new construction of the Freshmen Academy prioritizes N/S exposure. Every effort is being made to introduce daylight into current windowless locations, going so far as to cut light wells into the existing 1980's building. Spaces have been laid out to ensure windows to all teaching and learning rooms and labs, with the potential exception of shop and practice space. The schematic design phase will be used to continue refinements and improve daylight.
    - *Separation between the stage/auditorium and the costume shop;*

      Response: The current plans seek to utilize windowless areas for storage, mechanical and shop space, while also separating shop spaces acoustically from core academics. The proposed location requires a freight elevator to deliver sectional scene constructs

to be brought on stage. Delivery of materials and stage level locations will be studied during Schematic Design.

- *Proposed vehicle and pedestrian site access and site circulation, student transportation and parking locations;*

  Response: the proposed main entry is appropriately located on route from the parking garage and main road. It enters into the main lobby and open cafeteria that connects potential additional points of entry from the canal and courtyard sides of the site. The opposite side of the canal will have several controlled entry points for morning arrival; one at the auditorium entry and supplemental access area to be determined during Schematic Design.

- *Sheltered drop-off/pick-up area;*

  Response: The new Freshman Academy and main entry are positioned to allow more relief for student pick-up/drop-off and gathering along the school front. The covered canopy currently includes the main entry plaza area with openings for daylight. The extent will be determined during the schematic phase.

- *Community use of the canal, its history and the building's connection to the canal;*

  Response: Because the canals are owned by ENEL Green Power North, community use of the canals is restricted. However, the Project Team endeavors to incorporate the canals history into the project and connect the canals to the buildings via views, possible outdoor recreational spaces and educational opportunities.

- *Landscaping strategies pertaining to the sidewalk and working with the City to ensure student and public safety;*

  Response: as noted in response to sheltered drop-off, ample relief and buffer space is provided between the buildings and street. The new courtyard areas are intended to be gated for controlled access. Additional development will occur during Schematic Design.

- *Community outreach and support for the project;*

  Response:

  - City Council has held **7 meetings** regarding the proposed project, in compliance with the state Open Meeting Law.
  - Since the City Council took a vote regarding the downtown location of the preferred site of Lowell High School on January 2, 2018, the SBC has held 3 SBC meetings regarding the proposed project, also in compliance with the state Open Meeting Law.
  - School Committee Meeting at City Hall, City Council Chambers at 6:30pm on March 21, 2018 to review and approve revisions to updated Educational Plan.
  - LHS Approval Process Meeting: Planning Board, Commissions and Department Meeting, Lowell City Hall Mayor's Reception Room April 4, 2018 at 2:30pm: City of Lowell Departments reviewing the Design Options to understand any

approvals issues that can inform the PSR and the selection of the Preferred Option.

- Additional Community outreach public meetings regarding the proposed project on April 12, 2018 and April 30, 2018.

The presentation materials for each meeting, meeting minutes, and summary materials related to the Project are available locally for public review at https://www.lowellma.gov/963/Lowell-High-School-Project

- *The eminent domain schedule. Please note MSBA staff will issue a conditional recommendation for the Board's approval at the June 27, 2018 Board meeting contingent upon the City obtaining full ownership, control, and exclusive use of the adjacent property. Please provide updated information on the District's schedule for the eminent domain process*

  Response: The City has updated Appendix Z, Eminent Domain Timeline, see attached Eminent Domain Timeline letter from City of Lowell – Law Department dated 6/4/18. The District understands that MSBA staff will issue a conditional recommendation for the Board's approval at the June 27, 2018 Board meeting contingent upon the City obtaining full ownership, control, and exclusive use of the adjacent property.

- *Location of the proposed loading dock and consideration of adding a second; and,*

  Response: During Schematic Design, the Design Team will work with the District to explore the configuration of the loading dock on the west side of the canal adjacent to the 1980 Building, and will explore possibilities to add a supplemental loading area adjacent to the "1922 Building" if required.

- *Plans for the current Freshman Academy building.*

  Response: The City anticipates maintaining control of the Freshman Academy for educational purposes and will work with the school department.

- *Regarding past projects:*

  Both the MSBA's enabling legislation, M.G.L. c. 70B, and the MSBA's regulations, 963 CMR 2.00 et seq. specifically address the issue of past projects. MSBA records show a total MSBA payment $733,509 for a Roof repair (project #201101600505G) completed October 1, 2012 at the 1922 "Coburn Hall" building which is 6 years old as of 2018. Pursuant to these requirements and based on the City's decision to re-roof the 1922 portion of the Lowell High School, a pro-rated recovery of these funds totaling $513,456 will apply to this project, if the 2012 re-roof project is the same area that is to be re-roofed in 2018. Please see the MSBA website to view the MSBA's regulations, statute and closed school bulletin for additional information.

  Response: The proposed replacement roof project to be installed in 2018 is not the same roof project that was funded by the MSBA in 2012. The 2018 roof project is located on what is commonly referred to as the 1922 building. The 2012 MSBA roof project is a separate section

located on the Coburn Hall building. The 2012 Coburn Hall roof is not failing and will not be replaced as part of the 2018 1922 project.

MSBA also notes a $28,407,509 grant from the state for an addition/renovation project at the Lowell High School completed in 1998, anticipated to be beyond the 20 year recovery limitation date for this MSBA project per the submitted project schedule.

End

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED: Existing to Remain/Renovated			PROPOSED: New			PROPOSED: Total				MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**136,088**			**114,400**			**47,870**			**162,270**	reduced 2,690 per relocations			**169,040**	
(List classrooms of different sizes separately)																	
	746	4	2,983														
	809	6	4,851														
	850	12	10,197														
	948	3	2,844														
	1,024	2	2,048														
Classroom - Freshmen SubTotal	849	27	Averaged	0	0	0	900	33	29,700	**900**	**33**	**29,700**	(8E,8S,8M,4W,1H,4EII)				
	592	2	1,184	800	6	4,800			0	**800**	**6**	**4,800**	(3E,3S)				
	724	33	23,903	850	18	15,300			0	**850**	**18**	**15,300**	(5E,5S,3M,1W,3H,1EII)				
	808	15	12,114	875	10	8,750			0	**875**	**10**	**8,750**	(6M,4EII)				
	850	18	15,301	900	3	2,700	900	3	2,700	**900**	**6**	**5,400**	(3M,3H)				
	898	10	8,975	950	27	25,650			0	**950**	**27**	**25,650**	(3E,3S,6M,10W,5EII)				
	964	7	6,749	975	6	5,850			0	**975**	**6**	**5,850**	(3E,3S)				
	992	8	7,936	1,000	6	6,000			0	**1,000**	**6**	**6,000**	(3E,3S)				
	1,017	1	1,017			0			0			**0**					
	1,184	1	1,184			0			0			**0**					
Classroom - Gr. 10-12 SubTotal	825	95	Averaged	909	76	Averaged	900	3	Averaged	**908**	**79**	**Averaged**	(17E,17S,18M,11WL,6H,10EII)				
Total Classroom - General		122			76			36			**112**			850	120	102,000	825 SF min - 950 SF max
Teacher Planning - Freshman	493	1	493			0	400	4	1,600	**400**	**4**	**1,600**					
Tchr Plng (Tch-Out, Lng, Ktch, Comp, Copy)	604	8	4,834	400	15	6,000			0	**400**	**15**	**6,000**	(6hum,6stm,1W,1H,1EII)				
Dept Off's (Eng, SS, Mth, Sci, WL/ELL, Instr)	112	6	671			0	150	5	750	**150**	**5**	**750**					
Teacher Develop/Training (Little Thtr + Cntrl)	3,568	1	3,568	3,650	1	3,650			0	**3,650**	**1**	**3,650**					
Total Teacher Planning		16			16			9			**25**			100	120	12,000	
Small Group Seminar (20-30 seats)				450	6	2,700			0	**450**	**6**	**2,700**	(1E,1S,2M,1W,1E	500	8	4,000	
Science Classroom / Lab - Freshman	978	7	6,849	0	0	0	1,440	8	11,520	**1,440**	**8**	**11,520**	(8frshmn)				
Science Classroom / Lab - Gr.10-12	900	19	17,100	1,440	20	28,800	0	0	0	**1,440**	**20**	**28,800**	(8chm,7bio,2bio/chm,4env,1micro,1bio-t,1hlth)				
Total Science Classroom / Lab		26			20			8			**28**			1,440	31	44,640	3 x85% ut=20 Seats-1 per /day/student
Prep Room	156	7	1,091	350	11	3,850	400	4	1,600	**363**	**15**	**5,450**		200	31	6,200	
Central Chemical Storage Rm				350	1	350			0	**350**	**1**	**350**		200	1	200	
Unassigned Green House/Growing Room	196	1	196						0	part of prep rooms above							
Clean Room (w/ Micro/Bio Tech Lab)									0	part of prep rooms above							
SPECIAL EDUCATION			**21,845**			**25,550**			**14,850**			**40,400**	increased 1,450 per relocations			**34,240**	
Self-Contained SPED														950	24	22,800	825-950 SF equal to surrounding classrooms
Self-Contained SPED Toilet														60	24	1,440	
Resource Room														500	10	5,000	1/2 size Genl. Clrm.
Small Group Room														500	10	5,000	1/2 size Genl. Clrm.
LIFE SKILLS (69 stu's =78 prorated)																	
Life Skills CRs (2 ages +Kitch/Laund/Mail)	968	4	3,870	1,200	4	4,800			0	**1,200**	**4**	**4,800**					
Life Skills Hygene (Wash/Changing Room)				225	2	450			0	**225**	**2**	**450**					
Life Skills Intensive CR +Tlt (2 age grps)	872	2	1,744	950	2	1,900			0	**950**	**2**	**1,900**					
Life Skills Sensory/Deescalation Room	344	1	344	375	2	750			0	**375**	**2**	**750**	(450+300)				
Life Skills (CSA) Autism CR + Tlt & Quiet	816	2	1,632	1,050	6	6,300	950	2	1,900	**1,025**	**8**	**8,200**					
Life Skills - AdaptivePE / Sensory-Motor						0	3,000	2	6,000	**3,000**	**2**	**6,000**					
ADJUSTMENTS (40 stu's =46 prorated)																	
Adjustments CR	738	7	5,169	950	4	3,800	950	4	3,800	**950**	**8**	**7,600**					
Adjust Social Worker	165	1	165	0	0	0	150	1	150	**150**	**1**	**150**					
Counseling Room				0	0	0	200	1	200	**200**	**1**	**200**					
Storage				0	0	0	100	1	100	**100**	**1**	**100**					
FUNDAMNTL (190 stu's =214 prorated)																	
Fundamentals - Freshman	810	2	1,619			0	450	4	1,800	**450**	**4**	**1,800**					
Fundamentals - Gr.10-12	545	7	3,812	450	4	1,800	450	2	900	**450**	**6**	**2,700**					
Fundamentals Instruct. Support CR (for 24+)				1,900	1	1,900			0	**1,900**	**1**	**1,900**					
OTHER SPECIAL NEEDS																	
OT/PT (part-time)										therapy occurs in CRs							
Deaf/Hearing Impared Suite	1,066	1	1,066	600	1	600			0	**600**	**1**	**600**					
Speech & OT/PT (Office for 3 + mtgs for 6)	178	3	534	450	1	450			0	**450**	**1**	**450**					
Psych + Evaluators/Testing (BCBA in rms)	299	2	598	150	4	600			0	**150**	**4**	**600**					
Social Worker	189	1	189	200	1	200			0	**200**	**1**	**200**					
PALS Mentoring Office/Conf	161	2	321							part of soc worker							
SPED Dept Chair	241	1	241	250	1	250			0	**250**	**1**	**250**					
SPED Eval Team Chair (for 2)	237	1	237	250	1	250			0	**250**	**1**	**250**					
SPED Office (Clerk/Waiting/Files)	304	1	304	300	1	300			0	**300**	**1**	**300**					
Conference (for 6, 12 & 20)				400	3	1,200			0	**400**	**3**	**1,200**	(600+450+150)				

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

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ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
ART & MUSIC			**19,851**			**17,700**			**0**			**17,700**			**13,075**	
Art CR (incl. Photo/Anim, Graph, TV Prod)	1,301	6	7,803	1,350	6	8,100			0	**1,350**	**6**	**8,100**	1,200	6	7,200	Assumed use - 25% Population - 5 times/week
Art Workroom w/ Storage (kiln incl. in rm)	370	4	1,482	900	1	900			0	**900**	**1**	**900**	150	6	900	
Band - 50 - 100 seats	2,791	1	2,791	2,000	1	2,000			0	**2,000**	**1**	**2,000**	1,500	1	1,500	Assumed use - 25% Population - 5 times/week
Chorus - 50 - 100 seats (incl. Drama)	2,652	1	2,652	1,500	1	1,500			0	**1,500**	**1**	**1,500**	1,500	1	1,500	
Dance (also uses stage)	866	1	866	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Dance (changing)											incl. in rooms					
Ensemble						0			0		**0**	**0**	200	1	200	
Piano/Digital Lab	1,186	1	1,186	1,000	1	1,000			0	**1,000**	**1**	**1,000**				
Music Practice (incl. Guitar)	81	3	244	375	1	375			0	**375**	**1**	**375**	75	17	1,275	
Music Storage	256	7	1,789	200	5	1,000			0	**200**	**5**	**1,000**	500	1	500	
Fine Arts Dept Office	155	1	155	125	1	125			0	**125**	**1**	**125**				
Music Admin - Conf/ Off	183	4	731	300	1	300			0	**300**	**1**	**300**				
Dark Room	152	1	152			0			0		**0**	**0**				
VOCATIONS & TECHNOLOGY			**28,533**			**20,755**			**14,860**			**35,615**			**38,400**	
ROTC Classroom/PT (385 stu = 434 prorated)	955	4	3,819	900	5	4,500			0	**900**	**5**	**4,500**	5th Rm req'd @ 351			
Culinary Arts Classroom	1,163	2	2,325	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Business (Accounting/Pers-Finance/Law)	869	2	1,738			0	1,200	2	2,400	**1,200**	**2**	**2,400**				
Business (Mktg/Sports Mktg) **CH.74**	994	2	1,987								incl. below		Ch.74 calc's **NOT** in MSBA totals			Exist 281stu in 14.5sect 5x/wk of 35p cyc at 85% =2.4rms
Business (Retail Mktg - CR) **CH.74**	812	1	812			0	1,200	3	3,600	**1,200**	**3**	**3,600**	FTE	SF/stu.	SF Reg's	Adjust to 316 in 15.5sect x5/wk of 35p cyc at 85% =2.6 rms
Business (Retail Mktg - Store) **CH.74**	532	1	532								incl. above		**60**	**110**	**6,600**	20:1 stu/tchr ratio (2200sf min, 12' clear), 3 rm capacity = 60
Tech Clrm. - (E.G. Drafting, Business)		12			7						**12**		1,200	12	14,400	Assumed use - 50% Population - 5 times/week
ROTC MP/Gym w/ Stor (Drills/Band)	755	1	755			0	2,500	1	2,500	**2,500**	**1**	**2,500**				
Culinary Arts Kitch + Restaurant (for 25-30)	2,494	1	2,494	2,975	1	2,975			0	**2,975**	**1**	**2,975**				
Costume Shop w/ Sewing, Storage	727	1	727	1,440	1	1,440			0	**1,440**	**1**	**1,440**				
Scene Shop	future conversion of storage above			1,440	1	1,440			0	**1,440**	**1**	**1,440**				
TV Studio (w/ cntrl, edit/scrn, off/wait, equip)	3,882	1	3,882	4,000	1	4,000			0	**4,000**	**1**	**4,000**				
Robotics/CADD (w/ Engnr)	1,577	1	1,577			0	1,440	2	2,880	**1,440**	**2**	**2,880**				
Clean Enegry Lab (w/ Engnr)	1,577	1	1,577			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Maker Space (w/ Freshman Integr. Sci)	1,512	1	1,512			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Business (Bank/Credit Union)	287	1	287			0	400	1	400	**400**	**1**	**400**				
Tech Shop - (E.G. Consumer, Wood)		8			4			6			**10**		2,000	12	24,000	Assumed use - 50% Population - 5 times/week
ROTC Off/ Conf.	788	2	1,576	800	2	1,600			0	**800**	**2**	**1,600**				
ROTC Storage (4sf/cadet + mock weapons)	254	7	1,779	1,800	1	1,800			0	**1,800**	**1**	**1,800**	434x4 =1736+64			
Culinary Arts Storage	216	2	432	300	2	600			0	**300**	**2**	**600**				
Scene and Costume Storage	722	1	722						0		incl. in rooms					
Retail/Store Storage						0	200	1	200	**200**	**1**	**200**				
HEALTH & PHYSICAL EDUCATION			**46,121**			**0**			**41,600**			**41,600**	reduced 100		**35,912**	
Gymnasium (6 lane 134.1m trck, LJ, TJ, SP)	28,408	1	28,408			0	3,000	6	18,000	**3,000**	**6**	**18,000**		12,000	1	12,000	
PE Alternatives (Wrestling 42x84 req'd)	1,960	1	1,960			0	3,400	1	3,400	**3,400**	**1**	**3,400**	size correction	3,000	1	3,000	
Fitness & Functional Strngth	1,474	2	2,948			0	1,500	2	3,000	**1,500**	**2**	**3,000**				
Multi-Purpose (Gymnastics/Yoga/Cheering)	currently off-site					0	3,000	1	3,000	**3,000**	**1**	**3,000**				
Gym Storeroom (incl. Gymnastics w/ MP)	1,133	1	1,133			0	700	2	1,400	**700**	**2**	**1,400**	(500+900)	300	1	300	
Locker Rooms - Boys / Girls w/ Toilets	3,245	2	6,490			0	3,600	2	7,200	**3,600**	**2**	**7,200**		19,712	1	19,712	5.6 sf/student total
Varsity Lockers - Boys/ Girls w/ Toilets	870	2	1,740			0	800	3	2,400	**800**	**3**	**2,400**				
Phys. Ed. Storage (incl. Equip)	258	5	1,292			0	500	3	1,500	**500**	**3**	**1,500**	(750+500+250)	500	1	500	
Athletic Director's Office (Lord 1st fl -South)	185	1	185			0	150	1	150	**150**	**1**	**150**		150	1	150	
AD Secr, Bursor, Conf (Lord 1st fl - South)	155	3	464			0	150	3	450	**150**	**3**	**450**				
Health Instructor's Office w/ Shower & Toilet	170	5	852			0	125	4	500	**125**	**4**	**500**		250	1	250	
Trainers Room	216	3	649			0	600	1	600	**600**	**1**	**600**				
MEDIA CENTER			**13,164**			**13,100**			**8,800**			**21,900**			**21,900**	
Media Center / Reading Room	9,137	1	9,137	10,700	1	10,700	5,950	1	5,950	**8,325**	**2**	**16,650**		21,900	1	21,900	
Comp. Lab (tech ctr/trng lab incl. instr sp)	666	3	1,998	950	2	1,900	800	2	1,600	**875**	**4**	**3,500**				
Copy Center						0	800	1	800	**800**	**1**	**800**				
Data Processing + Scheduler	1,036	1	1,036			0	450	1	450	**450**	**1**	**450**				
Small Group				300	1	300			0	**300**	**1**	**300**				
MCAS/Testing Stor (incl instr specialist)	993	1	993	100	2	200			0	**100**	**2**	**200**				
AUDITORIUM / DRAMA			**20,233**			**15,500**			**0**			**15,500**			**10,400**	
Auditorium	11,627	1	11,627	11,600	1	11,600			0	**11,600**	**1**	**11,600**		7,500	1	7,500	2/3 Enrollment @ 10 SF/Seat - 750 seats MAX
Stage	2,614	1	2,614	2,600	1	2,600			0	**2,600**	**1**	**2,600**		1,600	1	1,600	
Auditorium Storage (incl Prop Storage)	598	2	1,196	166.7	3	500			0	**167**	**3**	**500**	(200+150+150)	500	1	500	
Make-up / Dressing Rooms				300	2	600			0	**300**	**2**	**600**		300	2	600	
Controls / Lighting / Projection	233	1	233	200	1	200			0	**200**	**1**	**200**		200	1	200	
Theater - Freshman	3,438	1	3,438													
Stage - Freshman	691	1	691													
Dressing/Storage	217	2	434													

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DINING & FOOD SERVICE			**21,955**			**1,130**			**24,050**			**25,180**				**25,180**	
Cafeteria - Freshman	4,215	1	4,215			0	5,000	1	5,000	**5,000**	**1**	**5,000**					
Cafeteria / Student Lounge / Break-out	10,408	1	10,408			0	12,600	1	12,600	**12,600**	**1**	**12,600**		17,600	1	17,600	3 seatings - 15SF per seat
Chair / Table Storage	156	1	156			0	630	1	630	**630**	**1**	**630**		1,030	1	1,030	
Scramble Serving Area	2,486	1	2,486			0	1,800	1	1,800	**1,800**	**1**	**1,800**		600	1	600	
Kitchen - Freshman	466	1	466			0	1,800	1	1,800	**1,800**	**1**	**1,800**					
Kitchen	3,553	1	3,553			0	2,220	1	2,220	**2,220**	**1**	**2,220**		4,820	1	4,820	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	671	1	671	1,130	1	1,130			0	**1,130**	**1**	**1,130**		1,130	1	1,130	20 SF/Occupant
MEDICAL			**2,215**			**2,610**			**0**			**2,610**				**2,610**	
Medical Suite Toilet	62	2	124	65	4	260			0	**65**	**4**	**260**		60	1	60	
Nurses' Office / Waiting Room	217	2	434	550	1	550			0	**550**	**1**	**550**		250	1	250	
Interview Room				112.5	8	900			0	**112.5**	**8**	**900**		100	8	800	
Examination Room / Resting	103	8	820	800	1	800			0	**800**	**1**	**800**		100	15	1,500	
Medical Suite Toilet - Freshman	47	1	47								**0**	**0**					
Nurses' Office - Freshman	126	1	126								**0**	**0**					
Exam / Resting - Freshman	332	2	664								**0**	**0**					
Mother's Room				50	2	100			0	**50**	**2**	**100**					
ADMINISTRATION & GUIDANCE			**17,459**			**10,932**			**3,873**			**14,805**	increased 250			**10,685**	
General Office / Waiting Room / Toilet	231	1	231	300	1	300			0	**300**	**1**	**300**		1,760	1	1,760	
Teachers' Mail and Time Room	138	1	138	250	1	250			0	**250**	**1**	**250**		100	1	100	
Duplicating Room	178	2	355	200	1	200			0	**200**	**1**	**200**		200	1	200	
Records Room	58	2	115	200	1	200			0	**200**	**1**	**200**		200	1	200	
Principal's Office w/ Conference Area	305	1	305	375	1	375			0	**375**	**1**	**375**		375	1	375	
Principal's Secretary / Waiting	268	1	268	125	1	125			0	**125**	**1**	**125**		125	1	125	
Asst Principal's Office - AP1 (Discipl/Oper)	280	1	280	200	1	200			0	**200**	**1**	**200**		150	1	150	
Asst Principal's Office - AP2 (Dir.ofCurric)	541	1	541	200	1	200			0	**200**	**1**	**200**		150	7	1,050	
Supervisory / Spare Office (Accts Payable)	137	1	137	120	1	120			0	**120**	**1**	**120**		120	1	120	
Conference Room (Administration)	284	3	853	450	1	450			0	**450**	**1**	**450**		450	1	450	
Freshman Office / Waiting Rm / Tlt	793	1	793			0	200	1	200	**200**	**1**	**200**					
Principal's Office w/ Conf Area - Freshman	206	1	206			0	150	1	150	**150**	**1**	**150**					
Conference Room - Freshman	175	1	175			0	200	1	200	**200**	**1**	**200**					
Guidance Office - Freshman	187	3	562			0	150	3	450	**150**	**3**	**450**	3rd office req'd				
Social Worker Office - Freshman	129	1	129			0	150	1	150	**150**	**1**	**150**					
Guidance Waiting Room - Freshman	559	1	559				100	1	100	**100**	**1**	**100**					
Guidance Storeroom - Freshman	124	1	124				100	1	100	**100**	**1**	**100**					
Records Room - Freshman							93	1	93	**93**	**1**	**93**					
Kitchenette - Freshman	200	1	200			0	100	1	100	**100**	**1**	**100**					
House Office / Waiting Rm / Tlt (B,C,D,E)	509	3	1,527	293	4	1,172			0	**293**	**4**	**1,172**					
Asst Principal's Office (B,C,D,E)	265	4	1,058	150	4	600			0	**150**	**4**	**600**					
Guidance Office (B,C,D,E)	152	8	1,219	150	8	1,200			0	**150**	**8**	**1,200**		150	18	2,700	
Social Worker Office (B,C,D,E)	169	4	676	150	4	600			0	**150**	**4**	**600**					
Guidance Waiting Room - C House	292	1	292	100	4	400			0	**100**	**4**	**400**		100	1	100	
Guidance Storeroom				100	4	400			0	**100**	**4**	**400**		100	1	100	
Career Center	677	2	1,354			0	1,030	1	1,030	**1,030**	**1**	**1,030**		1,030	1	1,030	
Records Room	77	1	77			0			0	combined w/ House Office				465	1	465	
Student Support Offices - Freshman	115	2	229			0	150	1	150	**150**	**1**	**150**					
Student Support Conf. - Freshman	230	1	230			0	200	1	200	**200**	**1**	**200**					
Sudent Support Suite (incl. Safe Harbors)	1,183	1	1,183	1,200	1	1,200			0	**1,200**	**1**	**1,200**					
Student Support Offices - Gr.10-12	85	3	256	150	3	450			0	**150**	**3**	**450**					
Student Support Conf. Gr.10-12	140	1	140	150	1	150			0	**150**	**1**	**150**					
Dir of Students	278	1	278	200	1	200			0	**200**	**1**	**200**					
ELL Dept Head + Testing	81	2	161	120	2	240			0	**120**	**2**	**240**					
Teachers' Work Room - Freshman	386	2	772	250	4	1,000	250	1	250	**250**	**5**	**1,250**		1,760	1	1,760	
Trio - Gear Up/Talent/Upward - Freshman	473	1	473	900	1	900	700	1	700	**1,600**	**2**	**1,600**	+100 per location				
Trio - Upward	579	1	579							included above							
Trio - Suite (recept, wait, 2 offices, conf)	197	5	984							included above							
CUSTODIAL & MAINTENANCE			**6,775**			**2,010**			**3,580**			**5,590**	increased 150			**4,265**	
Custodian's Office + Lockers	77	3	232			0				combined w/ Recv'g/Supply				150	1	150	
Custodian's Workshop	525	1	525			0				combined w/ Recv'g/Supply				250	1	250	
Custodian's Storage	72	26	1,884			0				combined w/ Recv'g/Supply				375	1	375	
Recycling Room / Trash	85	1	85			0	400	1	400	**400**	**1**	**400**		400	1	400	
Receiving and General Supply	84	1	84			0	2,580	1	2,580	**2,580**	**1**	**2,580**		1,030	1	1,030	
Storeroom + Books	220	11	2,417	173	9	1,560	75	4	300	**143**	**13**	**1,860**	3*300+100,2*105,	1,860	1	1,860	
Network / Telecom Room	86	18	1,548	56	8	450	43	7	300	**50**	**15**	**750**	11*50, 2*25, 2*75	200	1	200	
OTHER			**24,875**			**5,150**			**150**			**5,300**				**0**	

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
Unassigned Computer Lab - Freshman	868	2	1,736													
Unassigned Computer Lab - Gr.10-12	960	7	6,721													
Unassigned Science Lab - Freshman	1,385	1	1,385													
Unassigned Green House/Growing Room	207	2	413													
Spare Off, Wait, Conf (220A,B,C)	185	3	556													
Lowell Comm Hlth Center	608	1	608	1,500	1	1,500			0	**1,500**	**1**	**1,500**				
Lowell Comm Hlth Center - Exam	80	3	241							included above						
Lowell Comm Hlth Center - Office	103	2	205							included above						
Lowell Comm Hlth Center - File and Storage	146	3	437							included above						
Lowell Comm Hlth Center - Toilet	72	1	72							included above						
Catie's Closet - Freshman	225	1	225	800	1	800			0	**800**	**1**	**800**				
Catie's Closet - Gr.10-12	364	1	364							included above						
In School Suspension - Freshman	809	1	809	600	1	600				**600**	**1**	**600**				
In House Detention Gr.10-12	969	1	969	800	1	800			0	**800**	**1**	**800**				
Score Mediation (Office, Entry, Stor)	132	3	395	150	2	300				**150**	**2**	**300**				
Interactive Learning Center + Storage	995	1	995							use typ CRs/laptops						
Latino Connection	228	1	228	250	1	250				**250**	**1**	**250**				
Student Activities (Lord 1st fl - North)	284	1	284	300	1	300				**300**	**1**	**300**				
Substitute Teacher's Office	127	1	127			0	150	1	150	**150**	**1**	**150**				
Conseling Services	occurs in available space									use typ CRs/other space						
DARE Office & Security	233	3	700	150	2	300			0	**150**	**2**	**300**				
SRO Office & Entry (Lord 1st fl - North)	129	2	258	150	2	300			0	**150**	**2**	**300**				
Pool - 25 yd/8 lane (60'w x75'l, 10'clr +5'end)	6,895	1	6,895													
Pool + Towel Storage = Laundry	63	4	252													
Total Building Net Floor Area (NFA)			**359,113**			**228,837**			**159,633**			**388,470**	reduced 981sf per above notes		**365,707**	
Proposed Student Capacity / Enrollment			3,125									**3,520**			**3,520**	157
NON-PROGRAMMED SPACES					% of GFA	**159,426**		% of GFA	**74,882**		% of GFA	**234,308**				
Other Occupied Rooms (list separately)					0%			0%			0%					Non-Programmed space areas are
					0%			0%			0%					required to be included in the
					0%			0%			0%					following submittals:
					0%			0%			0%					Schematic Design Submittal
Unoccupied MEP/FP Spaces					0%			0%			0%					Design Development Submittal
Rooms					0%			0%			0%					60% Construction Documents
Toilet Rooms					0%			0%			0%					90% Construction Documents
Circulation (corridors, stairs, ramps & elevators)					0%			0%			0%					Final Construction Documents
Remaining[3]					41%	**159,426**		32%	**74,882**		38%	**234,308**				
Total Building Gross Floor Area (GFA)[2]			**614,353**	was 628.6k per SOI		388,263			234,515			**622,778**	reduced 5,780sf per bldg scan		**552,640**	Note: MSBA does not incl. Ch.74 calc's
Grossing factor (GFA/NFA)			**1.71**			**1.70**			**1.47**			**1.60**			**1.51**	

[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

[3] **Remaining** Includes exterior walls, interior partitions, chases, and other areas not listed above. Do not calculate this area, it is assumed to equal the difference between the Total Building Gross Floor Area and area not accounted for above.

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architect Firm: Perkins Eastman / DPC

Name of Principal Architect: Robert Bell

Signature of Principal Architect:

Date: 20th February 2019

APPENDIX B – SPACE SUMMARY TEMPLATE

- Updated Schematic Design Space Summary Template – Signed by Designer

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Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED: Existing to Remain/Renovated			PROPOSED: New			PROPOSED: Total				MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
CORE ACADEMIC SPACES			**136,088**			**114,400**			**47,870**			**162,270**	reduced 2,690 per relocations			**169,040**	
(List classrooms of different sizes separately)																	
	746	4	2,983														
	809	6	4,851														
	850	12	10,197														
	948	3	2,844														
	1,024	2	2,048														
Classroom - Freshmen SubTotal	849	27	Averaged	0	0	0	900	33	29,700	**900**	**33**	**29,700**	(8E,8S,8M,4W,1H,4EII)				
	592	2	1,184	800	6	4,800			0	**800**	**6**	**4,800**	(3E,3S)				
	724	33	23,903	850	18	15,300			0	**850**	**18**	**15,300**	(5E,5S,3M,1W,3H,1EII)				
	808	15	12,114	875	10	8,750			0	**875**	**10**	**8,750**	(6M,4EII)				
	850	18	15,301	900	3	2,700	900	3	2,700	**900**	**6**	**5,400**	(3M,3H)				
	898	10	8,975	950	27	25,650			0	**950**	**27**	**25,650**	(3E,3S,6M,10W,5EII)				
	964	7	6,749	975	6	5,850			0	**975**	**6**	**5,850**	(3E,3S)				
	992	8	7,936	1,000	6	6,000			0	**1,000**	**6**	**6,000**	(3E,3S)				
	1,017	1	1,017			0			0			**0**					
	1,184	1	1,184			0			0			**0**					
Classroom - Gr. 10-12 SubTotal	825	95	Averaged	909	76	Averaged	900	3	Averaged	**908**	**79**	**Averaged**	(17E,17S,18M,11WL,6H,10EII)				
Total Classroom - General		122			76			36			**112**			850	120	102,000	825 SF min - 950 SF max
Teacher Planning - Freshman	493	1	493			0	400	4	1,600	**400**	**4**	**1,600**					
Tchr Plng (Tch-Out, Lng, Ktch, Comp, Copy)	604	8	4,834	400	15	6,000			0	**400**	**15**	**6,000**	(6hum,6stm,1W,1H,1EII)				
Dept Off's (Eng, SS, Mth, Sci, WL/ELL, Instr)	112	6	671			0	150	5	750	**150**	**5**	**750**					
Teacher Develop/Training (Little Thtr + Cntrl)	3,568	1	3,568	3,650	1	3,650			0	**3,650**	**1**	**3,650**					
Total Teacher Planning		16			16			9			**25**			100	120	12,000	
Small Group Seminar (20-30 seats)				450	6	2,700			0	**450**	**6**	**2,700**	(1E,1S,2M,1W,1E	500	8	4,000	
Science Classroom / Lab - Freshman	978	7	6,849	0	0	0	1,440	8	11,520	**1,440**	**8**	**11,520**	(8frshmn)				
Science Classroom / Lab - Gr.10-12	900	19	17,100	1,440	20	28,800	0	0	0	**1,440**	**20**	**28,800**	(8chm,7bio,2bio/chm,4env,1micro,1bio-t,1hlth)				
Total Science Classroom / Lab		26			20			8			**28**			1,440	31	44,640	3 x85% ut=20 Seats-1 per /day/student
Prep Room	156	7	1,091	350	11	3,850	400	4	1,600	**363**	**15**	**5,450**		200	31	6,200	
Central Chemical Storage Rm				350	1	350			0	**350**	**1**	**350**		200	1	200	
Unassigned Green House/Growing Room	196	1	196						0	part of prep rooms above							
Clean Room (w/ Micro/Bio Tech Lab)									0	part of prep rooms above							
SPECIAL EDUCATION			**21,845**			**25,550**			**14,850**			**40,400**	increased 1,450 per relocations			**34,240**	
Self-Contained SPED														950	24	22,800	825-950 SF equal to surrounding classrooms
Self-Contained SPED Toilet														60	24	1,440	
Resource Room														500	10	5,000	1/2 size Genl. Clrm.
Small Group Room														500	10	5,000	1/2 size Genl. Clrm.
LIFE SKILLS (69 stu's =78 prorated)																	
Life Skills CRs (2 ages +Kitch/Laund/Mail)	968	4	3,870	1,200	4	4,800			0	**1,200**	**4**	**4,800**					
Life Skills Hygene (Wash/Changing Room)				225	2	450			0	**225**	**2**	**450**					
Life Skills Intensive CR +Tlt (2 age grps)	872	2	1,744	950	2	1,900			0	**950**	**2**	**1,900**					
Life Skills Sensory/Deescalation Room	344	1	344	375	2	750			0	**375**	**2**	**750**	(450+300)				
Life Skills (CSA) Autism CR + Tlt & Quiet	816	2	1,632	1,050	6	6,300	950	2	1,900	**1,025**	**8**	**8,200**					
Life Skills - AdaptivePE / Sensory-Motor						0	3,000	2	6,000	**3,000**	**2**	**6,000**					
ADJUSTMENTS (40 stu's =46 prorated)																	
Adjustments CR	738	7	5,169	950	4	3,800	950	4	3,800	**950**	**8**	**7,600**					
Adjust Social Worker	165	1	165	0	0	0	150	1	150	**150**	**1**	**150**					
Counseling Room				0	0	0	200	1	200	**200**	**1**	**200**					
Storage				0	0	0	100	1	100	**100**	**1**	**100**					
FUNDAMNTL (190 stu's =214 prorated)																	
Fundamentals - Freshman	810	2	1,619			0	450	4	1,800	**450**	**4**	**1,800**					
Fundamentals - Gr.10-12	545	7	3,812	450	4	1,800	450	2	900	**450**	**6**	**2,700**					
Fundamentals Instruct. Support CR (for 24+)				1,900	1	1,900			0	**1,900**	**1**	**1,900**					
OTHER SPECIAL NEEDS																	
OT/PT (part-time)										therapy occurs in CRs							
Deaf/Hearing Impared Suite	1,066	1	1,066	600	1	600			0	**600**	**1**	**600**					
Speech & OT/PT (Office for 3 + mtgs for 6)	178	3	534	450	1	450			0	**450**	**1**	**450**					
Psych + Evaluators/Testing (BCBA in rms)	299	2	598	150	4	600			0	**150**	**4**	**600**					
Social Worker	189	1	189	200	1	200			0	**200**	**1**	**200**					
PALS Mentoring Office/Conf	161	2	321							part of soc worker							
SPED Dept Chair	241	1	241	250	1	250			0	**250**	**1**	**250**					
SPED Eval Team Chair (for 2)	237	1	237	250	1	250			0	**250**	**1**	**250**					
SPED Office (Clerk/Waiting/Files)	304	1	304	300	1	300			0	**300**	**1**	**300**					
Conference (for 6, 12 & 20)				400	3	1,200			0	**400**	**3**	**1,200**	(600+450+150)				

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ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
ART & MUSIC			**19,851**			**17,700**			**0**			**17,700**			**13,075**	
Art CR (incl. Photo/Anim, Graph, TV Prod)	1,301	6	7,803	1,350	6	8,100			0	**1,350**	**6**	**8,100**	1,200	6	7,200	Assumed use - 25% Population - 5 times/week
Art Workroom w/ Storage (kiln incl. in rm)	370	4	1,482	900	1	900			0	**900**	**1**	**900**	150	6	900	
Band - 50 - 100 seats	2,791	1	2,791	2,000	1	2,000			0	**2,000**	**1**	**2,000**	1,500	1	1,500	Assumed use - 25% Population - 5 times/week
Chorus - 50 - 100 seats (incl. Drama)	2,652	1	2,652	1,500	1	1,500			0	**1,500**	**1**	**1,500**	1,500	1	1,500	
Dance (also uses stage)	866	1	866	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Dance (changing)											incl. in rooms					
Ensemble						0			0		**0**	**0**	200	1	200	
Piano/Digital Lab	1,186	1	1,186	1,000	1	1,000			0	**1,000**	**1**	**1,000**				
Music Practice (incl. Guitar)	81	3	244	375	1	375			0	**375**	**1**	**375**	75	17	1,275	
Music Storage	256	7	1,789	200	5	1,000			0	**200**	**5**	**1,000**	500	1	500	
Fine Arts Dept Office	155	1	155	125	1	125			0	**125**	**1**	**125**				
Music Admin - Conf/ Off	183	4	731	300	1	300			0	**300**	**1**	**300**				
Dark Room	152	1	152			0			0		**0**	**0**				
VOCATIONS & TECHNOLOGY			**28,533**			**20,755**			**14,860**			**35,615**			**38,400**	
ROTC Classroom/PT (385 stu = 434 prorated)	955	4	3,819	900	5	4,500			0	**900**	**5**	**4,500**	5th Rm req'd @ 351			
Culinary Arts Classroom	1,163	2	2,325	1,200	2	2,400			0	**1,200**	**2**	**2,400**				
Business (Accounting/Pers-Finance/Law)	869	2	1,738			0	1,200	2	2,400	**1,200**	**2**	**2,400**				
Business (Mktg/Sports Mktg) **CH.74**	994	2	1,987								incl. below		Ch.74 calc's **NOT** in MSBA totals			Exist 281stu in 14.5sect 5x/wk of 35p cyc at 85% =2.4rms
Business (Retail Mktg - CR) **CH.74**	812	1	812			0	1,200	3	3,600	**1,200**	**3**	**3,600**	FTE	SF/stu.	SF Reg's	Adjust to 316 in 15.5sect x5/wk of 35p cyc at 85% =2.6 rms
Business (Retail Mktg - Store) **CH.74**	532	1	532								incl. above		**60**	**110**	**6,600**	20:1 stu/tchr ratio (2200sf min, 12' clear), 3 rm capacity = 60
Tech Clrm. - (E.G. Drafting, Business)		12			7						**12**		1,200	12	14,400	Assumed use - 50% Population - 5 times/week
ROTC MP/Gym w/ Stor (Drills/Band)	755	1	755			0	2,500	1	2,500	**2,500**	**1**	**2,500**				
Culinary Arts Kitch + Restaurant (for 25-30)	2,494	1	2,494	2,975	1	2,975			0	**2,975**	**1**	**2,975**				
Costume Shop w/ Sewing, Storage	727	1	727	1,440	1	1,440			0	**1,440**	**1**	**1,440**				
Scene Shop	future conversion of storage above			1,440	1	1,440			0	**1,440**	**1**	**1,440**				
TV Studio (w/ cntrl, edit/scrn, off/wait, equip)	3,882	1	3,882	4,000	1	4,000			0	**4,000**	**1**	**4,000**				
Robotics/CADD (w/ Engnr)	1,577	1	1,577			0	1,440	2	2,880	**1,440**	**2**	**2,880**				
Clean Enegry Lab (w/ Engnr)	1,577	1	1,577			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Maker Space (w/ Freshman Integr. Sci)	1,512	1	1,512			0	1,440	1	1,440	**1,440**	**1**	**1,440**				
Business (Bank/Credit Union)	287	1	287			0	400	1	400	**400**	**1**	**400**				
Tech Shop - (E.G. Consumer, Wood)		8			4			6			**10**		2,000	12	24,000	Assumed use - 50% Population - 5 times/week
ROTC Off/ Conf.	788	2	1,576	800	2	1,600			0	**800**	**2**	**1,600**				
ROTC Storage (4sf/cadet + mock weapons)	254	7	1,779	1,800	1	1,800			0	**1,800**	**1**	**1,800**	434x4 =1736+64			
Culinary Arts Storage	216	2	432	300	2	600			0	**300**	**2**	**600**				
Scene and Costume Storage	722	1	722						0		incl. in rooms					
Retail/Store Storage						0	200	1	200	**200**	**1**	**200**				
HEALTH & PHYSICAL EDUCATION			**46,121**			**0**			**41,600**			**41,600**	reduced 100		**35,912**	
Gymnasium (6 lane 134.1m trck, LJ, TJ, SP)	28,408	1	28,408			0	3,000	6	18,000	**3,000**	**6**	**18,000**		12,000	1	12,000	
PE Alternatives (Wrestling 42x84 req'd)	1,960	1	1,960			0	3,400	1	3,400	**3,400**	**1**	**3,400**	size correction	3,000	1	3,000	
Fitness & Functional Strngth	1,474	2	2,948			0	1,500	2	3,000	**1,500**	**2**	**3,000**				
Multi-Purpose (Gymnastics/Yoga/Cheering)	currently off-site					0	3,000	1	3,000	**3,000**	**1**	**3,000**				
Gym Storeroom (incl. Gymnastics w/ MP)	1,133	1	1,133			0	700	2	1,400	**700**	**2**	**1,400**	(500+900)	300	1	300	
Locker Rooms - Boys / Girls w/ Toilets	3,245	2	6,490			0	3,600	2	7,200	**3,600**	**2**	**7,200**		19,712	1	19,712	5.6 sf/student total
Varsity Lockers - Boys/ Girls w/ Toilets	870	2	1,740			0	800	3	2,400	**800**	**3**	**2,400**				
Phys. Ed. Storage (incl. Equip)	258	5	1,292			0	500	3	1,500	**500**	**3**	**1,500**	(750+500+250)	500	1	500	
Athletic Director's Office (Lord 1st fl -South)	185	1	185			0	150	1	150	**150**	**1**	**150**		150	1	150	
AD Secr, Bursor, Conf (Lord 1st fl - South)	155	3	464			0	150	3	450	**150**	**3**	**450**				
Health Instructor's Office w/ Shower & Toilet	170	5	852			0	125	4	500	**125**	**4**	**500**		250	1	250	
Trainers Room	216	3	649			0	600	1	600	**600**	**1**	**600**				
MEDIA CENTER			**13,164**			**13,100**			**8,800**			**21,900**			**21,900**	
Media Center / Reading Room	9,137	1	9,137	10,700	1	10,700	5,950	1	5,950	**8,325**	**2**	**16,650**		21,900	1	21,900	
Comp. Lab (tech ctr/trng lab incl. instr sp)	666	3	1,998	950	2	1,900	800	2	1,600	**875**	**4**	**3,500**				
Copy Center						0	800	1	800	**800**	**1**	**800**				
Data Processing + Scheduler	1,036	1	1,036			0	450	1	450	**450**	**1**	**450**				
Small Group				300	1	300			0	**300**	**1**	**300**				
MCAS/Testing Stor (incl instr specialist)	993	1	993	100	2	200			0	**100**	**2**	**200**				
AUDITORIUM / DRAMA			**20,192**			**15,500**			**0**			**15,500**	reduced 41sf		**10,400**	
Auditorium	11,600	1	11,600	11,600	1	11,600			0	**11,600**	**1**	**11,600**		7,500	1	7,500	2/3 Enrollment @ 10 SF/Seat - 750 seats MAX
Stage	2,600	1	2,600	2,600	1	2,600			0	**2,600**	**1**	**2,600**		1,600	1	1,600	
Auditorium Storage (incl Prop Storage)	598	2	1,196	166.7	3	500			0	**167**	**3**	**500**	(200+150+150)	500	1	500	
Make-up / Dressing Rooms				300	2	600			0	**300**	**2**	**600**		300	2	600	
Controls / Lighting / Projection	233	1	233	200	1	200			0	**200**	**1**	**200**		200	1	200	
Theater - Freshman	3,438	1	3,438													
Stage - Freshman	691	1	691													
Dressing/Storage	217	2	434													

Proposed Space Summary - High Schools v23

Date: 2/20/2019 Schematic Design Submittal

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED										MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total							
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals		ROOM NFA[1]	# OF RMS	area totals	Comments
DINING & FOOD SERVICE			**21,955**			**1,130**			**24,050**			**25,180**				**25,180**	
Cafeteria - Freshman	4,215	1	4,215			0	5,000	1	5,000	**5,000**	**1**	**5,000**					
Cafeteria / Student Lounge / Break-out	10,408	1	10,408			0	12,600	1	12,600	**12,600**	**1**	**12,600**		17,600	1	17,600	3 seatings - 15SF per seat
Chair / Table Storage	156	1	156			0	630	1	630	**630**	**1**	**630**		1,030	1	1,030	
Scramble Serving Area	2,486	1	2,486			0	1,800	1	1,800	**1,800**	**1**	**1,800**		600	1	600	
Kitchen - Freshman	466	1	466			0	1,800	1	1,800	**1,800**	**1**	**1,800**					
Kitchen	3,553	1	3,553			0	2,220	1	2,220	**2,220**	**1**	**2,220**		4,820	1	4,820	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room	671	1	671	1,130	1	1,130			0	**1,130**	**1**	**1,130**		1,130	1	1,130	20 SF/Occupant
MEDICAL			**2,215**			**2,610**			**0**			**2,610**				**2,610**	
Medical Suite Toilet	62	2	124	65	4	260			0	**65**	**4**	**260**		60	1	60	
Nurses' Office / Waiting Room	217	2	434	550	1	550			0	**550**	**1**	**550**		250	1	250	
Interview Room				112.5	8	900			0	**112.5**	**8**	**900**		100	8	800	
Examination Room / Resting	103	8	820	800	1	800			0	**800**	**1**	**800**		100	15	1,500	
Medical Suite Toilet - Freshman	47	1	47								**0**	**0**					
Nurses' Office - Freshman	126	1	126								**0**	**0**					
Exam / Resting - Freshman	332	2	664								**0**	**0**					
Mother's Room				50	2	100			0	**50**	**2**	**100**					
ADMINISTRATION & GUIDANCE			**17,459**			**10,932**			**3,873**			**14,805**	increased 250			**10,685**	
General Office / Waiting Room / Toilet	231	1	231	300	1	300			0	**300**	**1**	**300**		1,760	1	1,760	
Teachers' Mail and Time Room	138	1	138	250	1	250			0	**250**	**1**	**250**		100	1	100	
Duplicating Room	178	2	355	200	1	200			0	**200**	**1**	**200**		200	1	200	
Records Room	58	2	115	200	1	200			0	**200**	**1**	**200**		200	1	200	
Principal's Office w/ Conference Area	305	1	305	375	1	375			0	**375**	**1**	**375**		375	1	375	
Principal's Secretary / Waiting	268	1	268	125	1	125			0	**125**	**1**	**125**		125	1	125	
Asst Principal's Office - AP1 (Discipl/Oper)	280	1	280	200	1	200			0	**200**	**1**	**200**		150	1	150	
Asst Principal's Office - AP2 (Dir.ofCurric)	541	1	541	200	1	200			0	**200**	**1**	**200**		150	7	1,050	
Supervisory / Spare Office (Accts Payable)	137	1	137	120	1	120			0	**120**	**1**	**120**		120	1	120	
Conference Room (Administration)	284	3	853	450	1	450			0	**450**	**1**	**450**		450	1	450	
Freshman Office / Waiting Rm / Tlt	793	1	793			0	200	1	200	**200**	**1**	**200**					
Principal's Office w/ Conf Area - Freshman	206	1	206			0	150	1	150	**150**	**1**	**150**					
Conference Room - Freshman	175	1	175			0	200	1	200	**200**	**1**	**200**					
Guidance Office - Freshman	187	3	562			0	150	3	450	**150**	**3**	**450**	3rd office req'd				
Social Worker Office - Freshman	129	1	129			0	150	1	150	**150**	**1**	**150**					
Guidance Waiting Room - Freshman	559	1	559				100	1	100	**100**	**1**	**100**					
Guidance Storeroom - Freshman	124	1	124				100	1	100	**100**	**1**	**100**					
Records Room - Freshman							93	1	93	**93**	**1**	**93**					
Kitchenette - Freshman	200	1	200			0	100	1	100	**100**	**1**	**100**					
House Office / Waiting Rm / Tlt (B,C,D,E)	509	3	1,527	293	4	1,172			0	**293**	**4**	**1,172**					
Asst Principal's Office (B,C,D,E)	265	4	1,058	150	4	600			0	**150**	**4**	**600**					
Guidance Office (B,C,D,E)	152	8	1,219	150	8	1,200			0	**150**	**8**	**1,200**		150	18	2,700	
Social Worker Office (B,C,D,E)	169	4	676	150	4	600			0	**150**	**4**	**600**					
Guidance Waiting Room - C House	292	1	292	100	4	400			0	**100**	**4**	**400**		100	1	100	
Guidance Storeroom				100	4	400			0	**100**	**4**	**400**		100	1	100	
Career Center	677	2	1,354			0	1,030	1	1,030	**1,030**	**1**	**1,030**		1,030	1	1,030	
Records Room	77	1	77			0			0	combined w/ House Office				465	1	465	
Student Support Offices - Freshman	115	2	229			0	150	1	150	**150**	**1**	**150**					
Student Support Conf. - Freshman	230	1	230			0	200	1	200	**200**	**1**	**200**					
Sudent Support Suite (incl. Safe Harbors)	1,183	1	1,183	1,200	1	1,200			0	**1,200**	**1**	**1,200**					
Student Support Offices - Gr.10-12	85	3	256	150	3	450			0	**150**	**3**	**450**					
Student Support Conf. Gr.10-12	140	1	140	150	1	150			0	**150**	**1**	**150**					
Dir of Students	278	1	278	200	1	200			0	**200**	**1**	**200**					
ELL Dept Head + Testing	81	2	161	120	2	240			0	**120**	**2**	**240**					
Teachers' Work Room - Freshman	386	2	772	250	4	1,000	250	1	250	**250**	**5**	**1,250**		1,760	1	1,760	
Trio - Gear Up/Talent/Upward - Freshman	473	1	473	900	1	900	700	1	700	**1,600**	**2**	**1,600**	+100 per location				
Trio - Upward	579	1	579							included above							
Trio - Suite (recept, wait, 2 offices, conf)	197	5	984							included above							
CUSTODIAL & MAINTENANCE			**6,775**			**2,010**			**3,580**			**5,590**	increased 150			**4,265**	
Custodian's Office + Lockers	77	3	232			0				combined w/ Recv'g/Supply				150	1	150	
Custodian's Workshop	525	1	525			0				combined w/ Recv'g/Supply				250	1	250	
Custodian's Storage	72	26	1,884			0				combined w/ Recv'g/Supply				375	1	375	
Recycling Room / Trash	85	1	85			0	400	1	400	**400**	**1**	**400**		400	1	400	
Receiving and General Supply	84	1	84			0	2,580	1	2,580	**2,580**	**1**	**2,580**		1,030	1	1,030	
Storeroom + Books	220	11	2,417	173	9	1,560	75	4	300	**143**	**13**	**1,860**	3*300+100,2*105,	1,860	1	1,860	
Network / Telecom Room	86	18	1,548	56	8	450	43	7	300	**50**	**15**	**750**	11*50, 2*25, 2*75	200	1	200	
OTHER			**24,875**			**5,150**			**150**			**5,300**				**0**	

Proposed Space Summary - High Schools v23

Date: 2/20/2019 **Schematic Design Submittal**

LOWELL HIGH SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
ROOM TYPE	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	ROOM NFA[1]	# OF RMS	area totals	Comments
Unassigned Computer Lab - Freshman	868	2	1,736													
Unassigned Computer Lab - Gr.10-12	960	7	6,721													
Unassigned Science Lab - Freshman	1,385	1	1,385													
Unassigned Green House/Growing Room	207	2	413													
Spare Off, Wait, Conf (220A,B,C)	185	3	556													
Lowell Comm Hlth Center	608	1	608	1,500	1	1,500			0	**1,500**	**1**	**1,500**				
Lowell Comm Hlth Center - Exam	80	3	241							included above						
Lowell Comm Hlth Center - Office	103	2	205							included above						
Lowell Comm Hlth Center - File and Storage	146	3	437							included above						
Lowell Comm Hlth Center - Toilet	72	1	72							included above						
Catie's Closet - Freshman	225	1	225	800	1	800			0	**800**	**1**	**800**				
Catie's Closet - Gr.10-12	364	1	364							included above						
In School Suspension - Freshman	809	1	809	600	1	600				**600**	**1**	**600**				
In House Detention Gr.10-12	969	1	969	800	1	800			0	**800**	**1**	**800**				
Score Mediation (Office, Entry, Stor)	132	3	395	150	2	300				**150**	**2**	**300**				
Interactive Learning Center + Storage	995	1	995							use typ CRs/laptops						
Latino Connection	228	1	228	250	1	250				**250**	**1**	**250**				
Student Activities (Lord 1st fl - North)	284	1	284	300	1	300				**300**	**1**	**300**				
Substitute Teacher's Office	127	1	127			0	150	1	150	**150**	**1**	**150**				
Conseling Services	occurs in available space									use typ CRs/other space						
DARE Office & Security	233	3	700	150	2	300			0	**150**	**2**	**300**				
SRO Office & Entry (Lord 1st fl - North)	129	2	258	150	2	300			0	**150**	**2**	**300**				
Pool - 25 yd/8 lane (60'w x75'l, 10'clr +5'end)	6,895	1	6,895													
Pool + Towel Storage = Laundry	63	4	252													
Total Building Net Floor Area (NFA)			**359,072**			**228,837**			**159,633**			**388,470**	reduced 981sf per above notes		**365,707**	
Proposed Student Capacity / Enrollment			3,125									**3,520**			**3,520**	157
NON-PROGRAMMED SPACES					% of GFA	**159,426**		% of GFA	**74,882**		% of GFA	**234,308**				
Other Occupied Rooms (Mother's)					0%			0%			0%	100				Non-Programmed space areas are
Unoccupied MEP/FP Spaces					0%			0%			1%	8,447				Design Development Submittal
Rooms					0%			0%			0%	855				60% Construction Documents
Toilet Rooms					0%			0%			2%	11,707				90% Construction Documents
Circulation (corridors, stairs, ramps & elevators)					0%			0%			22%	136,009				Final Construction Documents
Remaining[3]					41%	**159,426**		32%	**74,882**		12%	**77,190**				
Total Building Gross Floor Area (GFA)[2]			**614,353**	was 628.6k per SOI		388,263			234,515			**622,778**	reduced 5,780sf per bldg scan		**552,640**	Note: MSBA does not incl. Ch.74 calc's
Grossing factor (GFA/NFA)			**1.71**			**1.70**			**1.47**			**1.60**			**1.51**	

[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

[3] **Remaining** Includes exterior walls, interior partitions, chases, and other areas not listed above. Do not calculate this area, it is assumed to equal the difference between the Total Building Gross Floor Area and area not accounted for above.

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architect Firm: **Perkins Eastman / DPC**

Name of Principal Architect: **Robert Bell**

Signature of Principal Architect:

Date: **20th February 2019**

APPENDIX C – SUSTAINABILITY & ENERGY

- Signed Sustainability Letter
- LEED Scorecard
- Energy Analysis Report (provided by Thorton Thomasetti)

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PERKINS EASTMAN

February 20, 2019

Ms. Jennifer Flynn
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, Massachusetts 02109

Re:	Schematic Design Report
Project Name:	Lowell High School
Project Number:	67510
MSBA Project #:	201401600505
Subject:	Sustainability Letter

Perkins Eastman
Architects DPC

20 Ashburton Place
Floor 8
Boston, MA 02108
+1.617.449.4000

PERKINSEASTMAN.COM

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Stamford
Toronto
Washington DC

Dear Ms. Flynn:

This is an acknowledgement that the Lowell Public School District has identified a goal of 2% additional reimbursement from the MSBA High Efficiency Green School Program. As their Designer, I have submitted a completed LEED scorecard showing all prerequisites and 56 attempted points, which will meet that goal.

The scope of work for this project will include the construction elements and performance tasks to achieve that goal, and all subsequent documents, including but not limited to, specifications, drawings, and cost estimates will match the scope of work indicated in the submitted scorecard.

Sincerely,

Joseph Drown, AIA
Principal

PERKINS EASTMAN

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LEED v4 for BD+C: Schools

Project Checklist

Project Name: Lowell High School
Date: 12/4/2018
Prepared By: SSC

Y	?	N			
1	0	0	Credit 1	Integrative Process	1

14	1	0	Location and Transportation		15
0	0	na	Credit 1	LEED for Neighborhood Development Location	15
1	0	0	Credit 2	Sensitive Land Protection	1
2	0	0	Credit 3	High Priority Site	2
5	0	0	Credit 4	Surrounding Density and Diverse Uses	5
4	0	0	Credit 5	Access to Quality Transit	4
0	1	0	Credit 6	Bicycle Facilities	1
1	0	0	Credit 7	Reduced Parking Footprint	1
1	0	0	Credit 8	Green Vehicles	1

3	4	5	Sustainable Sites		12
Y			Prereq 1	Construction Activity Pollution Prevention	Required
Y			Prereq 2	Environmental Site Assessment	Required
0	1	0	Credit 1	Site Assessment	1
0	0	2	Credit 2	Site Development - Protect or Restore Habitat	2
1	0	0	Credit 3	Open Space	1
0	0	3	Credit 4	Rainwater Management	3
1	1	0	Credit 5	Heat Island Reduction	2
1	0	0	Credit 6	Light Pollution Reduction	1
0	1	0	Credit 7	Site Master Plan	1
0	1	0	Credit 8	Joint Use of Facilities	1

6	5	0	Water Efficiency		12
Y			Prereq 1	Outdoor Water Use Reduction	Required
Y			Prereq 2	Indoor Water Use Reduction	Required
Y			Prereq 3	Building-Level Water Metering	Required
1	1	0	Credit 1	Outdoor Water Use Reduction	2
4	2	0	Credit 2	Indoor Water Use Reduction	7
0	2	0	Credit 3	Cooling Tower Water Use	2
1	0	0	Credit 4	Water Metering	1

17	10	6	Energy and Atmosphere		31
Y			Prereq 1	Fundamental Commissioning and Verification	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Building-Level Energy Metering	Required
Y			Prereq 4	Fundamental Refrigerant Management	Required
4	2	0	Credit 1	Enhanced Commissioning	6
13	3	2	Credit 2	Optimize Energy Performance	16
0	1	0	Credit 3	Advanced Energy Metering	1
0	0	2	Credit 4	Demand Response	2
0	1	2	Credit 5	Renewable Energy Production	3
0	1	0	Credit 6	Enhanced Refrigerant Management	1
0	2	0	Credit 7	Green Power and Carbon Offsets	2

2	6	5	Materials and Resources		13
Y			Prereq 1	Storage and Collection of Recyclables	Required
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required
0	3	2	Credit 1	Building Life-Cycle Impact Reduction	5
0	1	1	Credit 2	Building Product Disclosure and Optimization - Environmental Product Declarations	2
0	1	1	Credit 3	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
0	1	1	Credit 4	Building Product Disclosure and Optimization - Material Ingredients	2
2	0	0	Credit 5	Construction and Demolition Waste Management	2

6	5	4	Indoor Environmental Quality		16
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke Control	Required
Y			Prereq 3	Minimum Acoustic Performance	Required
2	0	0	Credit 1	Enhanced Indoor Air Quality Strategies	2
0	1	2	Credit 2	Low-Emitting Materials	3
1	0	0	Credit 3	Construction Indoor Air Quality Management Plan	1
1	0	0	Credit 4	Indoor Air Quality Assessment	2
0	1	0	Credit 5	Thermal Comfort	1
1	1	0	Credit 6	Interior Lighting	2
0	1	2	Credit 7	Daylight	3
1	0	0	Credit 8	Quality Views	1
0	1	0	Credit 9	Acoustic Performance	1

4	2	0	Innovation		6
1	0	0	Credit 1.1	Education	1
1	0	0	Credit 1.2	Green Housekeeping	1
0	1	0	Credit 1.3	EP- Quality Transit	1
0	1	0	Credit 1.4	Water Recs	1
1	0	0	Credit 1.5	Integrated Pest Mgmt	1
1	0	0	Credit 2	LEED Accredited Professional	1

3	1	0	Regional Priority		4
1	0	0	Credit 1	Regional Priority: High Priority Site	1
1	0	0	Credit 2	Regional Priority: Indoor Water Use Reduction 4 of 7 points	1
1	0	0	Credit 3	Regional Priority: Optimize Energy Performance 8 of 16 points	1
0	1	0	Credit 4	Regional Priority: Renewable Energy Production 2 of 3 points	1
				Alts - Life Cycle -Rainwater	

56	34	20	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

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LOWELL HIGH SCHOOL
ENERGY ANALYSIS REPORT

Prepared for
Perkins Eastman
20 Ashburton Place
Boston, MA 02108

Prepared by
Thornton Tomasetti
386 Fore Street, #405
Portland, ME 04101

December 11, 2018

01 ANALYSIS DESCRIPTION & SUMMARY

Thornton Tomasetti, Inc. (TT) has performed whole building energy analysis for Lowell High School (LHS) to evaluate the relative energy performance of the proposed design case against several energy conservation measures (ECMs). The energy models were created using eQuest v3.65.

The ECMs studied in this report were selected from an inclusive list of strategies for reducing the projects overall energy use, and were identified as measures which will achieve an improved energy and cost performance while respecting the project budget.

The different design options analyzed in this study are listed below:

ENERGY CONSERVATION MEASURES

- Interior Lightshelves
- Solar Shading Devices
- Replace Exterior Walls 1980 Building
- Insulate Exterior Walls 1980 Building
- Triple Glazed Windows
- Natural Ventilation
- Make-up Air Unit (MAU) - Borrowed Air
- Demand Controlled Ventilation (DCV)
- DCV via Aircuity
- Solar Hot Water

Analysis of selected ECMs is separated for the west and east campuses. The west campus uses approximately 15% less energy than the east Campus. Natural Ventilation & Demand Controlled Ventilation ECMs provide greatest savings due to large portion of building loads from ventilation.

Utility bills of the existing high school were provided by the the city of Lowell, Department of Planning & Development. The existing building EUI was determined from the bills.

The analysis presented in this report should be used for comparative analysis and not as actual performance figures.

Figure 01. Lowell High School (Existing)

Photo Credit: Panoramo.com

Add/Reno Option Selected

02 ENERGY END USE PROFILE COMBINED CAMPUS

Figure 03. shows the annual aggregate energy end-use breakdown for the combined campus design case. Each color in the bar chart denotes various end-uses. As the chart illustrates, the heating and internal loads (plug loads and lighting) are the largest end uses.

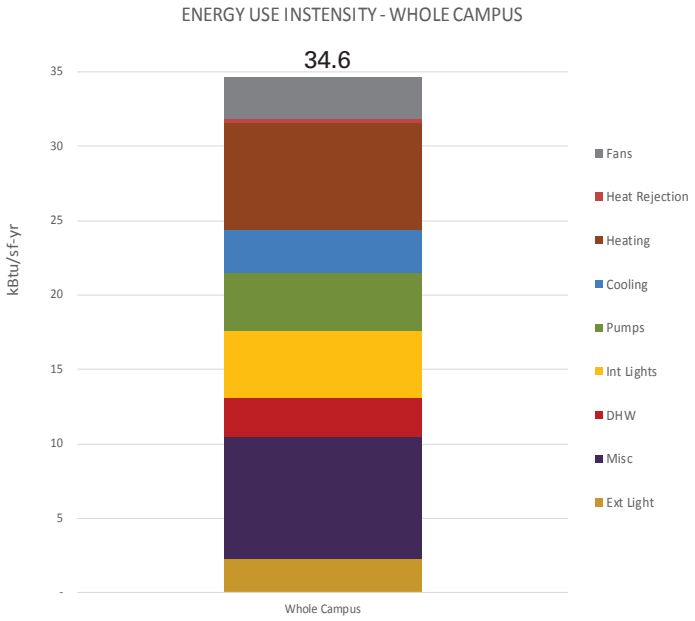


Figure 02. Energy End Use Profile Combined Campus

03 ENERGY USE BY UTILITY AND COST

Figure 03. shows the annual aggregate electricity and natural gas breakdown for each of the campuses, without ECMs savings included. Both campuses have a larger electricity usage than natural gas, and the East campus has a larger overall energy use than the West campus.

Figure 04. shows the annual aggregate electricity and natural gas cost breakdown for each of the campuses, without ECMs savings included. Both campuses have a larger electricity usage than natural gas, and the East campus has a larger overall energy use than the West campus. Since electricity is more expensive than natural gas, electricity has a greater percentage of the cost than it does for the energy use as per Figure 6.

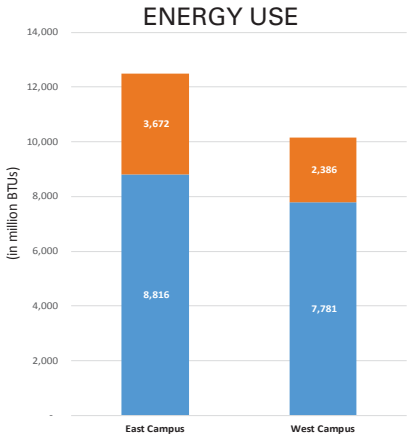


Figure 03. Energy End Use BY Utility

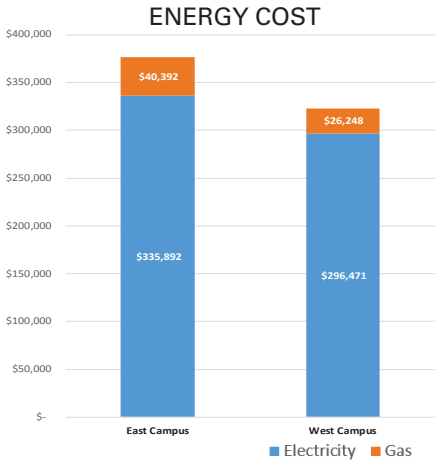


Figure 04. Energy End Use By Cost

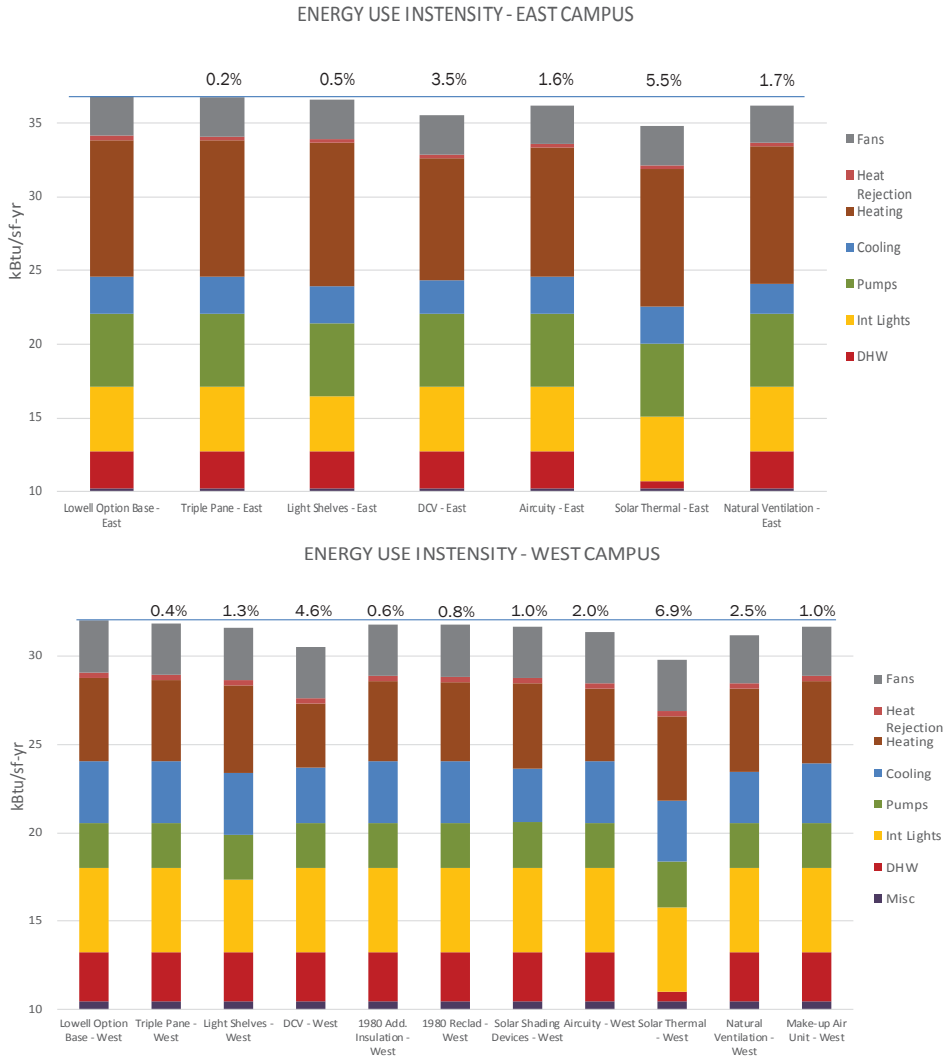


Figure 05. Annual Energy Use Intensity by Campus

04 ENERGY CONSERVATION MEASURES

The energy conservation measure charts in Figure 5 demonstrate the individual savings by measure for both the east and the west campus. The savings from envelope ECMs are small on the east campus. However, envelope ECMs could improve thermal comfort, eliminate perimeter heating, and reduce the HVAC system sizing.

The west campus, due to new addition, has more flexibility to optimize the envelope than on the east campus which include strategic external shading and envelope upgrades. The greatest savings are from strategies that reduce ventilation load such as deep DCV and natural ventilation. On-site renewable systems are considered after reducing the loads and incorporating high efficiency HVAC system. This allows for a smaller renewable energy system contributing to a higher percentage of energy use.

ENERGY CONSERVATION MEASURES DESCRIPTIONS:

Interior Light Shelves - Light shelves only on the north and south facades. They reflect daylight deeper into zones and allow more even distribution of daylight.

Solar Shading Devices - Horizontal shading on the north and south, vertical shading on the east and west on 1980 Building and Additions only (not 1922). These devices will reduce solar loads in summer and mitigate glare to a certain extent.

Replace Exterior Walls 1980 Building - Revise the existing walls to new walls with 5" exterior insulation.

Insulate Exterior Walls 1980 Building - Revise the existing walls to add 2" interior insulation.

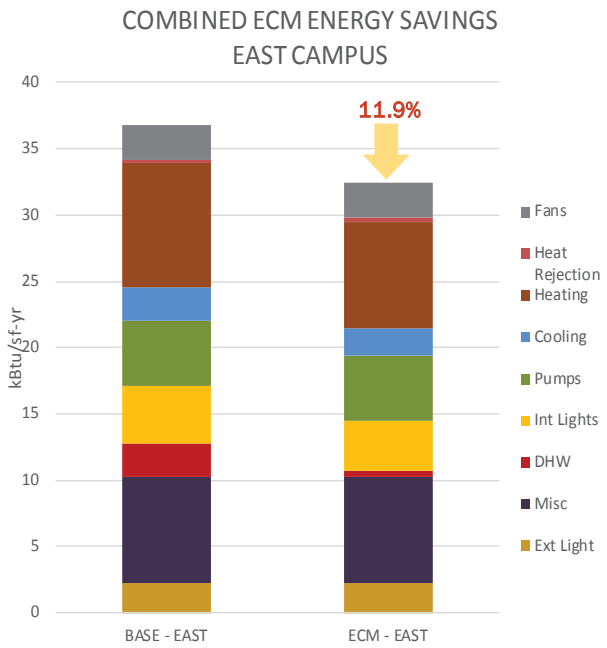
Triple Glazed Windows - Replace all existing windows with triple pane glazing that provides a higher R-value and increased thermal comfort.

Natural Ventilation - Use natural ventilation in shoulder months, that minimize the cooling energy in the building.

Make-up Air Unit (MAU) - Pull air from adjacent spaces into the kitchen versus using a direct makeup air unit at the hood.

Demand Controlled Ventilation (DCV) - Increase DCV to maintain a maxiumu CO2 limit of 800ppm.

DCV via Aircuity - Use the proprietary Aircuity system to more heavily control the DCV strategy.



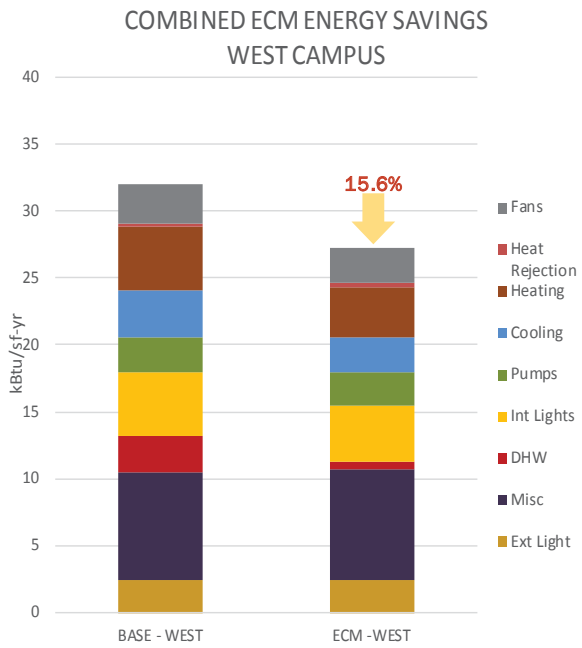


Figure 06. Annual Energy Use Intensity by Campus

05 CUMULATIVE SAVINGS OF ECMs

Figure 6 to the left illustrates the combined energy savings from the ECMs on both campus (East and West). The cumulative savings include interactive effects of ECMs with each other and will be less than aggregated savings of individual ECMs.

The West campus can achieve up to 15.6% reduction in energy savings with all ECMs incorporated into the design. The east campus shows 11.9% savings. The East campus has more cumulative savings based on including more ECMs than the West campus.

MODEL INPUT PARAMETER	SCHEMATIC DESIGN INPUT VALUE
Utility	
Electric Rates	$0.13/KWH
Natural Gas Rates	$1.10/therm
Number of Floors	1922 Building: 1 below grade + 3 above grade
	1980 Building: 3 above grade + 2 additional floors of Freshman Academy
Flr to Flr Height	**1980 Building:**
	•Floor 1: 18’
	•Floor 2-3: +/-13'-4"
	1980 Additions:
	•Floor 1: 18'
	•Flr 2: 13'4"
	•Flr 3: +/- 12-8"
	•Flr 4,5: +/- 12-0'-12'-8"
	1922 Building:
	•Floors Ground, 1, 2: +/- 13’-4”
	•Flr 3: +/- 16’-4”
Climate Zone	5A

MODEL INPUT PARAMETER	SCHEMATIC DESIGN INPUT VALUE
Building Envelope (Construction Assemblies)	
Roofs Construction/Exterior insulation/Additional insulation	**1980 Building & Additions:**
	•Membrane SRI 0.3
	•½" protection board
	•7" polyisocyanurate continuous plus tapered as required
	•Vapor barrier
	•Metal deck on steel frame
	1922 Building Roof Replacement (flat roofs):
	Assembly:
	•EPDM Roof Membrane
	•½" high density cover board
	•5" polyisocyanurate flat stock insulation
	•Air/Vapor retarder
	•Existing bituminous coating
	•Existing structurally sloped concrete deck
Walls (Above Grade) construction/Exterior insulation/Additional Insulation/Interior insulation	**1980 Building Base Scope: R value per assembly below, typical all assemblies**
	•4" Brick veneer
	•1" Air space
	•1 ¼" Insulation
	•8" CMU
	1980 Building ECM for Exterior Insulation: Rainscreen cladding 6: thermally broken girts with 1" air space 5" mineral wool insulation AVB existing 8" CMU **1980 Building ECM for Interior Insulation** 4" Brick veneer 1" air space 1 1/4" insulation existing 8" CMU 2" closed cell foam insulation 2.5" studs Interior GWB
	1922 Building:
	12 -16" Brick masonry walls
	2" closed cell foam insulation
	•5/8" Gypsum wall board
	1980 Additions:
	•Masonry veneer rain screen (25%) and metal panel rain screen (50%)
	•6" mineral wool insulation
	•Thermally broken Z – girts or masonry ties
	•AVB
	•5/8" exterior gyp. Board
	•6" metal studs
	•½" gypsum board

MODEL INPUT PARAMETER	SCHEMATIC DESIGN INPUT VALUE
Building Envelope (Construction Assemblies)	
Ground Floor construction/insulation	**1980 Building:**
	•Concrete Slab
	•Vapor Barrier
	•2" Rigid insulation (underside of slab)
	1980 Additions:
	•Concrete Slab
	•Vapor Barrier
	•2" Rigid insulation (3" at exterior foundation wall)
	1922 Building:
	•Concrete slab on grade
	•No insulation
	•No vapor barrier
Perimeter Zone Infiltration	**1980 Building**: 0.076 CFM/SF of exterior wall Base Scope, 0.038 for exterior or interior insulation ECMs
	1980 Additions:0.038 CFM/SF of exterior wall
	1922 Building: 0.057 CFM/SF of exterior wall
Core Zone Infiltration	0.001 CFM/SF
Vertical fenestration Area (% of Wall area)	**1922 Building:** North Elev. (inc. courtyard) 28%, South Elev (inc. courtyard 21%), East Elev. (inc. courtyard) 29%, West Elev (inc. courtyard) 27%1980/Additions: Freshman Academy is average 27% • North Elev at 39% • South Elev at 22% • East Elev at 11% • West Elev at 16% Gymnasium is average 34% (w/ Kalwall) or 3% (w/o Kalwall) • North Elev at 33% (w/ Kalwall) or 0% (w/o Kalwall) • South Elev at 37% (w/ Kalwall) or 0% (w/o Kalwall) • East Elev at 41% (w/ Kalwall) or 16% (w/o Kalwall) • West Elev at 27% (w/ Kalwall) or 0% (w/o Kalwall) **1980 Building** (include. Reno/New/Front Entry and Caf Connector) is average 41%: • North Elev at 46% • South Elev at 86% • East Elev at 26% • West Elev at 33% **Bridges** are average 89%: North Elev at 89%, South Elev at 89% **• North Elev at 89%** **• South Elev at 89%** • North Elev at 89% • South Elev at 89%
Vertical Glazing	Thermally broken aluminum windows w/ double layer of insulated glass, Solar Ban 60 and argon fill. **ECM** to provide triple glazing with two surfaces of Solar Ban 60 and argon fill
(Assembly)	U= 0.34
Vertical Glazing SHGC	Per glazing
Glazing Tvis	Per glazing
Shading Devices	No. See ECM - horizontal shading at south, vertical at east and west of 1980 building and additions

MODEL INPUT PARAMETER	SCHEMATIC DESIGN INPUT VALUE
Building Operation Schedule	
Occupancy	4,020 (3,520 Students + 500 Staff)
Schedule	Typical school year: 90% occupancy 8am-4pm
	Summer & Breaks: 15% occupancy 8am-4pm, 4 days/wk Evenings 4pm -9pm 15% occupancy weekends 8am - 4pm 15 % occupancy
Annual Days of Operation	365
HVAC (Air-Side)	
Primary HVAC Type[1] 1; # 1proposed system comparted to VAV overhead in all areas.	Full Air Conditioning Variable Air Volume
	Displacement System in classrooms
	Overhead ventilation system in:
	•Gym: Displacement
	•Locker rooms
	•Auditorium and stage: Displacement
	•Admin and media: Chilled Beam
	•Kitchen, Custodial Support, Receiving
	•Cafeteria: Displacement
	•Studios: Displacement
	•Corridors: Displacement
Cooling Source	1992: (2) 215 ton high efficiency water cooled chillers: Turbo core compressor
	1980: (2) 310 ton high efficiency water cooled chillers: Turbo core compressor
Heating Source	1922 Building - High efficiency gas-fired condensing boiler plant (3) 5400 MBH
	1980:(3) 5400 MBH output boilers
Seasonal Thermostat setpoints	
- Heating (occupied/unoccupied)	70 F ; 60 F: 66 standby mode
- Cooling (occupied/unoccupied)	75 F ; 80 F: 78 standby mode
Outside Air System	
Heat Recovery Device Type	Enthalpy Wheel
Effectiveness	70%
Domestic Water Heating	
Heater Fuel	Gas
Tank Volume	5,500 gal
Supply water Temp	135F
Lighting	
Lighting Power Density (LPD) for all activity areas	0.45 W/SF: Classroom
	0.6 W/SF: Gymnasium
	0.45 W/SF: Office
	0.6 W/SF: Library
	0.30 W/SF: Corridor
	0.6 W/SF: Kitchen
	0.45 0.45W/SF: Dining
	0.45 W/SF: Auditorium
Daylighting Controls	Continuous dimming in classroom spaces and all exterior spaces with glazing.
Miscellaneous	
Miscellaneous equipment	Plugload Classrooms - 0.50 W/sf and offices
	Core/transition spaces - 0.165 - 0.316 W/sf

APPENDIX D - REGULATORY

- Schematic Design Code Report
- Project Notification Form (PNF) Submission
- PNF Response by Mass Historic Commission (provided by MHC)
- Letter of Eminent Domain Taking (provided by City of Lowell)
- Article 97 Items (provided by City of Lowell)
- Abandoned Railroad Easement Letter (provided by National Park Service)
- Letter of Provided Parking (provided by City of Lowell)

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HASTINGS CONSULTING
Building, Fire & Access Codes | Fire Protection Engineering

Lowell High School
Lowell, Massachusetts

Schematic Design Code Report

Prepared By: Kevin S. Hastings, P.E., LEED AP

Date: December 11, 2018

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Table of Contents

Introduction

The existing Lowell High School is a campus-style high school consisting of multiple buildings, located on the East and West sides of a canal. The proposed scope of work involves renovations to the existing building, new additions, and new bridges connecting the buildings. The new Gymasium building will also be separated from the remainder of the West building so that the school will consist of three separate buildings as defined by the building code:

1. East Building
2. West Building
3. Gymnasium

This code summary is based on the proposed schematic design architectural plans and various site visits to the building. Following is a list of applicable codes:

Code Type	Applicable Code (Model Code Basis)
Building	780 CMR: Massachusetts State Building Code, 9th Edition • Amended 2015 International Building Code (IBC) • Amended 2015 International Existing Building Code (IEBC)
Fire Prevention	527 CMR: Massachusetts Fire Prevention Regulation
Accessibility	521 CMR: Massachusetts Architectural Access Board Regulations
Electrical	527 CMR 12.00: Massachusetts Electrical Code • Amended 2017 National Electrical Code
Elevators	524 CMR: Massachusetts Elevator Code • Amended ASME A17.1-2013/CSA B44-13
Mechanical	2015 International Mechanical Code (IMC)
Plumbing	248 CMR: Massachusetts Plumbing Code
Energy Conservation	2015 International Energy Conservation Code

International Existing Building Code

The 2015 International Existing Building Code with Massachusetts amendments allows for 3 separate compliance methods, the Prescriptive Method, Work Area Method, and Performance Compliance Method. This report is based on the Work Area Method.

1. Work Area and Classification of Work:

The proposed work will include renovations throughout the entire interior of the buildings, installation of new MEP systems throughout, as well as new additions. Since the “work area”, defined as the reconfigured area, will exceed 50% of the gross floor area in both the

East and West buildings, both will be classified as Level 3 Alterations (IEBC 505). The work must therefore comply with IEBC Chapters 7, 8 and 9 in each building. The West building is also required to comply with IEBC Chapter 11 due to the additions.

2. Occupancy Classifications:

There is no change in occupancy classification for any of the existing buildings.

West Building
Non-Separated Mixed Uses:

- Use Group E (Secondary Education)
- Use Group A-2 (Cafeteria – non-school use)

New Gymnasium Wing
Non-Separated Mixed Uses:

- Use Group E (Secondary Education)
- Use Group A-3 (Exercise Areas and Locker Rooms – non-school use)
- Use Group A-4 (Gymnasium with Spectator Seating – non-school use)

East Building
Non-Separated Mixed Uses:

- Use Group E (Secondary Education)
- Use Group A-1 (Auditorium – non-school use)

In accordance with IBC Section 303.1.3, assembly spaces associated with the educational use can be classified as part of the Use Group E occupancy. However, spaces that may be used for other community events that are not related to the school function must be classified as Use Group A occupancies.

3. Construction Type:

West Building
Based on existing conditions observed, the 1980 Building appears to be constructed with CMU walls and unprotected structural steel members resulting in Type IIB construction (noncombustible, no fire-resistance rating). However, as part of the proposed scope of work (and in order to comply with the area limitations as discussed below), fireproofing will be added to increase the building's construction to Type IIA (1 hour, non-combustible)

East Building
The East Building includes multiple sections constructed at separate times (South original 1892 building, central addition in 1922, and the North addition in 1997). It appears to be constructed with various construction materials including concrete, wood and steel structure and masonry exterior wall resulting in a minimum of Type IIIB construction (combustible interior- no fire-resistance rating; 2-hour noncombustible exterior wall). The North addition at the front of the building is non-combustible with spray-on fireproofing on the structure.

Since there is no addition or change in use planned, the existing mixed construction type is permitted to remain without further improvements. However, any new structural elements must be 1 hour rated as would be required to achieve classification as Type IIA or IIIA which would be necessary to comply with the area limitations for new construction in IBC Table 506.2.

Gymnasium Building
This new building will be classified as Type IIB construction (unprotected, non-combustible)

4. Height and Area Limitations

The construction of an addition requires that the building size not exceed the limitations for new construction (IEBC 1102).

East Building
Since this building will not undergo an addition or change in use it is not required to comply with the height and area limitations for new construction. The new elevated pedestrian walkways connecting the East and West Buildings will comply with IBC Section 3104. This allows the two buildings to be considered as separate structures for the purposes of evaluating compliance with the height and area limitations for new construction.

West Building
Due to the new Freshman Wing addition which will increase the area and height of the building, it must comply with the limitations for new construction. Due to the 5 story height of the Freshman Wing, the building must be Type IB construction (IBC Table 504.4). However, since the building will exceed 70 feet in height above grade it will be classified as a high-rise structure. This allows the construction type to be modified to Type IIA, but comply with the height and area limitations for Type IB (IBC 403.2.1.1(2)). The height and area limitations are as follows:

Code Reference	**Type IB (Modified to IIA) Use Group E**		**Type IB (Modified to IIA) Use Group A-2**	
	Height	**Area**	**Height**	**Area**
IBC Tables 504.3, 504.4 & 506.2: Tabular Value	6 St. (160 ft)	Unlimited	12 St. (160 ft)	Unlimited
IBC Section 506.2 Frontage Increase	-	Not Required	-	Note Required
Height and Area Allowed	**6 St. (160 ft)**	**Unlimited**	**12 St. (160 ft)**	**Unlimited**
Actual Height and Area	**5 St. (75'-4") Approx. 73,500 ft^2 Footprint**			

Gymnasium

Since the Gym will be separated from the remainder of the West Building by a fire wall it is classified as a separate building and must independently comply with the height and area limitations for Type IIB construction:

Code Reference	Type IIB Use Group E		Type IIB Use Group A-3 & A-4	
	Height	Area	Height	Area
IBC Tables 504.3, 504.4 & 506.2: Tabular Value	3 St. (75 ft)	43,500 ft^2	3 St. (75 ft)	28,500 ft^2
IBC Section 506.2 Frontage Increase – 80% Open	-	+7,975 ft^2	-	+5,225 ft^2
Height and Footprint Area Allowed	**3 St. (75 ft)**	**51,475 ft^2**	**3 St. (75 ft)**	**33,725 ft^2**
Actual Height and Footprint Area	**2 St.^{A} (Approx. 53 ft) Approx. 33,000 ft^2 Footprint**			

A. The Mechanical Mezzanine (1,970 ft^2) is less than 1/3 of the room below (18,000 ft^2) and therefore classified as a mezzanine rather than an additional building story (IBC 505).

5. Fire Resistance Ratings:

The following table summarizes the required fire resistance ratings for the buildings, based on IBC Table 601 and other applicable code provisions:

Structural Fire Ratings

Building Element	West Building Type IIB (Modified from IB)	Gymnasium Type IIB
	Fire Resistance Rating (Hrs)	
Primary Structural Frame	1^A	0^A
Exterior Bearing Walls including columns along the exterior wall	1^A	0^A
Exterior Non-Bearing Walls	Based on Fire Separation Distance	
Interior Bearing Walls	1^A	0^A
Floor Construction	1^A	0^A
Roof Construction	1	0

A. Not less than the rating supported (IBC 707.5.1, 708.4. and 711.2.3).

Building Element	Fire Resistance Rating (Hrs)	Opening Protectives (Hrs)
Exit Access Corridors (IBC Table 1020.1)	0	0
Existing shafts 3 stories or less (IEBC 803.2.1 Exc. 6)	Maintain Existing Enclosure	
Existing shafts 4 or more stories (IEBC 803.2.1)	1	1
New Shafts, connecting 4 stories or more (IBC 713.4)	2	1½
New Shafts, connecting less than 4 stories (IBC 713.4)	1	1
Elevator Machine Room (IBC 3005.4)	Same Rating As Shaft	
Pedestrian Walkway Separation (IBC 3104.5.2)	Smoke Resistant	Smoke Resitant
Storage Rooms Under Stairs (IBC 101.7.3)	1	¾
	Not Less Than Stair Rating	
Electrical rooms without sprinkler protection (NFPA 13)	2	1½
Fire Pump Room (IBC 913.2.1)[A]	2	1½
Fire Command Center (IBC 911.1.2)	1	¾

1 Location and access to the fire pump room shall be pre-planned with the fire department (NFPA 20 Section 4.12.2.1).

Incidental Accessory Occupancies (IBC Table 509)	
Room or Area	**Separation and/or Protection***
Furnace room where any piece of equipment is over 400,000 Btu per hour input	Smoke Resistant
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	Smoke Resistant
Refrigerant machinery room	Smoke Resistant
Laboratories and vocational shops not classified as Group H in Group E occupancies	Smoke Resistant

*Where an automatic fire-extinguishing system without a fire barrier is permitted, accessory occupancies shall be separated from the remainder of the building by construction capable of resisting the passage of smoke and doors shall be self- or automatic-closing upon detection of smoke.

Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions, or any other wall required to have protected openings or penetrations must be identified with signs or stenciling within accessible concealed spaces (i.e. floor-ceiling, attic spaces) at 30 ft intervals (IBC 703.7).

6. High Rise Requirements:

Since the height of the new Freshman Wing is greater than 70 feet, the building will be classified as a high-rise structure (780 CMR Section 202). This classification requires the building be equipped with the following features.

a. Automatic sprinkler system (403.3). Since the building is in Seismic Design Category B, a secondary on-site water supply is not required for the sprinkler system (403.3.3).
b. Smoke detection (403.4.1)
c. Fire alarm system (403.4.2) & Emergency voice/alarm communicating system (403.4.3)
d. Emergency responder radio coverage or wired fire department communication system (403.4.4, 907.2.13, & 915.2)
e. Fire command center within a minimum area of 200 sqft and a minimum dimension of 10 ft (403.4.6 & 911.1.3)
f. Manual or automatic smoke removal system for fire department operations (403.4.6)
g. Standby power and emergency power systems for fire pump, elevators, fire command center, and stair pressurizing equipment (403.4.7 & 403.4.8).
h. Stair pressurization is NOT required since the elevation of the top occupied floor is less than 75 feet above the lowest level of fire department access (403.5.4).
i. Luminous egress path markings (IBC 403.5.5)
j. Elevator hoistway opening protection is required for elevator hoistways more than 75 feet in height, measured from the lowest floor to the highest floor served by the hoistway (IBC 3006.2(5)). Elevator hoistway protection must be provided by either elevator lobbies separated by smoke partitions, an additional door at each hoistway opening, or pressurization (IBC 3006.3). A lobby or additional hoistway doors are not required at the ground level however (IBC 3006.2 Exception 2).
k. A fire service access elevator is NOT required since the elevation of the top occupied floor is less than 120 feet above the lowest level of fire department access (IBC 403.6.1).
l. Sprayed fire-resistant materials must have a bond strength of 1,000 psf (403.2.4)
m. Structural Integrity of Exit Stairs and Elevator Hoistways (403.2.3). Since the building is in Risk Category III based on IBC Table 1604.5 (Use Group E with occupant load greater than 250), stair and elevator shaft walls must comply with the additional impact test provision in IBC Section 403.2.3.

7. Vertical Openings:

All existing vertical openings in the work area connecting two or more floors must be enclosed with 1 hour rated construction and approved opening protectives unless the openings meet one of the exceptions in IEBC 803.2.1. Existing floor openings connecting 3 stories or less are permitted to remain within a fully sprinklered building (IEBC 703.2.1 Exc.6). New vertical openings are required to comply with IBC Sections 712 & 713.

The proposed Life Safety plans indicate all floor openings will be enclosed with rated construction, with the exception of the following:

West Building
The main entrance between the new Freshman Wing and existing building is a two story space with an open stairway. There is also another two-story opening between the 1st and 2nd Floors in the Cafeteria. These two story openings are permitted without any additional protection and the open stair can be used as a means of egress from the 2nd Floor (IBC 712.1.9, 712.1.16 & 1019.3).

Gymansium Building
The stair at the entrance to the Gymansium is permitted to be open and serve as a required means of egress from the 2nd Floor (IBC 712.1.9, 712.1.16 & 1019.3).

8. Interior Finishes:

The existing interior finish of walls and ceilings in the work area and in all exits and corridors serving the work area must comply with the code requirements for new construction (IEBC 803.4). All newly installed wall and ceiling finishes, and interior trim materials must also comply with IBC Table 803.11 (IEBC 702.1, 702.2, 702.3). The requirements are summarized below:

Walls & Ceilings (IBC Table 803.11)

Use Group:	E	A
Exit Enclosures	Class B	Class B
Exit Access Corridors	Class C	Class B
Rooms & Enclosed Spaces	Class C	Class C

Note that where exit stairs and exit access corridors serve more than one use group, the most restrictive interior finish is required. The existing interior finishes appeared to comply for all buildings.

9. Means of Egress:

The means of egress including the number of exits and egress capacity must be sufficient for the number of occupants on all floors (IBC 102.6.4). The means of egress for the existing buildings and proposed new structures appear sufficient on all levels based on the number of exits shown on the schematic plans.

General Egress Requirements
Existing means of egress stairs (including guardrails) and other elements can continue to serve as required egress regardless of their level of compliance with the code for new construction and regardless of the level of renovation (although see below for access code requirements for stair handrails and nosing improvement) (IBC 805.2 Exception 2).

The renovations and new buildings must be designed to comply with the following means of egress provisions for new construction, except where noted for existing conditions. No deficiencies with these requirements were identified in the proposed plans.

a. Maximum exit access travel distance must be less than 250 feet (IBC Table 1017.2):

b. Maximum dead-end corridor length must be less than 20 ft or 2.5 times the least width of space (up to 50 ft is permitted in Use Group E spaces or for existing dead-end corridors serving Use Group A areas) (IBC 1020.4, IEBC 805.6).

c. All rooms or spaces with an occupant load greater than 49 people or a common path of travel distance over 75 ft must be provided with two egress doors swinging in the direction of egress and illuminated exit signs at each exit (IBC Table 1006.2.1 & Sections 1010.1.2.1 & 1013.1). Boiler rooms require two means of egress if the room is greater than 500 sqft. and includes individual fuel-fired equipment greater than 400,000 Btuh input capacity, one of the two required exit access doorways is permitted to be a fixed ladder or alternating tread device (IBC Section 1006.2.2.1).

d. Doors serving rooms with more than 49 people and doors along the path of egress travel from such rooms must be provided with panic hardware (IBC 1010.1.10). Doors from main electrical rooms with equipment rated 1,200 amps and over 6 feet wide must swing in the direction of egress with panic hardware (IBC 1010.1.10).

e. All means of egress lighting and exit signs throughout the building must be provided with an emergency power supply to assure continued illumination for not less than 1.5 hours in case of primary power loss (IBC 1008.2 & 1008.3.4).

f. Remote means of egress must be separated by ⅓ of the diagonal dimension of the room or space they serve (IBC 1007.1.1). The distance between exits may be measured along 1-hour fire resistance rated corridors complying with IBC 1018 but must otherwise be measured in a straight line between exit doors. Additionally, high-rise buildings are required to have their interior exit stairways be separated by at least 30 feet or not less than one-fourth of the maximum overall diagonal dimension of the building floor (IBC 403.5.1).

g. A stair or alternating tread device must be provided to any main roof surface four or more stories above grade (IBC 1011.12). Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway (IBC 1011.12.1). Permanent means of access to any roof containing mechanical equipment must be provided in accordance with the Mechanical Code. Permanent means of access to any roof containing mechanical equipment must be provided in accordance with the Mechanical Code. If the roof contains any gas-fired equipment access via a hatch and permanent or foldaway inside stairway or ladder is required in accordance with Section 9.4.3 of the National Fuel Gas Code (NFPA 54).

h. All exits must discharge to the exterior of the building except that a maximum of 50% of the number and capacity of the exit enclosures are allowed to exit through areas on the level of discharge if the exit enclosures discharge to a free and unobstructed path of travel to an exterior exit that is readily visible from the discharge of the exit enclosure; the entire area of the level of exit discharge is separated from areas below by construction consistent with the rating of the exit enclosure; and the egress path and all

areas open to the egress path on the level of exit discharge must be fully sprinklered (IBC 1028.1).

i. For new additions or new buildings greater than four stories, at least one accessible means of egress must be an elevator complying with IBC 1009.4 unless a horizontal exit is provided (IBC 1009.2.1).

- Standby power must be provided for the elevator to be considered an accessible means of egress (IBC 1009.4).

Standby power will be required for the Freshman Wing elevators since the is 5 stories tall and a high-rise structure.

j. A two-way communication system is required at each elevator landing on accessible floors that are one or more stories above or below the level of exit discharge (IBC 1009.8).

k. An approved barrier must be provided at the level of exit discharge where a stair enclosure continues below its level of exit discharge (IBC 1023.8).

l. In each new building, at least one passenger elevator must be sized to accommodate the loading and transportation of an ambulance gurney or stretcher sized 24" wide by 84" long with 5" radius corners (524 CMR 17.40(1)). Note that a stretcher-sized elevator is not required in existing buildings regardless of the level of renovation.

m. Unoccupied attic spaces only require a single means of egress (IBC 1209.2).

10. Required Fire Protection Systems:

The following fire protection systems are required:

- Automatic sprinkler system required throughout (MGL c. 148 s. 26G).

- Fire Alarm (IEBC 804.4.1 & 804.2): although the IEBC allows existing previously approved fire alarm systems to remain regardless of the level of renovation, full compliance with the MA Architectural Access Board's Regulations (see below) will require a compliant fire alarm system throughout the building. The existing buildings currently contain a fire alarm system with deficient notification device coverage (no strobes in classrooms). To comply with current code provisions, new and existing areas require a voice/alarm communication system (IBC 907.2.3).

- Standpipe System (IBC): standpipe systems are required throughout the new Freshman Wing is has floors greater than 30 feet above the lowest level of fire department access (IBC 905.3.1).

- Fire extinguishers (527 CMR 1 Section 13.6 & IBC 906.1). Fire extinguishers must be located throughout the building so that the maximum travel distance to an extinguisher is less than 75 feet.

- Carbon Monoxide Detection: required in accordance with IBC 915 and 527 CMR 1 Chapter 13.

- Emergency responder radio coverage (IBC 916)

11. Energy Code Provisions for Existing Buildings

New work is subject to the 2015 International Energy Conservation Code (IECC) or ANSI/ASHRAE/IESNA 90.1 with Massachusetts Amendments (Massachusetts Energy Code). Level 3 alterations to existing buildings are permitted without requiring the entire building to comply with the energy requirements of the International Energy Conservation Code (IECC). The alterations (new elements) shall conform to the energy requirements of the IECC as they relate to new construction only (IEBC 811.1).

The Massachusetts Stretch Energy Code, as adopted by the City of Lowell, does not apply to existing buildings or additions to existing buildings. However it does apply to new buildings greater than 100,000 sqft. in area (780 CMR Appendix AA 101.2). Since the Gym is the only separate new building (not classified as an addition) and it is approximately 71,000 gross sqft., the Stretch Code will not apply to any of the buildings.

12. Ventilation Requirements

All reconfigured spaces must provide mechanical or natural ventilation in accordance with the International Mechanical Code, except that existing ventilation systems are permitted to remain provided they achieve not less than 5cfm of outdoor air per person and not less than 15 cfm of ventilation air per person (IEBC Section 809).

13. Structural Provisions for Existing Buildings

Structural alterations to the existing buildings must be evaluated by a registered structural engineer to determine compliance with the IEBC.

14. Accessibility for Persons with Disabilities

Massachusetts Architectural Access Board Regulations

Alterations to the building must comply with the requirements of the Massachusetts Architectural Access Board Regulations (521 CMR). For existing building alterations the requirements of 521 CMR are based on the cost of the proposed work:

A. If the cost of the proposed work is **less than $100,000,** only the new work must comply.

B. If the cost of the proposed work is **greater than $100,000** then all new work must comply and the existing building must include an accessible public entrance, toilet room, telephone and drinking fountain (if public phones and drinking fountains are provided) (521 CMR Section 3.3.1(b)).

C. If the cost of the proposed work is **greater than 30% of the full and fair cash value** of the existing building, the entire building is required to comply with 521 CMR (521 CMR Section 3.3.2). There is no exempt work, i.e. the entire project costs apply to determining the 30% criteria.

The cost of all work performed on a building in any 36 month period must be added together in determining the applicability of 521 CMR (521 CMR Section 3.5). The full and fair cash value of the existing building is determined by using the 100% equalized assessed value of the building on record with the city assessor's office.

It is anticipated that the cost of the renovations and additions to the existing buildings will exceed the 30% threshold, and therefore all portions of the building open to the general public (students, visitors, etc) must be upgraded to comply in full with the current requirements of 521 CMR. Any employee-only areas such as staff lounges, staff bathrooms, and staff work areas are not required to comply with 521 CMR, as long as student and public access is not permitted. It should be noted that the Access Board expects to extend their jurisdiction to employee areas.

Major upgrades required to meet full compliance with the provisions of 521 CMR will likely include the following building features (note that a comprehensive accessibility survey was not conducted, but should be completed if 30% trigger is reached in any existing building):

- All public entrances must be accessible (521 CMR 25.1).

- All public and common use areas must be accessible and provided with an accessible route thereto (521 CMR Section 12.2.2 and 20.1). Existing elevators having a minimum car size of 4' x 4' can continue to be used as an accessible route provided they have compliant controls (521 CMR 28.7 Exception).

- Accessible toilet rooms are required in each toilet room location (521 CMR 30.1).

- Accessible Handrails & Stair Nosings (521 CMR 27.4). Handrails in many locations throughout the buildings were not compliant with the MAAB due to improper extensions at the top and bottom, or handrails were only provided on one side of the stair. Stairs must be provided with handrails on each side and must extend at least 12 inches beyond the top riser and parallel with the floor. At the bottom, handrails must extend at least 12 inches plus the width of one tread beyond the bottom riser. The handrail shall continue to slope for a distance of the width of one tread from the bottom riser; the remainder of the extension shall be horizontal. The ramp located in the basement of the East Building is also not provided with handrails.

The majority of stairs throughout the East and West Buildings were provided with a compliant handrail on one side, however the handrail on the other side were typically not compliant with the extension requirements. Some stairs also included abrupt nosings that would have to be altered to comply.

- Accessible Wheelchair Seating (521 CMR 14.4). Designated wheelchair spaces are required to be provided based on the total number of seats in the assembly space. The Auditorium in the East Building is not currently provided with wheelchair spaces on the balcony level and they were not clearly designated on the main level, these will be addressed in the proposed plans.

- Accessible Door Hardware (521 CMR 26.11). In the East Building some doors are provided with knobs for opening devices. Doors must have operating devices that have a shape that is easy to operate with one hand and that does not require tight grasping (521 CMR 26.11.1). Lever operated mechanisms are required.

- Accessible Lab Benches (521 CMR 12.4). The science classrooms in the East Building were not provided with accessible lab benches (lacking knee clearance). At least 5% of each type of sink, counter or other work areas in classrooms and labs must be made accessible.

Americans with Disabilities Act Guidelines

The ADA Guidelines are not enforced by the Commonwealth of Massachusetts, they can only be enforced through a civil lawsuit or complaint filed with the U.S. Department of Justice. Compliance with the ADA Guidelines is triggered by renovations to the existing building. All renovations to the building must be made to ensure that, to the maximum extent feasible, the altered portions of the facility are readily accessible to and usable by individuals with disabilities (28 CFR Part 36 Section 36.402(a)). Alterations made to provide an accessible path of travel to altered areas and accessible facilities (i.e. provide accessible toilet facilities) are not required if the cost exceeds 20% of the total cost of the alteration (28 CFR Part 36 Section 36.403(f)). However, if the cost to meet these accessibility requirements does exceed 20%, alterations are still required to the maximum extent that the area can be made accessible without exceeding the 20% criteria (28 CFR Part 36 Section 36.403(g)). The ADA also contains less stringent dimensional requirements for some building elements in an existing building where it is infeasible to meet the requirements for new construction (ADA Section 4.1.6).

15. Minimum Number of Toilet Room Fixtures

The Massachusetts Plumbing Code (248 CMR) regulates the number of plumbing fixtures required throughout buildings. The minimum number of plumbing fixtures is established by 248 CMR 10.10(18) Table 1 based on the building use and the expected population as determined by the local Plumbing Inspector per 248 CMR 10.10 (18)(2). The Plumbing Inspector must approve the building population; however, the building population can generally be based on the designer's determination of the actual number of people expected within the building. The Plumbing Code expects that the building population will be divided

evenly between male and female for the purpose of determining fixture counts. Any distribution other than 50/50 must be justified to the Plumbing Inspector.

If the existing number of toilet room fixtures are altered (i.e. to make existing toilet rooms accessible) the number provided is subject to the minimum requirements of 248 CMR. The following analysis was completed using the maximum expected population provided by the architect of 500 staff and 3,520 students for the entire complex.

Classification		**Water Closets**		**Male Urinals** [A]	**Lavatories (Each Sex)**	**Drinking Fountains**	**Service Sink**
		Female	**Male**				
Staff	250 Female 250 Male	1 per 20	1 per 25	33%	1 per 40	Not Required	1 Per Floor
	Required fixtures	12.5	10	-	6.25	-	
	Total Required Fixtures	13	7	3	7	-	
Students	1,760 Female 1,760 Male	1 per 30	1 per 90	1 per 90	1 per 90	1 per 75	1 Per Floor
	Required fixtures	58.6	19.5	19.5	19.5	46.9	
	Total Required Fixtures	59	20	20	20	50	

[A] Urinals may be substituted for toilets up to the percentage shown of the required number.

BCA
BUILDING CONSERVATION ASSOCIATES INC

January 4, 2019

Secretary of the Commonwealth
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125-3314

Re: Lowell High School Feasibility Study Project Notification Forms

The City of Lowell has entered into the Schematic Design phase with the Massachusetts School Board Authority (MSBA) for renovations and an addition at Lowell High School. During the feasibility study phase a Project Notification Form (PNF) was submitted to the Massachusetts Historical Commission (MHC) for review on in March 2018. The PNF described the options for the high school being considered by the City of Lowell prior to producing a "Preferred Schematic Report" for the MSBA and sought input from the MHC regarding the design options. All options were located at the existing Lowell High School site. A letter requesting additional information on the proposed sites including project elevations and perspective views was received from the MHC on April 26, 2018.

The design selected by the City from the Preferred Schematic Report and presented in this PNF is substantially similar to Design Option C (Addition/Renovation Option 3A on Expanded Site) presented in the March 2018 submission. The project entails exterior and interior renovations to the existing high school buildings (MHC inventory numbers LOW.44 and LOW.1774). The project also includes partial demolition of a 1980s addition at the west side of the canal (no inventory number) and full demolition of a 1970 medical office building adjacent to the existing site (LOW.1116) to allow for construction of a new gymnasium wing and freshman academy. Two existing one-story pedestrian bridges over the Merrimack Canal (LOW.933) will also be demolished and replaced with new one-story pedestrian bridges. The south bridge will be rebuilt at the existing location, while the north bridge is being relocated slightly to the south to improve interior circulation. The National Park Service has obtained an opinion from the Department of the Interior regarding the relocation and is working with the City of Lowell to facilitate this change. Schematic Design drawings including elevations and perspective views have been included in this submission.

BUILDING CONSERVATION ASSOCIATES INC
10 Langley Road, Suite 202 Newton Centre, MA 02459
TEL 617.916.5661 FAX 617.477.2350
www.bcausa.com

Representatives from both the National Park Service and the Lowell Historic Board reviewed the design in progress on November 15, 2018. Comments from that meeting have been incorporated into the design.

The forms have been signed by Robin Greenberg, the Assistant Project Manager for the work at Perkins Eastman, who will be the primary contact for any comments or questions you may have.

Sincerely,

Building Conservation Associates, Inc.
Alicia Svenson
Senior Architectural Conservator

cc: Robin Greenberg, AIA, Associate
Perkins Eastman

Steve Stowell, Administrator
Lowell Historic Board

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: Lowell High School

Location/Address: 50 Father Morissette Blvd/75 Arcand Dr.

City / Town: Lowell, MA 01852

Project Proponent:

Name: City of Lowell: Eileen Donoghue, City Manager

Address: Lowell City Hall, 375 Merrimack St.

City/Town/Zip/Telephone: Lowell, MA 01852 978-674-1000

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or funding (specify)
Massachusetts School Building Authority (MSBA)	963 CMR 2: Partial reimbursement grant for construction and renovation of K-12 schools in the Commonwealth of Massachusetts.

Project Description (narrative): See attachment.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition. Yes, see attachment.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation. Yes, see attachment.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).
Yes, see attached schematic: site plans, floor plans, exterior elevations, renderings and exterior photographs for additional information.

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify. No

What is the total acreage of the project area?

Woodland	*0 Acres*	*Productive Resources:*	
Wetland	*0 Acres*	Agricultural	*0 Acres*
Floodplain	*0 Acres*	Forestry	*0 Acres*
Open Space	*±3.27 acres*	Mining/ Extraction	*0 Acres*
Developed	±4.13 *acres*	Total Project Acreage	*±7.43 Acres*

Note: These approximate areas are based on large scale GIS Maps and FEMA Maps and are not the result of an on the ground survey. Some of this data is a few years old and could have changed (wetlands, etc.) since then. A survey should be performed to confirm these areas.

What is the acreage of the proposed new construction? ±4.13 acres

What is the present land use of the project area?
The current use of the project area (50 Father Morissette Blvd) is the existing Lowell High School. The adjacent lot included in the project area (75 Arcand Drive) is currently used as a medical office building and parking lot.

Please attach a copy of the section of the USGA quadrangle map which clearly marks the project location. See attachment.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: _____ Date: 1/3/2019

Name: Robin Greenberg, Associate, Perkins Eastman

Address: 20 Ashburton Place, Floor 8

City/Town/Zip: Boston, MA 02108

Telephone: 617-449-4000

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

PERKINS EASTMAN

Project Notification Form
Appendix A: Descriptions Attachment
Lowell High School
December 19, 2018

Project Description (narrative):
The proposed Lowell High School project currently in schematic design is an addition/renovation to the existing school buildings. It does not include reuse of the Freshman Academy building (MHC inventory number LOW.1143) or the Steam Plant (LOW.2580), currently used by Lowell High School. These facilities will be turned over to the City of Lowell for a use to be determined.

The existing Lowell High School complex consists of the following components: The original high school building of 1892 with additions from 1922 and 1997 (LOW.44). This building is collectively referred to as the "1922 Building." There are also two existing structures that were added to the complex in 1980: the Lord Building (LOW.1774) and Field House building (no inventory number). These buildings are collectively referred to as the 1980's Building and are located across the Merrimack Canal (LOW.933) from the original high school. The 1980s building is connected to the 1922 Building with existing one-story pedestrian bridges over the canal. The attached schematic design document refers to all renovated existing and new construction on the west side of the canal as the "West Building" and the renovated 1922 building as the "East Building".

Perkins Eastman
Architects DPC

20 Ashburton Place
Floor 8
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+1.617.449.4000

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Boston
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Guayaquil
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New York
Pittsburgh
San Francisco
Shanghai
Stamford
Toronto
Washington DC

The proposed project entails exterior and interior renovations to the existing East Building and the West Building, as well as the demolition of the two existing one-story bridges, and construction of two new one-story bridges to connect the West and East Buildings. An adjacent lot on the west side of the canal, 75 Arcand Drive, is being added to the high school site. The existing 1980s Field House portion of the West Building and the existing Medical Office building at 75 Arcand Drive (LOW.1116, construction date 1970), will be fully demolished for new additions. A portion (approximately one-third) of the 1980 Lord Building will also be demolished for these additions. The proposed additions to the remaining portion of the 1980 building will include: a new main entry, a new Gymnasium Wing, a new 5-story Freshman Academy, and a new southern end to the West Building.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.
The existing Field House and portions of the 1980's Lord Building, an adjacent medical office building at 75 Arcand Drive from 1970, and the existing connecting bridges over the canal are to be completely demolished. The exterior stairs and ramp at the northern end of the East (1922) Building (1997 construction) will also be demolished. The exterior stairs and ramp are being replaced in order to improve accessibility access into the auditorium. Reconfiguration of interior spaces would involve partial interior demolition the 1922 and 1980's buildings.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.
The proposed project includes interior and exterior rehabilitation of the East (1922) Building and the West (1980) Building. The exterior appearance of the East Building will be retained and work will follow the Lowell Historic Board's Downtown Historic District Design Review Standards. The deteriorated existing aluminum windows in the 1892 and 1922 sections of the East Building will be removed and replaced with wood-clad aluminum windows that will restore the windows to their original appearance. At the request of the Lowell Historic Board, the

PERKINS EASTMAN

replacement windows in the remaining portion of the West Building (an addition dating to 1997) will be aluminum and retain the same appearance as they have now. The proposed replacement front entry ramp and stairs at the north side of the East Building will be rebuilt in the same style as the existing ramp.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

The proposed project includes new additions to the West (1980) Building including: a five-story Freshman Academy, a new two-level Gymnasium Wing, and an addition at the south. The exterior materials at the additions are polished finished concrete masonry unit (CMU) base and brick masonry above with aluminum windows and curtainwall systems. At the Gymnasium Wing, the clerestory windows are an opaque Kalwall glazing panel. The two new one-story bridges will be constructed to span the canal connecting the East (1922) Building and West Building. The southern bridge is being rebuilt at the existing location. The northern bridge is moved further south in order to improve interior circulation. The proposed bridges have exposed painted steel trusses and a curtainwall system.

Perkins Eastman Architects DPC

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Boston, MA 02108
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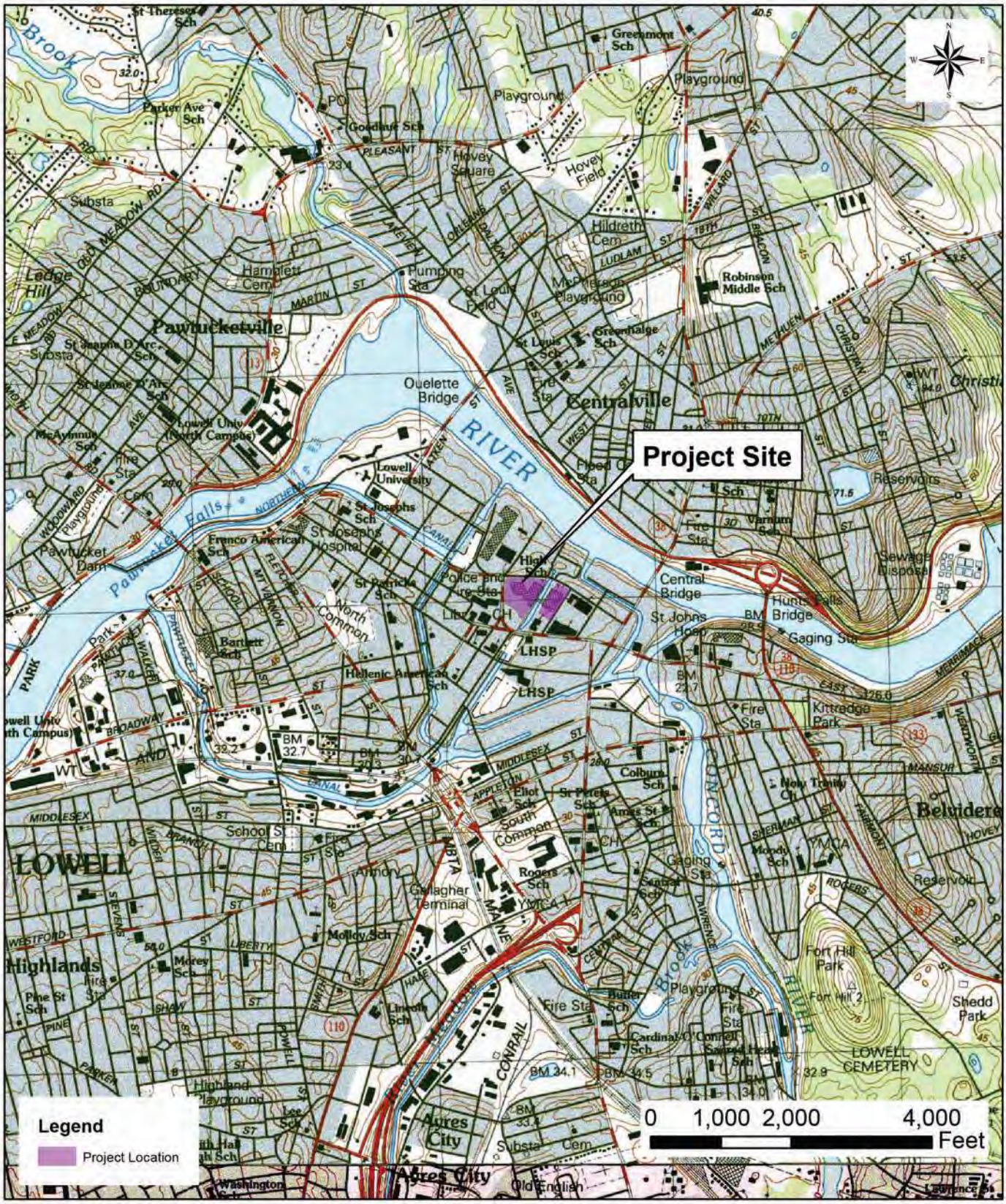


USGS Locus - Existing Site

Lowell High School
Lowell, Massachusetts

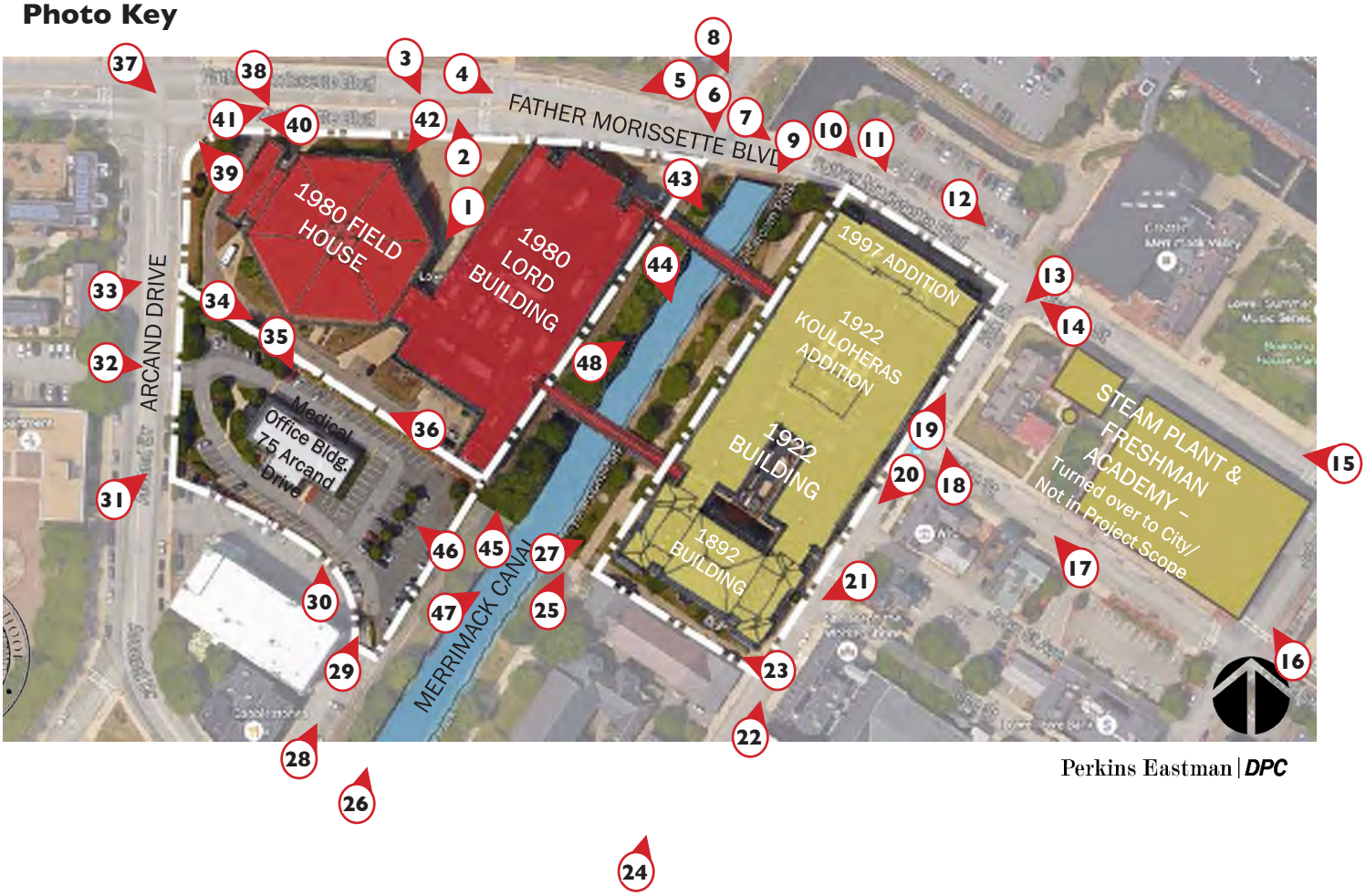
Data Source: MassGIS
Nitsch Project #11601

Nitsch Engineering

Lowell High School

Existing Conditions Photographs

Photo Key



Perkins Eastman | DPC

Photo 1. Lowell High School main entrance at 1980 Field House, north elevation.

Photo 2. George Ayotte parking garage across Father Morissette Boulevard from High School main entrance.

Photo 3. West elevation of 1980 Lord Building and partial north elevation of 1980 Field House.

Photo 4. North elevation of 1980 Lord building and partial west elevation of 1922 building from Father Morissette Boulevard.

Photo 5. View down Father Morissette Boulevard showing partial north elevation of 1980 Lord Building and 1980 Field House.

Photo 6. View from Father Morissette Boulevard of partial west elevation of 1922 building, partial north elevation of 1980 Lord building and north canal pedestrian bridge.

Photo 7. Northwest corner of 1922 building showing addition added in 1997 (north side of building) adjacent to 1922 construction.

Photo 8. Photo from upper level of George Ayotte parking garage showing partial west elevation of 1922 building, partial north elevation of 1980 Lord building and north canal pedestrian bridge.

Photo 9. View looking south down Merrimack Canal showing 1922 building, Lord building, and canal pedestrian bridges.

Photo 10. View of 1997 addition to north side of 1922 building.

Photo 11. North elevation of 1922 building (added in 1997).

Photo 12. View down French Street showing steam plant and Freshmen Academy.

Photo 13. View down Kirk Street from French Street showing northeast corner of 1922 building.

Photo 14. View down French Street looking west.

Photo 15. View down French Street looking west showing Freshmen Academy and steam plant.

Photo 16. View at corner of John Street and Paige Street showing southeast corner of Freshmen Academy with 1922 building in background.

Photo 17. View down Paige Street looking west.

Photo 18. Northeast corner of 1922 building from Paige Street.

Photo 19. View down Kirk Street, looking north.

Photo 20. View down Kirk Street, looking south. East elevation of 1922 building.

Photo 21. East elevation of original 1892 portion of 1922 building and connection to 1922 addition.

Photo 22. Southeast corner of 1922 building. View shows original 1982 portion and 1922 addition.

Photo 23. South elevation of 1922 building (part of the original 1892 construction).

Photo 24. View down Kirk Street from Merrimack Street

Photo 25. View down Merrimack Canal looking north from canal pathway.

Photo 26. View down Merrimack Canal looking north.

Photo 27. View of west elevation of 1922 building and south canal pedestrian bridge from canal pathway.

Photo 28. View of partial south elevation of 1980 Lord building from Merrimack Street.

Photo 29. View of west elevation of 1922 building and partial south elevation of 1980 Lord building from canal-side parking lot.

Photo 30. Southeast corner of 75 Arcand Drive and partial south elevation of 1980 Lord building and 1980 Field House from canal-side parking lot.

Photo 31. Southwest corner of 75 Arcand Drive

Photo 32. West elevation of 75 Arcand Drive

Photo 33. West elevation of 1980 Field House with 1980 Lord Building behind.

Photo 34. West elevation of 1980 Field House and partial west elevation of 1980 Lord building.

Photo 35. North elevation of 75 Arcand Drive, looking east.

Photo 36. North elevation of 1980 Field House and 75 Arcand Drive, looking west.

Photo 37. Northwest corner of 1980 Field House from across Father Morissette Boulevard.

Photo 38. Northwest corner of 1980 Field House.

Photo 39. View from 1980 Field House across Father Morissette Boulevard, looking west.

Photo 40. View down Father Morissette Boulevard, looking west.

Photo 41. View looking east down Father Morissette Boulevard showing partial west elevation of 1980 Lord Building and George Ayotte Parking Garage.

Photo 42. Partial east elevation of 1980 Field House.

Photo 43. View of north canal pedestrian bridge from canal pathway.

Photo 44. View of south canal pedestrian bridge from canal pathway.

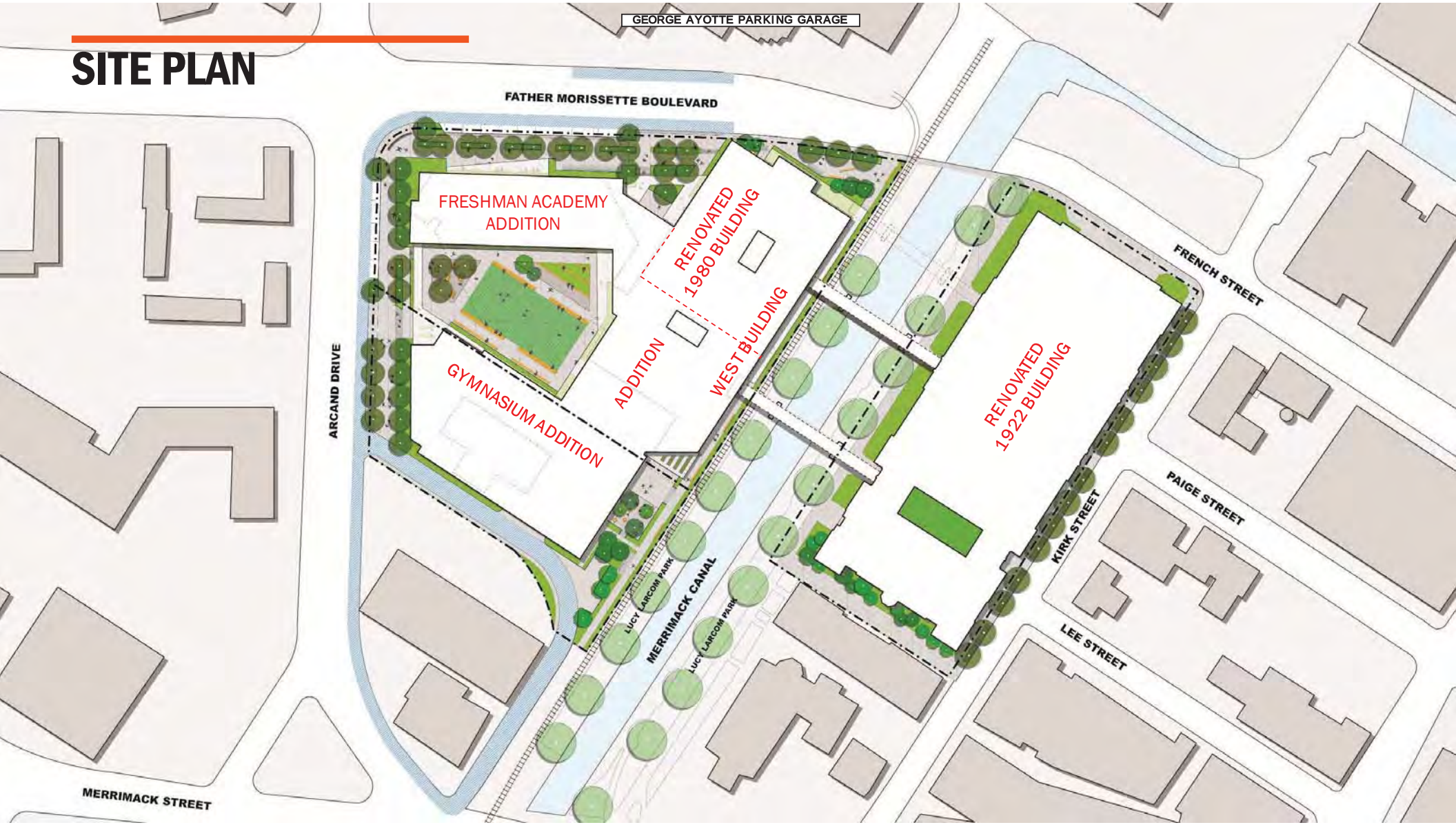
Photo 45. South elevation of 1980 Lord Building from canal pathway.

Photo 46. East elevation of 75 Arcand Drive from canal pathway.

Photo 47. View of west elevation of 1922 building, east elevation of 1980 Lord building, and south canal pedestrian bridge from canal pathway.

Photo 48. View of north canal pedestrian bridge from canal pathway.

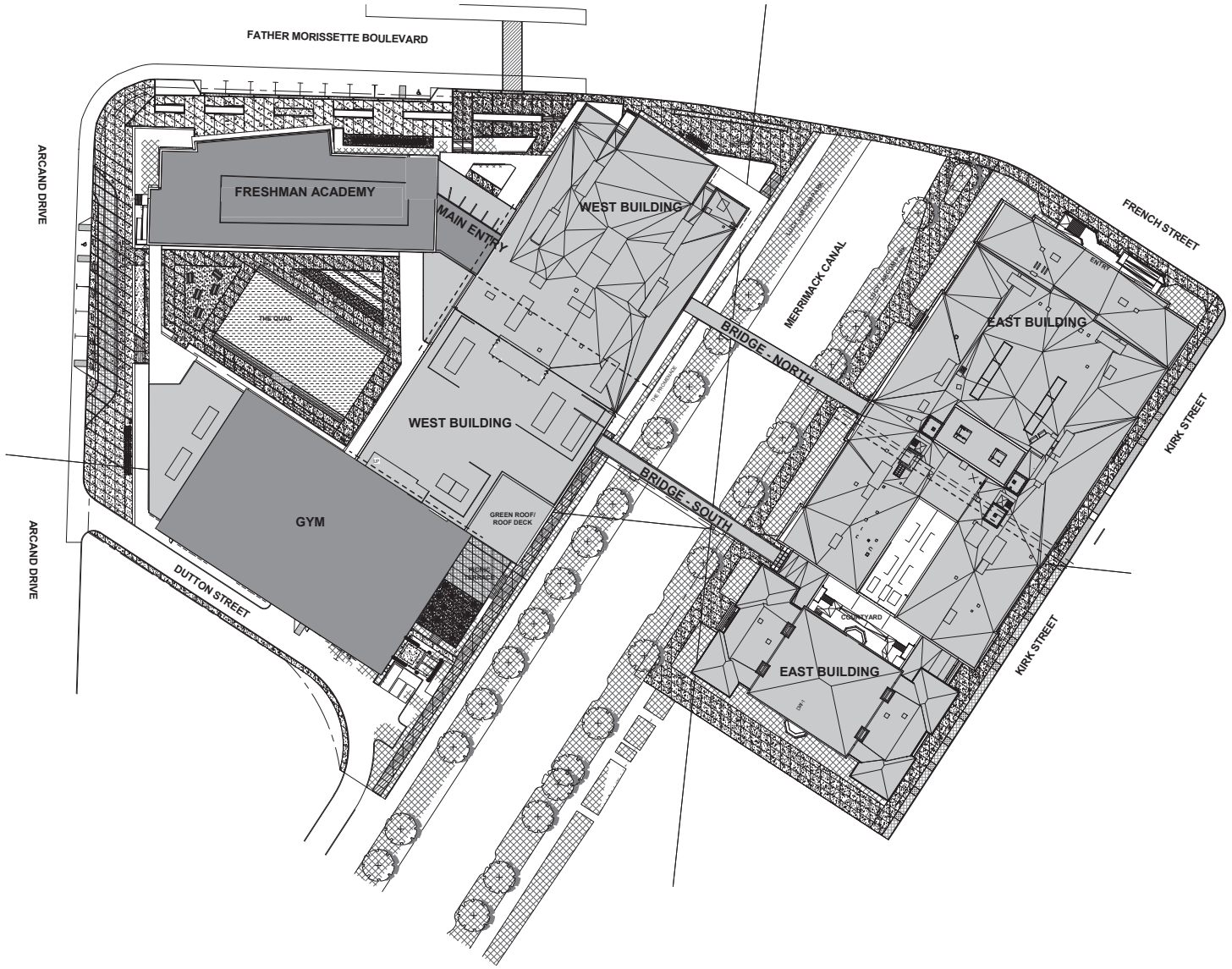
SITE PLAN


GEORGE AYOTTE PARKING GARAGE
FATHER MORISSETTE BOULEVARD
FRESHMAN ACADEMY ADDITION
RENOVATED 1980 BUILDING
ADDITION
WEST BUILDING
GYMNASIUM ADDITION
RENOVATED 1922 BUILDING
FRENCH STREET
ARCAND DRIVE
PAIGE STREET
KIRK STREET
LEE STREET
MERRIMACK CANAL
LUCY LARCOM PARK
LUCY LARCOM PARK
MERRIMACK STREET

AERIAL VIEW LOOKING SOUTHEAST
FROM FATHER MORISSETTE BOULEVARD


AERIAL VIEW LOOKING NORTH
FROM MERRIMACK STREET

VIEW LOOKING SOUTHEAST FROM
FATHER MORISSETTE BOULEVARD



1 **SITE PLAN**
1" = 30'-0"

C:\REVIT LOCAL\HS_Canal West_V2018_dcadder.rvt
12/17/2018 11:53:1 PM

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SITE PLAN

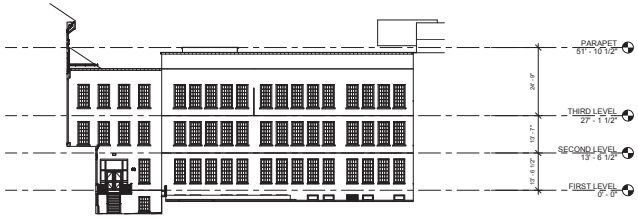
SCALE: 1" = 30'-0"

AS-000

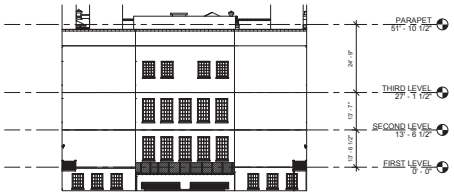
SCHEMATIC DESIGN - ESTIMATE

12/17/2018

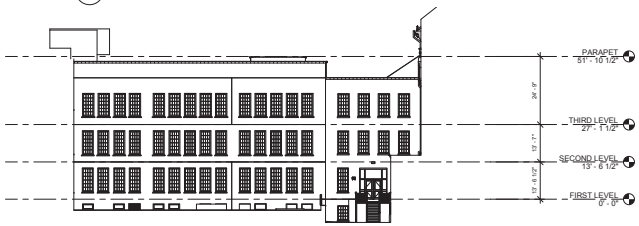
8 **SOUTH ELEVATION - EAST BLDG - COURTYARD**
1/16" = 1'-0"



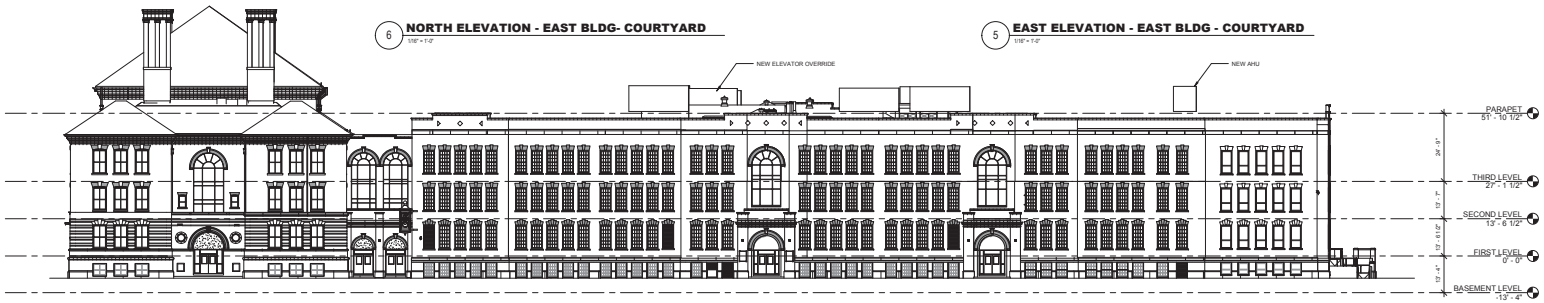
7 **WEST ELEVATION - EAST BLDG - COURTYARD**
1/16" = 1'-0"



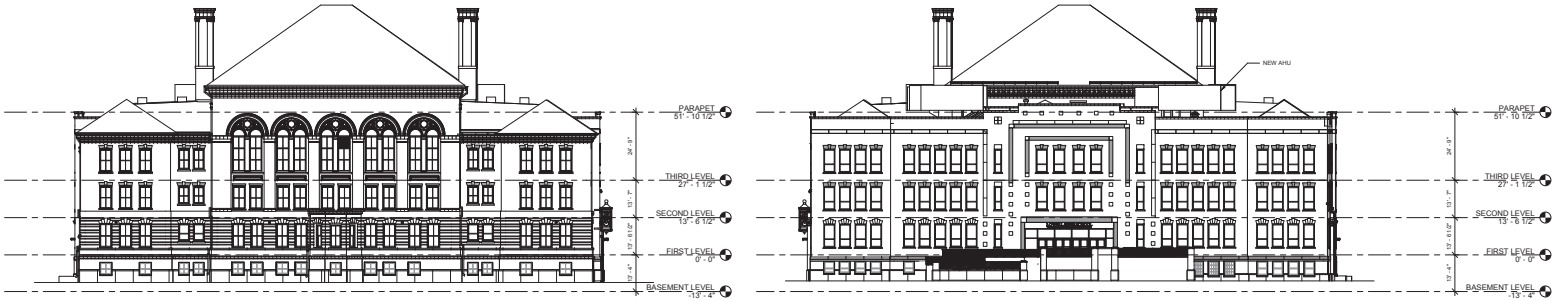
6 **NORTH ELEVATION - EAST BLDG- COURTYARD**
1/16" = 1'-0"



5 **EAST ELEVATION - EAST BLDG - COURTYARD**
1/16" = 1'-0"



4 **EAST ELEVATION - EAST BLDG**
1/16" = 1'-0"



3 **SOUTH ELEVATION - EAST BLDG**
1/16" = 1'-0"

2 **NORTH ELEVATION - EAST BLDG**
1/16" = 1'-0"

1 **WEST ELEVATION - OVERALL**
1/16" = 1'-0"

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NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4949

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

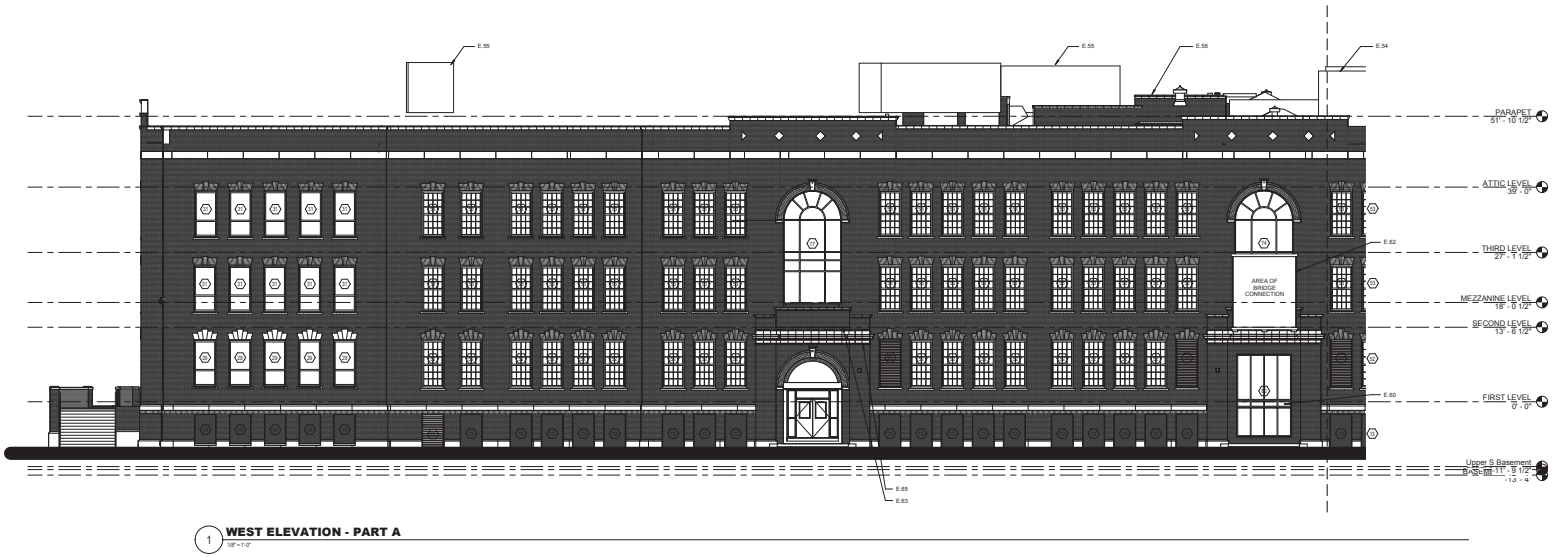
PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - OVERALL EAST BLDG
SCALE: 1/16" = 1'-0"

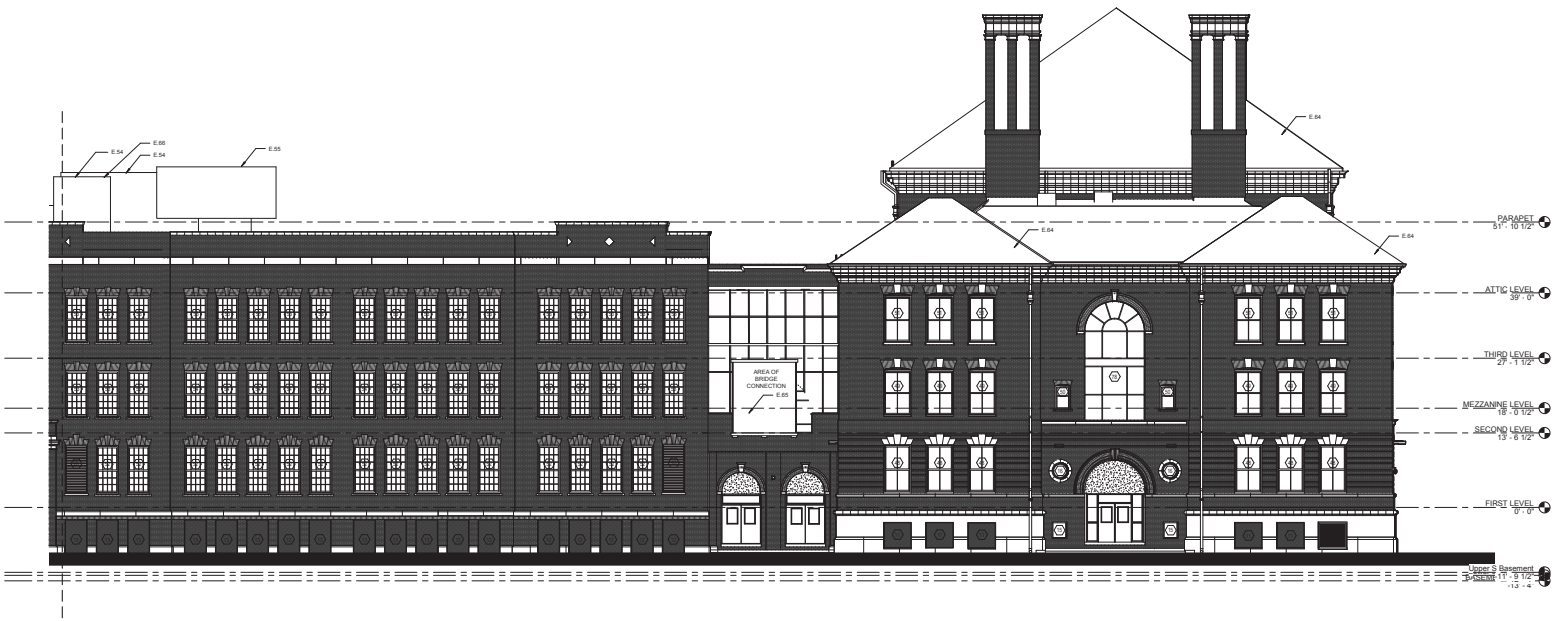
A-200

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **WEST ELEVATION - PART A**
1/8" = 1'-0"



2 **WEST ELEVATION - PART B**
1/8" = 1'-0"

EXTERIOR ELEVATION GENERAL NOTES - EAST CAMPUS

1. REPLACE ALL WINDOWS FRAMES AND SASHES AS INDICATED ON ELEVATIONS W ALUMINUM THERMALLY BROKEN WINDOWS W/ LOW-E GLAZING, INSECT SCREENS AND OPERABLE BOTTOM SASH (AWNING). WINDOW SHALL HAVE HISTORIC PATTERN (FOR MUNTINS AND FRAME PROFILES REFER TO WINDOW TYPE SCHEDULE.)
2. REPLACE ALL EXTERIOR DOORS AND LOUVERS.
3. REPLACE ALL EXTERIOR CAULKING AND SEALANTS.
4. REPAIR & PAINT EXISTING WOOD TRIM AT 1892 & 1922 BUILDING.
5. REPOINT AND CLEAN ALL EXISTING MASONRY. REMOVE ANY EFFLOURESCENCE.
6. REPOINT ALL STONE STEPS
7. REPLACE ALL LOUVERS AND MTL HOODS
8. REPAIR TERRA-COTTA TRIM. REPLACE WHERE NECESSARY.
9. REPAIR/ REPLACE PRECAST CORNICE.
10. REPAIR/ REPLACE PRE-CAST SILLS
11. REPLACE ALL METAL SECURITY SCREENS IN KIND AT BASEMENT WINDOWS
12. REPLACE BROKEN BRICKS
13. PROVIDE FULL FITTING AT TOILET ROOM WINDOWS, ALL LEVELS

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- NEW CONSTRUCTION - CMU PARTITION
- INFILL CONCRETE SLAB
- ADDITIONAL TAPERED INSULATION
- RAISED FLOOR W/ LGMF AND TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE FOR ADDITIONAL SCOPE INFORMATION.
2. REFER TO LIFE SAFETY PLANS FOR WALL RATINGS
3. REFER TO SHEET A-002 FOR PARTITION TYPES. REFER TO SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
4. APPLY SELF-LEVELING TOPPING IN ALL AREAS OF BASEMENT LEVEL UNLESS OTHERWISE NOTED
5. AT EXISTING STAIRWAYS TO REMAIN PROVIDE NEW CODE-COMPLIANT GALVANIZED GUARDS AND HANDRAILS TO ALL STAIRS UNLESS OTHERWISE NOTED. PROVIDE CONCRETE FILL TO DAMAGED CONCRETE TREADS AND RISERS AS NECESSARY. PROVIDE NEW METAL ANGLE NOSING AT EXISTING STAIRS. PROVIDE RUBBER FINISHED SURFACE ON TREADS, RISERS, AND LANDINGS.
6. UNDER NEW CMU WALLS CUT OUT EXISTING SLAB AND REPLACE WITH NEW THICKENED MAT. REFER TO STRUCTURAL FOR DETAIL.
7. NEW RAMPS AND STAIRS AT BAND AND CHORUS ROOMS TO BE BUILT OF LIGHT-GAUGE MTL FRAMING. COMPLETELY SEAL AND MAKE CAVITY BELOW RACCESSIBLE.
8. AT ALL CLASSROOMS ON FLOORS 1-3 WITH EXISTING T&G WOOD FLOORING, REPLACE WITH FIRE-TREATED PLYWOOD UNDERLAYMENT OVER FIRE TREATED SLEEPERS ON THE EXISTING STRUCTURAL DECK TO AN ELEVATION MATCHING THE ADJACENT CORRIDOR TERRAZZO FLOORING. PREPARE PLYWOOD TO RECEIVE LINOLEUM FINISH FLOORING
9. REPLACE ALL DOORS & FRAMES.
10. ALL EXISTING DOORS TO BE STRIPPED, PAINTED / REPAINTED.
11. PROVIDE ALL DOOR HARDWARE SETS.
12. INSTALL NEW TOILET ACCESSORIES THROUGHOUT.
13. REPAIR AND CLEAN ALL EXISTING TERRAZZO
14. REPLACE ALL EXISTING CORRIDOR AND CLASSROOM CEILINGS
15. PROVIDE ENTRY MATS AT ALL EXTERIOR DOORS
16. FULL FITTING AT TOILET ROOM WINDOWS, ALL LEVELS
17. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - EAST CAMPUS

E.1 INFILL EXISTING WINDOW OPENINGS WITH MASONRY TO MATCH EXISTING
E.2 VERTICAL SHAFT FOR DUCTWORK
E.3 TROPHY DISPLAY CASE W/ ADJUSTABLE SHELVES WITH RECESSED LIGHTING
E.4 RAISED FLOOR THIS AREA, CONSTRUCTED WITH LGMF W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.5 NEW LGMF STAIR AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.6 NEW LGMF RAMP, STAIR, AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.7 NEW LGMF RAMP AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.8 PROVIDE MOTORIZED WINDOW SHADES ALL WINDOWS THIS ROOM
E.9 NEW OPENING AT EXISTING MASONRY WALL. MISC. METALS LINTEL ABOVE NEW OPENINGS
E.10 OPERABLE PARTITION WALL W/ ACOUSTICAL FABRIC FINISH (SEE STRUCTURAL DWGS FOR ADDITIONAL SCOPE)
E.11 OPERABLE PARTITION WALL W/ MIRROR. (SEE STRUCTURAL DWGS FOR SCOPE)
E.12 REPLACE EXISTING CURTAINWALL AND EXTERIOR DOORS WITH NEW FIXED STORE FRONT - GLAZED AND WITH SPANDREL, REFER TO ELEVATIONS
E.13 SPECIALTY MILLWORK. 36" AFF TO 96" AFF THRU-WALL DISPLAY CABINETS WITH ONE SIDE LAMINATED GLASS BUTT-JOINTED, OTHER SIDE WITH FULL VISION MILLWORK DOORS, ADJUSTABLE SHELVING, AND RECESSED LIGHTING
E.14 SIDEWALL VENT
E.15 NEW CLERESTORY WINDOW
E.16 NEW RAMP WITH CONCRETE TOPPING OVER STYROFOAM FILLER
E.17 NEW RAISED STRUCTURAL FLOORS THIS AREA. REFER TO STRUCTURAL
E.18 NEW MULTI-STOP TRACTION ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.19 EXISTING STAIR TO BE RENOVATED. MADE CODE COMPLIANT REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.20 NEW STAIR. REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.21 AUTOMATIC DOOR OPERATOR AND CONTROL ON PEDESTAL
E.22 AUTOMATIC DOOR OPERATOR AND CONTROL
E.23 ALUM. STOREFRONT W/ BALLISTIC-RESISTANT GLAZING. INCLUDE TRANSACTION WINDOW
E.24 STAINLESS STEEL GUARD AND RAILS
E.25 GALVANIZED GUARD AND RAILS
E.26 NEW THEATER SEATING REFER TO AUDITORIUM PARTIAL PLAN
E.27 NEW FLOOR IN-FILL. REFER TO STRUCTURAL
E.28 CUT EXISTING MASONRY OPENING TO FLOOR LEVEL. INFILL OPENING WITH HOLLOW METAL FRAME AND FIRELITE GLAZING
E.29 STRUCTURAL SKYLIGHT W/ FIRE RATED GLAZING
E.30 REFURBISH ALL WALLS AND CEILINGS. SAND, PATCH, AND PAINT
E.31 EXISTING STRUCTURAL BEARING MASONRY CHIMNEY STACK W MULTI-FLUE TO REMAIN. WRAP WITH NEW PARTITION
E.32 NEW EPDM MEMBRANE OVER EXISTING COVERBOARD AND INSULATION. INFILL NEW INSULATION TO MATCH EXISTING TAPER PROFILE WHERE EXISTING MECHANICAL EQUIPMENT OR OTHER ROOF APPURTENANCES HAS BEEN REMOVED
E.33 CONCRETE FILLED STEEL PAN STAIRS. EXTENSION TO ATTIC LEVEL INCL. LANDING. PROVIDE MTL GRILL "CAGE" WITH LOCKABLE SECURITY DOOR TO LIMIT ACCESS TO ATTIC
E.34 NEW COUNTER-BALANCED RIGGING SYSTEM. REFER TO THEATER NARRATIVE FOR SCOPE
E.35 TEMPERED GLASS STOREFRONT FRAME WITH FRAMED TEMPERED GLASS DOOR (GLASS TRACK) PAINTED
E.36 USE EXISTING VERTICAL SHAFT FOR DUCTWORK SERVING AUDITORIUM. PROVIDE MISC. MTL SUPPORTS AS REQ'D
E.37 NEW WALL-MOUNTED LADDER W/ CAGE AND CATWALK PLATFORM BELOW CEILING
E.38 PROVIDE NEW WEATHER-TIGHT ENCLOSURE TO CONNECT NEW BRIDGE TO BUILDING
E.39 PROVIDE NEW METAL STAIR AND LANDING TO MEET CODE DIMENSIONAL REQUIREMENTS (MISC MTL)
E.40 INTERIOR COURTYARD. REFER TO LANDSCAPE PLANS FOR DETAILS
E.41 NEW LIMITED USE-LIMITED ACCESS ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.42 FIRE ALARM ACTIVATED ROLL DOWN FIRE SHUTTER
E.43 REFER TO ROOM DATA SHEETS FOR CASEWORK AND SINK LAYOUT
E.44 LIGHT WELL ABOVE. STRUCTURAL SKYLIGHT @1ST FLOOR FRAMING PLANE
E.45 CONCRETE INFILL AT PLUMBING TRENCHES
E.46 DIAMOND PLATE FLOORING
E.47 FRAMED OPENINGS THRU AUDITORIUM CEILING FOR STAGE LIGHTING RACK. PROVIDE MTL ANGLES AROUND PERIMETER OF OPENING FOR CEILING SUPPORT. TIE-BACK FRAMES TO EXISTING STRUCTURAL GRID
E.48 MTL MESH SECURITY DOOR
E.49 MTL SECURITY MESH AT ENTIRE LENGTH OF CATWALK SIDES. FROM DIAMOND PLATE FLOORING TO UNDERSIDE OF ROOF FRAMING
E.50 NEW ROOF: AIR VAPOR BARRIER, TAPERED RIGID INSULATION, COVERBOARD, AND EPDM MEMBRANE OVER ROOF DECK
E.51 MTL GALVANIZED SECURITY PIPE RAIL GUARD
E.52 NEW TAPERED INSULATION AND AIR VAPOR BARRIER TO MATCH ADJACENT PROFILE. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.53 NEW COVERBOARD AND EPDM MEMBRANE ROOFING
E.54 NEW PACKAGED MECHANICAL PENTHOUSE UNIT OVER SUPPORTING STEEL. REFER TO MECHANICAL AND STRUCTURAL DOCUMENTS FOR SCOPE
E.55 MECHANICAL ROOF-TOP UNIT ON GALVANIZED STEEL DUNNAGE SEE MECHANICAL AND STRUCTURAL DRAWINGS FOR SCOPE
E.56 STEEL FRAMED, GLAZED INFILL ROOF MONITOR OVER LIGHT WELLS. PROVIDE STRUCTURAL ROOF DECK WITH TAPERED INSULATION AND AIR VAPOR BARRIER, PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.57 PATH OF NEW EPDM MEMBRANE ROOF PADS
E.58 EXISTING ROOFING TO REMAIN
E.59 NEW METAL STAIR, RAILING, AND LANDING. PROCURE WITH ROOF TOP PACKAGED MECHANICAL UNIT
E.60 AREA OF SPANDREL GLASS
E.61 INSTALL SALVAGED CORNICE TO BE PROVIDED BY OWNER. MATCH EXISTING INSTALLATION PROFILE AT SIMILAR ENTRY BAYS
E.62 NEW EXPANSION JOINTS AROUND UNDERSIDE, SIDES AND ROOF OF NEW PEDESTRIAN BRIDGE (TYP.)
E.63 INSTALL NEW MASONRY TO MATCH EXISTING. RECREATE ENTRY BAY MASONRY CONFIGURATION AND PROFILES SIMILAR AT OTHER ENTRY WAYS IN 1922 ADDITION.
E.64 EXISTING ROOF TO REMAIN
E.65 MODIFY EXISTING "BRIDGE" TO ACCEPT NEW PEDESTRIAN BRIDGE CONFIGURATION. ADD ADDITIONAL NEW BRICK TO MATCH EXISTING TO INFILL AS MAY BE REQUIRED. MAINTAIN MASONRY PROFILES AND CONFIGURATION TO MATCH SIMILAR ENTRY AT KIRK STREET.
E.66 NEW ELEVATOR HEADHOUSE. MASONRY TO MATCH EXISTING OVER NEW CMU BLOCK WALL
E.67 NEW STOREFRONT SYSTEM WITH BALLISTIC RESISTANT GLAZING INCLUDING AT DOOR LIGHTS
E.68 MODIFY MASONRY TO ALLOW NEW FLASHING AND NEW WEEPHOLES AT RAISED ELEVATION TO ACCOMMODATE NEW HIGHER EXTERIOR ENTRY PLATFORM FINISHED ELEVATION
E.69 PROTECT AND PRESERVE EXISTING HISTORIC CLOCK. ASSESS AND PROVIDE MAINTENANCE ON UNIT REPAIR OR REPLACE ANY MISSING OR BROKEN ELEMENTS. CLEAN UNIT

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4949

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
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2150 Washington Street Newton, MA 02462

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370 Faunce Corner Road Dartmouth, MA 02747

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Lighting Consultant:
Lighting Consultant Name
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Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
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Planning / Zoning Consultant Address

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Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - EAST BLDG

SCALE: As indicated

A-201

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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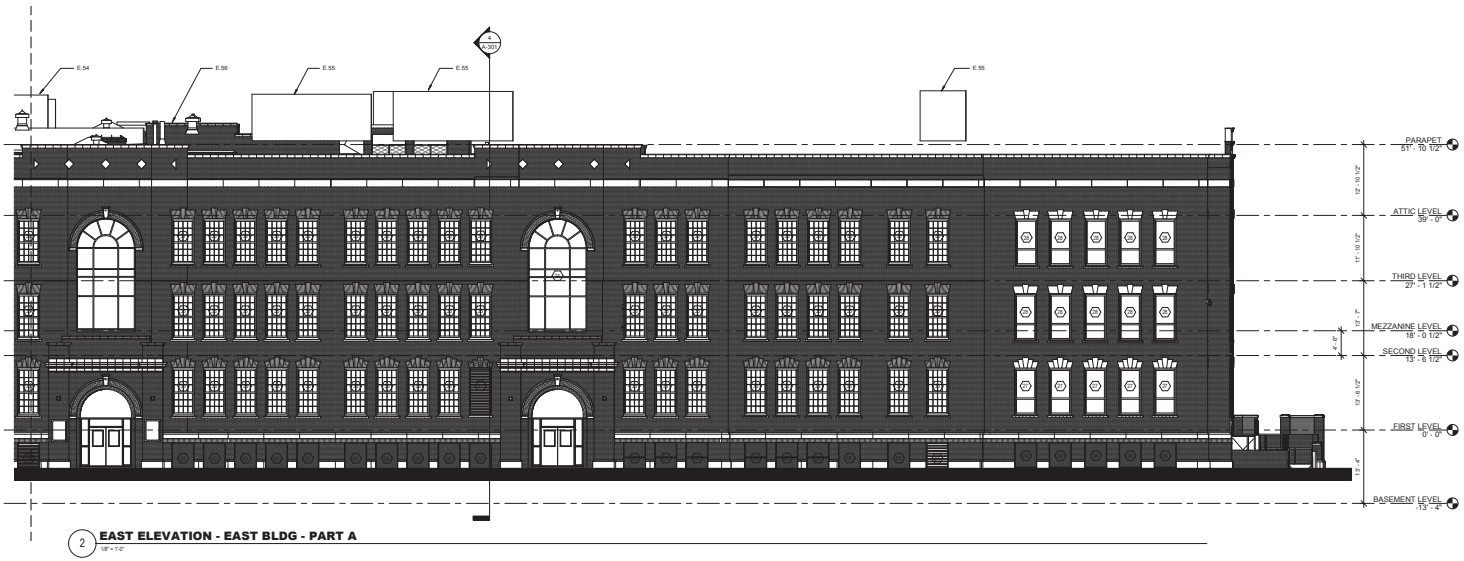
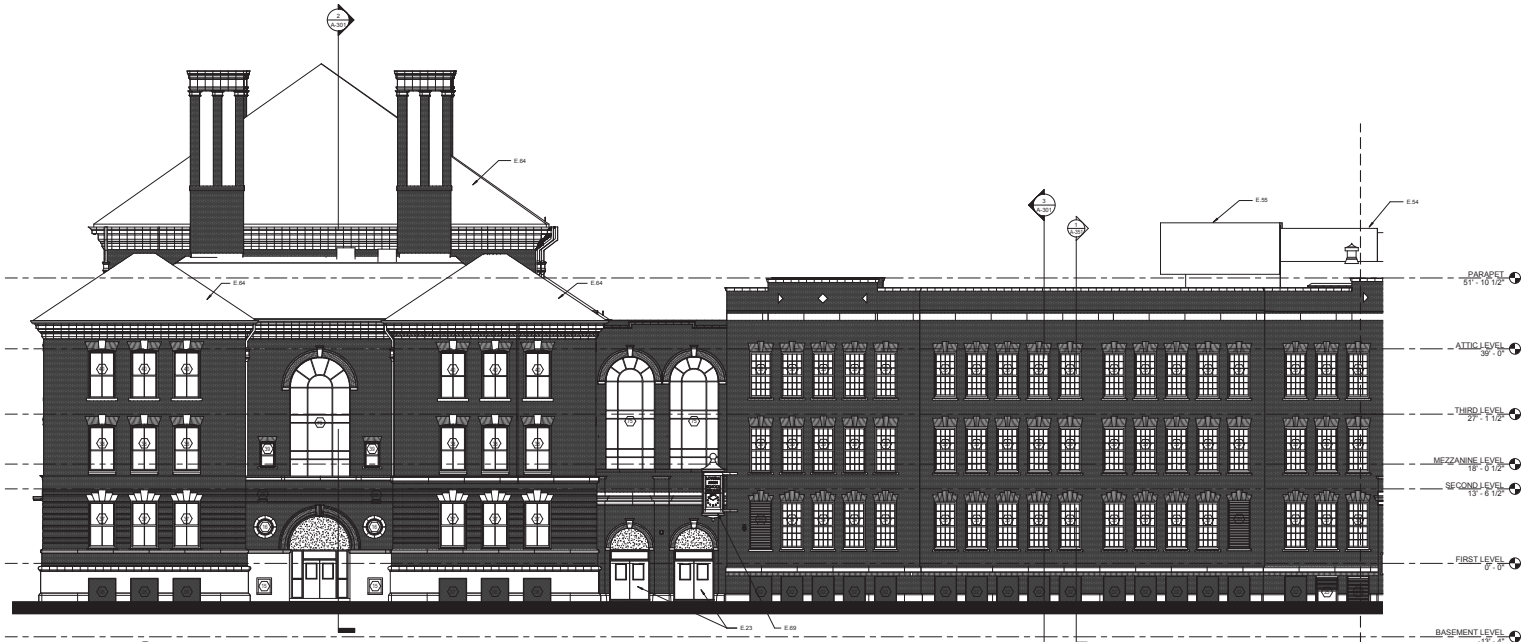


2 **EAST ELEVATION - EAST BLDG - PART A**
1/8" = 1'-0"



1 **EAST ELEVATION - EAST BLDG - PART B**
1/8" = 1'-0"

EXTERIOR ELEVATION GENERAL NOTES - EAST CAMPUS

1. REPLACE ALL WINDOWS FRAMES AND SASHES AS INDICATED ON ELEVATIONS W ALUMINUM THERMALLY BROKEN WINDOWS W/ LOW-GLAZING. INSECT SCREENS AND OPERABLE BOTTOM SASH (AWNING). WINDOW SHALL HAVE HISTORIC PATTERN FOR MUNTINS AND FRAME PROFILES REFER TO WINDOW TYPE SCHEDULE)
2. REPLACE ALL EXTERIOR DOORS AND LOCKSETS.
3. REPLACE ALL EXTERIOR CAULKING AND SEALANTS.
4. REPAIR & PAINT EXISTING WOOD TRIM AT 1902 & 1922 BUILDING.
5. REPOINT AND CLEAN ALL EXISTING MASONRY. REMOVE ANY EFFLOURESCENCE.
6. REPOINT ALL STONE STEPS
7. REPLACE ALL LOUVERS AND MTL HOODS
8. REPAIR TERRA COTTA TRIM. REPLACE WHERE NECESSARY.
9. REPAIR REPLACE PRECAST CORNICE.
10. REPAIR REPLACE PRE-CAST SILLS
11. REPLACE ALL METAL SECURITY SCREENS IN KIND AT BASEMENT WINDOWS
12. REPLACE BROKEN BRICKS
13. PROVIDE FULL FRITTING AT TOILET ROOM WINDOWS, ALL LEVELS

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- NEW CONSTRUCTION - CMU PARTITION
- INFILL CONCRETE SLAB
- ADDITIONAL TAPERED INSULATION
- RAISED FLOOR W/ LGMF AND TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE FOR ADDITIONAL SCOPE INFORMATION.
2. REFER TO LIFE SAFETY PLANS FOR WALL RATINGS
3. REFER TO SHEET A-502 FOR PARTITION TYPES. REFER TO SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
4. APPLY SELF-LEVELING TOPPING IN ALL AREAS OF BASEMENT LEVEL UNLESS OTHERWISE NOTED
5. AT EXISTING STAIRWAYS TO REMAIN PROVIDE NEW CODE-COMPLIANT GALVANIZED GUARDS AND HANDRAILS TO ALL STAIRS UNLESS OTHERWISE NOTED. PROVIDE CONCRETE FILL TO DAMAGED CONCRETE TREADS AND RISERS AS NECESSARY. PROVIDE NEW METAL ANGLE NOSING AT EXISTING STAIRS. PROVIDE RUBBER FINISHED SURFACE ON TREADS, RISERS, AND LANDINGS.
6. UNDER NEW CMU WALLS CUT OUT EXISTING SLAB AND REPLACE WITH NEW THICKENED MAT. REFER TO STRUCTURAL FOR DETAIL.
7. NEW RAMPS AND STAIRS AT BAND AND CHORUS ROOMS TO BE BUILT OF LIGHT-GAUGE MTL FRAMING. COMPLETELY SEAL AND MAKE CAVITY BELOW INACCESSIBLE.
8. AT ALL CLASSROOMS ON FLOORS 1-3 WITH EXISTING T&G WOOD FLOORING, REMOVE FLOORING AND INSTALL NEW SOUND ATTENUATION MAT OVER FIRE TREATED SLEEPERS ON THE EXISTING STRUCTURAL DECK TO AN ELEVATION MATCHING THE ADJACENT CORRIDOR TERRAZZO FLOORING. PREPARE PLYWOOD TO RECEIVE LINOLEUM FINISH FLOORING
9. REPLACE ALL DOORS & FRAMES.
10. ALL GWB & PLASTER WALLS ARE PAINTED / REPAINTED.
11. PROVIDE ALL DOOR HARDWARE SETS.
12. INSTALL NEW TOILET ACCESSORIES THROUGHOUT.
13. REPAIR AND CLEAN ALL EXISTING TERRAZZO
14. REPLACE ALL EXISTING CORRIDOR AND CLASSROOM CEILINGS
15. PROVIDE ENTRY MATS AT ALL EXTERIOR DOORS
16. FULL FITTING AT TOILET ROOM WINDOWS, ALL LEVELS
17. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - EAST CAMPUS

E.1 INFILL EXISTING WINDOW OPENINGS WITH MASONRY TO MATCH EXISTING
E.2 VERTICAL SHAFT FOR DUCTWORK
E.3 TROPHY DISPLAY CASE W/ ADJUSTABLE SHELVES WITH RECESSED LIGHTING
E.4 RAISED FLOOR THIS AREA, CONSTRUCTED WITH LGMF W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.5 NEW LGMF STAIR AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.6 NEW LGMF RAMP, STAIR, AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.7 NEW LGMF RAMP AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.8 PROVIDE MOTORIZED WINDOW SHADES ALL WINDOWS THIS ROOM
E.9 NEW LINTEL AT EXISTING MASONRY WALL. MISC. METALS SCHED. SIZING NEW OPENINGS
E.10 OPERABLE PARTITION WALL W ACOUSTICAL FABRIC FINISH (SEE STRUCTURAL DWGS FOR ADDITIONAL SCOPE)
E.11 OPERABLE PARTITION WALL W/ MIRROR. (SEE STRUCTURAL DWGS FOR SCOPE)
E.12 REPLACE EXISTING CURTAINWALL AND EXTERIOR DOORS WITH NEW FIXED STORE FRONT -GLAZED AND WITH SPANDREL. REFER TO ELEVATIONS
E.13 SPECIALTY MILLWORK. 36" AFF TO 96" AFF THRU-WALL DISPLAY CABINETS WITH ONE SIDE LAMINATED GLASS BUTT-JOINTED, OTHER SIDE WITH FULL VISION MILLWORK DOORS, ADJUSTABLE SHELVING, AND RECESSED LIGHTING
E.14 SIDEWALL VENT
E.15 NEW CLEARSTORY WINDOW
E.16 NEW RAMP WITH CONCRETE TOPPING OVER STYROFOAM FILLER
E.17 NEW RAISED STRUCTURAL FLOORS THIS AREA. REFER TO STRUCT DWGS
E.18 NEW MULTI-STOP TRACTION ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.19 EXISTING STAIR TO BE REMOVATED. MADE CODE COMPLIANT REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.20 NEW STAIR. REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.21 AUTOMATIC DOOR OPERATOR AND CONTROL ON PEDESTAL
E.22 AUTOMATIC DOOR OPERATOR AND CONTROL
E.23 ALUM. STOREFRONT W/ BALLISTIC-RESISTANT GLAZING. INCLUDE TRANSACTION WINDOW
E.24 STAINLESS STEEL GUARDS AND RAILS
E.25 NEW WOOD BENCH, SEAT AND RAILS
E.26 NEW THEATER SEATING REFER TO AUDITORIUM PARTIAL PLAN
E.27 NEW FLOOR IN-FILL. REFER TO STRUCTURAL
E.28 CUT EXISTING MASONRY OPENING TO FLOOR LEVEL. INFILL OPENING WITH HOLLOW METAL FRAME AND FIRELITE GLAZING
E.29 STRUCTURAL SKYLIGHT W/ FIRE RATED GLAZING
E.30 REFURBISH ALL WALLS AND CEILINGS. SAND, PATCH, AND PAINT
E.31 EXISTING STRUCTURAL BEARING MASONRY CHIMNEY STACK W/ MULTI-FLUE TO REMAIN. WRAP WITH NEW PARTITION
E.32 NEW EPDM MEMBRANE OVER EXISTING COVERBOARD AND INSULATION. INFILL NEW INSULATION TO MATCH EXISTING TAPER PROFILE WHERE EXISTING MECHANICAL EQUIPMENT OR OTHER ROOF APPURTENANCES HAS BEEN REMOVED
E.33 CONCRETE FILLED STEEL PAN STAIRS, EXTENSION TO ATTIC LEVEL INCL. LANDING. PROVIDE MTL GRILL "CAGE" WITH LOCKABLE SECURITY DOOR TO LIMIT ACCESS TO ATTIC
E.34 NEW COUNTER-BALANCED RIGGING SYSTEM. REFER TO THEATER NARRATIVE FOR SCOPE
E.35 TILTED FIRE TREATED WOOD FRAME WITH FRAMED TEMPERED GLAZING ON SLIDING TRACK, PAINTED
E.36 USE EXISTING VERTICAL SHAFT FOR DUCTWORK SERVING AUDITORIUM. PROVIDE MISC MTL SUPPORTS AS REQ'D
E.37 NEW WALL-MOUNTED LADDER W CAGE AND CATWALK PLATFORM BELOW CEILING
E.38 PROVIDE NEW WEATHER-TIGHT ENCLOSURE TO CONNECT NEW BRIDGE TO BUILDING
E.39 PROVIDE NEW METAL STAIR AND LANDING TO MEET CODE DIMENSIONAL REQUIREMENTS (MISC MTL)
E.40 INTERIOR COURTYARD - REFER TO LANDSCAPE PLANS FOR DETAILS
E.41 NEW PRIVATE USE-LIMITED ACCESS ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE.
E.42 FIRE ALARM ACTIVATED ROLL DOWN FIRE SHUTTER
E.43 REFER TO ROOM DATA SHEETS FOR CASEWORK AND SINK LAYOUT
E.44 LIGHT WELL ABOVE. STRUCTURAL SKYLIGHT @ 1ST FLOOR FRAMING PLANE
E.45 CONCRETE INFILL AT PLUMBING TRENCHES
E.46 DIAMOND PLATE FLOORING
E.47 FRAMED OPENINGS THRU AUDITORIUM CEILING FOR STAGE LIGHTING RACK. PROVIDE MTL ANGLES AROUND PERIMETER OF OPENING FOR CEILING SUPPORT. TIE-BACK FRAMES TO EXISTING STRUCTURAL GRID
E.48 MTL MESH SECURITY DOOR
E.49 MTL SECURITY MESH AT ENTIRE LENGTH OF CATWALK SIDES; FROM DIAMOND PLATE FLOORING TO UNDERSIDE OF ROOF FRAMING
E.50 NEW ROOF: AIR VAPOR BARRIER, TAPERED RIGID INSULATION, COVERBOARD, AND EPDM MEMBRANE OVER ROOF DECK
E.51 MTL GALVANIZED SECURITY PIPE RAIL GUARD
E.52 NEW TAPERED INSULATION AND AIR VAPOR BARRIER TO MATCH ADJACENT PROFILE. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.53 NEW COVERBOARD AND EPDM MEMBRANE ROOFING
E.54 NEW PACKAGED MECHANICAL PENTHOUSE UNIT OVER SUPPORTING STEEL. REFER TO MECHANICAL AND STRUCTURAL DOCUMENTS FOR SCOPE
E.55 MECHANICAL ROOF-TOP UNIT ON GALVANIZED STEEL DUNNAGE SEE MECHANICAL AND STRUCTURAL DRAWINGS FOR SCOPE
E.56 NEW ROOF: AIR VAPOR BARRIER, TAPERED RIGID INSULATION, COVERBOARD, AND EPDM MEMBRANE OVER TAPERED INSULATION AND AIR VAPOR BARRIER. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.57 PATH OF NEW EPDM MEMBRANE ROOF PADS
E.58 EXISTING ROOFING TO REMAIN
E.59 NEW METAL STAIR, RAILING, AND LANDING. PROCURE WITH ROOF TOP PACKAGED MECHANICAL UNIT
E.60 AREA OF SPANDREL GLASS
E.61 INSTALL SALVAGED CORNICE TO BE PROVIDED BY OWNER, MATCH EXISTING INSTALLATION PROFILE AT SIMILAR ENTRY BAYS
E.62 NEW EXPANSION JOINTS AROUND UNDERSIDE, SIDES AND ROOF OF NEW PEDESTRIAN BRIDGE (TYP.)
E.63 INSTALL NEW MASONRY TO MATCH EXISTING. RECREATE ENTRY BAY MASONRY CONFIGURATION AND PROFILES SIMILAR AT OTHER ENTRY BAYS IN 1922 ADDITION.
E.64 EXISTING ROOF TO REMAIN
E.65 MODIFY MASONRY TO ACCEPT NEW PEDESTRIAN BRIDGE CONFIGURATION. ADD ADDITIONAL NEW BRICK TO MATCH EXISTING TO INFILL AS MAY BE REQUIRED. MAINTAIN MASONRY PROFILES AND CONFIGURATION TO MATCH SIMILAR ENTRY AT KIRK STREET.
E.66 NEW ELEVATOR HEADHOUSE. MASONRY TO MATCH EXISTING OVER NEW CMU BLOCK WALL.
E.67 NEW STOREFRONT SYSTEM WITH BALLISTIC RESISTANT GLAZING INCLUDING AT DOOR LIGHTS
E.68 MODIFY MASONRY TO ALLOW NEW FLASHING AND NEW WEEPHOLES AT RAISED ELEVATION TO ACCOMMODATE NEW HIGHER EXTERIOR ENTRY PLATFORM FINISHED ELEVATION
E.69 PROTECT AND PRESERVE EXISTING HISTORIC CLOCK. ASSESS AND PROVIDE MAINTENANCE ON UNIT REPAIR OR REPLACE ANY MISSING OR BROKEN ELEMENTS. CLEAN UNIT

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4949

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

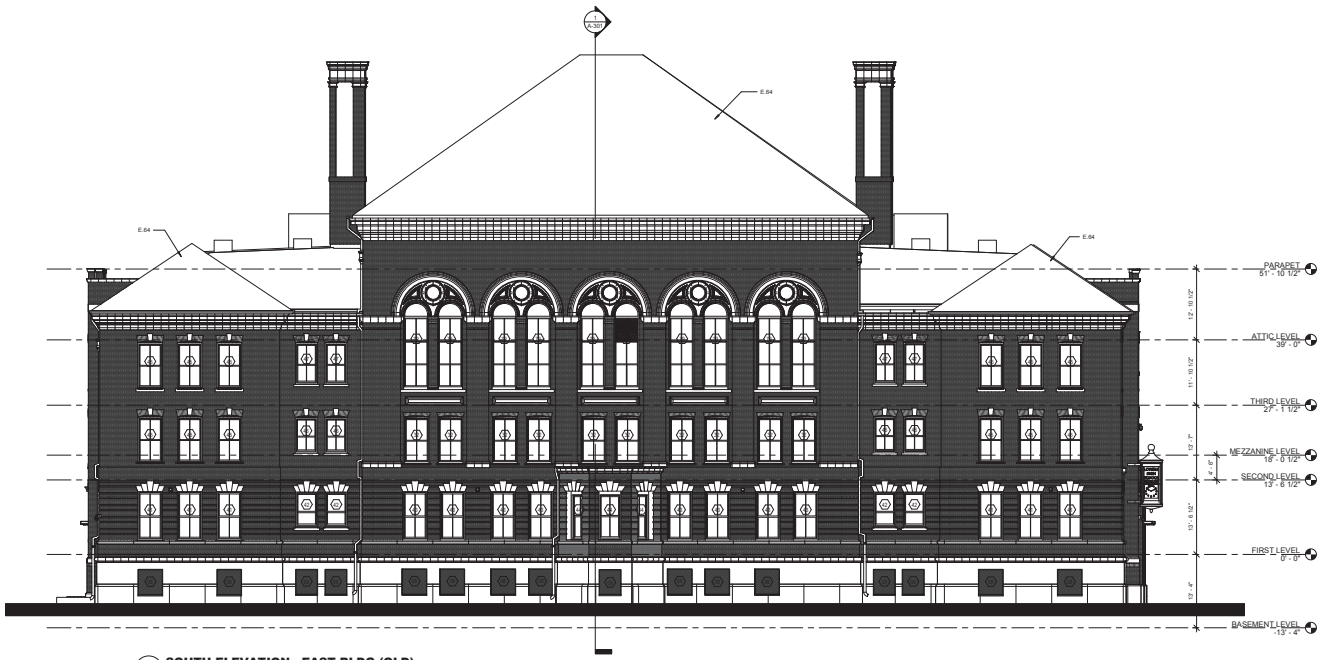
DRAWING TITLE:
EXTERIOR ELEVATIONS - EAST BLDG

SCALE: As indicated

A-202

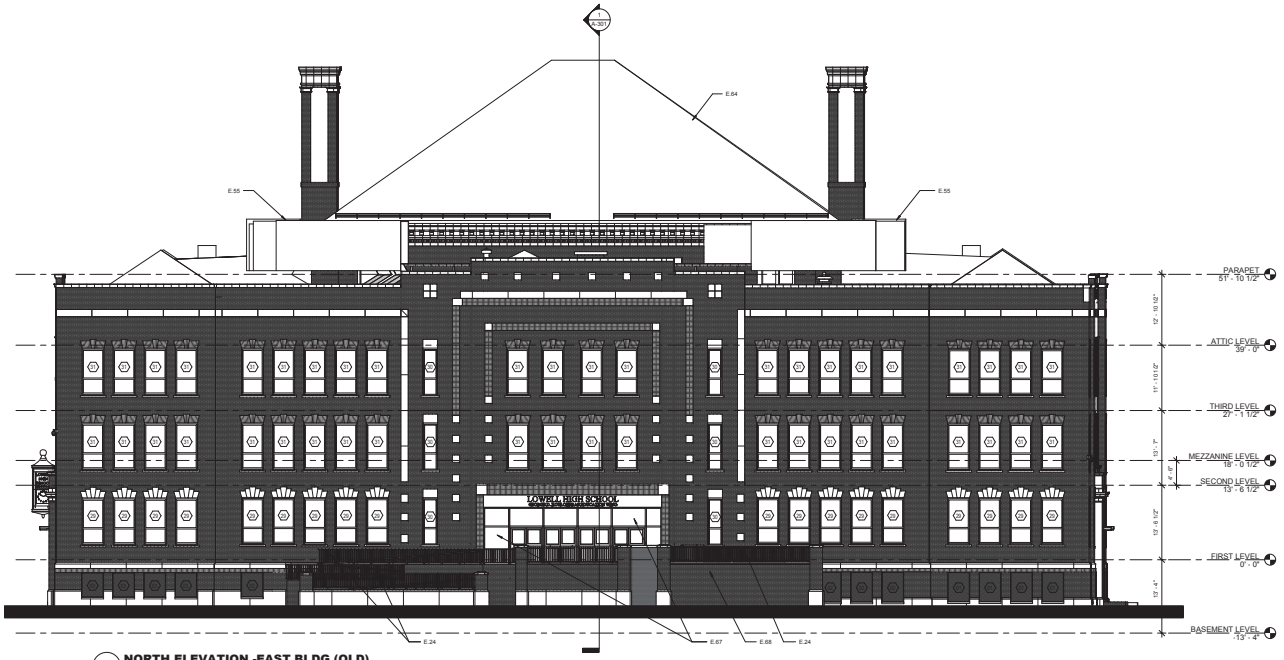
SCHEMATIC DESIGN - ESTIMATE

12/17/2018



2 **SOUTH ELEVATION - EAST BLDG (OLD)**

1/8" = 1'-0"



1 **NORTH ELEVATION -EAST BLDG (OLD)**

1/8" = 1'-0"

EXTERIOR ELEVATION GENERAL NOTES - EAST CAMPUS

1. REPLACE ALL WINDOWS FRAMES AND SASHES AS INDICATED ON ELEVATIONS W ALUMINUM THERMALLY BROKEN WINDOWS W LOW-E GLAZING, INSECT SCREENS AND OPERABLE BOTTOM SASH (AWNING). WINDOW SHALL HAVE HISTORIC PATTERN (FOR MUNTINS AND FRAME PROFILES REFER TO WINDOW TYPE SCHEDULE.)
2. REPLACE ALL EXTERIOR DOORS AND LOCKSETS.
3. REPLACE ALL EXTERIOR CAULKING AND SEALANTS.
4. REPAIR & PAINT EXISTING WOOD TRIM AT 1922 & 1922 BUILDING.
5. REPOINT AND CLEAN ALL EXISTING MASONRY. REMOVE ANY EFFLORESENCE.
6. REPOINT ALL STONE STEPS
7. REPLACE ALL LOUVERS AND MTL HOODS
8. REPAIR TERRA COTTA TRIM. REPLACE WHERE NECESSARY.
9. REPAIR/ REPLACE PRECAST CORNICE.
10. REPAIR/ REPLACE PRE-CAST SILLS
11. REPLACE ALL METAL SECURITY SCREENS IN KIND AT BASEMENT WINDOWS
12. REPLACE BROKEN BRICKS
13. PROVIDE FULL FRITTING AT TOILET ROOM WINDOWS, ALL LEVELS

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- NEW CONSTRUCTION - CMU PARTITION
- INFILL CONCRETE SLAB
- ADDITIONAL TAPERED INSULATION
- RAISED FLOOR W/ LGMF AND TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING

GENERAL NOTES - EAST CAMPUS

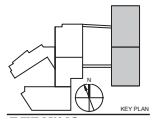
1. SEE ARCHITECTURAL NARRATIVE FOR ADDITIONAL SCOPE INFORMATION.
2. REFER TO LIFE SAFETY PLANS FOR WALL RATINGS
3. REFER TO SHEET A-002 FOR PARTITION TYPES. REFER TO SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
4. APPLY SELF-LEVELING TOPPING IN ALL AREAS OF BASEMENT LEVEL UNLESS OTHERWISE NOTED.
5. AT EXISTING STAIRWAYS TO REMAIN PROVIDE NEW CODE COMPLIANT GALVANIZED GUARDS AND HANDRAILS TO ALL STAIRS UNLESS OTHERWISE NOTED. PROVIDE CONCRETE FILL TO DAMAGED CONCRETE TREADS AND RISERS AS NECESSARY. PROVIDE NEW METAL ANGLE NOSING AT EXISTING STAIRS. PROVIDE RUBBER FINISHED SURFACE ON TREADS, RISERS, AND LANDINGS.
6. UNDER NEW CMU WALLS CUT OUT EXISTING SLAB AND REPLACE WITH NEW THICKENED MAT. REFER TO STRUCTURAL FOR DETAIL.
7. NEW RAMPS AND STAIRS AT BAND AND CHORUS ROOMS TO BE BUILT OF LIGHT-GAUGE MTL FRAMING. COMPLETELY SEAL AND MAKE CAVITY BELOW INACCESSIBLE
8. AT ALL CLASSROOMS ON FLOORS 1-3 WITH EXISTING T&G WOOD FLOORING, REPLACE WITH FIRE-TREATED PLYWOOD UNDERLAYMENT OVER FIRE TREATED SLEEPERS ON THE EXISTING CONCRETE SLAB. PROVIDE A FLOOR ELEVATION MATCHING THE ADJACENT CORRIDOR. READY FOR FLOORING. PREPARE PLYWOOD TO RECEIVE LINOLEUM/ FINISH FLOORING
9. REPLACE ALL DOORS & FRAMES
10. ALL GWB & PLASTER WALLS ARE PAINTED / REPAINTED.
11. PROVIDE ALL DOOR HARDWARE SETS.
12. INSTALL NEW TOILET ACCESSORIES THROUGHOUT.
13. REPAIR AND CLEAN ALL EXISTING TERRAZZO.
14. REPLACE ALL EXISTING CORRIDOR AND CLASSROOM CEILINGS
15. PROVIDE ENTRY MATS AT ALL EXTERIOR DOORS
16. FULL FITTING AT TOILET ROOM WINDOWS, ALL LEVELS
17. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - EAST CAMPUS

E.1 INFILL EXISTING WINDOW OPENINGS WITH MASONRY TO MATCH EXISTING
E.2 VERTICAL SHAFT FOR DUCTWORK.
E.3 TROPHY DISPLAY CASE W/ ADJUSTABLE SHELVES WITH RECESSED LIGHTING
E.4 RAISED FLOOR THIS AREA, CONSTRUCTED WITH LGMF W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.5 NEW LGMF STAIR AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.6 NEW LGMF RAMP, STAIR, AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.7 NEW LGMF RAMP AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.8 PROVIDE MOTORIZED WINDOW SHADES ALL WINDOWS THIS ROOM
E.9 NEW OPENING AT EXISTING MASONRY WALL. MISC. METALS LINTEL ABOVE NEW OPENINGS
E.10 OPERABLE PARTITION WALL W/ ACOUSTICAL FABRIC FINISH (SEE STRUCTURAL DWGS FOR ADDITIONAL SCOPE)
E.11 OPERABLE PARTITION WALL W/ MIRROR (SEE STRUCTURAL DWGS FOR SCOPE)
E.12 REPLACE EXISTING CURTAINWALL AND EXTERIOR DOORS WITH NEW FIXED STORE FRONT -GLAZED AND WITH SPANDREL. REFER TO ELEVATIONS
E.13 SPECIALTY DOOR ASSEMBLY. 96" A/F TO 96" A/F THRU-WALL DISPLAY CASE WITH ONE SIDE LAMINATED GLASS BUTT-JOINTED, OTHER SIDE WITH FULL VISION MILLWORK DOORS, ADJUSTABLE SHELVING, AND RECESSED LIGHTING
E.14 SIDEWALL VENT
E.15 NEW CLEARSTORY WINDOW
E.16 NEW RAMP WITH CONCRETE TOPPING OVER STYROFOAM FILLER
E.17 NEW RAISED STRUCTURAL FLOORS THIS AREA. REFER TO STRUCT DWGS
E.18 NEW MULTI-STOP TRACTION ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.19 EXISTING STAIR TO BE RENOVATED, MADE CODE COMPLIANT REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.20 NEW STAIR. REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.21 AUTOMATIC DOOR OPERATOR AND CONTROL ON PEDESTAL
E.22 AUTOMATIC DOOR OPERATOR AND CONTROL
E.23 ALUM. STOREFRONT W/ BALLISTIC-RESISTANT GLAZING. INCLUDE TRANSACTION WINDOW
E.24 STAINLESS STEEL GUARD AND RAILS
E.25 GALVANIZED GUARD AND RAILS
E.26 NEW THEATER SEATING REFER TO AUDITORIUM PARTIAL PLAN
E.27 NEW FLOOR IN FILL. REFER TO STRUCTURAL
E.28 CUT EXISTING MASONRY OPENING TO FLOOR LEVEL. INFILL OPENING WITH HOLLOW METAL FRAME AND FIRELITE GLAZING
E.29 STRUCTURAL SKYLIGHT W/ FIRE RATED GLAZING
E.30 REFURBISH ALL WALLS AND CEILINGS, SAND, PATCH, AND PAINT
E.31 EXISTING STRUCTURAL BEARING MASONRY CHIMNEY STACK W MILLY FLUE TO REMAIN. WRAP WITH NEW PARTITION
E.32 NEW EPDM MEMBRANE OVER EXISTING COVERBOARD AND INSULATION. NEW FLASHING TO MATCH EXISTING TAPER PROFILE. ALL EQUIPMENT TO BE REMOVED BY OTHERS. ALL APPURTENANCES HAS BEEN REMOVED
E.33 CONCRETE FILLED STEEL PAN STAIRS, EXTENSION TO ATTIC LEVEL INCL. LANDING. PROVIDE MTL GRILL "CAGE" WITH LOCKABLE SECURITY DOOR TO LIMIT ACCESS TO ATTIC
E.34 NEW COUNTER-BALANCED RIGGING SYSTEM. REFER TO THEATER NARRATIVE FOR SCOPE
E.35 TILTED FIRE TREATED WOOD FRAME WITH FRAMED TEMPERED GLAZING ON SLIDING TRACK, PAINTED.
E.36 USE EXISTING VERTICAL SHAFT FOR DUCTWORK SERVING AUDITORIUM. PROVIDE MISC. MTL SUPPORTS AS REQ'D
E.37 NEW WALL-MOUNTED LADDER W/ CAGE AND CATWALK PLATFORM BELOW CEILING
E.38 PROVIDE NEW WEATHER-TIGHT ENCLOSURE TO CONNECT NEW BRIDGE TO BUILDING
E.39 PROVIDE NEW METAL STAIR AND LANDING TO MEET CODE DIMENSIONAL REQUIREMENTS (MISC MTL)
E.40 INTERIOR COURTYARD. REFER TO LANDSCAPE PLANS FOR DETAILS
E.41 NEW LIMITED USE-LIMITED ACCESS ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.42 FIRE ALARM ACTIVATED ROLL DOWN FIRE SHUTTER
E.43 REFER TO ROOM DATA SHEETS FOR CASEWORK AND SINK LAYOUT
E.44 LIGHT WELL ABOVE. STRUCTURAL SKYLIGHT @ 1ST FLOOR FRAMING PLANE
E.45 CONCRETE INFILL AT PLUMBING TRENCHES
E.46 DIAMOND PLATE FLOORING
E.47 FINISHED SOFFIT/ CEILING AUDITORIUM CEILING FOR STAGE LIGHTING RACK. PROVIDE MTL ANGLES AROUND PERIMETER OF OPENING FOR CEILING SUPPORT. TIE-BACK FRAMES TO EXISTING STRUCTURAL GRID
E.48 MTL MESH SECURITY DOOR
E.49 MTL SECURITY MESH AT ENTIRE LENGTH OF CATWALK SIDES, FROM DIAMOND PLATE FLOORING TO UNDERSIDE OF ROOF FRAMING
E.50 NEW ROOF, AIR/ VAPOR BARRIER, TAPERED RIGID INSULATION, COVERBOARD, AND EPDM MEMBRANE OVER ROOF DECK
E.51 MTL GALVANIZED SECURITY PIPE RAIL GUARD
E.52 NEW TAPERED INSULATION AND AIR VAPOR BARRIER TO MATCH ADJACENT PROFILE. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.53 NEW COVERBOARD AND EPDM MEMBRANE ROOFING
E.54 NEW PACKAGED MECHANICAL PENTHOUSE UNIT OVER SUPPORTING STEEL. REFER TO MECHANICAL AND STRUCTURAL DOCUMENTS FOR SCOPE
E.55 MECHANICAL ROOF-TOP UNIT ON GALVANIZED STEEL DUNNAGE SEE MECHANICAL AND STRUCTURAL DRAWINGS FOR SCOPE
E.56 STEEL FRAMED, GLAZED INFILL ROOF MONITOR OVER LIGHT WELLS. PROVIDE STRUCTURAL ROOF DECK WITH TAPERED INSULATION AND AIR VAPOR BARRIER. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.57 PATH OF NEW EPDM MEMBRANE ROOF PADS
E.58 EXISTING ROOFING TO REMAIN
E.59 NEW METAL STAIR, RAILING, AND LANDING. PROCURE WITH ROOF TOP PACKAGED MECHANICAL UNIT
E.60 AREA OF SKYLIGHT OPENING
E.61 NEW GLAZED STOREFRONT SYSTEM TO BE PROVIDED BY OWNER. MATCH EXISTING INSTALLATION PROFILE AT SIMILAR ENTRY BAYS
E.62 NEW EXPANSION JOINTS AROUND UNDERSIDE, SIDES AND ROOF OF NEW PEDESTRIAN BRIDGE (TYP.)
E.63 INSTALL NEW MASONRY TO MATCH EXISTING. RECREATE ENTRY BAY MASONRY CONFIGURATION AND PROFILES SIMILAR AT OTHER ENTRY WAYS IN 1922 ADDITION.
E.64 EXISTING ROOF TO REMAIN
E.65 MODIFY MASONRY TO ACCEPT NEW PEDESTRIAN BRIDGE CONFIGURATION. ADD ADDITIONAL NEW BRICK TO MATCH EXISTING TO INFILL AS MAY BE REQUIRED. MAINTAIN MASONRY PROFILES AND CONFIGURATION TO MATCH SIMILAR ENTRY AT KIRK STREET.
E.66 NEW ELEVATOR HEADHOUSE. MASONRY TO MATCH EXISTING OVER NEW CMU BLOCK WALL
E.67 NEW STOREFRONT SYSTEM WITH BALISTIC RESISTANT GLAZING INCLUDING AT DOOR LIGHTS
E.68 MODIFY MASONRY TO ALLOW NEW FLASHING AND NEW WEEPHOLES AT RAISED ELEVATION TO ACCOMMODATE NEW HIGHER EXTERIOR ENTRY PLATFORM/ FINISHED ELEVATION
E.69 PROTECT AND PRESERVE EXISTING HISTORIC CLOCK. ASSESS AND PROVIDE MAINTENANCE ON UNIT REPAIR OR REPLACE ANY MISSING OR BROKEN ELEMENTS. CLEAN UNIT

NO.	DATE	ISSUE

SEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4949

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope orsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - EAST BLDG

SCALE: As indicated

A-203

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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EXTERIOR ELEVATION GENERAL NOTES - EAST CAMPUS

1. REPLACE ALL WINDOWS FRAMES AND SASHES AS INDICATED ON ELEVATIONS W ALUMINUM THERMALLY BROKEN WINDOWS W/ LOW-GLAZING, INSECT SCREENS AND OPERABLE BOTTOM SASH (AWNING), WINDOW SHALL HAVE HISTORIC PATTERN (FOR MUNTINS AND FRAME PROFILES REFER TO WINDOW TYPE SCHEDULE)
2. REPLACE ALL EXTERIOR DOORS AND LOCKSETS.
3. REPLACE ALL EXTERIOR CAULKING AND SEALANTS.
4. REPAIR & PAINT EXISTING WOOD TRIM AT 1922 & 1922 BUILDING.
5. REPOINT AND REPAIR ALL EXISTING MASONRY. REMOVE ANY EFFLORESCENCE/SALTS
6. REPOINT ALL STONE STEPS
7. REPLACE ALL LOUVERS AND MTL HOODS.
8. REPAIR TERRA COTTA TRIM. REPLACE WHERE NECESSARY.
9. REPAIR REPLACE PRECAST CORNICE.
10. REPAIR/ REPLACE PRE-CAST SILLS
11. REPLACE ALL METAL SECURITY SCREENS IN KIND AT BASEMENT WINDOWS
12. REPLACE BROKEN BRICKS
13. PROVIDE FULL FRITTING AT TOILET ROOM WINDOWS, ALL LEVELS

LEGEND

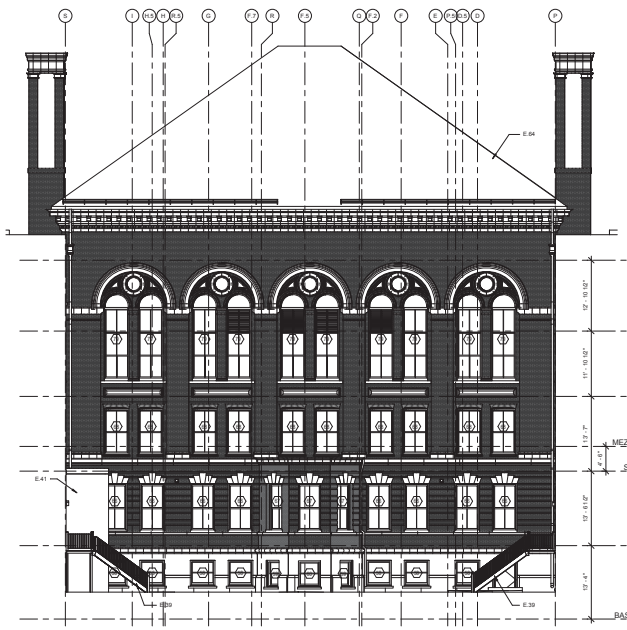
- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- NEW CONSTRUCTION - CMU PARTITION
- INFILL CONCRETE SLAB
- ADDITIONAL TAPERED INSULATION
- RAISED FLOOR W LGMF AND TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING

GENERAL NOTES - EAST CAMPUS

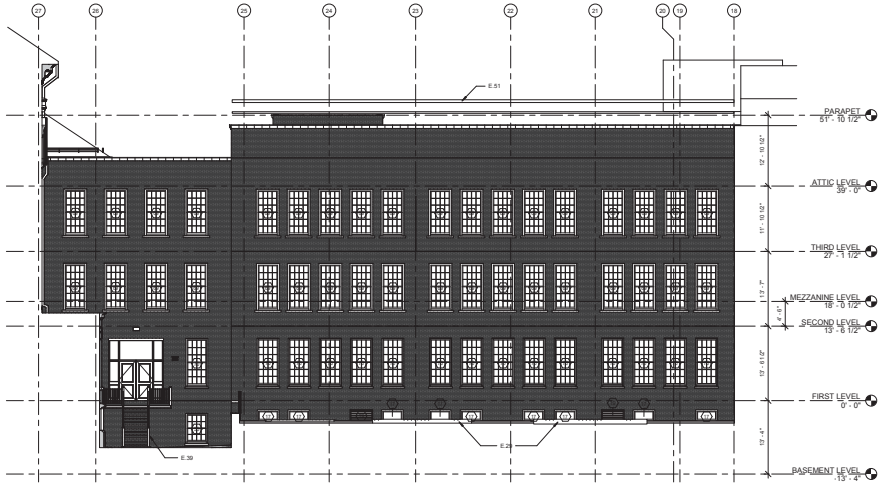
1. SEE ARCHITECTURAL NARRATIVE FOR ADDITIONAL SCOPE INFORMATION.
2. REFER TO LIFE SAFETY PLANS FOR WALL RATINGS
3. REFER TO SHEET A-202 FOR PARTITION TYPES. REFER TO SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
4. APPLY SELF-LEVELING TOPPING IN ALL AREAS OF BASEMENT LEVEL UNLESS OTHERWISE NOTED.
5. AT EXISTING STAIRWAYS TO REMAIN PROVIDE NEW CODE COMPLIANT GALVANIZED GUARDS AND HANDRAILS TO ALL STAIRS UNLESS OTHERWISE NOTED. PROVIDE CONCRETE FILL TO DAMAGED CONCRETE TREADS AND RISERS AS NECESSARY. PROVIDE NEW METAL ANGLE NOSING AT EXISTING STAIRS. PROVIDE RUBBER FINISHED SURFACE ON TREADS, RISERS, AND LANDINGS.
6. REMOVE NEW CMU WALLS CUT OUT EXISTING SLAB AND REPLACE WITH NEW THICKENED SAT. REFER TO STRUCTURAL FOR DETAIL.
7. NEW RAMPS AND STAIRS AT BAND AND CHORUS ROOMS TO BE BUILT OF LIGHT-GAUGE MTL FRAMING. COMPLETELY SEAL AND MARE CAVITY BELOW INACCESSIBLE.
8. AT ALL CLASSROOMS ON FLOORS 1-3 WITH EXISTING T&G WOOD FLOORING, REPLACE WITH FIRE-TREATED PLYWOOD UNDERLAYMENT OVER FIRE TREATED SUBFRPR ON THE EXISTING STRUCTURAL DECK TO AN ELEVATION MATCHING THE ADJACENT CORRIDOR TERRAZZO FLOORING. PREPARE PLYWOOD TO RECEIVE LINOLEUM FINISH FLOORING
9. REPLACE ALL DOORS & FRAMES.
10. ALL GWB & PLASTER WALLS ARE PAINTED / REPAINTED.
11. PROVIDE ALL DOOR HARDWARE SETS.
12. INSTALL NEW TOILET ACCESSORIES THROUGHOUT.
13. REPAIR AND CLEAN ALL EXISTING TERRAZZO
14. REPLACE ALL EXISTING CORRIDOR AND CLASSROOM CEILINGS
15. PROVIDE ENTRY MATS AT ALL EXTERIOR DOORS
16. FULL FITTING AT TOILET ROOM WINDOWS, ALL LEVELS
17. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - EAST CAMPUS

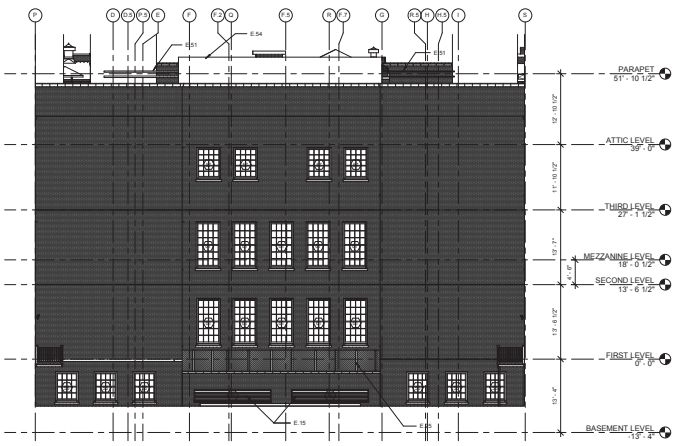
E.1 INFILL EXISTING WINDOW OPENINGS WITH MASONRY TO MATCH EXISTING
E.2 VERTICAL SHAFT FOR DUCTWORK.
E.3 TROPHY DISPLAY CASE W/ ADJUSTABLE SHELVES WITH RECESSED LIGHTING
E.4 RAISED FLOOR THIS AREA, CONSTRUCTED WITH LGMF W TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.5 NEW LGMF STAIR AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.6 NEW LGMF RAMP, STAIR, AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.7 NEW LGMF RAMP AND LANDING W/ TWO LAYERS OF FIRE RATED PLYWOOD SUBFLOORING
E.8 PROVIDE MOTORIZED WINDOW SHADES ALL WINDOWS THIS ROOM
E.9 NEW OPENING AT EXISTING MASONRY WALL. MISC. METALS LINTEL ABOVE NEW OPENINGS
E.10 OPERABLE PARTITION WALL W/ ACOUSTICAL FABRIC FINISH (SEE STRUCTURAL DWGS FOR ADDITIONAL SCOPE)
E.11 NEW FULL HEIGHT MIRROR WALL W/ MIRROR (SEE STRUCTURAL DWGS FOR SCOPE)
E.12 REPLACE EXISTING CURTAINWALL AND EXTERIOR DOORS WITH NEW FIXED STORE FRONT , GLAZED AND WITH SPANDREL. REFER TO ELEVATIONS
E.13 SPECIALTY MILLWORK: 36" AFF TO 96" AFF THRU-WALL DISPLAY CABINETS WITH ONE SIDE LAMINATED GLASS BUTT-JOINTED, OTHER SIDE WITH FULL VISION MILLWORK DOORS, ADJUSTABLE SHELVING, AND RECESSED LIGHTING
E.14 SIDEWALL VENT
E.15 NEW CLEARSTORY WINDOW
E.16 NEW RAMP WITH CONCRETE TOPPING OVER STYROFOAM FILLER
E.17 NEW RAISED STRUCTURAL FLOORS THIS AREA. REFER TO STRUCT DWGS
E.18 NEW MULTI-STOP TRACTION ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.19 EXISTING STAIR TO BE RENOVATED, MADE CODE COMPLIANT REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.20 NEW STAIR. REFER TO ARCH. NARRATIVE FOR COMPLETE SCOPE
E.21 AUTOMATIC DOOR OPERATOR AND CONTROL ON PEDESTAL
E.22 AUTOMATIC DOOR OPERATOR AND CONTROL
E.23 ALUM. STOREFRONT W/ BALLISTIC-RESISTANT GLAZING. INCLUDE TRANSACTION WINDOW
E.24 STAINLESS STEEL GUARD AND RAILS
E.25 GALVANIZED GUARD AND RAILS
E.26 NEW THEATER SEATING REFER TO AUDITORIUM PARTIAL PLAN
E.27 NEW FLOOR IN INFILL. REFER TO STRUCTURAL
E.28 CUT EXISTING MASONRY OPENING TO FLOOR LEVEL. INFILL OPENING WITH HOLLOW METAL FRAME AND FIRE-LITE GLAZING
E.29 NEW CONCRETE FILLED STEEL PAN STAIRS, EXTENSION
E.30 REFURBISH ALL WALLS AND CEILINGS: SAND, PATCH, AND PAINT
E.31 EXISTING STRUCTURAL BEARING MASONRY CHIMNEY STACK W/ MULTI-FLUE TO REMAIN. WRAP WITH NEW PARTITION
E.32 NEW EPDM MEMBRANE OVER EXISTING COVERBOARD AND INSULATION. INFILL NEW INSULATION TO MATCH EXISTING TAPER PROFILE WHERE EXISTING MECHANICAL EQUIPMENT OR OTHER ROOF APPURTENANCES HAS BEEN REMOVED
E.33 CONCRETE FILLED STEEL PAN STAIRS, EXTENSION TO ATTIC LEVEL INCL. LANDING. PROVIDE MTL GRILL "CAGE" WITH LOCKABLE SECURITY DOOR TO LIMIT ACCESS TO ATTIC
E.34 NEW COUNTER-BALANCED RIGGING SYSTEM. REFER TO THEATER NARRATIVE FOR SCOPE
E.35 TILTED FIRE TREATED WOOD FRAME WITH FRAMED TEMPERED GLAZING ON SLIDING TRACK, PAINTED
E.36 USE EXISTING VERTICAL SHAFT FOR DUCTWORK SERVING AUDITORIUM. PROVIDE MISC. MTL SUPPORTS AS REQ'D
E.37 NEW WALL-MOUNTED LADDER W/ CAGE AND CATWALK PLATFORM BELOW CEILING
E.38 PROVIDE NEW WEATHER-TIGHT ENCLOSURE TO CONNECT NEW BRIDGE TO BUILDING
E.39 PROVIDE NEW METAL STAIR AND LANDING TO MEET CODE DIMENSIONAL REQUIREMENTS (MISC MTL)
E.40 INTERIOR COURTYARD. REFER TO LANDSCAPE PLANS FOR DETAILS
E.41 NEW LIMITED USE-LIMITED ACCESS ELEVATOR. REFER TO ELEVATOR SCHEDULE IN ARCHITECTURAL NARRATIVE
E.42 FIRE ALARM ACTIVATED ROLL DOWN FIRE SHUTTER
E.43 REFER TO ROOM DATA SHEETS FOR CASEWORK AND SINK SCHEDULE
E.44 LIGHT WELL ABOVE. STRUCTURAL SKYLIGHT @11'-0" FLOOR FRAMING PLANS
E.45 CONCRETE INFILL AT PLUMBING TRENCHES
E.46 DIAMOND PLATE FLOORING
E.47 FRAMED OPENINGS THRU AUDITORIUM CEILING FOR STAGE LIGHTING RACK. PROVIDE MTL ANGLES AROUND PERIMETER OF OPENING FOR CEILING SUPPORT. TIE-BACK FRAMES TO EXISTING STRUCTURAL GRID
E.48 MTL MESH SECURITY DOOR
E.49 MTL SECURITY MESH AT ENTIRE LENGTH OF CATWALK SIDES. FROM DIAMOND PLATE FLOORING TO UNDERSIDE OF ROOF FRAMING
E.50 NEW ROOF, AIR VAPOR BARRIER, TAPERED RIGID INSULATION, COVERBOARD, AND EPDM MEMBRANE OVER ROOF DECK
E.51 MTL GALVANIZED SECURITY PIPE RAIL GUARD
E.52 NEW TAPERED INSULATION AND AIR VAPOR BARRIER TO MATCH ADJACENT PROFILE. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.53 NEW COVERBOARD AND EPDM MEMBRANE ROOFING
E.54 NEW PACKAGED MECHANICAL PENTHOUSE UNIT OVER SUPPORTING STEEL. REFER TO MECHANICAL AND STRUCTURAL DOCUMENTS FOR SCOPE
E.55 MECHANICAL ROOF-TOP UNIT ON GALVANIZED STEEL DUNNAGE SEE MECHANICAL AND STRUCTURAL DRAWINGS FOR SCOPE
E.56 STEEL FRAMED, GLAZED INFILL ROOF MONITOR OVER LIGHT WELLS. PROVIDE STRUCTURAL ROOF DECK WITH TAPERED INSULATION AND AIR VAPOR BARRIER. PROVIDE NEW COVERBOARD, AND EPDM ROOF MEMBRANE THIS AREA AS PER NOTE E53
E.57 REPLACE WITH NEW EPDM MEMBRANE ROOF PADS
E.58 EXISTING ROOFING TO REMAIN
E.59 NEW METAL STAIR, RAILING, AND LANDING. PROCURE WITH ROOF TOP PACKAGED MECHANICAL UNIT
E.60 AREA OF SPANDREL GLASS
E.61 INSTALL GALVAGED CORNICE TO BE PROVIDED BY OWNER. MATCH EXISTING INSTALLATION PROFILE AT SIMILAR ENTRY BAYS
E.62 NEW EXPANSION JOINTS AROUND UNDERSIDE, SIDES AND ROOF OF NEW PEDESTRIAN BRIDGE (TYP.)
E.63 INSTALL NEW MASONRY TO MATCH EXISTING. RECREATE ENTRY BAY MASONRY CONFIGURATION AND PROFILES SIMILAR AT OTHER ENTRY BAYS IN 1922 ADDITION.
E.64 EXISTING ROOF TO REMAIN
E.65 MODIFY MASONRY TO ACCEPT NEW PEDESTRIAN BRIDGE CONFIGURATION. ADD ADDITIONAL NEW BRICK TO MATCH EXISTING TO INFILL AS MAY BE REQUIRED. MAINTAIN MASONRY PROFILES AND CONFIGURATION TO MATCH SIMILAR ENTRY AT KIRK STREET.
E.66 NEW ELEVATOR HEADHOUSE. MASONRY TO MATCH EXISTING OVER NEW CMU BLOCK WALL.
E.67 NEW STOREFRONT SYSTEM WITH BALLISTIC RESISTANT GLAZING INCLUDING AT DOOR LIGHTS
E.68 MODIFY MASONRY TO ALLOW NEW FLASHING AND NEW WEEPHOLES AT RAISED ELEVATION TO ACCOMMODATE NEW HIGHER EXTERIOR ENTRY PLATFORM FINISHED ELEVATION
E.69 PROTECT AND PRESERVE EXISTING HISTORIC CLOCK. ASSESS AND PROVIDE MAINTENANCE ON UNIT REPAIR OR REPLACE ANY MISSING OR BROKEN ELEMENTS. CLEAN UNIT



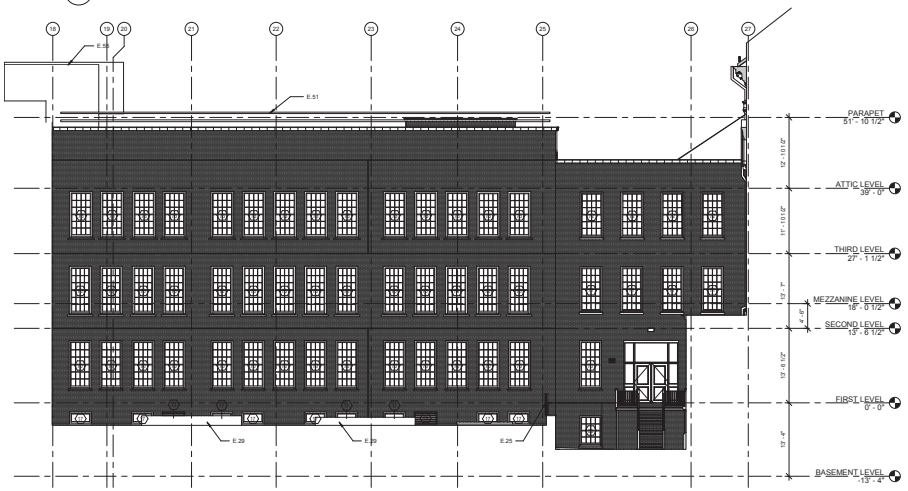
3 **SOUTH ELEVATION - EAST BLDG - COURTYARD**
1/8" = 1'-0"



4 **WEST ELEVATION - EAST BLDG - COURTYARD**
1/8" = 1'-0"



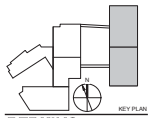
1 **NORTH ELEVATION - EAST BLDG- COURTYARD**
1/8" = 1'-0"



2 **EAST ELEVATION - EAST BLDG - COURTYARD**
1/8" = 1'-0"

NO.	DATE	ISSUE

SEAL



KEY PLAN

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20 Ashburton Place, Floor 8
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T. +1 617 449 4000
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Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverso Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope orsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollaton, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - EAST BLDG

SCALE: As indicated

A-204

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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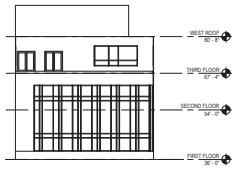

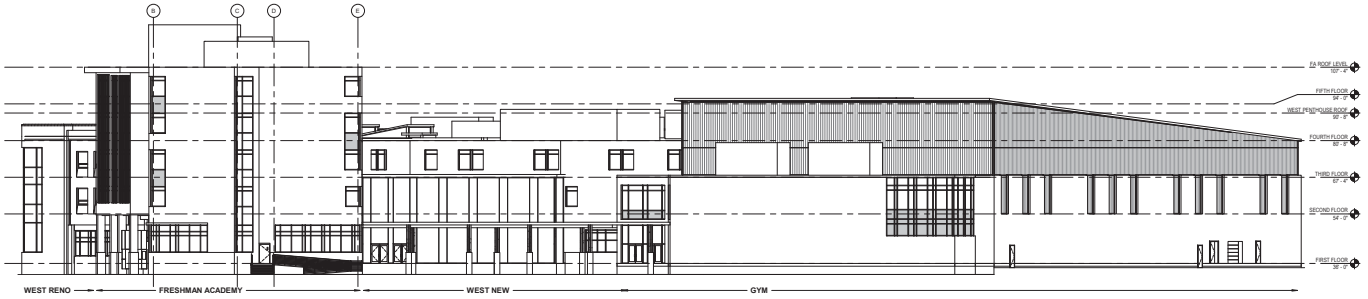

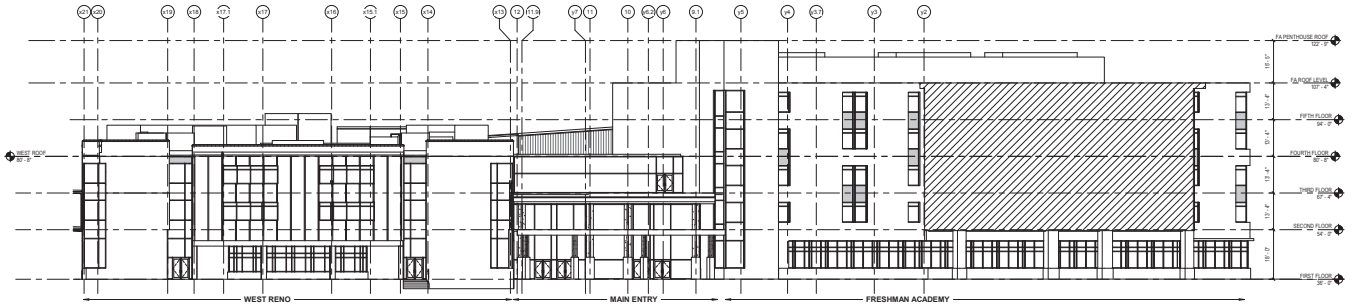

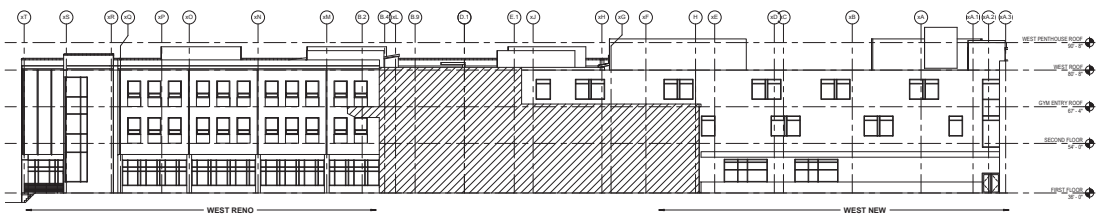

④ **WEST BLDG - SOUTH ELEVATION**

1/16" = 1'-0"

⑤ **FRESHMAN ACADEMY & GYMNASIUM - WEST ELEVATION**

1/16" = 1'-0"

③ **WEST BLDG & MAIN ENTRY - NORTH ELEVATION**

1/16" = 1'-0"

② **WEST BLDG - WEST ELEVATION**

1/16" = 1'-0"

① **WEST BLDG & GYM - EAST ELEVATION**

1/16" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
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Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

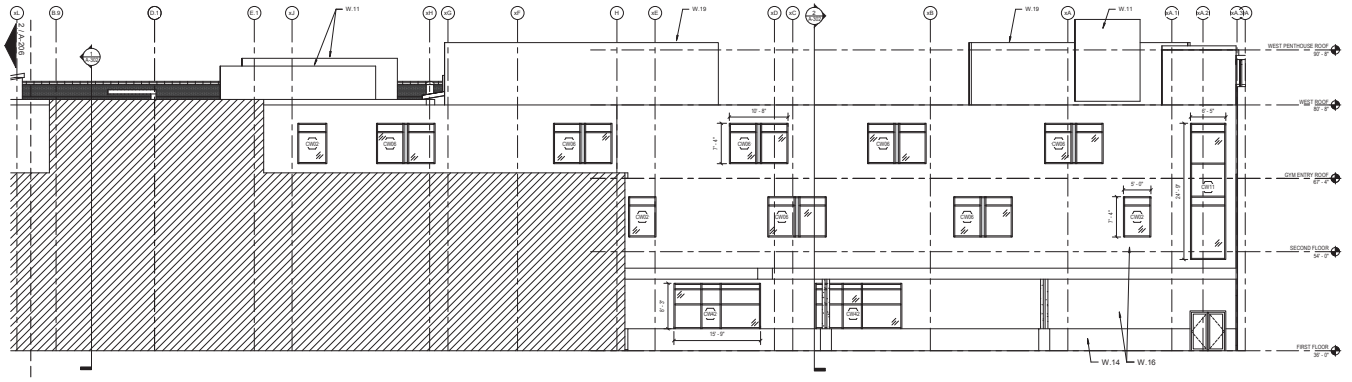
DRAWING TITLE:
EXTERIOR ELEVATIONS - OVERALL WEST BLDG

SCALE: 1/16" = 1'-0"

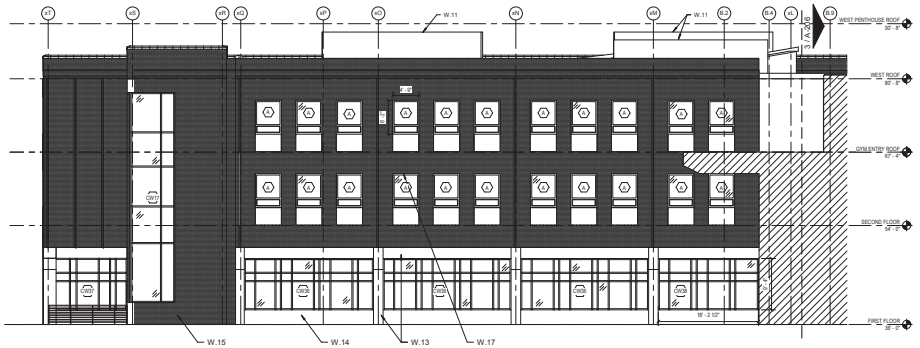
A-205

SCHEMATIC DESIGN - ESTIMATE

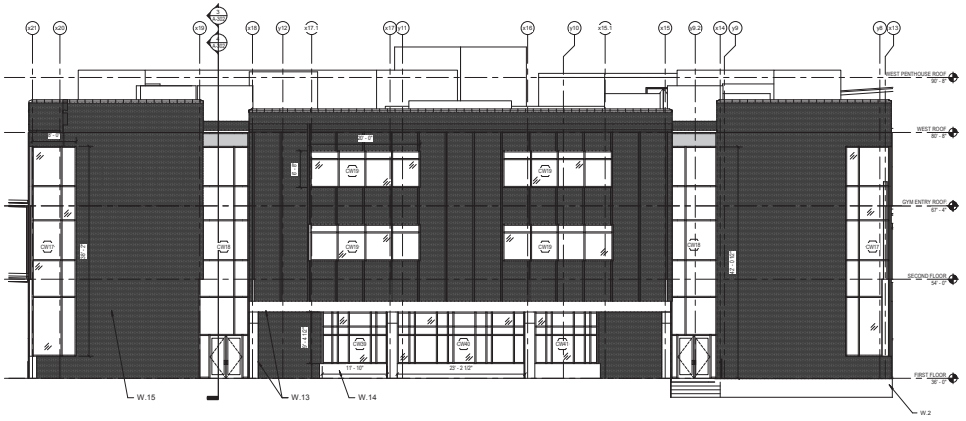
12/17/2018



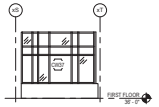
3 **WEST BLDG - WEST ELEVATION - PART D**
1/8" = 1'-0"



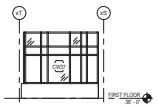
2 **WEST BLDG - WEST ELEVATION - PART C**
1/8" = 1'-0"



1 **WEST BLDG - NORTH ELEVATION**
1/8" = 1'-0"



4 **WEST BLDG - NORTH ELEVATION A**
1/8" = 1'-0"



5 **WEST BLDG - NORTH ELEVATION B**
1/8" = 1'-0"

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. OPTIONAL PREFABRICATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSESTS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS, REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF., MTL PANEL ABOVE @ COLUMN & SOFFIT. TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERN.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL. TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN
W.20 CONNECT TROLLEY CABLES @ UNDERSIDE OF BRIDGE. COORDINATE W/ TROLLEY OPERATOR.
W.21 KALWALL TRANSLUCENT PANELS. SEE 3D REPRESENTATIONS FOR PATTERN.
W.22 KALWALL CLEAR PANELS. SEE 3D REPRESENTATIONS FOR PATTERN.
W.23 RECESSED SLAB FOR LONG & TRIPLE JUMP PITS
W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS, SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN

NO.	DATE	ISSUE

SEAL

KEY PLAN

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Boston, MA 02108
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F: +1 617 449 4049

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Construction Manager Address

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2 Center Plaza Suite 430 Boston, MA 02108

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Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - WEST BLDG

SCALE: As indicated

A-206

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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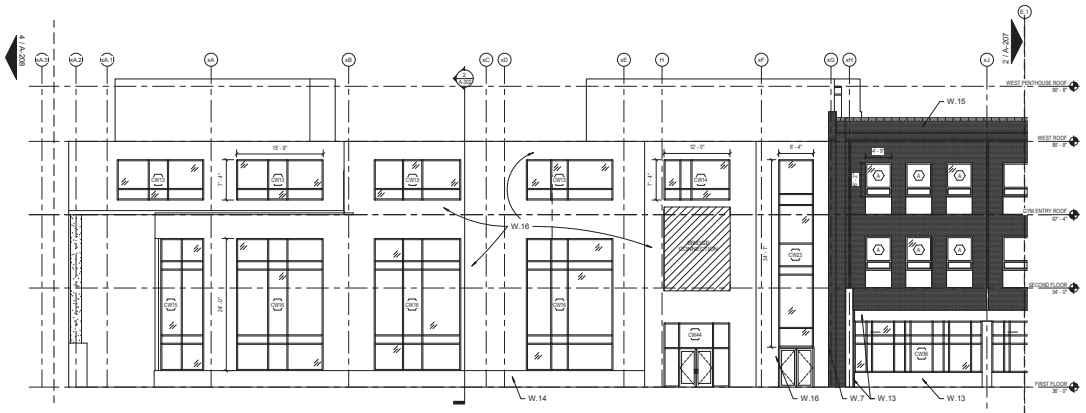
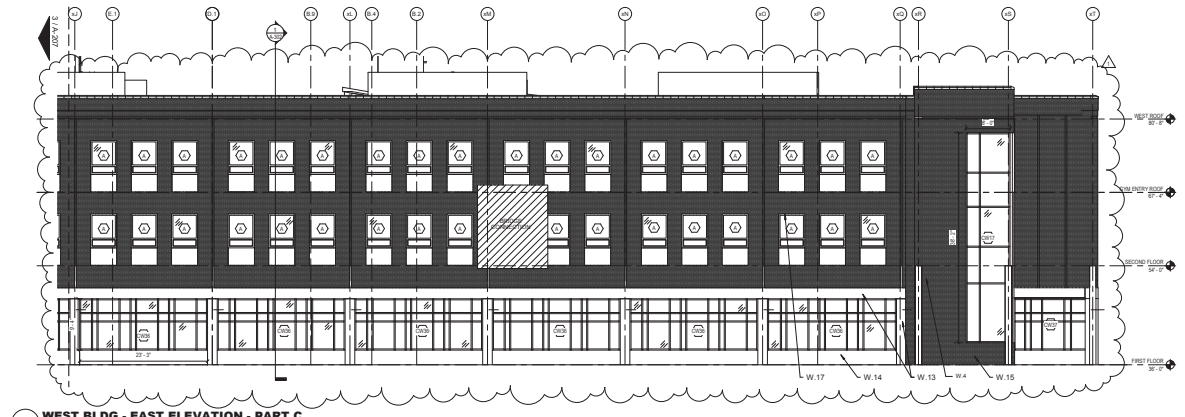
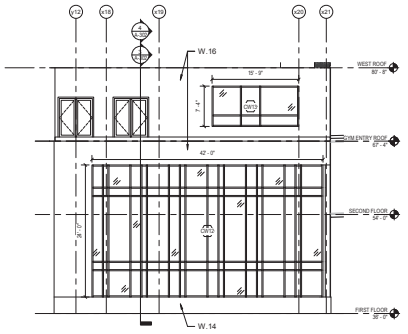


3 **WEST BLDG - EAST ELEVATION - PART D**
1/8" = 1'-0"



2 **WEST BLDG - EAST ELEVATION - PART C**
1/8" = 1'-0"



1 **WEST BLDG - SOUTH ELEVATION**
1/8" = 1'-0"

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GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW IN, UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE SHEET A-001 FOR PARTITION TYPES LEGEND.
4. SEE SHEET A-003 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS, REPLACE DAMAGED CONCRETE PAN. SEE NARATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH.DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT. TYP
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
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W.19 MECHANICAL EQUIPMENT SCREEN
W.20 CONNECT TROLLEY CABLES @ UNDERSIDE OF BRIDGE. COORDINATE W/ TROLLEY OPERATOR.
W.21 HORIZONTAL TRANSLUCENT PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.22 RAILWALL CLEAR PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.23 2" RECESSED SLAB FOR LONG & TRIPLE JUMP PITS
W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS. SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN

NO.	DATE	ISSUE
1	12/28/18	SD Estimating - Revision 1

SEAL

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Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - WEST BLDG

SCALE: As indicated

A-207

SCHEMATIC DESIGN - ESTIMATE

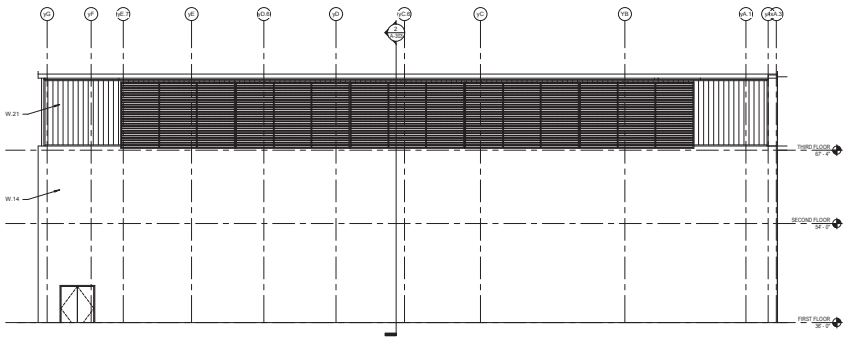
12/17/2018

GENERAL NOTES - WEST CAMPUS

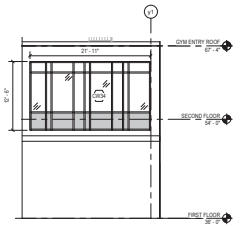
1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REMOVE ETR CONDUIT.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSESTS.

NOTES - WEST CAMPUS

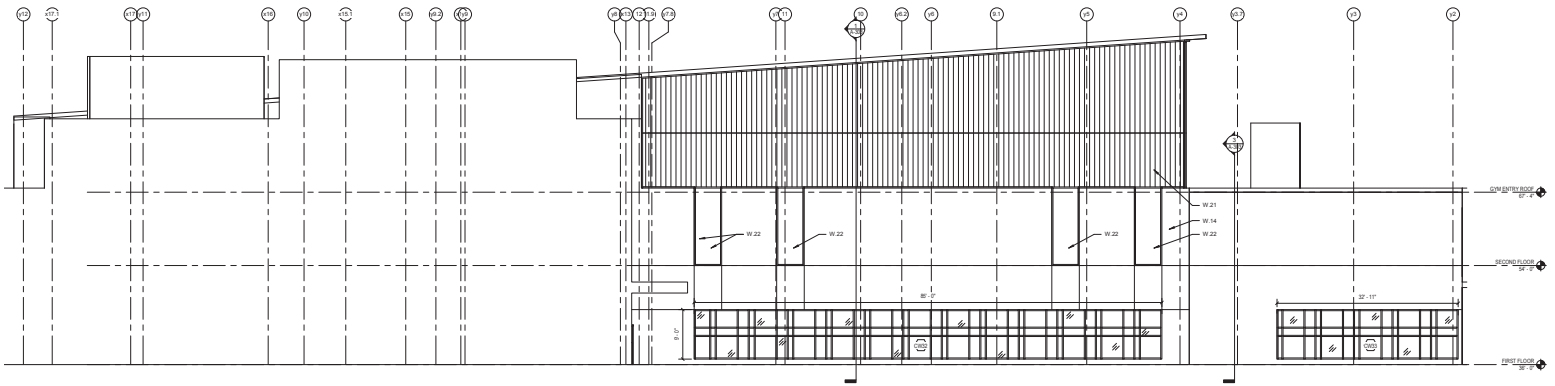
W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT. TYP
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL. TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN
W.20 CONNECT TROLLEY CABLES @ UNDERSIDE OF BRIDGE. COORDINATE W/ TROLLEY OPERATOR.
W.21 METAL TRANSLUCENT PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.22 KALWALL CLEAR PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.23 2" RECESSED SLAB FOR LONG & TRIPLE JUMP PITS
W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS. SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN



4 **GYM - EAST ELEVATION**
1/8" = 1'-0"



3 **GYM - NORTH ELEVATION**
1/8" = 1'-0"



1 **GYM - NORTH ELEVATION**
1/8" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
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2 Center Plaza Suite 430 Boston, MA 02108

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50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

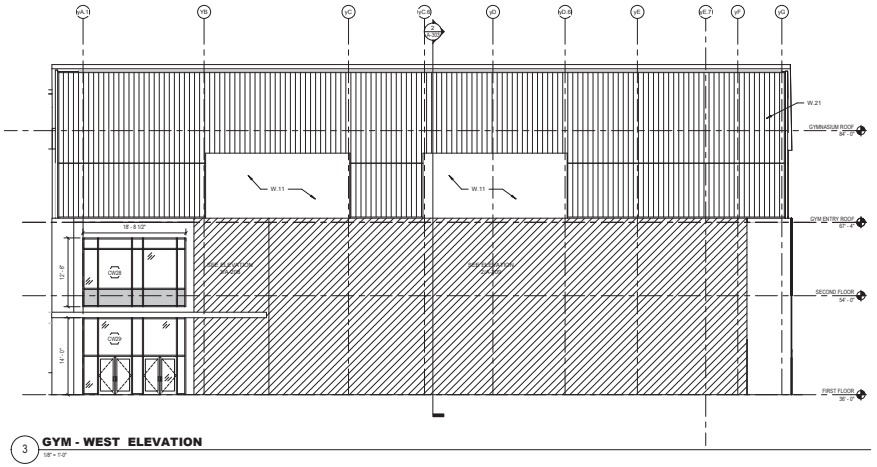
DRAWING TITLE:
EXTERIOR ELEVATIONS - GYM

SCALE: As indicated

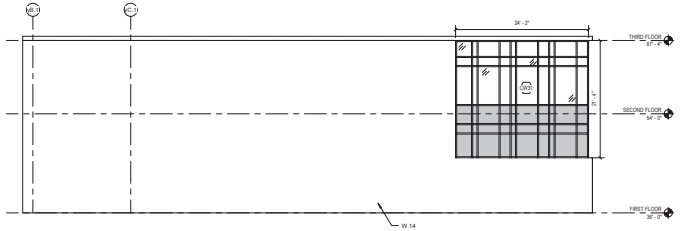
A-208

SCHEMATIC DESIGN - ESTIMATE

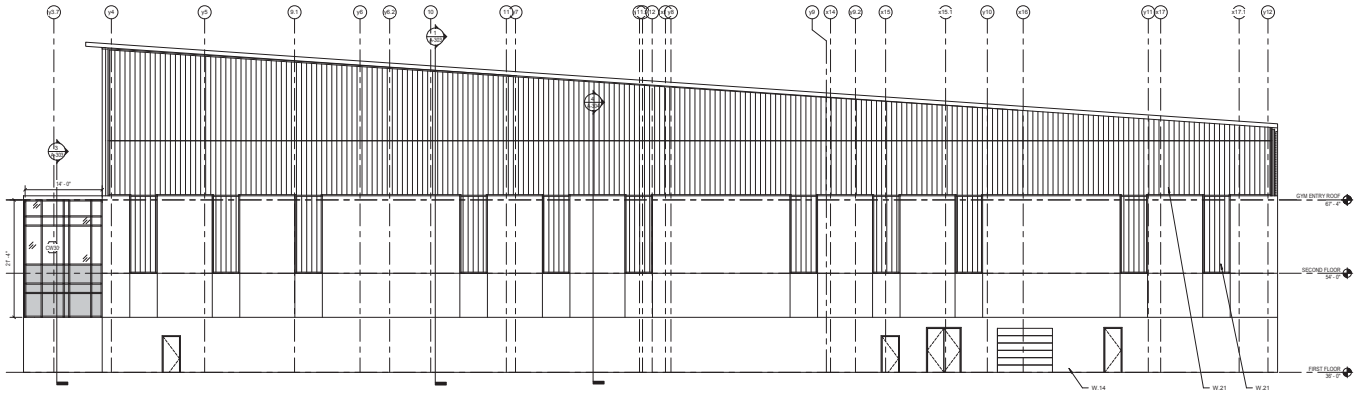
12/17/2018



3 **GYM - WEST ELEVATION**
1/8" = 1'-0"



2 **GYM - WEST ELEVATION**
1/8" = 1'-0"



1 **GYM - SOUTH ELEVATION**
1/8" = 1'-0"

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS W. THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE SHEET A-001 FOR WALL TYPES.
4. SEE SHEET A-020 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSETS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL. TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN
W.20 CONNECT TROLLEY CABLES @ UNDERSIDE OF BRIDGE. COORDINATE W/ TROLLEY OPERATOR.
W.21 KALWALL TRANSLUCENT PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.22 KALWALL CLEAR PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.23 3" RECESSED SLAB FOR LONG & TRIPLE JUMP PITS
W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS. SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

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Envelope onsultant Address

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142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - GYM

SCALE: As indicated

A-209

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

LEGEND - ELEVATION

SPANDREL PANEL

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
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3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION AND EXTENT OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITIARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSESTS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
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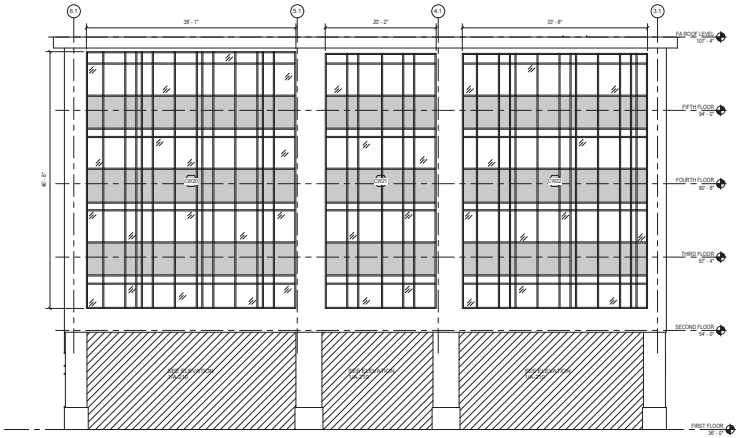
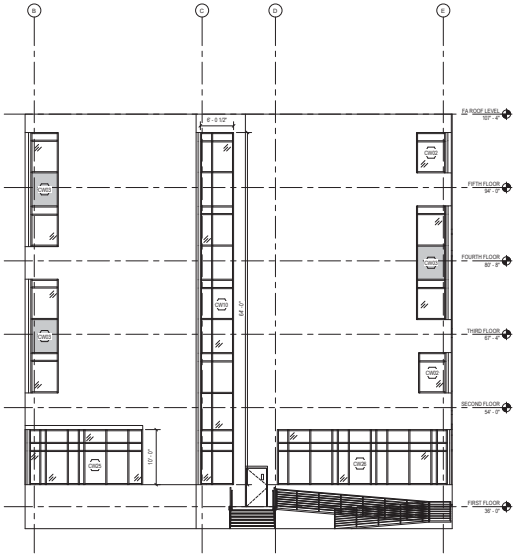
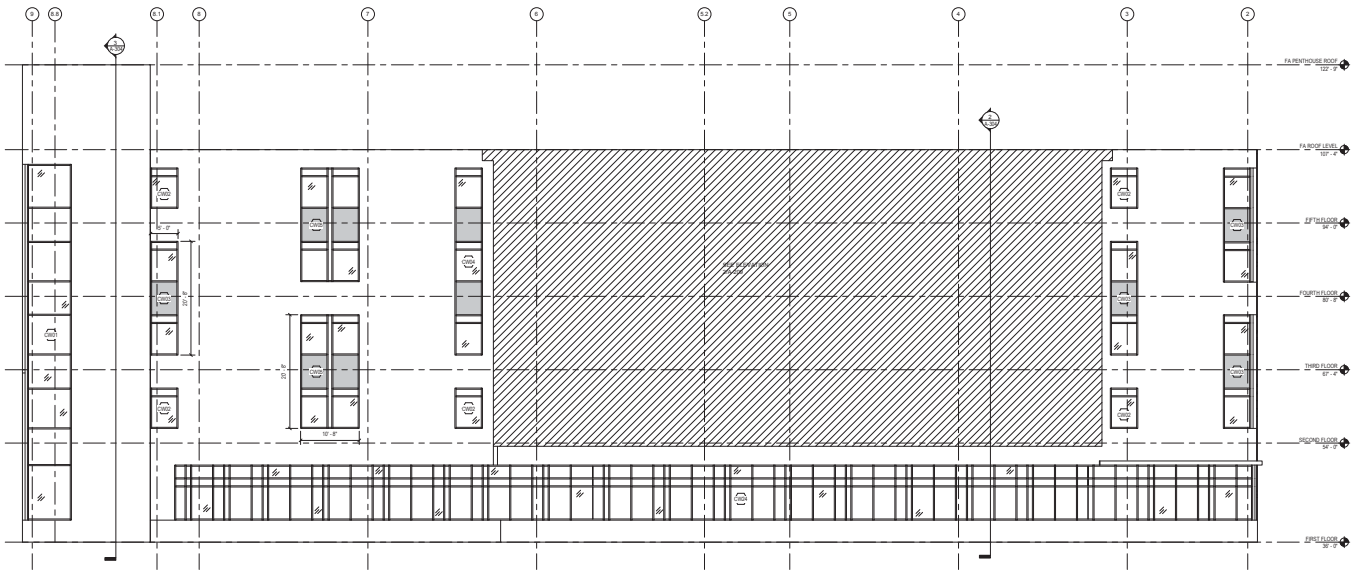
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH DWGS
W.12 RECESSED ENTRY MAT.
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL. TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN
W.20 CONNECT TROLLEY CABLES @ UNDERSIDE OF BRIDGE. COORDINATE W/ TROLLEY OPERATOR.
W.21 RAILSNAL TRANSLUCENT PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.22 INFILL WALL CLEAR PANELS. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.23 2" RECESSED SLAB FOR LONG & TRIPLE JUMP PITS
W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS, SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN



2 **FRESHMAN ACADEMY - PARTIAL NORTH ELEVATION**
1/8" = 1'-0"



3 **FRESHMAN ACADEMY - WEST ELEVATION**
1/8" = 1'-0"



1 **FRESHMAN ACADEMY - NORTH ELEVATION**
1/8" = 1'-0"

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 6
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T. +1 617 449 4000
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PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - FRESHMAN ACADEMY

SCALE: As indicated

A-210

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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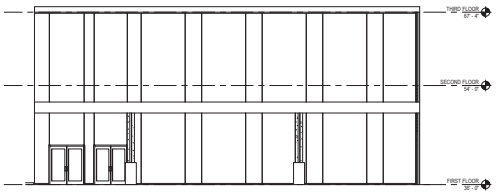
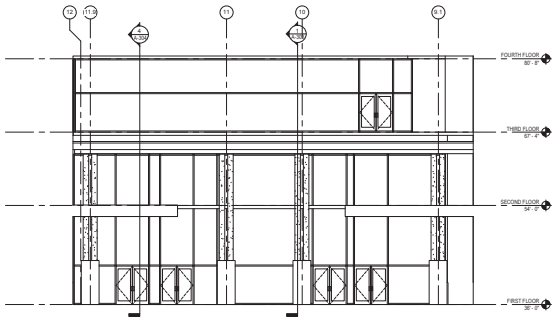
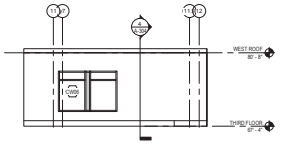


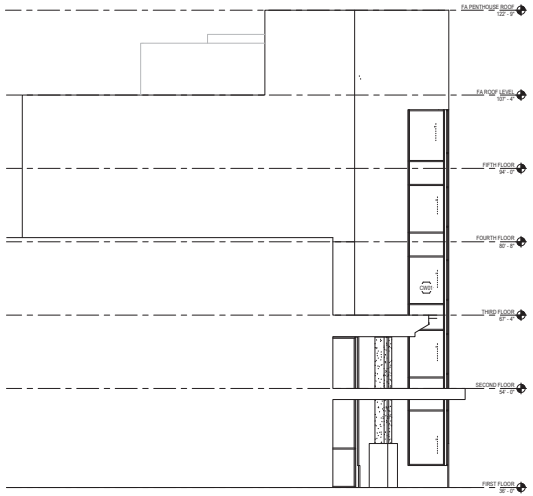
4 **MAIN ENTRY - WEST ELEVATION**
1/8" = 1'-0"



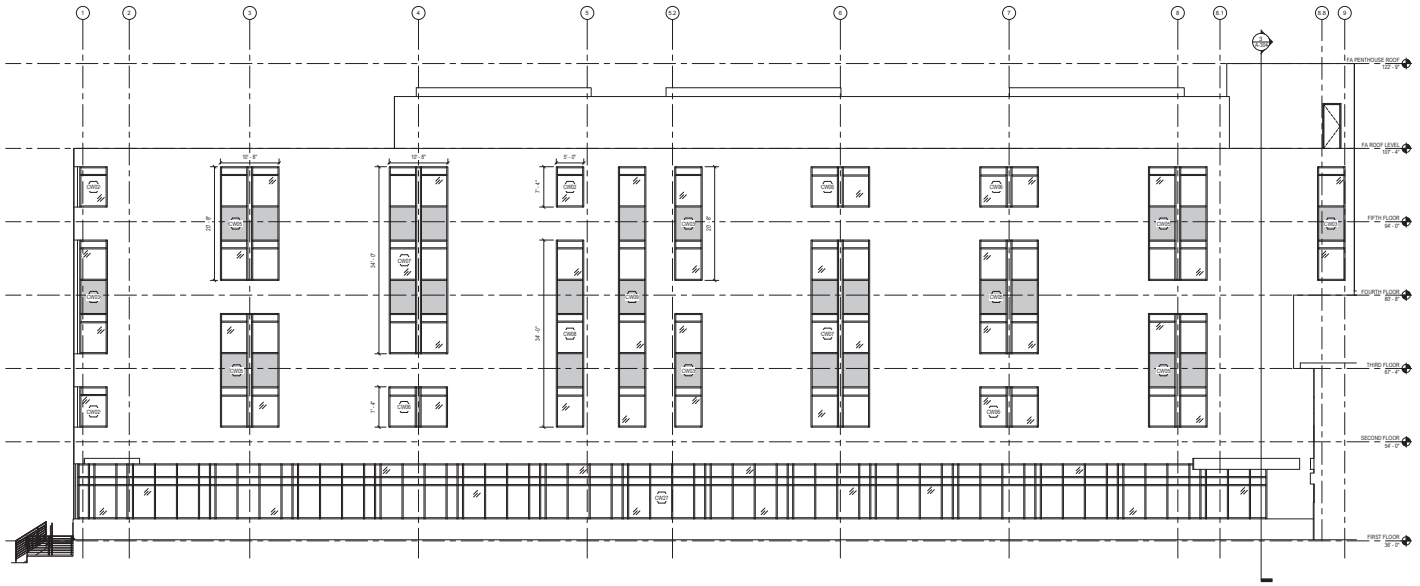
3 **MAIN ENTRY - NORTH ELEVATION**
1/8" = 1'-0"



5 **MAIN ENTRY - SOUTH ELEVATION**
1/8" = 1'-0"



1 **FRESHMAN ACADEMY - EAST ELEVATION**
1/8" = 1'-0"



2 **FRESHMAN ACADEMY - SOUTH ELEVATION**
1/8" = 1'-0"

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
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6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.
11. PROVIDE SLOP SINK @ ALL JANITOR CLOSESTS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 PROVIDE NEW FIRE RATED WALL PER UL CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
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W.24 2" RECESSED SLAB AT WOOD FLOORING
W.25 RAMP & RAILINGS. SEE STRUCTURAL DWGS
W.26 ELEVATOR OVERRUN

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Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
EXTERIOR ELEVATIONS - FRESHMAN ACADEMY

SCALE: As indicated

A-211

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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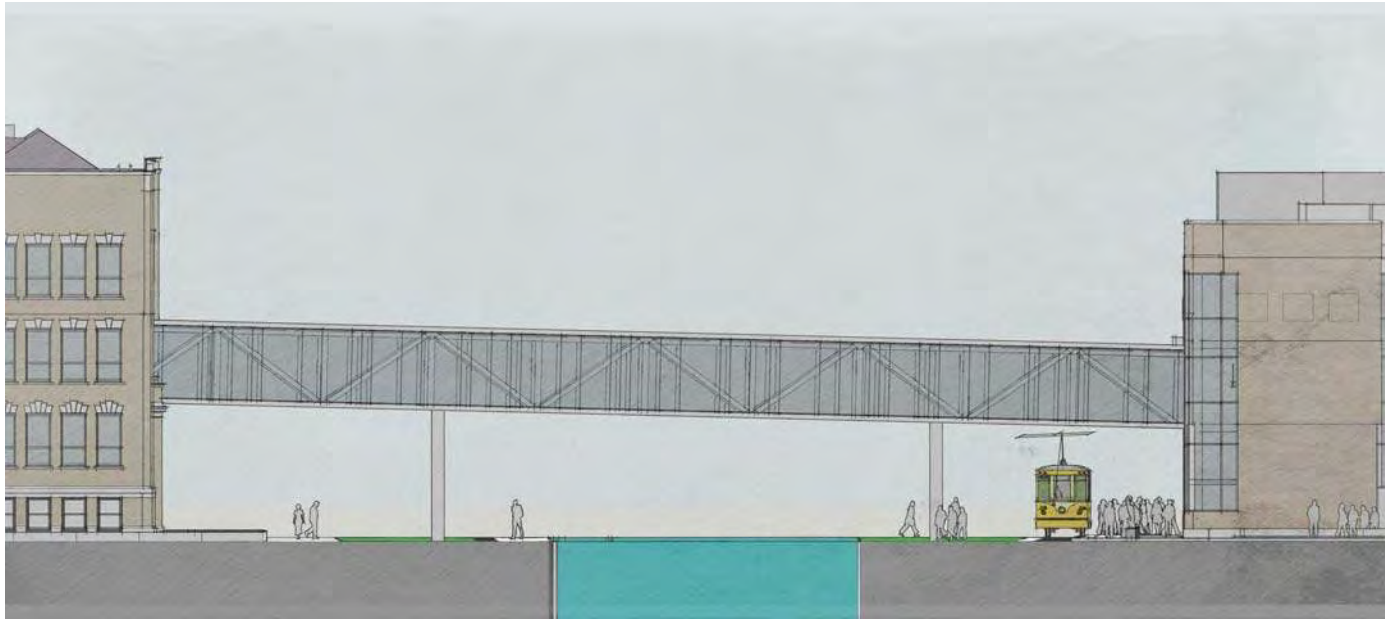
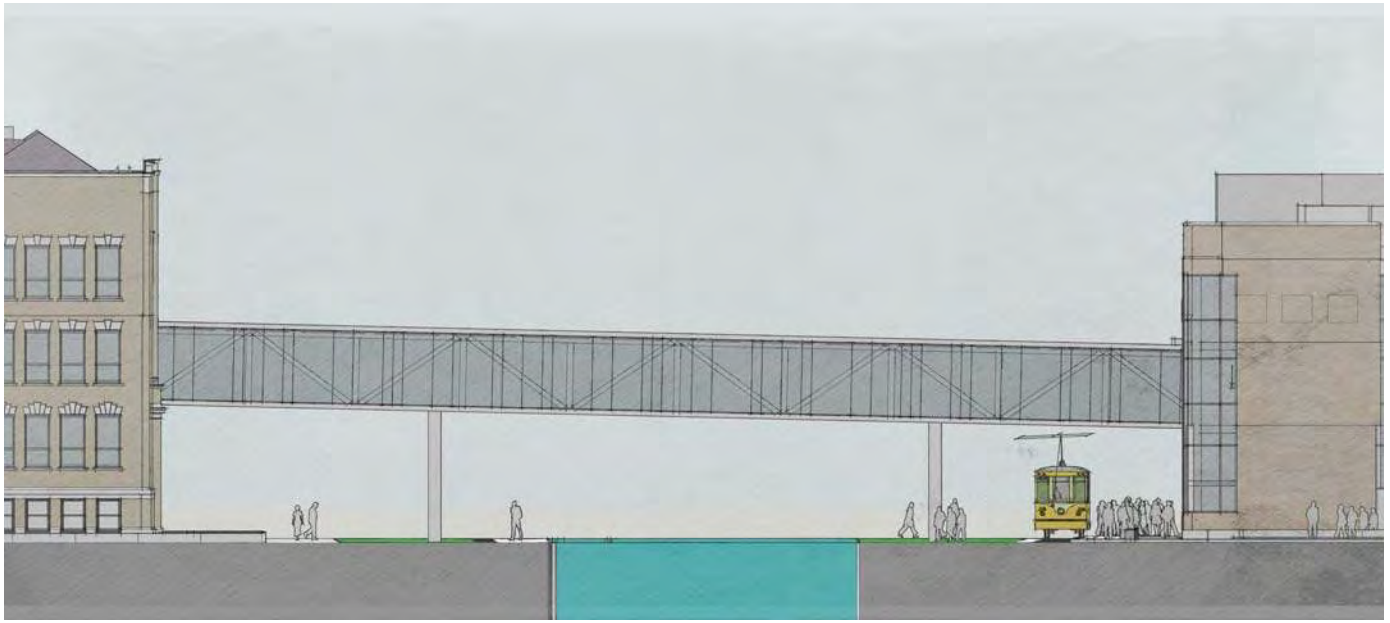


2 **NORTH BRIDGE ELEVATION - 3D RENDERING**
12" = 1'-0"



1 **SOUTH BRIDGE ELEVATION - 3D RENDERING**
12" = 1'-0"

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12/20/2018 10:55:52 AM

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

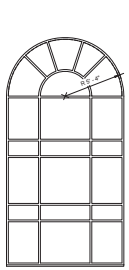
DRAWING TITLE:
EXTERIOR ELEVATIONS - BRIDGES

SCALE: 12" = 1'-0"

A-212

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



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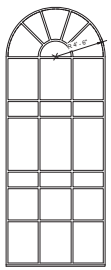

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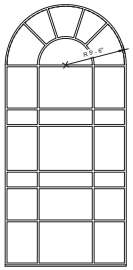

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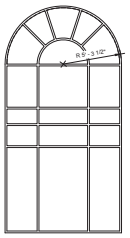

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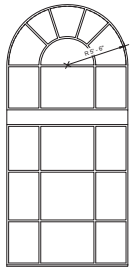

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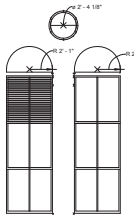

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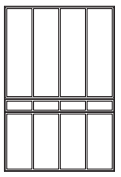
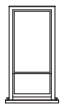


80

WINDOW SCHEDULE			
	Dimension		
Type Mark	Width	Height	Count
01	4' - 0"	5' - 5"	4
02	4' - 0"	5' - 6"	30
03	4' - 0"	4' - 6"	5
04	4' - 0"	4' - 7"	5
05	4' - 4"	5' - 8"	8
06	5' - 0"	4' - 8"	5
07	5' - 0"	4' - 8"	1
08	4' - 6"	4' - 8"	11
09	4' - 0"	4' - 7"	5
10	5' - 3"	5' - 0"	1
11	5' - 0"	4' - 8"	5
12	4' - 0"	7' - 0"	5
13	4' - 0"	7' - 1"	31
14	3' - 11"	5' - 5"	5
15	2' - 8"	3' - 0"	4
16	3' - 0"	3' - 0"	4
17	4' - 0"	2' - 6"	18
18	4' - 0"	2' - 0 1/2"	4
19	4' - 1"	2' - 2"	4
20	4' - 0"	9' - 0"	6
21	4' - 0"	8' - 10"	1
22	4' - 0"	7' - 0"	1
23	14' - 0"	2' - 2"	2
24	4' - 0"	5' - 6"	2
25	4' - 0"	5' - 10"	1
26	1' - 8"	0' - 7"	4
27	4' - 0"	8' - 7"	5
28	4' - 0"	8' - 7"	10
29	4' - 0"	8' - 7"	23
30	2' - 8"	8' - 9"	6
31	4' - 0"	8' - 7"	54
32	4' - 6"	8' - 5"	10
33	4' - 0"	8' - 10"	30
34	4' - 0"	8' - 10"	4
35	4' - 0"	8' - 5"	64
36	4' - 0"	8' - 5"	10
37	5' - 0"	8' - 8"	6
38	5' - 0"	8' - 8"	6

WINDOW SCHEDULE			
	Dimension		
Type Mark	Width	Height	Count
39	2' - 10"	4' - 8"	2
40	5' - 0"	8' - 8"	6
41	4' - 6"	8' - 10"	6
42	4' - 0"	6' - 4"	4
43	4' - 6"	8' - 10"	8
44	4' - 0"	6' - 10"	3
45	4' - 6"	8' - 2"	12
46	4' - 0"	6' - 9"	4
47	4' - 0"	7' - 10"	4
48	5' - 0"	8' - 10"	6
49	5' - 0"	8' - 4"	6
50	2' - 10"	4' - 5"	2
51	5' - 0"	8' - 10"	6
52	4' - 0"	6' - 10"	33
53	4' - 0"	8' - 5"	65
54	4' - 0"	8' - 5"	9
55	4' - 0"	5' - 8"	6
56	4' - 2"	6' - 8"	3
57	4' - 4"	6' - 0"	4
58	4' - 6"	4' - 10"	7
59	3' - 4"	5' - 0"	2
60	4' - 0"	4' - 11"	1
61	4' - 4"	8' - 8"	10
66	4' - 6"	8' - 8 1/2"	8
67	4' - 4"	8' - 8 1/2"	3
68	4' - 6"	6' - 5"	10
69	4' - 2"	8' - 8"	36
70	4' - 0"	9' - 0"	45
71	4' - 0"	8' - 6"	4
72	4' - 2"	6' - 6"	4
73	4' - 2"	8' - 8"	14
74	10' - 8"	15' - 4"	3
75	9' - 0"	18' - 11"	2
76	11' - 0"	18' - 2"	1
77	10' - 7"	15' - 4"	1
78	11' - 0"	18' - 2"	1
79	10' - 8"	13' - 6"	10
80	10' - 0"	15' - 0"	1
Grand total			752



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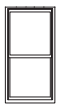

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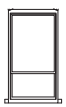

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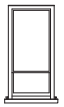

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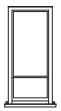

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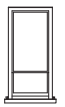

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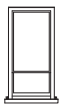

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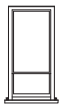

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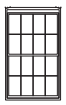

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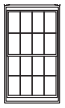

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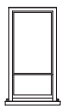

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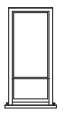

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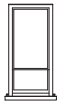

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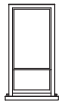

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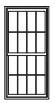

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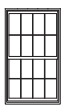

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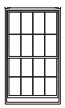

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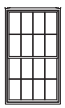

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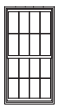

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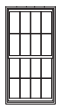

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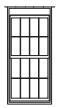

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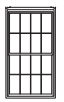

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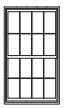

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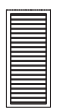

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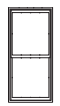

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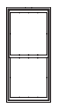

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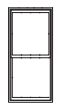

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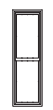

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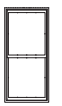

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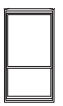

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01

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WINDOW TYPES

1/4" = 1'-0"

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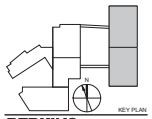
NO. DATE ISSUE

SEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
WINDOW TYPES - EAST BUILDING

SCALE: 1/4" = 1'-0"

A-620

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

6 **EXTERIOR VIEW OF EAST BUILDING**
1" = 10'-0"

5 **ARIEL VIEW OF LOWELL HIGH SCHOOL LOOKING NORTH**
1" = 10'-0"

4 **EXTERIOR VIEW OF MAIN ENTRY**
1" = 10'-0"

3 **EXTERIOR VIEW LOOKING OF GYMNASIUM**
1" = 10'-0"

2 **EXTERIOR VIEW OF FRESHMAN ACADEMY**
1" = 10'-0"

1 **EXTERIOR VIEW FROM ARCAND DRIVE**
1" = 10'-0"

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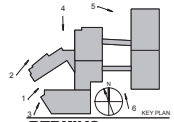
NO. DATE ISSUE

SEAL



KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
3D REPRESENTATIONS - EXTERIOR

SCALE: 1" = 10'-0"

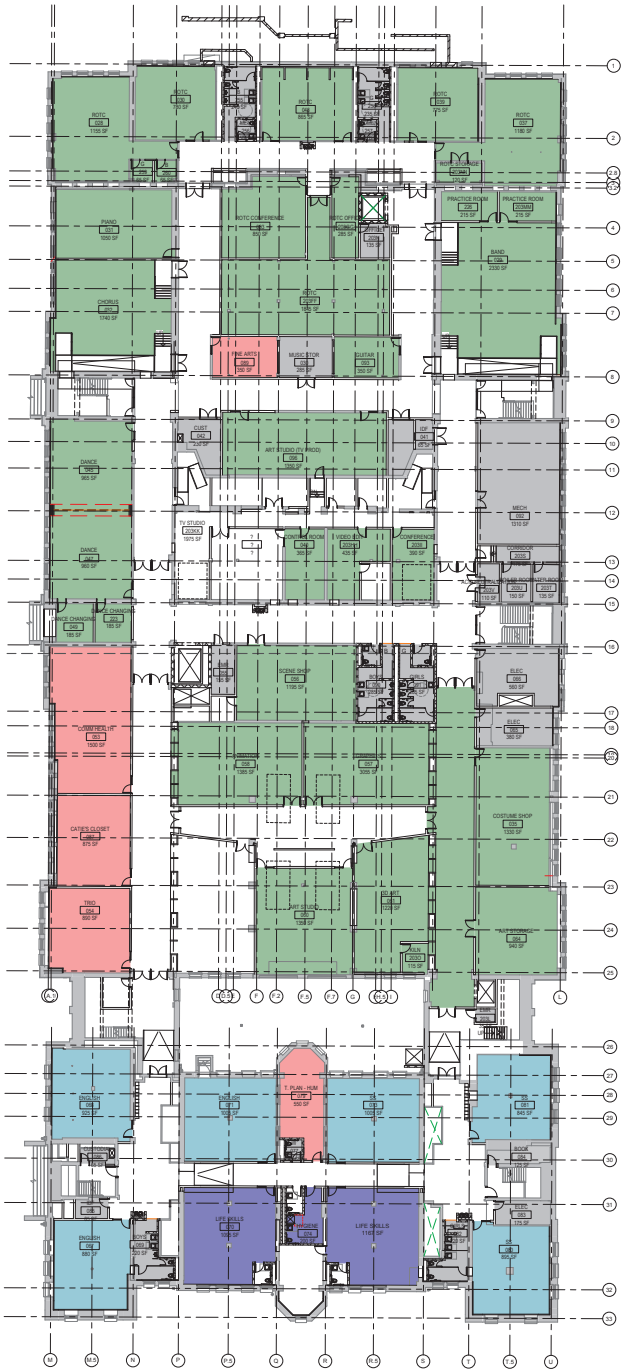
A-901

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM



1 **BASEMENT FLOOR PLAN - BASEMENT PROGRAM**
1/16" = 1'-0"

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

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150 Chestnut Street, 4th Floor Providence, RI 02903

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Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
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370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
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370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
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Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL BASEMENT PROGRAM PLAN -EAST

SCALE: 1/16" = 1'-0"

AP-100

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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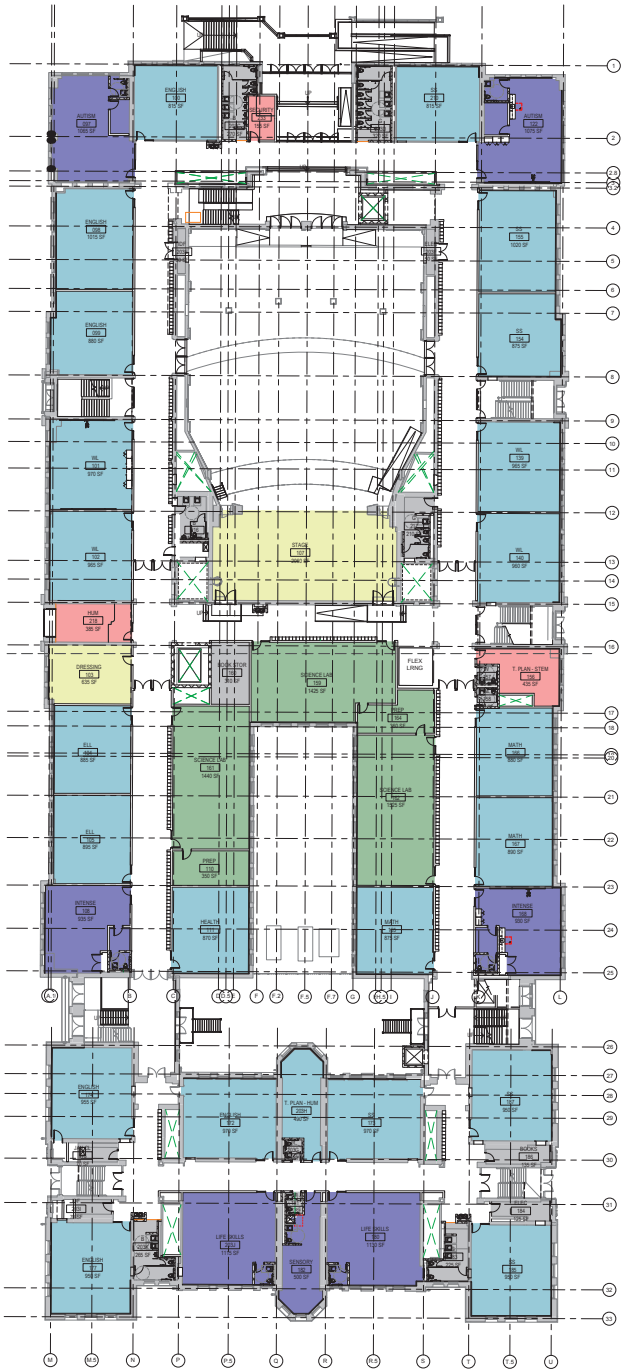
12/20/2018 8:54:29 AM

PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM



1 **FIRST FLOOR PLAN - FIRST FLOOR PROGRAM**
1/16" = 1'-0"

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
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370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
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370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL FIRST FLOOR PROGRAM PLAN - EAST

SCALE: 1/16" = 1'-0"

AP-101

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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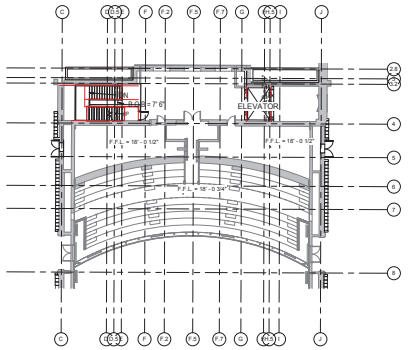
PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM



2 **MEZZANINE FLOOR PLAN PROGRAM**
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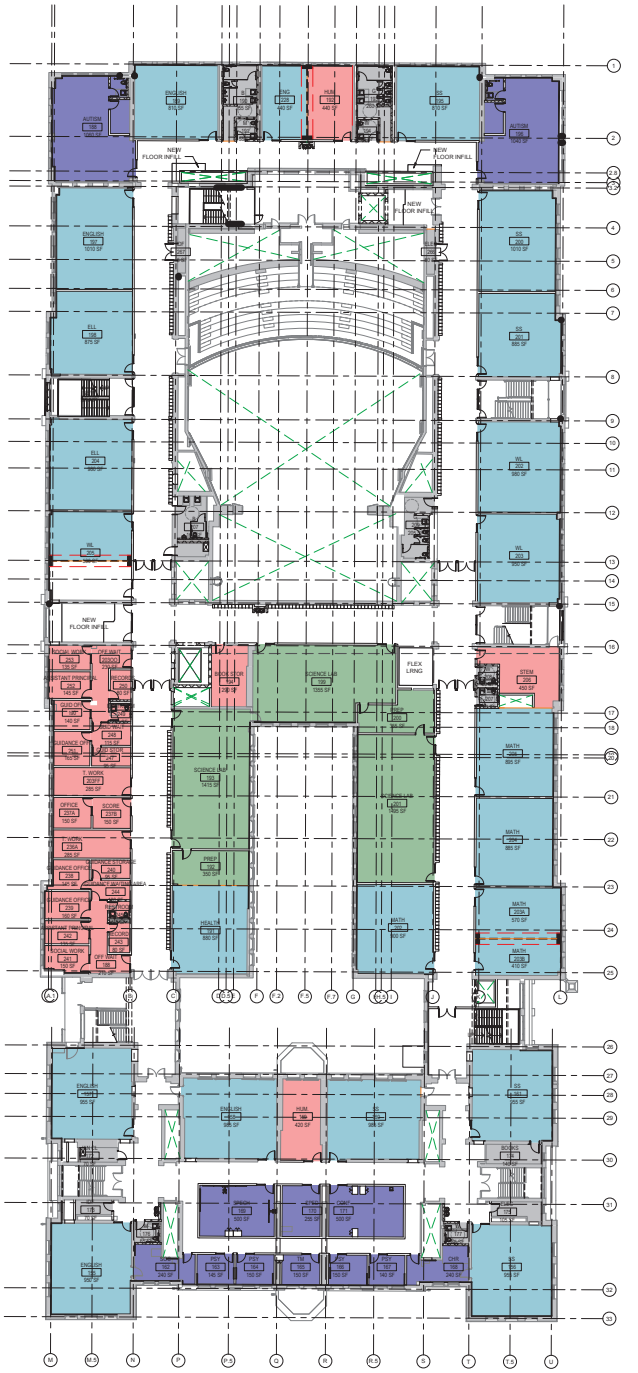

1 **SECOND FLOOR PLAN - SECOND FLOOR PROGRAM**
1/16" = 1'-0"

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
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Construction Manager Address

Civil / Site:
Nitsch Engineering
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Landscape:
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150 Chestnut Street, 4th Floor Providence, RI 02903

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Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL SECOND FLOOR PROGRAM PLAN -EAST

SCALE: 1/16" = 1'-0"

AP-102

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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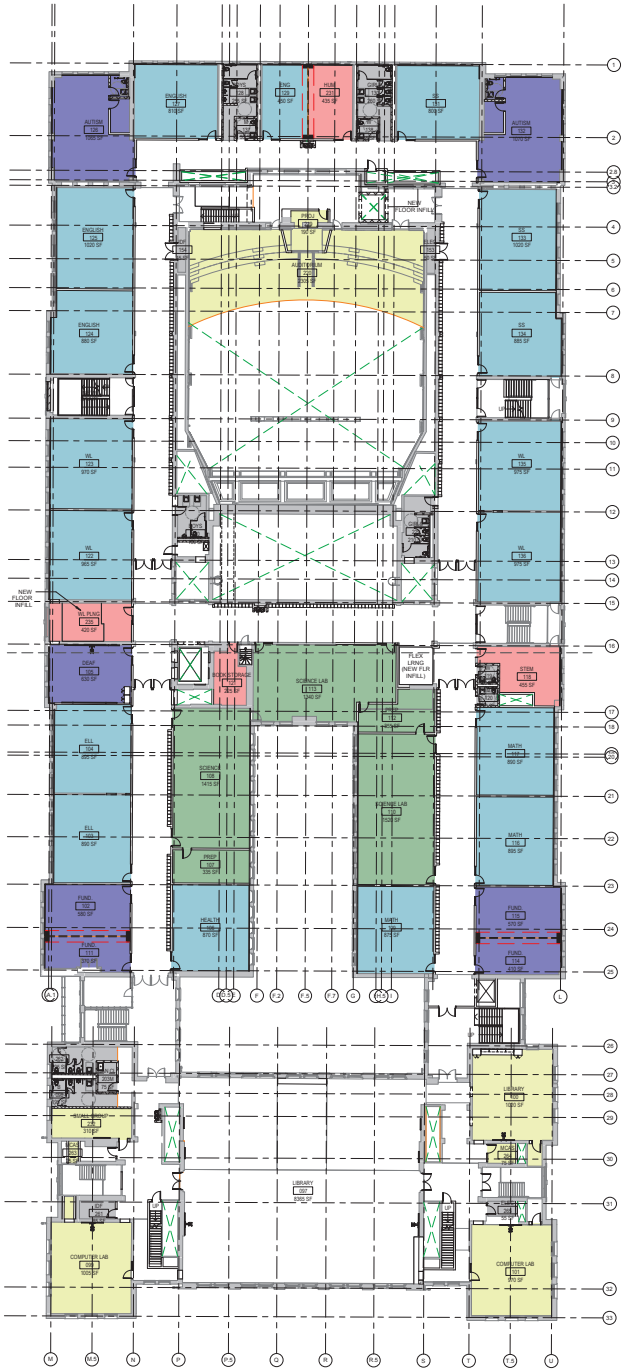
PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM



1 **THIRD FLOOR PLAN - THIRD FLOOR PROGRAM**
1/16" = 1'-0"

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

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Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

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Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

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Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL THIRD FLOOR PROGRAM PLAN - EAST

SCALE: 1/16" = 1'-0"

AP-103

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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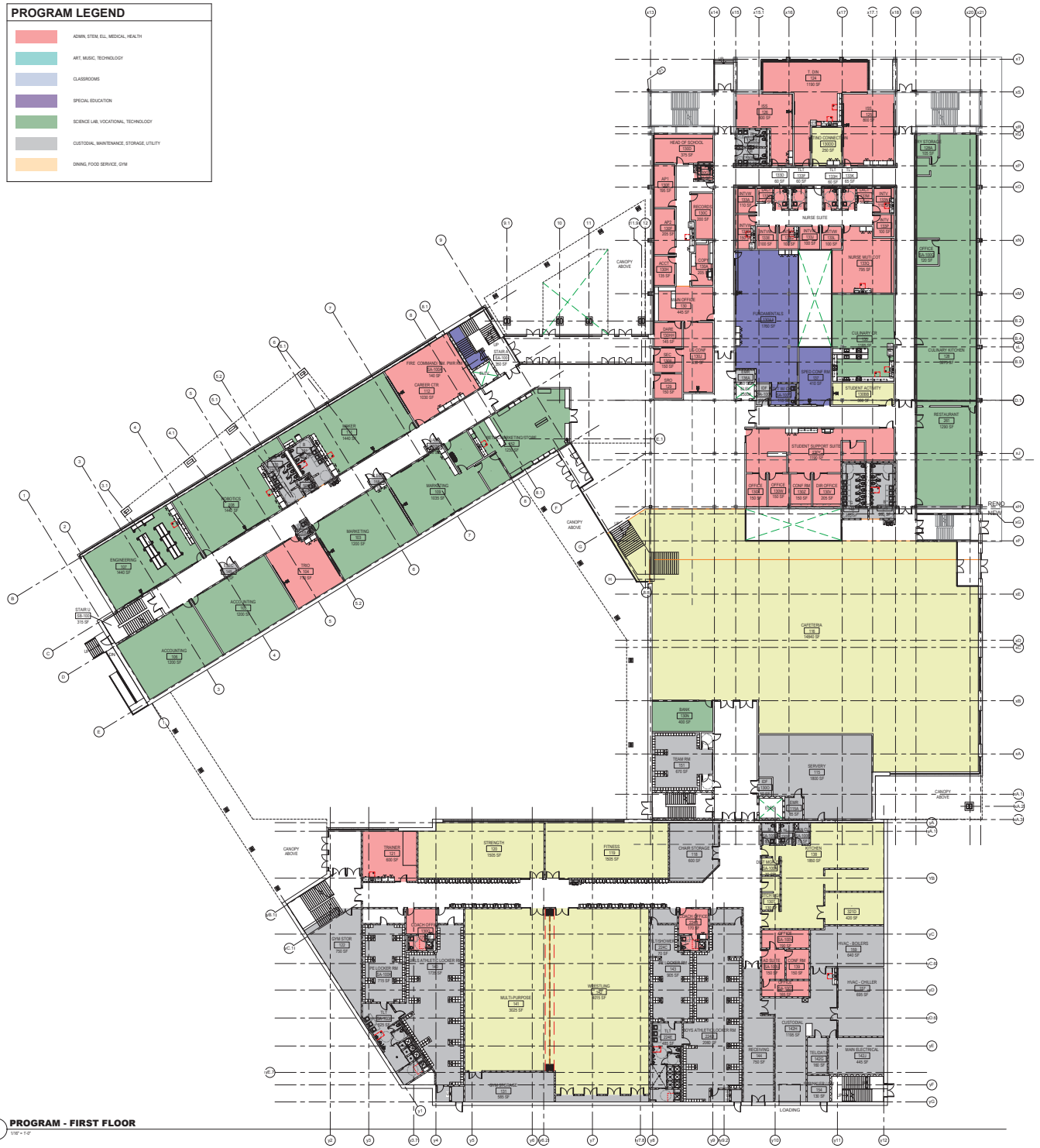

1 **PROGRAM - FIRST FLOOR**
1/16" = 1'-0"

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

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Construction Manager Name
Construction Manager Address

Civil / Site:
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370 Faunce Corner Road Dartmouth, MA 02747

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Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL FIRST FLOOR PROGRAM PLAN - WEST

SCALE: 1/16" = 1'-0"

AP-101W

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM

1 **PROGRAM - SECOND FLOOR**
1/16" = 1'-0"

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

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Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL SECOND FLOOR PROGRAM PLAN - WEST

SCALE: 1/16" = 1'-0"

AP-102W

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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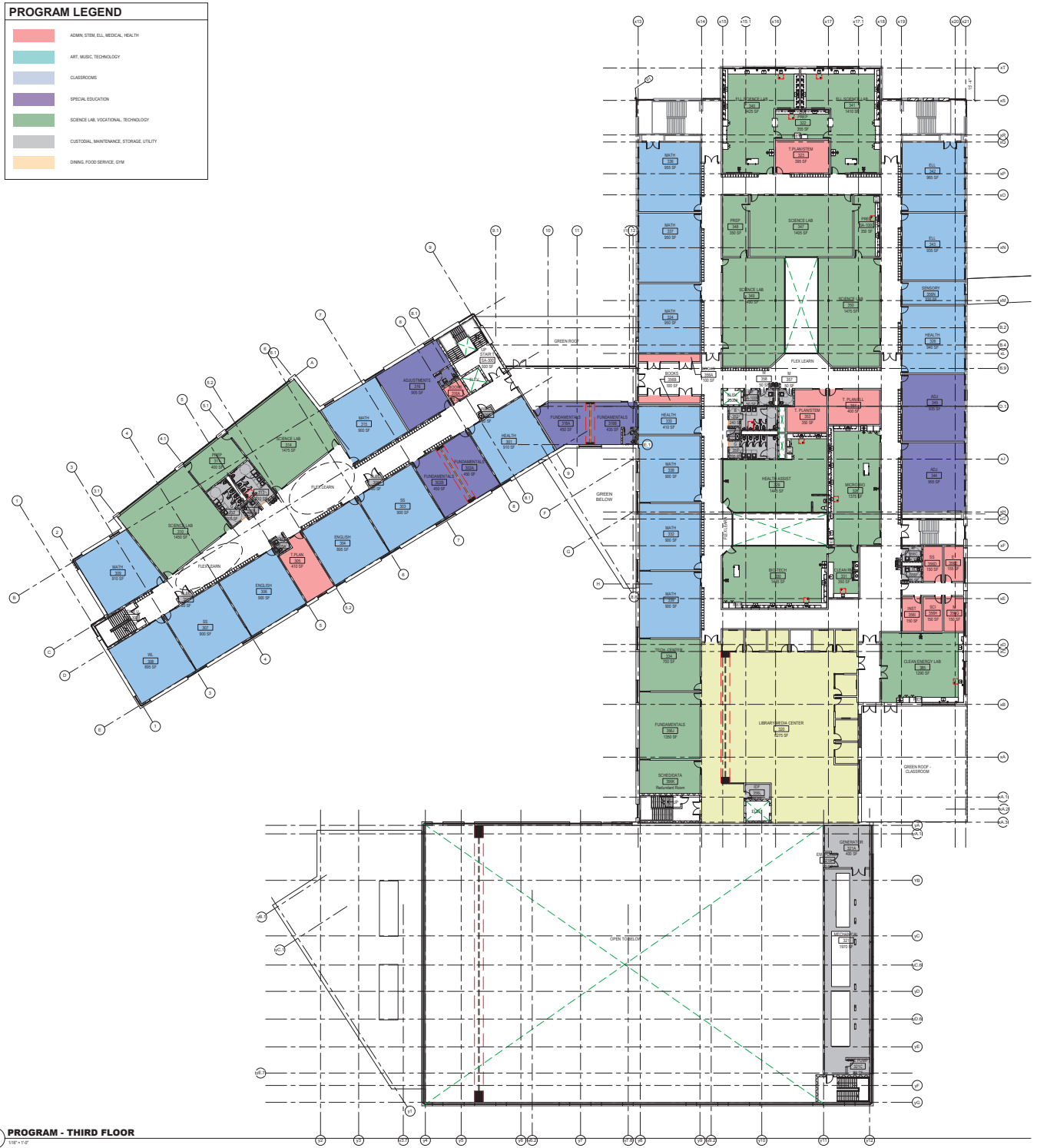
PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM



1 **PROGRAM - THIRD FLOOR**
1/16" = 1'-0"

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

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Food Service:
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Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL THIRD FLOOR PROGRAM PLAN - WEST

SCALE: 1/16" = 1'-0"

AP-103W

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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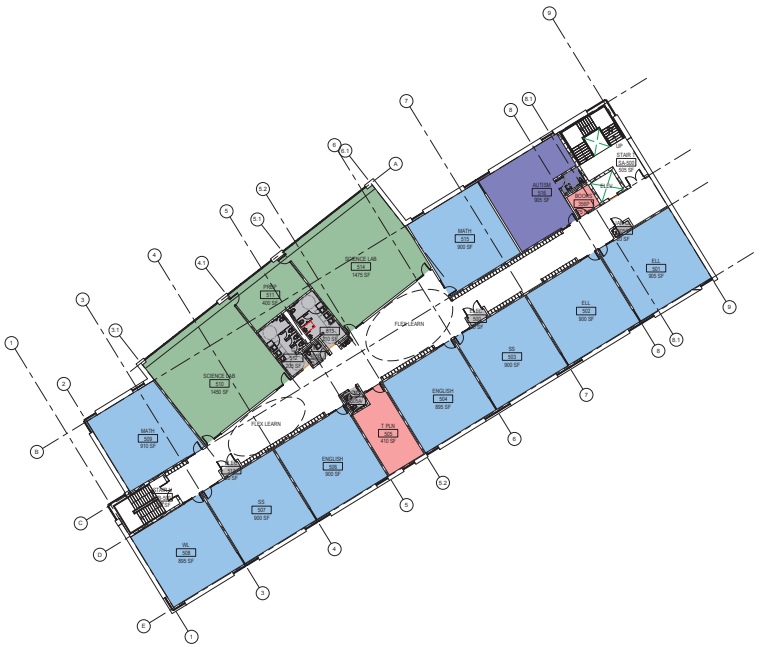
PROGRAM LEGEND

- ADMIN, STEM, ELL, MEDICAL, HEALTH
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, VOCATIONAL, TECHNOLOGY
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- DINING, FOOD SERVICE, GYM

1 **PROGRAM - FOURTH FLOOR**
1/16" = 1'-0"



2 **PROGRAM - FIFTH FLOOR**
1/16" = 1'-0"

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
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Construction Manager Address

Civil / Site:
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Food Service:
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161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
OVERALL FOURTH & FIFTH FLOOR PROGRAM PLANS - WEST

SCALE: 1/16" = 1'-0"

AP-104W

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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12/20/2018 10:17:42 AM

February 7, 2019

Eileen Donoghue
City Manager
City of Lowell
Lowell City Hall
375 Merrimack Street
Lowell, MA 01852

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

RE: Lowell High School Feasibility Study; 50 Father Morisette Boulevard, 55 French Street, and 75 Arcand Avenue, Lowell, MA; MHC# RC.62218

Dear Ms. Donoghue:

The Massachusetts Historical Commission (MHC) is in receipt of an updated project design and additional information, regarding the project referenced above, from Perkins Eastman and Building Conservation Association, Inc., which was received at this office January 7, 2019. The staff of the MHC have reviewed the information submitted and have the following comments.

From the PNF and information submitted, the MHC understands that the City of Lowell has entered into the design phase for the renovations and an addition at the existing Lowell High School, located at 55 French Street in Lowell. The information provided indicates that the project is receiving funding from the Massachusetts School Building Authority (MSBA).

The project as currently proposed involves the exterior and interior renovation of the original Lowell High School building and the Lord Building. The option would involve the demolition of: the existing bridges between the buildings, the existing Field House, and the building at 75 Arcand Drive, partial demolition of the Lord building; and demolition of the exterior stairs and ramp at the Northern End of the Lowell High School. New construction would include additions connected to the Lord building. Two one-story bridges would be constructed between the Lord Building and the Lowell High school over the Merrimack River and would replace the existing one-story bridges. The Freshman Academy building and the Steam Plant, located at 75 John Street, would be turned over to the City of Lowell and would have no work proposed under this option.

Review of the MHC's *Inventory of Historic and Archaeological Assets of the Commonwealth* indicates that project area includes the following properties, among others, which are listed in the State and National Registers of Historic Places as contributing elements to the Lowell National Historical Park (LOW.BC). The properties are also located within the Downtown Lowell Historic District (LOW.BE) which is listed in the State Register of Historic Places.

Lowell High School (LOW.44)
Lowell High School Annex (LOW.1143), referred to in the PNF as the Freshman Academy
Lowell High School Powerhouse (LOW.2580), referred to in the PNF the Steam Plant
Lowell High School Annex (LOW.1774), referred to in the PNF the 1980 Lord Building
Professional Park (LOW.1116), referred to in the PNF as the Medical Office Building

The project also includes pedestrian bridges over the Merrimack Canal (LOW.933), which is listed in the State and National Registers of Historic Places as a contributing element to the Lowell National Historical Park and the Locks and Canals District (LOW.C). The Locks and Canals District is also a National Historic Landmark.

The Lowell High School, Lowell High School Powerhouse, Merrimack Canal, and Professional Park are also within the City Hall District (LOW.A), which is listed in the State and National Registers of Historic Places.

The 1980 Field House is not included in MHC's *Inventory of Historic and Archaeological Assets of the Commonwealth*, and the Lowell High School Annex and Professional Park appear to be outside of the period of significance for both the Lowell National Historical Park and the City Hall District.

The City Hall District and the Downtown Lowell Historic District are Local Historic Districts, and as such the proponent may need to seek a Certificate of Appropriateness from the Lowell Historic Board for any work proposed within those districts.

The MHC understands from the information submitted that the Lowell Historic Board and the Lowell National Historical Park participated in a meeting for the design review process on November 15, 2018.

The information submitted identifies specific buildings that would be turned over to the City of Lowell: the Freshman Academy building (LOW.1143), and the Steam Plant (LOW.2580). These two buildings are listed in the State Register of Historic Places, and the MHC recommends that the City of Lowell develop appropriate plans for their maintenance and re-use. If any work will be undertaken on these buildings by the City in connection with the Lowell High School project or with any state and/or federal funding, licensing or permitting, project information should be submitted to the MHC for review and comment.

The current project proposal include the demolition of the two existing one-story pedestrian bridges over the Merrimack Canal (LOW.933), and the construction of two one-story bridges, one in the same location and the other in a different location. From the information submitted, the MHC understands that the Lowell National Historical Park has obtained an opinion from the Department of the Interior regarding the proposed bridge relocation and is working with the City of Lowell to facilitate the proposed changes.

The MHC also understands that the proposed rehabilitation of the exterior of the existing Lowell High School (LOW.44) will follow the Lowell Historic Board's Downtown Historic District Design Review Standards and that the proponent is working closely with the Lowell Historic Board.

Review of our files and the information submitted indicates that the proposed project will have "no adverse effect" (950 CMR 71.07(2)(b)(2)) on the Lowell High School (LOW.44), the Lowell National Historical Park, Downtown Lowell Historic District, and the Locks and Canals District (LOW.C), provided that the provided that the following condition is met: the City of Lowell continues to consult with the Lowell National Historical Park and the Lowell Historic Board as the project goes forward.

These comments are offered to assist in compliance with M.G.L. Chapter 9, sections 26-27C, (950 CMR 71.00). Please do not hesitate to contact Linda Santoro of my staff if you have any questions.

Sincerely,

Brona Simon

Brona Simon
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

xc: John McCarthy, MSBA
Peter Aucella, NPS Lowell NHP
Steve Stowell, Lowell Historic Board
Alicia Svenson, Building Conservation Association, Inc
Robin Greenberg, Perkins Eastman

City of Lowell - Law Department

375 Merrimack Street, 3rd Floor • Lowell MA 01852-5909
Tel: 978.674.4050 • Fax: 978.453.1510 • www.lowellma.gov

Christine P. O'Connor
City Solicitor

Rachel M. Brown
1st Assistant City Solicitor

Gary D. Gordon
John Richard Hucksam, Jr.
Adam LaGrassa
Hannah Pappenheim
Elliott J. Veloso
Assistant City Solicitors

January 14, 2019

Mary Ann Williams, Project Executive
James Dowd II, Esq., Senior Program Manager
Skanska USA Building Inc.
101 Seaport Blvd.
Boston, MA 02210

Re: Eminent Domain - 75 Arcand Drive

Dear Ms. Williams and Mr. Dowd:

I write to further update you regarding the status of the City of Lowell's ("City") taking of the property at 75 Arcand Drive via eminent domain pursuant to M.G.L. c. 79 in furtherance of the Lowell High School ("LHS") project.

On November 13, 2018, the City recorded its Order of Taking of 75 Arcand Drive at the Middlesex North Registry of Deeds (Book 32559, Page 1). Under state law, ownership of property taken by eminent domain vests with the taking authority on the date when the order is recorded at the appropriate registry of deeds. *See* M.G.L. c. 79, §3. Ownership of 75 Arcand Drive therefore vested with the City on November 13, 2018.

As required under M.G.L. c. 79A and 760 CMR 27.03(1)-(9), the City and its relocation specialist, Peter W. Sleeper Associates ("PWSA"), received approval of its relocation plan for the tenants at 75 Arcand Drive from the Massachusetts Bureau of Relocation. Copies of this relocation plan and a benefits handbook have been provided to all of the tenants. Pursuant to this plan, the City anticipates that all tenants shall be relocated from 75 Arcand Drive by the third quarter of 2019.

Sincerely,

Elliott J. Veloso
Assistant City Solicitor

cc. Eileen Donoghue, City Manager
Kara Keefe Mullin, Assistant City Manager
Christine P. O'Connor, City Solicitor

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City of Lowell - Law Department
375 Merrimack Street, 3rd Floor • Lowell MA 01852-5909
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Christine P. O'Connor
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Rachel M. Brown
1st Assistant City Solicitor

Gary D. Gordon
John Richard Hucksam, Jr.
Adam LaGrassa
Hannah Pappenheim
Elliott J. Veloso
Assistant City Solicitors

February 12, 2019

Mary Ann Williams, Project Executive
James Dowd II, Esq., Senior Program Manager
Skanska USA Building Inc.
101 Seaport Blvd.
Boston, MA 02210

Re: Air Rights for New Pedestrian Bridges – Lowell High School Project

Dear Ms. Williams and Mr. Dowd:

You have requested the City of Lowell ("City") provide an update regarding the process for securing certain air rights over Lucy Larcom Park and the Merrimack Canal as part of the Lowell High School ("LHS") project. Currently, two pedestrian bridges extend over portions of the Merrimack Canal, Lucy Larcom Park (258 Merrimack St; Lowell, Massachusetts 01852), and a railroad/trolley track between LHS's original 1922 Building and the Lord Building. As part of the LHS project, the more southern of the two bridges ("South Bridge") will be reconstructed in its current location, while the northern bridge ("North Bridge") will be relocated to a more central position between the two buildings.

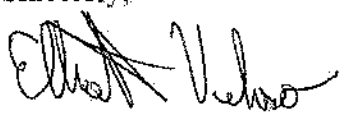
Current air rights over the Merrimack Canal are owned by the Massachusetts Department of Conservation and Recreation ("DCR") as successor in interest of Proprietors of Locks and Canals on Merrimack River. The City owns Lucy Larcom Park through the City Manager and the Chairman of the Board of Parks, and the holders of those offices or their equivalents in perpetuity, by deed recorded in Book 450, Page 431 in the Middlesex North Registry of Deeds.[1]

Moving the North Bridge to a new location over the Merrimack Canal and Lucy Larcom Park implicates the air rights over land that has been preserved for conservation and recreational purposes. This change in use for the air rights over the parkland triggers Article 97 of the Massachusetts Constitution. Under Article 97, "[l]ands and easements taken or acquired for such purposes shall not be used for other purposes or otherwise disposed of except by laws enacted by a two thirds vote, taken by yeas and nays, of each branch of the general court."

[1] Please note that this assessment is only in regards to the air rights over state and City owned land. The right to use the trolley tracks is currently owned by the United States Department of the Interior through its National Park Service. Discussion regarding the federal implications for constructing the pedestrian bridges over the trolley tracks will be addressed in a separate letter.

The City, through a vote of the City Council, has prepared a petition to the General Court and proposed legislation granting to the City those air rights necessary for the relocation and replacement of the pedestrian bridges at LHS. On February 5, 2019, the City Council, by unanimous vote, approved presenting the City's petition through its state delegation to the General Court for consideration and ratification. The City hopes to have this legislation passed by the end of summer, 2019.

Sincerely,



Elliott J. Veloso
Assistant City Solicitor

cc. Eileen Donoghue, City Manager
Kara Keefe Mullin, Assistant City Manager
Christine P. O'Connor, City Solicitor

United States Department of the Interior

NATIONAL PARK SERVICE
Lowell National Historical Park
67 Kirk Street
Lowell, Massachusetts 01852-1029

IN REPLY REFER TO:

February 1, 2019

Eileen Donoghue, City Manager
City Hall
375 Merrimack Street
Lowell, MA 01852

Re: Trolley Spur at 75 Arcand Drive

Dear City Manager Donoghue:

Plans for the construction of new Lowell High School facilities include landscape and paving work in an area subject to an easement owned by the United States and administered by Lowell National Historical Park. The easement allows the operation and maintenance of a trolley spur to provide access to the Arcand Drive-Fr. Morissette Blvd. intersection. We are unable to transfer ownership of or surrender the easement without executing a land exchange, which is a multi-year process. We do, however, conclude that your proposed upgrades to the site will not interfere with any currently anticipated exercise by the United States of its easement rights.

When the intersection between Arcand Drive and Fr. Morissette Blvd. was repaved as part of the project that installed an access road now known as Martin Luther King Blvd into the Tsongas Center (1999), city project managers asked the National Park if it intended to reactivate and use that spur or the route through the intersection. National Park staff indicated at the time that the route through the intersection was considered unsafe for trolley operations and would not be reactivated. The City paved over the tracks in the intersection and landscaped over them along the Arcand Drive side of the existing high school. The owners of 75 Arcand Drive paved over some areas of the track for parking and installed a business sign along the route.

The City's current plans to landscape and pave over sections of the easement (Plan AS-001 attached) are acceptable to the National Park. A recently completed 10-year program of improvements for the trolley system does not include use of this easement and expansion of operations is not presently anticipated. The development of the high school will not affect the National Park's rights to use of the easement as the design assures that no structures will be built on the easement, thus allowing access to the route if needed in the future. In such a case, new tracks, ties and other equipment would need to be installed

by the National Park. Since the existing buried tracks, ties and other equipment are nonfunctional, they may be removed as part of your project. Please be aware, of course, that this concurrence does not mean that the United States is surrendering its easement interest and retains the right to use the right in the future should it need or desire to do so.

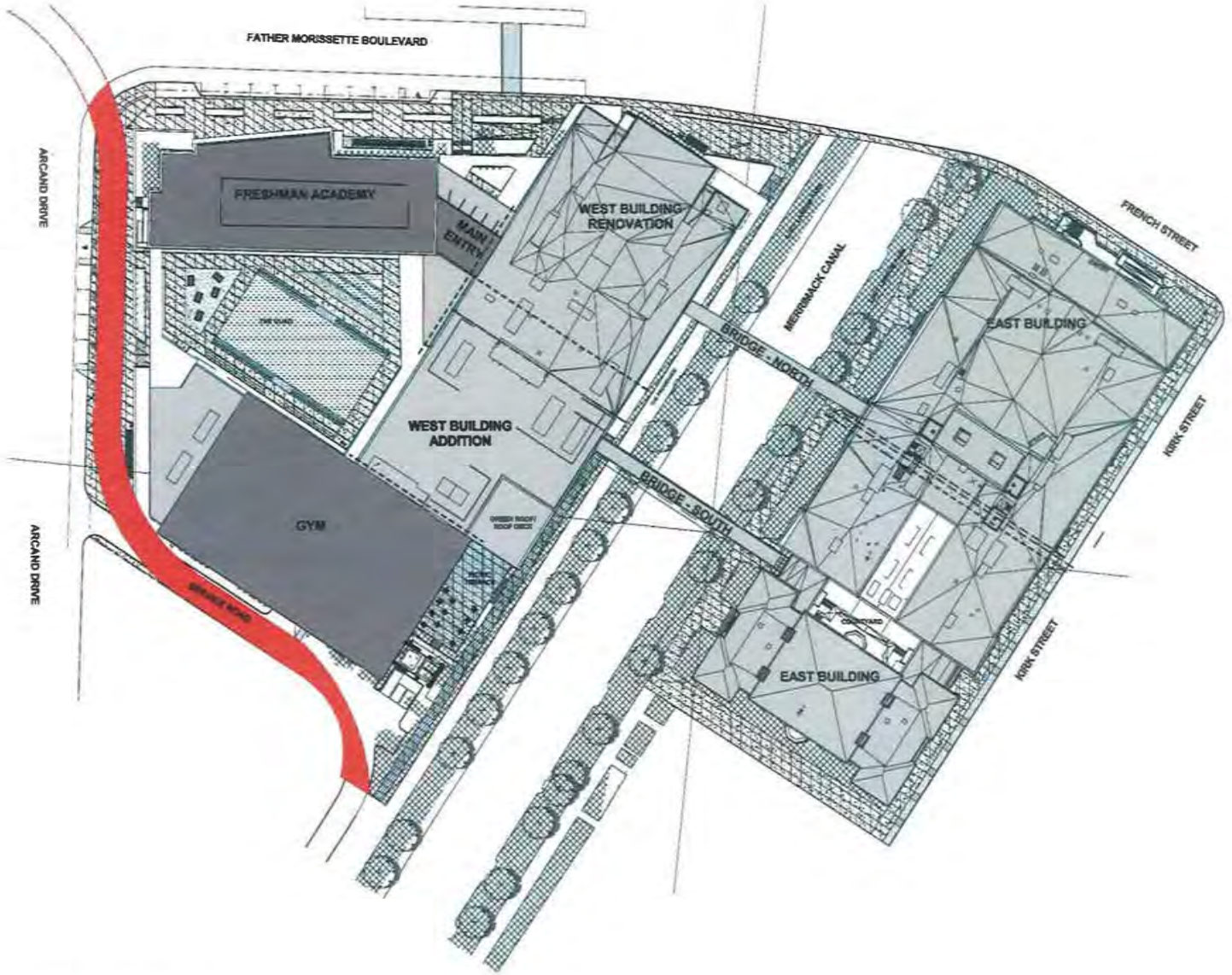
Sincerely,

Celeste Bernardo

Celeste Bernardo
Superintendent

Attachment: Plan AS-001 Proposed Lowell High School Site Plan

Cc: Christine Bruins, Planner
Pat Egan, Trolley Operations
Paul Fontaine, Facilities Manager
Kara Keefe-Mullin, Assistant City Manager
Elliott Veloso, Assistant City Solicitor
Jim Dowd, Skanska



1 SITE PLAN- LOWELL HIGH SCHOOL

PERKINS EASTMAN

LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD
LOWELL, MA 01852

PROJECT No: 67100

SITE PLAN

AS-001

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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The City of Lowell • Dept. of Planning and Development • Division of Development Services
Lowell City Hall • 375 Merrimack Street • Lowell, MA 01852
P: 978.674.4144 • F: 978.446.7103
www.LowellMA.gov

Diane N. Tradd
Assistant City Manager/Director

R. Eric Slagle
Director of Development Services

David Fuller
Building Commissioner

February 8, 2019

Jim Dowd
Skanska USA Building, Inc.
101 Seaport Boulevard
Boston, MA 02210

RE: Lowell High School Project

Dear Mr. Dowd,

Pursuant to Section 6.1.6 (8) of the Lowell Zoning Ordinance, all non-residential uses in the Downtown Mixed Use (DMU) zoning district are exempt from the listed parking requirements if a publicly owned parking facility is located within one thousand five hundred (1,500) feet of an entrance to the use.

The Joseph M. Downes (75 Downes Street) and George Ayotte (11 Post Office Square) parking garages are located within one thousand five hundred (1,500) feet of all current and proposed entrances of Lowell High School. As such, the proposed Lowell High School project does not require a Variance for parking from the Zoning Board of Appeals.

Please do not hesitate to contact me at 978-674-1472 or CMcCall@lowellma.gov if you have additional questions or concerns.

Sincerely,

Christine McCall

Christine McCall
Senior Planner

cc: Eileen M. Donoghue, City Manager
Diane N. Tradd, Assistant City Manager/DPD Director
Christine P. O'Connor, City Solicitor
R. Eric Slagle, Director of Development Services
David Fuller, Building Commissioner

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APPENDIX E – TESTING AND INVESTIGATIONS

In addition to the flow tests conducted for the entire building complex included in this section, further geoenviromental and geotechnical testing as well as a hazardous materials survey was conducted to better understand the conditions of the abutting parcel at 75 Arcand Drive. As described in previous reports, this parcel is being taken by eminent domain for use by this project. Access to the 75 Arcand parcel was not possible until this phase.

The information provided here is additional to the original geotechnical, geoenviromental, and hazardous materials reports for the existing high school provided previously within the Preliminary Design Program (PDP) and Preferred Schematic Report (PSR.)

- Flow Test Results (provided by Nitsch Engineering)
- Flow Test Review Letter by Plumbing/ Fire Protection Engineer (provided by VAV International)
- Supplemental Geoenviromental Investigation at 75 Arcand Drive (provided by Nobis Engineering)
- Supplemental Geotechnical Investigation at 75 Arcand Drive (provided by Geotechnical Partnership)
- Soil Analysis (Test Pit Report) for 75 Arcand Drive (provided by Nitsch Engineering)
- Hazardous Materials Identification Survey at 75 Arcand Drive (provided by Universal Environmental Consultants)

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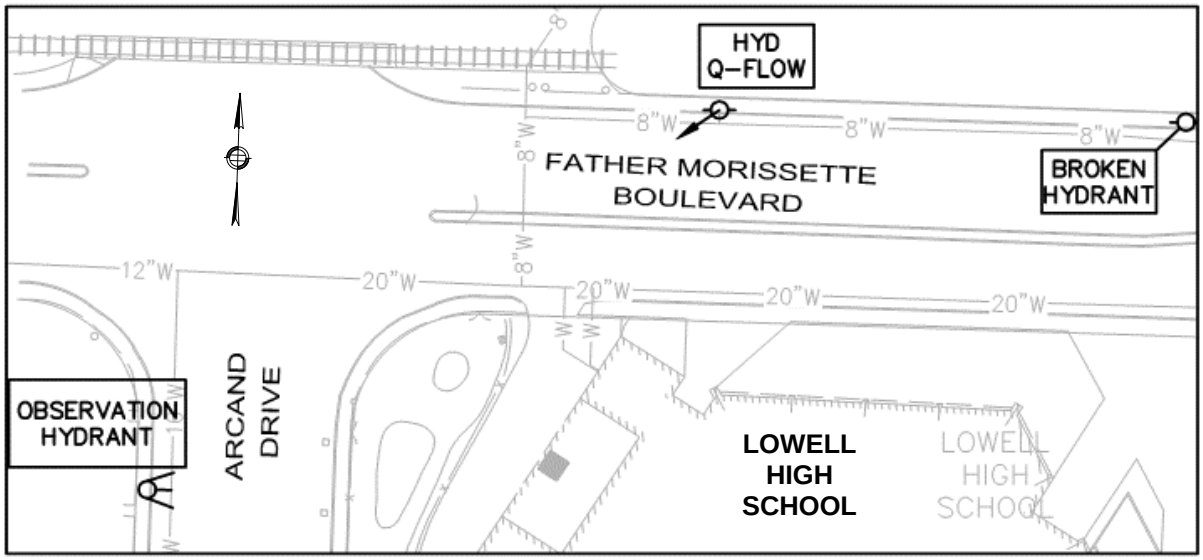
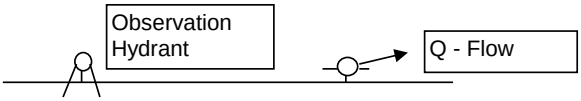
Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

HYDRANT FLOW TEST SUMMARY SHEET

Project # 11601 — Client: Perkins Eastman
Date: Monday July 9, 2018 — Project: Lowell High School
Time: 8:25 PM — Location: Lowell, MA 01852
Test By: William R. Maher, PE; Suny Bhagat, EIT (Nitsch Engineering)





Hydrant Coefficients: Ch=0.90 Ch=0.80 Ch=0.70

Flow Test Summary					
Observation Hydrant			Flow Hydrant:		
Static:	77	psi	Pitot (P):	61	psi
Residual:	76	psi	Diameter (d):	2.5	inches
(psi = pounds per square inch)			Hyd. Coefficient (Ch):	0.8	

Calculated Flow (Q = hydrant flow in gallons per minute - gpm)			
Q=29.83(Ch)(d)^2(P)^1/2	Q =	1164.9	gpm

Flow (Q20) at 20 psi							
Q20 = Q(PD20)^0.54/(PD1)^0.54						Q20 =	10338.6 gpm
PD20 = Static - 20 psi =	77	-	20	=	57	psi	
PD1 = Static - Observed =	77	-	76	=	1	psi	

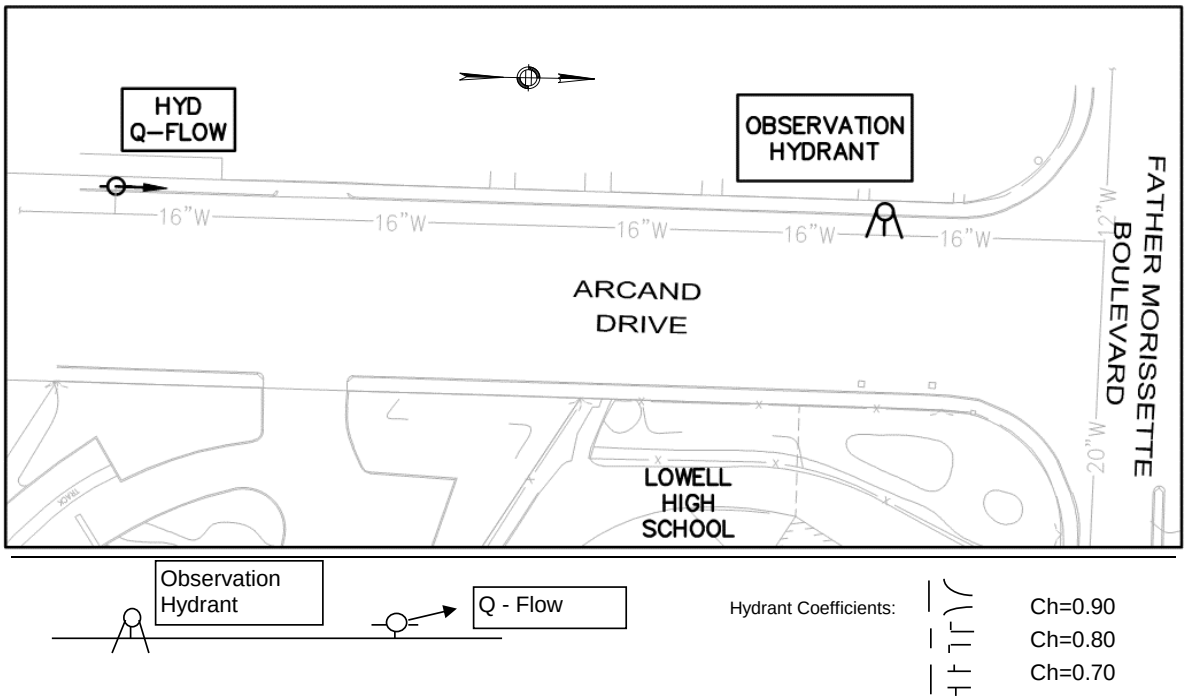
Comments
Hydrants operated by Brendan Flynn and Keith Basset from City of Lowell. Observed and Flow hydrants are Kennedy. Hydrant located on Father Morissette Blvd. near the Merrimack Canal was broken and could not be used for testing.

Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

HYDRANT FLOW TEST SUMMARY SHEET

Project # 11601 — Client: Perkins Eastman
Date: Monday July 9, 2018 — Project: Lowell High School
Time: 8:32 PM — Location: Lowell, MA 01852
Test By: William R. Maher, PE; Suny Bhagat, EIT (Nitsch Engineering)



Flow Test Summary					
Observation Hydrant			Flow Hydrant:		
Static:	77	psi	Pitot (P):	71	psi
Residual:	74	psi	Diameter (d):	2.5	inches
(psi = pounds per square inch)			Hyd. Coefficient (Ch):	0.8	

Calculated Flow (Q = hydrant flow in gallons per minute - gpm)		
Q=29.83(Ch)(d)^2(P)^1/2	Q =	1256.8 gpm

Flow (Q20) at 20 psi							
Q20 = Q(PD20)^0.54/(PD1)^0.54						Q20 =	6162.8 gpm
PD20 = Static - 20 psi =	77	-	20	=	57	psi	
PD1 = Static - Observed =	77	-	74	=	3	psi	

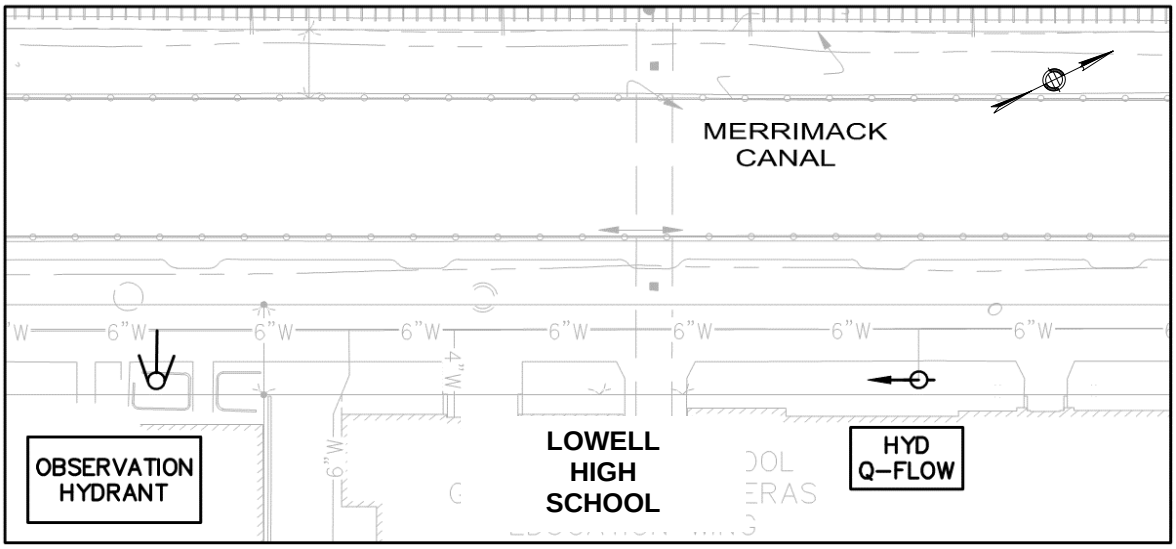
Comments
Hydrants operated by Brendan Flynn and Keith Basset from City of Lowell. Observed and Flow hydrants are Kennedy. Flow hydrant on Arcand Drive was left open to flush out dirty (brown) water after test.

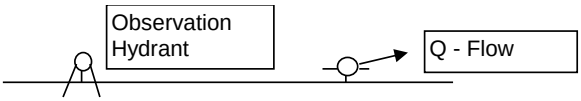
Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

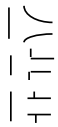
HYDRANT FLOW TEST SUMMARY SHEET

Project # 11601 — Client: Perkins Eastman
Date: Monday July 9, 2018 — Project: Lowell High School
Time: 8:46 PM — Location: Lowell, MA 01852
Test By: William R. Maher, PE; Suny Bhagat, EIT (Nitsch Engineering)





Hydrant Coefficients:



Ch=0.90
Ch=0.80
Ch=0.70

Flow Test Summary					
Observation Hydrant			Flow Hydrant:		
Static:	72	psi	Pitot (P):	28	psi
Residual:	52	psi	Diameter (d):	2.5	inches
(psi = pounds per square inch)			Hyd. Coefficient (Ch):	0.8	

Calculated Flow (Q = hydrant flow in gallons per minute - gpm)			
Q=29.83(Ch)(d)^2(P)^1/2	Q =	789.2	gpm

Flow (Q20) at 20 psi							
Q20 = Q(PD20)^0.54/(PD1)^0.54						Q20 =	1322.2 gpm
PD20 = Static - 20 psi =	72	-	20	=	52	psi	
PD1 = Static - Observed =	72	-	52	=	20	psi	

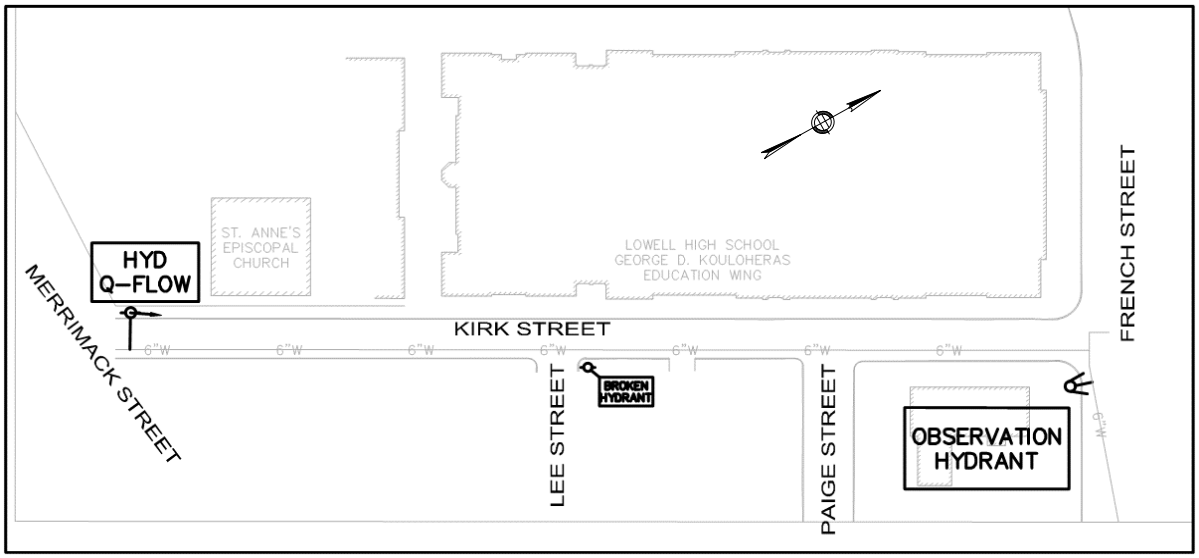
Comments
Hydrants operated by Brendan Flynn and Keith Basset from City of Lowell. Observed and Flow hydrants are American Darling Flow hydrant on Arcand Drive was left open to flush out dirty (brown) water after test.

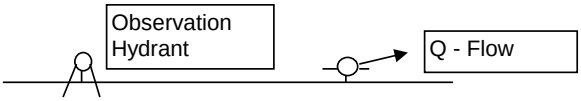
Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

HYDRANT FLOW TEST SUMMARY SHEET

Project # 11601 — Client: Perkins Eastman
Date: Monday July 9, 2018 — Project: Lowell High School
Time: 9:02 PM — Location: Lowell, MA 01852
Test By: William R. Maher, PE; Suny Bhagat, EIT (Nitsch Engineering)





Hydrant Coefficients: Ch=0.90 Ch=0.80 Ch=0.70

Flow Test Summary					
Observation Hydrant			Flow Hydrant:		
Static:	74	psi	Pitot (P):	24	psi
Residual:	72	psi	Diameter (d):	2.5	inches
(psi = pounds per square inch)			Hyd. Coefficient (Ch):	0.8	

Calculated Flow (Q = hydrant flow in gallons per minute - gpm)			
Q=29.83(Ch)(d)^2(P)^1/2	Q =	730.7	gpm

Flow (Q20) at 20 psi							
Q20 = Q(PD20)^0.54/(PD1)^0.54						Q20 =	4331.8 gpm
PD20 = Static - 20 psi =	74	-	20	=	54	psi	
PD1 = Static - Observed =	74	-	72	=	2	psi	

Comments
Hydrants operated by Brendan Flynn and Keith Basset from City of Lowell. Observed and Flow hydrants are Kennedy and American Darling, respectively. Flow hydrant on Arcand Drive was left open to flush out dirty (brown) water after test. The fire hydrant located at the corner of Kirk Street and Lee street had a cracked barrel in the front of it and could not be used for testing.

PLUMBING/ FP ENGINEER'S EVALUATION OF HYDRANT FLOW TEST

From: Frank Stramaglia
To: Daniel Ruiz
Cc: Robin Greenberg; Alicia Caritano
Subject: Lowell High School Flow Test Results
Date: Tuesday, January 08, 2019 10:54:21 AM

Daniel,

Multiple flow test results were performed by Nitsch Engineering on Monday July 9th, 2018 for the Lowell High School Project.

We reviewed this information back in July and confirmed a fire pump was not required to meet the sprinkler demand for the proposed additions and existing buildings.

However, Since then, the New Freshman Academy was modified and is now classified as a high-rise structure. Based on this there will now need to be a fire pump on the project to satisfy the code requirements for a high-rise building per NFPA. The new fire pump will serve the west campus, which consists of the Gym addition, 1980's building and Freshman Academy addition.

The east campus will be a separate fire protection system and will not require a fire pump.

If you have any more questions or need any other information please let me know.

Thank you

Frank Stramaglia, *CPD*
Associate, Manager of Plumbing and FP Department
VAV International, Inc.
Consulting Mechanical Engineers
400 W.Cummings Park, S-4700
Woburn, MA 01801
t. (781)935-7228
f. (781)935-1822
fstramaglia@vavint.com
www.vavint.com

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nobis

To:	Ms. Alicia Caitano Senior Associate Perkins Eastman 50 Franklin Street, Suite 203 Boston, Massachusetts 02110
Subject:	Transmittal of Phase II Environmental Site Assessment – 75 Arcand Dr. Lowell, MA
Date:	December 5, 2018

Dear Ms. Caritano:

Nobis Group, Inc. (Nobis) completed a Phase II Site Assessment (Phase II) in support of a Feasibility Study being performed by Perkins Eastman on behalf of the City of Lowell under a grant provided by the Massachusetts School Building Authority (MSBA). The Phase II was conducted on 75 Arcand Drive (the Site). The Phase II was conducted to address the recommendations provided by Nobis in a Phase I Environmental Site Assessment (ESA) prepared in January 2017, which identified Recognized Environmental Conditions (RECs) associated with the historical use of the property that could potentially have resulted in the release of contaminants to the environment.

OBJECTIVE OF THE PHASE II

The objective of the Phase II was to characterize soils at 75 Arcand Drive for the potential expansion of Lowell High School so that soil management procedures could be developed for the project and potential cost impacts from soil remediation could be evaluated. Therefore, the scope of the Phase II investigation was limited to 75 Arcand Drive. RECs that were identified on the property included a railroad spur present along the southern border of the property from the early 1900s until at least 1952.

PHASE II SITE ASSESSMENT FINDINGS

Nobis advanced four soil borings at the Site in areas potentially impacted by historical industrial use. Geological descriptions of soil cores indicated that historical fill overlies native soils at the Site. The presence of historical fill material in the top 4 to 6 feet of soil suggests that any soils

Nobis Group®
585 Middlesex Street
Lowell, MA 01851
T (978) 863-0891

removed or displaced during future earthwork activities should be considered potentially contaminated with urban fill constituents such as polycyclic aromatic hydrocarbons (PAHs) and metals.

Ten soil samples were collected for laboratory analysis during the Phase II investigation. Lead was detected in two soil samples at concentrations above Massachusetts Contingency Plan (MCP) "reportable concentrations" for an RCS-1 soil, triggering a 120-day notification obligation for the owner or other responsible party.

Soil contamination observed during the Phase II may be related to historical fill placed in the area. Potential remedial alternatives range from excavation and off-site disposal to on-site management of the contaminated soil through using construction of new building slabs or parking areas as effective horizontal barriers to exposure. Additional characterization will be necessary to refine the estimated extent of contamination and associated remedial costs.

Should you have any questions or comments, please contact me at (978) 703-6016, or dmcgrath@nobiseng.com.

Sincerely,

NOBIS ENGINEERING, INC.

Denis F. McGrath, C.H.M.M.
Sr. Project Manager

Adam N. Roy, C.H.M.M., L.S.P.
Project Manager

Enclosure

c: File 91830.04

PHASE II INVESTIGATION

75 ARCAND DRIVE
LOWELL MASSACHUSETTS

FOR

PERKINS EASTMAN

BY
NOBIS GROUP®

(800) 394-4182

www.nobis-group.com

Nobis Project No. 91830.04

DATE 12/5/2018

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TABLE OF CONTENTS
75 ARCAND DRIVE
LOWELL, MASSACHUSETTS

SECTION **PAGE**

TABLE OF CONTENTS (CONT.)
FINAL TARGETED BROWNFIELDS ASSESSMENT
777 SOUTH MAIN STREET
WATERBURY, CONNECTICUT

TABLES

NUMBER

FIGURES

NUMBER

APPENDICES

1.0 Introduction

Nobis Group® (d/b/a Nobis Engineering, Inc. [Nobis]) completed a Phase II Site Assessment (Phase II) in support of engineering analyses being performed by Perkins Eastman on behalf of the City of Lowell under a grant provided by the Massachusetts School Building Authority (MSBA). The Phase II was conducted at 75 Arcand Drive, Lowell, Massachusetts (Figure 1) (the Site). The Phase II was conducted to address the recommendations provided by Nobis in a Phase I Environmental Site Assessment (ESA) prepared in January 2017, which identified Recognized Environmental Conditions (RECs) associated with the historical use of the property that could potentially have resulted in the release of contaminants to the environment.

The objective of the Phase II was to characterize soils in potential future school construction areas such that remedial measures and soil management procedures and potential costs could be developed for the project.

2.0 General Site Information

The following sections describe the Site and surrounding properties and include a summary of ownership history and previous environmental investigations.

2.1 Site Location and Description

The 1.43-acre Site is being evaluated for the expansion of Lowell High School beyond its current footprint. As-of the Phase I ESA, 75 Arcand Drive was owned by TRS Lowell Doctors Park Trust; however, the City has initiated the eminent-domain process to acquire the property. The Site is occupied by a pediatric dentistry office. Based on City property record cards the site building is two stories, with electric heat, steel frame, and a tar and gravel roof. Much of the undeveloped portions of this parcel is occupied by a paved parking lot to the north, east, and south of the building. Unpaved areas of the parcel are landscaped with trees, shrubs, grass, and bark mulch. The Site is bordered: to the north by the Lowell High School Lord Building and Field House at 50 Father Morissette Boulevard; to the east by a north-south trolley line operated by the National Park Service, Lucy Larcom Park and the Merrimack Canal; to the west by Arcand Drive, residential properties, and the Lowell City Fire and Police Departments; and to the south by the Lowell Masonic Center.

According to the City of Lowell Assessor's Department, the Site is currently zoned "DMU", which is defined in Article 3 of the City of Lowell Zoning Book (adopted December 7, 2004) as a "downtown mixed-use district". The Site is located within an urban area of the City of Lowell

with mixed residential, commercial, and recreational uses. The topography of the Site and surrounding environs is relatively flat. According to the Site Locus Map (Figure 1), the topographic gradient decreases slightly to the north/northeast. The Merrimack River is located approximately 650 feet north of the Site.

2.2 Site Ownership and Usage

The Phase I ESA prepared by Nobis, dated January 2017 (Nobis, 2017), indicated that TRS Lowell Doctors Park Trust was the owner of the property at that time. The City of Lowell has initiated the eminent-domain process to expand the current high school. The Site currently operates as a pediatric dentist office.

2.3 Site Operations History

Based on the historical maps provided in the Phase I ESA, the 75 Arcand Drive property appeared to have been the site of mill-related housing provided by the Merrimack Company. The northwestern portion of the Site was formerly occupied by a section of Worthen Street, and the eastern/southeastern portion was formerly occupied by a section Dutton Street.

The operating trolley line at the eastern property boundary formerly operated as part of an industrial rail system, from which a partially extant spur enters the Site at its southern extent and curves in an "S" shape towards the north exiting the Site. The cargo and usage of these rail features is not known, but inferred to be related to the manufacturing operations of the mill complex.

2.4 Previous Investigations and Recognized Environmental Conditions

Nobis completed a Phase I ESA of the Lowell High School campus in January 2017. The Phase I ESA included assessment of six parcels of land (five on the current school campus and 75 Arcand Drive) located in the downtown area of Lowell, Massachusetts.

Based on the review of historical records, observations made during the site reconnaissance, and information provided in interviews with City personnel, Nobis identified the following RECs for the Site in the 2017 Phase I ESA:

- A railroad spur leading into the Merrimack Manufacturing Company was present along the southern border of the current 75 Arcand Drive property from the early 1900s until at least 1952. The railroad is not shown on the 1977 Sanborn fire insurance maps. Portions

of this spur remain visible. Former railroad activities likely transported and handled raw materials, chemicals, and hazardous materials associated with the operation of area industry. In addition, railroad operations and maintenance activities themselves may have impacted the Site, as creosote or arsenic-laced railroad ties, herbicides, lubricating oils, diesel fuel, and diesel exhaust commonly result in releases of heavy metals, pesticides/herbicides, and petroleum-related contamination along railroad corridors.

In addition to a hazardous building materials survey of the existing structure, the Phase I ESA report recommended implementation of a limited subsurface investigation prior to any pre-design or construction work to evaluate whether the identified RECs have resulted in a release of contamination to the environment. This Phase II investigation was intended to provide information to assist with soil management and health and safety planning for Site workers in the event that the 75 Arcand Drive addition was to be implemented.

3.0 2018 Phase II Field Investigation Program

The 2018 Phase II field investigation included the advancement of four soil borings, classification and field screening of soil samples, collection of soil samples for laboratory analysis, and evaluation of laboratory data. The sections below summarize the field investigation activities performed in November 2018. Limitations of the assessment are provided in Appendix A.

3.1 DigSafe Utility Clearance

On the morning of November 13, 2018, Nobis mobilized to the Site to pre-mark drilling locations for the Phase II site assessment. Later that day, at 14:30 Nobis notified DigSafe to initiate utility clearance activities in anticipation of commencing drilling activities on November 19, 2018. DigSafe assigned Ticket Number 20184603651 to the notification, and with the 72-hour notification requirement, a potential start date of November 19, 2018 at 06:00 was established.

On November 15, 2018, the Lowell Regional Water Authority informed Nobis that it would require Nobis to clear each borehole location to a depth of 6 feet below grade using a vacuum-assisted excavation. In response to this, Nobis adjusted its approach to include the use of a vacuum-assisted excavation to pre-clear each location prior to commencing direct-push drilling.

3.2 Soil Boring Pre-Clearing

Prior to commencing drilling operations, Nobis reviewed historical and existing plans illustrating subsurface utility systems including water, sewer, natural gas, electrical, and fiber optic lines

connected to Site. On November 19, 2018 Drilex Environmental of West Boylston, Massachusetts (Drilex) pre-cleared all four soil boring locations using a VacMaster 4000 vacuum truck and an air knife (Figure 2). Soil was removed from the top 5 to 6 feet using the air knife and consolidated within the VacMaster 4000 vehicle. Soil boring 75ARC-SB01 was only pre-cleared to 5 feet due to refusal on cobbles, all other borings were precleared to 6 feet.

Once the soil borings were adequately pre-cleared, Drilex advanced 4 overburden soil borings using a Geoprobe 6620DT track-mounted drill rig.

3.3 Soil Boring Advancement and Soil Sampling

During the pre-clearing operation, Nobis collected two soil samples per boring for laboratory analysis. A hand auger was used to collect a surface soil sample from 0 to 2 feet and subsurface soil sample from 4 to 6 feet. Samples were characterized by a Nobis field engineer and screened for the presence of volatile organic compounds (VOCs) using a photo-ionization detector (PID). Any notable observations were recorded on the soil boring logs attached in Appendix B.

Upon satisfactory borehole clearance, Drilex commenced direct-push drilling using a Geoprobe® 6620DT track-mounted drill rig. Drilling activities were directed by a Nobis field geologist, who also characterized subsurface materials and collected soil samples for laboratory analysis.

During drilling activities, soil samples were collected from each boring continuously using dedicated macro-core acetate sampling sleeves. All borings were advanced from the pre-cleared holes until a depth of 10 feet or 15 feet. All soil samples were characterized in the field by a Nobis engineer and screened for the presence of VOCs using a PID. Field screening, geological classification, and any other pertinent observations made during soil boring advancement were recorded on boring log forms, which are included in Appendix B.

An additional soil sample was collected for laboratory analysis from 75ARC-SB01 and 75ARC-SB03 from a deeper interval based on field observations and/or the groundwater surface. Soil samples were kept chilled on ice and transported under chain-of-custody until received by Con-Test Analytical Laboratories of East Longmeadow, Massachusetts for analysis. Samples were collected for the following laboratory analyses: VOC analysis by SW-846 8260C, volatile petroleum hydrocarbons (VPH) by the MassDEP Method, extractable petroleum hydrocarbons (EPH) and PAHs by the MassDEP Method, and Massachusetts Contingency Plan (MCP) metals analysis by SW 6010D/7471B.

4.0 Site Hydrogeological Observations

Based on observations made during the 2018 subsurface soil characterization, both historical fill material and naturally-occurring soil deposits are present at the Site. Historical fill material observed at the Site generally consists of brown poorly sorted silty sands, with varying amounts of debris materials encountered (glass, cobbles). Generally, debris was not encountered as distinct lenses, but appeared in small amounts commingled with soil. Underlying native deposits were generally characterized as brown sand, with varying levels of silts and gravels.

Based on soil boring moisture and/or soil staining observations, the groundwater table appears to be approximately 10-12 feet bgs. Nobis did not observe any odors, stains, or sheen on any of the saturated soil that might suggest groundwater contamination at the Site. The groundwater flow direction is believed to be toward the northeast in the direction of the Merrimack River.

5.0 2018 Soil Analytical Results

The following section presents a summary of the laboratory analytical data collected during the 2018 Phase II field investigation. Samples were collected for laboratory analysis of VOCs, VPH, EPH, PAHs, and MCP Metals. Analytical results were compared to MassDEP criteria to evaluate potential human health risks associated with the contaminant levels detected. A summary of soil analytical results is provided on Table 1. Laboratory data reports for soil samples collected during the November 2018 investigation are provided in Appendix C.

5.1 Applicable Regulatory Criteria

The soil sampling data were compared to several applicable state regulatory criteria, which are established in the MCP.

- Pursuant to 310 CMR 40.0361, the soil analytical results were initially screened against the MCP Reportable Concentrations of Oil and Hazardous Material in Soil classified as S-1 (RCS-1) to establish whether the results triggered any 120-day reporting obligations to MassDEP. RCS-1 is considered applicable to the Site because it is located within 500 feet of a school.

- If a contaminant was determined to exceed RCS-1, the result was also screened against the Imminent Hazard threshold concentrations provided in 310 CMR 40.0321(2) to determine whether the results triggered a 2-hour reporting obligation to MassDEP. This requirement is considered applicable to soil samples collected from the Site between 0 and

12 inches below ground surface because it is located within 500 feet of a school and access to soils is not necessarily restricted by a fence or the presence of asphalt/concrete pavement.

5.2 VOC Analytical Results

Acetone was detected above laboratory detection limits in surface soil from 75ARC-SB01(0.20 mg/kg), 75ARC-SB02 (0.23 mg/kg), and 75ARC-SB03 (0.29 mg/kg) and subsurface soil from 75ARC-SB02 (0.089 mg/kg). Toluene was detected in all four surface samples and subsurface samples from 75ARC-SB01, 75ARC-SB03, and 75ARC-SB04. Benzene was detected in 75ARC-SB01 from 4 to 6 feet. All results are significantly lower than the MCP RCS-1 standards.

5.3 VPH Analytical Results

No samples collected during the November 19, 2018 investigation contained VPH compounds above laboratory reporting limits.

5.4 EPH/PAH Analytical Results

Seven of the ten soil samples collected during the November 19, 2018 investigation contained EPH hydrocarbon ranges and/or PAHs above laboratory detection limits. Each of the detected concentrations were below applicable MCP RCS-1 soil standards.

5.5 MCP Metals Analytical Results

The MCP metals analysis includes antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc. Each of the ten samples collected for metals analysis during the November 19, 2018 investigation contained at least one of these metals above laboratory detection limits. The results are summarized below:

- Antimony, selenium, silver, and thallium were not detected in any of the samples analyzed.

- Arsenic which was detected at imminent hazard concentrations on the adjacent Lowell High School property was reported at concentrations ranging between 4 and 12 milligrams per kilogram (mg/kg). These concentrations are below the MCP RCS-1 soil standard (20 mg/kg), and well below the imminent hazard threshold (40 mg/kg).

- Lead was detected above the MCP RCS-1 soil standard in two soil samples (75ARC-SB01 from 4-6 feet bgs (1,400 mg/kg) and 75ARC-SB04 from 4-6 feet bgs) (220 mg/kg). Both of

these soil borings were advanced in locations east of the existing building along the former alignment of Dutton Street. These concentrations trigger an obligation on the property owner or other responsible party to notify the MassDEP of the condition within 120 days unless the condition remediated within 120 days through an MCP limited remedial action (LRA).

- Each of the remaining metals were detected at concentrations below the MCP RCS-1 soil standards.

7.0 Phase II Conclusions

Nobis completed a Phase II site assessment for 75 Arcand Drive in Lowell, Massachusetts. The following summarizes the results of subsurface investigation activities performed by Nobis.

- 75 Arcand Drive is currently occupied by a pediatric dentist office. The City of Lowell has initiated the eminent domain process to acquire this parcel to expand the current high school. The objective of the Phase II was to evaluate subsurface environmental conditions of the Site that could be impacted by potential future construction activities regarding the expansion.

- Nobis advanced four soil borings around the north, east, and southwest perimeters of the parcel in areas potentially impacted by historical industrial use.

- Nobis field personnel recorded geological descriptions, field screened subsurface soils, and collected soil samples for laboratory analysis of VOCs, VPH, EPH, PAHs, and MCP metals. Two soil samples were collected from each soil boring for laboratory analysis: one soil sample from 0 to 2 feet bgs, and a second soil sample from 4 to 6 feet bgs. An additional soil sample was collected from 75ARC-SB03 and 75ARC-SB01 from a deeper interval.

- Geological descriptions of soil samples identified both historical fill materials and native soil exists at the Site. Several borings contained small amounts of debris, including glass and cobble.

- Soil sampling results indicate that trace to non-detect levels of volatile contamination (both VOCs and VPH) exist in the areas sampled. Therefore, no potential threat of vapor intrusion into school buildings was identified during the investigation, and volatile contaminants are unlikely to be of concern during potential future construction activities.

- Concentrations of lead detected in soil samples collected from 75ARC-SB01 and 75ARC-SB04 require the City to notify MassDEP of this release within 120 days of gaining knowledge if they currently own, or when they take ownership of the property. This condition represents the only reporting condition identified by this Phase II investigation.

- Soil contamination observed during the Phase II may be attributed to the presence of historical fill material and historical releases from the railroad tracks that run along the western portion of the property. Historical fill material often contains elevated levels of PAHs and metals. Therefore, fill material within the top 4 to 6 feet of soil at the Site should be considered potentially contaminated with urban fill constituents such as PAHs and metals.

8.0 Regulatory Reporting Requirements and Recommendations

The following subsections summarize the recommendations and/or any regulatory requirements resulting from the detection of contamination at the Site.

8.1 Regulatory Reporting Requirements

120-Day Reporting. As stated previously, the concentrations of lead in soil samples collected from 75ARC-SB01 and 75ARC-SB04 exceeded RCS-1, triggering a requirement for the owner/responsible party to notify MassDEP within 120-days of obtaining knowledge of the release.

This notification may be avoided if the contamination is remediated by performing a Limited Removal Action (LRA) (310 CMR 40.0318) within 120 days of obtaining knowledge. Although several provisions are associated with LRAs, the primary provision limitation is that soil must be excavated and recycled, and the excavated volume cannot exceed 20 cubic yards (cy).

8.2 Recommendations for Soil Remediation

No imminent hazards were identified during this Phase II investigation. Therefore, Nobis does not recommend immediate remedial actions.

8.3 Recommendations for Soil Management

Future construction activities at the Site will likely displace contaminated soil and may generate excess soil volume which will require characterization and removal. Contaminated soil

management during construction may be accomplished under the MCP Release Abatement Measure (RAM) process. The construction cost estimate for the project should include provisions for worker safety, soil stockpiling in accordance with Section 310 CMR 40.0030 of the MCP, soil pre-characterization, and transportation/disposal of soils under the MassDEP Bill of Lading (BOL) process at an appropriately licensed facility.

In areas where soils are expected to be displaced by construction activities, pre-characterization soil samples should be collected to identify potential off-site reuse or disposal options. The results of these laboratory analyses will assist with recommendations for soil handling and off-site reuse/disposal, as well as identify any health and safety protocols that should be incorporated into earthwork operations. In a very general sense, the types of soils that might be encountered at the Site during construction will fall into one or more of the following classifications:

- Class A-1: Soils meet the definition of background and are suitable for reuse without restrictions. Typically this means that there are no detectable concentrations of VOCs, PCBs, or TPH; and that SVOCs and metals are present at concentrations lower than the values published in Table 1 of the MassDEP Technical Guidance Document *Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil* (May 2002). This class is not likely applicable to this Site.

- Class A-2: Soils contain detectable concentrations of some contaminants above background, but all contaminants are present below RCS-1. This soil is not regulated for disposal under the MCP and is therefore eligible for off-site reuse provided that the material meets the MassDEP's anti-degradation or "similar soils" provision (310 CMR 40.0032[3][b]). This section of the MCP states that soils must not be reused at a location where "existing concentrations of oil and/or hazardous material…are significantly lower than the levels of those oil and/or hazardous materials present in the soil being disposed or reused." In other words, the soils cannot be reused at a location where they would increase the level of contamination already present at the receiving site. This class does not apply to this Site.

- Class B-1: Soils contain concentrations of at least one contaminant above RCS-1. These soils are regulated under the MCP and, in many cases, require reporting to MassDEP. These soils may be disposed in a lined or unlined landfill within Massachusetts provided that they meet the criteria established in MassDEP Policy #COMM-97-001, *Reuse and Disposal of Contaminated Soil in Massachusetts Landfills* (August 1997). This Class (unlined landfill) may apply to this Site.

- Class B-2: Soils contain concentrations of at least one contaminant above RCS-1 and the COMM-97 reuse criteria. These soils must be transported to an out-of-state landfill for disposal. This Class may apply to this Site.

The general information included in the section above is provided as guidance for planning purposes during the feasibility stage of this project. There are several nuances, including exemptions and variances that can be applied if specific observations of urban fill materials are made, that might be applicable to the Site as subsurface information is collected and evaluated. A Licensed Site Professional (LSP) should be involved with any soil management evaluations that are made during pre-design or construction, to ensure compliance with all applicable environmental laws and regulations.

9.0 REMEDIAL OPTIONS AND APPROXIMATE COST ESTIMATES

The sections that follow summarize approximate cost estimates associated with remediation of lead impacted soils detected during the Phase II investigations. The costs presented below are based on a limited set of Site-specific data, assumptions regarding nature and extent and remedial schedule, and the assumption that the soil is considered non-hazardous. As more characterization data becomes available, these costs can be adjusted accordingly.

9.1 Limited Removal Action

As noted in Section 8.1, a LRA for lead contaminated soil is limited excavation and off-site disposal/recycling of 20 cy of material or less. A summary of LRA costs are presented in the table below.

Item	Estimated Cost
LSP Services, LRA Oversight, and LRA Report Preparation	$6,500
Laboratory Analytical Services (lead analysis)	$1,000
Soil Excavation, Transportation and Disposal of Lead-Impacted Soil	$4,000
Total Estimated Costs	$11,500

9.2 Release Abatement Measure

As noted in Section 8.3, contaminated soil may be remediated and managed under a RAM during (but independent of) construction activities. Many RAM options are available to manage the contamination; however, they each will require additional characterization prior to implementation.

Excavation and off-site disposal

It should be noted that the soil excavation, transportation, and disposal costs are highly dependent on the volume of soil removal required to support construction activities and the types and concentrations of contaminants detected in disposal characterization samples. Cost estimates are based on the LRA soil volume (20 cy) and the maximum amount of soil removal allowed under a RAM plan by the MCP (1,500 cy) [310 CMR 40.0442 (5)]. These estimates should be considered approximate and would be refined as additional data becomes available.

Item	Estimated Cost
LSP Services, RAM Oversight and Sample Collection, and MCP Reporting	$12,000
Pre-characterization drilling program	$13,000
Laboratory Analytical Services (Landfill Disposal Criteria and Additional Lead Analysis)	$6,000
Soil Excavation, Transportation and Disposal of Lead Soil	$11,500 - $280,000
Total Estimated Costs	$42,500 - $311,000

On-site Management

Another RAM option would be to manage the contamination using a permanent horizontal barrier (such as asphalt, concrete, or a building slab) to cover the contamination preventing exposure. This option would be performed in a manner consistent with Massachusetts guidance and best management practices for management of urban fill materials. Unless removal of this contaminated soil is required as part of the construction, under this RAM alternative Nobis recommends pre-characterization of the nature and extent of the contamination, and to coordinate the planned construction design to install a permanent barrier over the in-place contaminated soil. This option assumes that the barrier (parking lot, building slab etc.) would be required regardless of the presence of contaminated soil. Therefore, the costs to perform such a RAM would be relatively low. A different approach to this option would be to excavate the contaminated soil and place it in an area on the Site designed to receive a parking area or similar permanent barrier.

Item	Estimated Cost
LSP Services, RAM Oversight and Sample Collection, and MCP Reporting	$12,000
Pre-characterization drilling program	$8,000
Laboratory Analytical Services (Landfill Disposal Criteria and Additional Lead Analysis)	$6,000
Total Estimated Costs	$26,000

It should also be noted that if RAM activities cannot be completed or a Permanent Solution Statement (310 CMR 40.1000) is not filed within 1 year of notifying MassDEP of the 120-day reporting condition, preparation and filing of a Phase I Initial Site Investigation (Phase I) Report (310 CMR 40.0480) and Tier Classification (310 CMR 40.0500) will be required. A summary of costs associated with preparation and filing of a Phase I Report and Tier Classification are provided below.

9.3 Phase I Report and Tier Classification

Costs to prepare a Phase I Report and Tier Classification are presented in the table below. In the absence of other Site-specific data, limited subsurface investigations may be required to delineate the extent of lead impacted soil around borings 75ARC-SB01 and 75ARC-SB-04 to support preparation of the Phase I Report.

Item	Estimated Cost
LSP Services, Subsurface Investigations, Preparation of Phase I Report and Tier Classification Submittals	$12,000
Laboratory Analytical Services (Delineation of Lead Soil)	$1,000
Direct Push Drilling Subcontractor	$2,000
Total Estimated Costs	$14,000

TABLES

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Table 1
Summary of Soil Analytical Results
Lowell High School - 75 Arcand Drive
Lowell, Massachusetts
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SAMPLE LOCATION	RCS-1	RCS-2	75ARC-SB01	75ARC-SB01	75ARC-SB01	75ARC-SB02	75ARC-SB02	75ARC-SB03	75ARC-SB03	75ARC-SB03	75ARC-SB04	75ARC-SB04	FD01	TB01
SAMPLE DATE			11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018
SAMPLE DEPTH (feet bgs)			0-2 Feet	4-6 Feet	10-12 Feet	0-2 Feet	4-6 Feet	0-2 Feet	4-6 Feet	8-10 Feet	0-2 Feet	4-6 Feet	4-6 Feet	4-6 Feet
MADEP-EPH-04-1.1 (mg/Kg dry)														
C9-C18 ALIPHATICS	1000	3000	ND (12)	ND (12)	ND (12)	ND (12)	ND (11)	ND (11)	ND (12)	ND (11)	ND (11)	ND (12)	ND (12)	NT
C19-C36 ALIPHATICS	3000	5000	17	ND (12)	ND (12)	35	ND (11)	ND (11)	13	ND (11)	ND (11)	ND (12)	ND (12)	NT
C11-C22 AROMATICS	1000	3000	33	19	ND (12)	24	ND (11)	12	ND (12)	ND (11)	ND (11)	12	ND (12)	NT
ACENAPHTHENE	4	3000	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
ACENAPHTHYLENE	1	10	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
ANTHRACENE	1000	3000	0.21	0.21	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
BENZO(A)ANTHRACENE	7	40	1.1	0.55	ND (0.12)	0.17	ND (0.11)	0.17	ND (0.12)	ND (0.11)	ND (0.11)	0.18	ND (0.12)	NT
BENZO(A)PYRENE	2	7	1.2	0.59	ND (0.12)	0.28	ND (0.11)	0.29	0.12	ND (0.11)	ND (0.11)	0.31	ND (0.12)	NT
BENZO(B)FLUORANTHENE	7	40	1.9	0.80	ND (0.12)	0.35	ND (0.11)	0.43	0.17	ND (0.11)	ND (0.11)	0.36	0.16	NT
BENZO(G,H,I)PERYLENE	1000	3000	0.97	0.57	0.22	0.25	ND (0.11)	0.25	0.29	ND (0.11)	ND (0.11)	0.76	0.30	NT
BENZO(K)FLUORANTHENE	70	400	0.68	0.29	ND (0.12)	ND (0.12)	ND (0.11)	0.13	ND (0.12)	ND (0.11)	ND (0.11)	0.13	ND (0.12)	NT
CHRYSENE	70	400	1.6	0.63	ND (0.12)	0.23	ND (0.11)	0.27	ND (0.12)	ND (0.11)	ND (0.11)	0.24	0.13	NT
DIBENZ(A,H)ANTHRACENE	0.7	4	0.21	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
FLUORANTHENE	1000	3000	2.9	1.4	0.13	0.43	ND (0.11)	0.46	0.17	ND (0.11)	ND (0.11)	0.48	0.24	NT
FLUORENE	1000	3000	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
INDENO(1,2,3-CD)PYRENE	7	40	0.96	0.42	ND (0.12)	0.18	ND (0.11)	0.22	ND (0.12)	ND (0.11)	ND (0.11)	0.19	ND (0.12)	NT
2-METHYLNAPHTHALENE	0.7	80	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
NAPHTHALENE	4	20	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.12)	NT
PHENANTHRENE	10	1000	1.3	1.1	ND (0.12)	0.21	ND (0.11)	0.22	ND (0.12)	ND (0.11)	ND (0.11)	0.25	0.16	NT
PYRENE	1000	3000	2.6	1.4	0.15	0.45	ND (0.11)	0.49	0.19	ND (0.11)	ND (0.11)	0.48	0.24	NT
MADEP-VPH-Feb 2018 Rev 2.1 (mg/Kg dry)														
UNADJUSTED C5-C8 ALIPHATICS	~	~	ND (14)	ND (12)	ND (11)	ND (12)	ND (15)	ND (14)	ND (12)	ND (8.9)	ND (13)	ND (14)	ND (11)	NT
C5-C8 ALIPHATICS	100	500	ND (14)	ND (12)	ND (11)	ND (12)	ND (15)	ND (14)	ND (12)	ND (8.9)	ND (13)	ND (14)	ND (11)	NT
UNADJUSTED C9-C12 ALIPHATICS	~	~	ND (14)	ND (12)	ND (11)	ND (12)	ND (15)	ND (14)	ND (12)	ND (8.9)	ND (13)	ND (14)	ND (11)	NT
C9-C12 ALIPHATICS	1000	3000	ND (14)	ND (12)	ND (11)	ND (12)	ND (15)	ND (14)	ND (12)	ND (8.9)	ND (13)	ND (14)	ND (11)	NT
C9-C10 AROMATICS	100	500	ND (14)	ND (12)	ND (11)	ND (12)	ND (15)	ND (14)	ND (12)	ND (8.9)	ND (13)	ND (14)	ND (11)	NT
SM 2540G (% Wt)														
% Solids	~	~	81.3	82.4	81.6	81.9	87.9	84.8	85.3	87.7	87.7	81.5	81.4	NT
SW-846 6010D (mg/Kg dry) Metals Digestion														
ANTIMONY	20	30	ND (2.1)	ND (2.0)	ND (2.0)	ND (2.0)	ND (1.9)	ND (2.0)	ND (1.9)	ND (1.9)	ND (1.9)	ND (2.0)	ND (2.0)	NT
ARSENIC	20	20	6.8	12	4.9	7.3	12	6.9	9.8	5.2	7.0	15	4.0	NT
BARIUM	1000	3000	32	200	30	31	31	18	33	16	24	43	26	NT
BERYLLIUM	90	200	0.39	0.31	0.38	0.35	0.54	0.24	0.36	0.31	0.33	0.44	0.43	NT
CADMIUM	70	100	0.28	0.93	ND (0.20)	0.28	0.36	0.25	0.33	ND (0.19)	0.23	0.53	ND (0.20)	NT
CHROMIUM	100	200	21	13	11	22	26	11	11	13	16	14	11	NT
LEAD	200	600	47	**1400**	90	33	34	36	200	5.0	16	**220**	40	NT
NICKEL	600	1000	13	13	8.1	15	17	7.5	9.0	11	12	17	7.5	NT
SELENIUM	400	700	ND (4.1)	ND (4.0)	ND (4.1)	ND (4.0)	ND (3.8)	ND (4.0)	ND (3.8)	ND (3.7)	ND (3.8)	ND (4.1)	ND (4.0)	NT
SILVER	100	200	ND (0.41)	ND (0.40)	ND (0.41)	ND (0.40)	ND (0.38)	ND (0.40)	ND (0.38)	ND (0.37)	ND (0.38)	ND (0.41)	ND (0.40)	NT
THALLIUM	8	60	ND (2.1)	ND (2.0)	ND (2.0)	ND (2.0)	ND (1.9)	ND (2.0)	ND (1.9)	ND (1.9)	ND (1.9)	ND (2.0)	ND (2.0)	NT
VANADIUM	400	700	18	15	14	17	21	9.9	13	11	16	17	15	NT
ZINC	1000	3000	41	240	32	42	24	23	42	32	21	44	27	NT

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Table 1
Summary of Soil Analytical Results
Lowell High School - 75 Arcand Drive
Lowell, Massachusetts

SAMPLE LOCATION	RCS-1	RCS-2	75ARC-SB01	75ARC-SB01	75ARC-SB01	75ARC-SB02	75ARC-SB02	75ARC-SB03	75ARC-SB03	75ARC-SB03	75ARC-SB04	75ARC-SB04	FD01	TB01
SAMPLE DATE			11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018
SAMPLE DEPTH (feet bgs)			0-2 Feet	4-6 Feet	10-12 Feet	0-2 Feet	4-6 Feet	0-2 Feet	4-6 Feet	8-10 Feet	0-2 Feet	4-6 Feet	4-6 Feet	4-6 Feet
SW-846 7471B (mg/Kg dry) Metals Digestion														
MERCURY	20	30	0.076	0.58	0.054	0.038	0.097	0.033	0.42	0.029	0.032	0.20	0.098	NT
SW-846 8260C (mg/Kg wet)														
ACETONE	6	50	0.20	ND (0.088)	ND (0.078)	0.23	0.089	0.29	ND (0.094)	ND (0.073)	ND (0.098)	ND (0.12)	ND (0.089)	ND (0.10)
TERT-AMYL METHYL ETHER	~	~	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
BENZENE	2	200	ND (0.0024)	0.0025	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
BROMOBENZENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
BROMOCHLOROMETHANE	~	~	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
BROMODICHLOROMETHANE	0.1	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
BROMOFORM	0.1	1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
BROMOMETHANE	0.5	0.5	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
2-BUTANONE (MEK)	4	50	ND (0.048)	ND (0.035)	ND (0.031)	ND (0.045)	ND (0.035)	ND (0.052)	ND (0.038)	ND (0.029)	ND (0.039)	ND (0.047)	ND (0.036)	ND (0.040)
N-BUTYLBENZENE	~	~	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
SEC-BUTYLBENZENE	~	~	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TERT-BUTYLBENZENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TERT-BUTYLETHYL ETHER	~	~	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
CARBON DISULFIDE	100	1000	ND (0.0073)	ND (0.0053)	ND (0.0047)	ND (0.0068)	ND (0.0052)	ND (0.0078)	ND (0.0056)	ND (0.0044)	ND (0.0059)	ND (0.0070)	ND (0.0054)	ND (0.0060)
CARBON TETRACHLORIDE	5	5	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
CHLOROBENZENE	1	3	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
CHLORODIBROMOMETHANE	0.005	0.03	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
CHLOROETHANE	100	1000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
CHLOROFORM	0.2	0.2	ND (0.0048)	ND (0.0035)	ND (0.0031)	ND (0.0045)	ND (0.0035)	ND (0.0052)	ND (0.0038)	ND (0.0029)	ND (0.0039)	ND (0.0047)	ND (0.0036)	ND (0.0040)
CHLOROMETHANE	100	1000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
2-CHLOROTOLUENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
4-CHLOROTOLUENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2-DIBROMO-3-CHLOROPROPANE	10	100	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2-DIBROMOETHANE (EDB)	0.1	0.1	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
DIBROMOMETHANE	500	5000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2-DICHLOROBENZENE	9	100	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,3-DICHLOROBENZENE	3	200	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,4-DICHLOROBENZENE	0.7	1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
DICHLORODIFLUOROMETHANE	1000	10000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
1,1-DICHLOROETHANE	0.4	9	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2-DICHLOROETHANE	0.1	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1-DICHLOROETHYLENE	3	40	ND (0.0048)	ND (0.0035)	ND (0.0031)	ND (0.0045)	ND (0.0035)	ND (0.0052)	ND (0.0038)	ND (0.0029)	ND (0.0039)	ND (0.0047)	ND (0.0036)	ND (0.0040)
CIS-1,2-DICHLOROETHYLENE	0.1	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TRANS-1,2-DICHLOROETHYLENE	1	1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2-DICHLOROPROPANE	0.1	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,3-DICHLOROPROPANE	500	5000	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
2,2-DICHLOROPROPANE	0.1	0.2	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1-DICHLOROPROPENE	0.01	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
CIS-1,3-DICHLOROPROPENE	0.01	0.1	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
TRANS-1,3-DICHLOROPROPENE	0.01	0.1	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)

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Table 1
Summary of Soil Analytical Results
Lowell High School - 75 Arcand Drive
Lowell, Massachusetts

SAMPLE LOCATION	RCS-1	RCS-2	75ARC-SB01	75ARC-SB01	75ARC-SB01	75ARC-SB02	75ARC-SB02	75ARC-SB03	75ARC-SB03	75ARC-SB03	75ARC-SB04	75ARC-SB04	FD01	TB01
SAMPLE DATE			11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018	11/19/2018
SAMPLE DEPTH (feet bgs)			0-2 Feet	4-6 Feet	10-12 Feet	0-2 Feet	4-6 Feet	0-2 Feet	4-6 Feet	8-10 Feet	0-2 Feet	4-6 Feet	4-6 Feet	4-6 Feet
DIETHYL ETHER	100	1000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
DIISOPROPYL ETHER	100	1000	ND (0.0012)	ND (0.00088)	ND (0.00078)	ND (0.0011)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
1,4-DIOXANE	0.2	6	ND (0.12)	ND (0.088)	ND (0.078)	ND (0.11)	ND (0.087)	ND (0.13)	ND (0.094)	ND (0.073)	ND (0.098)	ND (0.12)	ND (0.089)	ND (0.10)
ETHYLBENZENE	40	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
HEXACHLOROBUTADIENE	30	100	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
2-HEXANONE	100	1000	ND (0.024)	ND (0.018)	ND (0.016)	ND (0.023)	ND (0.017)	ND (0.026)	ND (0.019)	ND (0.015)	ND (0.020)	ND (0.023)	ND (0.018)	ND (0.020)
ISOPROPYLBENZENE	1000	10000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
P-ISOPROPYLTOLUENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
METHYL TERT-BUTYL ETHER (MTB	0.1	100	ND (0.0048)	ND (0.0035)	ND (0.0031)	ND (0.0045)	ND (0.0035)	ND (0.0052)	ND (0.0038)	ND (0.0029)	ND (0.0039)	ND (0.0047)	ND (0.0036)	ND (0.0040)
METHYLENE CHLORIDE	0.1	20	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
4-METHYL-2-PENTANONE (MIBK)	0.4	50	ND (0.024)	ND (0.018)	ND (0.016)	ND (0.023)	ND (0.017)	ND (0.026)	ND (0.019)	ND (0.015)	ND (0.020)	ND (0.023)	ND (0.018)	ND (0.020)
NAPHTHALENE	4	20	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0038)	ND (0.0029)	ND (0.0039)	ND (0.0047)	ND (0.0036)	ND (0.010)
N-PROPYLBENZENE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
STYRENE	3	4	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1,1,2-TETRACHLOROETHANE	0.1	0.1	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1,2,2-TETRACHLOROETHANE	0.005	0.02	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.00087)	ND (0.0013)	ND (0.00094)	ND (0.00073)	ND (0.00098)	ND (0.0012)	ND (0.00089)	ND (0.0010)
TETRACHLOROETHYLENE	1	10	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TETRAHYDROFURAN	500	5000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
TOLUENE	30	1000	0.0044	0.012	ND (0.0016)	0.0081	ND (0.0017)	0.0058	ND (0.0019)	0.0053	0.0034	0.0076	ND (0.0018)	ND (0.0020)
1,2,3-TRICHLOROBENZENE	~	~	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2,4-TRICHLOROBENZENE	2	6	ND (0.0048)	ND (0.0035)	ND (0.0031)	ND (0.0045)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1,1-TRICHLOROETHANE	30	600	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,1,2-TRICHLOROETHANE	0.1	2	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TRICHLOROETHYLENE	0.3	0.3	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
TRICHLOROFLUOROMETHANE	1000	10000	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
1,2,3-TRICHLOROPROPANE	100	1000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,2,4-TRIMETHYLBENZENE	1000	10000	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
1,3,5-TRIMETHYLBENZENE	10	100	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)
VINYL CHLORIDE	0.7	0.7	ND (0.012)	ND (0.0088)	ND (0.0078)	ND (0.011)	ND (0.0087)	ND (0.013)	ND (0.0094)	ND (0.0073)	ND (0.0098)	ND (0.012)	ND (0.0089)	ND (0.010)
M/P-XYLENE	100	100	ND (0.0048)	ND (0.0035)	ND (0.0031)	ND (0.0045)	ND (0.0035)	ND (0.0052)	ND (0.0038)	ND (0.0029)	ND (0.0039)	ND (0.0047)	ND (0.0036)	ND (0.0040)
O-XYLENE	100	100	ND (0.0024)	ND (0.0018)	ND (0.0016)	ND (0.0023)	ND (0.0017)	ND (0.0026)	ND (0.0019)	ND (0.0015)	ND (0.0020)	ND (0.0023)	ND (0.0018)	ND (0.0020)

NOTES:
1. RCS-1 = Reportable Concentrations for Category S-1 Soil
2. RCS-2 = Reportable Concentrations for Category S-2 Soil
3. ND = Not detected above the lab reporting limits shown in parenthesis.
4. NT = Not tested.
5. ~ = No RCS-1 available
6. Shaded values exceed the applicable MCP Reportable Concentrations (RCs).

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FIGURES

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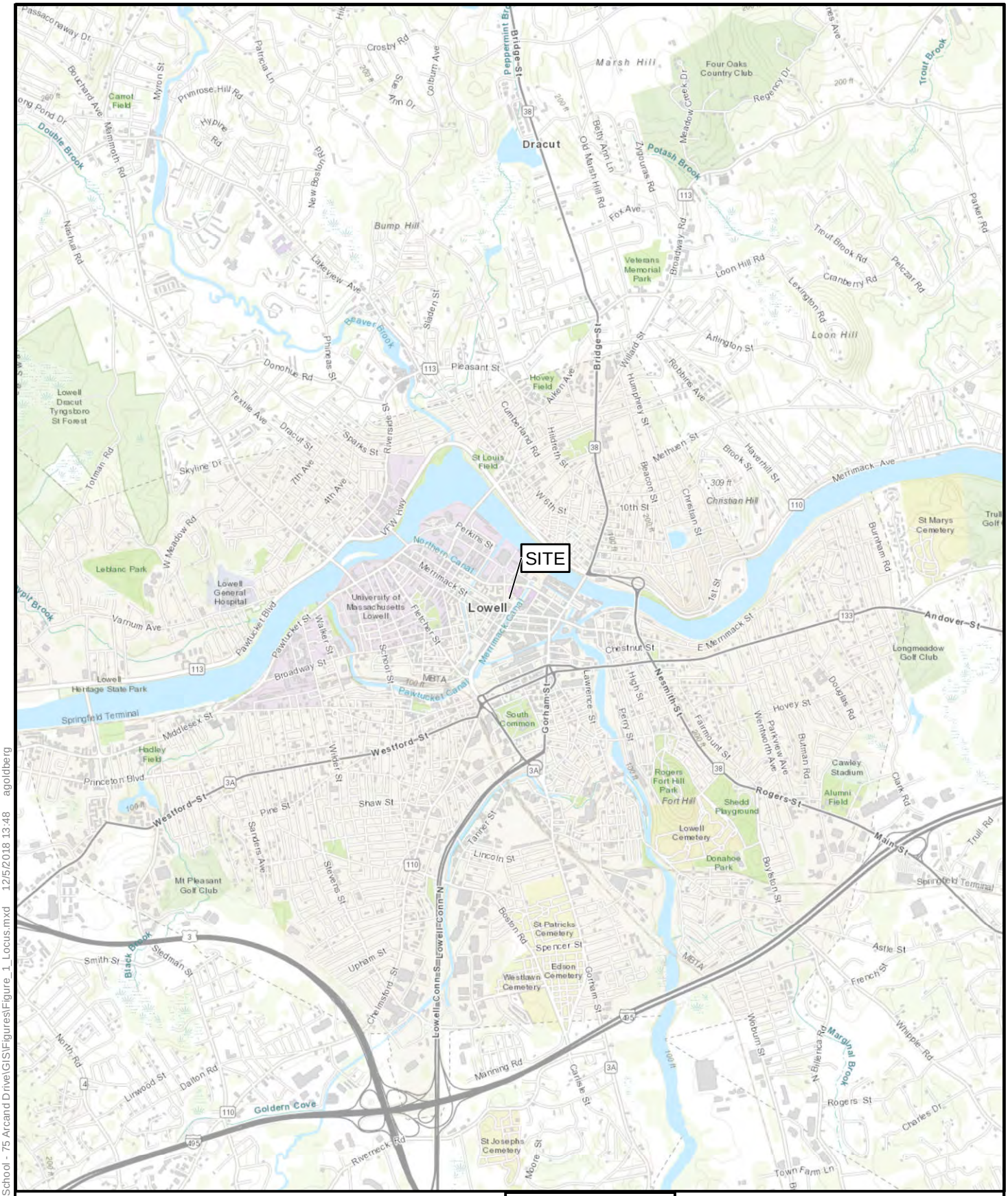

nobis

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www.nobis-group.com

FIGURE 1

SITE LOCUS
75 ARCAND DRIVE
LOWELL HIGH SCHOOL
LOWELL, MASSACHUSETTS

PREPARED BY: AG	APROVED BY: DM
PROJECT NO. 91830.04	DATE: DEC. 2018

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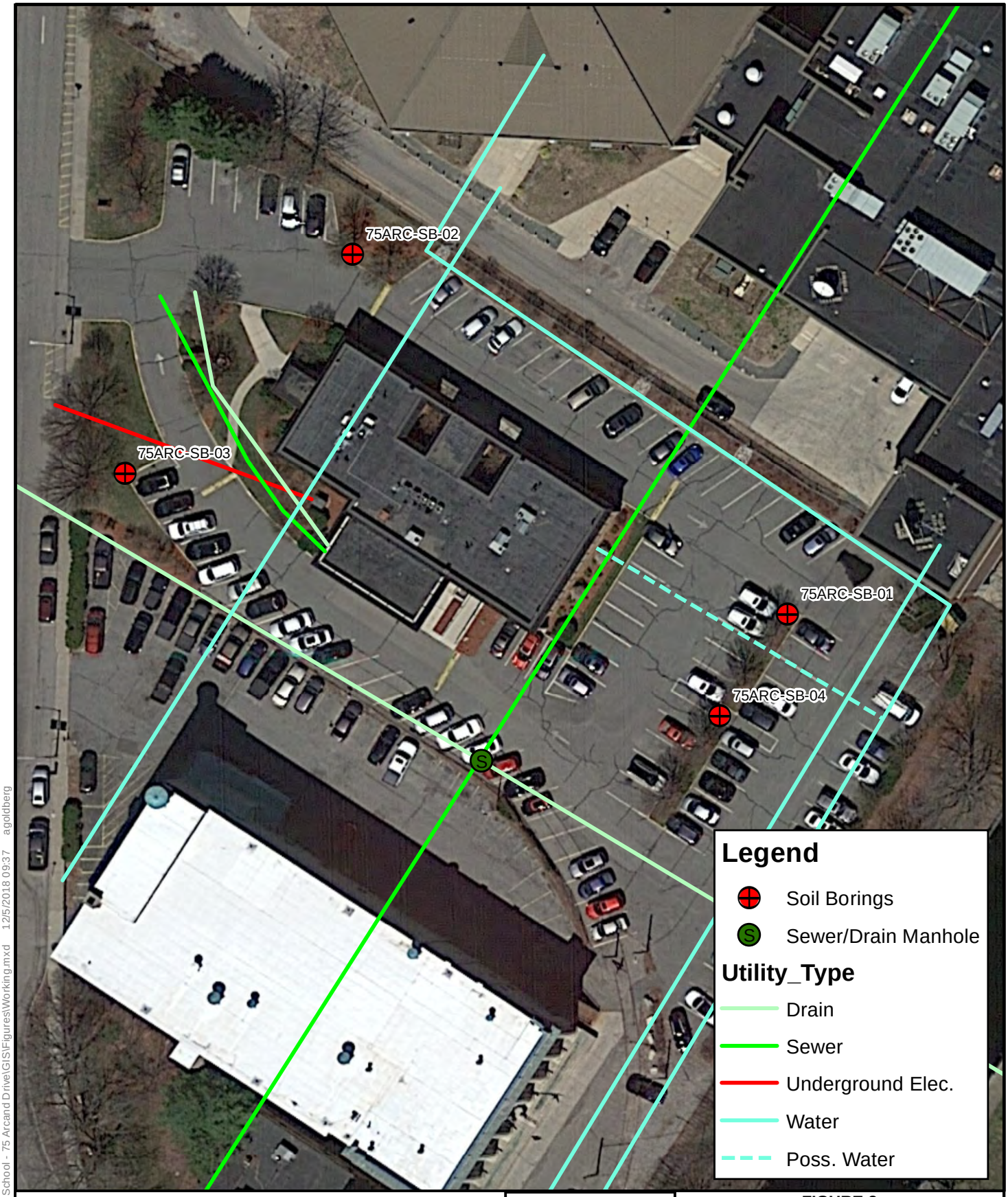

0 25 50 100

Feet

1 inch = 50 feet

N

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FIGURE 2

BORING LOCATION MAP
75 ARCAND DRIVE
LOWELL HIGH SCHOOL
LOWELL, MASSACHUSETTS

PREPARED BY: DFM	APPROVED BY: DFM
PROJECT NO. 91830.04	DATE: DEC. 2018

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APPENDIX A

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APPENDIX A
LIMITATIONS

1) These environmental services were performed in accordance with generally accepted practices of other consultants undertaking similar assessments at the same time and in the same geographical area. The results of this assessment are based on our professional judgment and are not scientific certainties. Specifically, Nobis Engineering, Inc. does not and cannot represent that the site contains no hazardous wastes, oil or other latent conditions beyond those observed during this assessment. No other warranty, express or implied, is made.

2) The observations and conclusions presented in this report were made solely on the basis of conditions described in the report and not on scientific tasks or procedures beyond the scope of described services or the budgetary and time constraints imposed by the client.

3) Observations were made of the site as indicated in this report. Where access to portions of the site was unavailable or limited, Nobis Engineering, Inc. renders no opinion as to the presence of hazardous wastes or the presence of indirect evidence of hazardous wastes in that portion of the site.

4) No property boundary, site feature or topographic surveys of the site were performed by Nobis Engineering, Inc. unless specifically indicated in the text of the report.

5) No sampling or testing was performed for the presence of dioxins, furans, pesticides, herbicides, radon, lead paint, urea-formaldehyde, asbestos or polychlorinated biphenyls (PCBs) at the site unless specifically indicated in the text of the report.

6) Chemical analyses have been performed for specific parameters during this assessment, as described in the text of the report. Additional chemical constituents not searched for during the current study may be present in soil and/or groundwater at the site. In addition, where such analyses have been conducted by an outside laboratory, Nobis Engineering, Inc. has relied upon the data provided and has not conducted an independent evaluation of the reliability of these data.

7) This report has been prepared for the exclusive use of Perkins Eastman and the City of Lowell solely for use in an environmental evaluation of the site. This report shall not, in whole or in part, be conveyed to any other party, other than Perkins Eastman or the City of Lowell without prior written consent of Nobis Engineering, Inc.

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APPENDIX B

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BORING LOG

Nobis — Engineering a Sustainable Future

Project: Lowell High School - 75 Arcand Drive

Location: 75 Arcand Drive

Nobis Project No.: 91830.04

Boring No.: **75ARC-SB01**

Boring Location: See Site Plan

Checked by: D. McGrath

Date Start: November 19, 2018

Date Finish: November 19, 2018

Contractor: Drilex Environmental, Inc.

Driller: T. LaFleche

Nobis Rep.: A. Goldberg

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1 3/4"	1.75 x 60
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-2		0.3				S-1: Brown, fine to coarse SAND, some Silt, little fine Gravel, little Organics. moist. Sample collected from hand auger.	
5	S-2		4-5		0.2				S-2: Black/gray, fine SAND and Silt. some Cobbles, trace Glass. moist. Hand augered to 5 feet, hit refusal on cobbles.	
6	S-3	38	5-10						S-3A (12"): Gray/brown, fine to coarse SAND, some fine to coarse Gravel, some Silt. moist.	
7					0.0				S-3B (26"): Brown, fine to coarse SAND, some Silt, trace fine Gravel. moist.	
8								SILTY SAND		
11	S-4	31	10-15		0.3				S-4A (12"): Dark brown, fine to medium SAND, some Silt, trace fine Gravel. wet.	
									S-4B (19"): Gray/brown, fine to coarse SAND. wet.	
15								/ 15.0		
16									Boring terminated at 15 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Boring was pre-cleared to 5 feet bgs. Sample was collected from 0-2 feet using a hand auger for laboratory analysis. Auger refusal on cobbles at 5 feet. Samples collected from 4-6 and 10-12 feet were collected from Geoprobe sleeve.
2) Field Duplicate sample was collected from 10-12 feet.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Engineering a Sustainable Future

Project: Lowell High School - 75 Arcand Drive

Location: 75 Arcand Drive

Nobis Project No.: 91830.04

Boring No.: **75ARC-SB02**

Boring Location: See Site Plan

Checked by: D. McGrath

Date Start: November 19, 2018

Date Finish: November 19, 2018

Contractor: Drilex Environmental, Inc.

Driller: T. LaFleche

Nobis Rep.: A. Goldberg

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1 3/4"	1.75 x 60
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-2		0.05				S-1: Brown, fine to coarse SAND, some Silt, trace fine Gravel, trace Organics. moist. Sample collected from hand auger.	
5	S-2		4-6		0.03				S-2: Black, fine to coarse SAND, some fine to coarse Gravel, trace Silt. moist. Sample collected from hand auger.	
								SAND		
7	S-3	25	6-10		0.05				S-3: Brown, fine to coarse SAND, trace fine to coarse Gravel, trace Silt, trace Cobbles. wet. Crushed stone from 15-19".	
10								/ 10.0		
11									Boring terminated at 10 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Boring was pre-cleared to 6 feet bgs. Samples were collected from 0-2 feet and 4-6 feet using a hand auger for laboratory analysis.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Lowell High School - 75 Arcand Drive

Location: 75 Arcand Drive

Nobis Project No.: 91830.04

Boring No.: **75ARC-SB03**

Boring Location: See Site Plan

Checked by: D. McGrath

Date Start: November 19, 2018

Date Finish: November 19, 2018

Contractor: Drilex Environmental, Inc.

Driller: T. LaFleche

Nobis Rep.: A. Goldberg

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1 3/4"	1.75 x 60
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-2		0.0				S-1: Brown, fine to coarse SAND, some Silt, trace fine Gravel, trace Organics. dry. Sample collected from hand auger.	
2										
3										
4										
5	S-2		4-6		0.0				S-2: Brown, fine to coarse SAND, little Silt, trace fine to coarse Gravel, trace Cobbles. moist. Sample collected from hand auger.	
6										
7	S-3	22	6-10		2.1				S-3: Brown, fine to coarse SAND, some Silt, little fine Gravel, trace Cobbles. wet.	
8								SAND		
9										
10										
11	S-4	43	10-15		0.7				S-4: Brown, fine to coarse SAND, trace Silt. wet.	
12										
13										
14										
15								/ 15.0		
16									Boring terminated at 15 feet.	
17										
18										
19										
20										
21										
22										
23										
24										
25										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Boring was pre-cleared to 6 feet bgs. Samples were collected from 0-2 feet and 4-6 feet using a hand auger for laboratory analysis. Sample from 8-10 feet was collected from Geoprobe sleeve for laboratory analysis.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Lowell High School - 75 Arcand Drive		Boring No.: **75ARC-SB04**
		Boring Location: See Site Plan
Location: 75 Arcand Drive		Checked by: D. McGrath
Nobis Project No.: 91830.04		Date Start: November 19, 2018
		Date Finish: November 19, 2018
Contractor: Drilex Environmental, Inc.	Rig Type / Model: Geoprobe 6620DT	Ground Surface Elev.:
Driller: T. LaFleche	Hammer Type: N/A	
Nobis Rep.: A. Goldberg	Hammer Hoist: N/A	Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1 3/4"	1.75 x 60
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-2		1.2				S-1: Brown, fine to coarse SAND, some Silt, trace fine to coarse Gravel, trace Organics. moist. Sample collected from hand auger.	
2										
3								SAND		
4										
5	S-2		4-6		0.7				S-2: Brown, fine to coarse SAND, some Silt, trace fine to coarse Gravel. moist. Sample collected from hand auger.	
6								/ 6.0		
7	S-3	29	6-10		0.0				S-3: Light brown, SILT and fine Sand, trace Organic Fibers. moist.	
8										
9										
10										
11	S-4	52	10-15		0.4			SILT & SAND	S-4A (38"): Brown, SILT and fine Sand. wet. Black silt observed from 12-15".	
12										
13										
14									S-4B (16"): Brown, fine to coarse SAND. wet.	
15								/ 15.0		
16									Boring terminated at 15 feet.	
17										
18										
19										
20										
21										
22										
23										
24										
25										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Boring was pre-cleared to 6 feet bgs. Samples were collected from 0-2 feet and 4-6 feet using a hand auger for laboratory analysis.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

APPENDIX C

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con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

December 3, 2018

Denis McGrath
Nobis Engineering
585 Middlesex Street
Lowell, MA 01851

Project Location: 75 Arcand Drive, Lowell, MA
Client Job Number:
Project Number: 91830.04
Laboratory Work Order Number: 18K0939

Enclosed are results of analyses for samples received by the laboratory on November 20, 2018. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Emily E. Snyder
Project Manager

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Table of Contents

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con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Nobis Engineering
585 Middlesex Street
Lowell, MA 01851
ATTN: Denis McGrath

REPORT DATE: 12/3/2018

PURCHASE ORDER NUMBER: MO 16-008

PROJECT NUMBER: 91830.04

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 18K0939

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: 75 Arcand Drive, Lowell, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
75ARC-SB01-0002'	18K0939-01	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	
75ARC-SB01-0406'	18K0939-02	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	
75ARC-SB01-1012'	18K0939-03	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	
75ARC-SB02-0002'	18K0939-04	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	
75ARC-SB02-0406'	18K0939-05	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	
75ARC-SB03-0002'	18K0939-06	Soil		MADEP-EPH-04-1.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8260C	

con-test® ANALYTICAL LABORATORY
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Nobis Engineering
585 Middlesex Street
Lowell, MA 01851
ATTN: Denis McGrath

REPORT DATE: 12/3/2018

PURCHASE ORDER NUMBER: MO 16-008

PROJECT NUMBER: 91830.04

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 18K0939

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: 75 Arcand Drive, Lowell, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
75ARC-SB03-0406'	18K0939-07	Soil		MADEP-EPH-04-1.1 MADEP-VPH-Feb 2018 Rev 2.1 SM 2540G SW-846 6010D SW-846 7471B SW-846 8260C	
75ARC-SB03-0810'	18K0939-08	Soil		MADEP-EPH-04-1.1 MADEP-VPH-Feb 2018 Rev 2.1 SM 2540G SW-846 6010D SW-846 7471B SW-846 8260C	
75ARC-SB04-0002'	18K0939-09	Soil		MADEP-EPH-04-1.1 MADEP-VPH-Feb 2018 Rev 2.1 SM 2540G SW-846 6010D SW-846 7471B SW-846 8260C	
75ARC-SB04-0406'	18K0939-10	Soil		MADEP-EPH-04-1.1 MADEP-VPH-Feb 2018 Rev 2.1 SM 2540G SW-846 6010D SW-846 7471B SW-846 8260C	
FD01	18K0939-11	Soil		MADEP-EPH-04-1.1 MADEP-VPH-Feb 2018 Rev 2.1 SM 2540G SW-846 6010D SW-846 7471B SW-846 8260C	
TB01	18K0939-12	Trip Blank Soil		MADEP-VPH-Feb 2018 Rev 2.1 SW-846 8260C	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method MA VPH only hydrocarbon ranges were requested and reported.

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

MADEP-EPH-04-1.1

Qualifications:

B

Analyte is found in the associated laboratory blank as well as in the sample.

Analyte & Samples(s) Qualified:

n-Octadecane
B217946-BS1, B217946-BSD1

MS-07A

Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possiblity of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

n-Nonane
B217946-MS1, B217946-MSD1

MADEP-VPH-Feb 2018 Rev 2.1

Qualifications:

O-01

Soil/methanol ratio does not meet method specifications. Excess amount of soil. Sample was completely covered with methanol, but with less than the method-specified amount.

Analyte & Samples(s) Qualified:

18K0939-02[75ARC-SB01-0406'], 18K0939-03[75ARC-SB01-1012'], 18K0939-08[75ARC-SB03-0810'], 18K0939-11[FD01]

SW-846 8260C

Qualifications:

L-02

Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.

Analyte & Samples(s) Qualified:

2-Butanone (MEK)
B217916-BS1, B217916-BSD1, B218022-BS1, B218022-BSD1, S029739-CCV1

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Methylene Chloride
18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

Tetrahydrofuran
18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

Vinyl Chloride
18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

L-06

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the high side.

Analyte & Samples(s) Qualified:

Acetone
18K0939-01[75ARC-SB01-0002'], 18K0939-04[75ARC-SB02-0002'], 18K0939-05[75ARC-SB02-0406'], 18K0939-06[75ARC-SB03-0002'], B217916-BS1, B217916-BSD1, B218022-BS1, B218022-BSD1, S029739-CCV1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

2-Hexanone (MBK)
B217916-BSD1

Diisopropyl Ether (DIPE)
B218094-BSD1

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Acetone

18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

V-05

Continuing calibration did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Chloromethane

18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

Methylene Chloride

18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

Tetrahydrofuran

18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], B218094-BLK1, B218094-BS1, B218094-BSD1, S029829-CCV1

V-16

Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.

Analyte & Samples(s) Qualified:

1,4-Dioxane

18K0939-01[75ARC-SB01-0002'], 18K0939-02[75ARC-SB01-0406'], 18K0939-03[75ARC-SB01-1012'], 18K0939-04[75ARC-SB02-0002'], 18K0939-05[75ARC-SB02-0406'], 18K0939-06[75ARC-SB03-0002'], 18K0939-07[75ARC-SB03-0406'], 18K0939-08[75ARC-SB03-0810'], 18K0939-09[75ARC-SB04-0002'], 18K0939-10[75ARC-SB04-0406'], 18K0939- 11[FD01], 18K0939-12[TB01], B217916-BLK1, B217916-BS1, B217916-BSD1, B218022-BLK1, B218022-BS1, B218022-BSD1, B218094-BLK1, B218094-BS1, B218094-BSD1, S029739-CCV1, S 029811-CCV1, S029829-CCV1

1,4-Dioxane (SIM)

18K0939-01[75ARC-SB01-0002'], 18K0939-02[75ARC-SB01-0406'], 18K0939-03[75ARC-SB01-1012'], 18K0939-04[75ARC-SB02-0002'], B217916-BLK1, B217916-BS1, B217916-BSD1, S029739-CCV1

Tetrahydrofuran

18K0939-01[75ARC-SB01-0002'], 18K0939-02[75ARC-SB01-0406'], 18K0939-03[75ARC-SB01-1012'], 18K0939-04[75ARC-SB02-0002'], 18K0939-05[75ARC-SB02-0406'], 18K0939-06[75ARC-SB03-0002'], 18K0939-12[TB01], B217916-BLK1, B217916-BS1, B217916-BSD1, B218022-BLK1, B218022-BS1, B218022-BSD1, S029739-CCV1, S029811-CCV1

V-20

Continuing calibration did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

1,4-Dioxane

B217916-BS1, B217916-BSD1, S029739-CCV1

Carbon Tetrachloride

B218094-BS1, B218094-BSD1, S029829-CCV1

Tetrahydrofuran

S029811-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Bromomethane

B217916-BS1, B217916-BSD1, B218022-BS1, B218022-BSD1, S029739-CCV1, S029811-CCV1

V-36

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

1,4-Dioxane

B217916-BS1, B217916-BSD1, B218022-BS1, B218022-BSD1, S029739-CCV1, S029811-CCV1

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MADEP-EPH-04-1.1

SPE cartridge contamination with non-petroleum compounds, if present, is verified by GC/MS in each method blank per extraction batch and excluded from C 11-C22 aromatic range fraction in all samples in the batch. No significant modifications were made to the method.

MADEP-VPH-Feb 2018 Rev 2.1

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

No significant modifications were made to the method. All VPH samples were received preserved properly in methanol with a soil/methanol ratio of 1:1 +/- 25% completely covered by methanol in the proper containers specified on the chain-of-custody form unless specified in this narrative.

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

SW-846 8260C

Laboratory control sample recoveries for required MCP Data Enhancement 8260 compounds were all within limits specified by the method except for “difficult analytes” where recovery control limits of 40-160% are used and/or unless otherwise listed in this narrative. Difficult analytes: MIBK, MEK, acetone, 1,4-dioxane, chloromethane, dichlorodifluoromethane, 2-hexanone, and bromomethane.

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Tod E. Kopyscinski
Laboratory Director

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	0.20	0.12	mg/Kg dry	1	L-06	SW-846 8260C	11/27/18	11/27/18 14:17	BRF
tert-Amyl Methyl Ether (TAME)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Benzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Bromobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Bromochloromethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Bromodichloromethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Bromoform	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Bromomethane	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
2-Butanone (MEK)	ND	0.048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
n-Butylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
sec-Butylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
tert-Butylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Carbon Disulfide	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Carbon Tetrachloride	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Chlorobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Chlorodibromomethane	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Chloroethane	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Chloroform	ND	0.0048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Chloromethane	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
2-Chlorotoluene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
4-Chlorotoluene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2-Dibromoethane (EDB)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Dibromomethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2-Dichlorobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,3-Dichlorobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,4-Dichlorobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Dichlorodifluoromethane (Freon 12)	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1-Dichloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2-Dichloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1-Dichloroethylene	ND	0.0048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
cis-1,2-Dichloroethylene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
trans-1,2-Dichloroethylene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2-Dichloropropane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,3-Dichloropropane	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
2,2-Dichloropropane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1-Dichloropropene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
cis-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
trans-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Diethyl Ether	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Diisopropyl Ether (DIPE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,4-Dioxane	ND	0.12	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,4-Dioxane (SIM)	ND	0.048	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:17	BRF

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Hexachlorobutadiene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
2-Hexanone (MBK)	ND	0.024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Isopropylbenzene (Cumene)	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
p-Isopropyltoluene (p-Cymene)	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Methyl tert-Butyl Ether (MTBE)	ND	0.0048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Methylene Chloride	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
4-Methyl-2-pentanone (MIBK)	ND	0.024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Naphthalene	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
n-Propylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Styrene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1,1,2-Tetrachloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1,2,2-Tetrachloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Tetrachloroethylene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Tetrahydrofuran	ND	0.012	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Toluene	0.0044	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2,3-Trichlorobenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2,4-Trichlorobenzene	ND	0.0048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1,1-Trichloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,1,2-Trichloroethane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Trichloroethylene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Trichlorofluoromethane (Freon 11)	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2,3-Trichloropropane	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,2,4-Trimethylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
1,3,5-Trimethylbenzene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
Vinyl Chloride	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
m+p Xylene	ND	0.0048	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF
o-Xylene	ND	0.0024	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:17	BRF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	96.5	70-130		11/27/18 14:17
Toluene-d8	97.6	70-130		11/27/18 14:17
4-Bromofluorobenzene	101	70-130		11/27/18 14:17

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
C19-C36 Aliphatics	17	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Unadjusted C11-C22 Aromatics	48	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
C11-C22 Aromatics	33	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Anthracene	0.21	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Benzo(a)anthracene	1.1	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Benzo(a)pyrene	1.2	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Benzo(b)fluoranthene	1.9	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Benzo(g,h,i)perylene	0.97	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Benzo(k)fluoranthene	0.68	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Chrysene	1.6	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Dibenz(a,h)anthracene	0.21	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Fluoranthene	2.9	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Indeno(1,2,3-cd)pyrene	0.96	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Phenanthrene	1.3	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB
Pyrene	2.6	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 10:50	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	63.5	40-140		11/30/18 10:50
o-Terphenyl (OTP)	73.2	40-140		11/30/18 10:50
2-Bromonaphthalene	102	40-140		11/30/18 10:50
2-Fluorobiphenyl	107	40-140		11/30/18 10:50

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.03

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 22:46	EEH
C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 22:46	EEH
Unadjusted C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 22:46	EEH
C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 22:46	EEH
C9-C10 Aromatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 22:46	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	103	70-130		11/21/18 22:46
2,5-Dibromotoluene (PID)	102	70-130		11/21/18 22:46

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Arsenic	6.8	2.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Barium	32	2.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Beryllium	0.39	0.21	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Cadmium	0.28	0.21	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Chromium	21	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Lead	47	0.62	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Mercury	0.076	0.030	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:46	AJL
Nickel	13	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Selenium	ND	4.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Silver	ND	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Thallium	ND	2.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Vanadium	18	0.83	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB
Zinc	41	0.83	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 16:56	EJB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0002' | Sampled: 11/19/2018 10:20

Sample ID: 18K0939-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.3		% Wt	1		SM 2540G	11/26/18	11/27/18 15:35	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' | Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
tert-Amyl Methyl Ether (TAME)	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Benzene	0.0025	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Bromobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Bromochloromethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Bromodichloromethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Bromoform	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Bromomethane	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
2-Butanone (MEK)	ND	0.035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
n-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
sec-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
tert-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
tert-Butyl Ethyl Ether (TBEE)	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Carbon Disulfide	ND	0.0053	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Carbon Tetrachloride	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Chlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Chlorodibromomethane	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Chloroethane	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Chloroform	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Chloromethane	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
2-Chlorotoluene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
4-Chlorotoluene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2-Dibromoethane (EDB)	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Dibromomethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,3-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,4-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Dichlorodifluoromethane (Freon 12)	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1-Dichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2-Dichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1-Dichloroethylene	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
cis-1,2-Dichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
trans-1,2-Dichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2-Dichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,3-Dichloropropane	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
2,2-Dichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1-Dichloropropene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
cis-1,3-Dichloropropene	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
trans-1,3-Dichloropropene	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Diethyl Ether	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Diisopropyl Ether (DIPE)	ND	0.00088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,4-Dioxane	ND	0.088	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,4-Dioxane (SIM)	ND	0.035	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:46	BRF

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Hexachlorobutadiene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
2-Hexanone (MBK)	ND	0.018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Isopropylbenzene (Cumene)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
p-Isopropyltoluene (p-Cymene)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Methyl tert-Butyl Ether (MTBE)	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Methylene Chloride	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
4-Methyl-2-pentanone (MIBK)	ND	0.018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Naphthalene	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
n-Propylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Styrene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1,1,2-Tetrachloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1,2,2-Tetrachloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Tetrachloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Tetrahydrofuran	ND	0.0088	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Toluene	0.012	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2,3-Trichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2,4-Trichlorobenzene	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1,1-Trichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,1,2-Trichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Trichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Trichlorofluoromethane (Freon 11)	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2,3-Trichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,2,4-Trimethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
1,3,5-Trimethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
Vinyl Chloride	ND	0.0088	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
m+p Xylene	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF
o-Xylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 14:46	BRF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	97.8	70-130		11/27/18 14:46
Toluene-d8	98.1	70-130		11/27/18 14:46
4-Bromofluorobenzene	103	70-130		11/27/18 14:46

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
C19-C36 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Unadjusted C11-C22 Aromatics	27	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
C11-C22 Aromatics	19	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Anthracene	0.21	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Benzo(a)anthracene	0.55	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Benzo(a)pyrene	0.59	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Benzo(b)fluoranthene	0.80	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Benzo(g,h,i)perylene	0.57	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Benzo(k)fluoranthene	0.29	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Chrysene	0.63	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Fluoranthene	1.4	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Indeno(1,2,3-cd)pyrene	0.42	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Phenanthrene	1.1	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB
Pyrene	1.4	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:55	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	67.9	40-140		11/30/18 14:55
o-Terphenyl (OTP)	79.9	40-140		11/30/18 14:55
2-Bromonaphthalene	111	40-140		11/30/18 14:55
2-Fluorobiphenyl	120	40-140		11/30/18 14:55

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' | Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Sample Flags: O-01

Soil/Methanol Preservation Ratio: 1.29

Petroleum Hydrocarbons Analyses - VPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:15	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:15	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:15	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:15	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:15	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	112	70-130		11/21/18 23:15
2,5-Dibromotoluene (PID)	109	70-130		11/21/18 23:15

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Arsenic	12	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Barium	200	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Beryllium	0.31	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Cadmium	0.93	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Chromium	13	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Lead	1400	0.60	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Mercury	0.58	0.030	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:48	AJL
Nickel	13	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Selenium	ND	4.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Silver	ND	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Vanadium	15	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB
Zinc	240	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:01	EJB

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-0406' Sampled: 11/19/2018 10:20

Sample ID: 18K0939-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.4		% Wt	1		SM 2540G	11/26/18	11/27/18 15:35	MJR

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' | Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
tert-Amyl Methyl Ether (TAME)	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Benzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Bromobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Bromochloromethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Bromodichloromethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Bromoform	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Bromomethane	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
2-Butanone (MEK)	ND	0.031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
n-Butylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
sec-Butylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
tert-Butylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
tert-Butyl Ethyl Ether (TBEE)	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Carbon Disulfide	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Carbon Tetrachloride	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Chlorobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Chlorodibromomethane	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Chloroethane	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Chloroform	ND	0.0031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Chloromethane	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
2-Chlorotoluene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
4-Chlorotoluene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2-Dibromoethane (EDB)	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Dibromomethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2-Dichlorobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,3-Dichlorobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,4-Dichlorobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Dichlorodifluoromethane (Freon 12)	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1-Dichloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2-Dichloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1-Dichloroethylene	ND	0.0031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
cis-1,2-Dichloroethylene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
trans-1,2-Dichloroethylene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2-Dichloropropane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,3-Dichloropropane	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
2,2-Dichloropropane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1-Dichloropropene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
cis-1,3-Dichloropropene	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
trans-1,3-Dichloropropene	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Diethyl Ether	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Diisopropyl Ether (DIPE)	ND	0.00078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,4-Dioxane	ND	0.078	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,4-Dioxane (SIM)	ND	0.031	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:11	BRF

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' | Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Hexachlorobutadiene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
2-Hexanone (MBK)	ND	0.016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Isopropylbenzene (Cumene)	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
p-Isopropyltoluene (p-Cymene)	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Methyl tert-Butyl Ether (MTBE)	ND	0.0031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Methylene Chloride	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
4-Methyl-2-pentanone (MIBK)	ND	0.016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Naphthalene	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
n-Propylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Styrene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1,1,2-Tetrachloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1,2,2-Tetrachloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Tetrachloroethylene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Tetrahydrofuran	ND	0.0078	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Toluene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2,3-Trichlorobenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2,4-Trichlorobenzene	ND	0.0031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1,1-Trichloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,1,2-Trichloroethane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Trichloroethylene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Trichlorofluoromethane (Freon 11)	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2,3-Trichloropropane	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,2,4-Trimethylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
1,3,5-Trimethylbenzene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
Vinyl Chloride	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
m+p Xylene	ND	0.0031	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF
o-Xylene	ND	0.0016	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:11	BRF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	98.5	70-130		11/27/18 15:11
Toluene-d8	96.8	70-130		11/27/18 15:11
4-Bromofluorobenzene	101	70-130		11/27/18 15:11

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
C19-C36 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Unadjusted C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Benzo(a)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Benzo(a)pyrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Benzo(b)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Benzo(g,h,i)perylene	0.22	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Chrysene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Fluoranthene	0.13	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Indeno(1,2,3-cd)pyrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Phenanthrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB
Pyrene	0.15	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:45	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
Chlorooctadecane (COD)	77.0	40-140		11/30/18	8:45
o-Terphenyl (OTP)	90.7	40-140		11/30/18	8:45
2-Bromonaphthalene	92.0	40-140		11/30/18	8:45
2-Fluorobiphenyl	98.6	40-140		11/30/18	8:45

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' | Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Sample Flags: O-01

Soil/Methanol Preservation Ratio: 1.33

Petroleum Hydrocarbons Analyses - VPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:45	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:45	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:45	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:45	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/21/18 23:45	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	114	70-130		11/21/18 23:45
2,5-Dibromotoluene (PID)	110	70-130		11/21/18 23:45

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Arsenic	4.9	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Barium	30	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Beryllium	0.38	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Cadmium	ND	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Chromium	11	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Lead	90	0.61	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Mercury	0.054	0.031	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:49	AJL
Nickel	8.1	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Selenium	ND	4.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Silver	ND	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Vanadium	14	0.81	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB
Zinc	32	0.81	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:05	EJB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB01-1012' | Sampled: 11/19/2018 10:40

Sample ID: 18K0939-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.6		% Wt	1		SM 2540G	11/26/18	11/27/18 15:35	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' | Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	0.23	0.11	mg/Kg dry	1	L-06	SW-846 8260C	11/27/18	11/27/18 15:38	BRF
tert-Amyl Methyl Ether (TAME)	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Benzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Bromobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Bromochloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Bromodichloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Bromoform	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Bromomethane	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
2-Butanone (MEK)	ND	0.045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
n-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
sec-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
tert-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Carbon Disulfide	ND	0.0068	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Carbon Tetrachloride	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Chlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Chlorodibromomethane	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Chloroethane	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Chloroform	ND	0.0045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Chloromethane	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
2-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
4-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2-Dibromoethane (EDB)	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Dibromomethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,3-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,4-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Dichlorodifluoromethane (Freon 12)	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1-Dichloroethylene	ND	0.0045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
cis-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
trans-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,3-Dichloropropane	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
2,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1-Dichloropropene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
cis-1,3-Dichloropropene	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
trans-1,3-Dichloropropene	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Diethyl Ether	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Diisopropyl Ether (DIPE)	ND	0.0011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,4-Dioxane	ND	0.11	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,4-Dioxane (SIM)	ND	0.045	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:38	BRF

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Hexachlorobutadiene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
2-Hexanone (MBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Isopropylbenzene (Cumene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
p-Isopropyltoluene (p-Cymene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Methyl tert-Butyl Ether (MTBE)	ND	0.0045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Methylene Chloride	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
4-Methyl-2-pentanone (MIBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Naphthalene	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
n-Propylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Styrene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1,1,2-Tetrachloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1,2,2-Tetrachloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Tetrachloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Tetrahydrofuran	ND	0.011	mg/Kg dry	1	V-16	SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Toluene	0.0081	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2,3-Trichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2,4-Trichlorobenzene	ND	0.0045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1,1-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,1,2-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Trichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Trichlorofluoromethane (Freon 11)	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2,3-Trichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,2,4-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
1,3,5-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
Vinyl Chloride	ND	0.011	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
m+p Xylene	ND	0.0045	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF
o-Xylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/27/18	11/27/18 15:38	BRF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.4	70-130		11/27/18 15:38
Toluene-d8	96.6	70-130		11/27/18 15:38
4-Bromofluorobenzene	99.3	70-130		11/27/18 15:38

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
C19-C36 Aliphatics	35	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Unadjusted C11-C22 Aromatics	27	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
C11-C22 Aromatics	24	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Benzo(a)anthracene	0.17	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Benzo(a)pyrene	0.28	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Benzo(b)fluoranthene	0.35	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Benzo(g,h,i)perylene	0.25	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Chrysene	0.23	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Fluoranthene	0.43	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Indeno(1,2,3-cd)pyrene	0.18	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Phenanthrene	0.21	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB
Pyrene	0.45	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:30	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	59.6	40-140		11/30/18 15:30
o-Terphenyl (OTP)	69.9	40-140		11/30/18 15:30
2-Bromonaphthalene	93.5	40-140		11/30/18 15:30
2-Fluorobiphenyl	105	40-140		11/30/18 15:30

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.20

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:14	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:14	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:14	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:14	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:14	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	112	70-130		11/22/18 0:14
2,5-Dibromotoluene (PID)	110	70-130		11/22/18 0:14

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' | Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Arsenic	7.3	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Barium	31	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Beryllium	0.35	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Cadmium	0.28	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Chromium	22	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Lead	33	0.60	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Mercury	0.038	0.030	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:51	AJL
Nickel	15	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Selenium	ND	4.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Silver	ND	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Vanadium	17	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB
Zinc	42	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:10	EJB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0002' | Sampled: 11/19/2018 11:05

Sample ID: 18K0939-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.9		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' | Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	0.089	0.087	mg/Kg dry	1	L-06	SW-846 8260C	11/28/18	11/28/18 10:44	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Benzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Bromobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Bromochloromethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Bromodichloromethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Bromoform	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Bromomethane	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
2-Butanone (MEK)	ND	0.035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
n-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
sec-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
tert-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Carbon Disulfide	ND	0.0052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Carbon Tetrachloride	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Chlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Chlorodibromomethane	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Chloroethane	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Chloroform	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Chloromethane	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
2-Chlorotoluene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
4-Chlorotoluene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2-Dibromoethane (EDB)	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Dibromomethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,3-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,4-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1-Dichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2-Dichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1-Dichloroethylene	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
cis-1,2-Dichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
trans-1,2-Dichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2-Dichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,3-Dichloropropane	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
2,2-Dichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1-Dichloropropene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
cis-1,3-Dichloropropene	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
trans-1,3-Dichloropropene	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Diethyl Ether	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Diisopropyl Ether (DIPE)	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,4-Dioxane	ND	0.087	mg/Kg dry	1	V-16	SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,4-Dioxane (SIM)	ND	0.035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Hexachlorobutadiene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
2-Hexanone (MBK)	ND	0.017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Isopropylbenzene (Cumene)	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Methylene Chloride	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Naphthalene	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
n-Propylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Styrene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1,1,2-Tetrachloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1,2,2-Tetrachloroethane	ND	0.00087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Tetrachloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Tetrahydrofuran	ND	0.0087	mg/Kg dry	1	V-16	SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Toluene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2,3-Trichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2,4-Trichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1,1-Trichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,1,2-Trichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Trichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Trichlorofluoromethane (Freon 11)	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2,3-Trichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,2,4-Trimethylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
1,3,5-Trimethylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
Vinyl Chloride	ND	0.0087	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
m+p Xylene	ND	0.0035	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF
o-Xylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 10:44	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.8	70-130		11/28/18 10:44
Toluene-d8	99.7	70-130		11/28/18 10:44
4-Bromofluorobenzene	103	70-130		11/28/18 10:44

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' | Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:09	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	78.8	40-140		11/30/18 8:09
o-Terphenyl (OTP)	90.4	40-140		11/30/18 8:09
2-Bromonaphthalene	92.4	40-140		11/30/18 8:09
2-Fluorobiphenyl	96.5	40-140		11/30/18 8:09

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 0.84

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	15	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:43	EEH
C5-C8 Aliphatics	ND	15	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:43	EEH
Unadjusted C9-C12 Aliphatics	ND	15	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:43	EEH
C9-C12 Aliphatics	ND	15	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:43	EEH
C9-C10 Aromatics	ND	15	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 0:43	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	115	70-130		11/22/18 0:43
2,5-Dibromotoluene (PID)	108	70-130		11/22/18 0:43

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' | Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Arsenic	12	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Barium	31	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Beryllium	0.54	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Cadmium	0.36	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Chromium	26	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Lead	34	0.57	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Mercury	0.097	0.028	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:57	AJL
Nickel	17	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Selenium	ND	3.8	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Silver	ND	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Thallium	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Vanadium	21	0.76	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB
Zinc	24	0.76	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:15	EJB

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB02-0406' Sampled: 11/19/2018 11:15

Sample ID: 18K0939-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.9		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' | Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	0.29	0.13	mg/Kg dry	1	L-06	SW-846 8260C	11/28/18	11/28/18 11:11	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Benzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Bromobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Bromochloromethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Bromodichloromethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Bromoform	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Bromomethane	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
2-Butanone (MEK)	ND	0.052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
n-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
sec-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
tert-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Carbon Disulfide	ND	0.0078	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Carbon Tetrachloride	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Chlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Chlorodibromomethane	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Chloroethane	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Chloroform	ND	0.0052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Chloromethane	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
2-Chlorotoluene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
4-Chlorotoluene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2-Dibromoethane (EDB)	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Dibromomethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,3-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,4-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1-Dichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2-Dichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1-Dichloroethylene	ND	0.0052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
cis-1,2-Dichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
trans-1,2-Dichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2-Dichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,3-Dichloropropane	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
2,2-Dichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1-Dichloropropene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
cis-1,3-Dichloropropene	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
trans-1,3-Dichloropropene	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Diethyl Ether	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Diisopropyl Ether (DIPE)	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,4-Dioxane	ND	0.13	mg/Kg dry	1	V-16	SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,4-Dioxane (SIM)	ND	0.052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Hexachlorobutadiene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
2-Hexanone (MBK)	ND	0.026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Isopropylbenzene (Cumene)	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Methylene Chloride	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Naphthalene	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
n-Propylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Styrene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1,1,2-Tetrachloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1,2,2-Tetrachloroethane	ND	0.0013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Tetrachloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Tetrahydrofuran	ND	0.013	mg/Kg dry	1	V-16	SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Toluene	0.0058	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2,3-Trichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2,4-Trichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1,1-Trichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,1,2-Trichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Trichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Trichlorofluoromethane (Freon 11)	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2,3-Trichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,2,4-Trimethylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
1,3,5-Trimethylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
Vinyl Chloride	ND	0.013	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
m+p Xylene	ND	0.0052	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF
o-Xylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C	11/28/18	11/28/18 11:11	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.8	70-130		11/28/18 11:11
Toluene-d8	98.2	70-130		11/28/18 11:11
4-Bromofluorobenzene	102	70-130		11/28/18 11:11

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Unadjusted C11-C22 Aromatics	15	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
C11-C22 Aromatics	12	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Benzo(a)anthracene	0.17	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Benzo(a)pyrene	0.29	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Benzo(b)fluoranthene	0.43	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Benzo(g,h,i)perylene	0.25	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Benzo(k)fluoranthene	0.13	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Chrysene	0.27	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Fluoranthene	0.46	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Indeno(1,2,3-cd)pyrene	0.22	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Phenanthrene	0.22	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB
Pyrene	0.49	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:41	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
Chlorooctadecane (COD)	73.0	40-140		11/30/18	9:41
o-Terphenyl (OTP)	86.6	40-140		11/30/18	9:41
2-Bromonaphthalene	94.3	40-140		11/30/18	9:41
2-Fluorobiphenyl	101	40-140		11/30/18	9:41

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 0.99

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 1:13	EEH
C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 1:13	EEH
Unadjusted C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 1:13	EEH
C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 1:13	EEH
C9-C10 Aromatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/21/18	11/22/18 1:13	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	115	70-130		11/22/18 1:13
2,5-Dibromotoluene (PID)	112	70-130		11/22/18 1:13

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Arsenic	6.9	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Barium	18	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Beryllium	0.24	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Cadmium	0.25	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Chromium	11	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Lead	36	0.59	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Mercury	0.033	0.029	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:58	AJL
Nickel	7.5	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Selenium	ND	4.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Silver	ND	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Vanadium	9.9	0.79	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB
Zinc	23	0.79	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:30	EJB

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0002' Sampled: 11/19/2018 08:35

Sample ID: 18K0939-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.8		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' | Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.094	mg/Kg dry	1	R-05	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Benzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Bromobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Bromochloromethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Bromodichloromethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Bromoform	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Bromomethane	ND	0.0094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
2-Butanone (MEK)	ND	0.038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
n-Butylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
sec-Butylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
tert-Butylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Carbon Disulfide	ND	0.0056	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Carbon Tetrachloride	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Chlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Chlorodibromomethane	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Chloroethane	ND	0.0094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Chloroform	ND	0.0038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Chloromethane	ND	0.0094	mg/Kg dry	1	V-05	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
2-Chlorotoluene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
4-Chlorotoluene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2-Dibromoethane (EDB)	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Dibromomethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2-Dichlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,3-Dichlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,4-Dichlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.0094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1-Dichloroethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2-Dichloroethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1-Dichloroethylene	ND	0.0038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
cis-1,2-Dichloroethylene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
trans-1,2-Dichloroethylene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2-Dichloropropane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,3-Dichloropropane	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
2,2-Dichloropropane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1-Dichloropropene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
cis-1,3-Dichloropropene	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
trans-1,3-Dichloropropene	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Diethyl Ether	ND	0.0094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Diisopropyl Ether (DIPE)	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,4-Dioxane	ND	0.094	mg/Kg dry	1	V-16	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Ethylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
2-Hexanone (MBK)	ND	0.019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Isopropylbenzene (Cumene)	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.0038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Methylene Chloride	ND	0.0094	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Naphthalene	ND	0.0038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
n-Propylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Styrene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1,1,2-Tetrachloroethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1,2,2-Tetrachloroethane	ND	0.00094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Tetrachloroethylene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Tetrahydrofuran	ND	0.0094	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Toluene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2,3-Trichlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2,4-Trichlorobenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1,1-Trichloroethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,1,2-Trichloroethane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Trichloroethylene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Trichlorofluoromethane (Freon 11)	ND	0.0094	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2,3-Trichloropropane	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,2,4-Trimethylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
1,3,5-Trimethylbenzene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
Vinyl Chloride	ND	0.0094	mg/Kg dry	1	L-04	SW-846 8260C	11/29/18	11/29/18 8:48	EEH
m+p Xylene	ND	0.0038	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH
o-Xylene	ND	0.0019	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 8:48	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	100	70-130		11/29/18 8:48
Toluene-d8	99.4	70-130		11/29/18 8:48
4-Bromofluorobenzene	108	70-130		11/29/18 8:48

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
C19-C36 Aliphatics	13	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Unadjusted C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Benzo(a)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Benzo(a)pyrene	0.12	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Benzo(b)fluoranthene	0.17	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Benzo(g,h,i)perylene	0.29	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Chrysene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Fluoranthene	0.17	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Indeno(1,2,3-cd)pyrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Phenanthrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB
Pyrene	0.19	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:04	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
Chlorooctadecane (COD)	73.0	40-140		11/30/18	9:04
o-Terphenyl (OTP)	84.3	40-140		11/30/18	9:04
2-Bromonaphthalene	86.6	40-140		11/30/18	9:04
2-Fluorobiphenyl	93.0	40-140		11/30/18	9:04

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.15

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:04	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:04	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:04	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:04	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:04	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	116	70-130		11/26/18 21:04
2,5-Dibromotoluene (PID)	109	70-130		11/26/18 21:04

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Arsenic	9.8	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Barium	33	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Beryllium	0.36	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Cadmium	0.33	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Chromium	11	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Lead	200	0.58	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Mercury	0.42	0.029	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 11:00	AJL
Nickel	9.0	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Selenium	ND	3.8	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Silver	ND	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Thallium	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Vanadium	13	0.77	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB
Zinc	42	0.77	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:35	EJB

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0406' Sampled: 11/19/2018 08:45

Sample ID: 18K0939-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.3		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' | Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.073	mg/Kg dry	1	R-05	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Benzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Bromobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Bromochloromethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Bromodichloromethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Bromoform	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Bromomethane	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
2-Butanone (MEK)	ND	0.029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
n-Butylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
sec-Butylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
tert-Butylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Carbon Disulfide	ND	0.0044	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Carbon Tetrachloride	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Chlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Chlorodibromomethane	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Chloroethane	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Chloroform	ND	0.0029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Chloromethane	ND	0.0073	mg/Kg dry	1	V-05	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
2-Chlorotoluene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
4-Chlorotoluene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2-Dibromoethane (EDB)	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Dibromomethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2-Dichlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,3-Dichlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,4-Dichlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1-Dichloroethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2-Dichloroethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1-Dichloroethylene	ND	0.0029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
cis-1,2-Dichloroethylene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
trans-1,2-Dichloroethylene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2-Dichloropropane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,3-Dichloropropane	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
2,2-Dichloropropane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1-Dichloropropene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
cis-1,3-Dichloropropene	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
trans-1,3-Dichloropropene	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Diethyl Ether	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Diisopropyl Ether (DIPE)	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,4-Dioxane	ND	0.073	mg/Kg dry	1	V-16	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Ethylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' | Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
2-Hexanone (MBK)	ND	0.015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Isopropylbenzene (Cumene)	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.0029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Methylene Chloride	ND	0.0073	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Naphthalene	ND	0.0029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
n-Propylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Styrene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1,1,2-Tetrachloroethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1,2,2-Tetrachloroethane	ND	0.00073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Tetrachloroethylene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Tetrahydrofuran	ND	0.0073	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Toluene	0.0053	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2,3-Trichlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2,4-Trichlorobenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1,1-Trichloroethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,1,2-Trichloroethane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Trichloroethylene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Trichlorofluoromethane (Freon 11)	ND	0.0073	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2,3-Trichloropropane	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,2,4-Trimethylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
1,3,5-Trimethylbenzene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
Vinyl Chloride	ND	0.0073	mg/Kg dry	1	L-04	SW-846 8260C	11/29/18	11/29/18 9:13	EEH
m+p Xylene	ND	0.0029	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH
o-Xylene	ND	0.0015	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:13	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
1,2-Dichloroethane-d4	98.9	70-130		11/29/18 9:13	
Toluene-d8	95.7	70-130		11/29/18 9:13	
4-Bromofluorobenzene	104	70-130		11/29/18 9:13	

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' | Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 8:27	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	74.7	40-140		11/30/18 8:27
o-Terphenyl (OTP)	88.0	40-140		11/30/18 8:27
2-Bromonaphthalene	92.0	40-140		11/30/18 8:27
2-Fluorobiphenyl	97.6	40-140		11/30/18 8:27

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Sample Flags: O-01

Soil/Methanol Preservation Ratio: 1.53

Petroleum Hydrocarbons Analyses - VPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	8.9	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:33	EEH
C5-C8 Aliphatics	ND	8.9	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:33	EEH
Unadjusted C9-C12 Aliphatics	ND	8.9	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:33	EEH
C9-C12 Aliphatics	ND	8.9	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:33	EEH
C9-C10 Aromatics	ND	8.9	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 21:33	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	111	70-130		11/26/18 21:33
2,5-Dibromotoluene (PID)	107	70-130		11/26/18 21:33

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Arsenic	5.2	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Barium	16	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Beryllium	0.31	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Cadmium	ND	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Chromium	13	0.37	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Lead	5.0	0.56	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Mercury	0.029	0.029	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 11:02	AJL
Nickel	11	0.37	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Selenium	ND	3.7	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Silver	ND	0.37	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Thallium	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Vanadium	11	0.75	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB
Zinc	32	0.75	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:40	EJB

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB03-0810' Sampled: 11/19/2018 09:00

Sample ID: 18K0939-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.7		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.098	mg/Kg dry	1	R-05	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Benzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Bromobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Bromochloromethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Bromodichloromethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Bromoform	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Bromomethane	ND	0.0098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
2-Butanone (MEK)	ND	0.039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
n-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
sec-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
tert-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Carbon Disulfide	ND	0.0059	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Carbon Tetrachloride	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Chlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Chlorodibromomethane	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Chloroethane	ND	0.0098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Chloroform	ND	0.0039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Chloromethane	ND	0.0098	mg/Kg dry	1	V-05	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
2-Chlorotoluene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
4-Chlorotoluene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2-Dibromoethane (EDB)	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Dibromomethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,3-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,4-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.0098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1-Dichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2-Dichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1-Dichloroethylene	ND	0.0039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2-Dichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,3-Dichloropropane	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
2,2-Dichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1-Dichloropropene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
cis-1,3-Dichloropropene	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
trans-1,3-Dichloropropene	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Diethyl Ether	ND	0.0098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Diisopropyl Ether (DIPE)	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,4-Dioxane	ND	0.098	mg/Kg dry	1	V-16	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Ethylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
2-Hexanone (MBK)	ND	0.020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.0039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Methylene Chloride	ND	0.0098	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Naphthalene	ND	0.0039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
n-Propylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Styrene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1,2,2-Tetrachloroethane	ND	0.00098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Tetrachloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Tetrahydrofuran	ND	0.0098	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Toluene	0.0034	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1,1-Trichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,1,2-Trichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Trichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Trichlorofluoromethane (Freon 11)	ND	0.0098	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2,3-Trichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
Vinyl Chloride	ND	0.0098	mg/Kg dry	1	L-04	SW-846 8260C	11/29/18	11/29/18 9:37	EEH
m+p Xylene	ND	0.0039	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH
o-Xylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 9:37	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
1,2-Dichloroethane-d4	100	70-130		11/29/18 9:37	
Toluene-d8	95.6	70-130		11/29/18 9:37	
4-Bromofluorobenzene	103	70-130		11/29/18 9:37	

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 15:48	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	70.7	40-140		11/30/18 15:48
o-Terphenyl (OTP)	84.1	40-140		11/30/18 15:48
2-Bromonaphthalene	94.0	40-140		11/30/18 15:48
2-Fluorobiphenyl	98.8	40-140		11/30/18 15:48

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.00

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:03	EEH
C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:03	EEH
Unadjusted C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:03	EEH
C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:03	EEH
C9-C10 Aromatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:03	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	110	70-130		11/26/18 22:03
2,5-Dibromotoluene (PID)	96.9	70-130		11/26/18 22:03

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' | Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Arsenic	7.0	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Barium	24	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Beryllium	0.33	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Cadmium	0.23	0.19	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Chromium	16	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Lead	16	0.58	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Mercury	0.032	0.028	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 10:45	AJL
Nickel	12	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Selenium	ND	3.8	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Silver	ND	0.38	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Thallium	ND	1.9	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Vanadium	16	0.77	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB
Zinc	21	0.77	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:45	EJB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0002' | Sampled: 11/19/2018 09:40

Sample ID: 18K0939-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.7		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.12	mg/Kg dry	1	R-05	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Benzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Bromobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Bromochloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Bromodichloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Bromoform	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Bromomethane	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
2-Butanone (MEK)	ND	0.047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
n-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
sec-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
tert-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Carbon Disulfide	ND	0.0070	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Carbon Tetrachloride	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Chlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Chlorodibromomethane	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Chloroethane	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Chloroform	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Chloromethane	ND	0.012	mg/Kg dry	1	V-05	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
2-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
4-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2-Dibromoethane (EDB)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Dibromomethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,3-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,4-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1-Dichloroethylene	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
cis-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
trans-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,3-Dichloropropane	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
2,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1-Dichloropropene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
cis-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
trans-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Diethyl Ether	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Diisopropyl Ether (DIPE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,4-Dioxane	ND	0.12	mg/Kg dry	1	V-16	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Ethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' | Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
2-Hexanone (MBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Isopropylbenzene (Cumene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Methylene Chloride	ND	0.012	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Naphthalene	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
n-Propylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Styrene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1,1,2-Tetrachloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1,2,2-Tetrachloroethane	ND	0.0012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Tetrachloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Tetrahydrofuran	ND	0.012	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Toluene	0.0076	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2,3-Trichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2,4-Trichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1,1-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,1,2-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Trichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Trichlorofluoromethane (Freon 11)	ND	0.012	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2,3-Trichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,2,4-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
1,3,5-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
Vinyl Chloride	ND	0.012	mg/Kg dry	1	L-04	SW-846 8260C	11/29/18	11/29/18 10:02	EEH
m+p Xylene	ND	0.0047	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH
o-Xylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:02	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	98.4	70-130		11/29/18 10:02
Toluene-d8	96.2	70-130		11/29/18 10:02
4-Bromofluorobenzene	104	70-130		11/29/18 10:02

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
C19-C36 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Unadjusted C11-C22 Aromatics	16	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
C11-C22 Aromatics	12	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Benzo(a)anthracene	0.18	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Benzo(a)pyrene	0.31	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Benzo(b)fluoranthene	0.36	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Benzo(g,h,i)perylene	0.76	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Benzo(k)fluoranthene	0.13	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Chrysene	0.24	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Fluoranthene	0.48	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Indeno(1,2,3-cd)pyrene	0.19	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Phenanthrene	0.25	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB
Pyrene	0.48	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 14:37	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	73.0	40-140		11/30/18 14:37
o-Terphenyl (OTP)	85.4	40-140		11/30/18 14:37
2-Bromonaphthalene	94.7	40-140		11/30/18 14:37
2-Fluorobiphenyl	99.9	40-140		11/30/18 14:37

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' | Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.00

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:32	EEH
C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:32	EEH
Unadjusted C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:32	EEH
C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:32	EEH
C9-C10 Aromatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 22:32	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	106	70-130		11/26/18 22:32
2,5-Dibromotoluene (PID)	101	70-130		11/26/18 22:32

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' | Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Arsenic	15	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Barium	43	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Beryllium	0.44	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Cadmium	0.53	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Chromium	14	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Lead	220	0.61	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Mercury	0.20	0.031	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 11:03	AJL
Nickel	17	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Selenium	ND	4.1	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Silver	ND	0.41	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Vanadium	17	0.82	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB
Zinc	44	0.82	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:50	EJB

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: 75ARC-SB04-0406' Sampled: 11/19/2018 09:50

Sample ID: 18K0939-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.5		% Wt	1		SM 2540G	11/26/18	11/27/18 15:36	MJR

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 | Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.089	mg/Kg dry	1	R-05	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Benzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Bromobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Bromochloromethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Bromodichloromethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Bromoform	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Bromomethane	ND	0.0089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
2-Butanone (MEK)	ND	0.036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
n-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
sec-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
tert-Butylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Carbon Disulfide	ND	0.0054	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Carbon Tetrachloride	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Chlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Chlorodibromomethane	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Chloroethane	ND	0.0089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Chloroform	ND	0.0036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Chloromethane	ND	0.0089	mg/Kg dry	1	V-05	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
2-Chlorotoluene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
4-Chlorotoluene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2-Dibromoethane (EDB)	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Dibromomethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,3-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,4-Dichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.0089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1-Dichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2-Dichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1-Dichloroethylene	ND	0.0036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
cis-1,2-Dichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
trans-1,2-Dichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2-Dichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,3-Dichloropropane	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
2,2-Dichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1-Dichloropropene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
cis-1,3-Dichloropropene	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
trans-1,3-Dichloropropene	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Diethyl Ether	ND	0.0089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Diisopropyl Ether (DIPE)	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,4-Dioxane	ND	0.089	mg/Kg dry	1	V-16	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Ethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 | Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
2-Hexanone (MBK)	ND	0.018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Isopropylbenzene (Cumene)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.0036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Methylene Chloride	ND	0.0089	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Naphthalene	ND	0.0036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
n-Propylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Styrene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1,1,2-Tetrachloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1,2,2-Tetrachloroethane	ND	0.00089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Tetrachloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Tetrahydrofuran	ND	0.0089	mg/Kg dry	1	L-04, V-05	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Toluene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2,3-Trichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2,4-Trichlorobenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1,1-Trichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,1,2-Trichloroethane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Trichloroethylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Trichlorofluoromethane (Freon 11)	ND	0.0089	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2,3-Trichloropropane	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,2,4-Trimethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
1,3,5-Trimethylbenzene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
Vinyl Chloride	ND	0.0089	mg/Kg dry	1	L-04	SW-846 8260C	11/29/18	11/29/18 10:27	EEH
m+p Xylene	ND	0.0036	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH
o-Xylene	ND	0.0018	mg/Kg dry	1		SW-846 8260C	11/29/18	11/29/18 10:27	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	97.8	70-130		11/29/18 10:27
Toluene-d8	95.5	70-130		11/29/18 10:27
4-Bromofluorobenzene	104	70-130		11/29/18 10:27

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 | Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
C19-C36 Aliphatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Unadjusted C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Benzo(a)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Benzo(a)pyrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Benzo(b)fluoranthene	0.16	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Benzo(g,h,i)perylene	0.30	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Chrysene	0.13	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Fluoranthene	0.24	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Indeno(1,2,3-cd)pyrene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Phenanthrene	0.16	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB
Pyrene	0.24	0.12	mg/Kg dry	1		MADEP-EPH-04-1.1	11/27/18	11/30/18 9:22	KLB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	86.7	40-140		11/30/18 9:22
o-Terphenyl (OTP)	100	40-140		11/30/18 9:22
2-Bromonaphthalene	95.5	40-140		11/30/18 9:22
2-Fluorobiphenyl	99.8	40-140		11/30/18 9:22

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 | Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Sample Flags: O-01

Soil/Methanol Preservation Ratio: 1.46

Petroleum Hydrocarbons Analyses - VPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 23:01	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 23:01	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 23:01	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 23:01	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 23:01	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	115	70-130		11/26/18 23:01
2,5-Dibromotoluene (PID)	107	70-130		11/26/18 23:01

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Project Location: 75 Arcand Drive, Lowell, MA Sample Description: Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Arsenic	4.0	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Barium	26	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Beryllium	0.43	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Cadmium	ND	0.20	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Chromium	11	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Lead	40	0.60	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Mercury	0.098	0.031	mg/Kg dry	1		SW-846 7471B	11/28/18	11/29/18 11:05	AJL
Nickel	7.5	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Selenium	ND	4.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Silver	ND	0.40	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Thallium	ND	2.0	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Vanadium	15	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB
Zinc	27	0.80	mg/Kg dry	1		SW-846 6010D	11/27/18	11/28/18 17:55	EJB

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Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: FD01 | Sampled: 11/19/2018 18:00

Sample ID: 18K0939-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.4		% Wt	1		SM 2540G	11/26/18	11/27/18 15:37	MJR

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: TB01 | Sampled: 11/19/2018 07:45

Sample ID: 18K0939-12

Sample Matrix: Trip Blank Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.10	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Benzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Bromobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Bromochloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Bromodichloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Bromoform	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Bromomethane	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
2-Butanone (MEK)	ND	0.040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
n-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
sec-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
tert-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Carbon Disulfide	ND	0.0060	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Carbon Tetrachloride	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Chlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Chlorodibromomethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Chloroethane	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Chloroform	ND	0.0040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Chloromethane	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
2-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
4-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Dibromomethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,3-Dichloropropane	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
2,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1-Dichloropropene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Diethyl Ether	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,4-Dioxane	ND	0.10	mg/Kg wet	1	V-16	SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,4-Dioxane (SIM)	ND	0.040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: TB01 | Sampled: 11/19/2018 07:45

Sample ID: 18K0939-12

Sample Matrix: Trip Blank Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Hexachlorobutadiene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
2-Hexanone (MBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Methylene Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Naphthalene	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
n-Propylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Styrene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Tetrachloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Tetrahydrofuran	ND	0.010	mg/Kg wet	1	V-16	SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Toluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Trichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
Vinyl Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
m+p Xylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF
o-Xylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C	11/28/18	11/28/18 11:40	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.3	70-130		11/28/18 11:40
Toluene-d8	97.3	70-130		11/28/18 11:40
4-Bromofluorobenzene	99.8	70-130		11/28/18 11:40

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 75 Arcand Drive, Lowell, MA | Sample Description: | Work Order: 18K0939

Date Received: 11/20/2018

Field Sample #: TB01 | Sampled: 11/19/2018 07:45

Sample ID: 18K0939-12

Sample Matrix: Trip Blank Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.00

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
C5-C8 Aliphatics	ND	10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
C9-C12 Aliphatics	ND	10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
C9-C10 Aromatics	ND	10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Benzene	ND	0.050	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Ethylbenzene	ND	0.050	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Naphthalene	ND	0.25	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
Toluene	ND	0.050	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
m+p Xylene	ND	0.10	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH
o-Xylene	ND	0.050	mg/Kg wet	1		MADEP-VPH-Feb 2018 Rev 2.1	11/26/18	11/26/18 18:37	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	99.7	70-130		11/26/18 18:37
2,5-Dibromotoluene (PID)	105	70-130		11/26/18 18:37

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Sample Extraction Data

Prep Method: SW-846 3546-MADEP-EPH-04-1.1

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-01 [75ARC-SB01-0002']	B217946	20.4	2.00	11/27/18
18K0939-02 [75ARC-SB01-0406']	B217946	20.0	2.00	11/27/18
18K0939-03 [75ARC-SB01-1012']	B217946	20.1	2.00	11/27/18
18K0939-04 [75ARC-SB02-0002']	B217946	20.2	2.00	11/27/18
18K0939-05 [75ARC-SB02-0406']	B217946	20.3	2.00	11/27/18
18K0939-06 [75ARC-SB03-0002']	B217946	20.6	2.00	11/27/18
18K0939-07 [75ARC-SB03-0406']	B217946	20.2	2.00	11/27/18
18K0939-08 [75ARC-SB03-0810']	B217946	20.1	2.00	11/27/18
18K0939-09 [75ARC-SB04-0002']	B217946	20.3	2.00	11/27/18
18K0939-10 [75ARC-SB04-0406']	B217946	20.3	2.00	11/27/18
18K0939-11 [FD01]	B217946	20.2	2.00	11/27/18

Prep Method: MA VPH-MADEP-VPH-Feb 2018 Rev 2.1

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-01 [75ARC-SB01-0002']	B217735	15.5	17.9	11/21/18
18K0939-02 [75ARC-SB01-0406']	B217735	19.4	18.4	11/21/18
18K0939-03 [75ARC-SB01-1012']	B217735	20.0	18.7	11/21/18
18K0939-04 [75ARC-SB02-0002']	B217735	6.00	6.10	11/21/18
18K0939-05 [75ARC-SB02-0406']	B217735	12.6	16.5	11/21/18
18K0939-06 [75ARC-SB03-0002']	B217735	5.00	5.80	11/21/18

Prep Method: MA VPH-MADEP-VPH-Feb 2018 Rev 2.1

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-07 [75ARC-SB03-0406']	B217834	17.3	17.5	11/26/18
18K0939-08 [75ARC-SB03-0810']	B217834	22.9	17.8	11/26/18
18K0939-09 [75ARC-SB04-0002']	B217834	15.0	16.8	11/26/18
18K0939-10 [75ARC-SB04-0406']	B217834	5.00	5.90	11/26/18
18K0939-11 [FD01]	B217834	21.9	19.1	11/26/18
18K0939-12 [TB01]	B217834	15.0	15.0	11/26/18

Prep Method: % Solids-SM 2540G

Lab Number [Field ID]	Batch	Date
18K0939-01 [75ARC-SB01-0002']	B217892	11/26/18
18K0939-02 [75ARC-SB01-0406']	B217892	11/26/18
18K0939-03 [75ARC-SB01-1012']	B217892	11/26/18
18K0939-04 [75ARC-SB02-0002']	B217892	11/26/18
18K0939-05 [75ARC-SB02-0406']	B217892	11/26/18
18K0939-06 [75ARC-SB03-0002']	B217892	11/26/18
18K0939-07 [75ARC-SB03-0406']	B217892	11/26/18
18K0939-08 [75ARC-SB03-0810']	B217892	11/26/18
18K0939-09 [75ARC-SB04-0002']	B217892	11/26/18
18K0939-10 [75ARC-SB04-0406']	B217892	11/26/18
18K0939-11 [FD01]	B217892	11/26/18

Prep Method: SW-846 3050B-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date

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Sample Extraction Data

Prep Method: SW-846 3050B-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-01 [75ARC-SB01-0002']	B217953	1.49	50.0	11/27/18
18K0939-02 [75ARC-SB01-0406']	B217953	1.51	50.0	11/27/18
18K0939-03 [75ARC-SB01-1012']	B217953	1.51	50.0	11/27/18
18K0939-04 [75ARC-SB02-0002']	B217953	1.52	50.0	11/27/18
18K0939-05 [75ARC-SB02-0406']	B217953	1.50	50.0	11/27/18
18K0939-06 [75ARC-SB03-0002']	B217953	1.49	50.0	11/27/18
18K0939-07 [75ARC-SB03-0406']	B217953	1.53	50.0	11/27/18
18K0939-08 [75ARC-SB03-0810']	B217953	1.52	50.0	11/27/18
18K0939-09 [75ARC-SB04-0002']	B217953	1.48	50.0	11/27/18
18K0939-10 [75ARC-SB04-0406']	B217953	1.50	50.0	11/27/18
18K0939-11 [FD01]	B217953	1.53	50.0	11/27/18

Prep Method: SW-846 7471-SW-846 7471B

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-01 [75ARC-SB01-0002']	B218036	0.617	50.0	11/28/18
18K0939-02 [75ARC-SB01-0406']	B218036	0.601	50.0	11/28/18
18K0939-03 [75ARC-SB01-1012']	B218036	0.598	50.0	11/28/18
18K0939-04 [75ARC-SB02-0002']	B218036	0.605	50.0	11/28/18
18K0939-05 [75ARC-SB02-0406']	B218036	0.599	50.0	11/28/18
18K0939-06 [75ARC-SB03-0002']	B218036	0.603	50.0	11/28/18
18K0939-07 [75ARC-SB03-0406']	B218036	0.598	50.0	11/28/18
18K0939-08 [75ARC-SB03-0810']	B218036	0.598	50.0	11/28/18
18K0939-09 [75ARC-SB04-0002']	B218036	0.605	50.0	11/28/18
18K0939-10 [75ARC-SB04-0406']	B218036	0.588	50.0	11/28/18
18K0939-11 [FD01]	B218036	0.599	50.0	11/28/18

Prep Method: SW-846 5035-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-01 [75ARC-SB01-0002']	B217916	5.08	10.0	11/27/18
18K0939-02 [75ARC-SB01-0406']	B217916	6.93	10.0	11/27/18
18K0939-03 [75ARC-SB01-1012']	B217916	7.81	10.0	11/27/18
18K0939-04 [75ARC-SB02-0002']	B217916	5.41	10.0	11/27/18

Prep Method: SW-846 5035-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-05 [75ARC-SB02-0406']	B218022	6.51	10.0	11/28/18
18K0939-06 [75ARC-SB03-0002']	B218022	4.53	10.0	11/28/18
18K0939-12 [TB01]	B218022	5.00	10.0	11/28/18

Prep Method: SW-846 5035-SW-846 8260C

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
18K0939-07 [75ARC-SB03-0406']	B218094	6.25	10.0	11/29/18
18K0939-08 [75ARC-SB03-0810']	B218094	7.81	10.0	11/29/18
18K0939-09 [75ARC-SB04-0002']	B218094	5.83	10.0	11/29/18
18K0939-10 [75ARC-SB04-0406']	B218094	5.22	10.0	11/29/18
18K0939-11 [FD01]	B218094	6.87	10.0	11/29/18

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Sample Extraction Data

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217916 - SW-846 5035										
Blank (B217916-BLK1)				Prepared & Analyzed: 11/27/18						
Acetone	ND	0.10	mg/Kg wet							
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet							
Benzene	ND	0.0020	mg/Kg wet							
Bromobenzene	ND	0.0020	mg/Kg wet							
Bromochloromethane	ND	0.0020	mg/Kg wet							
Bromodichloromethane	ND	0.0020	mg/Kg wet							
Bromoform	ND	0.0020	mg/Kg wet							
Bromomethane	ND	0.010	mg/Kg wet							
2-Butanone (MEK)	ND	0.040	mg/Kg wet							
n-Butylbenzene	ND	0.0020	mg/Kg wet							
sec-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet							
Carbon Disulfide	ND	0.0060	mg/Kg wet							
Carbon Tetrachloride	ND	0.0020	mg/Kg wet							
Chlorobenzene	ND	0.0020	mg/Kg wet							
Chlorodibromomethane	ND	0.0010	mg/Kg wet							
Chloroethane	ND	0.010	mg/Kg wet							
Chloroform	ND	0.0040	mg/Kg wet							
Chloromethane	ND	0.010	mg/Kg wet							
2-Chlorotoluene	ND	0.0020	mg/Kg wet							
4-Chlorotoluene	ND	0.0020	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet							
Dibromomethane	ND	0.0020	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet							
1,1-Dichloroethane	ND	0.0020	mg/Kg wet							
1,2-Dichloroethane	ND	0.0020	mg/Kg wet							
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
1,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,3-Dichloropropane	ND	0.0010	mg/Kg wet							
2,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,1-Dichloropropene	ND	0.0020	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
Diethyl Ether	ND	0.010	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet							
1,4-Dioxane	ND	0.10	mg/Kg wet							V-16
1,4-Dioxane (SIM)	ND	0.040	mg/Kg wet							V-16
Ethylbenzene	ND	0.0020	mg/Kg wet							
Hexachlorobutadiene	ND	0.0020	mg/Kg wet							
2-Hexanone (MBK)	ND	0.020	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet							
Methylene Chloride	ND	0.010	mg/Kg wet							
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet							

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B217916 - SW-846 5035												
Blank (B217916-BLK1)				Prepared & Analyzed: 11/27/18								
Naphthalene	ND	0.0040	mg/Kg wet									
n-Propylbenzene	ND	0.0020	mg/Kg wet									
Styrene	ND	0.0020	mg/Kg wet									
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet									
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet									
Tetrachloroethylene	ND	0.0020	mg/Kg wet									
Tetrahydrofuran	ND	0.010	mg/Kg wet								V-16	
Toluene	ND	0.0020	mg/Kg wet									
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet									
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet									
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet									
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet									
Trichloroethylene	ND	0.0020	mg/Kg wet									
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet									
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet									
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet									
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet									
Vinyl Chloride	ND	0.010	mg/Kg wet									
m+p Xylene	ND	0.0040	mg/Kg wet									
o-Xylene	ND	0.0020	mg/Kg wet									
Surrogate: 1,2-Dichloroethane-d4	*0.0505*		mg/Kg wet	0.0500		101		70-130				
Surrogate: Toluene-d8	*0.0483*		mg/Kg wet	0.0500		96.6		70-130				
Surrogate: 4-Bromofluorobenzene	*0.0504*		mg/Kg wet	0.0500		101		70-130				
LCS (B217916-BS1)				Prepared & Analyzed: 11/27/18								
Acetone	0.530	0.10	mg/Kg wet	0.200		**265**	*	40-160			L-06	†
tert-Amyl Methyl Ether (TAME)	0.0191	0.0010	mg/Kg wet	0.0200		95.3		70-130				
Benzene	0.0180	0.0020	mg/Kg wet	0.0200		90.0		70-130				
Bromobenzene	0.0188	0.0020	mg/Kg wet	0.0200		94.2		70-130				
Bromochloromethane	0.0203	0.0020	mg/Kg wet	0.0200		101		70-130				
Bromodichloromethane	0.0200	0.0020	mg/Kg wet	0.0200		100		70-130				
Bromoform	0.0199	0.0020	mg/Kg wet	0.0200		99.5		70-130				
Bromomethane	0.0117	0.010	mg/Kg wet	0.0200		58.4		40-160			L-14, V-34	†
2-Butanone (MEK)	0.362	0.040	mg/Kg wet	0.200		**181**	*	40-160			L-02	†
n-Butylbenzene	0.0188	0.0020	mg/Kg wet	0.0200		94.2		70-130				
sec-Butylbenzene	0.0183	0.0020	mg/Kg wet	0.0200		91.6		70-130				
tert-Butylbenzene	0.0187	0.0020	mg/Kg wet	0.0200		93.4		70-130				
tert-Butyl Ethyl Ether (TBEE)	0.0186	0.0010	mg/Kg wet	0.0200		93.1		70-130				
Carbon Disulfide	0.0182	0.0060	mg/Kg wet	0.0200		91.1		70-130				
Carbon Tetrachloride	0.0199	0.0020	mg/Kg wet	0.0200		99.6		70-130				
Chlorobenzene	0.0204	0.0020	mg/Kg wet	0.0200		102		70-130				
Chlorodibromomethane	0.0228	0.0010	mg/Kg wet	0.0200		114		70-130				
Chloroethane	0.0169	0.010	mg/Kg wet	0.0200		84.7		70-130				
Chloroform	0.0194	0.0040	mg/Kg wet	0.0200		96.8		70-130				
Chloromethane	0.0155	0.010	mg/Kg wet	0.0200		77.6		40-160				†
2-Chlorotoluene	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130				
4-Chlorotoluene	0.0196	0.0020	mg/Kg wet	0.0200		98.1		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.0176	0.0020	mg/Kg wet	0.0200		88.2		70-130				
1,2-Dibromoethane (EDB)	0.0203	0.0010	mg/Kg wet	0.0200		102		70-130				
Dibromomethane	0.0209	0.0020	mg/Kg wet	0.0200		105		70-130				
1,2-Dichlorobenzene	0.0197	0.0020	mg/Kg wet	0.0200		98.3		70-130				
1,3-Dichlorobenzene	0.0197	0.0020	mg/Kg wet	0.0200		98.5		70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B217916 - SW-846 5035											
LCS (B217916-BS1)				Prepared & Analyzed: 11/27/18							
1,4-Dichlorobenzene	0.0187	0.0020	mg/Kg wet	0.0200		93.4	70-130				
Dichlorodifluoromethane (Freon 12)	0.0122	0.010	mg/Kg wet	0.0200		61.1	40-160			L-14	†
1,1-Dichloroethane	0.0189	0.0020	mg/Kg wet	0.0200		94.3	70-130				
1,2-Dichloroethane	0.0203	0.0020	mg/Kg wet	0.0200		101	70-130				
1,1-Dichloroethylene	0.0181	0.0040	mg/Kg wet	0.0200		90.7	70-130				
cis-1,2-Dichloroethylene	0.0175	0.0020	mg/Kg wet	0.0200		87.7	70-130				
trans-1,2-Dichloroethylene	0.0185	0.0020	mg/Kg wet	0.0200		92.4	70-130				
1,2-Dichloropropane	0.0201	0.0020	mg/Kg wet	0.0200		101	70-130				
1,3-Dichloropropane	0.0195	0.0010	mg/Kg wet	0.0200		97.5	70-130				
2,2-Dichloropropane	0.0183	0.0020	mg/Kg wet	0.0200		91.7	70-130				
1,1-Dichloropropene	0.0197	0.0020	mg/Kg wet	0.0200		98.4	70-130				
cis-1,3-Dichloropropene	0.0208	0.0010	mg/Kg wet	0.0200		104	70-130				
trans-1,3-Dichloropropene	0.0206	0.0010	mg/Kg wet	0.0200		103	70-130				
Diethyl Ether	0.0177	0.010	mg/Kg wet	0.0200		88.4	70-130				
Diisopropyl Ether (DIPE)	0.0190	0.0010	mg/Kg wet	0.0200		95.1	70-130				
1,4-Dioxane	0.219	0.10	mg/Kg wet	0.200		109	40-160			V-16, V-20, V-36	†
1,4-Dioxane (SIM)	0.190	0.040	mg/Kg wet	0.200		95.2	40-160			V-16	†
Ethylbenzene	0.0191	0.0020	mg/Kg wet	0.0200		95.6	70-130				
Hexachlorobutadiene	0.0193	0.0020	mg/Kg wet	0.0200		96.5	70-130				
2-Hexanone (MBK)	0.319	0.020	mg/Kg wet	0.200		160	40-160			L-14	†
Isopropylbenzene (Cumene)	0.0209	0.0020	mg/Kg wet	0.0200		105	70-130				
p-Isopropyltoluene (p-Cymene)	0.0180	0.0020	mg/Kg wet	0.0200		89.8	70-130				
Methyl tert-Butyl Ether (MTBE)	0.0194	0.0040	mg/Kg wet	0.0200		97.2	70-130				
Methylene Chloride	0.0196	0.010	mg/Kg wet	0.0200		98.0	70-130				
4-Methyl-2-pentanone (MIBK)	0.211	0.020	mg/Kg wet	0.200		106	40-160				†
Naphthalene	0.0180	0.0040	mg/Kg wet	0.0200		89.9	70-130				
n-Propylbenzene	0.0196	0.0020	mg/Kg wet	0.0200		98.2	70-130				
Styrene	0.0189	0.0020	mg/Kg wet	0.0200		94.5	70-130				
1,1,1,2-Tetrachloroethane	0.0207	0.0020	mg/Kg wet	0.0200		103	70-130				
1,1,2,2-Tetrachloroethane	0.0177	0.0010	mg/Kg wet	0.0200		88.7	70-130				
Tetrachloroethylene	0.0210	0.0020	mg/Kg wet	0.0200		105	70-130				
Tetrahydrofuran	0.0179	0.010	mg/Kg wet	0.0200		89.6	70-130			V-16	
Toluene	0.0188	0.0020	mg/Kg wet	0.0200		93.9	70-130				
1,2,3-Trichlorobenzene	0.0194	0.0020	mg/Kg wet	0.0200		96.9	70-130				
1,2,4-Trichlorobenzene	0.0219	0.0020	mg/Kg wet	0.0200		109	70-130				
1,1,1-Trichloroethane	0.0182	0.0020	mg/Kg wet	0.0200		91.2	70-130				
1,1,2-Trichloroethane	0.0190	0.0020	mg/Kg wet	0.0200		94.8	70-130				
Trichloroethylene	0.0197	0.0020	mg/Kg wet	0.0200		98.6	70-130				
Trichlorofluoromethane (Freon 11)	0.0168	0.010	mg/Kg wet	0.0200		84.1	70-130				
1,2,3-Trichloropropane	0.0190	0.0020	mg/Kg wet	0.0200		94.9	70-130				
1,2,4-Trimethylbenzene	0.0179	0.0020	mg/Kg wet	0.0200		89.6	70-130				
1,3,5-Trimethylbenzene	0.0200	0.0020	mg/Kg wet	0.0200		100	70-130				
Vinyl Chloride	0.0152	0.010	mg/Kg wet	0.0200		75.8	70-130				
m+p Xylene	0.0382	0.0040	mg/Kg wet	0.0400		95.4	70-130				
o-Xylene	0.0188	0.0020	mg/Kg wet	0.0200		94.2	70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0480*		mg/Kg wet	0.0500		96.1	70-130				
Surrogate: Toluene-d8	*0.0488*		mg/Kg wet	0.0500		97.6	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0506*		mg/Kg wet	0.0500		101	70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B217916 - SW-846 5035												
LCS Dup (B217916-BSD1)				Prepared & Analyzed: 11/27/18								
Acetone	0.582	0.10	mg/Kg wet	0.200		**291**	*	40-160	9.42	20	L-06	†
tert-Amyl Methyl Ether (TAME)	0.0209	0.0010	mg/Kg wet	0.0200		104		70-130	9.11	20		
Benzene	0.0203	0.0020	mg/Kg wet	0.0200		102		70-130	12.1	20		
Bromobenzene	0.0210	0.0020	mg/Kg wet	0.0200		105		70-130	10.9	20		
Bromochloromethane	0.0232	0.0020	mg/Kg wet	0.0200		116		70-130	13.7	20		
Bromodichloromethane	0.0213	0.0020	mg/Kg wet	0.0200		107		70-130	6.39	20		
Bromoform	0.0223	0.0020	mg/Kg wet	0.0200		112		70-130	11.4	20		
Bromomethane	0.0141	0.010	mg/Kg wet	0.0200		70.5		40-160	18.8	20	V-34	†
2-Butanone (MEK)	0.401	0.040	mg/Kg wet	0.200		**201**	*	40-160	10.1	20	L-02	†
n-Butylbenzene	0.0202	0.0020	mg/Kg wet	0.0200		101		70-130	6.97	20		
sec-Butylbenzene	0.0217	0.0020	mg/Kg wet	0.0200		109		70-130	17.0	20		
tert-Butylbenzene	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130	7.12	20		
tert-Butyl Ethyl Ether (TBEE)	0.0213	0.0010	mg/Kg wet	0.0200		106		70-130	13.4	20		
Carbon Disulfide	0.0200	0.0060	mg/Kg wet	0.0200		100		70-130	9.41	20		
Carbon Tetrachloride	0.0220	0.0020	mg/Kg wet	0.0200		110		70-130	9.83	20		
Chlorobenzene	0.0234	0.0020	mg/Kg wet	0.0200		117		70-130	13.9	20		
Chlorodibromomethane	0.0238	0.0010	mg/Kg wet	0.0200		119		70-130	3.95	20		
Chloroethane	0.0175	0.010	mg/Kg wet	0.0200		87.4		70-130	3.14	20		
Chloroform	0.0222	0.0040	mg/Kg wet	0.0200		111		70-130	13.8	20		
Chloromethane	0.0177	0.010	mg/Kg wet	0.0200		88.4		40-160	13.0	20		†
2-Chlorotoluene	0.0229	0.0020	mg/Kg wet	0.0200		115		70-130	13.2	20		
4-Chlorotoluene	0.0222	0.0020	mg/Kg wet	0.0200		111		70-130	12.5	20		
1,2-Dibromo-3-chloropropane (DBCP)	0.0186	0.0020	mg/Kg wet	0.0200		93.2		70-130	5.51	20		
1,2-Dibromoethane (EDB)	0.0238	0.0010	mg/Kg wet	0.0200		119		70-130	15.9	20		
Dibromomethane	0.0235	0.0020	mg/Kg wet	0.0200		117		70-130	11.4	20		
1,2-Dichlorobenzene	0.0211	0.0020	mg/Kg wet	0.0200		106		70-130	7.16	20		
1,3-Dichlorobenzene	0.0219	0.0020	mg/Kg wet	0.0200		109		70-130	10.5	20		
1,4-Dichlorobenzene	0.0205	0.0020	mg/Kg wet	0.0200		103		70-130	9.48	20		
Dichlorodifluoromethane (Freon 12)	0.0134	0.010	mg/Kg wet	0.0200		67.2		40-160	9.51	20	L-14	†
1,1-Dichloroethane	0.0213	0.0020	mg/Kg wet	0.0200		106		70-130	12.0	20		
1,2-Dichloroethane	0.0222	0.0020	mg/Kg wet	0.0200		111		70-130	9.05	20		
1,1-Dichloroethylene	0.0196	0.0040	mg/Kg wet	0.0200		98.2		70-130	7.94	20		
cis-1,2-Dichloroethylene	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130	13.6	20		
trans-1,2-Dichloroethylene	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130	8.30	20		
1,2-Dichloropropane	0.0232	0.0020	mg/Kg wet	0.0200		116		70-130	14.1	20		
1,3-Dichloropropane	0.0222	0.0010	mg/Kg wet	0.0200		111		70-130	13.1	20		
2,2-Dichloropropane	0.0200	0.0020	mg/Kg wet	0.0200		99.9		70-130	8.56	20		
1,1-Dichloropropene	0.0209	0.0020	mg/Kg wet	0.0200		104		70-130	5.92	20		
cis-1,3-Dichloropropene	0.0226	0.0010	mg/Kg wet	0.0200		113		70-130	8.38	20		
trans-1,3-Dichloropropene	0.0236	0.0010	mg/Kg wet	0.0200		118		70-130	13.7	20		
Diethyl Ether	0.0202	0.010	mg/Kg wet	0.0200		101		70-130	13.4	20		
Diisopropyl Ether (DIPE)	0.0210	0.0010	mg/Kg wet	0.0200		105		70-130	9.70	20		
1,4-Dioxane	0.235	0.10	mg/Kg wet	0.200		118		40-160	7.24	20	V-16, V-20, V-36	†
1,4-Dioxane (SIM)	0.205	0.040	mg/Kg wet	0.200		102		40-160	7.25	20	V-16	† ‡
Ethylbenzene	0.0215	0.0020	mg/Kg wet	0.0200		107		70-130	11.6	20		
Hexachlorobutadiene	0.0222	0.0020	mg/Kg wet	0.0200		111		70-130	14.1	20		
2-Hexanone (MBK)	0.346	0.020	mg/Kg wet	0.200		**173**	*	40-160	8.06	20	L-07	†
Isopropylbenzene (Cumene)	0.0235	0.0020	mg/Kg wet	0.0200		118		70-130	11.6	20		
p-Isopropyltoluene (p-Cymene)	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130	11.2	20		
Methyl tert-Butyl Ether (MTBE)	0.0210	0.0040	mg/Kg wet	0.0200		105		70-130	7.81	20		
Methylene Chloride	0.0213	0.010	mg/Kg wet	0.0200		106		70-130	8.31	20		
4-Methyl-2-pentanone (MIBK)	0.232	0.020	mg/Kg wet	0.200		116		40-160	9.40	20		†

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QUALITY CONTROL

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217916 - SW-846 5035										
LCS Dup (B217916-BSD1)				Prepared & Analyzed: 11/27/18						
Naphthalene	0.0193	0.0040	mg/Kg wet	0.0200		96.6	70-130	7.18	20	
n-Propylbenzene	0.0218	0.0020	mg/Kg wet	0.0200		109	70-130	10.2	20	
Styrene	0.0216	0.0020	mg/Kg wet	0.0200		108	70-130	13.2	20	
1,1,1,2-Tetrachloroethane	0.0228	0.0020	mg/Kg wet	0.0200		114	70-130	10.0	20	
1,1,2,2-Tetrachloroethane	0.0208	0.0010	mg/Kg wet	0.0200		104	70-130	15.8	20	
Tetrachloroethylene	0.0217	0.0020	mg/Kg wet	0.0200		109	70-130	3.56	20	
Tetrahydrofuran	0.0195	0.010	mg/Kg wet	0.0200		97.6	70-130	8.55	20	V-16
Toluene	0.0203	0.0020	mg/Kg wet	0.0200		101	70-130	7.58	20	
1,2,3-Trichlorobenzene	0.0206	0.0020	mg/Kg wet	0.0200		103	70-130	6.10	20	
1,2,4-Trichlorobenzene	0.0238	0.0020	mg/Kg wet	0.0200		119	70-130	8.41	20	
1,1,1-Trichloroethane	0.0203	0.0020	mg/Kg wet	0.0200		102	70-130	10.9	20	
1,1,2-Trichloroethane	0.0213	0.0020	mg/Kg wet	0.0200		107	70-130	11.8	20	
Trichloroethylene	0.0223	0.0020	mg/Kg wet	0.0200		112	70-130	12.4	20	
Trichlorofluoromethane (Freon 11)	0.0185	0.010	mg/Kg wet	0.0200		92.4	70-130	9.41	20	
1,2,3-Trichloropropane	0.0216	0.0020	mg/Kg wet	0.0200		108	70-130	12.7	20	
1,2,4-Trimethylbenzene	0.0200	0.0020	mg/Kg wet	0.0200		99.9	70-130	10.9	20	
1,3,5-Trimethylbenzene	0.0223	0.0020	mg/Kg wet	0.0200		111	70-130	10.7	20	
Vinyl Chloride	0.0179	0.010	mg/Kg wet	0.0200		89.4	70-130	16.5	20	
m+p Xylene	0.0432	0.0040	mg/Kg wet	0.0400		108	70-130	12.5	20	
o-Xylene	0.0212	0.0020	mg/Kg wet	0.0200		106	70-130	11.9	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0483*		mg/Kg wet	0.0500		96.6	70-130			
Surrogate: Toluene-d8	*0.0486*		mg/Kg wet	0.0500		97.2	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0529*		mg/Kg wet	0.0500		106	70-130			
Batch B218022 - SW-846 5035										
Blank (B218022-BLK1)				Prepared & Analyzed: 11/28/18						
Acetone	ND	0.10	mg/Kg wet							
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet							
Benzene	ND	0.0020	mg/Kg wet							
Bromobenzene	ND	0.0020	mg/Kg wet							
Bromochloromethane	ND	0.0020	mg/Kg wet							
Bromodichloromethane	ND	0.0020	mg/Kg wet							
Bromoform	ND	0.0020	mg/Kg wet							
Bromomethane	ND	0.010	mg/Kg wet							
2-Butanone (MEK)	ND	0.040	mg/Kg wet							
n-Butylbenzene	ND	0.0020	mg/Kg wet							
sec-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet							
Carbon Disulfide	ND	0.0060	mg/Kg wet							
Carbon Tetrachloride	ND	0.0020	mg/Kg wet							
Chlorobenzene	ND	0.0020	mg/Kg wet							
Chlorodibromomethane	ND	0.0010	mg/Kg wet							
Chloroethane	ND	0.010	mg/Kg wet							
Chloroform	ND	0.0040	mg/Kg wet							
Chloromethane	ND	0.010	mg/Kg wet							
2-Chlorotoluene	ND	0.0020	mg/Kg wet							
4-Chlorotoluene	ND	0.0020	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet							
Dibromomethane	ND	0.0020	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet							

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B218022 - SW-846 5035										
Blank (B218022-BLK1)			Prepared & Analyzed: 11/28/18							
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet							
1,1-Dichloroethane	ND	0.0020	mg/Kg wet							
1,2-Dichloroethane	ND	0.0020	mg/Kg wet							
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
1,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,3-Dichloropropane	ND	0.0010	mg/Kg wet							
2,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,1-Dichloropropene	ND	0.0020	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
Diethyl Ether	ND	0.010	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet							
1,4-Dioxane	ND	0.10	mg/Kg wet							V-16
1,4-Dioxane (SIM)	ND	0.040	mg/Kg wet							
Ethylbenzene	ND	0.0020	mg/Kg wet							
Hexachlorobutadiene	ND	0.0020	mg/Kg wet							
2-Hexanone (MBK)	ND	0.020	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet							
Methylene Chloride	ND	0.010	mg/Kg wet							
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet							
Naphthalene	ND	0.010	mg/Kg wet							
n-Propylbenzene	ND	0.0020	mg/Kg wet							
Styrene	ND	0.0020	mg/Kg wet							
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet							
Tetrachloroethylene	ND	0.0020	mg/Kg wet							
Tetrahydrofuran	ND	0.010	mg/Kg wet							V-16
Toluene	ND	0.0020	mg/Kg wet							
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet							
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet							
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet							
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet							
Trichloroethylene	ND	0.0020	mg/Kg wet							
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet							
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet							
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet							
Vinyl Chloride	ND	0.010	mg/Kg wet							
m+p Xylene	ND	0.0040	mg/Kg wet							
o-Xylene	ND	0.0020	mg/Kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0494*		mg/Kg wet	0.0500		98.8	70-130			
Surrogate: Toluene-d8	*0.0482*		mg/Kg wet	0.0500		96.4	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0498*		mg/Kg wet	0.0500		99.6	70-130			

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B218022 - SW-846 5035												
LCS (B218022-BS1)				Prepared & Analyzed: 11/28/18								
Acetone	0.553	0.10	mg/Kg wet	0.200		**276**	*	40-160			L-06	†
tert-Amyl Methyl Ether (TAME)	0.0203	0.0010	mg/Kg wet	0.0200		102		70-130				
Benzene	0.0185	0.0020	mg/Kg wet	0.0200		92.7		70-130				
Bromobenzene	0.0186	0.0020	mg/Kg wet	0.0200		93.1		70-130				
Bromochloromethane	0.0204	0.0020	mg/Kg wet	0.0200		102		70-130				
Bromodichloromethane	0.0198	0.0020	mg/Kg wet	0.0200		98.9		70-130				
Bromoform	0.0203	0.0020	mg/Kg wet	0.0200		101		70-130				
Bromomethane	0.0112	0.010	mg/Kg wet	0.0200		56.2		40-160			L-14, V-34	†
2-Butanone (MEK)	0.372	0.040	mg/Kg wet	0.200		**186**	*	40-160			L-02	†
n-Butylbenzene	0.0178	0.0020	mg/Kg wet	0.0200		89.0		70-130				
sec-Butylbenzene	0.0178	0.0020	mg/Kg wet	0.0200		88.8		70-130				
tert-Butylbenzene	0.0178	0.0020	mg/Kg wet	0.0200		89.1		70-130				
tert-Butyl Ethyl Ether (TBEE)	0.0201	0.0010	mg/Kg wet	0.0200		100		70-130				
Carbon Disulfide	0.0182	0.0060	mg/Kg wet	0.0200		91.2		70-130				
Carbon Tetrachloride	0.0192	0.0020	mg/Kg wet	0.0200		96.1		70-130				
Chlorobenzene	0.0204	0.0020	mg/Kg wet	0.0200		102		70-130				
Chlorodibromomethane	0.0227	0.0010	mg/Kg wet	0.0200		114		70-130				
Chloroethane	0.0173	0.010	mg/Kg wet	0.0200		86.3		70-130				
Chloroform	0.0199	0.0040	mg/Kg wet	0.0200		99.5		70-130				
Chloromethane	0.0151	0.010	mg/Kg wet	0.0200		75.5		40-160				†
2-Chlorotoluene	0.0192	0.0020	mg/Kg wet	0.0200		95.8		70-130				
4-Chlorotoluene	0.0194	0.0020	mg/Kg wet	0.0200		97.1		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.0193	0.0020	mg/Kg wet	0.0200		96.6		70-130				
1,2-Dibromoethane (EDB)	0.0212	0.0010	mg/Kg wet	0.0200		106		70-130				
Dibromomethane	0.0217	0.0020	mg/Kg wet	0.0200		108		70-130				
1,2-Dichlorobenzene	0.0184	0.0020	mg/Kg wet	0.0200		92.2		70-130				
1,3-Dichlorobenzene	0.0188	0.0020	mg/Kg wet	0.0200		93.9		70-130				
1,4-Dichlorobenzene	0.0183	0.0020	mg/Kg wet	0.0200		91.7		70-130				
Dichlorodifluoromethane (Freon 12)	0.0144	0.010	mg/Kg wet	0.0200		71.9		40-160				†
1,1-Dichloroethane	0.0194	0.0020	mg/Kg wet	0.0200		97.2		70-130				
1,2-Dichloroethane	0.0210	0.0020	mg/Kg wet	0.0200		105		70-130				
1,1-Dichloroethylene	0.0181	0.0040	mg/Kg wet	0.0200		90.4		70-130				
cis-1,2-Dichloroethylene	0.0181	0.0020	mg/Kg wet	0.0200		90.5		70-130				
trans-1,2-Dichloroethylene	0.0189	0.0020	mg/Kg wet	0.0200		94.7		70-130				
1,2-Dichloropropane	0.0197	0.0020	mg/Kg wet	0.0200		98.3		70-130				
1,3-Dichloropropane	0.0211	0.0010	mg/Kg wet	0.0200		105		70-130				
2,2-Dichloropropane	0.0184	0.0020	mg/Kg wet	0.0200		92.1		70-130				
1,1-Dichloropropene	0.0186	0.0020	mg/Kg wet	0.0200		92.8		70-130				
cis-1,3-Dichloropropene	0.0196	0.0010	mg/Kg wet	0.0200		98.1		70-130				
trans-1,3-Dichloropropene	0.0213	0.0010	mg/Kg wet	0.0200		106		70-130				
Diethyl Ether	0.0203	0.010	mg/Kg wet	0.0200		101		70-130				
Diisopropyl Ether (DIPE)	0.0194	0.0010	mg/Kg wet	0.0200		96.9		70-130				
1,4-Dioxane	0.234	0.10	mg/Kg wet	0.200		117		40-160			V-16, V-36	†
1,4-Dioxane (SIM)	0.202	0.040	mg/Kg wet	0.200		101		40-160				†
Ethylbenzene	0.0187	0.0020	mg/Kg wet	0.0200		93.4		70-130				
Hexachlorobutadiene	0.0186	0.0020	mg/Kg wet	0.0200		93.0		70-130				
2-Hexanone (MBK)	0.315	0.020	mg/Kg wet	0.200		158		40-160			L-14	†
Isopropylbenzene (Cumene)	0.0199	0.0020	mg/Kg wet	0.0200		99.3		70-130				
p-Isopropyltoluene (p-Cymene)	0.0175	0.0020	mg/Kg wet	0.0200		87.5		70-130				
Methyl tert-Butyl Ether (MTBE)	0.0212	0.0040	mg/Kg wet	0.0200		106		70-130				
Methylene Chloride	0.0193	0.010	mg/Kg wet	0.0200		96.7		70-130				
4-Methyl-2-pentanone (MIBK)	0.227	0.020	mg/Kg wet	0.200		114		40-160				†

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QUALITY CONTROL

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B218022 - SW-846 5035												
LCS (B218022-BS1)				Prepared & Analyzed: 11/28/18								
Naphthalene	0.0189	0.010	mg/Kg wet	0.0200		94.4		70-130				
n-Propylbenzene	0.0192	0.0020	mg/Kg wet	0.0200		96.2		70-130				
Styrene	0.0193	0.0020	mg/Kg wet	0.0200		96.4		70-130				
1,1,1,2-Tetrachloroethane	0.0185	0.0020	mg/Kg wet	0.0200		92.4		70-130				
1,1,2,2-Tetrachloroethane	0.0205	0.0010	mg/Kg wet	0.0200		102		70-130				
Tetrachloroethylene	0.0214	0.0020	mg/Kg wet	0.0200		107		70-130				
Tetrahydrofuran	0.0224	0.010	mg/Kg wet	0.0200		112		70-130			V-16	
Toluene	0.0184	0.0020	mg/Kg wet	0.0200		91.8		70-130				
1,2,3-Trichlorobenzene	0.0200	0.0020	mg/Kg wet	0.0200		100		70-130				
1,2,4-Trichlorobenzene	0.0205	0.0020	mg/Kg wet	0.0200		102		70-130				
1,1,1-Trichloroethane	0.0182	0.0020	mg/Kg wet	0.0200		90.9		70-130				
1,1,2-Trichloroethane	0.0207	0.0020	mg/Kg wet	0.0200		104		70-130				
Trichloroethylene	0.0189	0.0020	mg/Kg wet	0.0200		94.6		70-130				
Trichlorofluoromethane (Freon 11)	0.0167	0.010	mg/Kg wet	0.0200		83.6		70-130				
1,2,3-Trichloropropane	0.0213	0.0020	mg/Kg wet	0.0200		107		70-130				
1,2,4-Trimethylbenzene	0.0174	0.0020	mg/Kg wet	0.0200		87.0		70-130				
1,3,5-Trimethylbenzene	0.0188	0.0020	mg/Kg wet	0.0200		93.9		70-130				
Vinyl Chloride	0.0159	0.010	mg/Kg wet	0.0200		79.5		70-130				
m+p Xylene	0.0370	0.0040	mg/Kg wet	0.0400		92.6		70-130				
o-Xylene	0.0183	0.0020	mg/Kg wet	0.0200		91.3		70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0496*		mg/Kg wet	0.0500		99.2		70-130				
Surrogate: Toluene-d8	*0.0489*		mg/Kg wet	0.0500		97.8		70-130				
Surrogate: 4-Bromofluorobenzene	*0.0500*		mg/Kg wet	0.0500		100		70-130				
LCS Dup (B218022-BSD1)				Prepared & Analyzed: 11/28/18								
Acetone	0.475	0.10	mg/Kg wet	0.200		**238**	*	40-160	15.0	20	L-06	†
tert-Amyl Methyl Ether (TAME)	0.0196	0.0010	mg/Kg wet	0.0200		97.8		70-130	3.81	20		
Benzene	0.0183	0.0020	mg/Kg wet	0.0200		91.6		70-130	1.19	20		
Bromobenzene	0.0200	0.0020	mg/Kg wet	0.0200		99.8		70-130	6.95	20		
Bromochloromethane	0.0223	0.0020	mg/Kg wet	0.0200		112		70-130	9.18	20		
Bromodichloromethane	0.0194	0.0020	mg/Kg wet	0.0200		96.9		70-130	2.04	20		
Bromoform	0.0183	0.0020	mg/Kg wet	0.0200		91.7		70-130	9.95	20		
Bromomethane	0.0128	0.010	mg/Kg wet	0.0200		63.9		40-160	12.8	20	L-14, V-34	†
2-Butanone (MEK)	0.328	0.040	mg/Kg wet	0.200		**164**	*	40-160	12.6	20	L-02	†
n-Butylbenzene	0.0179	0.0020	mg/Kg wet	0.0200		89.4		70-130	0.448	20		
sec-Butylbenzene	0.0181	0.0020	mg/Kg wet	0.0200		90.6		70-130	2.01	20		
tert-Butylbenzene	0.0179	0.0020	mg/Kg wet	0.0200		89.6		70-130	0.560	20		
tert-Butyl Ethyl Ether (TBEE)	0.0198	0.0010	mg/Kg wet	0.0200		99.1		70-130	1.20	20		
Carbon Disulfide	0.0180	0.0060	mg/Kg wet	0.0200		90.2		70-130	1.10	20		
Carbon Tetrachloride	0.0194	0.0020	mg/Kg wet	0.0200		97.1		70-130	1.04	20		
Chlorobenzene	0.0200	0.0020	mg/Kg wet	0.0200		100		70-130	1.88	20		
Chlorodibromomethane	0.0226	0.0010	mg/Kg wet	0.0200		113		70-130	0.441	20		
Chloroethane	0.0176	0.010	mg/Kg wet	0.0200		87.8		70-130	1.72	20		
Chloroform	0.0195	0.0040	mg/Kg wet	0.0200		97.4		70-130	2.13	20		
Chloromethane	0.0152	0.010	mg/Kg wet	0.0200		76.1		40-160	0.792	20		†
2-Chlorotoluene	0.0183	0.0020	mg/Kg wet	0.0200		91.4		70-130	4.70	20		
4-Chlorotoluene	0.0194	0.0020	mg/Kg wet	0.0200		96.8		70-130	0.309	20		
1,2-Dibromo-3-chloropropane (DBCP)	0.0173	0.0020	mg/Kg wet	0.0200		86.4		70-130	11.1	20		
1,2-Dibromoethane (EDB)	0.0207	0.0010	mg/Kg wet	0.0200		104		70-130	2.48	20		
Dibromomethane	0.0206	0.0020	mg/Kg wet	0.0200		103		70-130	5.20	20		
1,2-Dichlorobenzene	0.0192	0.0020	mg/Kg wet	0.0200		96.0		70-130	4.04	20		
1,3-Dichlorobenzene	0.0194	0.0020	mg/Kg wet	0.0200		97.0		70-130	3.25	20		

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B218022 - SW-846 5035											
LCS Dup (B218022-BSD1)				Prepared & Analyzed: 11/28/18							
1,4-Dichlorobenzene	0.0186	0.0020	mg/Kg wet	0.0200		93.0	70-130	1.41	20		
Dichlorodifluoromethane (Freon 12)	0.0130	0.010	mg/Kg wet	0.0200		65.0	40-160	10.1	20	L-14	†
1,1-Dichloroethane	0.0191	0.0020	mg/Kg wet	0.0200		95.3	70-130	1.97	20		
1,2-Dichloroethane	0.0203	0.0020	mg/Kg wet	0.0200		102	70-130	3.38	20		
1,1-Dichloroethylene	0.0186	0.0040	mg/Kg wet	0.0200		93.1	70-130	2.94	20		
cis-1,2-Dichloroethylene	0.0180	0.0020	mg/Kg wet	0.0200		90.0	70-130	0.554	20		
trans-1,2-Dichloroethylene	0.0188	0.0020	mg/Kg wet	0.0200		93.9	70-130	0.848	20		
1,2-Dichloropropane	0.0197	0.0020	mg/Kg wet	0.0200		98.5	70-130	0.203	20		
1,3-Dichloropropane	0.0204	0.0010	mg/Kg wet	0.0200		102	70-130	2.99	20		
2,2-Dichloropropane	0.0182	0.0020	mg/Kg wet	0.0200		91.2	70-130	0.982	20		
1,1-Dichloropropene	0.0188	0.0020	mg/Kg wet	0.0200		93.9	70-130	1.18	20		
cis-1,3-Dichloropropene	0.0202	0.0010	mg/Kg wet	0.0200		101	70-130	2.81	20		
trans-1,3-Dichloropropene	0.0203	0.0010	mg/Kg wet	0.0200		102	70-130	4.71	20		
Diethyl Ether	0.0190	0.010	mg/Kg wet	0.0200		95.1	70-130	6.31	20		
Diisopropyl Ether (DIPE)	0.0188	0.0010	mg/Kg wet	0.0200		94.2	70-130	2.83	20		
1,4-Dioxane	0.210	0.10	mg/Kg wet	0.200		105	40-160	11.2	20	V-16, V-36	†
1,4-Dioxane (SIM)	0.195	0.040	mg/Kg wet	0.200		97.7	40-160	3.06	20		† ‡
Ethylbenzene	0.0185	0.0020	mg/Kg wet	0.0200		92.5	70-130	0.968	20		
Hexachlorobutadiene	0.0200	0.0020	mg/Kg wet	0.0200		100	70-130	7.25	20		
2-Hexanone (MBK)	0.273	0.020	mg/Kg wet	0.200		136	40-160	14.4	20	L-14	†
Isopropylbenzene (Cumene)	0.0202	0.0020	mg/Kg wet	0.0200		101	70-130	1.60	20		
p-Isopropyltoluene (p-Cymene)	0.0175	0.0020	mg/Kg wet	0.0200		87.7	70-130	0.228	20		
Methyl tert-Butyl Ether (MTBE)	0.0203	0.0040	mg/Kg wet	0.0200		102	70-130	4.34	20		
Methylene Chloride	0.0192	0.010	mg/Kg wet	0.0200		96.2	70-130	0.518	20		
4-Methyl-2-pentanone (MIBK)	0.215	0.020	mg/Kg wet	0.200		107	40-160	5.70	20		†
Naphthalene	0.0181	0.010	mg/Kg wet	0.0200		90.4	70-130	4.33	20		
n-Propylbenzene	0.0195	0.0020	mg/Kg wet	0.0200		97.4	70-130	1.24	20		
Styrene	0.0194	0.0020	mg/Kg wet	0.0200		97.2	70-130	0.826	20		
1,1,1,2-Tetrachloroethane	0.0195	0.0020	mg/Kg wet	0.0200		97.7	70-130	5.58	20		
1,1,2,2-Tetrachloroethane	0.0193	0.0010	mg/Kg wet	0.0200		96.5	70-130	5.84	20		
Tetrachloroethylene	0.0208	0.0020	mg/Kg wet	0.0200		104	70-130	2.94	20		
Tetrahydrofuran	0.0203	0.010	mg/Kg wet	0.0200		101	70-130	9.93	20	V-16	
Toluene	0.0176	0.0020	mg/Kg wet	0.0200		88.2	70-130	4.00	20		
1,2,3-Trichlorobenzene	0.0188	0.0020	mg/Kg wet	0.0200		94.1	70-130	6.08	20		
1,2,4-Trichlorobenzene	0.0212	0.0020	mg/Kg wet	0.0200		106	70-130	3.55	20		
1,1,1-Trichloroethane	0.0179	0.0020	mg/Kg wet	0.0200		89.6	70-130	1.44	20		
1,1,2-Trichloroethane	0.0192	0.0020	mg/Kg wet	0.0200		96.0	70-130	7.71	20		
Trichloroethylene	0.0186	0.0020	mg/Kg wet	0.0200		93.0	70-130	1.71	20		
Trichlorofluoromethane (Freon 11)	0.0161	0.010	mg/Kg wet	0.0200		80.4	70-130	3.90	20		
1,2,3-Trichloropropane	0.0187	0.0020	mg/Kg wet	0.0200		93.3	70-130	13.4	20		
1,2,4-Trimethylbenzene	0.0173	0.0020	mg/Kg wet	0.0200		86.4	70-130	0.692	20		
1,3,5-Trimethylbenzene	0.0188	0.0020	mg/Kg wet	0.0200		94.0	70-130	0.106	20		
Vinyl Chloride	0.0160	0.010	mg/Kg wet	0.0200		80.2	70-130	0.877	20		
m+p Xylene	0.0369	0.0040	mg/Kg wet	0.0400		92.2	70-130	0.325	20		
o-Xylene	0.0189	0.0020	mg/Kg wet	0.0200		94.4	70-130	3.34	20		
Surrogate: 1,2-Dichloroethane-d4	*0.0494*		mg/Kg wet	0.0500		98.8	70-130				
Surrogate: Toluene-d8	*0.0490*		mg/Kg wet	0.0500		97.9	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0516*		mg/Kg wet	0.0500		103	70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B218094 - SW-846 5035										
Blank (B218094-BLK1)				Prepared & Analyzed: 11/29/18						
Acetone	ND	0.10	mg/Kg wet							R-05
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet							
Benzene	ND	0.0020	mg/Kg wet							
Bromobenzene	ND	0.0020	mg/Kg wet							
Bromochloromethane	ND	0.0020	mg/Kg wet							
Bromodichloromethane	ND	0.0020	mg/Kg wet							
Bromoform	ND	0.0020	mg/Kg wet							
Bromomethane	ND	0.010	mg/Kg wet							
2-Butanone (MEK)	ND	0.040	mg/Kg wet							
n-Butylbenzene	ND	0.0020	mg/Kg wet							
sec-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet							
Carbon Disulfide	ND	0.0060	mg/Kg wet							
Carbon Tetrachloride	ND	0.0020	mg/Kg wet							
Chlorobenzene	ND	0.0020	mg/Kg wet							
Chlorodibromomethane	ND	0.0010	mg/Kg wet							
Chloroethane	ND	0.010	mg/Kg wet							
Chloroform	ND	0.0040	mg/Kg wet							
Chloromethane	ND	0.010	mg/Kg wet							V-05
2-Chlorotoluene	ND	0.0020	mg/Kg wet							
4-Chlorotoluene	ND	0.0020	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet							
Dibromomethane	ND	0.0020	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet							
1,1-Dichloroethane	ND	0.0020	mg/Kg wet							
1,2-Dichloroethane	ND	0.0020	mg/Kg wet							
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
1,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,3-Dichloropropane	ND	0.0010	mg/Kg wet							
2,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,1-Dichloropropene	ND	0.0020	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
Diethyl Ether	ND	0.010	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet							
1,4-Dioxane	ND	0.10	mg/Kg wet							V-16
Ethylbenzene	ND	0.0020	mg/Kg wet							
Hexachlorobutadiene	ND	0.0020	mg/Kg wet							
2-Hexanone (MBK)	ND	0.020	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet							
Methylene Chloride	ND	0.010	mg/Kg wet							L-04, V-05
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet							
Naphthalene	ND	0.0040	mg/Kg wet							

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B218094 - SW-846 5035											
Blank (B218094-BLK1)				Prepared & Analyzed: 11/29/18							
n-Propylbenzene	ND	0.0020	mg/Kg wet								
Styrene	ND	0.0020	mg/Kg wet								
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet								
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet								
Tetrachloroethylene	ND	0.0020	mg/Kg wet								
Tetrahydrofuran	ND	0.010	mg/Kg wet							L-04, V-05	
Toluene	ND	0.0020	mg/Kg wet								
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet								
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet								
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet								
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet								
Trichloroethylene	ND	0.0020	mg/Kg wet								
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet								
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet								
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet								
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet								
Vinyl Chloride	ND	0.010	mg/Kg wet							L-04	
m+p Xylene	ND	0.0040	mg/Kg wet								
o-Xylene	ND	0.0020	mg/Kg wet								
Surrogate: 1,2-Dichloroethane-d4	*0.0509*		mg/Kg wet	0.0500		102	70-130				
Surrogate: Toluene-d8	*0.0482*		mg/Kg wet	0.0500		96.4	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0521*		mg/Kg wet	0.0500		104	70-130				
LCS (B218094-BS1)				Prepared & Analyzed: 11/29/18							
Acetone	0.244	0.10	mg/Kg wet	0.200		122	40-160			R-05	†
tert-Amyl Methyl Ether (TAME)	0.0177	0.0010	mg/Kg wet	0.0200		88.4	70-130				
Benzene	0.0173	0.0020	mg/Kg wet	0.0200		86.7	70-130				
Bromobenzene	0.0191	0.0020	mg/Kg wet	0.0200		95.7	70-130				
Bromochloromethane	0.0150	0.0020	mg/Kg wet	0.0200		74.8	70-130				
Bromodichloromethane	0.0191	0.0020	mg/Kg wet	0.0200		95.5	70-130				
Bromoform	0.0218	0.0020	mg/Kg wet	0.0200		109	70-130				
Bromomethane	0.0114	0.010	mg/Kg wet	0.0200		57.2	40-160			L-14	†
2-Butanone (MEK)	0.199	0.040	mg/Kg wet	0.200		99.3	40-160				†
n-Butylbenzene	0.0181	0.0020	mg/Kg wet	0.0200		90.7	70-130				
sec-Butylbenzene	0.0192	0.0020	mg/Kg wet	0.0200		96.1	70-130				
tert-Butylbenzene	0.0198	0.0020	mg/Kg wet	0.0200		99.2	70-130				
tert-Butyl Ethyl Ether (TBEE)	0.0163	0.0010	mg/Kg wet	0.0200		81.4	70-130				
Carbon Disulfide	0.0169	0.0060	mg/Kg wet	0.0200		84.7	70-130				
Carbon Tetrachloride	0.0215	0.0020	mg/Kg wet	0.0200		108	70-130			V-20	
Chlorobenzene	0.0208	0.0020	mg/Kg wet	0.0200		104	70-130				
Chlorodibromomethane	0.0217	0.0010	mg/Kg wet	0.0200		109	70-130				
Chloroethane	0.0157	0.010	mg/Kg wet	0.0200		78.6	70-130				
Chloroform	0.0196	0.0040	mg/Kg wet	0.0200		97.9	70-130				
Chloromethane	0.0109	0.010	mg/Kg wet	0.0200		54.5	40-160			L-14, V-05	†
2-Chlorotoluene	0.0204	0.0020	mg/Kg wet	0.0200		102	70-130				
4-Chlorotoluene	0.0215	0.0020	mg/Kg wet	0.0200		107	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.0176	0.0020	mg/Kg wet	0.0200		88.1	70-130				
1,2-Dibromoethane (EDB)	0.0213	0.0010	mg/Kg wet	0.0200		106	70-130				
Dibromomethane	0.0180	0.0020	mg/Kg wet	0.0200		89.9	70-130				
1,2-Dichlorobenzene	0.0195	0.0020	mg/Kg wet	0.0200		97.3	70-130				
1,3-Dichlorobenzene	0.0200	0.0020	mg/Kg wet	0.0200		99.9	70-130				
1,4-Dichlorobenzene	0.0191	0.0020	mg/Kg wet	0.0200		95.5	70-130				

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QUALITY CONTROL

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B218094 - SW-846 5035												
LCS (B218094-BS1)				Prepared & Analyzed: 11/29/18								
Dichlorodifluoromethane (Freon 12)	0.0108	0.010	mg/Kg wet	0.0200		53.9		40-160			L-14	†
1,1-Dichloroethane	0.0167	0.0020	mg/Kg wet	0.0200		83.6		70-130				
1,2-Dichloroethane	0.0194	0.0020	mg/Kg wet	0.0200		97.1		70-130				
1,1-Dichloroethylene	0.0162	0.0040	mg/Kg wet	0.0200		80.8		70-130				
cis-1,2-Dichloroethylene	0.0173	0.0020	mg/Kg wet	0.0200		86.4		70-130				
trans-1,2-Dichloroethylene	0.0162	0.0020	mg/Kg wet	0.0200		81.0		70-130				
1,2-Dichloropropane	0.0153	0.0020	mg/Kg wet	0.0200		76.3		70-130				
1,3-Dichloropropane	0.0178	0.0010	mg/Kg wet	0.0200		89.2		70-130				
2,2-Dichloropropane	0.0212	0.0020	mg/Kg wet	0.0200		106		70-130				
1,1-Dichloropropene	0.0186	0.0020	mg/Kg wet	0.0200		93.1		70-130				
cis-1,3-Dichloropropene	0.0183	0.0010	mg/Kg wet	0.0200		91.4		70-130				
trans-1,3-Dichloropropene	0.0210	0.0010	mg/Kg wet	0.0200		105		70-130				
Diethyl Ether	0.0147	0.010	mg/Kg wet	0.0200		73.3		70-130				
Diisopropyl Ether (DIPE)	0.0141	0.0010	mg/Kg wet	0.0200		70.7		70-130				
1,4-Dioxane	0.161	0.10	mg/Kg wet	0.200		80.7		40-160			V-16	†
Ethylbenzene	0.0193	0.0020	mg/Kg wet	0.0200		96.4		70-130				
Hexachlorobutadiene	0.0201	0.0020	mg/Kg wet	0.0200		101		70-130				
2-Hexanone (MBK)	0.169	0.020	mg/Kg wet	0.200		84.6		40-160				†
Isopropylbenzene (Cumene)	0.0214	0.0020	mg/Kg wet	0.0200		107		70-130				
p-Isopropyltoluene (p-Cymene)	0.0189	0.0020	mg/Kg wet	0.0200		94.4		70-130				
Methyl tert-Butyl Ether (MTBE)	0.0201	0.0040	mg/Kg wet	0.0200		101		70-130				
Methylene Chloride	0.0120	0.010	mg/Kg wet	0.0200		**59.9**	*	70-130			L-04, V-05	
4-Methyl-2-pentanone (MIBK)	0.150	0.020	mg/Kg wet	0.200		74.9		40-160				†
Naphthalene	0.0180	0.0040	mg/Kg wet	0.0200		90.2		70-130				
n-Propylbenzene	0.0201	0.0020	mg/Kg wet	0.0200		101		70-130				
Styrene	0.0203	0.0020	mg/Kg wet	0.0200		102		70-130				
1,1,1,2-Tetrachloroethane	0.0226	0.0020	mg/Kg wet	0.0200		113		70-130				
1,1,2,2-Tetrachloroethane	0.0186	0.0010	mg/Kg wet	0.0200		93.2		70-130				
Tetrachloroethylene	0.0197	0.0020	mg/Kg wet	0.0200		98.3		70-130				
Tetrahydrofuran	0.0129	0.010	mg/Kg wet	0.0200		**64.3**	*	70-130			L-04, V-05	
Toluene	0.0177	0.0020	mg/Kg wet	0.0200		88.4		70-130				
1,2,3-Trichlorobenzene	0.0191	0.0020	mg/Kg wet	0.0200		95.6		70-130				
1,2,4-Trichlorobenzene	0.0195	0.0020	mg/Kg wet	0.0200		97.3		70-130				
1,1,1-Trichloroethane	0.0199	0.0020	mg/Kg wet	0.0200		99.6		70-130				
1,1,2-Trichloroethane	0.0192	0.0020	mg/Kg wet	0.0200		96.2		70-130				
Trichloroethylene	0.0185	0.0020	mg/Kg wet	0.0200		92.7		70-130				
Trichlorofluoromethane (Freon 11)	0.0175	0.010	mg/Kg wet	0.0200		87.4		70-130				
1,2,3-Trichloropropane	0.0190	0.0020	mg/Kg wet	0.0200		94.9		70-130				
1,2,4-Trimethylbenzene	0.0187	0.0020	mg/Kg wet	0.0200		93.4		70-130				
1,3,5-Trimethylbenzene	0.0211	0.0020	mg/Kg wet	0.0200		105		70-130				
Vinyl Chloride	0.0134	0.010	mg/Kg wet	0.0200		**67.0**	*	70-130			L-04	
m+p Xylene	0.0409	0.0040	mg/Kg wet	0.0400		102		70-130				
o-Xylene	0.0199	0.0020	mg/Kg wet	0.0200		99.4		70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0497*		mg/Kg wet	0.0500		99.4		70-130				
Surrogate: Toluene-d8	*0.0484*		mg/Kg wet	0.0500		96.8		70-130				
Surrogate: 4-Bromofluorobenzene	*0.0529*		mg/Kg wet	0.0500		106		70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B218094 - SW-846 5035											
LCS Dup (B218094-BSD1)				Prepared & Analyzed: 11/29/18							
Acetone	0.196	0.10	mg/Kg wet	0.200		98.1	40-160	**21.8** *	20	R-05	†
tert-Amyl Methyl Ether (TAME)	0.0171	0.0010	mg/Kg wet	0.0200		85.3	70-130	3.65	20		
Benzene	0.0168	0.0020	mg/Kg wet	0.0200		84.1	70-130	3.14	20		
Bromobenzene	0.0177	0.0020	mg/Kg wet	0.0200		88.4	70-130	7.88	20		
Bromochloromethane	0.0155	0.0020	mg/Kg wet	0.0200		77.4	70-130	3.43	20		
Bromodichloromethane	0.0187	0.0020	mg/Kg wet	0.0200		93.3	70-130	2.33	20		
Bromoform	0.0199	0.0020	mg/Kg wet	0.0200		99.3	70-130	9.54	20		
Bromomethane	0.0120	0.010	mg/Kg wet	0.0200		59.8	40-160	4.43	20	L-14	†
2-Butanone (MEK)	0.186	0.040	mg/Kg wet	0.200		92.9	40-160	6.65	20		†
n-Butylbenzene	0.0172	0.0020	mg/Kg wet	0.0200		85.9	70-130	5.35	20		
sec-Butylbenzene	0.0184	0.0020	mg/Kg wet	0.0200		92.2	70-130	4.11	20		
tert-Butylbenzene	0.0187	0.0020	mg/Kg wet	0.0200		93.4	70-130	6.01	20		
tert-Butyl Ethyl Ether (TBEE)	0.0161	0.0010	mg/Kg wet	0.0200		80.7	70-130	0.864	20		
Carbon Disulfide	0.0173	0.0060	mg/Kg wet	0.0200		86.4	70-130	1.91	20		
Carbon Tetrachloride	0.0206	0.0020	mg/Kg wet	0.0200		103	70-130	4.57	20	V-20	
Chlorobenzene	0.0200	0.0020	mg/Kg wet	0.0200		100	70-130	3.97	20		
Chlorodibromomethane	0.0220	0.0010	mg/Kg wet	0.0200		110	70-130	1.10	20		
Chloroethane	0.0164	0.010	mg/Kg wet	0.0200		81.8	70-130	3.98	20		
Chloroform	0.0188	0.0040	mg/Kg wet	0.0200		93.8	70-130	4.29	20		
Chloromethane	0.0110	0.010	mg/Kg wet	0.0200		55.1	40-160	1.11	20	L-14, V-05	†
2-Chlorotoluene	0.0198	0.0020	mg/Kg wet	0.0200		99.2	70-130	2.90	20		
4-Chlorotoluene	0.0207	0.0020	mg/Kg wet	0.0200		104	70-130	3.61	20		
1,2-Dibromo-3-chloropropane (DBCP)	0.0174	0.0020	mg/Kg wet	0.0200		87.1	70-130	1.10	20		
1,2-Dibromoethane (EDB)	0.0214	0.0010	mg/Kg wet	0.0200		107	70-130	0.422	20		
Dibromomethane	0.0186	0.0020	mg/Kg wet	0.0200		92.9	70-130	3.24	20		
1,2-Dichlorobenzene	0.0188	0.0020	mg/Kg wet	0.0200		93.8	70-130	3.64	20		
1,3-Dichlorobenzene	0.0190	0.0020	mg/Kg wet	0.0200		95.0	70-130	5.09	20		
1,4-Dichlorobenzene	0.0182	0.0020	mg/Kg wet	0.0200		91.0	70-130	4.78	20		
Dichlorodifluoromethane (Freon 12)	0.0108	0.010	mg/Kg wet	0.0200		53.8	40-160	0.130	20	L-14	†
1,1-Dichloroethane	0.0166	0.0020	mg/Kg wet	0.0200		82.9	70-130	0.793	20		
1,2-Dichloroethane	0.0191	0.0020	mg/Kg wet	0.0200		95.5	70-130	1.71	20		
1,1-Dichloroethylene	0.0164	0.0040	mg/Kg wet	0.0200		82.2	70-130	1.62	20		
cis-1,2-Dichloroethylene	0.0172	0.0020	mg/Kg wet	0.0200		86.2	70-130	0.220	20		
trans-1,2-Dichloroethylene	0.0162	0.0020	mg/Kg wet	0.0200		81.2	70-130	0.283	20		
1,2-Dichloropropane	0.0160	0.0020	mg/Kg wet	0.0200		80.1	70-130	4.82	20		
1,3-Dichloropropane	0.0169	0.0010	mg/Kg wet	0.0200		84.6	70-130	5.22	20		
2,2-Dichloropropane	0.0202	0.0020	mg/Kg wet	0.0200		101	70-130	4.88	20		
1,1-Dichloropropene	0.0179	0.0020	mg/Kg wet	0.0200		89.3	70-130	4.20	20		
cis-1,3-Dichloropropene	0.0178	0.0010	mg/Kg wet	0.0200		88.9	70-130	2.77	20		
trans-1,3-Dichloropropene	0.0206	0.0010	mg/Kg wet	0.0200		103	70-130	1.83	20		
Diethyl Ether	0.0140	0.010	mg/Kg wet	0.0200		70.0	70-130	4.63	20		
Diisopropyl Ether (DIPE)	0.0139	0.0010	mg/Kg wet	0.0200		**69.3** *	70-130	2.00	20	L-07	
1,4-Dioxane	0.193	0.10	mg/Kg wet	0.200		96.7	40-160	18.0	20	V-16	†
Ethylbenzene	0.0190	0.0020	mg/Kg wet	0.0200		95.0	70-130	1.43	20		
Hexachlorobutadiene	0.0198	0.0020	mg/Kg wet	0.0200		99.1	70-130	1.40	20		
2-Hexanone (MBK)	0.166	0.020	mg/Kg wet	0.200		83.0	40-160	1.94	20		†
Isopropylbenzene (Cumene)	0.0211	0.0020	mg/Kg wet	0.0200		105	70-130	1.31	20		
p-Isopropyltoluene (p-Cymene)	0.0181	0.0020	mg/Kg wet	0.0200		90.5	70-130	4.21	20		
Methyl tert-Butyl Ether (MTBE)	0.0188	0.0040	mg/Kg wet	0.0200		94.1	70-130	6.86	20		
Methylene Chloride	0.0123	0.010	mg/Kg wet	0.0200		**61.7** *	70-130	2.91	20	L-04, V-05	
4-Methyl-2-pentanone (MIBK)	0.149	0.020	mg/Kg wet	0.200		74.7	40-160	0.290	20		†
Naphthalene	0.0166	0.0040	mg/Kg wet	0.0200		83.2	70-130	8.13	20		

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B218094 - SW-846 5035											
LCS Dup (B218094-BSD1)				Prepared & Analyzed: 11/29/18							
n-Propylbenzene	0.0198	0.0020	mg/Kg wet	0.0200		98.8		70-130	1.89	20	
Styrene	0.0194	0.0020	mg/Kg wet	0.0200		97.0		70-130	4.62	20	
1,1,1,2-Tetrachloroethane	0.0211	0.0020	mg/Kg wet	0.0200		105		70-130	7.09	20	
1,1,2,2-Tetrachloroethane	0.0191	0.0010	mg/Kg wet	0.0200		95.3		70-130	2.16	20	
Tetrachloroethylene	0.0205	0.0020	mg/Kg wet	0.0200		102		70-130	4.09	20	
Tetrahydrofuran	0.0127	0.010	mg/Kg wet	0.0200		**63.3**	*	70-130	1.52	20	L-04, V-05
Toluene	0.0180	0.0020	mg/Kg wet	0.0200		90.0		70-130	1.83	20	
1,2,3-Trichlorobenzene	0.0176	0.0020	mg/Kg wet	0.0200		87.8		70-130	8.56	20	
1,2,4-Trichlorobenzene	0.0182	0.0020	mg/Kg wet	0.0200		91.0		70-130	6.73	20	
1,1,1-Trichloroethane	0.0197	0.0020	mg/Kg wet	0.0200		98.3		70-130	1.36	20	
1,1,2-Trichloroethane	0.0201	0.0020	mg/Kg wet	0.0200		100		70-130	4.40	20	
Trichloroethylene	0.0190	0.0020	mg/Kg wet	0.0200		94.8		70-130	2.27	20	
Trichlorofluoromethane (Freon 11)	0.0169	0.010	mg/Kg wet	0.0200		84.4		70-130	3.55	20	
1,2,3-Trichloropropane	0.0166	0.0020	mg/Kg wet	0.0200		82.9		70-130	13.5	20	
1,2,4-Trimethylbenzene	0.0179	0.0020	mg/Kg wet	0.0200		89.4		70-130	4.38	20	
1,3,5-Trimethylbenzene	0.0209	0.0020	mg/Kg wet	0.0200		105		70-130	0.619	20	
Vinyl Chloride	0.0131	0.010	mg/Kg wet	0.0200		**65.4**	*	70-130	2.48	20	L-04
m+p Xylene	0.0396	0.0040	mg/Kg wet	0.0400		99.0		70-130	3.19	20	
o-Xylene	0.0195	0.0020	mg/Kg wet	0.0200		97.7		70-130	1.65	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0489*		mg/Kg wet	0.0500		97.9		70-130			
Surrogate: Toluene-d8	*0.0496*		mg/Kg wet	0.0500		99.2		70-130			
Surrogate: 4-Bromofluorobenzene	*0.0530*		mg/Kg wet	0.0500		106		70-130			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217946 - SW-846 3546										
Blank (B217946-BLK1)				Prepared: 11/27/18 Analyzed: 11/28/18						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
n-Decane	ND	0.10	mg/Kg wet							
n-Docosane	ND	0.10	mg/Kg wet							
n-Dodecane	ND	0.10	mg/Kg wet							
n-Eicosane	ND	0.10	mg/Kg wet							
n-Hexacosane	ND	0.10	mg/Kg wet							
n-Hexadecane	ND	0.10	mg/Kg wet							
n-Hexatriacontane	ND	0.10	mg/Kg wet							
n-Nonadecane	ND	0.10	mg/Kg wet							
n-Nonane	ND	0.10	mg/Kg wet							
n-Octacosane	ND	0.10	mg/Kg wet							
n-Octadecane	0.12	0.10	mg/Kg wet							
n-Tetracosane	ND	0.10	mg/Kg wet							
n-Tetradecane	ND	0.10	mg/Kg wet							
n-Triacontane	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*4.07*		mg/Kg wet	5.00		81.3	40-140			
Surrogate: o-Terphenyl (OTP)	*4.53*		mg/Kg wet	5.00		90.7	40-140			
Surrogate: 2-Bromonaphthalene	*5.04*		mg/Kg wet	5.00		101	40-140			
Surrogate: 2-Fluorobiphenyl	*5.06*		mg/Kg wet	5.00		101	40-140			
LCS (B217946-BS1)				Prepared: 11/27/18 Analyzed: 11/28/18						
C9-C18 Aliphatics	27.9	10	mg/Kg wet	30.0		92.9	40-140			
C19-C36 Aliphatics	40.2	10	mg/Kg wet	40.0		101	40-140			
Unadjusted C11-C22 Aromatics	85.5	10	mg/Kg wet	85.0		101	40-140			
Acenaphthene	4.83	0.10	mg/Kg wet	5.00		96.6	40-140			
Acenaphthylene	4.49	0.10	mg/Kg wet	5.00		89.8	40-140			
Anthracene	4.92	0.10	mg/Kg wet	5.00		98.3	40-140			
Benzo(a)anthracene	4.85	0.10	mg/Kg wet	5.00		97.0	40-140			
Benzo(a)pyrene	4.66	0.10	mg/Kg wet	5.00		93.3	40-140			
Benzo(b)fluoranthene	4.90	0.10	mg/Kg wet	5.00		98.1	40-140			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217946 - SW-846 3546										
LCS (B217946-BS1)				Prepared: 11/27/18 Analyzed: 11/28/18						
Benzo(g,h,i)perylene	4.70	0.10	mg/Kg wet	5.00		94.0	40-140			
Benzo(k)fluoranthene	4.82	0.10	mg/Kg wet	5.00		96.4	40-140			
Chrysene	5.00	0.10	mg/Kg wet	5.00		99.9	40-140			
Dibenz(a,h)anthracene	4.86	0.10	mg/Kg wet	5.00		97.2	40-140			
Fluoranthene	5.04	0.10	mg/Kg wet	5.00		101	40-140			
Fluorene	4.81	0.10	mg/Kg wet	5.00		96.1	40-140			
Indeno(1,2,3-cd)pyrene	4.54	0.10	mg/Kg wet	5.00		90.8	40-140			
2-Methylnaphthalene	4.20	0.10	mg/Kg wet	5.00		83.9	40-140			
Naphthalene	4.20	0.10	mg/Kg wet	5.00		84.1	40-140			
Phenanthrene	5.02	0.10	mg/Kg wet	5.00		100	40-140			
Pyrene	5.06	0.10	mg/Kg wet	5.00		101	40-140			
n-Decane	3.20	0.10	mg/Kg wet	5.00		64.0	40-140			
n-Docosane	4.69	0.10	mg/Kg wet	5.00		93.8	40-140			
n-Dodecane	4.01	0.10	mg/Kg wet	5.00		80.2	40-140			
n-Eicosane	4.67	0.10	mg/Kg wet	5.00		93.4	40-140			
n-Hexacosane	4.61	0.10	mg/Kg wet	5.00		92.1	40-140			
n-Hexadecane	4.83	0.10	mg/Kg wet	5.00		96.5	40-140			
n-Hexatriacontane	4.64	0.10	mg/Kg wet	5.00		92.8	40-140			
n-Nonadecane	4.70	0.10	mg/Kg wet	5.00		94.0	40-140			
n-Nonane	2.23	0.10	mg/Kg wet	5.00		44.5	30-140			
n-Octacosane	4.51	0.10	mg/Kg wet	5.00		90.1	40-140			
n-Octadecane	4.84	0.10	mg/Kg wet	5.00		96.9	40-140			B
n-Tetracosane	4.65	0.10	mg/Kg wet	5.00		92.9	40-140			
n-Tetradecane	4.56	0.10	mg/Kg wet	5.00		91.2	40-140			
n-Triacontane	4.58	0.10	mg/Kg wet	5.00		91.6	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*4.39*		mg/Kg wet	5.00		87.7	40-140			
Surrogate: o-Terphenyl (OTP)	*4.97*		mg/Kg wet	5.00		99.4	40-140			
Surrogate: 2-Bromonaphthalene	*4.97*		mg/Kg wet	5.00		99.4	40-140			
Surrogate: 2-Fluorobiphenyl	*5.18*		mg/Kg wet	5.00		104	40-140			
LCS Dup (B217946-BSD1)				Prepared: 11/27/18 Analyzed: 11/28/18						
C9-C18 Aliphatics	26.0	10	mg/Kg wet	30.0		86.7	40-140	6.89	25	
C19-C36 Aliphatics	39.2	10	mg/Kg wet	40.0		98.1	40-140	2.48	25	
Unadjusted C11-C22 Aromatics	83.8	10	mg/Kg wet	85.0		98.5	40-140	2.08	25	
Acenaphthene	4.67	0.10	mg/Kg wet	5.00		93.4	40-140	3.41	25	
Acenaphthylene	4.32	0.10	mg/Kg wet	5.00		86.3	40-140	3.90	25	
Anthracene	4.91	0.10	mg/Kg wet	5.00		98.2	40-140	0.0957	25	
Benzo(a)anthracene	4.84	0.10	mg/Kg wet	5.00		96.8	40-140	0.237	25	
Benzo(a)pyrene	4.65	0.10	mg/Kg wet	5.00		93.0	40-140	0.283	25	
Benzo(b)fluoranthene	4.90	0.10	mg/Kg wet	5.00		98.0	40-140	0.0979	25	
Benzo(g,h,i)perylene	4.66	0.10	mg/Kg wet	5.00		93.1	40-140	0.911	25	
Benzo(k)fluoranthene	4.81	0.10	mg/Kg wet	5.00		96.1	40-140	0.301	25	
Chrysene	4.97	0.10	mg/Kg wet	5.00		99.4	40-140	0.554	25	
Dibenz(a,h)anthracene	4.79	0.10	mg/Kg wet	5.00		95.8	40-140	1.46	25	
Fluoranthene	5.03	0.10	mg/Kg wet	5.00		101	40-140	0.0914	25	
Fluorene	4.74	0.10	mg/Kg wet	5.00		94.7	40-140	1.47	25	
Indeno(1,2,3-cd)pyrene	4.56	0.10	mg/Kg wet	5.00		91.2	40-140	0.468	25	
2-Methylnaphthalene	3.94	0.10	mg/Kg wet	5.00		78.9	40-140	6.21	25	
Naphthalene	3.91	0.10	mg/Kg wet	5.00		78.2	40-140	7.23	25	
Phenanthrene	4.99	0.10	mg/Kg wet	5.00		99.8	40-140	0.647	25	

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B217946 - SW-846 3546											
LCS Dup (B217946-BSD1)				Prepared: 11/27/18 Analyzed: 11/28/18							
Pyrene	5.04	0.10	mg/Kg wet	5.00		101		40-140	0.370	25	
n-Decane	2.88	0.10	mg/Kg wet	5.00		57.6		40-140	10.5	25	
n-Docosane	4.61	0.10	mg/Kg wet	5.00		92.1		40-140	1.86	25	
n-Dodecane	3.67	0.10	mg/Kg wet	5.00		73.3		40-140	8.98	25	
n-Eicosane	4.57	0.10	mg/Kg wet	5.00		91.4		40-140	2.08	25	
n-Hexacosane	4.55	0.10	mg/Kg wet	5.00		91.0		40-140	1.26	25	
n-Hexadecane	4.71	0.10	mg/Kg wet	5.00		94.1		40-140	2.53	25	
n-Hexatriacontane	4.62	0.10	mg/Kg wet	5.00		92.4		40-140	0.447	25	
n-Nonadecane	4.61	0.10	mg/Kg wet	5.00		92.2		40-140	1.90	25	
n-Nonane	1.97	0.10	mg/Kg wet	5.00		39.4		30-140	12.2	25	
n-Octacosane	4.46	0.10	mg/Kg wet	5.00		89.3		40-140	0.961	25	
n-Octadecane	4.74	0.10	mg/Kg wet	5.00		94.8		40-140	2.13	25	B
n-Tetracosane	4.58	0.10	mg/Kg wet	5.00		91.6		40-140	1.40	25	
n-Tetradecane	4.34	0.10	mg/Kg wet	5.00		86.8		40-140	4.89	25	
n-Triacontane	4.53	0.10	mg/Kg wet	5.00		90.6		40-140	1.07	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00				0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00				0-5			
Surrogate: Chlorooctadecane (COD)	*4.25*		mg/Kg wet	5.00		85.0		40-140			
Surrogate: o-Terphenyl (OTP)	*4.95*		mg/Kg wet	5.00		98.9		40-140			
Surrogate: 2-Bromonaphthalene	*5.06*		mg/Kg wet	5.00		101		40-140			
Surrogate: 2-Fluorobiphenyl	*5.18*		mg/Kg wet	5.00		104		40-140			
Matrix Spike (B217946-MS1)		**Source: 18K0939-01**		Prepared: 11/27/18 Analyzed: 11/30/18							
C9-C18 Aliphatics	26.6	12	mg/Kg dry	36.2	5.49	58.3		40-140			
C19-C36 Aliphatics	55.6	12	mg/Kg dry	48.2	17.0	80.0		40-140			
Unadjusted C11-C22 Aromatics	117	12	mg/Kg dry	103	48.0	67.7		40-140			
Acenaphthene	4.59	0.12	mg/Kg dry	6.03	0.0631	75.1		40-140			
Acenaphthylene	4.26	0.12	mg/Kg dry	6.03	ND	70.7		40-140			
Anthracene	4.68	0.12	mg/Kg dry	6.03	0.211	74.2		40-140			
Benzo(a)anthracene	5.38	0.12	mg/Kg dry	6.03	1.08	71.3		40-140			
Benzo(a)pyrene	5.40	0.12	mg/Kg dry	6.03	1.20	69.7		40-140			
Benzo(b)fluoranthene	5.98	0.12	mg/Kg dry	6.03	1.88	68.1		40-140			
Benzo(g,h,i)perylene	5.15	0.12	mg/Kg dry	6.03	0.966	69.4		40-140			
Benzo(k)fluoranthene	4.98	0.12	mg/Kg dry	6.03	0.677	71.3		40-140			
Chrysene	5.81	0.12	mg/Kg dry	6.03	1.56	70.4		40-140			
Dibenz(a,h)anthracene	4.59	0.12	mg/Kg dry	6.03	0.214	72.5		40-140			
Fluoranthene	6.84	0.12	mg/Kg dry	6.03	2.86	66.0		40-140			
Fluorene	4.59	0.12	mg/Kg dry	6.03	0.0790	74.7		40-140			
Indeno(1,2,3-cd)pyrene	4.97	0.12	mg/Kg dry	6.03	0.964	66.4		40-140			
2-Methylnaphthalene	3.79	0.12	mg/Kg dry	6.03	ND	62.8		40-140			
Naphthalene	3.51	0.12	mg/Kg dry	6.03	ND	58.2		40-140			
Phenanthrene	5.62	0.12	mg/Kg dry	6.03	1.28	71.9		40-140			
Pyrene	6.63	0.12	mg/Kg dry	6.03	2.57	67.4		40-140			
n-Nonane	1.39	0.12	mg/Kg dry	6.03	ND	**23.0**	*	30-140			MS-07A
Surrogate: Chlorooctadecane (COD)	*4.11*		mg/Kg dry	6.03		68.2		40-140			
Surrogate: o-Terphenyl (OTP)	*4.67*		mg/Kg dry	6.03		77.4		40-140			
Surrogate: 2-Bromonaphthalene	*5.90*		mg/Kg dry	6.03		97.9		40-140			
Surrogate: 2-Fluorobiphenyl	*6.25*		mg/Kg dry	6.03		104		40-140			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B217946 - SW-846 3546											
Matrix Spike Dup (B217946-MSD1)	**Source: 18K0939-01**			Prepared: 11/27/18 Analyzed: 11/30/18							
C9-C18 Aliphatics	26.6	12	mg/Kg dry	35.5	5.49	59.6		40-140	0.187	50	
C19-C36 Aliphatics	58.9	12	mg/Kg dry	47.3	17.0	88.4		40-140	5.64	50	
Unadjusted C11-C22 Aromatics	119	12	mg/Kg dry	101	48.0	70.6		40-140	1.33	50	
Acenaphthene	4.78	0.12	mg/Kg dry	5.91	0.0631	79.7		40-140	3.92	50	
Acenaphthylene	4.41	0.12	mg/Kg dry	5.91	ND	74.7		40-140	3.57	50	
Anthracene	4.88	0.12	mg/Kg dry	5.91	0.211	78.9		40-140	4.10	50	
Benzo(a)anthracene	5.50	0.12	mg/Kg dry	5.91	1.08	74.8		40-140	2.35	50	
Benzo(a)pyrene	5.39	0.12	mg/Kg dry	5.91	1.20	70.9		40-140	0.176	50	
Benzo(b)fluoranthene	5.99	0.12	mg/Kg dry	5.91	1.88	69.6		40-140	0.113	50	
Benzo(g,h,i)perylene	5.23	0.12	mg/Kg dry	5.91	0.966	72.0		40-140	1.45	50	
Benzo(k)fluoranthene	5.07	0.12	mg/Kg dry	5.91	0.677	74.3		40-140	1.85	50	
Chrysene	5.93	0.12	mg/Kg dry	5.91	1.56	73.8		40-140	2.05	50	
Dibenz(a,h)anthracene	4.68	0.12	mg/Kg dry	5.91	0.214	75.5		40-140	1.97	50	
Fluoranthene	7.07	0.12	mg/Kg dry	5.91	2.86	71.2		40-140	3.32	50	
Fluorene	4.78	0.12	mg/Kg dry	5.91	0.0790	79.5		40-140	4.16	50	
Indeno(1,2,3-cd)pyrene	5.02	0.12	mg/Kg dry	5.91	0.964	68.6		40-140	1.06	50	
2-Methylnaphthalene	3.90	0.12	mg/Kg dry	5.91	ND	66.0		40-140	3.05	50	
Naphthalene	3.63	0.12	mg/Kg dry	5.91	ND	61.3		40-140	3.32	50	
Phenanthrene	5.96	0.12	mg/Kg dry	5.91	1.28	79.0		40-140	5.80	50	
Pyrene	6.83	0.12	mg/Kg dry	5.91	2.57	72.1		40-140	2.97	50	
n-Nonane	1.36	0.12	mg/Kg dry	5.91	ND	**23.0**	*	30-140	1.92	50	MS-07A
Surrogate: Chlorooctadecane (COD)	*4.34*		mg/Kg dry	5.91		73.4		40-140			
Surrogate: o-Terphenyl (OTP)	*4.97*		mg/Kg dry	5.91		84.1		40-140			
Surrogate: 2-Bromonaphthalene	*6.08*		mg/Kg dry	5.91		103		40-140			
Surrogate: 2-Fluorobiphenyl	*6.37*		mg/Kg dry	5.91		108		40-140			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217735 - MA VPH										
Blank (B217735-BLK1)				Prepared & Analyzed: 11/21/18						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.50	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*44.7*		µg/L	40.0		112	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*43.1*		µg/L	40.0		108	70-130			
LCS (B217735-BS1)				Prepared & Analyzed: 11/21/18						
Benzene	0.0476	0.0010	mg/Kg wet	0.0500		95.1	70-130			
Butylcyclohexane	0.0566	0.0010	mg/Kg wet	0.0500		113	70-130			
Decane	0.0452	0.0010	mg/Kg wet	0.0500		90.3	70-130			
Ethylbenzene	0.0491	0.0010	mg/Kg wet	0.0500		98.2	70-130			
Methyl tert-Butyl Ether (MTBE)	0.0466	0.0010	mg/Kg wet	0.0500		93.2	70-130			
2-Methylpentane	0.0514	0.0010	mg/Kg wet	0.0500		103	70-130			
Naphthalene	0.0454	0.010	mg/Kg wet	0.0500		90.8	70-130			
Nonane	0.0549	0.0010	mg/Kg wet	0.0500		110	30-130			
Pentane	0.0467	0.0010	mg/Kg wet	0.0500		93.3	70-130			
Toluene	0.0484	0.0010	mg/Kg wet	0.0500		96.8	70-130			
1,2,4-Trimethylbenzene	0.0501	0.0010	mg/Kg wet	0.0500		100	70-130			
2,2,4-Trimethylpentane	0.0507	0.0010	mg/Kg wet	0.0500		101	70-130			
m+p Xylene	0.0991	0.0020	mg/Kg wet	0.100		99.1	70-130			
o-Xylene	0.0493	0.0010	mg/Kg wet	0.0500		98.7	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*42.0*		µg/L	40.0		105	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*41.1*		µg/L	40.0		103	70-130			
LCS Dup (B217735-BSD1)				Prepared & Analyzed: 11/21/18						
Benzene	0.0465	0.0010	mg/Kg wet	0.0500		93.1	70-130	2.15	25	
Butylcyclohexane	0.0554	0.0010	mg/Kg wet	0.0500		111	70-130	2.06	25	
Decane	0.0430	0.0010	mg/Kg wet	0.0500		85.9	70-130	4.96	25	
Ethylbenzene	0.0480	0.0010	mg/Kg wet	0.0500		96.1	70-130	2.24	25	
Methyl tert-Butyl Ether (MTBE)	0.0471	0.0010	mg/Kg wet	0.0500		94.2	70-130	1.02	25	
2-Methylpentane	0.0489	0.0010	mg/Kg wet	0.0500		97.9	70-130	4.84	25	
Naphthalene	0.0468	0.010	mg/Kg wet	0.0500		93.5	70-130	2.99	25	
Nonane	0.0532	0.0010	mg/Kg wet	0.0500		106	30-130	3.05	25	
Pentane	0.0442	0.0010	mg/Kg wet	0.0500		88.4	70-130	5.41	25	
Toluene	0.0474	0.0010	mg/Kg wet	0.0500		94.8	70-130	2.08	25	
1,2,4-Trimethylbenzene	0.0494	0.0010	mg/Kg wet	0.0500		98.8	70-130	1.48	25	

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217735 - MA VPH										
LCS Dup (B217735-BSD1)				Prepared & Analyzed: 11/21/18						
2,2,4-Trimethylpentane	0.0480	0.0010	mg/Kg wet	0.0500		95.9	70-130	5.46	25	
m+p Xylene	0.0971	0.0020	mg/Kg wet	0.100		97.1	70-130	2.08	25	
o-Xylene	0.0485	0.0010	mg/Kg wet	0.0500		97.1	70-130	1.60	25	
Surrogate: 2,5-Dibromotoluene (FID)	*47.4*		µg/L	40.0		119	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*46.0*		µg/L	40.0		115	70-130			
Batch B217834 - MA VPH										
Blank (B217834-BLK1)				Prepared & Analyzed: 11/26/18						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.25	mg/Kg wet							
Naphthalene	ND	0.50	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*47.1*		µg/L	40.0		118	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*43.9*		µg/L	40.0		110	70-130			
LCS (B217834-BS1)				Prepared & Analyzed: 11/26/18						
Benzene	0.0489	0.0010	mg/Kg wet	0.0500		97.8	70-130			
Butylcyclohexane	0.0593	0.0010	mg/Kg wet	0.0500		119	70-130			
Decane	0.0472	0.0010	mg/Kg wet	0.0500		94.3	70-130			
Ethylbenzene	0.0507	0.0010	mg/Kg wet	0.0500		101	70-130			
Methyl tert-Butyl Ether (MTBE)	0.0488	0.0010	mg/Kg wet	0.0500		97.5	70-130			
2-Methylpentane	0.0539	0.0010	mg/Kg wet	0.0500		108	70-130			
Naphthalene	0.0483	0.010	mg/Kg wet	0.0500		96.6	70-130			
Naphthalene	0.0483	0.0050	mg/Kg wet	0.0500		96.6	70-130			
Nonane	0.0570	0.0010	mg/Kg wet	0.0500		114	30-130			
Pentane	0.0478	0.0010	mg/Kg wet	0.0500		95.6	70-130			
Toluene	0.0497	0.0010	mg/Kg wet	0.0500		99.5	70-130			
1,2,4-Trimethylbenzene	0.0519	0.0010	mg/Kg wet	0.0500		104	70-130			
2,2,4-Trimethylpentane	0.0537	0.0010	mg/Kg wet	0.0500		107	70-130			
m+p Xylene	0.102	0.0020	mg/Kg wet	0.100		102	70-130			
o-Xylene	0.0509	0.0010	mg/Kg wet	0.0500		102	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*46.0*		µg/L	40.0		115	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*45.0*		µg/L	40.0		112	70-130			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217834 - MA VPH										
LCS Dup (B217834-BSD1)				Prepared & Analyzed: 11/26/18						
Benzene	0.0497	0.0010	mg/Kg wet	0.0500		99.4	70-130	1.67	25	
Butylcyclohexane	0.0580	0.0010	mg/Kg wet	0.0500		116	70-130	2.27	25	
Decane	0.0467	0.0010	mg/Kg wet	0.0500		93.5	70-130	0.937	25	
Ethylbenzene	0.0514	0.0010	mg/Kg wet	0.0500		103	70-130	1.46	25	
Methyl tert-Butyl Ether (MTBE)	0.0490	0.0010	mg/Kg wet	0.0500		98.0	70-130	0.515	25	
2-Methylpentane	0.0543	0.0010	mg/Kg wet	0.0500		109	70-130	0.839	25	
Naphthalene	0.0465	0.0050	mg/Kg wet	0.0500		93.0	70-130	3.73	25	
Naphthalene	0.0465	0.010	mg/Kg wet	0.0500		93.0	70-130	3.73	25	
Nonane	0.0564	0.0010	mg/Kg wet	0.0500		113	30-130	1.13	25	
Pentane	0.0482	0.0010	mg/Kg wet	0.0500		96.5	70-130	0.885	25	
Toluene	0.0506	0.0010	mg/Kg wet	0.0500		101	70-130	1.62	25	
1,2,4-Trimethylbenzene	0.0522	0.0010	mg/Kg wet	0.0500		104	70-130	0.642	25	
2,2,4-Trimethylpentane	0.0539	0.0010	mg/Kg wet	0.0500		108	70-130	0.217	25	
m+p Xylene	0.103	0.0020	mg/Kg wet	0.100		103	70-130	1.25	25	
o-Xylene	0.0516	0.0010	mg/Kg wet	0.0500		103	70-130	1.36	25	
Surrogate: 2,5-Dibromotoluene (FID)	*44.9*		µg/L	40.0		112	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*42.5*		µg/L	40.0		106	70-130			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217953 - SW-846 3050B										
Blank (B217953-BLK1)				Prepared: 11/27/18 Analyzed: 11/28/18						
Antimony	ND	1.7	mg/Kg wet							
Arsenic	ND	1.7	mg/Kg wet							
Barium	ND	1.7	mg/Kg wet							
Beryllium	ND	0.17	mg/Kg wet							
Cadmium	ND	0.17	mg/Kg wet							
Chromium	ND	0.33	mg/Kg wet							
Lead	ND	0.50	mg/Kg wet							
Nickel	ND	0.33	mg/Kg wet							
Selenium	ND	3.3	mg/Kg wet							
Silver	ND	0.33	mg/Kg wet							
Thallium	ND	1.7	mg/Kg wet							
Vanadium	ND	0.67	mg/Kg wet							
Zinc	ND	0.67	mg/Kg wet							
LCS (B217953-BS1)				Prepared: 11/27/18 Analyzed: 11/28/18						
Antimony	59.4	5.0	mg/Kg wet	75.5		78.7	3.8-196			
Arsenic	153	5.0	mg/Kg wet	161		95.3	83.2-116.8			
Barium	261	5.0	mg/Kg wet	260		100	82.7-117.3			
Beryllium	91.5	0.50	mg/Kg wet	97.6		93.7	83.4-116.8			
Cadmium	207	0.50	mg/Kg wet	211		98.0	83.4-116.6			
Chromium	134	0.99	mg/Kg wet	136		98.6	82.4-117.6			
Lead	106	1.5	mg/Kg wet	111		95.2	83-117.1			
Nickel	93.7	0.99	mg/Kg wet	91.9		102	82.9-117.5			
Selenium	179	9.9	mg/Kg wet	191		93.8	79.6-120.9			
Silver	45.4	0.99	mg/Kg wet	43.3		105	79.9-119.9			
Thallium	158	5.0	mg/Kg wet	156		101	81.4-119.2			
Vanadium	51.2	2.0	mg/Kg wet	56.7		90.3	79-121.2			
Zinc	196	2.0	mg/Kg wet	199		98.5	81.4-119.1			
LCS Dup (B217953-BSD1)				Prepared: 11/27/18 Analyzed: 11/28/18						
Antimony	60.8	5.0	mg/Kg wet	75.5		80.5	3.8-196	2.23	30	
Arsenic	152	5.0	mg/Kg wet	161		94.5	83.2-116.8	0.801	30	
Barium	258	5.0	mg/Kg wet	260		99.2	82.7-117.3	1.17	30	
Beryllium	90.3	0.50	mg/Kg wet	97.6		92.6	83.4-116.8	1.26	30	
Cadmium	201	0.50	mg/Kg wet	211		95.3	83.4-116.6	2.77	30	
Chromium	134	1.0	mg/Kg wet	136		98.3	82.4-117.6	0.326	30	
Lead	109	1.5	mg/Kg wet	111		98.5	83-117.1	3.41	30	
Nickel	92.8	1.0	mg/Kg wet	91.9		101	82.9-117.5	0.902	30	
Selenium	177	10	mg/Kg wet	191		92.7	79.6-120.9	1.12	30	
Silver	45.2	1.0	mg/Kg wet	43.3		105	79.9-119.9	0.266	30	
Thallium	158	5.0	mg/Kg wet	156		101	81.4-119.2	0.324	30	
Vanadium	51.9	2.0	mg/Kg wet	56.7		91.6	79-121.2	1.39	30	
Zinc	196	2.0	mg/Kg wet	199		98.3	81.4-119.1	0.223	30	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217953 - SW-846 3050B										
MRL Check (B217953-MRL1)				Prepared: 11/27/18 Analyzed: 11/29/18						
Lead	0.573	0.49	mg/Kg wet	0.491		117	80-120			
Batch B218036 - SW-846 7471										
Blank (B218036-BLK1)				Prepared: 11/28/18 Analyzed: 11/29/18						
Mercury	ND	0.025	mg/Kg wet							
LCS (B218036-BS1)				Prepared: 11/28/18 Analyzed: 11/29/18						
Mercury	11.8	1.9	mg/Kg wet	11.5		103	71.6-127.8			
LCS Dup (B218036-BSD1)				Prepared: 11/28/18 Analyzed: 11/29/18						
Mercury	12.1	1.9	mg/Kg wet	11.5		105	71.6-127.8	2.16	30	
Duplicate (B218036-DUP1)	**Source: 18K0939-09**			Prepared: 11/28/18 Analyzed: 11/29/18						
Mercury	0.0372	0.028	mg/Kg dry		0.0322			14.3	35	
Matrix Spike (B218036-MS1)	**Source: 18K0939-09**			Prepared: 11/28/18 Analyzed: 11/29/18						
Mercury	0.218	0.028	mg/Kg dry	0.187	0.0322	99.3	75-125			

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B217892 - % Solids										
Duplicate (B217892-DUP2)	**Source: 18K0939-01**			Prepared: 11/26/18 Analyzed: 11/27/18						
% Solids	81.0		% Wt		81.3			0.417	20	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B	Analyte is found in the associated laboratory blank as well as in the sample.
L-02	Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-06	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the high side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
L-14	Compound classified by MA CAM as difficult with acceptable recoveries of 40-160%. Recovery does not meet 70-130% criteria but does meet difficult compound criteria.
MS-07A	Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possiblity of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.
O-01	Soil/methanol ratio does not meet method specifications. Excess amount of soil. Sample was completely covered with methanol, but with less than the method-specified amount.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
V-05	Continuing calibration did not meet method specifications and was biased on the low side for this compound.
V-16	Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.
V-20	Continuing calibration did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-36	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP-EPH-04-1.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Soil	
Antimony	CT,NH,NY,ME,VA,NC
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Beryllium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
Nickel	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
Thallium	CT,NH,NY,ME,VA,NC
Vanadium	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8260C in Soil	
Acetone	CT,NH,NY,ME
Benzene	CT,NH,NY,ME
Bromobenzene	NH,NY,ME
Bromochloromethane	NH,NY,ME
Bromodichloromethane	CT,NH,NY,ME
Bromoform	CT,NH,NY,ME
Bromomethane	CT,NH,NY,ME
2-Butanone (MEK)	CT,NH,NY,ME
n-Butylbenzene	CT,NH,NY,ME
sec-Butylbenzene	CT,NH,NY,ME
tert-Butylbenzene	CT,NH,NY,ME
Carbon Disulfide	CT,NH,NY,ME
Carbon Tetrachloride	CT,NH,NY,ME
Chlorobenzene	CT,NH,NY,ME
Chlorodibromomethane	CT,NH,NY,ME
Chloroethane	CT,NH,NY,ME
Chloroform	CT,NH,NY,ME
Chloromethane	CT,NH,NY,ME
2-Chlorotoluene	CT,NH,NY,ME
4-Chlorotoluene	CT,NH,NY,ME
1,2-Dibromo-3-chloropropane (DBCP)	NY
Dibromomethane	NH,NY,ME
1,2-Dichlorobenzene	CT,NH,NY,ME
1,3-Dichlorobenzene	CT,NH,NY,ME
1,4-Dichlorobenzene	CT,NH,NY,ME
Dichlorodifluoromethane (Freon 12)	NY,ME
1,1-Dichloroethane	CT,NH,NY,ME
1,2-Dichloroethane	CT,NH,NY,ME

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C in Soil	
1,1-Dichloroethylene	CT,NH,NY,ME
cis-1,2-Dichloroethylene	CT,NH,NY,ME
trans-1,2-Dichloroethylene	CT,NH,NY,ME
1,2-Dichloropropane	CT,NH,NY,ME
1,3-Dichloropropane	NH,NY,ME
2,2-Dichloropropane	NH,NY,ME
1,1-Dichloropropene	NH,NY,ME
cis-1,3-Dichloropropene	CT,NH,NY,ME
trans-1,3-Dichloropropene	CT,NH,NY,ME
1,4-Dioxane	NY
Ethylbenzene	CT,NH,NY,ME
Hexachlorobutadiene	NH,NY,ME
2-Hexanone (MBK)	CT,NH,NY,ME
Isopropylbenzene (Cumene)	CT,NH,NY,ME
p-Isopropyltoluene (p-Cymene)	NH,NY
Methyl tert-Butyl Ether (MTBE)	NH,NY
Methylene Chloride	CT,NH,NY,ME
4-Methyl-2-pentanone (MIBK)	CT,NH,NY
Naphthalene	NH,NY,ME
n-Propylbenzene	NH,NY
Styrene	CT,NH,NY,ME
1,1,1,2-Tetrachloroethane	CT,NH,NY,ME
1,1,2,2-Tetrachloroethane	CT,NH,NY,ME
Tetrachloroethylene	CT,NH,NY,ME
Toluene	CT,NH,NY,ME
1,2,3-Trichlorobenzene	NY
1,2,4-Trichlorobenzene	NH,NY,ME
1,1,1-Trichloroethane	CT,NH,NY,ME
1,1,2-Trichloroethane	CT,NH,NY,ME
Trichloroethylene	CT,NH,NY,ME
Trichlorofluoromethane (Freon 11)	CT,NH,NY,ME
1,2,3-Trichloropropane	NH,NY,ME
1,2,4-Trimethylbenzene	CT,NH,NY,ME
1,3,5-Trimethylbenzene	CT,NH,NY,ME
Vinyl Chloride	CT,NH,NY,ME
m+p Xylene	CT,NH,NY,ME
o-Xylene	CT,NH,NY,ME

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The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2019
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2019
RI	Rhode Island Department of Health	LAO00112	12/30/2018
NC	North Carolina Div. of Water Quality	652	12/31/2018
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2018
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2019
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2019
NC-DW	North Carolina Department of Health	25703	07/31/2019

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EES 18K0939

con-test ANALYTICAL LABORATORY

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http://www.contestlabs.com

Doc # 381 Rev 1_03242017

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 2

Company Name: Nobis Engineering
Address: 585 Middlesex St
Phone: 978-703-6914
Project Name: Lowell High School
Project Location: 75 Arcand Drive, Lowell
Project Number: 91830.04
Project Manager: Denis McGrath
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: A. Goldberg

Requested Turnaround Time:
7-Day [X] 10-Day [ ]
Due Date:

Rush Approval Required:
1-Day [ ] 3-Day [ ]
2-Day [ ] 4-Day [ ]

Data Delivery:
Format: PDF [X] EXCEL [X]
Other:
CLP Like Data Pkg Required: [ ]
Email To: dmcgrath@nobisengr.com
Fax To #:

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1] Matrix Code	Conc Code	VOCs	VPH	EPH	MCP14 Metals including Mercury
1	75ARC-SB01-0002'	11-19-18 10:20			X	S		X	X	X	X
2	75ARC-SB01-0406'	11-19-18 10:20			X			X	X	X	X
3	75ARC-SB01-1012'	11-19-18 10:40			X			X	X	X	X
4	75ARC-SB02-0002'	11-19-18 11:05			X			X	X	X	X
5	75ARC-SB02-0406'	11-19-18 11:15			X			X	X	X	X
6	75ARC-SB03-0002'	11-19-18 8:35			X			X	X	X	X
7	75ARC-SB03-0406'	11-19-18 8:45			X			X	X	X	X
8	75ARC-SB03-0810'	11-19-18 9:00			X			X	X	X	X
9	75ARC-SB04-0002'	11-19-18 9:40			X			X	X	X	X
10	75ARC-SB04-0406'	11-19-18 9:50			X	↓		X	X	X	X

# of Containers: 3 1 1 1
[2] Preservation Code: V V G
[3] Container Code: V V G

Dissolved Metals Samples: [ ] Field Filtered [ ] Lab to Filter
Orthophosphate Samples: [ ] Field Filtered [ ] Lab to Filter

Comments:
Metals MCP14 include Mercury
VPH - carbon ranges
EPH - include target compounds
((SB02-0406') - VPH sample methanol expired 9/18 please analyze first)

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] Container Codes:
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Relinquished by: (signature)	Date/Time: 11/20/18 1030	
Received by: (signature)	Date/Time: 11/20/18 1030	
Relinquished by: (signature)	Date/Time: 11/20/18 1739	
Received by: (signature)	Date/Time: 11/20/18 1750	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

Detection Limit Requirements
MA:
CT:
Other:

Special Requirements
[X] MA MCP Required
MCP Certification Form Required
[ ] CT RCP Required
RCP Certification Form Required
[ ] MA State DW Required
PWSID #

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Project Entity
[ ] Government [ ] Municipality [ ] MWRA [ ] WRTA
[ ] Federal [ ] 21 J [ ] School
[ ] City [ ] Brownfield [ ] MBTA

Other
[ ] Chromatogram
[ ] AIHA-LAP, LLC

PCB ONLY
[ ] Soxhlet
[ ] Non Soxhlet

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39 Spruce Street
East Longmeadow, MA 01028

CHAIN OF CUSTODY RECORD

Company Name: Nobis Engineering
Address: 585 Middlesex St.
Phone: 978-703-6014
Project Name: Lowell High School
Project Location: 75 Arcand Drive
Project Number: 91830.04
Project Manager: Denis McGrath
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: A. Goldberg

Required Turnaround Time: 7-Day [X] Due Date: 10-Day [ ]
Rush Approval Required: 1-Day [ ] 2-Day [ ] 3-Day [ ] 4-Day [ ]
Data Delivery: Format: PDF [X] EXCEL [X] Other:
CLP Like Data Pkg Required: [ ]
Email To: dmcgrath@nobiseng.com
Fax To #:

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	VOCs	VPH	EPH	MCP14 + Hg	# of Containers	[2] Preservation Code	[3] Container Code
11	FD01	11-19-18 10:00			G	S		X	X	X	X	3	V	G
12	TB01	11-19-18 7:45			G	S		X	X			1	V	G
												1	a	G
												1	a	G

ANALYSIS REQUESTED

Dissolved Metals Samples: O Field Filtered O Lab to Filter
8 Hour Hexavalent Samples: O Field Filtered O Lab to Filter

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:
Metals - MCP 14 include mercury
VPH - carbon ranges
EPH include target compounds

Please use the following codes to indicate possible sample concentration within the **Conc Code** column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time: 11/20/18 1030	
Received by: (signature)	Date/Time: 11/20/18 1030	
Relinquished by: (signature)	Date/Time: 11/20/18 1730	
Received by: (signature)	Date/Time: 11/20/2018 1730	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

Detection Limit Requirements: MA: RCP: Other:

Special Requirements:
[ ] MA MCP Required
MCP Certification Form Required
[ ] CT RCP Required
RCP Certification Form Required
[ ] MA State DW Required
PWSID #

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Project Entity:
[ ] Government [ ] Municipality [ ] MWRA [ ] WRTA
[ ] Federal [ ] 21 J [ ] School
[ ] City [ ] Brownfield [ ] MBTA

Other:
[ ] Chromatogram
[ ] AIHA-LAP, LLC

PCB ONLY:
[ ] Soxhlet
[ ] Non Soxhlet

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I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

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Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Nobis Engineering

Received By TS Date 11/20/2018 Time 17 30

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 2.7

By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? _____

Proper Media/Containers Used? T Is splitting samples required? _____

Were trip blanks received? F On COC? _____

Do all samples have the proper pH? NA Acid _____ Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	11
Meoh-	24	250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-	24	Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test Analytical Laboratory	Project #: 18K0939
Project Location: 75 Arcand Drive, Lowell, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

18K0939-01 thru 18K0939-12

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A (X)	7470/7471 Hg CAM IIIB (X)	MassDEP VPH CAM IV A (X)	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B ( )	7010 Metals CAM III C ( )	MassDEP VPH CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A (X)	6020 Metals CAM III D ( )	MassDEP EPH CAM IV A (X)	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☑ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]
	A response to questions G, H and I below is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**		
H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☐ Yes	☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Tod Kopyscinski Position: Laboratory Director

Printed Name: Tod E. Kopyscinski Date: 12/03/18

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Geotechnical Partnership, Inc.

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Lisa R. Casselli,PE Principal - A WBE Firm

Subsurface Exploration ***Laboratory Soil Testing*** ***Geothermal Testing***
Foundation Specialty Systems ***Ground Improvement*** ***Earthwork Testing***

25 November 2018
GPI File No. 1628-02
PEADPC No. 67150.00

Perkins Eastman
50 Franklin Street – Suite 203
Boston, MA 02110

Attention: Joseph Drown, AIA - Principal

Subject: Lowell High School, Lowell MA
PSR Pricing Narrative – Geotechnical Addendum (75 Arcand Drive)

Dear Sir:

This geotechnical data summary report provides our supplemental site background data review, subsurface explorations, field soil and groundwater review, engineering data summary, analyses and calculations for the proposed new Lowell High School building construction planned to take place on the property currently known as 75 Arcand Drive in Lowell, Massachusetts (refer to *Figure 1*).

Figure 1: Site Exploration Location Plan

45 New Ocean Street – Suite A
Swampscott, MA 01907
Tel. 781/646-6982

805 Main Street
Sanford, ME 04073
Tel. 207/459-7800

I. Background:

Reference Report:

- Purview of this Report: This geotechnical site review focuses specifically on the 75 Arcand Drive property, located immediately south of and adjacent to the Lowell High School downtown campus.

- Previous Project Geotechnical Report:
  - Throughout the 75 Arcand Drive review, reference will be made to our 28 March 2018 Lowell High School geotechnical site report entitled "Lowell high School, Lowell MA PSR Pricing Narrative – Geotechnical".
  - Shorthand reference to the LHS campus report herein is as follows: March LHS Report.

Existing Conditions – 75 Arcand Drive:

- Plan reference:
  - *Site Plan, Lowell High School*; dated 4 October 2018; 10-scale.

- Direction, Datum and Coordinates:
  - Direction:
    - Plan north: refer to *Figure 1A* of the March LHS Report (page 1)
    - Called north in this report: in the direction of Father Morissette Boulevard
    - Elevation datum:
      - Elevations referenced in the March LHS Report utilized the Lowell City Base datum (LCB).
      - No elevation survey was available for the 75 Arcand Drive property at the time of this review.
  - Site Coordinates:
    - Latitude: 42.6476° N
    - Longitude: -71.3120° W

- Existing Site Conditions:
  - Remnant foundations were found within the soil borings drilled on the Lowell High School campus and at 75 Arcand Drive. These foundations remained from buildings active on the properties during their occupation by the Merrimack Manufacturing Company (Merrimack Mills). The company and its site structures are detailed in the March LHS Report (page 3).
  - Previous structures mapped for the 75 Arcand Drive property are portrayed in March LHS Report *Figure 1B: Lowell High School Downtown Campus Area – 1936*. The 75 Arcand Drive previous structures are shown adjacent left of the project area boundary shown on *Figure 1B* (page 2).
  - The existing, post Merrimack Mills, on-site building consists of a 2-story office building with basement level. Paved access drives and parking areas surround the structure. Limited planted areas exist at 75 Arcand Drive (see *Figure 1).*

II. Subsurface Conditions:

Topographic Data – 75 Arcand Drive:

- Elevation Range: The 75 Arcand Drive site is relatively level.

- Area Topography and Geology: the geologic data relevant to 75 Arcand Drive is as described for the Lowell High School campus and includes (March LHS Report, pages 5-7):
  - Area Surficial Geology
  - Area Water Bodies
  - Geologically Predicted Site Substrata; and
  - Area Bedrock Geology

Previous Test Borings – 75 Arcand Drive

- On-Site Completed Test Borings:
  - No borings of record were found.
  - No groundwater well roadway boxes were found which would have indicated prior subsurface on-site review.

- Nearby Completed Test Borings: ten (10) relevant previous borings undertaken on the Lowell High School campus are described in the March LHS Report by text, location plan, strength plots and subsoil profiles (pages 8-17).

Test Borings Undertaken – 75 Arcand Drive

- Dig Safe:
  - Dig Safe site underground utility clearance was provided by Soil Exploration Corporation of Leominster, Massachusetts: Dig Safe ticket number is held by them.
  - Utilities contacted: utilities list is held by Soil Exploration Corporation
  - Water & sewer is not covered by Dig Safe and the City of Lowell engineer's office and the Lowell DPW were visited separately by Soil Exploration for Dig Safe site review.
  - During this process the City of Lowell water department office requested pre-clearance of most campus site drilling locations by soil vacuuming to about 6 ft. depth.
    - These requests were made due to uncertainty with respect to the locations of existing site utilities.
    - Soil vacuuming of boring locations in advance of test boring drilling was performed as noted on the boring logs in *Appendix A*.

- Test borings:
  - Drilling by Soil Exploration Corp. of Leominster, MA:
    - Seven (7) structural borings were drilled at 75 Arcand Drive during 19-20 November 2018. The borings were designated B201 through B207.
    - Approximate as-drilled boring locations are shown on *Figure 1*.
  - A drill-rig equipped with an auto-hammer drilled and sampled soils below grade in all borings (*Photo 1*). Soil samples were taken in 2-foot increments.
    - HSA auger borings were drilled to up to 37 ft. depth with:
      - A soil sample retrieved from the bottom of the soil vacuum interval.
      - Standard 5-foot interval sampling and testing thereafter.

- Digital Boring Logs:
  - Recovered test boring soil samples were digitally logged by the geotechnical engineer in accordance with *ASTM D-5434-97: Standard Guide for Logging of Subsurface Explorations of Soil and Rock*.
  - Boring logs prepared by the engineer are presented in soil boring log sheets in *Appendix A.* Logs detail soil type, boundary elevation or depth, density, consistency, thickness, coloration, moisture and composition.

III. Geotechnical Testing – 75 Arcand Drive:

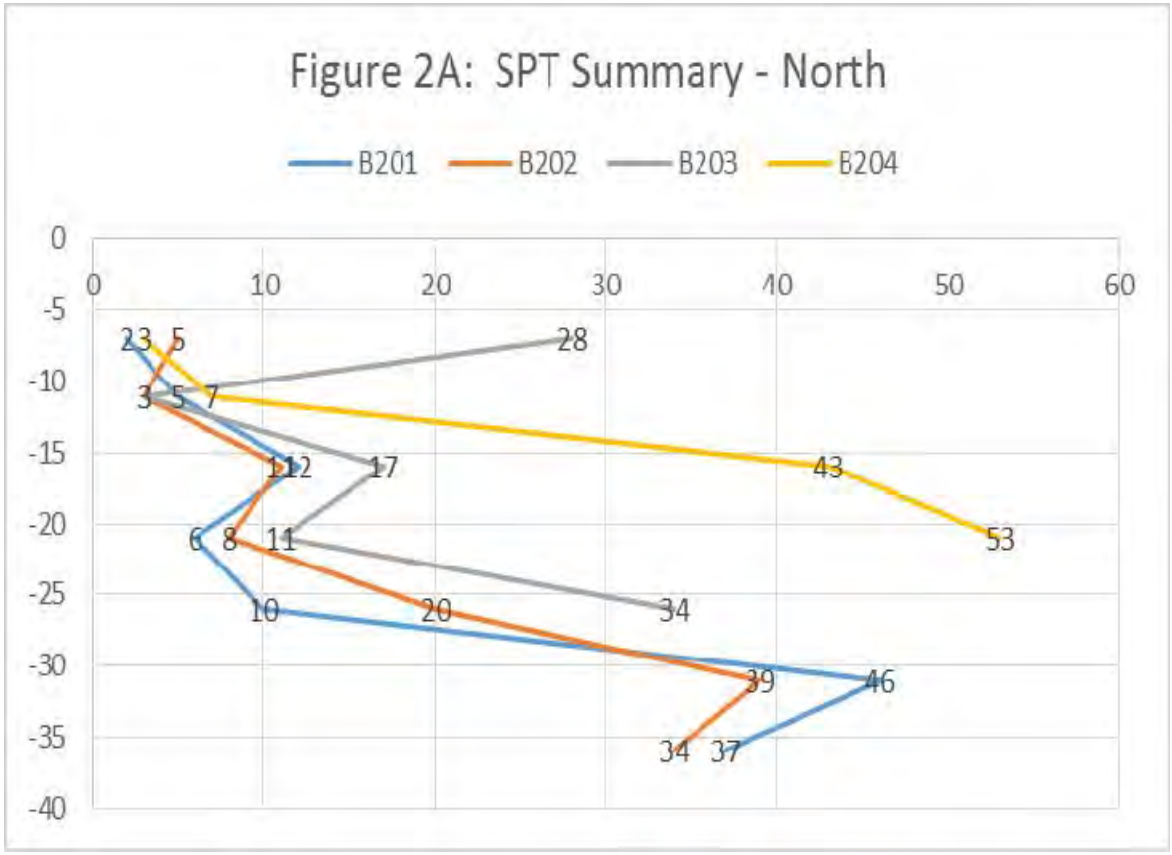
Field Testing Performed:

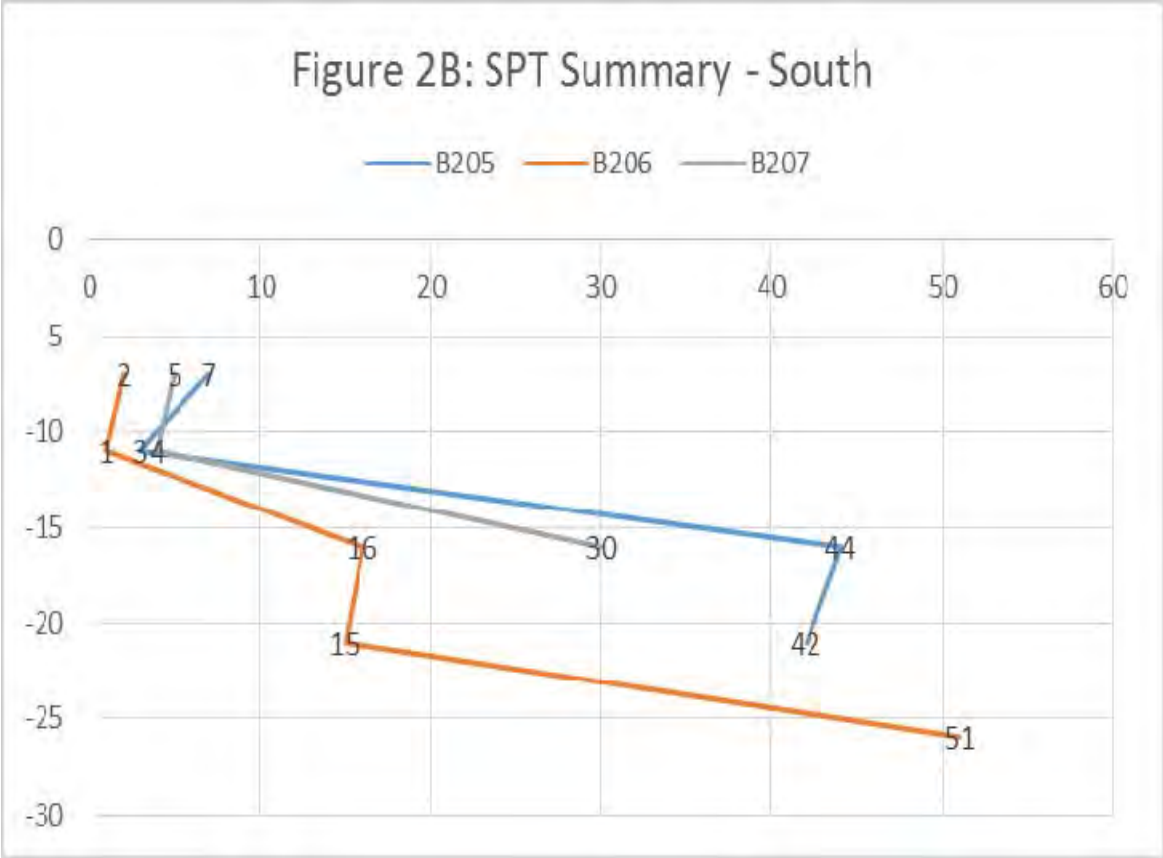
- Standard Penetration Tests (SPT) (N_{70} in blows/foot)
- Field Gradation Tests

Standard Penetration Testing (SPT):

- SPT Presentation and Definition:
  - A standard penetration test is defined as the number of blows of a 140 lb. hammer falling 30 inches to drive a standard soil split spoon sampler 12 vertical inches. The number of blows is designated as "N"
  - Standard penetration tests (SPT) N are summarized for the relevant borings with depth on the boring logs in *Appendix A* and in *Figure 3A* and *Figure 3B.*
  - Field SPT N (blows/foot) are taken from blow count graphs provided on the boring logs.
  - Standard penetration test N is plotted for the borings with depth in *Figure 2A* and *Figure 2B.*

- SPT Type:
  - The borings drilled for this study (see *Appendix A*) used an auto-hammer sampler drive system which delivers replicable, consistent energy for each blow.
  - This is considered an improvement over older style drill rigs which utilized a rope and cathead system and can have operator error or bias particularly when drilling in dense soils (e.g. "short stroke" as driller tired, yielding artificially high N values).





- SPT N Data Analysis of this Site:
  - Note that in the plot of N with elevation in *Figure 2A* and *Figure 2B*:
    - The borings showed reasonable consistency with depth.
    - Borings found low strength soils (fills, glacial fluvial soils) to 25 ft. to 30 ft. depth (north) and from 15 ft. to 25 ft. depth (south).
    - The borings gained soil strength below this level within dense SP glacial fluvial (*Figure 3A*) and glacial till (*Figure 3A* and *Figure 3B*)
  - See the N pattern variation with depth with respect to soil type in *Figure 3A* and *Figure 3B* as well as in the blow count graphs on the boring logs in *Appendix A.*

- SPT N Engineering Uses and Corrections: this information is detailed in the March LHS Report (page 10).

Field Gradation Tests:

- Test Use: Limited field gradation tests are usually performed to better determine the relative percents of coarse gravel, fine gravel, coarse sand, and medium sand and fines (silt and fine sand) in recovered granular soil samples: dried SP glacial fluvial soil.

- Limitations:
  - Field tests were limited to recovered dry or field air dried soil samples.
  - 4-sieve method does not allow for separation of silt from fine sand.

Laboratory Soil Testing: No laboratory testing was undertaken for this review.

IV. Soil Strata – 75 Arcand Drive:

Data Summaries:

- Soil Profile Data Summary: a summary of the on-site borings is provided in *Table I*.

Table I: Exploration Summary -75 Arcand Drive

Test Boring No.	***Surface Elevation (LCB) (ft.)***	***Depth Drilled (ft.)***	***All Fill (ft.)***	***All Organics (ft.)***	***ML Glacial Fluvial (ft.)***	***SP Glacial Fluvial (ft.)***	***Silty Clay (ft.)***	***Glacial Till (ft.)***
B201	NA	37	10	---	4	14	---	>9
B202	NA	37	11	---	2	23.5	---	>0.5
B203	NA	27	11.1	---	0.9	14	---	>1
B204	NA	22	6	---	6	4	---	>6
B205	NA	22	11.2	---	2.8	2	---	6
B206	NA	27	11.5	---	1.5	11	---	>3
B207	NA	17	7	---	6	3.5	---	>0.5

- Soil Profile Drawings:
  - Refer to the soil profiles sketched in *Figure 3A* and *Figure 3B* to gain an overview of site subsurface conditions at 75 Arcand Drive (*Figure 1*) based upon the test borings.
  - Subsoil profiles were taken from Arcand Drive east across the property (*Figure 1*).

- Soil Profile Field Descriptions: Detailed field soil descriptions are given in the logs of the borings presented in *Appendix A*.

Soil Classification System Used for this Site Investigation: refer to the March LHS Report (page 18).

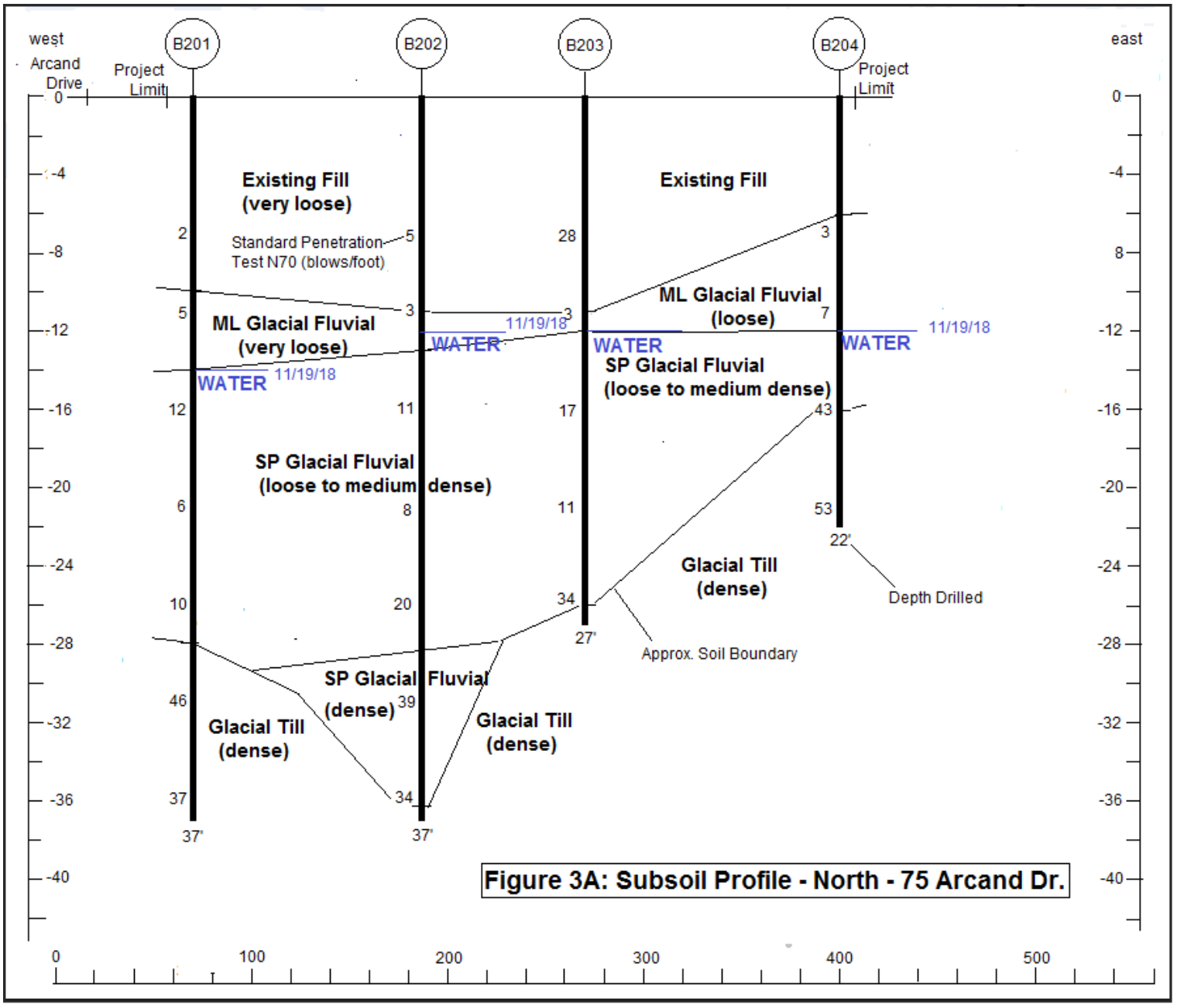


Figure 3A: Subsoil Profile - North - 75 Arcand Dr.

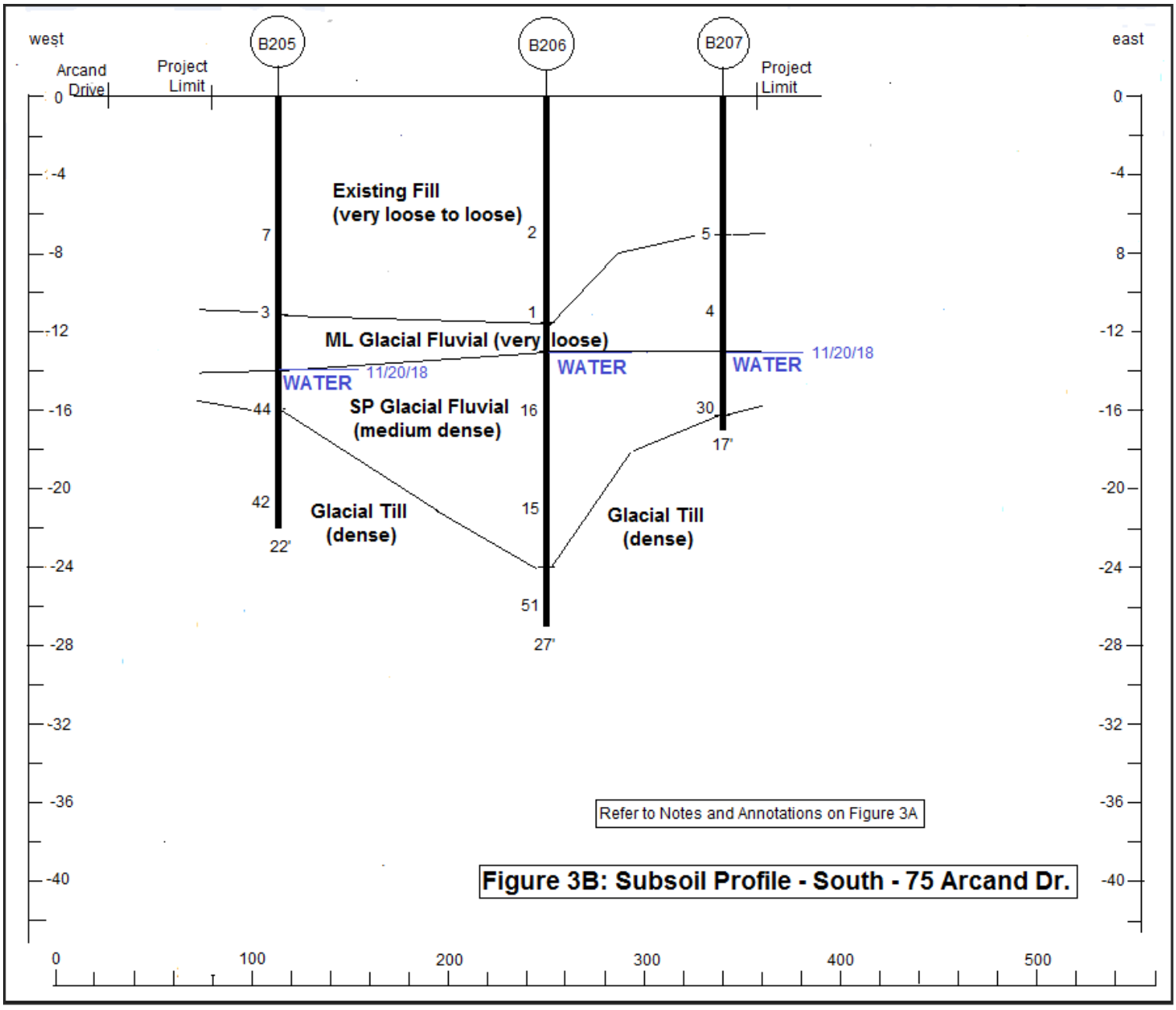


Figure 3B: Subsoil Profile - South - 75 Arcand Dr.

Photo 1: Soil Vacuuming

Photo 2: Common Fill

Photo 3: Buried Topsoil (L); ML Glacial Fluvial (R)

Photo 4: Wet SP Glacial Fluvial

Site Subsoil Descriptions - 75 Arcand Drive:

- <u>Existing Fill:</u>
  - Types: fill variation found borings:
    - Granular fill: limited volume; typically at depth > 6 ft.
    - Common fill (*Photo 2*):
      - High silt content soil with lesser sand and gravel
      - Solid waste was found during soil vacuuming (*Photo 1; Appendix A*)
  - Thickness: refer to *Table I, Appendix A*.
  - Quality for re-use:
    - Common fill would be limited to re-use as common fill (below planted areas). Possible use below a structural slab or ground improved grade slab if used in design. Otherwise it would have to be exported off-site.
    - Granular fill, if found, could be re-used as engineered fill pending lab tests during earthwork.

- <u>Organics</u>: neither peat nor organic silt were found at 75 Arcand Drive at the drilled locations

- Marine Sediment: neither silty clay nor cohesive silt were found at 75 Arcand Drive at the drilled locations

- Glacial Fluvial Soils:
  - Soil definition, source, description and competency for structural bearing are as described in the March LHS Report (page 20).
  - Sub-layer thicknesses (ML, SP) are provided in *Table I* and *Appendix A*

- Glacial Till:
  - Glacial till description, coloration, density and competence are as provided in the March LHS Report (page 21).
  - The layer was not fully penetrated to bedrock in any of the 75 Arcand Drive borings.
  - Depth to top of glacial till at 75 Arcand Drive is portrayed in *Figure 3A* and *Figure 3B*.

- Bedrock:
  - Bedrock data collected in the borings drilled at Lowell High School is relevant to the 75 Arcand Drive site (March LHS Report, pages 21-22).
  - Bedrock was not found to the depths drilled at 75 Arcand Drive (*Appendix A*).

Photo 5: Groundwater in Completed Borehole B202

V. Groundwater Behavior – 75 Arcand Drive

- Free Water:
  - A wet (saturated) soil zone (SP glacial fluvial; *Photo 4*) was found in all seven of the borings drilled at 75 Arcand Drive. (*Figure 3A, Figure 3B; Appendix A*).
  - 75 Arcand Drive lies within a mapped significant groundwater aquifer (March LHS Report, page 22).

- Groundwater data is given in *Table II* below and shown on *Figure 3A* and *Figure 3B*:

Table II: Groundwater Observations – 75 Arcand Drive

Boring	Elevation (LCB)	Date	Observation	Groundwater Depth	Groundwater El. (LCB)
B201	NA	11/19/18	Wet SP Glacial Fluvial	14 ft.	NA
B202	NA	11/19/18	Wet SP Glacial Fluvial	12 ft.	NA
B203	NA	11/19/18	Wet SP Glacial Fluvial	12 ft.	NA
B204	NA	11/19/18	Wet SP Glacial Fluvial	12 ft.	NA
B205	NA	11/20/18	Wet SP Glacial Fluvial	14 ft.	NA
B206	NA	11/20/18	Wet SP Glacial Fluvial	13 ft.	NA
B207	NA	11/20/18	Wet SP Glacial Fluvial	13 ft.	NA

- Groundwater Level Variation:
  - Reasons for groundwater level variation were provided in the March LHS Report (pages 23-24).
  - Based upon the groundwater data collected to date:
    - Initial estimate of seasonal high groundwater for 75 Arcand Drive is about 10 ft. depth below existing site grade, based on the borings (*Table II*).
    - Seasonal high water level:
      - Seasonal high groundwater estimate for the LHS west campus was about 8 ft. depth below campus grade at nearby LHS well B105.
      - As well water levels are more reliable than test boring water levels, a seasonal high water elevation of El. 24.5 ft. (LCB) should be maintained for 75 Arcand Drive as well.
    - Underground utilities on some sites are designed to be installed deeper than foundations, however such data has not been provided us to-date for this project.

Soil Hydraulic Conductivity (K in GPD/ft.^{2}):

- Scope: Laboratory soil gradation testing was not undertaken for this study and associated calculations and estimations of soil hydraulic conductivity (K) were not undertaken for any site subsoil unit.

- K Determination: Many input factors go into determination of K. K is a function of particle grain sizes, soil density, soil particle uniformity, gravel content, soil cementation and soil layering.

VI. Foundation Review and Recommendations – 75 Arcand Drive:

Foundation System:

- Subsoil Impacts to the Foundation System Selected:
  - Key subsurface impacts are:
    - Weak upper level subsoils: loose existing fill and ML glacial fluvial soil to 12 ft. to 14 ft. depth (*Figure 3A, Figure 3B)*
    - Variable strength SP glacial fluvial soil from 12 ft. to 26 ft. depth (*Figure 3A, Figure 3B)*

- Foundation Alternatives Provided in the March LHS Report and Useable at 75 Arcand Drive:
  - Alternatives reviewed in March LHS Report (pages 25-26):
    - Conventional shallow foundations: not practicable with existing subsoils
    - Driven piles (pre-cast, pre-stressed concrete pile, pipe pile, steel H-pile)
    - Drilled concrete micropiles (DMP)
    - Ground improvement with aggregate piers

- Ground improvement foundation alternative at 75 Arcand Drive:
  - Design and execution of the ground improvement option at 75 Arcand Drive is equivalent to that as described in the March LHS Report (page 26) and is summarized below.
  - An acceptable site ground improvement design would provide:
    - A minimum 6 KSF net allowable soil bearing pressure for structural support with less than 1 in. total settlement and less than 0.5 in. differential settlement; and
    - The ability to use conventional shallow foundations (wall footings and column footings) and slabs-on-grade for new construction on this site. Use of pile caps, grade beams and structural slabs are unnecessary with ground improvement.
  - A grid of aggregate piers (20 in. to 30 in. nominal diameter columns of compacted aggregate) can be designed to be installed on-site to provide ground improvement for structural support below new footings and floor slabs:
    - Aggregate piers can be designed as ungrouted. Use of either rigid inclusions or load transfer platforms at the top of installed piers is not necessary.
    - The existing fill can remain in-place below structural units.
    - Conventional aggregate pier installation equipment cannot penetrate buried solid waste.
      - Foundations and debris from the Merrimack Manufacturing Company building complex (see *Figure 1B* in the March LHS Report), have been found to remain below ground (*Appendix A*) in the test borings.
      - Solid waste removal requires trench excavation (pre-trenching) at aggregate pier locations to about 6 ft. depth prior to pier installation.
    - Piers would typically be designed to take-up (about 1 foot penetration) within the high medium dense to dense glacial fluvial or glacial till bearing soil zones shown in *Figure 3A* and *Figure 3B*. Approximate aggregate pier lengths at the drilled boring locations (*Figure 1*) are:

Boring	Pier Length from Existing Grade
B201	29 ft.
B202	28 ft.
B203	25 ft.
B204	15 ft.
B205	15 ft.
B206	23 ft.
B207	15 ft.

    - An acceptable site ground improvement design can provide:
      - A minimum 6 KSF net allowable soil bearing pressure for structural support with less than 1 in. total settlement and less than 0.5 in. differential settlement; and
      - The ability to use conventional shallow foundations (wall footings and column footings) and slabs-on-grade for new construction on this site. Use of pile caps, grade beams and structural slabs are unnecessary with ground improvement.

Other Geotechnical Engineering Topics – 75 Arcand Drive:

- Seismic Recommendations: the following topics as covered on March LHS Report pages 27-29 are also applicable to the Arcand Drive site as given:
  - Seismic site hazard review including area earthquake history
  - Seismic site class determination and recommendation
  - Seismic design factors
  - Liquefaction factors and site liquefaction determination

- Foundation Wall Design (Restrained Walls): the following topics as covered on March LHS Report page 29 are also applicable to the Arcand Drive site as given:
  - Lateral earth pressure and hydrostatic pressure determination
  - Other relevant wall loads including surcharge loads and seismically induced loads

- Footing Embedment: the following topics as covered on March LHS Report page 30 are also applicable to the Arcand Drive site as given:
  - Definition and recommendation of frost depth
  - Cold weather earthwork bearing soil protection recommendations

- Support of Excavation: the following topics as covered on March LHS Report page 30 are also applicable to the Arcand Drive site as given
  - Excavations less than 4 ft. depth
  - Excavations greater than 4 ft. depth

- Drainage and Waterproofing: the following topics as covered on March LHS Report page 31 are also applicable to the Arcand Drive site as given
  - Practices to address surface water run-off at building limits
  - Drainage and waterproofing design for building foundation walls
  - Drainage and waterproofing design for lowest level floor slabs

- Engineered Fills: the following topics as covered on March LHS Report pages 31-32 are also applicable to the Arcand Drive site as given
  - Crushed stone definition and usage
  - Gravel definition and usage
  - Structural fill definition and usage
  - Dense grade structural fill definition and usage
  - Granular fill definition and usage
  - Re-use of excavated site subsoils: existing fill and glacial soils

Thank you for inviting us to perform this site study addendum. Please contact us with any questions.

Sincerely yours,
Geotechnical Partnership, Inc.

Lisa R. Casselli, PE
Principal

Attachments: *Appendix A*: *Logs of Test Borings B201 through B207*

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APPENDIX A: Logs of Structural Test Borings B201 – B207

75 Arcand Drive
Lowell, Massachusetts

Geotechnical Partnership, Inc.
Swampscott, MA
File No. 1628-02

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Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B201

(1 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming							Groundwater=14'
1									Well Set: no
2		Required by City Water Department to 6 foot depth:							
3		Soil (cohesionless silt and sand with gravel) removed to 6 foot depth: encountered foundation remnants, but no utilities:							
4									
5			AR						
6				1	1				SS-1: 6' - 8'
7		Tan, medium to fine SAND, ltlle silt,few fine gravel, trace coarse sand (very loose; moist) --Miscellaneous Fill--			1				R=21 N=2
8					1				
9									
10		10.0 ft.							
		Tan, SILT (non-plastic), few to little fine sand (medium dense; moist) --Glacial Fluvial--		2	2				SS-2: 10' - 12'
11					3				R=18 N=5
12			ML		2				
13					2				
14		14.0 ft.							
15				3	4				SS-3: 15' - 17'
16		Tan, medium to fine SAND, trace silt (medium dense; wet)			6				R=20 N=12
17					6				
18			SP		5				
19									
20				4	3				SS-4: 20' - 22'
21		Tan, medium to fine SAND, trace silt, coarse sand and fine gravel (medium dense; wet) --Glacial Fluvial--			3				R=24 N=6
22					3				
					3				

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
0-8
8-15
16-40
41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B201

(1 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B201
(2 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	REMARKS
22		Tan, medium to fine SAND, trace silt (medium dense; wet)				
25		Tan, medium to fine SAND, trace silt and coarse sand (medium dense; wet) --Glacial Fluvial--	SP	5	4 4 6 6	SS-5: 25' - 27' R=18 N=10
28		28.0 ft.				
30		Tan to tan-gray, medium to fine sandy SILT (non-plastic), some coarse to fine gravel (angular), trace coarse sand (dense; very moist)	GT	6	18 20 26 31	SS-6: 30' - 32' R=24 N=46
35		Tan to tan-gray, medium to fine sandy SILT (non-plastic), little to some coarse to fine gravel (angular), trace coarse sand (dense; very moist) --Glacial Till--		7	14 16 21 27	SS-7: 35' - 37' R=18 N=37
37		Bottom of Exploration at 37 feet Depth				Boring backfilled; pavement patch installed. Drill rig wash water applied to surface to aid clean-up.
40						P=Penetrometer
43		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%				

Blow Count Graph: 10 50

Average qu-Field (TSF): 0 1 2 3 4

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
0-8
8-15
16-40
41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B201
(2 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B202

(1 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming							Groundwater=12'
1		Required by City Water Department to 6 foot depth:							Well Set: no
2		Soil removed: silt and sand with gravel; cohesionless soil; cobbles; some foundation remnants							
3									
4		No utilities found							
5			AR						
6				1	2				SS-1: 6' - 8'
7		Tan, silty medium to fine SAND, few coarse to fine gravel, trace coarse sand (very loose; dry)			2				R=11 N=5
8					3				
9		Tan, medium to fine sandy SILT (non-plastic) to silty medium to fine sand, few to little coarse to fine gravel, trace coarse sand (very loose; dry)			3				
10		10.5 ft. --Miscellaneous Fill--		2	2				SS-2: 10' - 12'
11		Dark-brown, SILT LOAM (non-plastic), few fine sand (very loose; dry to moist)	AR		1				R=11 N=3
12		11.0 ft. --Buried Topsoil--	ML		2				
13		Tan, SILT (non-plastic), few fine sand (very loose; moist) --Glacial Fluvial-- 13.0 ft.							
14									
15				3	4				SS-3: 15' - 17'
16		Tan, medium to fine SAND, trace silt (medium dense; wet)			5				R=21 N=11
17			SP		6				
18					10				
19									
20				4	3				SS-4: 20' - 22'
21		Tan, medium to fine SAND, trace silt (loose; wet) --Glacial Fluvial--			3				R=19 N=8
22					5				
					5				

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
0-8
8-15
16-40
41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B202

(1 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B202

(2 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
22									
23									
24									
25		Tan, medium to fine SAND, few coarse sand and fine gravel, trace silt (medium dense; wet)	SP	5	8 10 10 15				SS-5: 25' - 27' R=24 N=20
26									
27									
28									
29									
30		Tan, medium to fine SAND, few coarse to fine gravel, trace silt and coarse sand (dense; wet)		6	17 17 22 23				SS-6: 30' - 32' R=24 N=39
31									
32									
33									
34		Tan, medium to fine SAND, few coarse to fine gravel, trace silt and coarse sand (dense; wet) --Glacial Fluvial--							
35		36.5 ft.		7	16 16 18 23				SS-7: 35' - 37' R=24 N=34
36		Tan-gray, medium to fine sandy SILT (non-plastic), little coarse to fine gravel (angular), trace coarse sand (dense; very moist) --Glacial Till--	GT						P=Penetrometer
37		Bottom of Exploration at 37 feet Depth							
38									
39									
40									
41									
42									
43									
44									

Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose; 6-10 Loose; 11-30 Med-Dense; >30 Dense; Very Dense >50
0-8; 8-15; 16-40; 41-50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF); 2-4 Soft (0.25-0.5 TSF); 4-8 Med. Stiff (0.5-1.0 TSF); 9-20 Stiff (1.0-4.0 TSF); >20 Hard (>4.0 TSF)

Test Boring No. B202

(2 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B203

(1 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming Required by City Water Department to 6 foot depth: Soil removed: slt and sand with gravel; cohesionless soil to 6 ft. depth.							Groundwater=12' Well Set: no
1									
2									
3		Found foundation remnants; no utilities found							
4									
5			AR						
6				1	2				SS-1: 6' - 8' R=10 N=28
7		Tan, medium to fine SAND, little to some silt, few coarse to fine gravel, trace coarse sand (medium dense; moist)			14				
8					14				
9		Tan, silty medium to fine SAND, few coarse to fine gravel, trace coarse sand (very loose; moist) --Miscellaneous Fill--			12				
10		10.3 ft.							SS-2: 10' - 12' R=24 N=3
11		Dark-brown, SILT LOAM, few fine sand (very loose; dry to moist) --Buried Topsoil-- 11.1 ft.	AR	2	3				
12		Tan, SILT (non-plastic), few fine sand (very loose; moist) 12.0 ft. --Glacial Fluvial--	ML		2				
13					1				
14					2				
15				3	6				SS-3: 15' - 17' R=24 N=17
16		Tan, medium to fine SAND, trace silt and coarse sand (medium dense; wet)			7				
17			SP		10				
18					10				
19									
20				4	7				SS-4: 20' - 22' R=24 N=11
21		Tan, medium to fine SAND, trace silt (medium dense; wet) --Glacial Fluvial--			4				
22					7				
					10				

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
Very Dense
0-8
8-15
16-40
41-50
>50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B203

(1 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B203
(2 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	GRAPHIC	Water Level	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
22–44		Tan, medium to fine SAND, trace silt (medium dense; wet) --Glacial Fluvial-- 26.0 ft.	SP			5	8 17 17 14				SS-5: 25' - 27' R=24 N=34
		Tan-gray, medium to fine sandy SILT (non-plastic), little coarse to fine gravel (angular), trace coarse sand (dense; very moist) --Glacial Till--	GT								P=Penetrometer
		Bottom of Exploration at 27 feet Depth									

Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
0-8
8-15
16-40
41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B203
(2 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B204

(1 of 1)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming Required by City Water Department to 6 foot depth: Soil removed: silt and sand with gravel; cohesionless soil							Groundwater=12' Well Set: no
3		Encountered cobbles, foundation remnants; found no utilities	AR						
5		--Miscellaneous Fill--							
6		6.0 ft.							
6		Tan to tan-yellow, SILT (non-plastic), few to little fine sand (very loose; moist)		1	1 1 2 2				SS-1: 6' - 8' R=23 N=3
9			ML						
10				2	2 2 5 6				SS-2: 10' - 12' R=19 N=7
11		Tan to tan-yellow, SILT (non-plastic), trace fine sand (loose; moist) --Glacial Fluvial--							
12		12.0 ft.							
14			SP						
15		Tan, medium to fine SAND, trace silt (medium dense; wet) --Glacial Fluvial--		3	8 22 21 22				SS-3: 15' - 17' R=20 N=43
16		16.0 ft.							
16		Tan-gray, medium to fine sandy SILT (non-plastic), little to some coarse to fine gravel (angular), trace coarse sand (dense; moist)							
19		Tan-gray, medium to fine sandy SILT (non-plastic), little coarse to fine gravel (angular), trace coarse sand (dense; moist) --Glacial Till--	GT	4	8 31 22 19				SS-4: 20' - 22' R=21 N=53
22		Bottom of Exploration at 22 feet Depth							
23		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							P=Penetrometer

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose; 6-10 Loose; 11-30 Med-Dense; >30 Dense; Very Dense >50
0-8; 8-15; 16-40; 41-50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF); 2-4 Soft (0.25-0.5 TSF); 4-8 Med. Stiff (0.5-1.0 TSF); 9-20 Stiff (1.0-4.0 TSF); >20 Hard (>4.0 TSF)

Test Boring No. B204

(1 of 1)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B205

(1 of 1)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	GRAPHIC	Water Level	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming Required by City Water Department to 6 foot depth: Soil removed: silt and sand with gravel; cohesionless soil									Groundwater=14' Well Set: no
1											
2											
3		Cobbles found									
4		2 in. dia. cast iron pipe found at 5.5 ft. moved borehole 3 ft. west; found cobbles, no utilities									
5			AR								
6						1	9				SS-1: 6' - 8' R=13 N=7
7		Tan, SILT (non-plastic), few to little coarse to fine gravel, few fine sand, trace coarse sand					4 3 3				
8											
9											
10		Tan, fine SAND, some medium sand, few silt (loose; moist) --Miscellaneous Fill-- 10.6 ft.				2	3				SS-2: 10' - 12' R=20 N=3
11		Dark-brown, SILT LOAM, few fiine sand (very loose; dry to moist) --Buried Topsoil-- 11.2 ft.	AR				2 1 2				
12											
13		Tan, SILT (non-plastic), few to little fine sand (medium dense; moist) --Glacial Fluvial-- 14.0 ft.	ML								
14											
15		Tan, medium to fine SAND, trace silt (medium dense; wet) --Glacial Fluvial-- 16.0 ft.	SP			3	9				SS-3: 15' - 17' R=17 N=44
16							19 25 20				
17		Tan-gray, medium to fine sandy SILT (non-plastic), somle coarse to fine gravel (angular), trace coarse sand (dense; very moist)									
18											
19			GT								
20		Tan-gray, medium to fine sandy SILT (non-plastic), little coarse to fine gravel (angular), trace coarse sand (dense; moist) --Glacial Till--				4	19				SS-4: 20' - 22' R=14 N=42
21							23 19 19				
22		Bottom of Exploration at 22 feet Depth									P=Penetrometer
23											
24		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%									

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose; 6-10 Loose; 11-30 Med-Dense; >30 Dense; Very Dense >50
0-8; 8-15; 16-40; 41-50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF); 2-4 Soft (0.25-0.5 TSF); 4-8 Med. Stiff (0.5-1.0 TSF); 9-20 Stiff (1.0-4.0 TSF); >20 Hard (>4.0 TSF)

Test Boring No. B205

(1 of 1)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B206

(1 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Average qu-Field	Average qu-Field (TSF)	REMARKS
0		Utility clearance by air vacuuming Required by City Water Department to 6 foot depth:						Groundwater=13' Well Set: no
1		Soil removed: silt and sand with lesser gravel; cohesionless soil removed to 6 ft. depth						
2		Cobbles; no utilities found						
3								
4								
5			AR					
6		Tan, medium to fine sandy SILT (non-plastic) to silty medium to fine SAND, few coarse to fine gravel, trace coarse sand (very loose; moist)		1	1 1 1 1			SS-1: 6' - 8' R=6 N=2
7								
8								
9								
10		Tan, medium to fine SAND, little silt (very loose; moist) --Miscellaneous Fill-- 11.0 ft.		2	woh woh 1 1			SS-2: 10' - 12' R=20 N=1
11		Dark-brown, SILT LOAM, few fine sand (very loose; dry to moist) --Buried Topsoil-- 11.5 ft.	AR					
12			ML					
13		Tan to tan-yellow, SILT (non-plastic), few fine sand (very loose; moist) 13.0 ft. --Glacial Fluvial--						
14								
15				3	4 8 8 9			SS-3: 15' - 17' R=24 N=16
16		Tan, medium to fine SAND, trace silt (medium dense; wet)						
17			SP					
18								
19								
20				4	4 7 8 8			SS-4: 20' - 22' R=22 N=15
21		Tan, medium to fine SAND, trace silt, coarse sand and fine gravel (medium dense; wet) with lenses tan, SILT (non-plastic), few fine sand (very moist) --Glacial Fluvial--						
22								

Blow Count Graph: 10 50

Average qu-Field (TSF): 0 1 2 3 4

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose 0-8
6-10 Loose 8-15
11-30 Med-Dense 16-40
>30 Dense 41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B206

(1 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B206
(2 of 2)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	GRAPHIC	Water Level	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
22		Tan, medium to fine SAND, few ooarse sand, trace silt and fine gravel (dense; wet) --Glacial Fluvial--	SP								
23		24.0 ft.									
24											
25		Tan-gray, medium to fine sandy SILT (non-plastic), little to some coarse to fine gravel (angular), trace coarse sand (dense; moist to very moist) --Glacial Till--	GT			5	16 18 33 35				SS-5: 25' - 27' R=17 N=51
26											
27		Bottom of Exploration at 27 feet Depth									P=Penetrometer
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%									
44											

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose
6-10 Loose
11-30 Med-Dense
>30 Dense
0-8
8-15
16-40
41-50
Very Dense >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF)
2-4 Soft (0.25-0.5 TSF)
4-8 Med. Stiff (0.5-1.0 TSF)
9-20 Stiff (1.0-4.0 TSF)
>20 Hard (>4.0 TSF)

Test Boring No. B206
(2 of 2)

Geotechnical Partnership, Inc.
Swampscott, Massachusetts
Sanford, Maine

PROJECT: Potential New Construction
75 Arcand Drive
Lowell, Massachusetts

CLIENT: Perkins Eastman DPC Boston, MA

File No. 1628-02

Date Drilled	: 19-20 November 2018
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Soil Exploration Corp.
	: Leominster, MA
Driller	: D. Ledger
Rock Core	: ---
GPI Field Engineer	: LR Casselli, PE, MASCE CSI
Elevation and Datum	: El.
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Water added as needed

Test Boring No. B207

(1 of 1)

Drill Rig Type	: Truck Mounted
Hammer Type	: Auto
Cat-Head or Winch	: NA
Soil Casing Type	: 8 in. OD HSA
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0		Utility clearance by air vacuuming Required by City Water Department to 6 foot depth: Soil removed: Tan, silt and sand with lesser gravel							Groundwater=13' Well Set: no
1		No utilities found							
2									
3			AR						
4									
5									
6		Tan, medium to fine SAND, few silt, coarse sand and fine gravel (very loose; moist)		1	1 1 4 4				SS-1: 6' - 8' R=1 N=5
7		7.0 ft. --Miscellaneous Fill--							
8		Tan, SILT (non-plastic), few to little fine sand (loose; moist)							
9									
10			ML	2	5 3 1 2				SS-2: 10' - 12' R=17 N=4
11		Tan, SILT (non-plastic), few fine sand (very loose; moist)							
12		--Glacial Fluvial--							
13		13.0 ft.							
14									
15			SP	3	10 14 16 20				SS-3: 15' - 17' R=24 N=30
16		Tan, medium to fine SAND, trace silt (medium dense; wet) --Glacial Fluvial-- 16.5 ft.							
17		Tan-gray, medium to fine sandy SILT (non-plastic), some coarse to fine gravel (angular), trace coarse sand (dense; very moist) --Glacial Till--	GT						P=Penetrometer
18		Bottom of Exploration at 17 feet Depth							
19									
20									
21									
22		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels
0-6 Very Loose; 6-10 Loose; 11-30 Med-Dense; >30 Dense; Very Dense >50
0-8; 8-15; 16-40; 41-50; >50

COHESIVE SOILS: (CONSISTENCY)
0-2 Very Soft (<0.25 TSF); 2-4 Soft (0.25-0.5 TSF); 4-8 Med. Stiff (0.5-1.0 TSF); 9-20 Stiff (1.0-4.0 TSF); >20 Hard (>4.0 TSF)

Test Boring No. B207

(1 of 1)

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Nitsch Engineering

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Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

MEMORANDUM

TO: Alicia Caritano, Senior Associate, Perkins Eastman

FROM: William R. Maher, PE

DATE: December 14, 2018

RE: Existing 75 Arcand Drive Civil Soils Test Pits

EXISTING CONDITION

The existing 75 Arcand Drive Site is comprised of one (1) building with driveway/parking areas which is located at 75 Arcand Drive in downtown Lowell (Figures 1 - 3).

The existing 75 Arcand Drive Site is bounded by the existing Lowell High School to the north, private properties to the east and south and Arnand Drive to the west. No wetland resource areas were observed on the property.

NRSC Soil Designations

The Soil Classification Summary (Table 1) outlines the Natural Resources Conservation Services (NRCS) designation of the soil series at the existing 75 Arcand Drive Site (refer to FIGURE 1 in Appendix A). The area that comprises of and surrounds the existing 75 Arcand Drive Site is classified as Urban Land with an unclassified hydrologic soil group (HSG).

Table 1. NRCS Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
602	Urban Land	---

On-Site Soil Investigations

Nitsch Engineering, Inc. performed four (4) test pits (refer to FIGURES 2 and 3 in Appendix A) at the existing 75 Arcand Drive Site on Tuesday, November 20, 2018. These test pits were located along the driveway/access road and parking areas. The results of the soil testing indicated fill material observed in each test pit of varying depths. No groundwater or soil mottling was observed in any of the test pits. Ledge appeared to be encountered in Test Pit #4 performed by Nitsch Engineering. These test pit logs are provided in Appendix A.

RECOMMENDATIONS/CONCLUSIONS

In 1997, the Massachusetts Department of Environmental Protection (the “Department” or “MassDEP”) published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy. MassDEP has revised the Stormwater Management Standards and Massachusetts Stormwater Handbook (2008) to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L .c. 21, §§ 26-53.

RECOMMENDATIONS/CONCLUSIONS – continued

The Stormwater Management Standards address water quality (pollutants) and water quantity (flooding, low base flow and recharge) by establishing standards that require the implementation of a wide variety of stormwater management strategies. These strategies include environmentally sensitive site design and LID techniques to minimize impervious surface and land disturbance, source control and pollution prevention, structural BMPs, construction period erosion and sedimentation control, and the long-term operation and maintenance of stormwater management systems.

The intent of this standard is to ensure that the infiltration volume of precipitation into the ground under post-development conditions is at least as much as the infiltration volume under pre-development conditions. Standard 3 requires the restoration of recharge, using infiltration measures and careful site design. Through judicious use of low impact development techniques and other approaches that minimize impervious surfaces and mimic natural conditions, new developments can approximate pre-development recharge for most storms. This standard must be met as the existing 75 Arcand Drive site will require compliance with the Wetlands Protection Act due to its proximity to a wetland resource area (Merrimack Canal) and the expected permitting (filing of a Notice Intent [NOI] to receive an Order of Conditions) from the Lowell Conservation Commission.

When designing infiltration BMPs, adequate subsurface information needs to be obtained. Infiltration systems must be installed in soils capable of absorbing the recharge volume (i.e. not D soils). Infiltration structures must be able to drain fully within 72 hours. In addition, there must be at least a 2-foot separation between the bottom of the infiltration structure and the seasonal high groundwater table.

Based on the soil data, Nitsch Engineering would recommend that additional test pits be performed to determine the location of and design of a proposed drainage recharge system (subsurface) for the site to comply with the Wetlands Protection Act and the Massachusetts Stormwater Handbook for the renovated Lowell High School.

SOIL TEST PIT PHOTOGRAPHS

PHOTOGRAPH NO. 1 – Test Pit #101

PHOTOGRAPH NO. 2 – Test Pit

PHOTOGRAPH NO. 3 – Test Pit #102

PHOTOGRAPH NO. 4

PHOTOGRAPH NO. 5 – Test Pit #103

PHOTOGRAPH NO. 6

PHOTOGRAPH NO. 7 – Test Pit #104

PHOTOGRAPH NO. 8

APPENDIX A

Soil Investigations

NRCS Soil Map and Description (FIGURE 1)
Soil Test Pit Location Map (FIGURES 2-3)
Soil Test Pit Logs

Soil Map—Middlesex County, Massachusetts
(Existing Lowell High School Site)

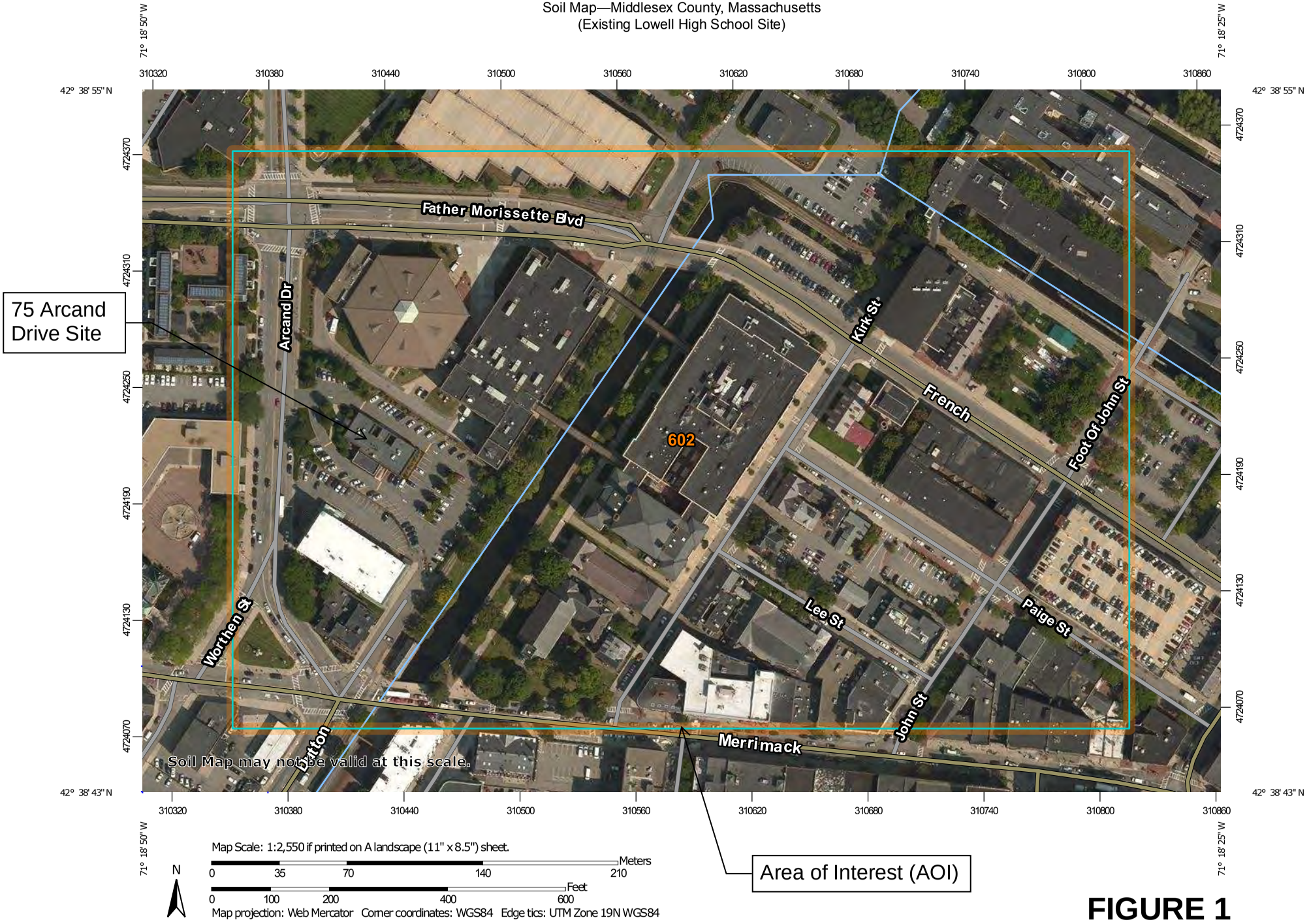

FIGURE 1

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 16, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 29, 2014—Sep 19, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
602	Urban land	34.2	100.0%
Totals for Area of Interest		**34.2**	**100.0%**

UTILITY INFORMATION STATEMENT

1. THE SUB-SURFACE UTILITY INFORMATION SHOWN HEREON IS COMPILED BASED ON FIELD SURVEY INFORMATION, RECORD INFORMATION AS SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES, AND PLAN INFORMATION SUPPLIED BY THE CLIENT, IF ANY; THEREFORE WE CANNOT GUARANTEE THE ACCURACY OF SAID COMPILED SUB-SURFACE INFORMATION TO ANY CERTAIN DEGREE OF STATED TOLERANCE. ONLY PHYSICALLY LOCATED SUB-SURFACE UTILITY FEATURES FALL WITHIN NORMAL STANDARD OF CARE ACCURACIES.

2. THE LOCATIONS OF UNDERGROUND PIPES, CONDUITS, AND STRUCTURES HAVE BEEN DETERMINED FROM SAID INFORMATION, AND ARE APPROXIMATE ONLY. COMPILED LOCATIONS OF ANY UNDERGROUND STRUCTURES, NOT VISIBLY OBSERVED AND LOCATED, CAN VARY FROM THEIR ACTUAL LOCATIONS.

3. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED.

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8. AS OF THE DATE OF THIS PLAN RECORD INFORMATION HAS NOT BEEN RECEIVED BY NITSCH ENGINEERING FOR THE FOLLOWING UTILITIES:

NOTES

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2. THE PURPOSE OF THIS PLAN IS TO SHOW EXISTING CONDITIONS SURVEY AS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY WHICH OCCURRED BETWEEN AUGUST 24 AND OCTOBER 11 OF 2016.

3. HORIZONTAL COORDINATES REFER TO NAD83 BASE ON RTK GPS OBSERVATION.

4. ELEVATION REFERS TO CITY OF LOWELL VERTICAL DATUM BASED ON RTK GPS OBSERVATION AND CHECKING BENCHMARKS..

5. THE INFORMATION CONTAINED ON THE DISK OR ELECTRONIC DRAWING FILE ACCOMPANYING THIS PLAN MUST BE COMPARED TO THE SEALED AND SIGNED HARD COPY OF THE PLAN TO ENSURE THE ACCURACY OF ALL INFORMATION AND TO ENSURE NO CHANGES, ALTERATIONS, OR MODIFICATIONS HAVE BEEN MADE. RELIANCE SHALL NOT BE MADE ON A DOCUMENT TRANSMITTED BY COMPUTER OR OTHER ELECTRONIC MEANS UNLESS FIRST COMPARED TO THE ORIGINAL SEALED DOCUMENT ISSUED AT THE TIME OF THE SURVEY. DUE TO THE CRITICAL NATURE OF SURVEYING, DATA ACQUISITION, AND AUTOCAD PLAN DEVELOPMENT, IF CRITICAL DIMENSIONAL INFORMATION IS NEEDED AND IS NOT SPECIFICALLY SHOWN ON THE ELECTRONIC DRAWING FILE, PLEASE CONTACT NITSCH ENGINEERING.

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

BENCH MARK:TBM-A
X-CUT ON BOLT OF LIGHT POLE BASE NO. 40
ELEVATION=31.48(L.C.B)
FIELD BOOK 645A PAGE 44
SET ON (09/20/16)

FATHER MORISSETTE BOULEVARD
(PUBLIC - 80' WIDE)

ARCAND DRIVE
(PUBLIC - 75' WIDE)

MERRIMACK CANAL

N/F CITY OF LOWELL SCHOOL DEPARTMENT GI PARCEL ID#2450-50 BOOK 2313 PAGE 190

"FIELD HOUSE" NO. 50 FATHER MORISSETTE BOULEVARD

3 STORY BRICK

30' WIDE EASEMENT FOR OVERHEAD PEDESTRIAN WALKWAY TO THE CITY OF LOWELL, BOOK 2405 PAGE 382

MATCH LINE - SEE SHEET EX.1

MATCH LINE - SEE SHEET EX.2

MATCH LINE - SEE SHEET EX.3

TP-104

LEGEND

	CATCH BASIN
	CABLE TELEVISION MANHOLE
	DRAIN MANHOLE
	ELECTRIC MANHOLE
	MISCELLANEOUS MANHOLE
	SEWER MANHOLE
	TELEPHONE MANHOLE
	WATER MANHOLE
GSO	GAS SHUT-OFF
WSO	WATER SHUT-OFF
GG	GAS GATE
WG	WATER GATE
ICV	IRRIGATION CONTROL VALVE
CLEANOUT	CLEANOUT
SIA	SIAMESE SPRINKLER HEAD
	FIRE HYDRANT
DS	DOWN SPOUT
	UTILITY POLE
UP W/ UE	UTILITY POLE WITH CONDUIT LINE TO GROUND
	LIGHT POLE
LB	LIGHT BOLLARD
LL	LANDSCAPE LIGHT
HH	HAND HOLE
TC	TRASH CAN
CAT	CATENARY POLE
FACB	FIRE ALARM CALL BOX
FP	FLAG POLE
PM	PARKING METER
	SIGN POST
12"	DECIDUOUS TREE WITH TRUNK DIAMETER
12"	CONIFEROUS TREE WITH TRUNK DIAMETER
	HANDICAP PARKING
31x43	SPOT ELEVATION
CLF	CHAIN LINK FENCE
SGC	SLOPED GRANITE CURB
VGC	VERTICAL GRANITE CURB
VCC	VERTICAL CONCRETE CURB
WCR	WHEELCHAIR RAMP
R=	RIM ELEVATION EQUALS
I=	INVERT ELEVATION EQUALS
TH=	TOP OF HOOD ELEVATION EQUALS
NPV	NO PIPES VISIBLE
TOW=	TOP OF WATER
TW	TOP OF WALL ELEVATION
CATV	UNDERGROUND CABLE TELEVISION LINE
D	UNDERGROUND DRAIN LINE
UD	UNDERGROUND UNDER DRAIN LINE
E	UNDERGROUND ELECTRIC LINE
G	UNDERGROUND GAS LINE
S	UNDERGROUND SEWER LINE
T	UNDERGROUND TELEPHONE LINE
W	UNDERGROUND WATER LINE
OHW	OVERHEAD WIRES
	BENCH MARK
	TEST PIT & NUMBER
TP-XXX	

GRAPHIC SCALE
20 10 0 20 40 60
SCALE: 1"=20'

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www.nitscheng.com
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T: (617) 338-0063
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- Structural Engineering
- Green Infrastructure
- Planning
- GIS

EXISTING CONDITIONS SURVEY

LOWELL HIGH SCHOOL
50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 01852

PREPARED FOR:
PERKINS EASTMAN, AIA
50 FRANKLIN STREET, SUITE 203, BOSTON, MA 02110

REV.	COMMENTS	DATE
	REVISIONS	

PROJECT #:	11601
FILE:	11601_TOP01.dwg
SCALE:	1"= 20'
DATE:	OCTOBER 20, 2016
DES./COMP.:	ALEX A. DIOTTE
FIELD BOOK:	645A
DRAFTED BY:	TI
CHECKED BY:	

SHEET: 1

FIGURE 2

OF 4 REV.

MATCH LINE - SEE SHEET EX.1

MATCH LINE - SEE SHEET EX.3

BENCH MARK:TBM-B
CHISEL SQUARE CUT ON COR
RETAINING WALL @ STEP TO
JFK MUNICIPAL BUILDING
ELEVATION=37.81(L.C.B)
FIELD BOOK 645A PAGE 44
SET ON (09/20/16)

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

LEGEND

- CATCH BASIN
- CABLE TELEVISION MANHOLE
- DRAIN MANHOLE
- ELECTRIC MANHOLE
- MISCELLANEOUS MANHOLE
- SEWER MANHOLE
- TELEPHONE MANHOLE
- WATER MANHOLE
- GSO GAS SHUT-OFF
- WSO WATER SHUT-OFF
- GG GAS GATE
- WG WATER GATE
- ICV IRRIGATION CONTROL VALVE
- CLEANOUT CLEANOUT
- SIA SIAMESE SPRINKLER HEAD
- FIRE HYDRANT
- DS DOWN SPOUT
- UP UTILITY POLE
- UP W/ UE UTILITY POLE WITH CONDUIT LINE TO GROUND
- LIGHT POLE
- LB LIGHT BOLLARD
- LL LANDSCAPE LIGHT
- HH HAND HOLE
- TC TRASH CAN
- CAT CATENARY POLE
- FACB FIRE ALARM CALL BOX
- FP FLAG POLE
- PM PARKING METER
- SP SIGN POST
- 12" DECIDUOUS TREE WITH TRUNK DIAMETER
- 12" CONIFEROUS TREE WITH TRUNK DIAMETER
- HANDICAP PARKING
- 31x43 SPOT ELEVATION
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- NPV NO PIPES VISIBLE
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- TW TOP OF WALL ELEVATION
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- D UNDERGROUND DRAIN LINE
- UD UNDERGROUND UNDER DRAIN LINE
- E UNDERGROUND ELECTRIC LINE
- G UNDERGROUND GAS LINE
- S UNDERGROUND SEWER LINE
- T UNDERGROUND TELEPHONE LINE
- W UNDERGROUND WATER LINE
- OHW OVERHEAD WIRES
- BENCH MARK
- TEST PIT & NUMBER
- TP-XXX

UTILITY INFORMATION STATEMENT

1. THE SUB-SURFACE UTILITY INFORMATION SHOWN HEREON IS COMPILED BASED ON FIELD SURVEY INFORMATION, RECORD INFORMATION AS SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES, AND PLAN INFORMATION SUPPLIED BY THE CLIENT, IF ANY. THEREFORE WE CANNOT GUARANTEE THE ACCURACY OF SAID COMPILED SUB-SURFACE INFORMATION TO ANY CERTAIN DEGREE OF STATED TOLERANCE. ONLY PHYSICALLY LOCATED SUB-SURFACE UTILITY FEATURES FALL WITHIN NORMAL STANDARD OF CARE ACCURACIES.

2. THE LOCATIONS OF UNDERGROUND PIPES, CONDUITS, AND STRUCTURES HAVE BEEN DETERMINED FROM SAID INFORMATION, AND ARE APPROXIMATE ONLY. COMPILED LOCATIONS OF ANY UNDERGROUND STRUCTURES, NOT VISIBLY OBSERVED AND LOCATED, CAN VARY FROM THEIR ACTUAL LOCATIONS.

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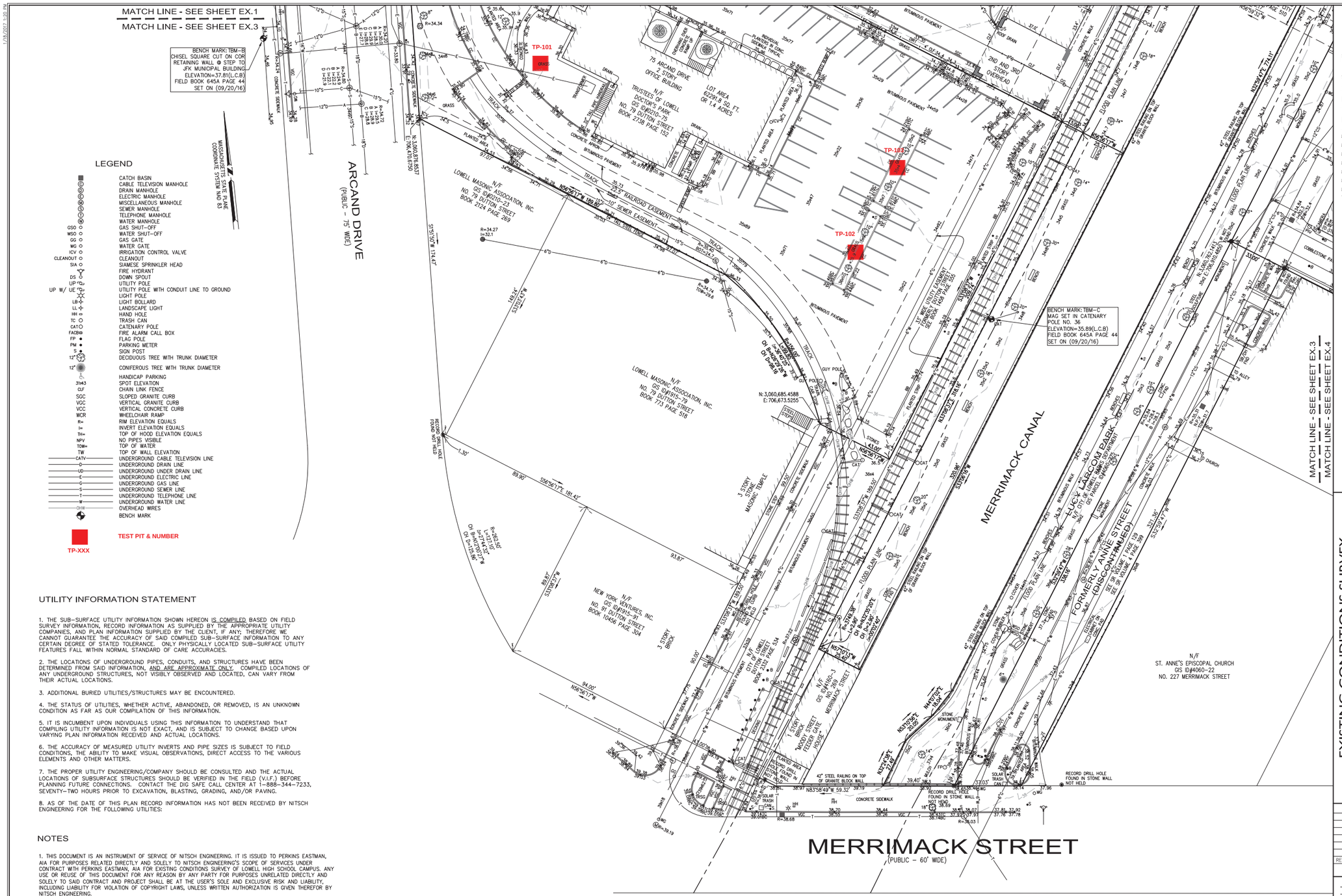

GRAPHIC SCALE

20 10 0 20 40 60

SCALE: 1"=20'

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- Green Infrastructure
- Planning
- GIS

EXISTING CONDITIONS SURVEY

LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 01852

PREPARED FOR:

PERKINS EASTMAN, AIA

50 FRANKLIN STREET, SUITE 203, BOSTON, MA 02110

REV.	COMMENTS	DATE
	REVISIONS	

PROJECT #	11601
FILE:	11601_TOP01.dwg
SCALE:	1"= 20'
DATE:	OCTOBER 20, 2016
DES./COMP:	ALEX A. DIOTTE
FIELD BOOK:	645A
DRAFTED BY:	TI
CHECKED BY:	

SHEET: 3

FIGURE 3

OF 4 REV.

J:\11601 Lowell Hs Survey\Dwg\11601_Top01.dwg, 10/20/2016 1:20:21 PM

Commonwealth of Massachusetts
City of Lowell

Form 11 - Soil Suitability Assessment

FOR DRAINAGE SYSTEM ONLY

Date: November 20, 2018
Location: 75 Arcand Drive
Lowell, MA
33º, Snow

XXX.X± Elevation

Deep Observation Hole Number: **101**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14	FILL	-	-	-	-	-	-	-	-	-	LOAM
14-100	FILL	-	-	-	-	-	-	-	-	-	FILL (BRICK, STONES, METAL)

Additional Notes: NO GROUND WATER/SEEPAGE OBSERVED, NO REDOX VISIBLE.

Commonwealth of Massachusetts
City of Lowell

Form 11 - Soil Suitability Assessment

FOR DRAINAGE SYSTEM ONLY

XXX.X± Elevation

Date: November 20, 2018
Location: 75 Arcand Drive
Lowell, MA
33º, Snow

Deep Observation Hole Number: **102**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9	FILL	-	-	-	-	-	-	-	-	-	LOAM
9-84	FILL	-	-	-	-	-	-	-	-	-	FILL (BRICK, STONES, TREE/RR TIES, GRANITE BLOCKS)

Additional Notes: NO GROUND WATER/SEEPAGE OBSERVED, NO REDOX VISIBLE.

Commonwealth of Massachusetts
City of Lowell

Form 11 - Soil Suitability Assessment

FOR DRAINAGE SYSTEM ONLY

XXX.X± Elevation

Date: November 20, 2018
Location: 75 Arcand Drive
Lowell, MA
33º, Snow

Deep Observation Hole Number: **103**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	FILL	-	-	-	-	-	-	-	-	-	LOAM
7-44	FILL	-	-	-	-		-	-	-	-	-
44-55	Ao	-	-	-	-	-	-	-	-	-	(ORIGINAL LOAM LAYER)
55-110	C	2.5Y 6/2	-	-	-	GLACIAL TILL	10%	<5%	MASSIVE	VERY FRIABLE	-

Additional Notes: NO GROUND WATER/SEEPAGE VISIBLE. NO REDOX VISIBLE.

Commonwealth of Massachusetts
City of Lowell

Form 11 - Soil Suitability Assessment

FOR DRAINAGE SYSTEM ONLY

Date: November 20, 2018
Location: 75 Arcand Drive
Lowell, MA
33º, Snow

XXX.X± Elevation

Deep Observation Hole Number: **104**

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12	FILL	-	-	-	-	-	-	-	-	-	LOAM
12-40	FILL	-	-	-	-	-	-	-	-	-	FILL (METAL, BRICKS)
40-54	LEDGE	-	-	-	-	-	-	-	-	-	LEDGE BREAKING UP DURING EXCAVATION

Additional Notes: NO GROUND WATER/SEEPAGE VISIBLE. NO REDOX VISIBLE.

REPORT
FOR
HAZARDOUS MATERIALS IDENTIFICATION SURVEY
AT
75 ARCAND DRIVE
LOWELL, MASSACHUSETTS

PROJECT NO: 219 001.00

SURVEY DATE:
January 9, 2019

SURVEY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 Brewster Road
Framingham, MA 01702

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UEC universal environmental consultants

January 14, 2019

Ms. Alicia Caritano
Perkins Eastman
20 Ashburton Place, Floor 8
Boston, MA 02108

Reference: Report for Hazardous Materials Identification Survey at 75 Arcand Drive, Lowell, Massachusetts

Dear Ms. Caritano:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the final report for Hazardous Materials Identification Survey at 75 Arcand Drive, Lowell, Massachusetts.

The inspection was performed by a Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963).

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

Ammar M. Dieb
President

UEC:\219 001.00\Report-DOC

Enclosure

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1.0 INTRODUCTION:

Universal Environmental Consultants (UEC) has been providing comprehensive asbestos services since 2001 and has completed projects throughout New England. We have completed projects for a variety of clients including commercial, industrial, municipal, and public and private schools. We maintain appropriate asbestos licenses and staff with a minimum of thirty years of experience.

UEC was contracted by Perkins Eastman to conduct an identification survey for Hazardous Materials at 75 Arcand Drive, Lowell, Massachusetts. A comprehensive survey per the Environmental Protection Agency (EPA) NESHAP regulation would be required prior to any renovation or demolition activities.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos and determination of types of ACM found. Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) method in accordance with the Environmental Protection Agency (EPA) standard. Bulk samples were collected by a Massachusetts licensed asbestos inspector Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory Asbestos Identification Laboratory, Woburn, MA.

Samples results are attached.

2.0 FINDINGS:

Asbestos Containing Materials (ACM):
The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed.

All suspect materials were grouped into homogenous areas. By definition, a homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to contain asbestos based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount greater than 1 percent in accordance with EPA regulations.

Number of Samples Collected
Fifty-three (53) bulk samples were collected from the following materials suspected of containing asbestos.

Type and Location of Material

1. Joint compound on stairwell storage room wall
2. Joint compound on suite 2 wall
3. Joint compound on suite 2 wall
4. Joint compound on suite 3 wall
5. Joint compound on suite 3 wall
6. Joint compound on suite 5 wall
7. Joint compound on suite 5 wall
8. Joint compound on suite 6 wall
9. Joint compound on suite 6 wall
10. Black sink coating in suite 1
11. White sink coating in suite 2
12. White sink coating in suite 3
13. White sink coating in suite 4
14. White sink coating in suite 5
15. Grey sink coating in suite 6
16. Decorative 2’ x 2’ suspended acoustical tile in suite 1
17. 2’ x 2’ Suspended acoustical tile type 1 in suite 1
18. 2’ x 2’ Suspended acoustical tile type 2 in suite 2

19. 2’ x 2’ Suspended acoustical tile type 3 in suite 3
20. 2’ x 2’ Suspended acoustical tile type 4 in suite 5
21. 2’ x 2’ Suspended acoustical tile type 5 in suite 6
22. 2’ x 2’ Suspended acoustical tile type 6 in suite 7
23. Ceramic wall tile glue in suite 1 bathroom
24. Wall panel glue in suite 1
25. Wall panel glue in suite 1
26. Carpet glue in suite 1
27. Carpet glue in suite 3
28. Vinyl laminate floor in suite 3
29. Pink 12” x 12” vinyl floor tile in suite 7
30. Yellow glue for pink 12” x 12” vinyl floor tile in suite 7
31. Blue pebble linoleum in suite 1
32. Beige pebble linoleum in suite 1
33. Red linoleum in suite 4
34. Beige linoleum type 1 in suite 4
35. Yellow glue for beige linoleum type 1 in suite 4
36. Colored pebble linoleum in suite 5
37. Beige linoleum type 2 in suite 6
38. Old roofing tar in suite 1 attic space
39. Old roofing tar in suite 1 attic space
40. Through wall foundation flashing at foundation joint
41. Through wall foundation flashing at foundation joint
42. Exterior window framing caulking
43. Exterior window framing caulking
44. Exterior window framing caulking
45. Exterior panel framing caulking
46. Exterior panel framing caulking
47. Exterior panel framing caulking
48. Exterior window glazing caulking
49. Exterior window glazing caulking
50. Exterior window glazing caulking
51. Exterior door framing caulking
52. Exterior door framing caulking
53. Exterior door framing caulking

No additional accessible ACM was found during this survey. However, hidden ACM may be found during any renovation or demolition activities.

Sample Results

Type and Location of Material	Sample Result
1. Joint compound on stairwell storage room wall	2% Chrysotile
2. Joint compound on suite 2 wall	2% Chrysotile
3. Joint compound on suite 2 wall	2% Chrysotile
4. Joint compound on suite 3 wall	2% Chrysotile
5. Joint compound on suite 3 wall	No Asbestos Detected
6. Joint compound on suite 5 wall	No Asbestos Detected
7. Joint compound on suite 5 wall	No Asbestos Detected
8. Joint compound on suite 6 wall	No Asbestos Detected
9. Joint compound on suite 6 wall	No Asbestos Detected
10. Black sink coating in suite 1	5% Chrysotile
11. White sink coating in suite 2	No Asbestos Detected
12. White sink coating in suite 3	No Asbestos Detected

13. White sink coating in suite 4	No Asbestos Detected
14. White sink coating in suite 5	No Asbestos Detected
15. Grey sink coating in suite 6	No Asbestos Detected
16. Decorative 2’ x 2’ suspended acoustical tile in suite 1	No Asbestos Detected
17. 2’ x 2’ Suspended acoustical tile type 1 in suite 1	No Asbestos Detected
18. 2’ x 2’ Suspended acoustical tile type 2 in suite 2	No Asbestos Detected
19. 2’ x 2’ Suspended acoustical tile type 3 in suite 3	No Asbestos Detected
20. 2’ x 2’ Suspended acoustical tile type 4 in suite 5	No Asbestos Detected
21. 2’ x 2’ Suspended acoustical tile type 5 in suite 6	No Asbestos Detected
22. 2’ x 2’ Suspended acoustical tile type 6 in suite 7	No Asbestos Detected
23. Ceramic wall tile glue in suite 1 bathroom	No Asbestos Detected
24. Wall panel glue in suite 1	10% Chrysotile
25. Wall panel glue in suite 1	10% Chrysotile
26. Carpet glue in suite 1	No Asbestos Detected
27. Carpet glue in suite 3	No Asbestos Detected
28. Vinyl laminate floor in suite 3	No Asbestos Detected
29. Pink 12” x 12” vinyl floor tile in suite 7	No Asbestos Detected
30. Yellow glue for pink 12” x 12” vinyl floor tile in suite 7	No Asbestos Detected
31. Blue pebble linoleum in suite 1	No Asbestos Detected
32. Beige pebble linoleum in suite 1	20% Chrysotile
33. Red linoleum in suite 4	No Asbestos Detected
34. Beige linoleum type 1 in suite 4	No Asbestos Detected
35. Yellow glue for beige linoleum type 1 in suite 4	No Asbestos Detected
36. Colored pebble linoleum in suite 5	No Asbestos Detected
37. Beige linoleum type 2 in suite 6	No Asbestos Detected
38. Old roofing tar in suite 1 attic space	5% Chrysotile
39. Old roofing tar in suite 1 attic space	No Asbestos Detected
40. Through wall foundation flashing at foundation joint	No Asbestos Detected
41. Through wall foundation flashing at foundation joint	No Asbestos Detected
42. Exterior window framing caulking	2% Chrysotile
43. Exterior window framing caulking	2% Chrysotile
44. Exterior window framing caulking	2% Chrysotile
45. Exterior panel framing caulking	No Asbestos Detected
46. Exterior panel framing caulking	No Asbestos Detected
47. Exterior panel framing caulking	No Asbestos Detected
48. Exterior window glazing caulking	No Asbestos Detected
49. Exterior window glazing caulking	No Asbestos Detected
50. Exterior window glazing caulking	2% Chrysotile
51. Exterior door framing caulking	2% Chrysotile
52. Exterior door framing caulking	2% Chrysotile
53. Exterior door framing caulking	<1% Chrysotile

OBSERVATIONS AND RECOMMENDATIONS:
All asbestos abatement activities must be performed by a Massachusetts licensed asbestos abatement contractor under the supervision of Massachusetts licensed project monitor should renovations or demolitions activities might disturb the ACM.

1. Joint compound on sheetrock walls was found to contain asbestos.
2. Black sink coating was found to contain asbestos.
3. Wall panel glue was found to contain asbestos.
4. Beige pebble linoleum flooring was found to contain asbestos.
5. Window framing caulking was found to contain asbestos.
6. Window glazing caulking was found to contain asbestos.
7. Door framing caulking was found to contain asbestos.
8. Old roofing tar was found to contain asbestos.

9. White cloth flexible duct connectors are assumed to contain asbestos.
10. Transite soffit panels are assumed to contain asbestos.
11. Window panel inserts are assumed to contain asbestos.
12. Exterior damproofing on exterior and foundation walls was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
13. Underground sewer pipes were assumed to contain asbestos.
14. All other suspect materials were found not to contain asbestos.

3.0 COST ESTIMATES:

The cost includes removal and disposal of all accessible ACM, other hazardous material and an allowance for removal of inaccessible or hidden ACM that may be found during demolition

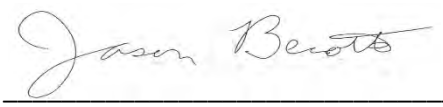
Location	Material	Approximate Quantity	Cost Estimate ($)
Throughout	Sheetrock and Joint Compound	23,000 SF	115,000.00
	Wall Panel with Glue	10,000 SF	50,000.00
	White Cloth Duct Connectors	2 Total	400.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
	Hidden ACM	Unknown	15,000.00
	Light Fixtures	Unknown	25,000.00
Suite 1	Black Sink Coating	1 Sink	200.00
	Beige Pebble Linoleum	250 SF	1,500.00
Exterior	Windows	56 Total	16,800.00
	Window Panels	560 SF	5,600.00
	Doors	10 Total	2,500.00
	Transite Soffit	1,000 SF	5,000.00
	Roofing Materials	7,000 SF	28,000.00
	Transite Sewer Pipes	Unknown[1]	25,000.00
	Damproofing/Flashing on Walls	1,000 Tons[1]	150,000.00
		TOTAL:	**465,000.00**

4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos samples were collected using a method that prevents fiber release. Homogeneous sample areas were determined by criteria outlined in EPA document 560/5-85-030a.

Bulk material samples were analyzed using PLM and dispersion staining techniques in accordance with EPA method 600/M4-82-020.

Inspected By:



Jason Becotte
Asbestos Inspector

5.0 LIMITATIONS AND CONDITIONS:

This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner's representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

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Asbestos Identification Laboratory

165 New Boston St., Ste 227
Woburn, MA 01801
781-932-9600

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com

Batch: 38838

NVLAP®
Lab Code: 200919-0

January 11, 2019

Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Project Number:
Project Name: 75 Arcand Drive, Lowell, MA

Date Sampled: 2019-01-10
Work Received: 2019-01-10
Work Analyzed: 2019-01-10

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

Dear Ammar Dieb,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project .

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Ammar Dieb for your business.

Michael Manning
Owner/Director

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January 11, 2019

Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Project Number:
Project Name: 75 Arcand Drive, Lowell, MA

Date Sampled: 2019-01-10
Work Received: 2019-01-10
Work Analyzed: 2019-01-10

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
1 / 428455	Joint Compound	Stairwell Storage Room Wall	tan	Non-Fibrous 98	**Detected** Chrysotile 2
2 / 428456	Joint Compound	Suite 2 Wall	tan	Non-Fibrous 98	**Detected** Chrysotile 2
3 / 428457	Joint Compound	Suite 2 Wall	tan	Non-Fibrous 98	**Detected** Chrysotile 2
4 / 428458	Joint Compound	Suite 3 Wall	tan	Non-Fibrous 98	**Detected** Chrysotile 2
5 / 428459	Joint Compound	Suite 3 Wall	white	Non-Fibrous 100	None Detected
6 / 428460	Joint Compound	Suite 5 Wall	white	Non-Fibrous 100	None Detected
7 / 428461	Joint Compound	Suite 5 Wall	white	Non-Fibrous 100	None Detected
8 / 428462	Joint Compound	Suite 6 Wall	white	Non-Fibrous 100	None Detected
9 / 428463	Joint Compound	Suite 6 Wall	white	Non-Fibrous 100	None Detected
10 / 428464	Black Sink Coating	Suite 1	black	Non-Fibrous 95	**Detected** Chrysotile 5
11 / 428465	White Sink Coating	Suite 2	white	Non-Fibrous 100	None Detected
12 / 428466	White Sink Coating	Suite 3	tan	Cellulose 5 Non-Fibrous 95	None Detected
13 / 428467	White Sink Coating	Suite 4	tan	Non-Fibrous 100	None Detected
14 / 428468	White Sink Coating	Suite 5	tan	Cellulose 5 Non-Fibrous 95	None Detected

FieldID LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
15 428469	White Sink Coating	Suite 6	gray	Cellulose 5 Non-Fibrous 95	None Detected
16 428470	Decorative 2x2 SAT	Suite 1	gray	Mineral Wool 10 Cellulose 80 Non-Fibrous 10	None Detected
17 428471	2x2 SAT Type 1	Suite 1	gray	Mineral Wool 70 Cellulose 5 Non-Fibrous 25	None Detected
18 428472	2x2 SAT Type 2	Suite 2	gray	Mineral Wool 5 Cellulose 80 Non-Fibrous 15	None Detected
19 428473	2x2 SAT Type 3	Suite 3	gray	Cellulose 85 Non-Fibrous 15	None Detected
20 428474	2x2 SAT Type 4	Suite 5	gray	Mineral Wool 60 Cellulose 30 Non-Fibrous 10	None Detected
21 428475	2x2 SAT Type 5	Suite 6	gray	Mineral Wool 50 Cellulose 30 Non-Fibrous 20	None Detected
22 428476	2x2 SAT Type 6	Suite 7	gray	Mineral Wool 5 Cellulose 80 Non-Fibrous 15	None Detected
23 428477	Ceramic Wall Tile Glue	Suite 1 Bathroom	yellow	Non-Fibrous 100	None Detected
24 428478	Wall Panel Glue	Suite 1	brown	Non-Fibrous 90	**Detected** **Chrysotile 10**
25 428479	Wall Panel Glue	Suite 1	brown	Non-Fibrous 90	**Detected** **Chrysotile 10**
26 428480	Carpet Glue	Suite 1	multi	Cellulose 2 Non-Fibrous 98	None Detected
27 428481	Carpet Glue	Suite 3	yellow	Non-Fibrous 100	None Detected
28 428482	Vinyl Laminate Floor	Suite 3	gray	Non-Fibrous 100	None Detected
29 428483	Pink 12x12 VFT	Suite 7	pink	Non-Fibrous 100	None Detected
30 428484	Yellow Glue	Suite 7	yellow	Non-Fibrous 100	None Detected
31 428485	Blue Pebble Linoleum	Suite 1	multi	Cellulose 30 Non-Fibrous 70	None Detected
32 428486	Beige Pebble Linoleum	Suite 1	multi	Cellulose 20 Non-Fibrous 60	**Detected** **Chrysotile 20**

FieldID LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
33 428487	Red Linoleum	Suite 4	multi	Cellulose 30 Non-Fibrous 70	None Detected
34 428488	Beige Linoleum Type 1	Suite 4	multi	Cellulose 30 Non-Fibrous 70	None Detected
35 428489	Yellow Glue	Suite 4	yellow	Cellulose 2 Non-Fibrous 98	None Detected
36 428490	Colored Pebble Linoleum	Suite 5	multi	Cellulose 40 Non-Fibrous 60	None Detected
37 428491	Beige Linoleum Type 2	Suite 6	multi	Cellulose 40 Non-Fibrous 60	None Detected
38 428492	Old Roofing Tar	Suite 1 Attic Space	black	Cellulose 10 Non-Fibrous 85	**Detected** **Chrysotile 5**
39 428493	Old Roofing Tar	Suite 1 Attic Space	black	Non-Fibrous 100	None Detected
40 428494	Through Wall Foundation Flashing	At Foundation Joint	black	Non-Fibrous 100	None Detected
41 428495	Through Wall Foundation Flashing	At Foundation Joint	black	Non-Fibrous 100	None Detected
42 428496	Window Frame Caulk	Exterior Windows at Frame	brown	Non-Fibrous 98	**Detected** **Chrysotile 2**
43 428497	Window Frame Caulk	Exterior Windows at Frame	brown	Non-Fibrous 98	**Detected** **Chrysotile 2**
44 428498	Window Frame Caulk	Exterior Windows at Frame	brown	Non-Fibrous 98	**Detected** **Chrysotile 2**
45 428499	Window Panel Caulk	Exterior Windows at Panel	brown	Non-Fibrous 100	None Detected
46 428500	Window Panel Caulk	Exterior Windows at Panel	brown	Non-Fibrous 100	None Detected
47 428501	Window Panel Caulk	Exterior Windows at Panel	brown	Non-Fibrous 100	None Detected
48 428502	Window Glass Glaze	Exterior Windows	black	Non-Fibrous 100	None Detected
49 428503	Window Glass Glaze	Exterior Windows	black	Non-Fibrous 100	None Detected
50 428504	Window Glass Glaze	Exterior Windows	brown	Non-Fibrous 98	**Detected** **Chrysotile 2**

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
51 / 428505	Door Frame Caulk	Exterior Doors	gray	Non-Fibrous 98	Detected Chrysotile 2
52 / 428506	Door Frame Caulk	Exterior Doors	gray	Non-Fibrous 98	Detected Chrysotile 2
53 / 428507	Door Frame Caulk		gray	Non-Fibrous 100	Detected Chrysotile < 1

Friday 11 January

Analyzed by: Erik Gongas

End of Report

Batch: 38838

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM
24-hour TAT

Town/City: Lowell, MA Building Name 75 Arcand Drive

Sample	Result	Description of Material	Sample Location
1		Joint Compound	Stairwell storage room wall
2			Suite 2 wall
3			" "
4			Suite 3 wall
5			" "
6			Suite 5 wall
7			" "
8			Suite 6 wall
9			" "
10		Black sink coating	Suite 1
11		White sink coating	Suite 2
12			Suite 3
13			Suite 4
14			Suite 5
15		Gray sink coating	Suite 6
16		Decorative 2x2 SAT	Suite 1
17		2x2 SAT Type 1	Suite 1
18		2x2 SAT Type 2	Suite 2
19		2x2 SAT Type 3	Suite 3
20		2x2 SAT Type 4	Suite 5

Reported By: Jason Becotte Date: 1-9-19 Due Date: ----------

Received By: [signature] Date: 1/10/19

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM

Town/City: Lowell MA Building Name 75 Arcand Drive

Sample	Result	Description of Material	Sample Location
21		2x2 SAT Type 5	Suite 6
22		2x2 SAT Type 6	Suite 7
23		Ceramic wall tile glue	Suite 1 Bathroom
24		Wall Panel glue	Suite 1
25		1 1	1 1
26		Carpet glue	Suite 1
27		1 1	Suite 3
28		Vinyl Laminate floor	Suite 3
29		Pink 12x12 VFT	Suite 7
30		Yellow glue	1 1
31		Blue pebble Linoleum	Suite 1
32		Beige Pebble Linoleum	1 1
33		Red Linoleum	Suite 4
34		Beige Linoleum Type 1	Suite 4
35		Yellow glue	1 1
36		Colored Pebble Linoleum	Suite 5
37		Beige Linoleum Type 2	Suite 6
38		Old roofing tar	Suite 1 Attic Space
39		1 1	1 1
40		Through wall foundation flashing	at foundation joint

Reported By: Jason Berotte Date: 1-9-19 Due Date: ----------

Received By: ---------- Date: ----------

CHAIN OF CUSTODY

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Framingham, MA 01702
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adieb@uec-env.com

PLM

Town/City: Lowell, MA Building Name 75 Arcand Drive

Sample	Result	Description of Material	Sample Location
41		through wall foundation flashing	at foundation joint
42		window frame caulk	exterior windows at frame
43		"	"
44		"	"
45		window panel caulk	exterior windows at panel
46		"	"
47		"	"
48		window glass glaze	exterior windows
49		"	"
50		"	"
51		Door frame caulk	exterior doors
52		"	"
53		"	"

Reported By: Jason Beutte Date: 1-9-19 Due Date: ----------

Received By: ---------- Date: ----------

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APPENDIX F – MEETING MINUTES AND PRESENTATIONS

Through the course of the Schematic Design Phase the project team has met with various groups to discuss the project.

- School Building Committee Meetings
    - August 2, 2018
    - September 6, 2018
    - October 4, 2018
    - November 1, 2018
    - December 6, 2018
    - February 7, 2019
- City Council/ Community Meetings
    - January 22, 2019
    - February 14, 2019
- Regulatory/ City Department Meetings
    - City of Lowell: City Manager – 10/4/2018
    - National Park Service: Overview – 10/9/2018
    - City of Lowell: Historic & Planning and Development Departments – 10/9/2018
    - City of Lowell: Trolley & Capital Improvement Project Review – 10/9/ 2018
    - City of Lowell: Traffic Meeting – 10/9/2018
    - City of Lowell: Civil Engineering Overview – 10/18/2018
    - City of Lowell: National Grid – 10/29/2018
    - City of Lowell: Inspectional Services Project Overview – 11/7/2018
    - National Park Service: Update– 11/15/2018
    - City of Lowell: Mayor's Office Overview – 11/15/2018
- Working Group Sub-Committee Meetings
    - Working Group Meeting – 8/14/2018
    - Working Group Meeting – 8/30/2018
    - Working Group Meeting – 9/11/2018
    - Working Group Meeting – 9/25/2018
    - Working Group Meeting – 10/29/2018

- Focus Group Programming Meetings
    - Educator Programming Meetings – 9/18/2018 & 9/20/2018
    - Food Service Programming Meeting – 9/20/2018
    - Educator Programming Meeting –11/7/2018
    - Security Programming Meting – 12/10/2018
- Student Forum
    - Student Educational Visioning Workshop – 12/5/2018
- Citizen Group
    - The Lowell Plan Meeting – 2/7/2018

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www.LowellMA.gov

Eileen Donoghue
City Manager
Kara Keefe Mullin
Assistant City Manager

School Building Committee MSBA Meeting

Meeting Minutes

Date: August 2, 2018
Time: 6:30 PM
Location: City Council Chambers

I. Attendance

Present: Eileen Donoghue, William Samaras, Conor Baldwin, Maryann Ballotta, Marianne Busteed, David Cunningham, Edward Kennedy, Jay Mason, Jeanine Durkin.

Also in attendance:

City: Kara Keefe Mullin, Elliott Veloso, Heather Varney, Alex Magee
Skanska: Maryann Williams, Jim Dowd
Perkins Eastman: Joe Drown, Bob Bell, Ashley Iannuccilli

City Manager E. Donoghue called the meeting to order at 6:30 PM.

II. Update on Tasks Since Last SBC Meeting 4/30

R. Bell of Perkins Eastman led off presentation. Comments focused on May 9 MSBA Facilities Assessment Subcommittee (FAS) meeting. Noted that the MSBA FAS spoke with design team, focused on education plan to verify the school design will achieve education plan. Formal submissions of feasibility studies PDP and PSR occurred with many favorable determinations. Some highlights from the FAS meeting included board members' comments on designs, and some were curious about elevators and general travel times between spaces. Explained freshman academy functions as its own "School". MSBA urged caution regarding air rights and to make sure to work with local historic board. There were some comments on community and after hours use. Consultants noted that safety/security part of design. The stage and scene-shop will be accessible to each other, as addressed in the design. In design, there is a good buffer to main entry to the school to accommodate large queues of students. R. Bell noted that this was a very unique school, with canals, history, etc., design team continuing to explore opportunities to involve them in design.

Regarding the program spaces – the MSBA accepted almost all of the spaces as proposed. They will continue to review some area as some are ineligible such as Catie's Closet, health center, bank, and school store. MSBA is still considering options for these programs.

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Eileen Donoghue
City Manager
Kara Keefe Mullin
Assistant City Manager

An Education Leadership meeting was held on June 13, allowing for individuals a chance to speak on the education program locations and Special Education in particular.

J. Drown noted that on June 27, 2018 there was a an MSBA Board Meeting. The project was approved to proceed into Schematic design; and therefore has now entered the next phase "Schematic Design". Perkins Eastman will continue to refine project design during this period (July 2018 to approximately February 2019). The team has started in the high school conducting laser scanning . The team will also be conducting hydro-flow testing on plumbing systems to make sure adequate water pressure exists where it needs to.

III. Site Plan Opportunities

A. Iannuccilli walked the SBC through site plan. She noted that in past designs, there was not much plaza space near entry. The current design has more handicap parking spaces near entrance, replacing the bus lineup area. Also, the team has created more outdoor plaza/dining space on the canal, a unique feature that the team would like to showcase. This design also considers the possibility of utilizing access from Dutton St. which will make service vehicle turnaround easier. The presentation showcased inspiration pictures to show possible designs including green roof space with outdoor classrooms, rooftop gardening, and light wells with 3D sculpturing. The presentation depicted light wells in the 1980's building to bring natural light to middle of the building. A. Iannuccilli also discussed a large greenspace that will be used in different ways including passive recreation, gym class, marching band, etc. She mentioned that these were just some ideas for now, and the team will continue to develop and design these elements.

IV. Plan Updates

E. Kennedy asked a question regarding access between buildings, whether designers have given thought to footbridge across canal. Perkins Eastman has not designed this but will consider possible options. J. Mason commented on encouraging bike safety, storage, usage. Perkins Eastman noted that they are and will consider this moving forward.

R. Bell gave a general look at floor plans, noting that each color represents a different educational subject: pink - administration/teacher areas, purple – SPED, yellow – arts/gym/cafeteria/library, blue – humanities, and green - STEM. The 1922 building will consist of arts, both visual and performing, as well as the TV studio. The team will try to design abundant sources of natural light, hoping to restore historic light wells which had been shuttered. Academic clusters will be utilized for both STEM and Humanity with SPED and teacher planning space mixed in. A new main lobby, considered the heart of the school, with easy access

to the canal, cafeteria, fitness center, culinary restaurant, bank, and school store. There will also be a security station upon entry.

W. Samaras asked a question regarding cafeteria size. R. Bell replied that the cafeteria is large enough for a third of the school population based on standard MSBA formula. W. Samaras then asked about the auditorium plan. R. Bell replied that the team is looking at options and including any access issues that may arise. The team is also planning to renovate and restore the space with all new seating, walls, lighting, stage, etc.

R. Bell continued that the building will contain one large cafeteria with alcoves and break out space and the floor above will have a smaller cafeteria for freshman . One kitchen will distribute to two serving areas.

W. Samaras asked question about openness of the large cafeteria. R. Bell replied the cafeteria design is still to be determined. He also noted all House Administrations will be one floor up from lobby, clustered so that they are close to each other near the heart of the school. MSBA approved co-location of adaptive PE and Gym space all within fieldhouse at the maximum space allowed.

V. Eminent Domain & Air Rights/Article 97 Updates by the City

E. Veloso gave an update on ongoing issues related to the air rights. He discussed 760 CMR 27.03 regarding relocation plan submission to Bureau of Relocation. E. Veloso noted the city has finalized a plan and will submit this Friday. It is anticipated that eminent domain will take place 45 days from that date. A vote will be presented to City Council in September 2018. Once the city records copy with registry of deeds, the property will be under city control. E. Veloso noted that the city continues to explore air rights. Some specific issues have come up with the National Parks over trolley tracks, and DCR, which has control of air rights over canals. E. Kennedy inquired where the city currently stands with the National Parks in negotiations. E. Veloso noted contact with Peter Aucella and top level discussion of air rights, including securing easements. E. Kennedy also asked how long the process will take. E. Veloso noted that the city will need to speak with representatives from the Dept. of the Interior in Washington D.C. A review of the process should take somewhere between 6 months to 1 year. E. Donoghue noted that easements exist for where tunnels are currently. She noted that the Administration cannot say for certain where the tunnels will be placed as this is ultimately based on ongoing designs. New easements will be discussed depending on the final design. R. Bell noted the team is looking at design options; and could make the tunnels work as they are if necessary.

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City Manager
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Assistant City Manager

E. Kennedy noted that the city is currently not boxed into a corner in terms of time constraints, but this could change in the next few months. E. Kennedy questioned whether appraisals have come back yet. E. Donoghue stated that the appraisals have not come back yet. E. Kennedy mentioned that he thought they were to receive appraisals in August, and inquired to why it will be delayed a month. E. Donoghue confirmed that they will be received in September, noting the city is comfortably where we need to be based on the timeline. E. Kennedy asked about a working committee for the school, and inquired whether this can discussed this yet. E. Donoghue noted yes, a team has been appointed, and the Administration will inform the City Council of appointees. E. Donoghue also pointed out regarding article 97, that she is confident DCR will work with the Administration on air right easements. She also noted the city cannot draft a home-rule petition until the new legislature is elected.

E. Kennedy asked about Article 97 legislation passed last year, and if it would be prudent to ask delegation to negate what was done last year. E. Donoghue stated what was passed last year had language including terms that if a school was not built on that land within 5 years, that it would revert back to the Board of Parks. She mentioned that when the city files new Article 97 legislation, the city would ask to remove previous relief at the same time.

VI. Schedule Overview

J. Drown discussed the upcoming schedule, noting there are some specific working groups such as the Education Leadership Team and some other smaller working groups. Focus groups have been utilized to help define program and goals of project. Now that the city has one design selected, the design team will need guidance on programs from the focus groups in September and October 2018. Student forums and community meetings will continue to occur over next 6 months as well.

A 3-dimensional modeling of building is currently underway, which is an important step in the design process. J. Drown noted they have identified the 75 Arcand building and believe it will be available by Nov. 1 for access and testing. He noted a potential extra traffic study is on their radar as well, should it become necessary. He stated the design team will be refining design through November and will begin cost estimates in December. J. Drown noted a potential vote in February 2019 with School Building Committee and City Council to submit final design to MSBA.

VI. Next Steps

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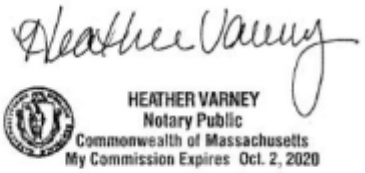
Eileen Donoghue
City Manager
Kara Keefe Mullin
Assistant City Manager

E. Kennedy asked about the security within building. J. Drown noted there have been meetings on this already, which the team has begun to develop implementation strategies on security and will continue to look at this issue closely. W. Samaras inquired if the exits can be shut down or blocked off. J. Drown noted they are looking at options but will need to work to code, and that egress needs to be maintained.

E. Donoghue made an announcement welcoming acting superintendent Jeanine Durkin.

Motion to adjourn by City Manager Donoghue, 2nd by Ed Kennedy 7:26 PM.

Notes taken by Alex Magee and certified by:



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PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE / COMMUNITY MEETING

LOWELL HS PROJECT

2 AUGUST 2018

LOWELL HIGH SCHOOL

AGENDA

- Updates Since last SBC Meeting 4/30/18:
  - 5/9: MSBA Facilities Assessment Subcommittee Mtg. & Preferred Schematic Report Submission
  - 6/13: ELT Meeting to Review Plans before summer recess
  - 6/27: MSBA Approval to proceed to Schematic Design (SD)
  - 7/2-7/31: Existing Conditions Survey / Laser Scan of Existing Buildings, Hydrant Flow Test
- Site Plan & Opportunities
- Plan Updates
- Eminent Domain & Air Rights/Article 97 Updates by the City
- SD Schedule Overview
- Next Steps

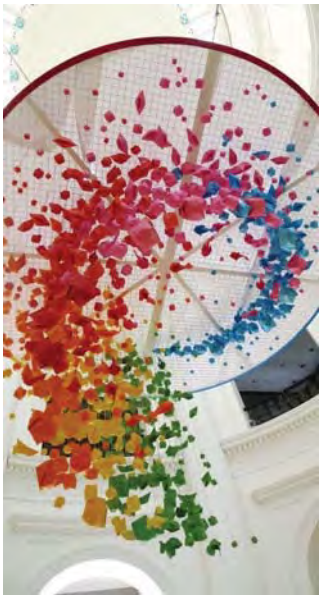
LOWELL HIGH SCHOOL

LOWELL HIGH SCHOOL : OPPORTUNITIES

GREEN ROOF/ROOFTOP AGRICULTURE

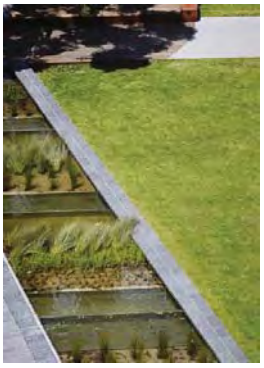
LOWELL HIGH SCHOOL : OPPORTUNITIES

ATRIUMS



LOWELL HIGH SCHOOL : OPPORTUNITIES

CAMPUS GREEN

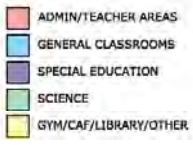


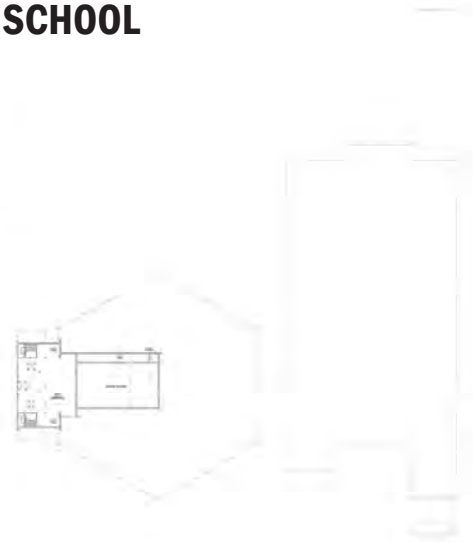
LOWELL HIGH SCHOOL : OPPORTUNITIES

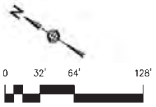
PLAZA OVERLOOKING THE CANAL

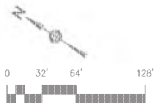
LOWELL HIGH SCHOOL

BASEMENT PLAN









LOWELL HIGH SCHOOL

BASEMENT PLAN

🟥 ADMIN/TEACHER AREAS
🟦 GENERAL CLASSROOMS
🟪 SPECIAL EDUCATION
🟩 SCIENCE
🟨 GYM/CAF/LIBRARY/OTHER

LOWELL HIGH SCHOOL

BASEMENT PLAN

🟥 ADMIN/TEACHER AREAS
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LOWELL HIGH SCHOOL

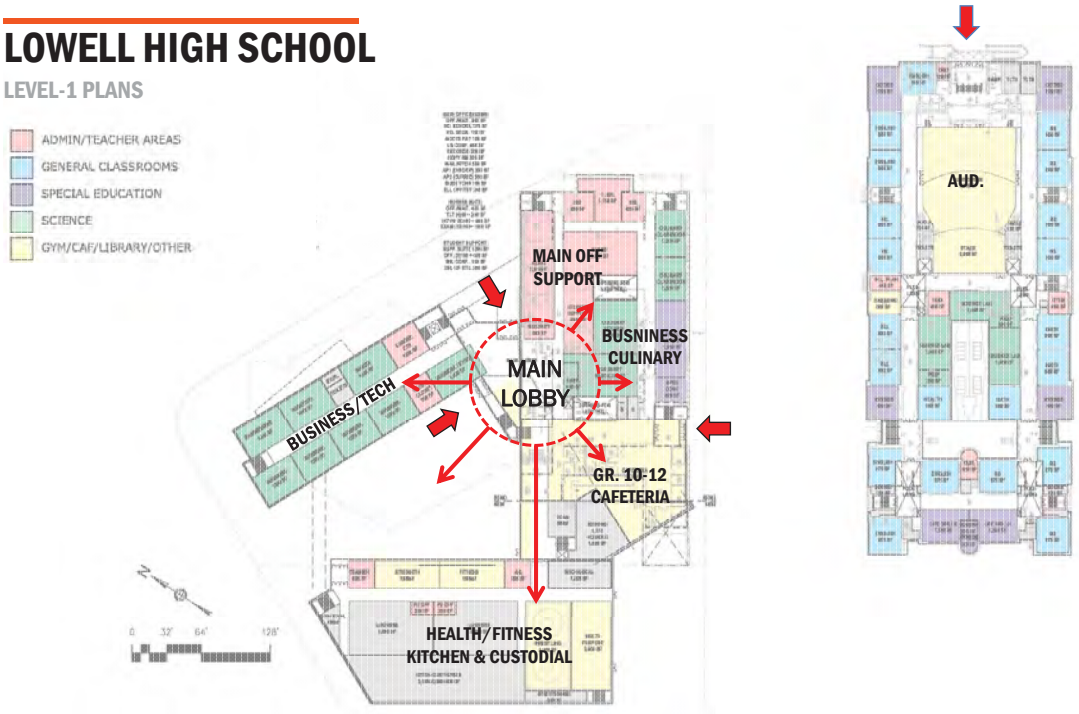
LEVEL-1 PLANS

LOWELL HIGH SCHOOL

LEVEL-1 PLANS

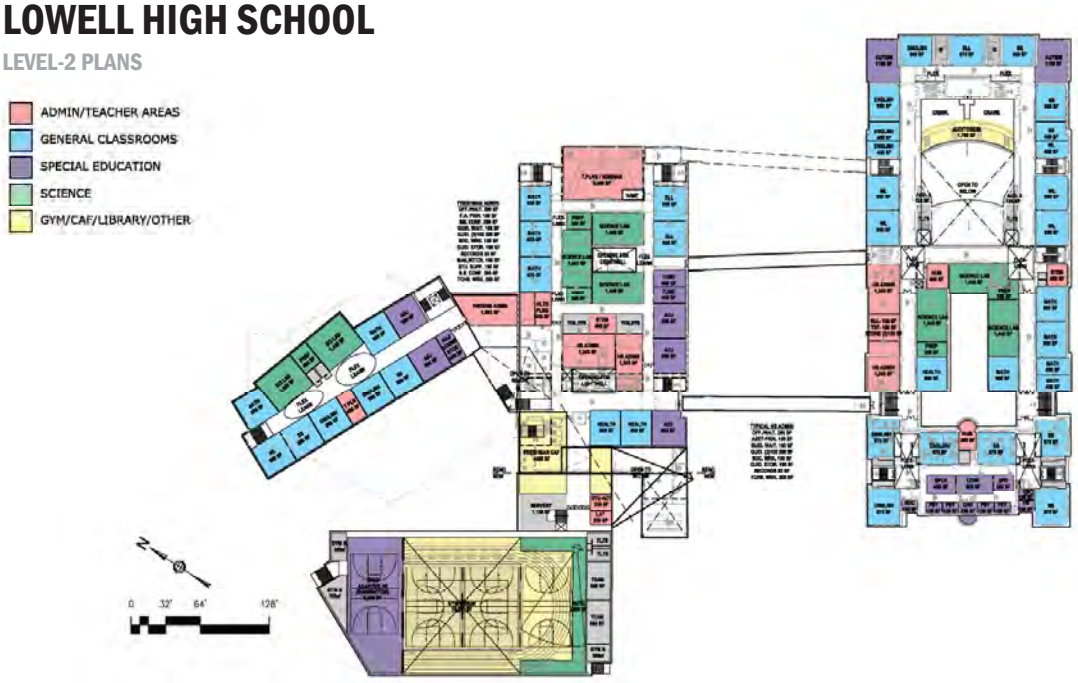
LOWELL HIGH SCHOOL

LEVEL-1 PLANS



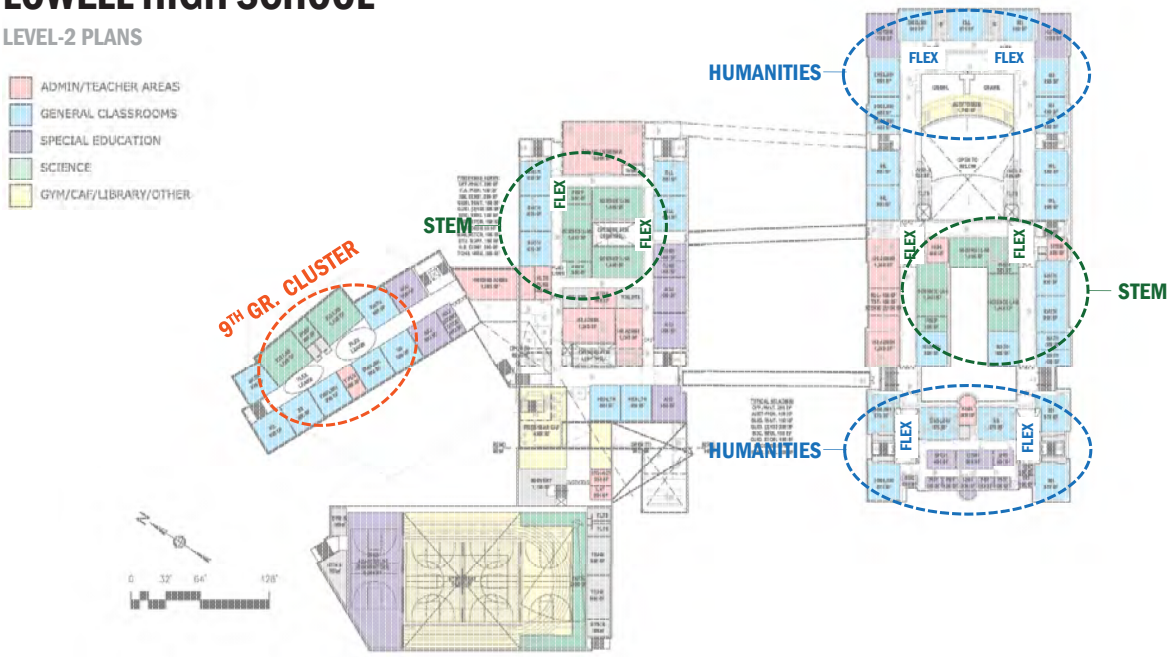
LOWELL HIGH SCHOOL

LEVEL-2 PLANS



LOWELL HIGH SCHOOL

LEVEL-2 PLANS



LOWELL HIGH SCHOOL

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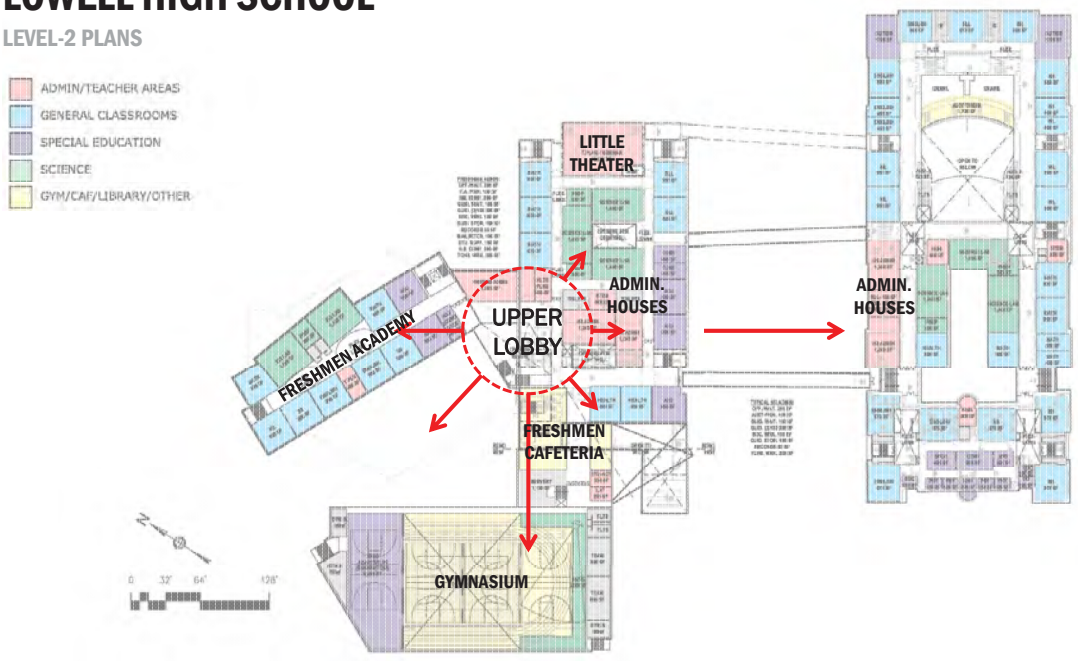
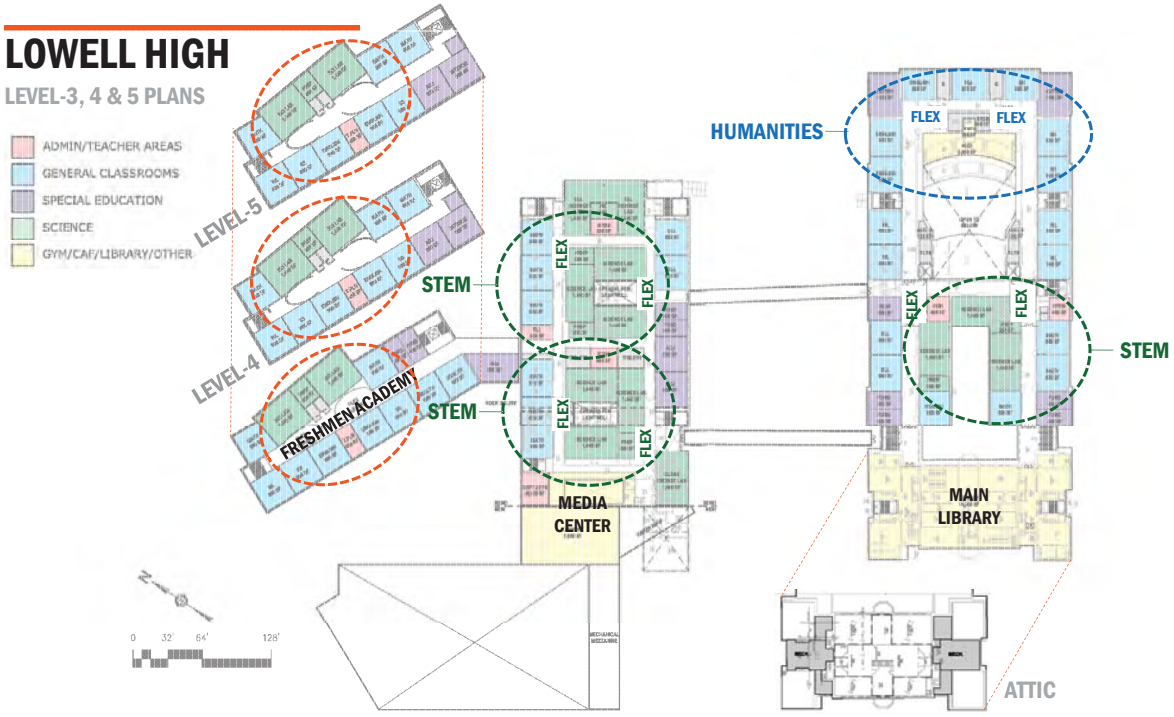


LOWELL HIGH

LEVEL-3, 4 & 5 PLANS

LOWELL HIGH

LEVEL-3, 4 & 5 PLANS



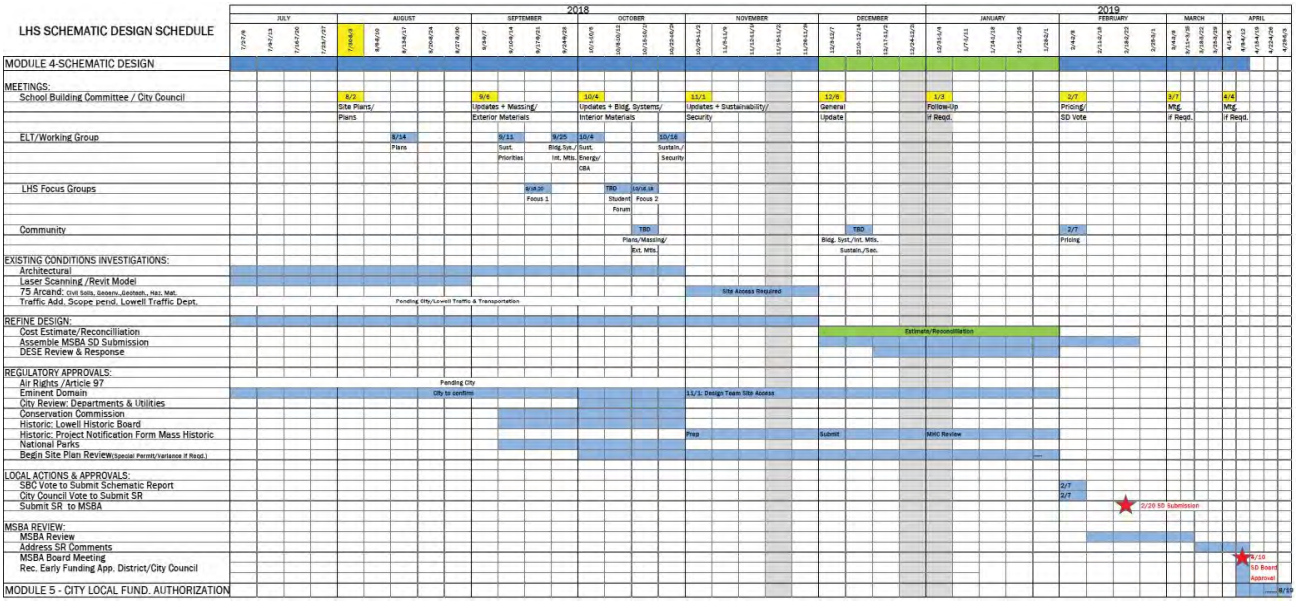
LOWELL HIGH SCHOOL

CITY UPDATES

- Updates Since last SBC Meeting 4/30/18:
  - 5/9: MSBA Facilities Assessment Subcommittee Mtg. & Preferred Schematic Report Submission
  - 6/13: ELT Meeting to Review Plans before summer recess
  - 6/27: MSBA Approval to proceed to Schematic Design (SD)
  - 7/2-7/31: Existing Conditions Survey / Laser Scan of Existing Buildings, Hydrant Flow Test
- Site Plan Opportunities
- Plan Updates
- Eminent Domain & Air Rights/Article 97 Updates by the City
- SD Schedule Overview
- Next Steps

LOWELL HIGH SCHOOL

SCHEDULE



LOWELL HIGH SCHOOL

NEXT STEPS

- 8/14: ELT Meeting / Plan Updates
- Ongoing: Laser Scanning of Existing Buildings
- Ongoing: Develop Schematic (Design & Scope)
- 9/6: SBC Meeting / Massing & Exterior Updates
- 9/11: ELT/Sustainability Meeting
- TBD: Lowell Historic Board Informal Meeting
- TBD: Conservation Commission Informal Meeting
- TBD: Planning & Development Informal Meeting
- 11/1: Access to 75 Arcand Drive for Existing Conditions Investigations: (Civil Soils, Geo-Environmental, Geotechnical, Hazardous Materials)

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Eileen Donoghue
City Manager
Kara Keefe Mullin
Assistant City Manager

School Building Committee MSBA Meeting

Meeting Minutes

Date: September 6, 2018
Time: 6:30 PM
Location: City Council Chambers

City Manager E. Donoghue called the meeting to order at 6:35 PM.

I. Attendance

Present: Eileen Donoghue, William Samaras, Edward Kennedy, Rodney Elliott, Connie Martin, Conor Baldwin, Marianne Busteed, James Cook, David Cunningham, Jeannine Durkin, Jay Mason, Maria Sheehy, Diane Tradd, Michael Vaughn, Richard Underwood (late arrival)

Also in attendance:

Skanska: Mary Ann Williams, Jim Dowd
Perkins Eastman: Joe Drown, Bob Bell, Dawn Guariello, Alicia Caritano
City: Kara Keefe Mullin, Elliott Veloso, Heather Varney, & Alex Magee

II. Updates Since last SBC Meeting 8/2/2018

A. Caritano began the discussion with the agenda and material related to existing conditions. Current existing conditions assessment includes laser scanning of entire building to build a 3 dimensional model. The architectural team and cultural consultants are currently looking over existing conditions, verifying how they compare to assumptions. The team noted that there have also been numerous meetings with local stakeholders.

Preliminary massing and materials were presented by D. Guariello. The team have begun massing and materials studies on a preliminary basis, to determine what the building could look like. D. Guariello mentioned that while nothing is final, the team is interested in investigating the scale of building and materials appearances. At end of schematic design, the team will be utilizing design palette to help inform the City on budgetary decisions.

The presentation illustrates the images produced thus far, including the existing site shown with new building overlay. D. Guariello stated that Perkins Eastman is focusing on the envelope improvements to existing structures. The slides serve inspirational purposes, to assist with forming an idea of how the building may appear. One illustration focusing on the Freshman Academy from the street has a depiction of the communal space for students on the first floor. J. Mason questioned the vertical bar on outside of building; D. Guariello stated that is a stairwell that will be featured with lighting from outside. Light wells allow natural light to permeate spaces, especially communal spaces like the gym. A look at the green space is given from perspective of Freshman Academy, as well as the front entry, were also provided. While the physical appearance of the school is still being designed, the team noted that there may be a desire to tie in the existing building to new building with the use of certain materials.

W. Samaras inquired to the gymnasium being a temporary structure, and if this would have the same quality. D. Guariello stated that the gym was depicted as a prefabricated structure, which only notes how the building is constructed; it does not take away from any quality or useful life. She continued, noting that the gymnasium will be designed to last for over 50 years, and will not sacrifice durability. B. Bell noted that the structure would be built to last, but could be assembled quicker. Custom buildings can become extremely expensive; while many modern construction projects are completed this way. W Samaras stated that he has not seen high level of quality in prefabricated work. E. Kennedy noted his concerns, primarily the durability of prefabricated structures vs. other traditional buildings. D. Guariello noted that there are potential limiting issues aside from cost differences between the types of structures. J. Drown mentioned cost and construction issues. The team will be investigating determining if the system is appropriate for this application and if it is the best solution for the project. E. Kennedy clarified his question of space vs. life of building; asking which last longer and what the cost differences are. J. Drown noted that a hybrid may be the best solution for duration and durability standpoint. D. Guariello stated that this decision is important and may need to be made relatively quickly. A. Caritano mentioned upcoming meetings that will include other system introductions and decisions that may include some more information on the fieldhouse. Examples of similar buildings with some prefabricated designs include Rhode Island and Chelsea. J. Mason commented about design, cost and prefabricated cost and benefits.

D. Guariello noted that the team's design incorporates an extremely durable base, which is needed in all schools in New England. This will help with wear and tear of snow removal, which can be solved with brick and stone. D. Guariello mentioned that softer materials will be used on higher exterior elevations. D. Tradd inquired to the costs of materials. D. Guariello noted that most are within a $45-65 per sq. foot range. D. Guariello stated that the team is looking to find a

way to blend a modern and historical appearance while reflecting the era in which it is built. She also mentioned that the design will attempt to utilize 24% glass exterior for sustainability reasons. E. Donoghue asked if the sketches can be modified to include different materials on the different buildings to achieve a better understanding of appearance. D. Guariello will showcase some materials on buildings later in presentation.

D. Guariello brought sample materials with different combinations of colors available. Materials include brick, fiber cement, wall panels, stone, metallic panels, glass, etc. W. Samaras asked about the cost and durability of each. D. Guariello stated that the durability of materials would depend on what is selected for the top portion of building as well. D. Guariello replied to prices, noting that all materials shown are in a $45-65 range, which can be adjust slightly based on design. D. Guariello noted the importance of the space behind the bricks. She noted that materials have come a long way and are more durable and better quality than they used to be. E. Kennedy noted that he did not like corrugated metal, mentioning how it deteriorates, and will eventually look tired for the second half of its useful life. D. Guariello stated that the design does not call for corrugated metal, that the plan can include brick or stone facade. E. Kennedy asked for the price difference between the two and would want a compelling price difference in order to go with corrugated metal.

III. Eminent Domain Updates by the City

E. Donoghue began the discussion on the eminent domain update. This process has been progressing as required. The appraisers and relocation experts will be finishing work soon, which includes giving proper notice to owners. E. Veloso noted that the City Council will vote on notice of taking, in early October. He mentioned that there will be more of an update at the next SBC meeting and they want the process to conclude by the time of the MSBA Board Meeting in April of 2019.

IV. Next steps in preparation for SBC Meeting 10/4

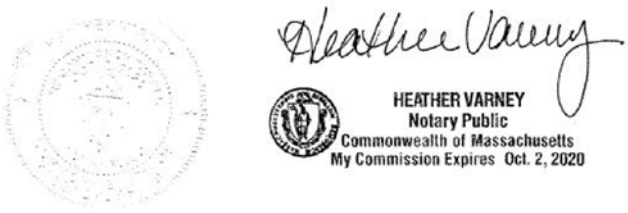
A. Caritano noted next steps including meetings on 9/11/18 Sustainability priorities meeting regroup, 9/18/18 and 9/20/18 focus group meetings with departments at the high school detailing various spaces. On 9/25/18 the working group will meet to receive updates on information discussed today as well as building systems. On 10/3/18 there will be a student forum to engage students and faculty. The next SBC meeting will take place on 10/4/18.

D. Cunningham inquired to the back wall along canal, possibly creating a movie theater. He asked if the team is working with different groups in city to use Lucy Larcom park. R. Bell stated

that yes, they are. He continued that the team is looking for the entire campus to be used as a teaching tool/asset. D. Guarianello noted that the team met today with DPD staff and National Parks Services to discuss the canal greenspace. E. Kennedy noted that he liked the idea for all types of performances that many people can use, a small performance spaces will be great for community. J. Mason inquired the systems and costs related to energy systems and their associated costs. A. Caritano noted that they are still working on this, the plans are certainly not final and are subject to budget and change. J. Cook commented on including DPD office. R. Elliott asked if there will be air conditioning in the new buildings, which Perkins Eastman answer is yes.

Motion to adjourn by E. Kennedy, second by D. Cunningham. Meeting adjourns at 7:37.

Notes taken by Alex Magee and certified by:



PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE / COMMUNITY MEETING

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

AGENDA

- Updates Since last SBC Meeting 8/02/18
  - Additional Existing Conditions Investigations:
    - Laser Scanning/ 3D Computer model of existing buildings
    - Site visits Architecture and Structure
    - Informational meetings with Lowell: Planning & Development/ Historic and National Historic Parks
- Preliminary Massing and Exterior Materials
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- Next Steps in Preparation for SBC Meeting 10/4
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LOWELL HIGH SCHOOL

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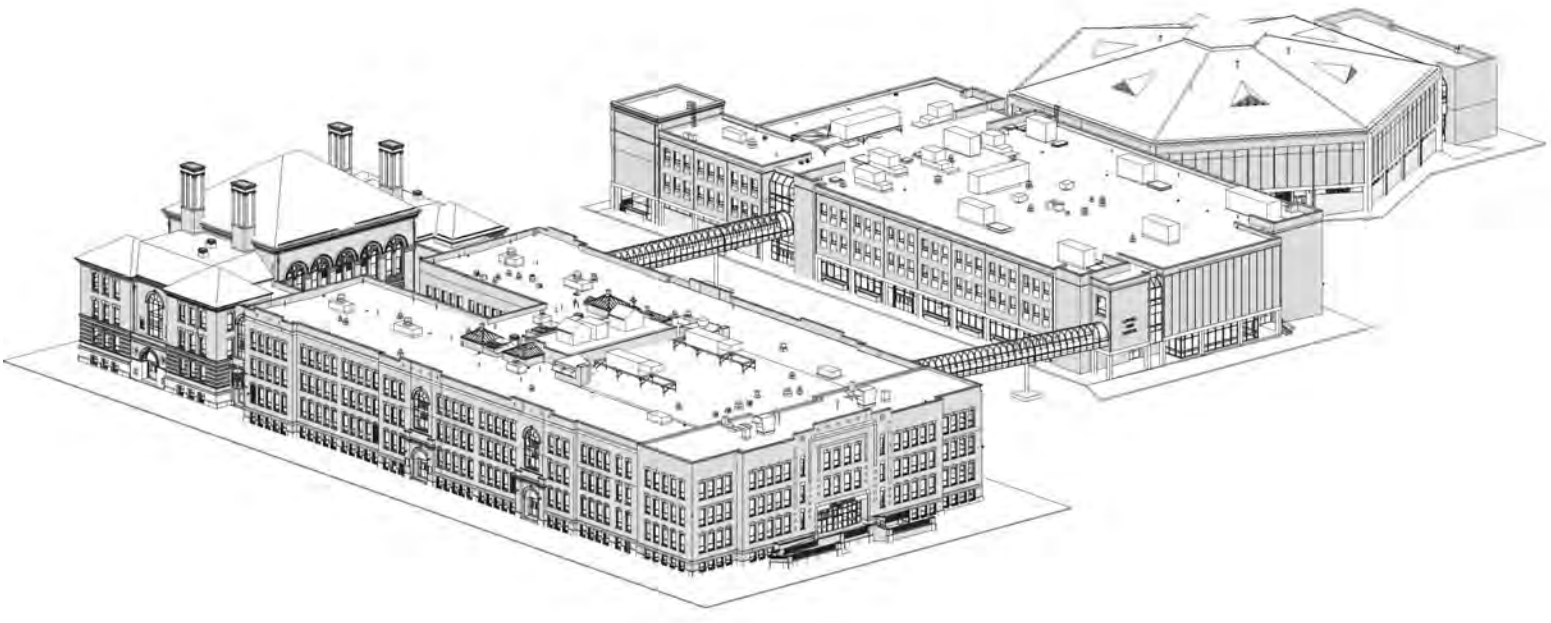
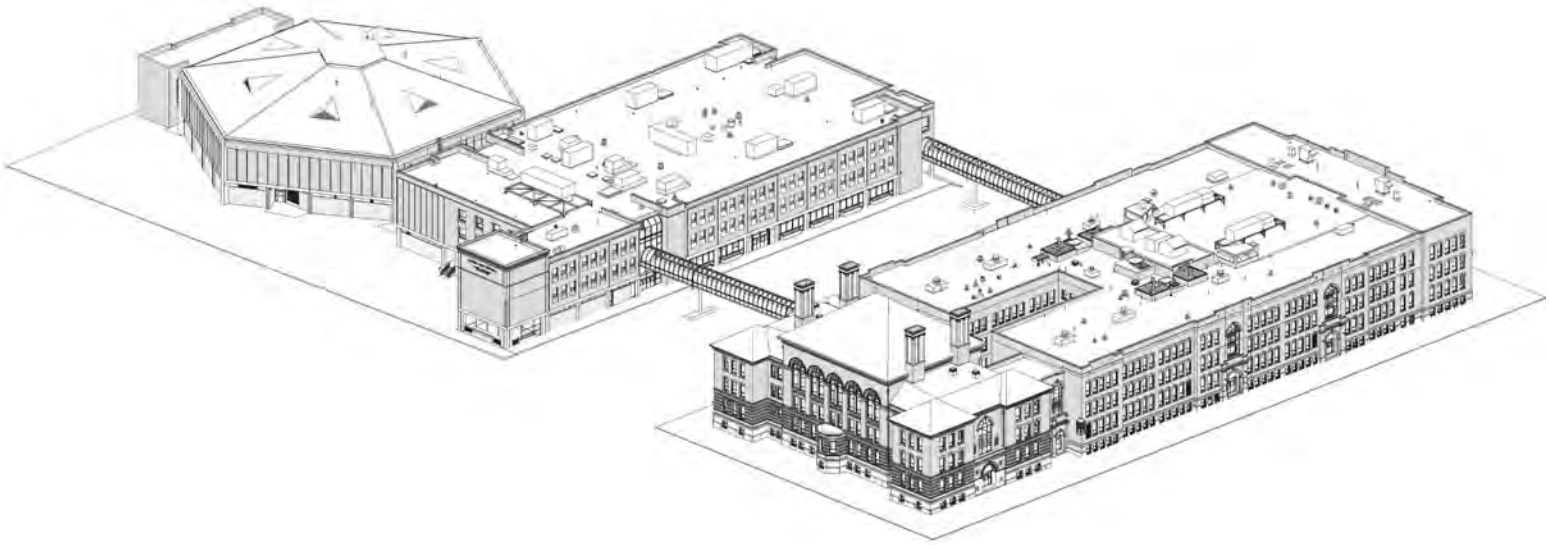
LOWELL HIGH SCHOOL

IMAGE OF EXISTING CONDITIONS 3D MODEL



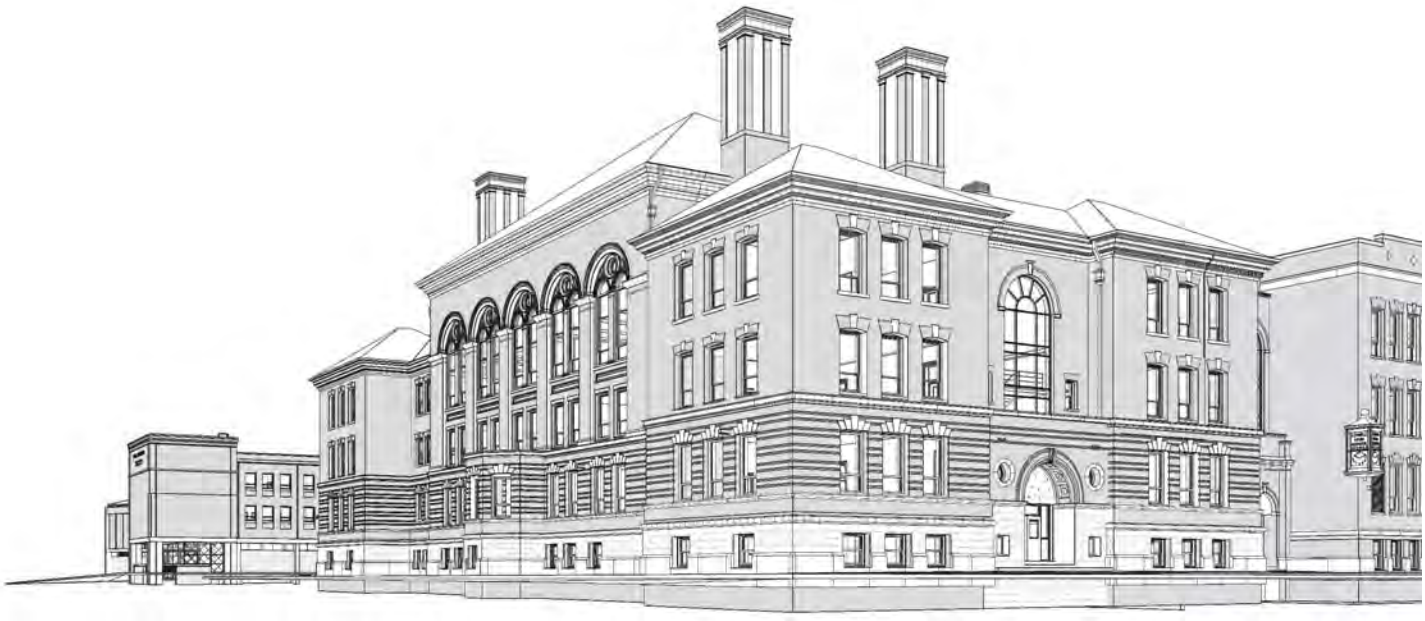
LOWELL HIGH SCHOOL

IMAGE OF EXISTING CONDITIONS 3D MODEL



LOWELL HIGH SCHOOL

IMAGE OF EXISTING CONDITIONS 3D MODEL



LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

DOWNTOWN LOWELL ARCHITECTURE

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY PRECEDENTS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

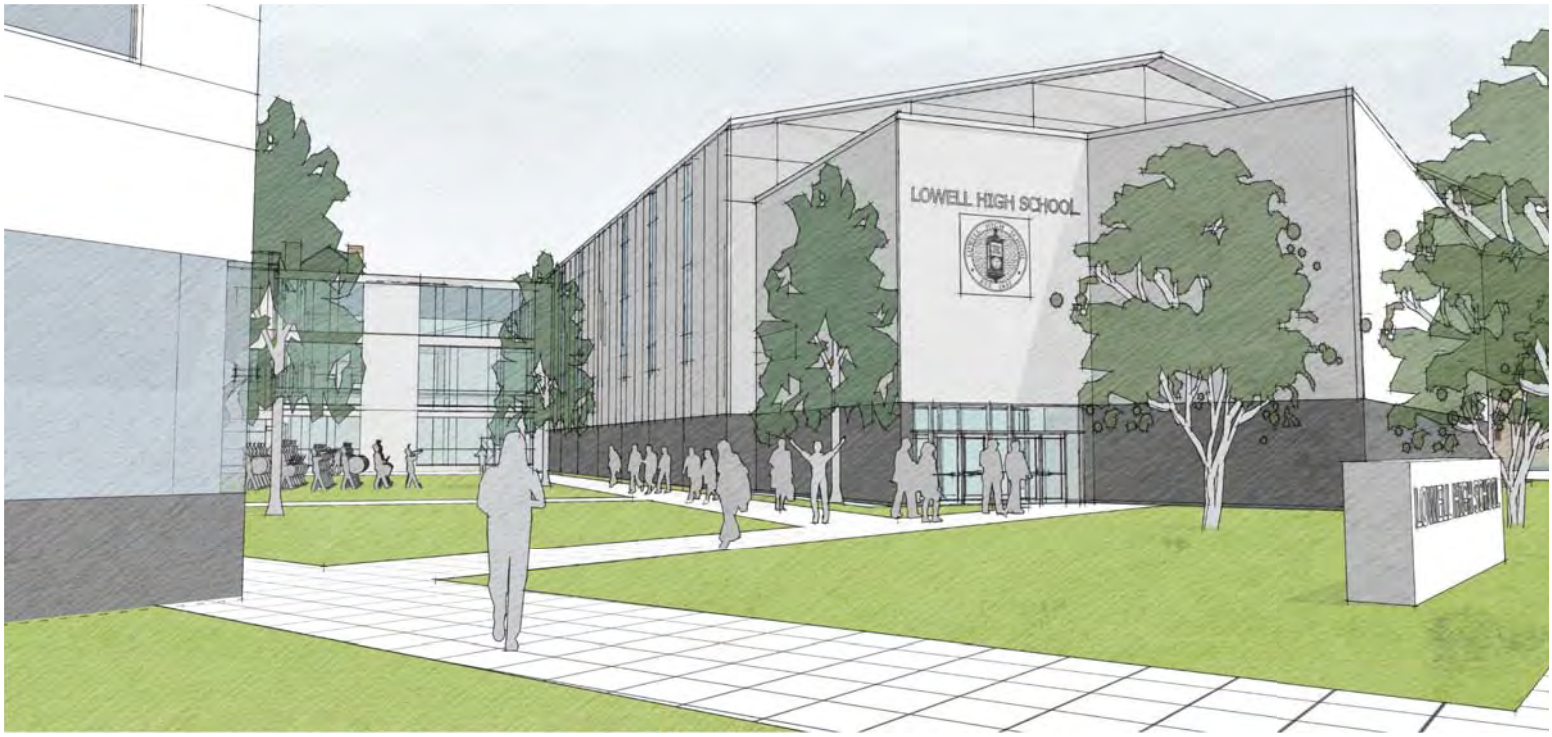
FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE- UPDATED

LOWELL HIGH SCHOOL

GYMNASIUM PRECEDENTS

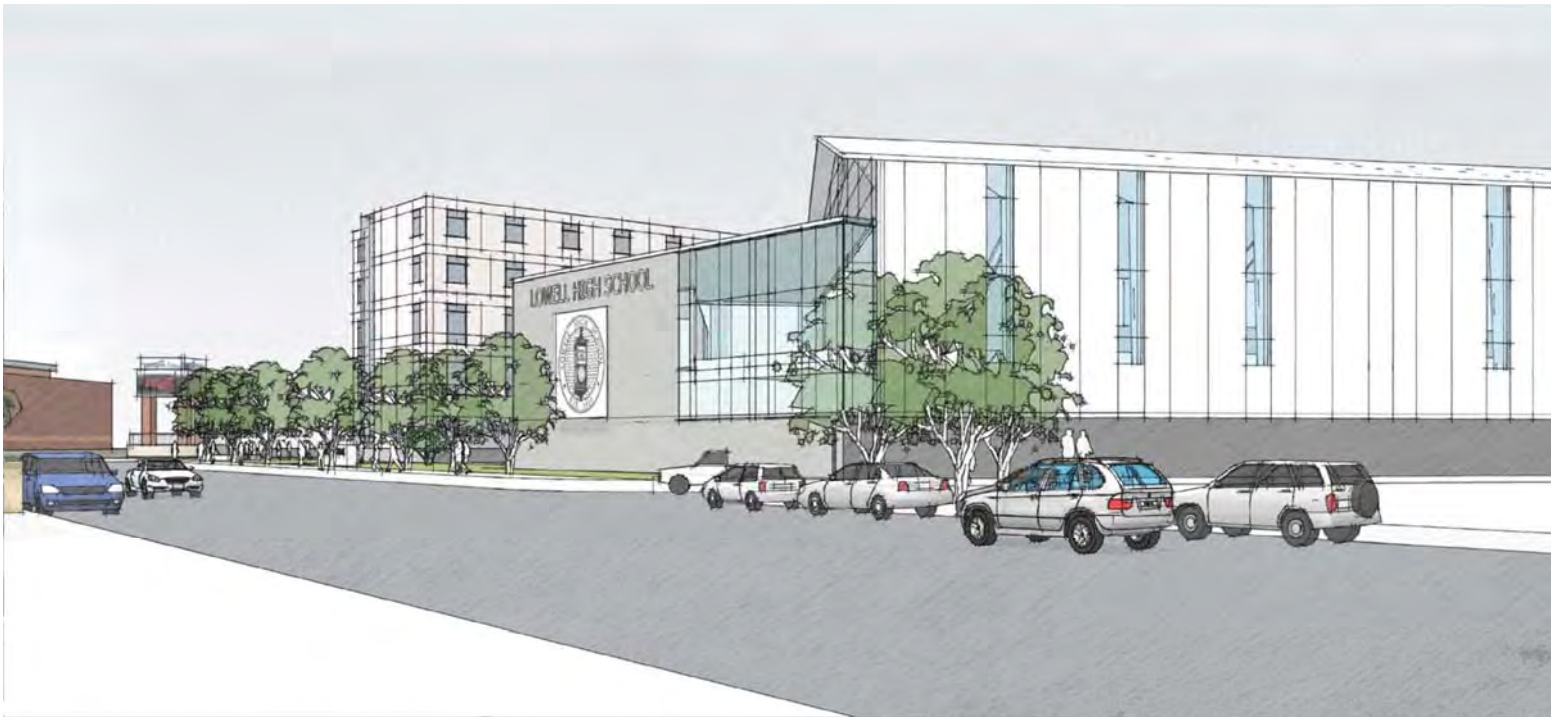
LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND GYMNASIUM BUILDING- UPDATED



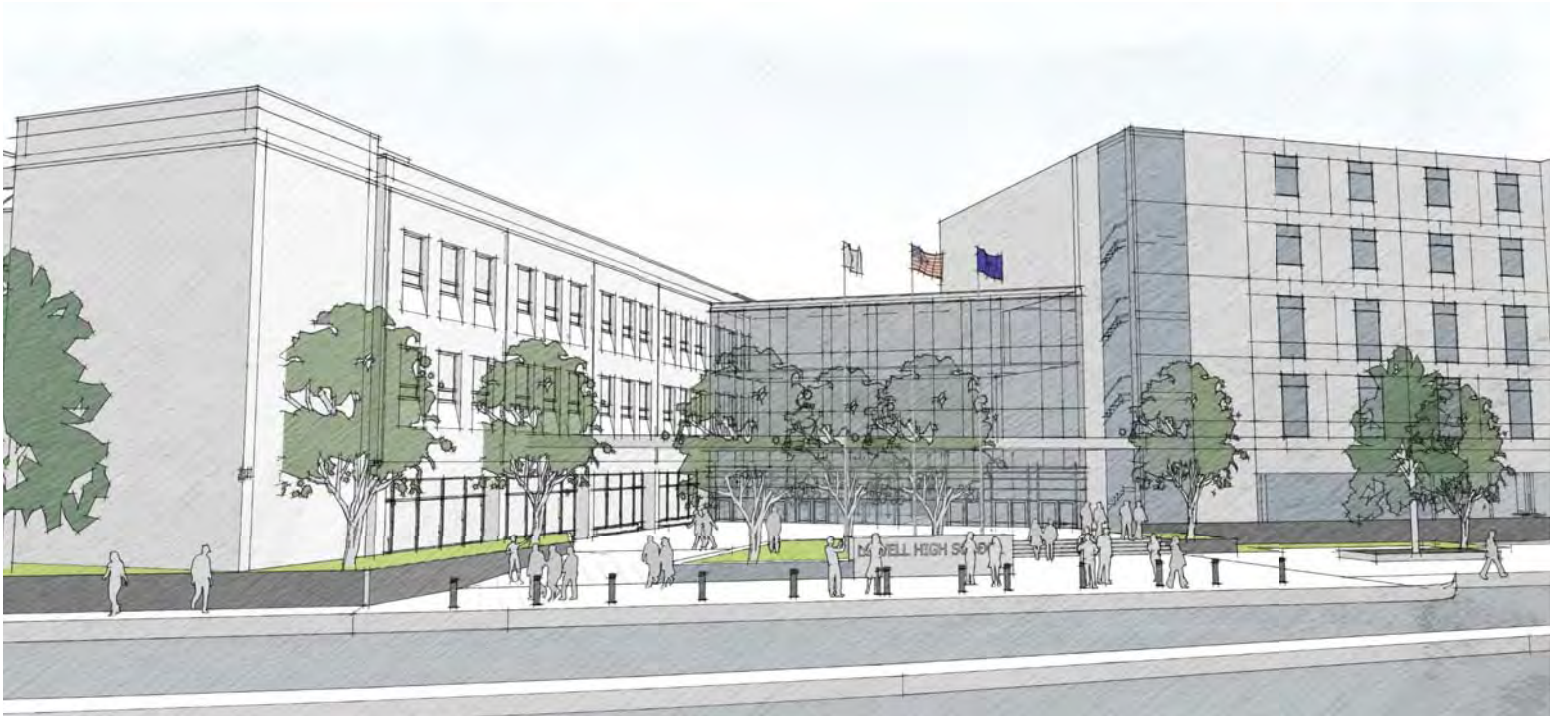
LOWELL HIGH SCHOOL

VIEW TOWARD FROM ARCAND DRIVE- UPDATED



LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

DURABLE BASE MATERIALS

BRICK VENEER

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

DURABLE BASE MATERIALS- EXAMPLE PROJECTS

BRICK VENEER

MARTIN LUTHER KING SCHOOL CAMBRIDGE, MA

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

DURABLE BASE MATERIALS- EXAMPLE PROJECTS

MOUNT GREYLOCK REGIONAL SCHOOL
WILLIAMSTOWN, MA

BRICK VENEER

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

DURABLE BASE MATERIALS- EXAMPLE PROJECTS

BRICK VENEER

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

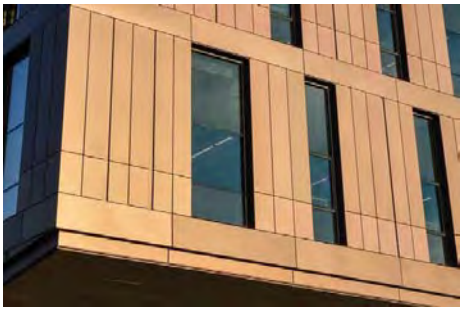
FACADE MATERIALS

PHENOLIC PANEL RAINSCREEN- SOLID

BRICK

HIGH DENSITY FIBER CEMENT PANEL

PHENOLIC PANEL RAINSCREEN- WOOD



INSULATED METAL PANEL

CORREGATED METAL

LOWELL HIGH SCHOOL

FACADE MATERIALS- EXAMPLE PROJECTS

PHENOLIC PANEL RAINSCREEN - SOLID

PHENOLIC PANEL RAINSCREEN - WOOD

ESSEX TECHNICAL HIGH SCHOOL DANVERS, MA

INSULATED METAL PANEL

CORREGATED METAL

LOWELL HIGH SCHOOL

FACADE MATERIALS- EXAMPLE PROJECTS

PHENOLIC PANEL RAINSCREEN - SOLID

LASELL COLLEGE NEWTON, MA

BRICK

(STEFFIAN BRADLEY)

LOWELL HIGH SCHOOL

FACADE MATERIALS- EXAMPLE PROJECTS

PHENOLIC PANEL RAINSCREEN - WOOD

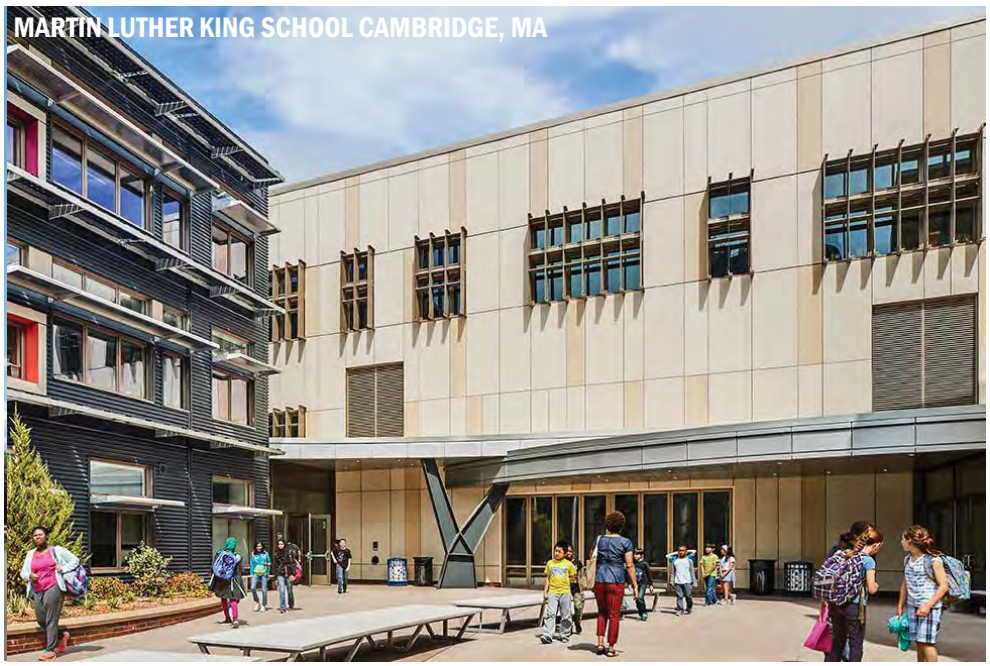
BRICK

INSULATED METAL PANEL

CORREGATED METAL

LOWELL HIGH SCHOOL

FACADE MATERIALS- EXAMPLE PROJECTS



PHENOLIC PANEL RAINSCREEN - WOOD

HIGH DENSITY FIBER CEMENT PANEL

INSULATED METAL PANEL

CORREGATED METAL

LOWELL HIGH SCHOOL

FACADE MATERIALS- EXAMPLE PROJECTS

HIGH DENSITY FIBER CEMENT PANEL

PHENOLIC PANEL RAINSCREEN - WOOD

INSULATED METAL PANEL

CORREGATED METAL

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY – BRICK/BRICK OPTION

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY – BRICK/STONE OPTION

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY – PHENOLIC PANEL RAINSCREEN/BRICK OPTION

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY – PHENOLIC PANEL RAINSCREEN/STONE OPTION

LOWELL HIGH SCHOOL

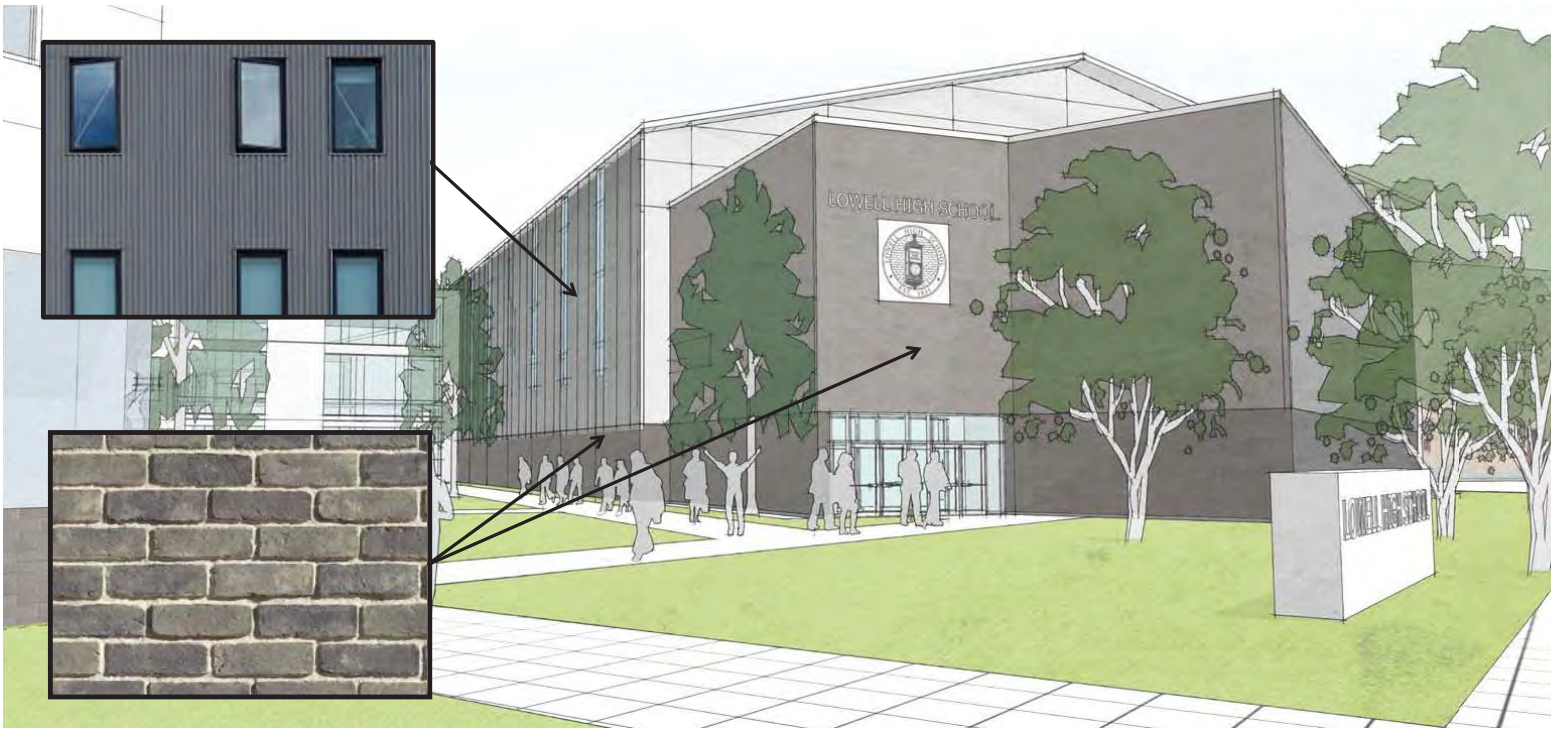
FRESHMAN ACADEMY – HIGH DENSITY FIBER CEMENT PANEL /BRICK OPTION

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY – HIGH DENSITY FIBER CEMENT PANEL /STONE OPTION

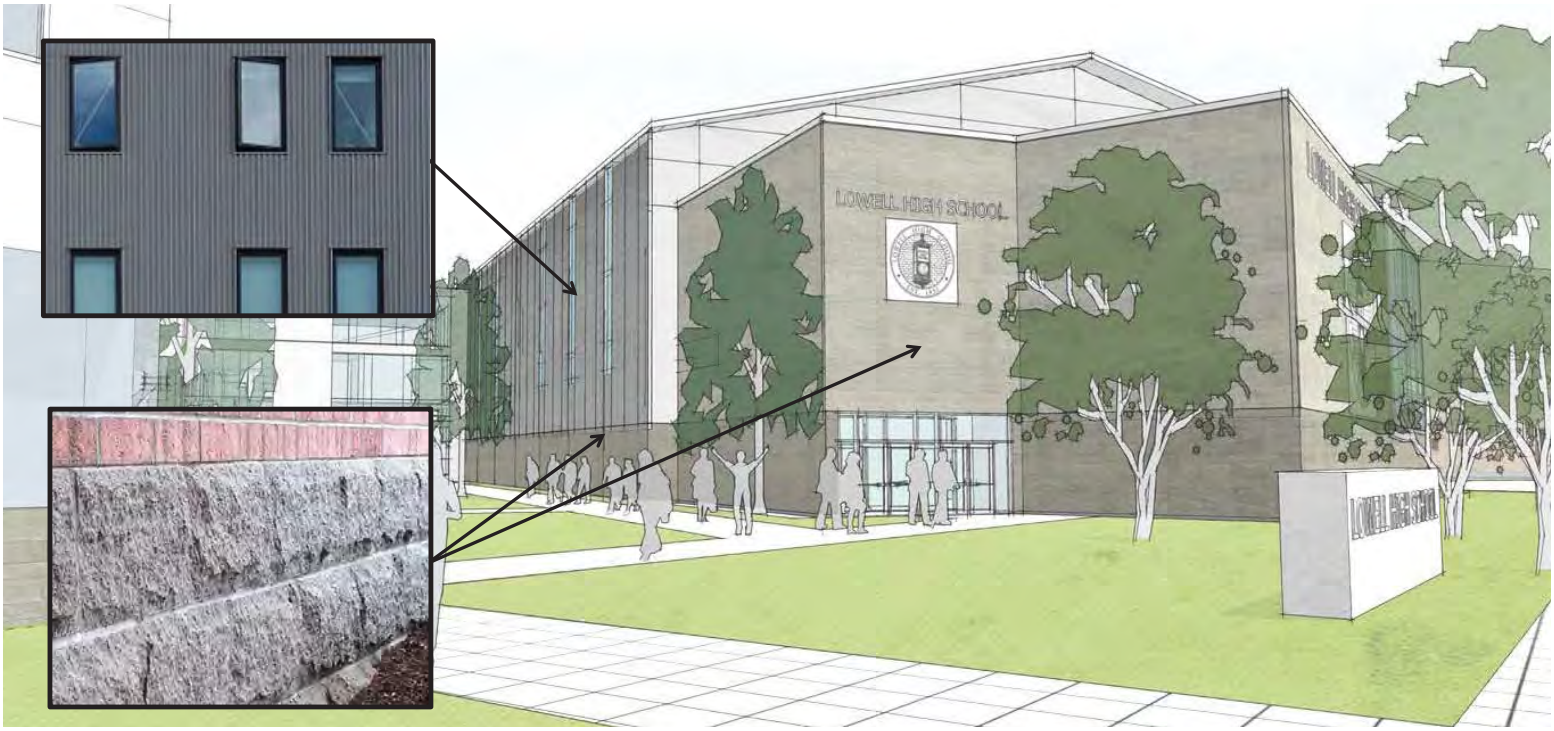
LOWELL HIGH SCHOOL

GYMNASIUM– METAL PANEL/ BRICK OPTION



LOWELL HIGH SCHOOL

GYMNASIUM– METAL PANEL/ BRICK OPTION



LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

LOWELL HIGH SCHOOL

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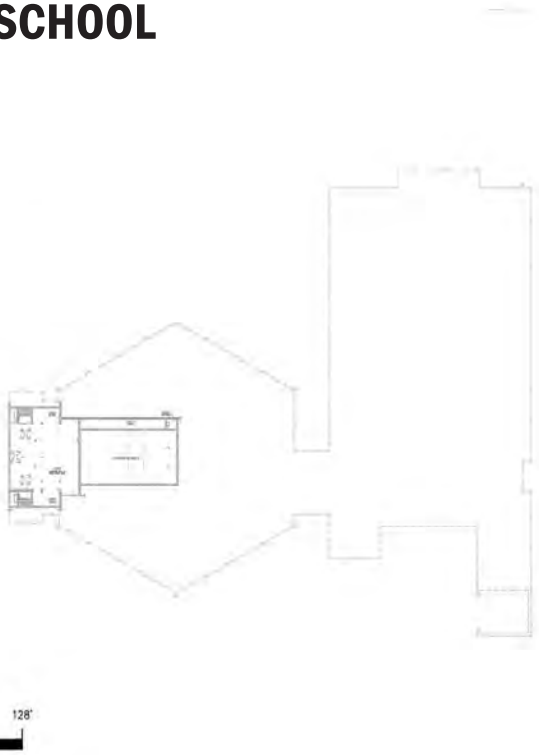

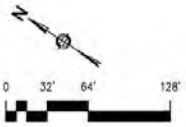

LOWELL HIGH SCHOOL

LEVEL-1 PLANS

- ADMIN/TEACHER AREAS
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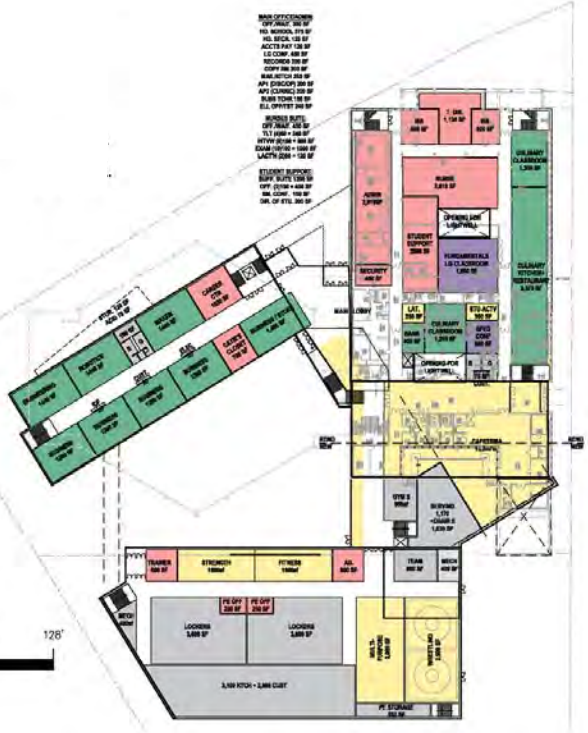
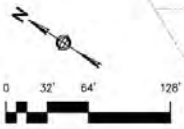
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

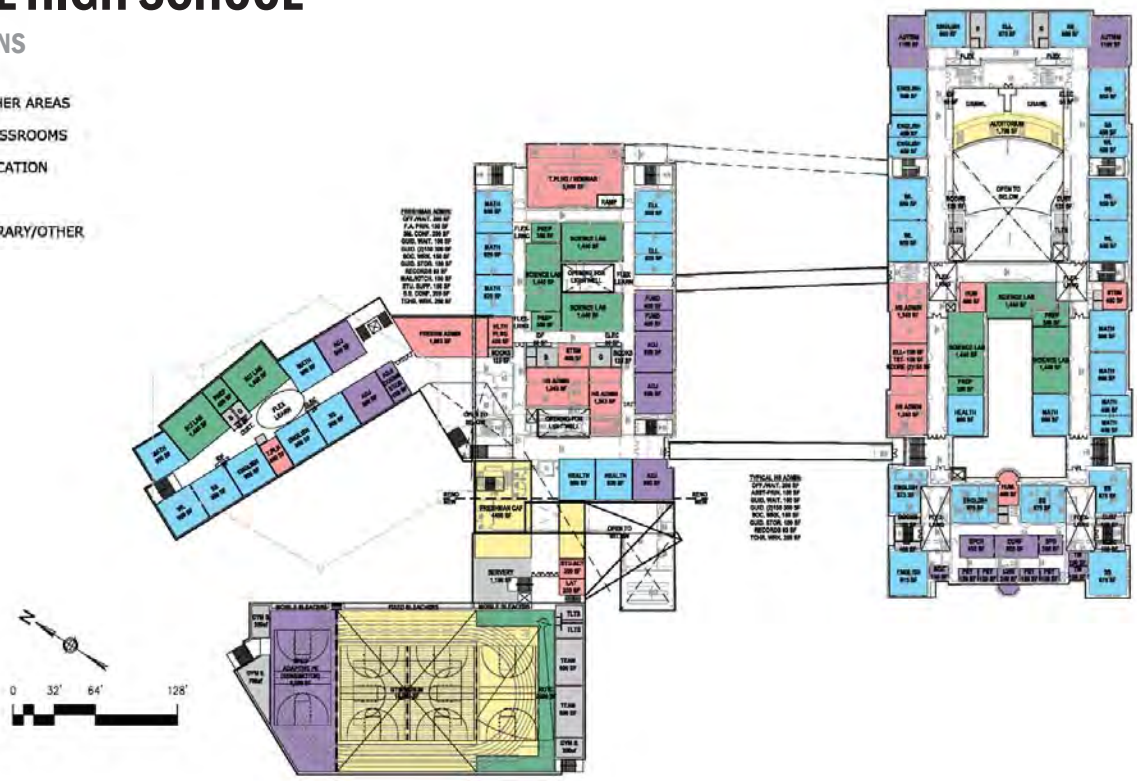




LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH

LEVEL-3 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

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Eileen Donoghue
City Manager
Kara Keefe Mullin
Assistant City Manager

School Building Committee MSBA Meeting

Meeting Minutes

Date: October 4, 2018
Time: 6:30 PM
Location: City Council Chambers

Attendance: Eileen Donoghue, William Samaras, Gerry Nutter (in attendance for Connie Martin), Conor Baldwin, Diane Tradd, Jeannine Durkin, Billie Jo Turner, Jay Mason, and Maria Sheehy.

SKANSKA: Jim Dowd, Maryann Williams

Perkins Eastman: Robert Bell, Dawn Guarriello, Joe Drown,

Dominick Puniello & Carlos DeSousa

Also in attendance: Kara Keefe Mullin & Heather Varney

I. Updates Since Last SBC Meeting 9/6/18

E. Donoghue called the meeting to order. She took a moment to remember David Cunningham whom served on the School Building Committee and has recently passed away. J. Drown outlined the agenda.

II. Design Updates

Pre-engineered Building Update

J. Drown noted that earlier during the PSR study, the team introduced a pre-engineered building for the gymnasium. The design was meant to easily and economically accommodate expanding the basketball and track facilities. The design team has been in touch with building manufacturers and cost estimators to discuss cost efficiency with how fast the building can be constructed and the cost. As the design is customized with better exteriors, the pre-engineered building will start to loose cost efficiencies. J. Drown made the recommendation that the SBC discontinue with this approach and move forward with standard building.

Exterior Update

D. Guarriello continued, noting that the design has been refined, and will continue to do so moving forward. As J. Drown mentioned, the team decided not to move forward with

a pre-engineered gym structure which resulted in removal of the geometric roof, and instead went to a shed roof as a design change to the gymnasium. The illustrations presented include an updated canopy outside gymnasium to both shelter students waiting for a ride as well as provide a security feature that will prevent individuals from wandering into the greenspace. D. Guarriello explained that Kalwall is a translucent wall that will allow natural daylight in to a space without ability to look in. Other changes for the front entry now include a design for a live green roof corridor, and opening of stairwells to improve visibility of vertical activity. The image from the canal side illustrates the connection of the cafeteria to canal. The proposed design incorporates a two story bridge, which may not be well received by the historic board. D. Guarriello noted that the design team has illustrated what a single and double story bridge would look like from different perspectives. W. Samaras inquired to the expense between the two and single story bridge. J. Drown noted that the double story is currently in the budget, so there may be some cost savings if the design changed to one. W. Samaras mentioned that it would make it safer to have two stories. J. Mason commented that the two level bridge was reviewed by the Sustainability Committee discussing the improved circulation by providing connection between the levels. He continued that it may be interesting to add extra space for discussion. D. Guarriello – noted that there may not be supervision there from an educator's perspective but it is something that they thought about. Based on feedback received, this is more functional. E. Donoghue noted the SBC will need to provide some input on the decision of 1 story or 2 stories. E. Kennedy inquired to the cost estimates. J. Drown noted that the team would follow up. D. Guarriello stated that the design is for two stories now, but they will come back with costs next month. E. Kennedy requested the bridge cost estimates and also inquired to the exterior for the gymnasium.

III. Design Options

Exterior Material Options

D. Guarriello discussed the current building materials, internal design and included how the Freshman Academy will have a civic presence. She provided examples of how civic design can be timeless. D. Guarriello noted that the CMU is an addition to exterior materials that was not included last time, and natural stone was eliminated as it was cost prohibitive. The PSR estimate carried $4,599,900 for the exterior facade, (Freshman Academy $3.15M, Gymnasium $1.45M). The brick façade and polished CMU base example (option 1) totaled $4.372,370, which is approximately $227,000 less than

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budgeted. Option 2 – included simulated stone base and brick façade totaling $4,607,612, which is approximately $7,000 over PSR budget. Option 3 – phenolic panel façade and polished CMU base, (the Gymnasium has polished CMU to offset cost as well) totaled $4,775,795 which is $175,895 over the PSR budget. D. Guarriello stated that the team was looking for a preference of the committee to create a budget. E. Donoghue stated that her favorite was Option 1, as it is the least expensive. She noted this was not a formal vote but would like the SBC to provide their opinions to give insight to the design team. E. Donoghue explained her reasoning that Option 1 keeps with architecture of the City but keeps with the design of the other buildings. E. Kennedy inquired to the phenolic façade material. D. Guarriello noted that the masonry would not be structural, holding up the building like the original buildings, it would be engineered to allow water to get out and not build up behind the masonry. E. Kennedy asked for the advantages to this type of construction, to which D. Guarriello noted that there are no joints to repoint which reduced maintenance. The core of the façade is highly durable and more contemporary used in Europe for 50 years. The façade is also popular around here as well; some projects Perkins has worked on have utilized this material. W. Samaras inquired to the brick façade compared to actual bricks. D. Guarriello stated that there is a 75 year life expectancy for brick and that power washing and resealing would be necessary maintenance. J. Drown noted the way brick walls are constructed today; the majority of load transfer is done with steel. This assists with controlling moisture and mold growth where installation is provided today. Brick maintenance requirements include replacing the caulking every 5-10 years. Rain screen allows the water to find its way out through vapor and liquid methods. W. Samaras asked how the design team felt about Option 1; J. Drown replied that the materials are very durable and require little maintenance. The difference in phenolic, as D. Guarriello pointed out, there is less sealants between panels that need to be maintained. W. Samaras noted that the idea is to have a building that would last 75 years. Is the difference in price so different that they shouldn't do it? D. Guarriello noted that Option 1 is most economical, but she would consider brick on brick rather than the simulated stone. She also mentioned that it is beneficial to carry costs at or below budget, as it is more flexible. The design team looked to provide illustrations on what is below budget, on budget and over budget. J. Durkin noted that she liked the brick in Option 1 as it was similar to the other buildings. She also agreed with W. Samaras that it would be interesting to find the total cost for entire brick. D. Guarriello noted that it would not meet code if the building was constructed entirely with brick. She also mentioned that the veneer is a full 6x4 brick not the width of the sample. E. Kennedy agreed Option 1 was the best choice.

Interior Material Options

Interior material options are different by room type. Class rooms are recommended to have ceiling tiles, Gypsum painted walls and linoleum floors. VCT – 12x12 tile in most schools is very common and the majority of these materials are in the high school now. The team also proposes that the corridors have the same materials, except that it would have porcelain tiles wainscot with the Gipson walls. E. Kennedy noted that the SBC should consider using similar materials in all the schools for maintenance and inventory management purposes. The gymnasium would have a painted steel ceiling, painted CMU walls and tectum panels and sports flooring as well as wood flooring. Restrooms would be designed with painted drywall ceiling, painted CMU walls and epoxy floor. The floor would not have tile, as it is poured, with higher resistance and durability. Stairwells would include ceiling tiles, CMU walls, and rubber stairs. The cafeteria would have ceiling tiles, painted Gypsum walls, porcelain tile wainscot, and linoleum floors.

IV. Building Systems

D. Puniello discussed the HVAC overview and design for the new high school. The presentation includes steps of lifecycle cost analysis, for three or four options vs. the code based system. The baseline system is a variable air volume system (VAV). Option 1 would be displacement system with radiant cooling and heating, more efficient way to provide air conditioning; Option 2 would provide chilled beam induction units; Option 3 would use air source VRF (variant refrigerant flow system); and Option 4 would have a water source VRF system. In comparison to existing HVAC system all options will provide greater thermal comfort and energy efficiency. The goal of any new system would be to improved air quality, filtration level, energy efficiency, thermal comfort, reduced noise operations and automatic temperature control and building energy management system.

D. Puniello noted that Option 1 positives include pollution removal, low noise levels, low air velocity, low moisture levels, and reduced initial costs: Option 2 positives include uses dedicated outdoor air unit, high energy efficiency, ventilation air and ductwork minimized, low noise levels, flexibility of installation, moderate first costs, simplified controls, and lower maintenance. However, Option 2 requires increased coordination with ceiling systems, additional ventilation air in some cases and potential for condensation. Both Options 1 & 2 have boiler and chiller plants on both sides of the canal in both buildings.

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Option 3 would entail lower piping installation costs due to the refrigerant piping system, the boiler, chiller and distribution plants would not be required. A single cabinet can be utilized for heating and cooling, simultaneous heating and cooling, smaller central ventilation ductwork, high energy efficiency, modular design allows for level of redundancy and no site emissions. However, individual fan motors take up space, have slightly higher noise levels, quarterly filter changes required per unit, condensate drain maintenance for terminal units, equipment in occupied areas, as well as higher electrical energy use due to increase electrical heating.

Option 4 is similar to Option 3, in that it would incorporate a cooling tower and the VRF distribution systems would be water cooled.. The cost estimated would include preliminary installation and maintenance over 30 year period. D. Puniello asked the SBC to provide feedback on what members like these options. E. Kennedy asked of these four recommended options, which the expert would recommend. Option 1 has benefits with lower noise levels, but the team does not want to provide recommendations prior to completing the life cycle analysis. E. Kennedy noted that he is looking more at the most negative aspects on the systems. Option 3 seems to have a lot of moving parts that can break down in multiple areas, noting that this is a current issue. G. Nutter agreed with E. Kennedy, it would make sense to concentrate on 1 and 2, as 3 and 4 have so many variables with more required maintenance. W. Samaras asked if the options react well to extreme temperatures. D. Puniello replied that yes, the systems would be designed to maintain 70 degrees in the classroom on a 0 degree day outside. He also noted that a redundant design would provide flexibility; if one system went off line, it would not impact entire system.

C. DeSousa noted that the lifecycle cost over a thirty year period include maintenance and the initial capital cost. The goal of the system is to monitor and control the humidity, CO2 and temperature. Building automation and energy management system controls lighting, CO2, ventilation (40% energy in building). It would also be able to monitor gas and water usage, emergency generators and fire alarm system. C. DeSousa also noted that this system can be scheduled with School Dude, and populates within the management system.

A photovoltaic array (PA) system would require team to look at loading and structure of the building. Energy use and production would be displayed on the dashboard. E. Kennedy asked if the solar panels would be on the roof with the gardens as well. C. DeSousa noted that the solar panels would be located where there was limited shade, but there would be room for vegetation and equipment. D Guarriello noted that the design

still has a green roof with vegetation. J. Drown stated that the team needs to continue to investigate how the building would carry the load and the cost is not represented in the presentation today. W. Samaras asked if there would be any financial benefits for the school going green. J. Drown noted MSBA requirements that the building be constructed green, targeting LEED Silver. This will be looked into by the design team as they work through the Schematic Design. J. Drown noted it may be easier to accomplish a higher LEED rating on west side of the canal than the left due to existing conditions that cannot be changed. W. Samaras asked if they would look into tax credits. J. Drown replied that the team will also be meeting with National Grid to contribute to strategies in those areas as well.

V. Next Steps in Preparation for SBC Meeting 11/1/18

J. Drown mentioned the meetings over the next month with a landscape group, the focus group, civil engineering meetings, and a working group and National Grid.

VI. Announcements

E. Donoghue stated that the meetings are critical as they provide important information to the members to make informed decisions. The next meeting will be November 1, 2018 at 5:30 PM. The CM at Risk method will be discussed, and the presentation was provided to the SBC. The SBC will need to vote on the process that will be used. The SBC will be polled to determine if a 5:30 PM start time is appealing for future meetings.

Meeting adjourned 7:53PM

Notes taken and certified by:

HEATHER VARNEY
Notary Public
Commonwealth of Massachusetts
My Commission Expires Oct. 2, 2020

PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE / COMMUNITY MEETING

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

AGENDA

- Updates Since Last SBC Meeting 9/6/18
- Design Updates:
  - Pre-Engineered Building Update
  - Exterior Update
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  - Exterior Material Options
  - Interior Material Options
- Building Systems
- Next Steps in Preparation for SBC Meeting 11/1/18
- Announcements

LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

GYMNASIUM PRECEDENTS






LOWELL HIGH SCHOOL

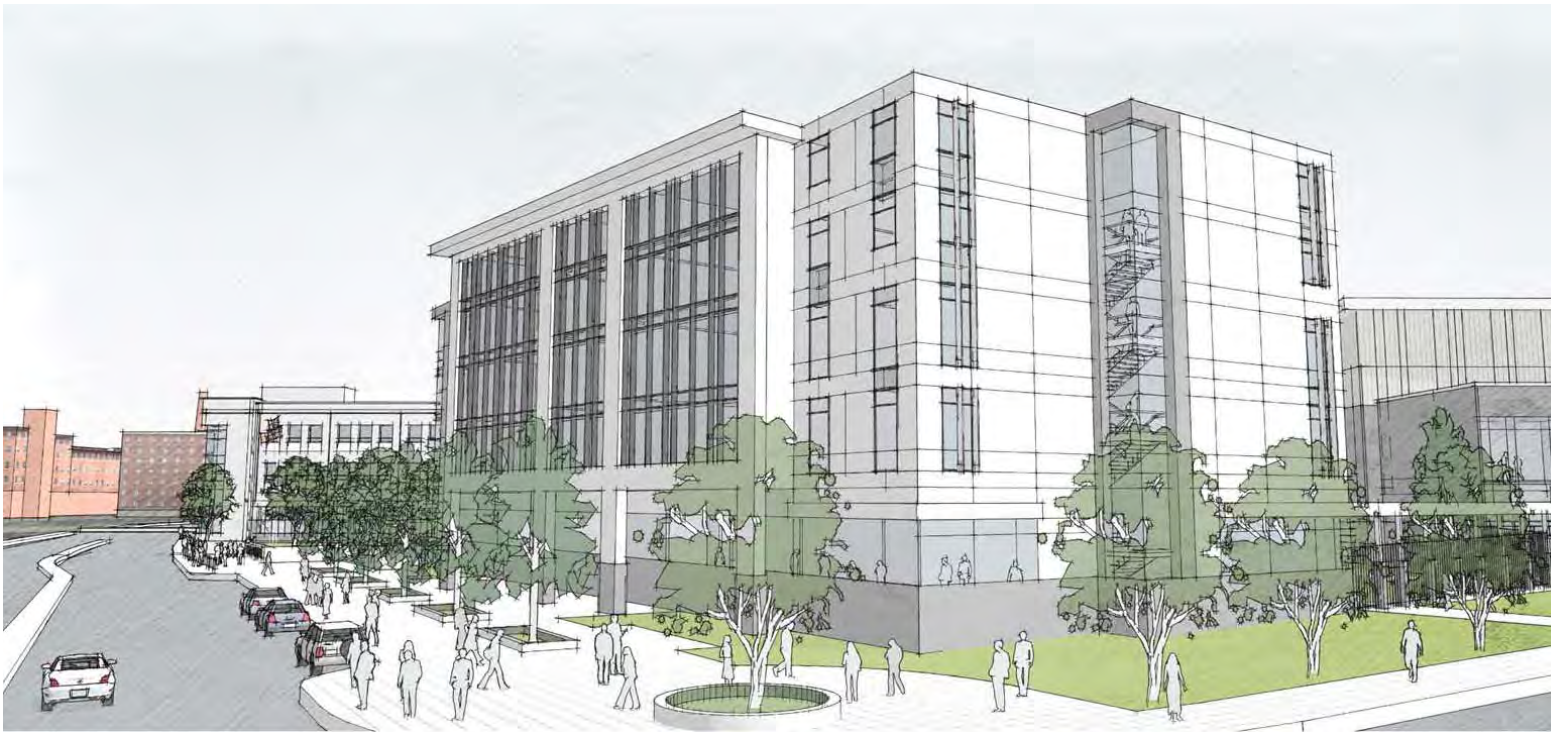
AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

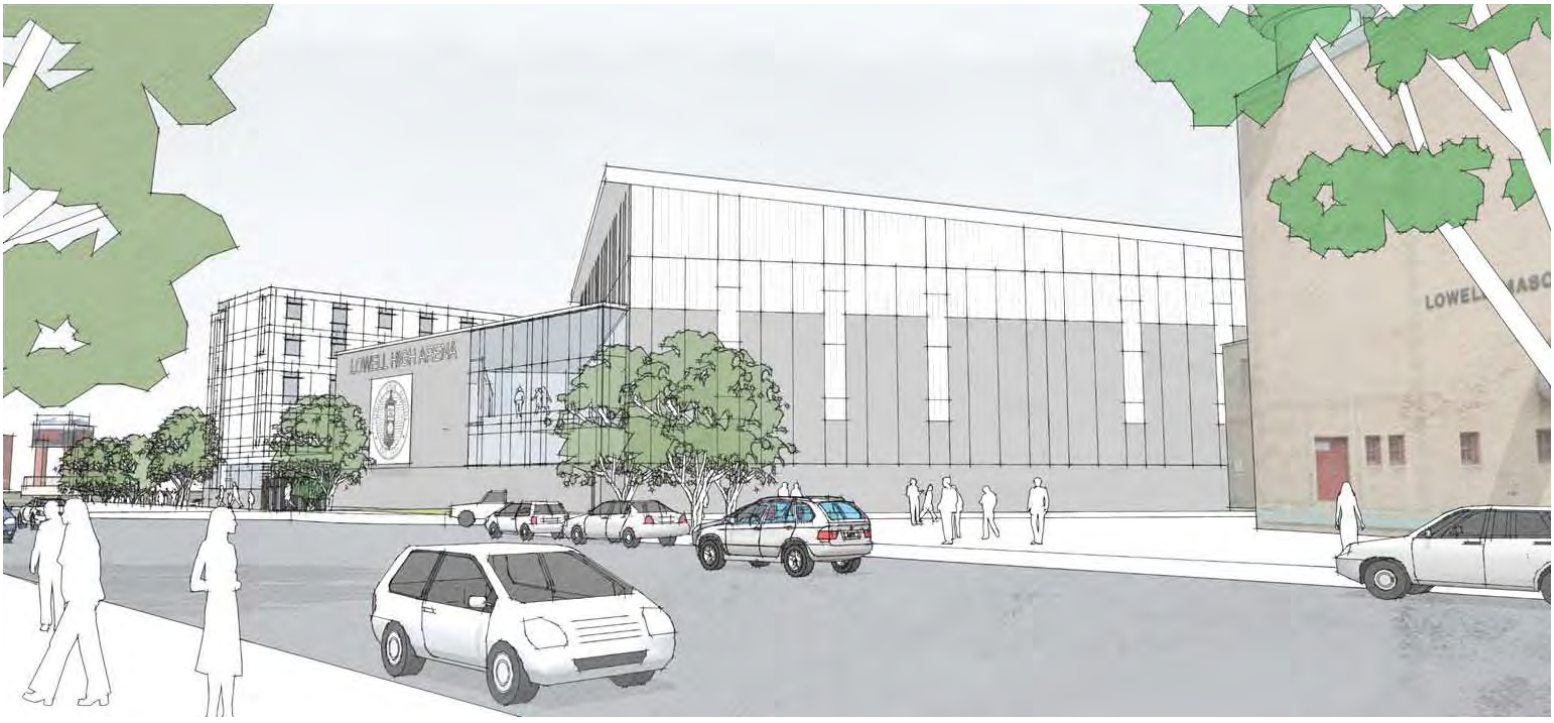


LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND SOUTH FAÇADE OF FRESHMAN ACADEMY

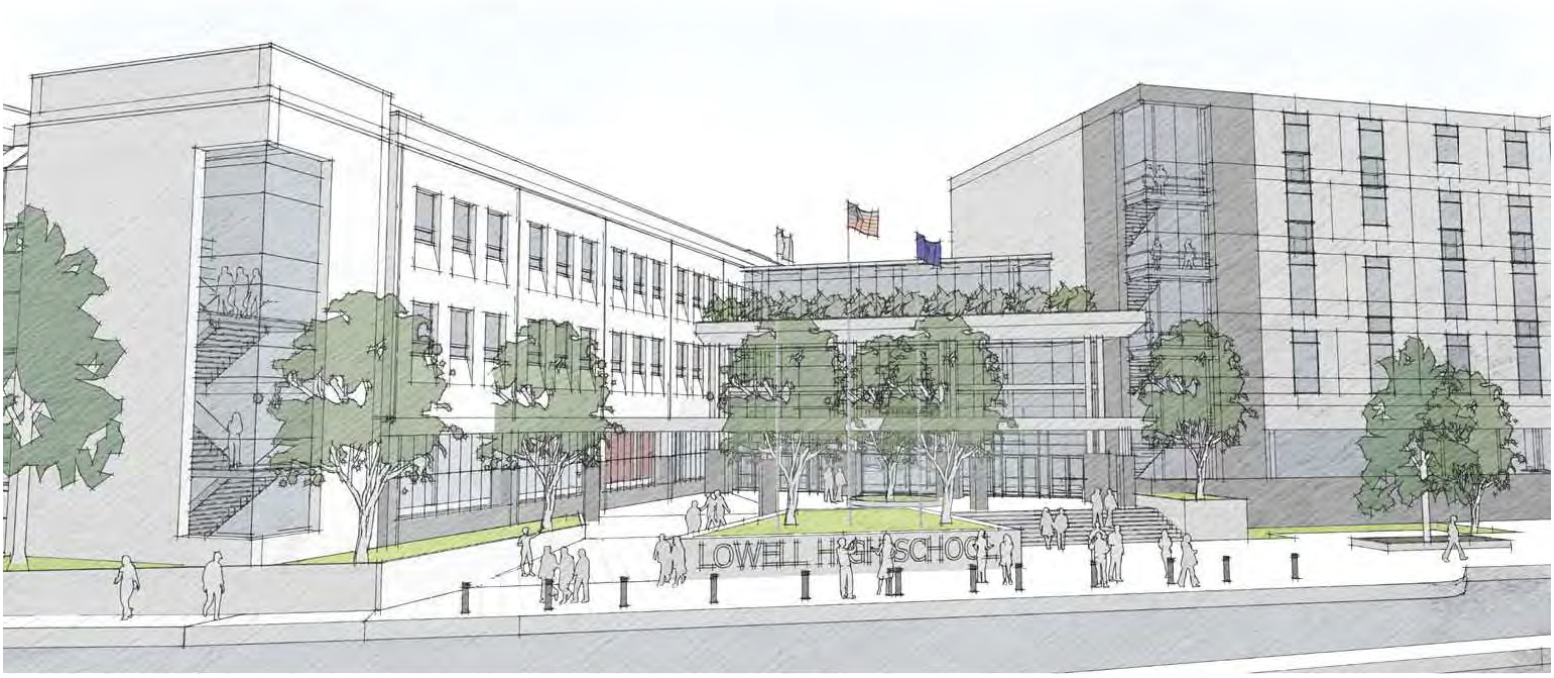
LOWELL HIGH SCHOOL

VIEW FROM ARCAND DRIVE



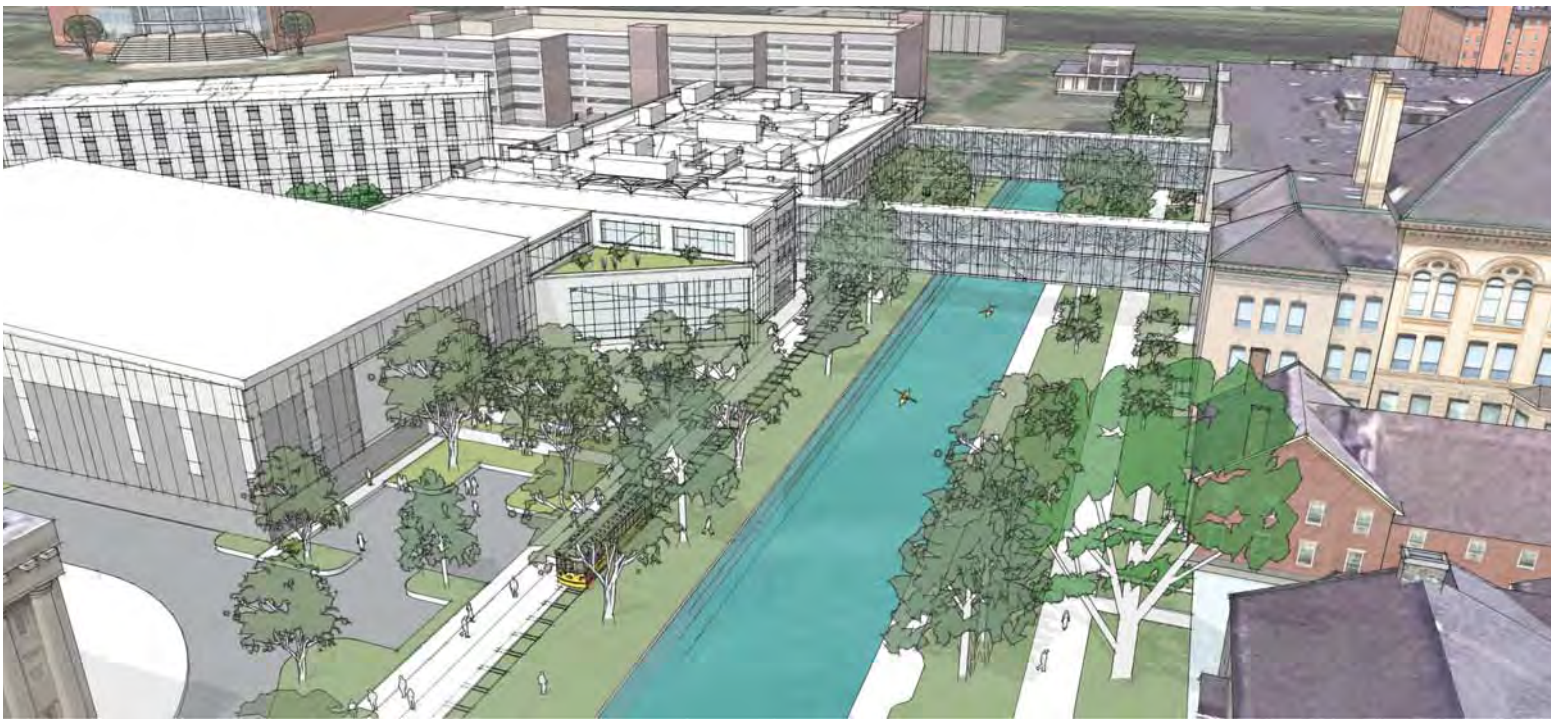
LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



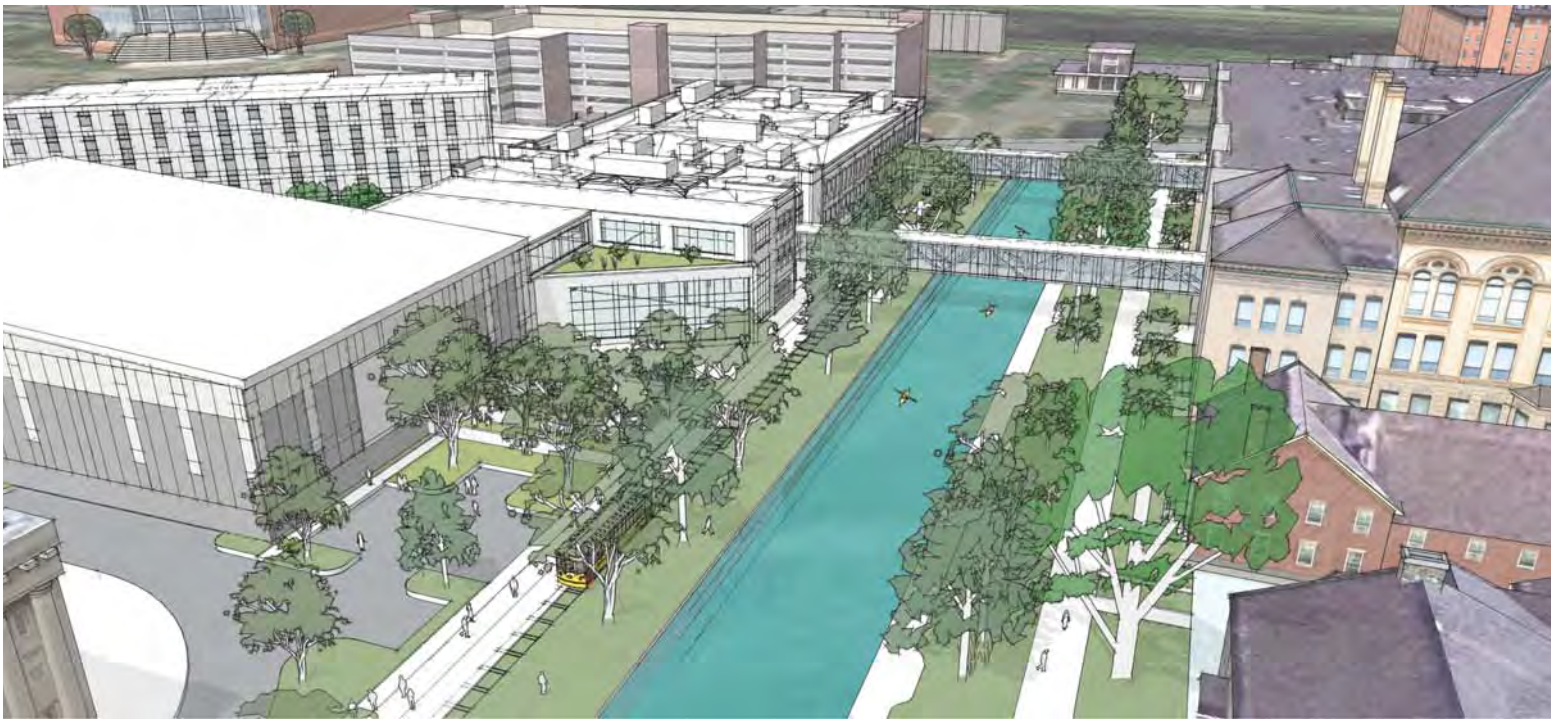
LOWELL HIGH SCHOOL

TWO-STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH



LOWELL HIGH SCHOOL

ONE-STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH



LOWELL HIGH SCHOOL

TWO-STORY BRIDGE OPTION- VIEW FROM ACROSS FATHR MORRISETTE

LOWELL HIGH SCHOOL

ONE-STORY BRIDGE OPTION- VIEW FROM ACROSS FATHR MORRISETTE

LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

DOWNTOWN LOWELL ARCHITECTURE








LOWELL HIGH SCHOOL

KNITTING TOGETHER MATERIALS



LOWELL HIGH SCHOOL

CIVIC/MUNICIPAL PRESENCE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS INFORMATION

EXTERIOR MATERIALS

- DURABILTY
- COST
- MAINTENANCE
- LIFE CYCLE

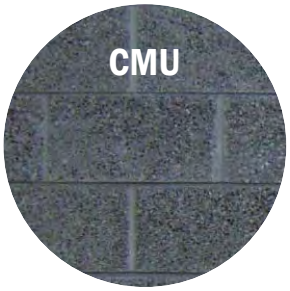
BRICK VENEER

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

DURABLE BASE



	BRICK	SIM. STONE	CMU
DURABILITY :	**HIGH**	**MEDIUM**	**HIGH**
ABOVE AVERAGE:	STRENGTH, DURABILITY, WEARABILITY	N/A	STRENGTH, DURABILITY, WEARABILITY
AVERAGE:	MOISTURE, CHEMICAL AND STAIN RESISTANCE	STRENGTH, DURABILITY, WEARABILITY	MOISTURE, CHEMICAL AND STAIN RESISTANCE
BELOW AVERAGE:	N/A	MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
ESTIMATED COST :	**$35-50/SF**	**$48/SF**	**$30-$40/SF**
MAINTENANCE:	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING
LIFE CYCLE :	**75 YEARS**	**45 YEARS** DEPENDS ON THICKNESS	**50 YEARS**

LOWELL HIGH SCHOOL

FACADE MATERIALS

	CORRUGATED METAL	PHENOLIC PANELS	FIBER CEMENT PANELS
DURABILITY :	**MEDIUM**	**HIGH**	**MEDIUM**
ABOVE AVERAGE:	MOISTURE AND STAIN RESISTANCE	STRENGTH, DURABILITY, WEARABILITY, RESISTANCE	MOISTURE, CHEMICAL AND STAIN RESISTANCE
AVERAGE:	STRENGTH AND HEAT ABSORPTION	N/A	STRENGTH AND DURABILITY
BELOW AVERAGE:	DURABILITY AND WEARABILITY	HEAT ABSORPTION	HEAT ABSORPTION
ESTIMATED COST :	**$48/SF**	**$65/SF**	**$35/SF**
MAINTENANCE RATING:	**HIGH** PERIODIC RESEALING, POWERWASHING	**MEDIUM** PERIODIC RESEALING, POWERWASHING (AND OILING JOINTS IF SCORED)	**LOW**
LIFE CYCLE :	**30 YEARS**	**50 YEARS**	**40 YEARS**

LOWELL HIGH SCHOOL

EXTERIOR FACADE COST COMPARISONS

	FRESHMAN ACADEMY	GYMNASIUM	TOTAL
PREFERRED SCHEMATIC REPORT **BRICK BASE/METAL FACADE**	**$3,150,000**	**$1,449,900**	**$4,599,900**

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 1

POLISHED CMU BASE/ BRICK FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 1

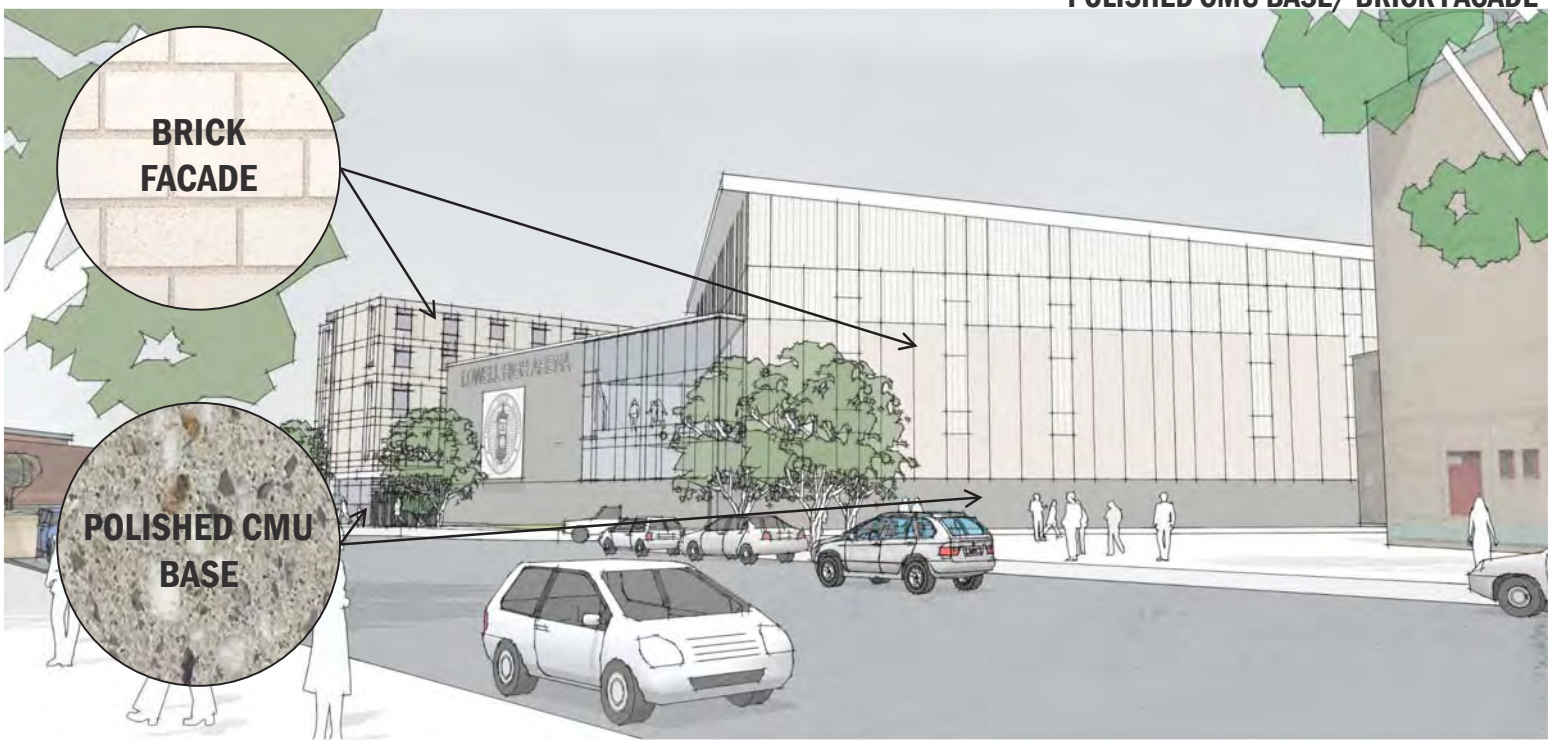
POLISHED CMU BASE/ BRICK FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 1

POLISHED CMU BASE/ BRICK FACADE



LOWELL HIGH SCHOOL

EXTERIOR FACADE COST COMPARISONS

	FRESHMAN ACADEMY	GYMNASIUM	TOTAL
PREFERRED SCHEMATIC REPORT BRICK BASE/METAL FACADE	$3,150,000	$1,449,900	$4,599,900
OPTION 1: POLISHED CMU BASE/BRICK FACADE	$2,532,620 (-$617,380)	$1,839,750 (+$389,850)	$4,372,370 (-$227,530)

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 2

SIMULATED STONE BASE/ BRICK FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 2

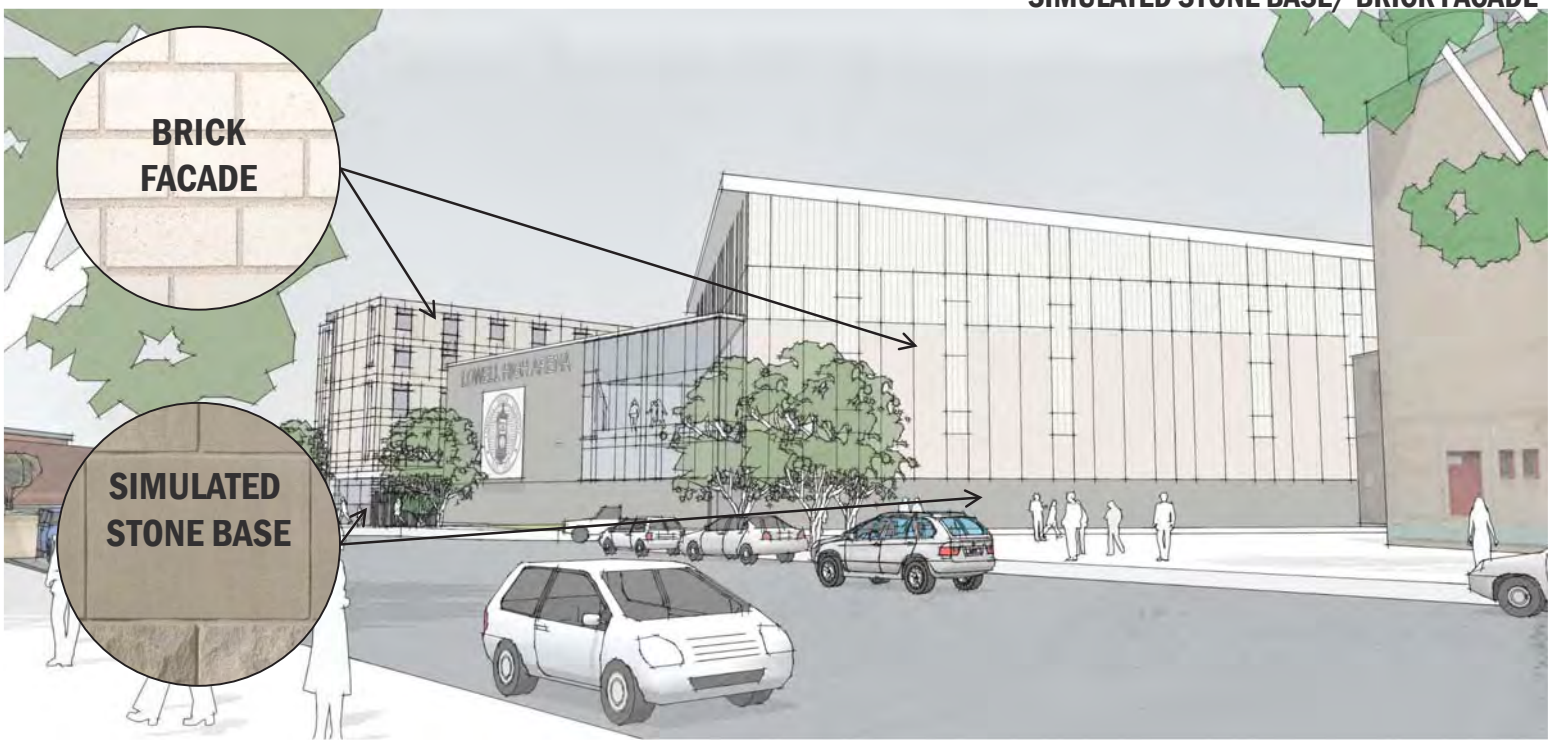
SIMULATED STONE BASE/ BRICK FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 2

SIMULATED STONE BASE/ BRICK FACADE



LOWELL HIGH SCHOOL

EXTERIOR FACADE COST COMPARISONS

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OPTION 2: SIMULATED STONE BASE/ BRICK FACADE	$2,647,262 (-$502,738)	$1,960,350 (+510,450)	$4,607,612 (+$7,712)

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 3

POLISHED CMU BASE/ PHENOLIC FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 3

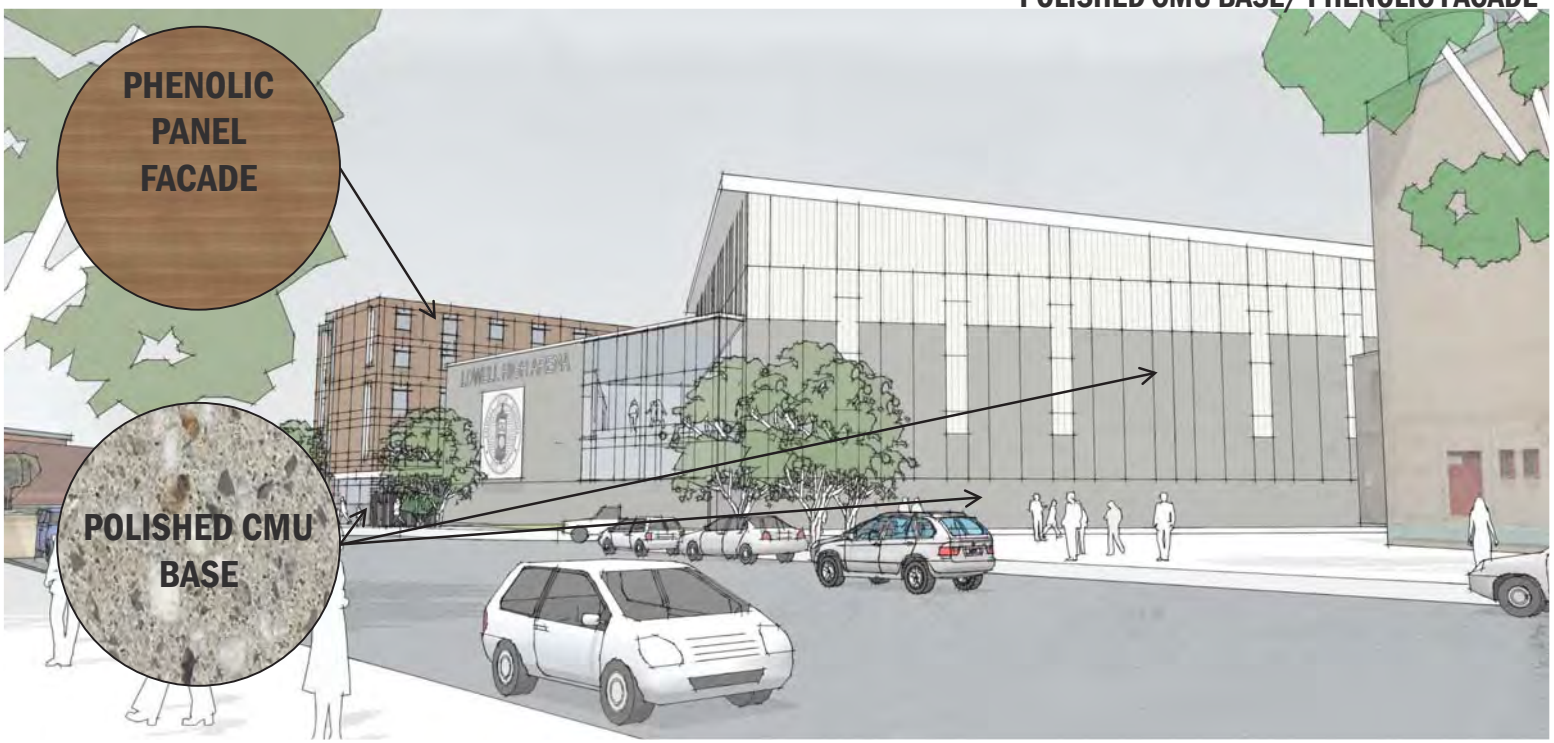
POLISHED CMU BASE/ PHENOLIC FACADE

LOWELL HIGH SCHOOL

EXTERIOR MATERIALS OPTIONS

OPTION 3

POLISHED CMU BASE/ PHENOLIC FACADE



LOWELL HIGH SCHOOL

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LOWELL HIGH SCHOOL

EXTERIOR FACADE COST COMPARISONS

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LOWELL HIGH SCHOOL

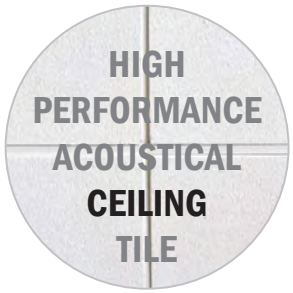
INTERIOR MATERIALS INFORMATION

INTERIOR MATERIALS

- DURABILTY
- COST
- MAINTENANCE
- LIFE CYCLE

LOWELL HIGH SCHOOL

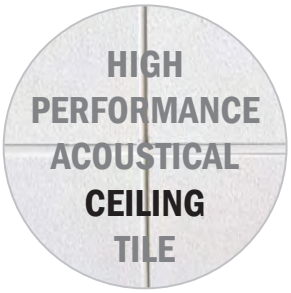
TYPICAL CLASSROOM FINISHES



	HIGH PERFORMANCE ACOUSTICAL CEILING TILE	PAINTED GWB WALLS	LINOLEUM FLOORS
DURABILITY :	**HIGH**	**MEDIUM**	**HIGH**
ABOVE AVERAGE:	N/A	N/A	DURABILITY, WEARABILITY, MILDEW RESISTANCE
AVERAGE:	DURABILITY, STAIN RESISTANCE, WEARABILITY	STRENGTH, DURABILITY, WEARABILITY	STRENGTH, MOISTURE AND STAIN RESISTANCE
BELOW AVERAGE:	STRENGTH AND MOISTURE RESISTANCE	MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
ESTIMATED COST :	**$6.50/SF**	**$.90/SF**	**$5-7/SF**
MAINTENANCE RATING:	**MEDIUM** EXCELLENT ACOUSTICS	**HIGH** DAILY SWEEPING AND WET MOPPING MONTHLY WAXING AND BUFFING SEMI-ANNUAL SCRUBBING AND STRIPPING	**MEDIUM** DAILY SWEEPING AND WET MOPPING ANNUAL WAXING AND BUFFING
LIFE CYCLE :	**VARIES**	**VARIES**	**30 YEARS**

LOWELL HIGH SCHOOL

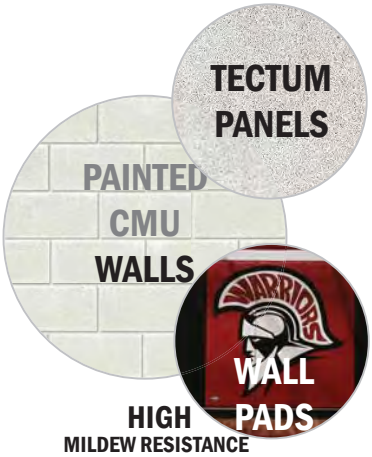
TYPICAL CORRIDOR FINISHES



DURABILITY :	**HIGH**	**HIGH**	**HIGH**
ABOVE AVERAGE:	N/A	STRENGTH, DURABILITY, WEARABILITY- ALL	DURABILITY, WEARABILITY, MILDEW RESISTANCE
AVERAGE:	DURABILITY, STAIN RESISTANCE, WEARABILITY	N/A	STRENGTH, MOISTURE AND STAIN RESISTANCE
BELOW AVERAGE:	STRENGTH AND MOISTURE RESISTANCE	N/A	N/A
ESTIMATED COST :	**$6.50/SF**	**$18.50/SF**	**$5-7/SF**
MAINTENANCE RATING:	**MEDIUM** EXCELLENT ACOUSTICS	**LOW** REGROUTING AS REQ'D	**MEDIUM** DAILY SWEEPING AND WET MOPPING ANNUAL WAXING AND BUFFING
LIFE CYCLE :	**VARIES**	**VARIES**	**30 YEARS**

LOWELL HIGH SCHOOL

TYPICAL GYMNASIUM FINISHES



DURABILITY :	**HIGH**	**HIGH**	**HIGH**
ABOVE AVERAGE:	ALL	MILDEW RESISTANCE	STRENGTH, DURABILITY, WEARABILITY
AVERAGE:	N/A	STRENGTH, DURABILITY, WEARABILITY	MOISTURE, CHEMICAL AND STAIN RESISTANCE
BELOW AVERAGE:	N/A	MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
ESTIMATED COST :	**$2.50/SF**	**$18.00/SF**	**$15.00/SF**
MAINTENANCE RATING:	**LOW** PERIODIC REPAINTING	**MEDIUM** PERIODIC SCRUBBING, PAINTING AND RE-POINTING	**LOW** DAILY SWEEPING & DAMPMOPPING PERIODIC SANDING FOR WOOD FLOOR
LIFE CYCLE :	**VARIES**	**VARIES**	**10+/VARIES**

LOWELL HIGH SCHOOL

TYPICAL RESTROOM FINISHES

DURABILITY :	**MEDIUM**	**HIGH**	**HIGH**
ABOVE AVERAGE:	N/A	MILDEW RESISTANCE	STRENGTH, DURABILITY, WEARABILITY
AVERAGE:	ALL	STRENGTH, DURABILITY, WEARABILITY	MOISTURE, CHEMICAL AND STAIN RESISTANCE
BELOW AVERAGE:	N/A	MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
ESTIMATED COST :	**$2.50/SF**	**$18.00/SF**	**$12.00/SF**
MAINTENANCE RATING:	**MEDIUM** PATCHING REQ'D IF DAMAGED	**MEDIUM** PERIODIC SCRUBBING, PAINTING AND RE-POINTING	**LOW** DAILY SWEEPING WEEKLY WET MOPPING MONTHLY SCRUBBING
LIFE CYCLE :	**VARIES**	**VARIES**	**12 YEARS**

LOWELL HIGH SCHOOL

TYPICAL STAIRWELL FINISHES

DURABILITY :	**HIGH**	**HIGH**	**MEDIUM**
ABOVE AVERAGE:	N/A	MILDEW RESISTANCE	STRENGTH
AVERAGE:	DURABILITY, STAIN RESISTANCE, WEARABILITY	STRENGTH, DURABILITY, WEARABILITY	STAIN & MOISTURE RESISTANCE
BELOW AVERAGE:		MOISTURE, CHEMICAL AND STAIN RESISTANCE	DURABILITY
ESTIMATED COST :	**$4.25/SF**	**$18.00/SF**	**$15.00/SF**
MAINTENANCE RATING:	**MEDIUM** EXCELLENT ACOUSTICS	**MEDIUM** PERIODIC SCRUBBING, PAINTING AND RE-POINTING	**MEDIUM** DAILY SWEEPING WEEKLY WET MOPPING
LIFE CYCLE :	**VARIES**	**VARIES**	**10 YEARS**

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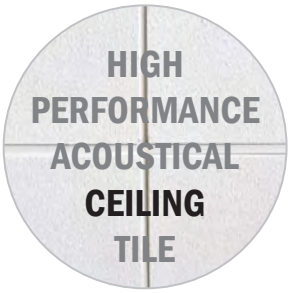
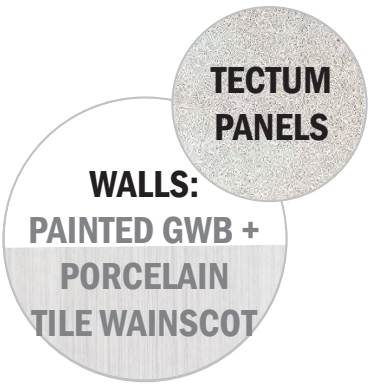
CAFETERIA FINISHES





DURABILITY :	**HIGH**	**HIGH**	**HIGH**
ABOVE AVERAGE:	N/A	STRENGTH, DURABILITY, WEARABILITY- ALL	DURABILITY, WEARABILITY, MILDEW RESISTANCE
AVERAGE:	DURABILITY, STAIN RESISTANCE, WEARABILITY	N/A	STRENGTH, MOISTURE AND STAIN RESISTANCE
BELOW AVERAGE:	STRENGTH AND MOISTURE RESISTANCE	N/A	N/A
ESTIMATED COST :	**$6.50/SF**	**$18.50/SF**	**$5-7/SF**
MAINTENANCE RATING:	**MEDIUM** EXCELLENT ACOUSTICS	**LOW** REGROUTING AS REQ'D	**MEDIUM** DAILY SWEEPING AND WET MOPPING ANNUAL WAXING AND BUFFING
LIFE CYCLE :	**VARIES**	**VARIES**	**30 YEARS**

LOWELL HIGH SCHOOL

AGENDA

- Updates Since Last SBC Meeting 9/6/18
- Design Updates:
  - Pre-Engineered Building Update
  - Exterior Update
- Design Options:
  - Exterior Material Options
  - Interior Material Options
- Building Systems
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HVAC SYSTEMS OVERVIEW

Lowell High School
Lowell, MA

Garcia, Galuska & DeSousa
Consulting Engineers Inc.

LIFE CYCLE ECONOMIC ANALYSIS

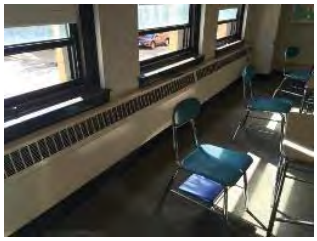
- Comparison of different HVAC systems in comparison to a Baseline code HVAC system
- Analysis of First Costs, Operating Costs and Maintenance Costs
- Determine lowest overall cost of ownership over 30 years.
- Systems to compare:
    1. Baseline: VAV System
    2. Option 1: Displacement System with Radiant Cooling/Heating
    3. Option 2 –Active Chilled Beams (Induction Units) Option 3 – Air-Source VRF (Variable Refrigerant Flow) System
    4. Option 4 – Water-Source VRF (Variable Refrigerant Flow) System

Garcia, Galuska & DeSousa
Consulting Engineers Inc.

EXISTING HVAC SYSTEM ISSUES

1. Systems are Old and/or Failing and in need of Replacement
2. Low Overall Energy Efficiency
3. Inadequate Ventilation in Many Areas
4. Poor Filtration
5. Lack of Air Conditioning in Most Areas
6. Antiquated Control System



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Consulting Engineers Inc.

NEW HVAC SYSTEM OPTIONS COMMON FEATURES

1. Improved Air Quality
2. Improved Level of Filtration
3. High Energy Efficiency
4. High Level of Thermal Comfort
5. Low Noise Operation
6. New Automatic Temperature Control and Building Energy Management System

Garcia, Galuska & DeSousa
Consulting Engineers Inc.

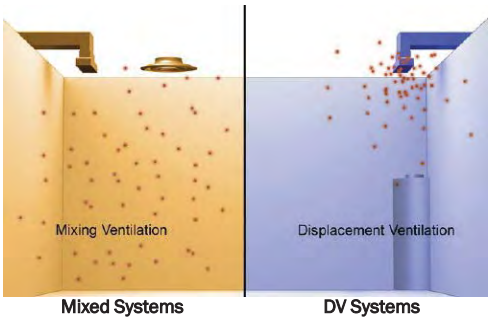
OPTION 1: DISPLACEMENT SYSTEM WITH RADIANT COOLING & HEATING

Pros:

•Uses dedicated outdoor air unit
- Excellent pollution removal
- Very low noise levels
- Very low air velocity
- Low moisture levels
- Reduced initial cost
- Variable volume reheat is not required
- High ventilation effectiveness
- High energy efficiency
- Reduced cooling loads

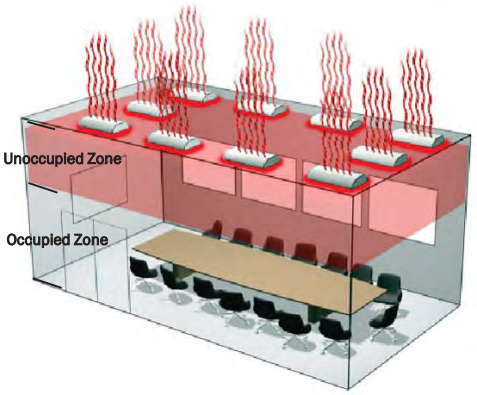
Cons:

- Requires perimeter radiation heating/cooling panels
- Requires coordination for chases and floor mounted diffuser locations



Mixed Systems E_c= 0.8

DV Systems E_c=1.2 - 1.4



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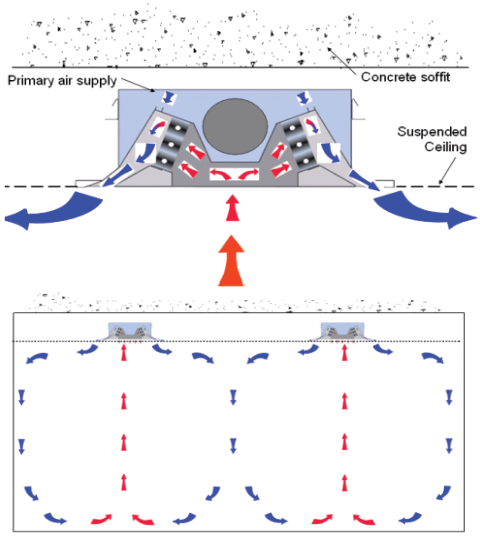
OPTION 2 – ACTIVE CHILLED BEAMS

Pros:
- Uses dedicated outdoor air unit
- High energy efficiency
- Ventilation air & ductwork minimized
- Low Noise Levels
- Flexibility of Installation
- Moderate first cost
- Simplified Controls (No Fans in Occupied Zones)
- Lower Maintenance (No Terminal Filters)



Cons:
- Requires increased coordination with “ceiling” system. (e.g. additional piping, HW, CHW & condensate piping)
- Requires additional ventilation air in some cases
- Potential for condensate at units if humidity levels are not properly controlled.

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HIGH EFFICIENCY HEATING HOT WATER AND CHILLED WATER PLANT (SIMILAR FOR OPTIONS 1 & 2)

Boiler Plant
- High efficiency (90%+) gas-fired condensing boilers
- Boiler temperature reset controls
- Variable speed pumps with VFD's

Chiller Plant
- High efficiency water cooled or air-cooled chiller
- Variable speed pumps with VFD's

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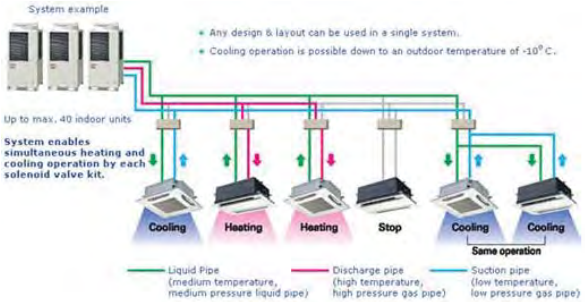
OPTION 3 – AIR-SOURCE ELECTRIC VRF (VARIABLE REFRIGERANT FLOW)

Pros:
- Lower piping installed costs due to refrigerant piping system only
- Boiler/chiller plants and distribution not required
- Single cabinet can be utilized for both heating and cooling applications.
- Simultaneous heating and cooling.
- Smaller central ventilation ductwork
- High energy efficiency
- Modular design allows for level of redundancy
- No site emissions



Cons:
- Individual fan motors in space
- Slightly higher noise levels in occupied space
- Quarterly filter changes per unit
- Condensate drain maintenance for terminal units
- Maintenance of equipment in occupied area
- Higher Electrical energy use due to increased electric heating
- Potentially Larger Emergency Generator

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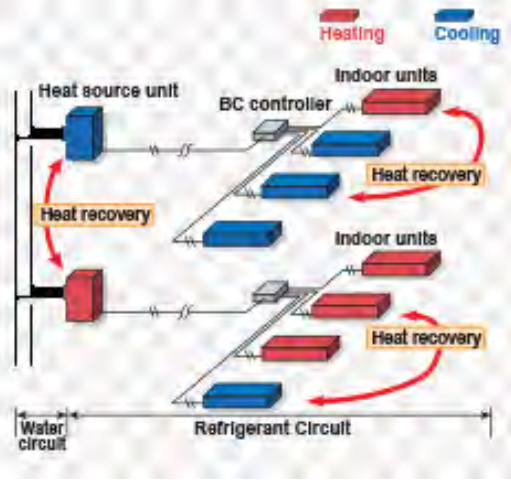
OPTION 4 – WATER-SOURCE VRF (VARIABLE REFRIGERANT FLOW)

Pros:

- Similar to Option 3.
- Chiller Plant and distribution systems not required.
- Use Cooling Tower instead of Condensing Units; Extends life of Equipment

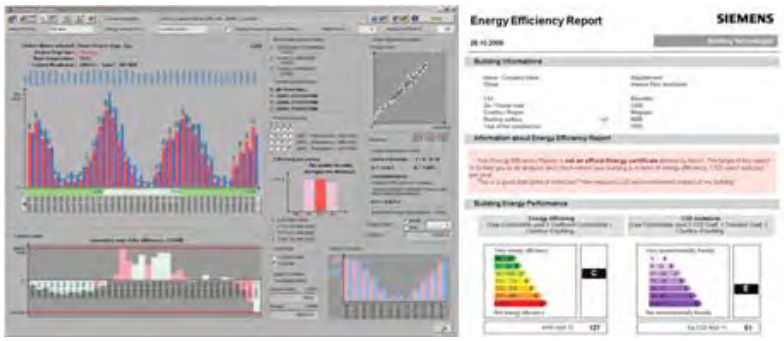
Cons:

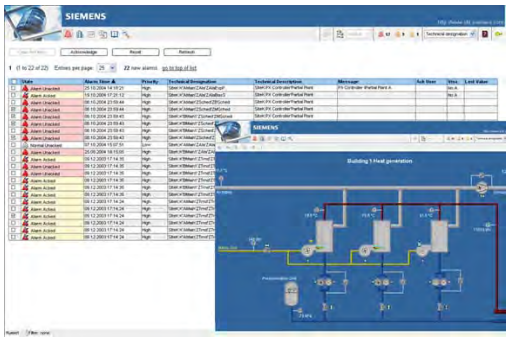
- Similar to Option 3
- Cooling Tower Maintenance



BUILDING AUTOMATION AND ENERGY MANAGEMENT SYSTEM

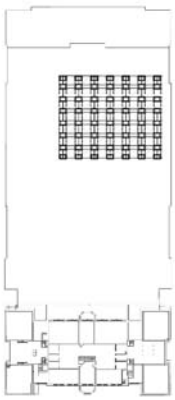
- Utility Data
- On-Site Generation System
- Submetering
- BACnet IP Integration:
  - Lighting Controls
  - Water & Gas Meters
  - Emergency Generator
  - Fire Alarm System



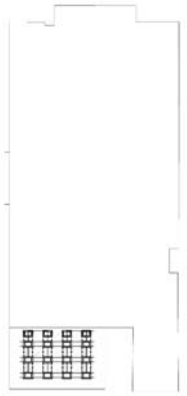


PHOTOVOLTAIC ARRAY (PV) SYSTEM

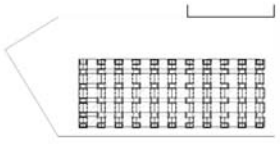
- % Renewable Energy = equivalent cost of energy produced by the system/Total building annual energy cost.
- 334kW total size of the PV arrays producing 386,717kWh/year and a $54,137 energy value.
- Based on $684,310 total building energy cost the project would earn 2 LEED points for 7.9% percentage renewable energy.



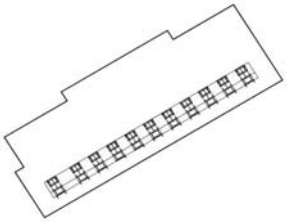
1922 Building roof 120kW PV array



Library roof 31kW PV array



Gymnasium roof 145kW PV array



Freshman roof 38kW PV array

Garcia, Galuska & DeSousa Consulting Engineers Inc.

Thank You

Questions and Discussions

Garcia, Galuska & DeSousa Consulting Engineers Inc.

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NEXT STEPS

- 10/09- Landscape Meetings with the City:
  - Historic, Trolley, Traffic, National Park Service
- 10/16- Focus Group Meetings
- 10/18- Civil Meetings w/ City:
  - Regional Water and Wastewater Utilities, City Engineer, DPW, Conservation Commission
- 10/23- Working Group Meeting
  - Site Plan, HVAC Follow-Up, Energy

LOWELL HIGH SCHOOL

AGENDA

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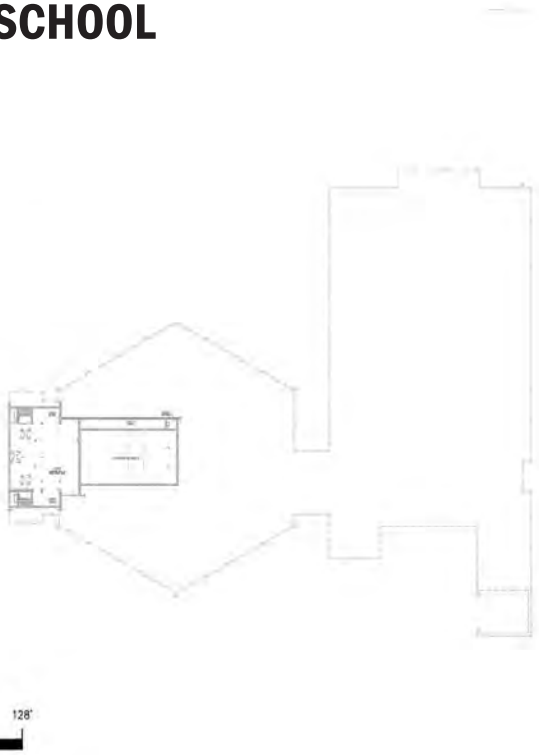
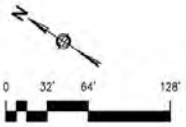
BASEMENT PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

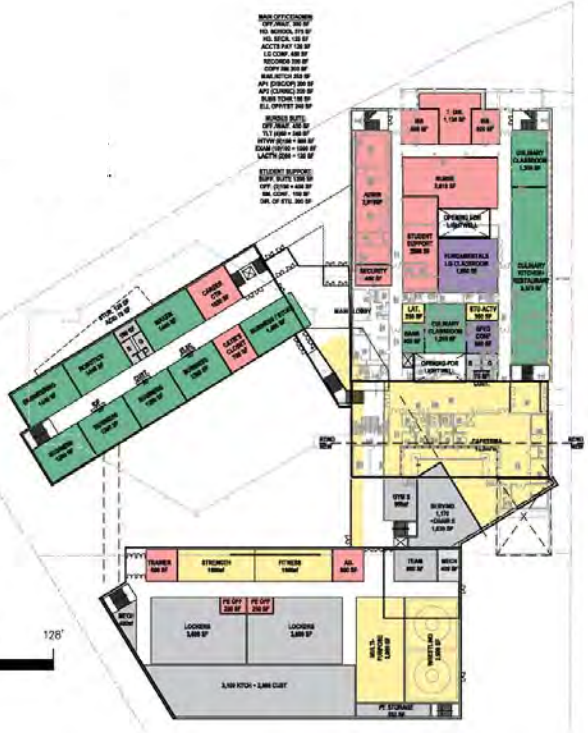


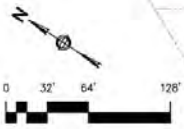


LOWELL HIGH SCHOOL

LEVEL-1 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

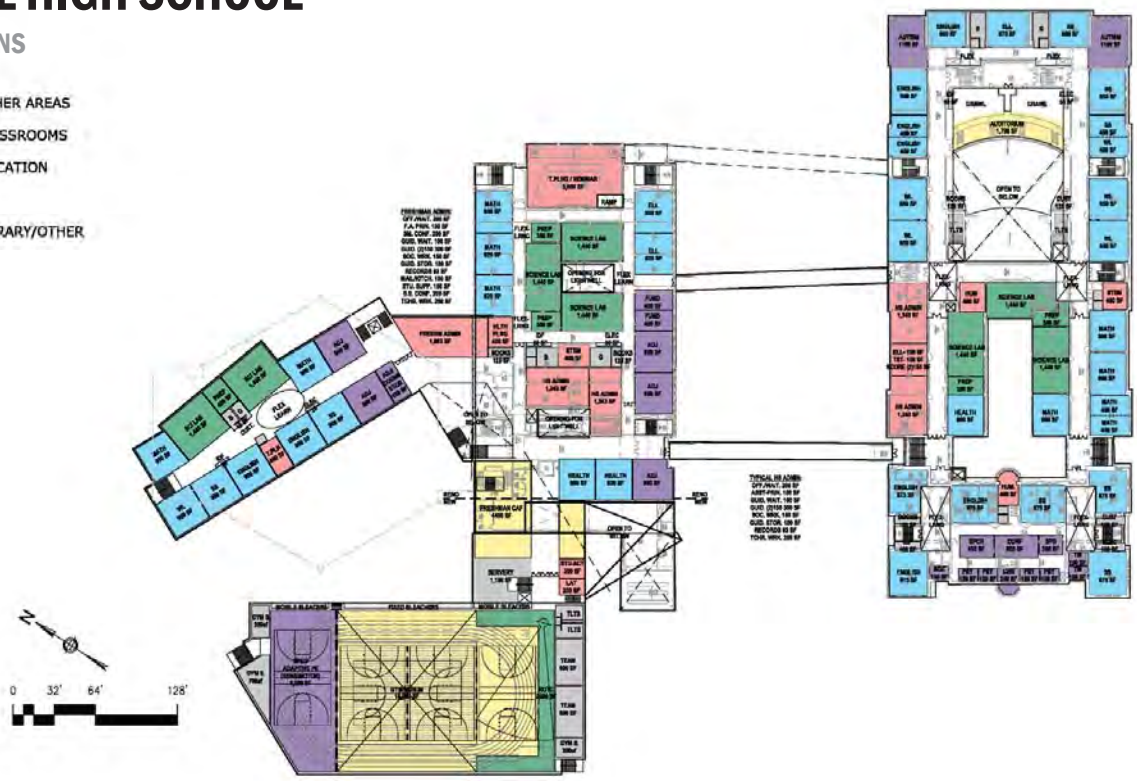




LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH

LEVEL-3 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

City of Lowell – Office of the City Manager
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www.LowellMA.gov

Eileen Donoghue
City Manager

Kara Keefe Mullin
Assistant City Manager

Date: November 1, 2018
Time: 5:30 PM
Location: City Council Chamber

1. Meeting called to order by City Manager Donoghue at 6:37 PM

2. Roll Call

Eileen Donoghue, William Samaras, Connie Martin, Conor Baldwin, Michael Vaughn, Jeannine Durkin, Billie Jo Turner, Christine Clancy, James Cook, Maryann Ballotta, Jay Mason, Maria Sheehy. Roll call shows 12 School Building Committee members present.

Others in Attendance from the City:

Kara Keefe Mullin, Alex Magee, Elliot Valoso, Craig Thomas

Project Team Member Associates in Attendance:

Skanska: Mary Ann Williams, Dale Caldwell, Jim Dowd
Perkins Eastman: Joseph Drown, Alicia Caritano
Traverse Landscapes (Landscape Architect): Ashley Iannucelli
Garcia Galuska DeSousa (Mechanical Engineers): Dominick Puniello
Thonston & Thomasetti (Energy Modelers): Vamshi Gooje

3. Presentations

City Manager Eileen Donoghue began with welcoming remarks, inquiring if the body would like to start meeting at 5:30 going forward. She stated she would poll the group at the end of the meeting, but it seems like 5:30 is the preferred time at this point.

Mary Ann Williams of Skanska began the presentation on construction methodologies. She discussed traditional Design-Bid-Build (D-B-B) method, which historically has produced issues with cost and

schedule overruns and often litigation. With DBB, a construction manager is not brought onboard as a partner; rather, the project is awarded to the lowest bidders and General Contractor without having the preconstruction input from a construction manager (estimating, constructability review, etc.). She then showed a delivery method comparison of Construction Manager at Risk (CM at Risk) v. Design-bid-build. D-B-B method has 100% design complete before building project is bid, and the project goes to lowest General Contractor bidder, and lowest bidding subcontractors. With CM at Risk, the Owner will prequalify construction managers and subcontractors in order to mitigate risk. Traditional D-B-B approach has a longer, more linear schedule. Bidding a project with CM at Risk method allows for an earlier start of construction before completion of design, more flexibility and shorter timeline. D-B-B has distinct roles of owner, General Contractor (GC), and separation between owner and SCs. Construction Manager provides design assistance and phased reviews. She noted the LHS project is well suited for CM at Risk method due to occupancy during construction, phased renovations, etc. CM at Risk also utilizes open book accounting and a maximum price guarantee. D-B-B has issues with cost overruns, change orders, etc. CM at risk provides design feedback throughout the entire project process.

M. Williams continued with aspects of D-B-B – noted it is more familiar, simpler; less control over selection of partners (GC, contractors, etc.). She said it is typically a longer overall process for design and construction durations. She continued stating the CM at Risk method is based on qualifications, experience and proposed team rather than low cost. She speculated the City is looking at $270-280M in likely construction costs on this project and that only 5-6 firms can actually bond a project of this size in Massachusetts. Many firms will not take on the risk of a D-B-B project due to amount of work of this magnitude already out there.

M. Williams continued to discuss lump sum pricing vs. guaranteed max pricing, stating lump sum often leads to change orders and price increases. Guaranteed max price leads to constant communication among Owners Project Manager (OPM) and construction manager to maintain price and budget throughout process. She then advised that owners don't want to be fighting over costs with contractors for the duration of the project. M. Williams opened up discussion to the group.

James Cook stated he had experience since mid-1990s with D-B-B method, which turned out terrible (Tsongas arena). He said he would suggest not giving D-B-B a hard look because they had to let contractor go and start over on that process, it led to wasted time, effort and money.

Jay Mason inquired about CM at Risk method, and asked if all items of guaranteed max price were negotiable? M. Williams explained that the method was qualifications based first, with the evaluation of a pricing proposal. M. Williams noted the construction Manager's fee is not negotiable, (2.0 -2 .75% typically0(please clarify) however, the preconstruction fee, General Conditions and General

Requirements are negotiable. M. Williams noted Skanska uses DCAMM's procurement documents, and when evaluating qualifications and pricing proposals, performs an apples-to-apples line by line comparison. Selecting a construction manager allows for more flexibility and control with the project.

William Samaras asked a clarifying question regarding the owners and architects, inquiring if they are in better communication with the CM at Risk with this method, as opposed to arguments between architects/contracts in D-B-B method. M. Williams replied affirmatively yes, exactly, that is one of the big advantages of CM at Risk.

E. Donoghue noted the good summation by the Mayor. Most recent projects in area are utilizing CM at Risk, and this method of building is considered a best practice. Several very large projects construction managers out there working on local schools; there is a small group regionally who're able to work on these and are specialized. E. Donoghue noted this was a new process since the last time the City built a school in Lowell. She then asked when we will want to bring on a construction company. M. Williams responded soon as possible after April 10th MSBA approval; we should be looking for an RFP very soon after that. E. Donoghue mentioned this will allow for construction company to work hand in hand with design consultants, help with recommendations where necessary, etc. rather than only doing the work as designed by someone else. M. Williams noted it will allow a strong collaborative team process. E. Donoghue reiterated the phased process that allows for flexibility and will hopefully remove change orders. M. Williams noted the lower risk of change orders with the CM at Risk method, though they will always exist in large projects.

M. Vaughn noted that from the procurement point of view, he highly recommended CM at Risk. It allows for partnership and the best chance for a quality high school at the best price. He has had his best success with this method in 40 years of bids.

E. Donoghue wanted to verify the timeline looked ok, and to take look at our expected April MSBA meeting. M. Williams outlined the process following MSBA approval in April, including hiring a construction contractor. E. Donoghue questioned if the City is completing things on schedule within next month, will allow for ample time to maintain current trajectory? Will be seeking a vote next month on final construction methodology.

E. Donoghue called for a recess to allow design team to arrive and set up for presentation at 6:05 PM

Meeting called back to order at 6:16

Alicia Caritano of Perkins Eastman laid out the agenda for this portion of the meeting, including landscape architecture (including an exterior site update), sustainability priorities, energy modeling, HVAC/mechanical systems, one vs. two story bridges.

A. Caritano continued into discussion of the sustainability priorities, which were the outcome of a meeting in September with the LHS working group. Highest priority interest was air quality, then curriculum/building interaction, then quality of natural light, then durability, then systems monitoring/control, etc. She noted these priorities will help inform design moving forward.

Ashley Iannucelli, landscape architect, presented on guiding principles for design, including city lines and historical lines, including street and canal directional perpendicular flows. She stated community and history have had a large influence in the design to date. She said LHS is a hub in the City, a special site located within a national park, and there are special lines within the site. She presented an overlay which creates a "lines and overlays" grid to inform our design. She is hoping to draw on Lowell's rich history to inform design. A. Ianucelli spoke about traffic circulation and ongoing discussions with the City Traffic Engineer and others in the City, to help solve this issue as best as we can within the site constraints. They are looking to see if they could connect Arcand and Dutton to make traffic flow better. Looking at dedicated traffic lanes for drop-offs and pick-ups, providing handicap parking, and temporary parking as well. Some space required for bus lineups, looking to address this. She noted they are considering reverse traffic flow for certain parts of the day; design is still being discussed with the City.

W. Samaras stated bus lineups have created issues for a long time. The idea presented allows for better flow for moving students out of school area. J. Cook wondered if it would possibly add congestion to the area. W. Samaras stated he thought no, typically lights are lined up well and this could help get people out of the area.

A. Ianucelli continued with more site plan visuals, and discussed issues such as, grade changes, and storm-water runoff. She showed images of benches around the entire site, including a quad to be used for all kinds of recreational/passive activities, including raised seating around outside, and a look at a picnic terrace area next to canal. Regarding rooftop options, she noted that these areas could be used either for classroom space or garden space, or a combination of the two. She noted the final direction will come down to programming, who will maintain the space etc. She noted the goal is to create a space that is well used by everyone.

Jeannine Durkin asked a question regarding afternoon transportation and the LRTA bus lineups up on Page St., noting presently they are lined up on Page and Fr. Morissette. She asked if the consultants are

suggesting buses will be on both sides of street? A. Ianucelli answered they are not going to change the existing for now, but they are working with transportation engineer from the city on this going forward.

Vamshi Gooje presented on energy modeling design and noted the project is starting at a relatively high performance level compared to the existing buildings. He noted they are still trying to further find any efficiencies possible in the design. He stated energy modeling helps quantify some sustainability strategies, it will show how much heat loss is happening through the envelope (building). He said ventilation is the predominant energy load. He noted we are starting at a good place efficiency-wise. He stated they want to separate the campus into East v. West. The West is 1980s building, East is 1922 building, and for practical upgrade purposes it makes sense to treat these as two separate sites. V. Gooje noted the west campus has greater flexibility for upgrades due to the additions/new construction. E. Donoghue asked a clarifying question if the west side contained just the 1980s building? V. Gooje answered it will include the entire west campus including the proposed freshman academy, fieldhouse, and addition to the south.

V. Gooje presented charts showing Energy Conservation Measures (ECM) savings. Light-shelves, solar shading devices, exterior walls and insulation of 1980s building, and triple glazed windows are all options. He noted windows are not a large percentage of savings compared to other ECM's, but do offer much better comfort in the space, as well reduce the load on HVAC systems.

M. Vaughn asked a question on estimates on models, are these based on today's building or on the proposed design? V. Gooje replied they are based on the proposed design. J. Mason asked if they were looking at how much photovoltaic (Solar Panels) can fit on roof. J. Mason asked if 5 – 15% of total building's required electric load, is that possible? V. Gooje said yes it is. J. Mason further inquired if it is possible to use modeling to use PV system to include operational, capital, and other costs? V. Gooje said they could look at power purchase agreements to offset costs, which will come out of school budget. He was not sure it was possible to tie directly in to HVAC system. E. Donoghue thanked V. Gooje for presentation.

Dominick Puniello presented 5 options on HVAC systems, including all 4 studied options, studied against the "code based" line, which is decent but not really an applicable option for this project. All of these systems are energy efficient, provide good comfort, and indoor air quality, and are low noise systems. All offer good choices and some pros and cons. All options connected to unique a building energy management system as well.

Baseline – Overhead Variable Air Volume
Option 1 – Displacement Ventilation system w/ heating/cooling panels
Option 2 –Active Chilled Beams
Option 3 – Air-source VRF
Option 4 – Water-source VRF

D. Puniello discussed methodology for these systems and noted he GGD and Thorton Tomasetti, the Energy Modeling Consultant and are is confident in the simulations and numbers as presented. He said the energy model consultants used EQuest, a Department of Energy software program, which takes into account building architecture, local weather, occupation and usage of building, efficiencies, local utility prices etc. to make a holistic picture of the energy model. They alsoGGD used Building Lifecycle 5 (another DOE program) to put together costsdetermine lifecycle cost for each system. He notes that the working group looked at numbers 1 and 3 as the "winners" based on the analysis. Option 1 had the best savings and lowest combined annual expenses and maintenance, where option 3 had lowest up front installed cost and lowest environmental impact. Option 3 would save $1.7m up front. D. Puniello noted both Energy Usage Indicator (EUI) numbers were very good. Option 3 would cost over $100k more than option 1 per year to maintain properly. He noted the working group had a good debate between options.

M. Vaughn noted the contractor was talking about pollution, but that electricity doesn't take into account the natural gas used to create electricity in this region. He then asked for heat, isn't gas much cheaper? M. Puniello stated that with old electric systems, yes electric was much more expensive, but . Nowadayscurrently, electric isheating systems are much more efficient, but stillhowever generally are still more expensive to operate than high efficiency gas systems.

J. Mason wanted to point out the performance of electric is much better than the gas systems. Look at technology for performance of VRF systems going forward into the future. He believes you could make the argument that these systems will get cheaper going forward.

Connie Martin stated that in 75 years the building will likely still be as built, but also in 20 years we may be able to get a replacement system for the mechanical system. She said she had no doubt electric systems will improve and maybe we could upgrade later on.

W. Samaras noted he thinks the issue here is fossil fuels vs. solar. He said that things will be more solar based in the future but the older systems are more reliable, and we cannot be sure where electric prices will go in the future.

D. Puniello gave more comments on W. Samaras' questions stating that yes, HVAC systems change over time,. He and agreed, stating they don't last 75 years. He said systems used to be more durable, with analog controls and mechanical parts, now they are supposed to last 25-30 years. The proposed options (like option #1) is a system of valves and dampers and noted how you generate the heat is potentially interchangeable. He said there was nothing to say you couldn't put electric boiler in, but at this point wouldn't recommend because it's less efficient now. VRF systems have grown in different directions since, and there's no guarantee to saying 25-30 years things will change moving into the future. He notes you will always be able to create hot and cold water with different kind of boilers and chillers. Piping and ducting should last 50 years; equipment that feeds them should last around half that.

J. Mason wanted to reiterate the obvious for him, choosing more sustainable system, understanding sophistications of them, a technology that has been around and is dependable and shown reliability; however, the school will be here for a long time, and he wants to make case for 100% resolution; this will increase our gas usage.

E. Donoghue noted she applauds the goal of 100% renewables. She is concerned with operational and maintenance costs today with our systems, and wants to be realistic. Option 1, even with fossil fuels, is cheaper to operate and maintain. That is in year 1 through the end.

W. Samaras asked if the SBC chose option 1, could they move to electric boilers on this system at some point down the road? D. Puniello answered yes, if rates came down and it became feasible, it would certainly be an option but some additional plant modifications would need to occur. W. Samaras added we do need to watch what we are spending, and could use savings to move to modernized system down the road.

J. Mason argued that picking a fuel source now will likely be the fuel source we use permanently moving forward. He noted if we should buy into this now, we are going to have it going forward. J. Mason asked D. Puniello if he has seen conversions switched from gas to electric like this? D. Puniello noted that no he has not for this size building, but has seen plenty from electric to gas the other way. Lots of electric heat was installed when rates were cheaper and has now become much too expensive. He noted he has seen lots of oil to natural gas conversions due to costs. Boilers come down to efficiency to operate, and right nowCurrently gas is cheaper less expensive than electric for heating systems.

C. Clancy noted that during the working group meeting, D. Puniello talked about the maintenance involved with the various systems, and asked if he could please speak to maintenance needs for the various systems. D. Puniello noted that hot water/chilled water system has many more contractors available to work on it in terms of maintenance. Option 3 requires special refrigeration licenses and specialized repairs (specific parts, company specific). He said owners could be tied to the manufacturing company that they purchase equipment from originally, and their unique parts/systems, along with specialized labor. He stated for example you could not put an LG unit into a Mitsubishi system. He continued to say a hot water/chilled water system terminal equipment is a "dumb" system, anyone more contractors can work on it, and it offers more flexibility for multiple manufacturers.

J. Mason asked about the MLK school in Cambridge that Perkins Eastman just completed. What is their fuel source? A. Caritano answered that MLK school is a combination of geothermal and individual heat pumps, a system that is not feasible in Lowell.

J. Cook noted the city is responsible for paying the bills, one option seems to present short term and immediate savings, and asked if the City Manager has a recommendation? E. Donoghue responded that the working group chose in favor of option 1 (over option 3) by margin of 7-4; E. Donoghue also noted she prefers option 1 due to her position requiring her to maintain finances and operations etc. keeping cost down.

J. Cook made a motion to vote on HVAC system, seconded by W. Samaras.

4. Vote – SBC members were instructed to make their choice from the presented options 1 through 4; 11 members voted for option 1, 1 member voted for option 3

	Option 1 - Displacement Ventilation system w/ heating/cooling panels	Option 2 - Active Chilled Beams	Option 3 - Air-source VRF	Option 4 - Water-source VRF
Eileen Donoghue	X			
William Samaras	X			
Connie Martin	X			

Conor Baldwin	X			
Michael Vaughn	X			
Jeannine Durkin	X			
Billie Jo Turner	X			
Christine Clancy	X			
James Cook	X			
Maryann Ballotta	X			
Jay Mason			X	
Maria Sheehy	X			
	11	0	1	0

A. Caritano continued with presentation on canal bridges. There were some renderings/views created from various vantages and presented to the SBC. E. Donoghue noted that in addition to costs, Historic or other approvals could create potential issues for having a 2 story bridge, which could provide possibilities for delays. W. Samaras questioned the width issue of the bridges, and noted that there was currently a bottleneck on the way into the 1922 building. A. Caritano responded saying they were looking to reconfigure the areas to make better flow. She noted they are already planning on relocating the northern bridge to improve bottlenecks.

J. Cook clarified that E. Donoghue was recommending a one story bridge. E. Donoghue replied yes, and will continue to look at location and bottlenecks.

J. Cook made a motion to take roll call, second by Samaras.

5. Vote - roll call vote to approve the 1-story option passed 12-0 in favor

	Yes	No
Eileen Donoghue	X	
William Samaras	X	

Connie Martin	X	
Conor Baldwin	X	
Michael Vaughn	X	
Jeannine Durkin	X	
Billie Jo Turner	X	
Christine Clancy	X	
James Cook	X	
Maryann Ballotta	X	
Jay Mason	X	
Maria Sheehy	X	
	12	0

A. Caritano showed upcoming schedule including various upcoming meetings.

6. Adjournment

E. Donoghue thanked the committee for their time, and noted they will plan on 5:30 PM meetings going forward, and asked for motion to adjourn. Connie Martin motion to adjourn, Seconded by J. Durkin. 7:22 PM.

PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE | COMMUNITY MEETING

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

AGENDA

- Sustainable Priorities Site Energy Model
- Mechanical Systems
  - System Alternatives Analysis /Questions
  - SBC Decision on System Recommendation by Working Group
- One Story vs. Two Story Bridges
  - SBC Decision One vs. Two Stories
- Next Steps

LOWELL HIGH SCHOOL

SUSTAINABLE PRIORITIES FOLLOW-UP

Strategies	School	City	Design Team	Total
High Level Air Quality	4	2	7	13
Curriculum Tied to Building/Features	3	4	4	11
Quality Natural Light	2	2	6	10
Durable/Maintainable, Materials	2	2	5	9
Systems Monitoring & Control	4	3	2	9
Natural Ventilation & Light Wells	3	0	4	7
Solar Power & Wind Power	1	2	4	7
Multi-use Green Space:Stormwater,Teaching Opp.	2	4	1	7
Plenty of Glass-Visibility	2	2	2	6

LOWELL HIGH SCHOOL

SITE DESIGN

GUIDING PRINCIPALS

“CONNECTIONS”

CAMPUS TO COMMUNITY

CAMPUS TO HISTORY

OUR TEAM LOOKS FORWARD TO WORKING WITH THE SCHOOL AND THE COMMUNITY TO EVOLVE AND DEVELOP A DESIGN TOGETHER THAT IS INCLUSIVE, COMPREHENSIVE, ROBUST AND MUCH-LOVED.

LOWELL HIGH SCHOOL

EPICENTER OF LOWELL

CAMPUS TO COMMUNITY

- In many ways Lowell High School is the “Center” of Lowell, not just geographically, but as a hub **education, growth and community**.
- The new campus will offer a wide variety of spaces both intimate and open. The site will support everyday use and enjoyment while also providing spaces that **bring together** cutting-edge educational and social programming within a diverse group of students and community members.
- Our objective is to create a holistic **sense-of-place**, unique to the Campus and the City of Lowell.

LOWELL HIGH SCHOOL

GRID OF THE “LINES AND OVERLAYS”

CAMPUS TO HISTORY

City Lines

+

History Lines

LOWELL HIGH SCHOOL

"LINES + OVERLAYS"

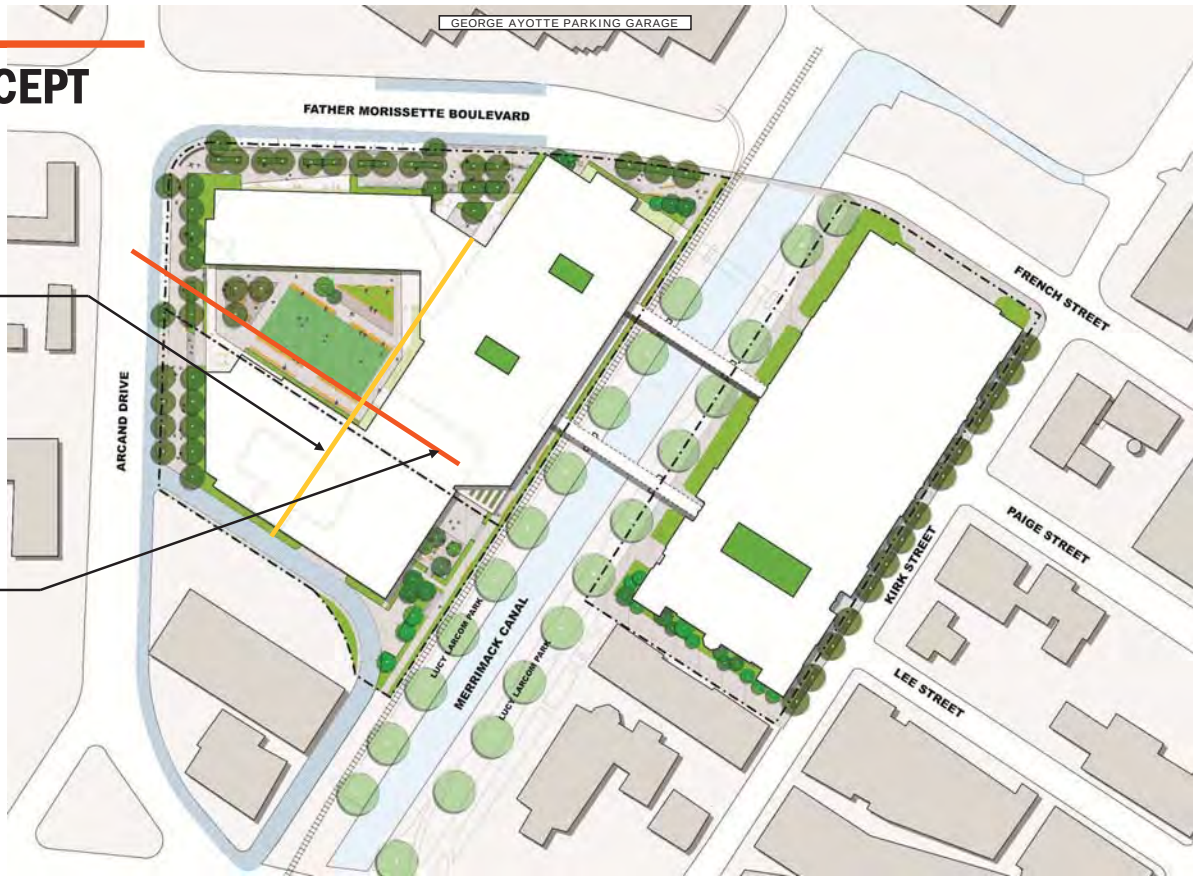
The linear and angular forms found on site are a geometric response to an urban grid tailored by a highly engineered system of canals fed by the Merrimack River.

The City grid is a historic feature echoing decades of industry, growth and resiliency-**Taking formal inspiration from this significant framework,** or lines of history, will bolster the campus's connection to the city and provide reference to Lowell's deep history.

APPLIED CONCEPT

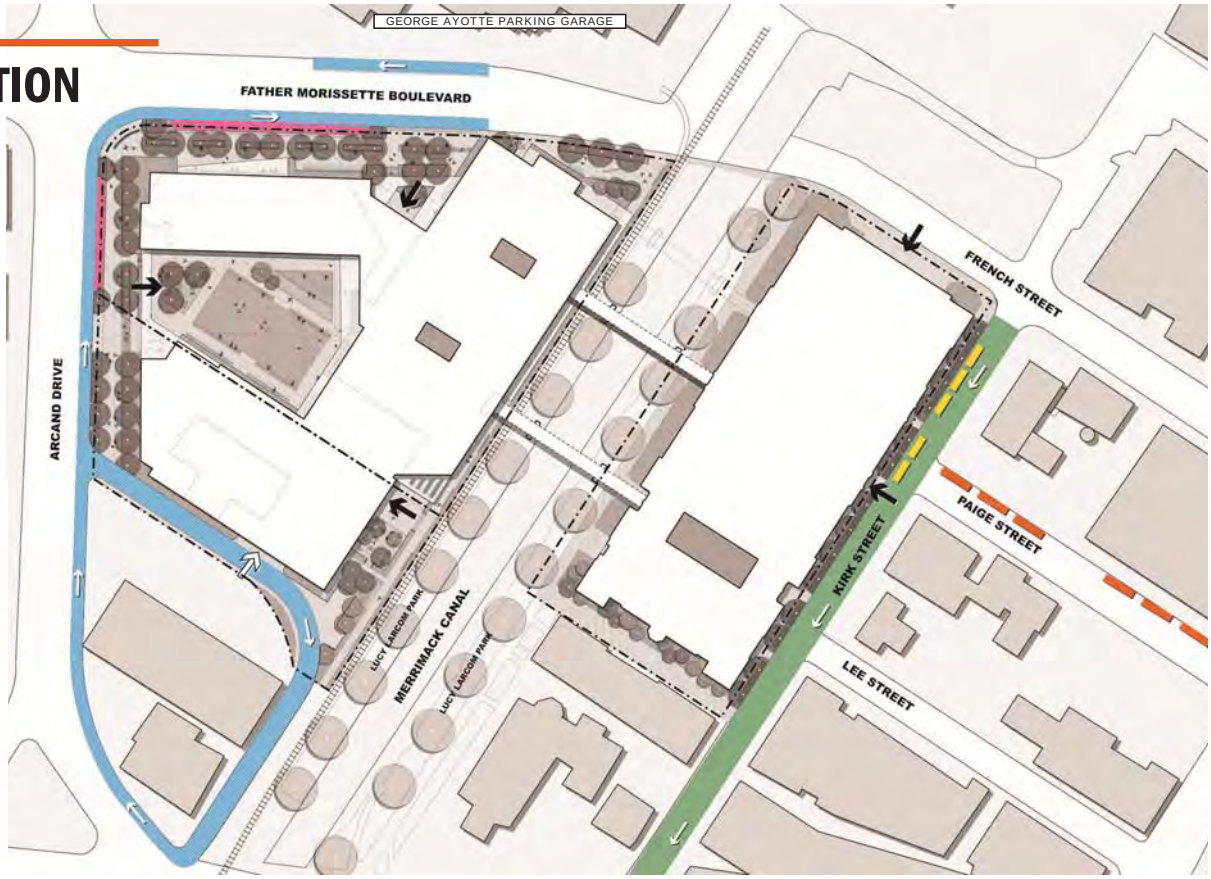
The **"overlays"** expressed through materials and paving patterns throughout the site will create a holistic "sense of place" while emphasizing the threshold to the Campus

Based on the city grid the **"lines"** of history will create organization for design elements such as benches, planters and greenspace



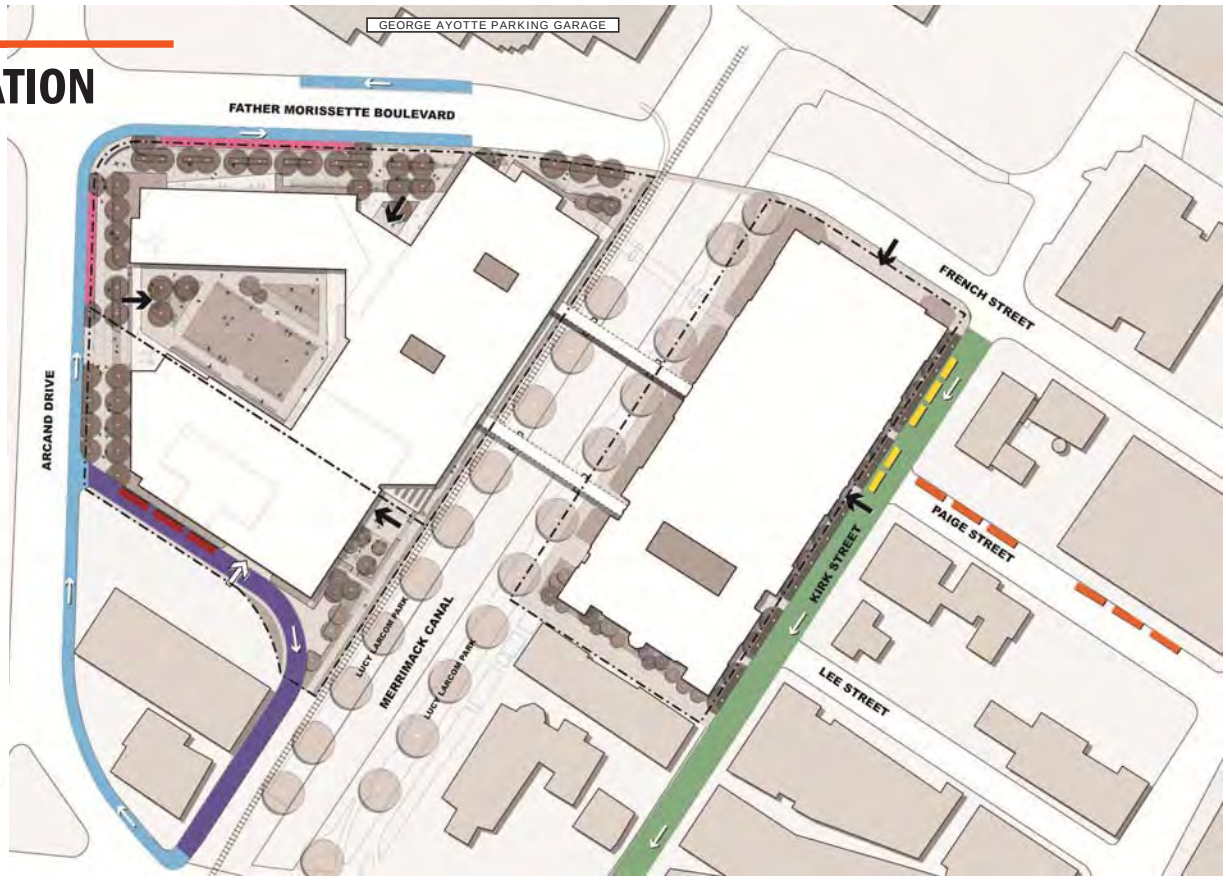
AM CIRCULATION

AM TRAFFIC CONGESTION CAUSED BY PRIVATE CAR DROP OFF

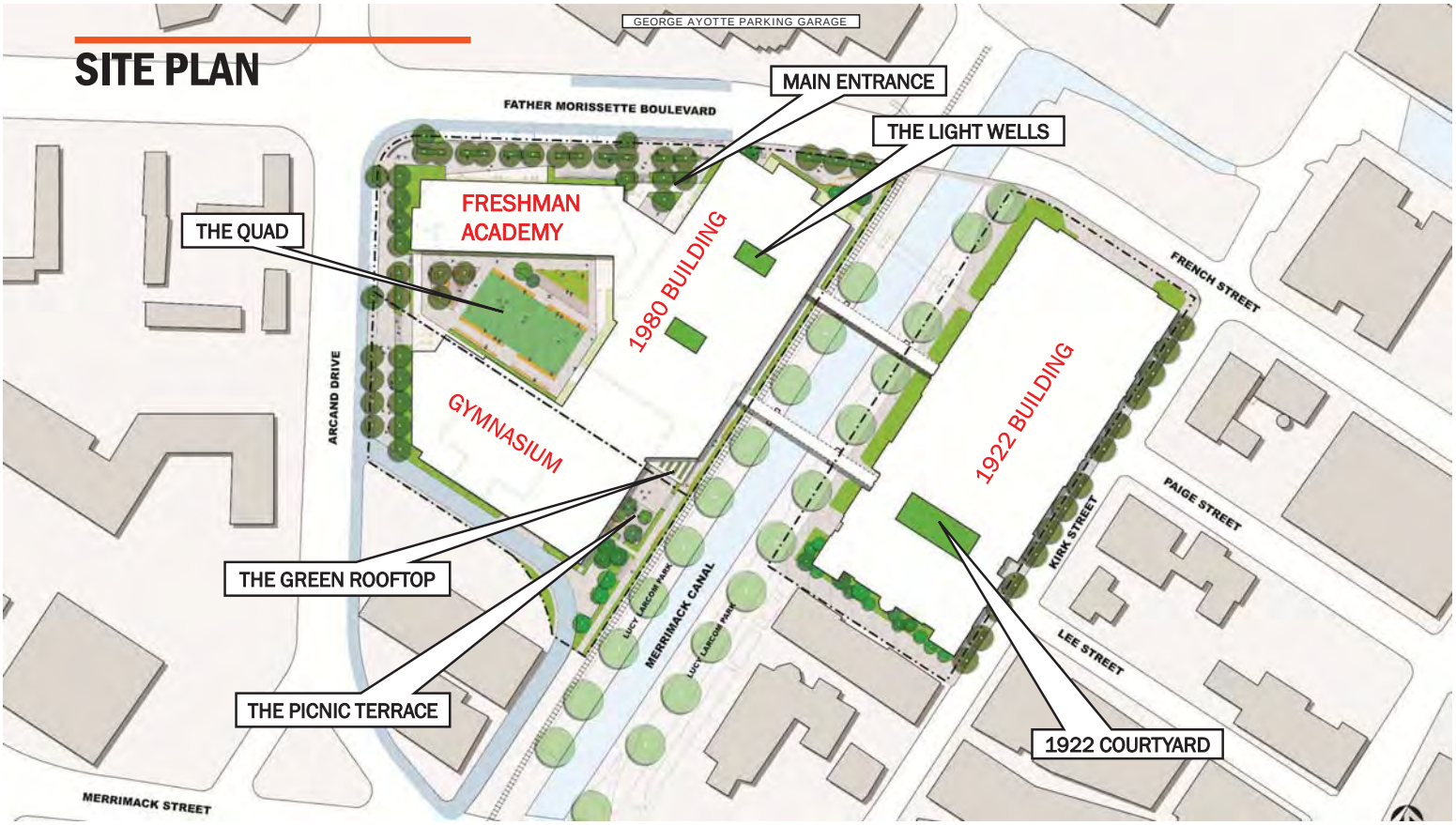


PM CIRCULATION

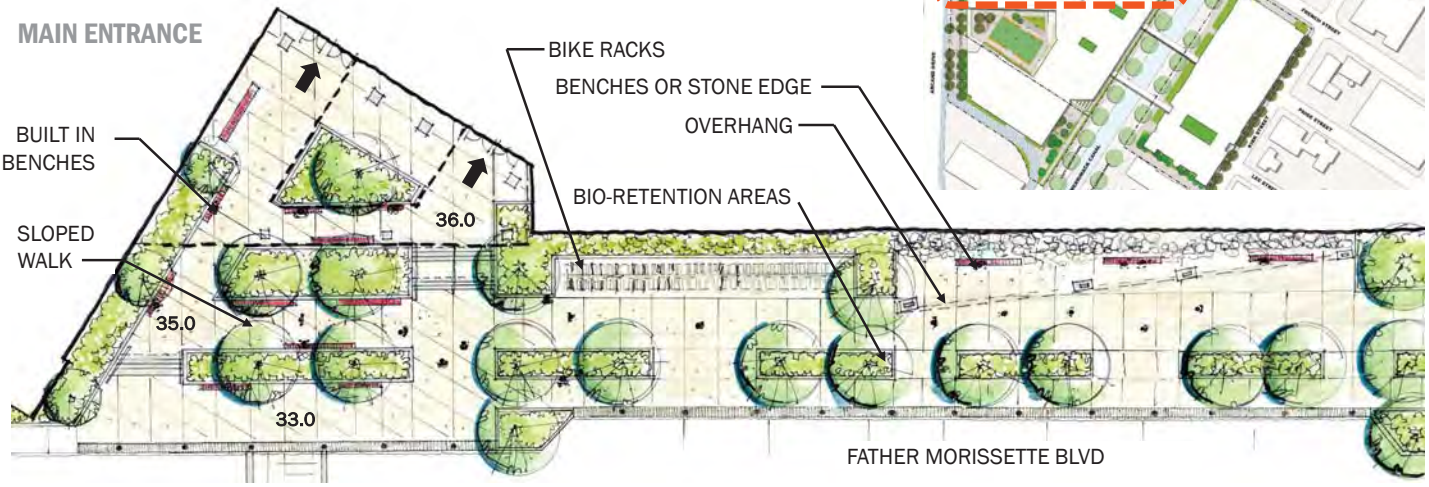
PM TRAFFIC CONGESTION CAUSED BY LRTA AND ATHLETIC BUS PICKUP

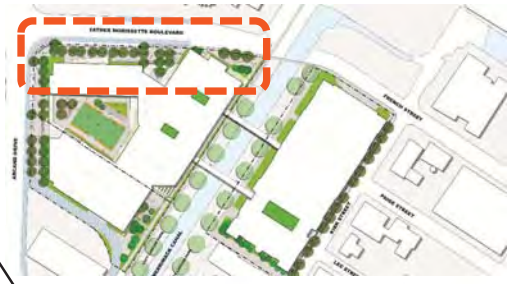


SITE PLAN



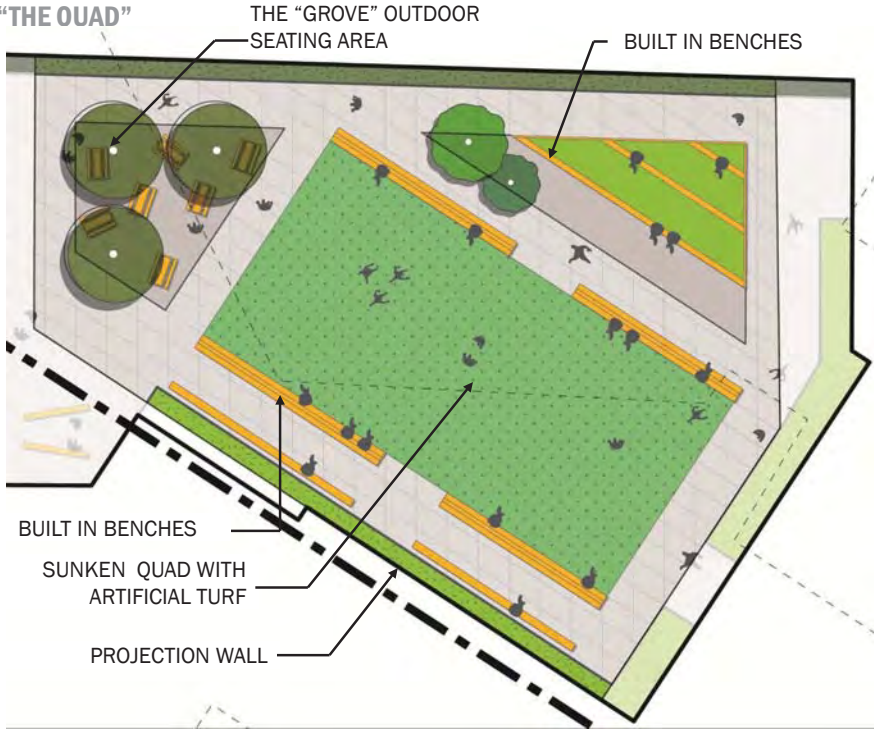
LANDSCAPE OPPORTUNITIES





LANDSCAPE OPPORTUNITIES

"THE QUAD"



LANDSCAPE OPPORTUNITIES

"THE GROVE" AND QUAD ENTRANCE

LANDSCAPE OPPORTUNITIES

"THE PROMENADE"

LANDSCAPE OPPORTUNITIES

"THE PICNIC TERRACE"

LANDSCAPE OPPORTUNITIES

"THE ROOFTOP"

Adelaide High School Roof Terrace,
Adelaide, Australia

Alexandria Center for Life Sciences,
NYC, NY

Fenway Farms,
Boston, MA

LANDSCAPE OPPORTUNITIES

"THE LIGHT WELLS"

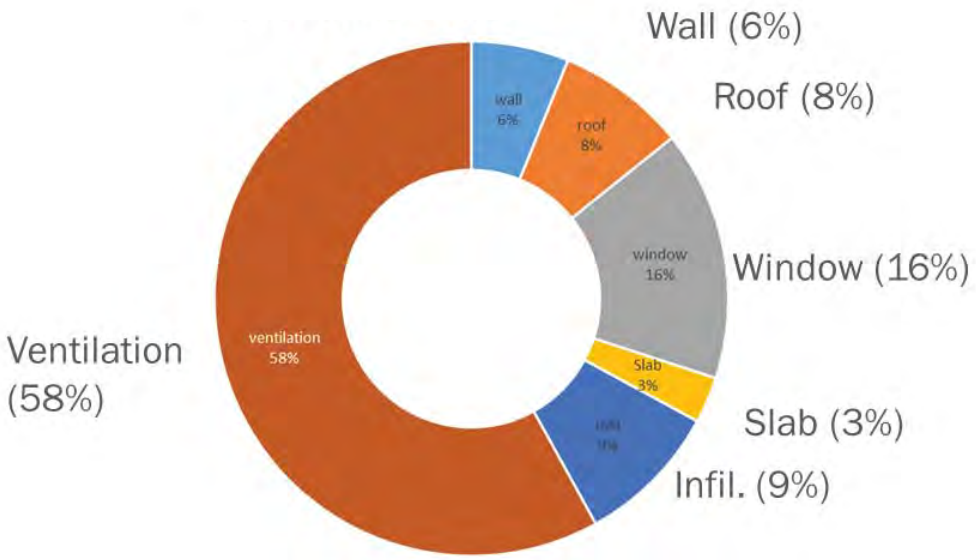
Tahari Courtyards,
Millburn NJ

Tahari Courtyards,
Millburn NJ

Site Specific Installation,
Velvet Da Vinci San Francisco

LOWELL HIGH SCHOOL

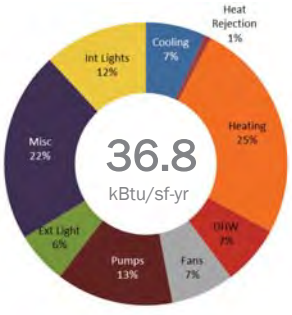
BUILDING ENERGY LOADS



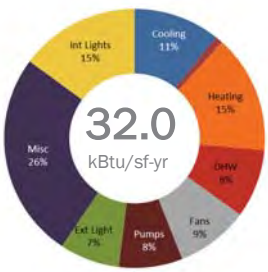
LOWELL HIGH SCHOOL

ENERGY USE INTENSITY

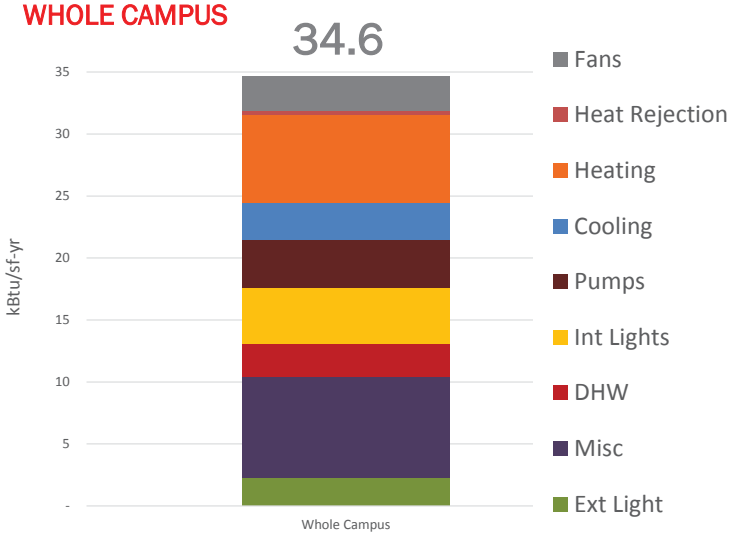
EAST CAMPUS



WEST CAMPUS



WHOLE CAMPUS



LOWELL HIGH SCHOOL

ENERGY CONSERVATION MEASURES - ECMS

ENVELOPE ECMs

1. Interior Lightshelves
2. Solar Shading Devices
3. Replace Exterior Walls 1980 Building
4. Insulate Exterior Walls 1980 Building
5. Triple Glazed Windows

VENTILATION ECMs

1. Demand Control Ventilation - Typical
2. Natural Ventilation
3. Demand Control Ventilation - Aircuity
4. Kitchen Makeup Air by “Borrowed Air”

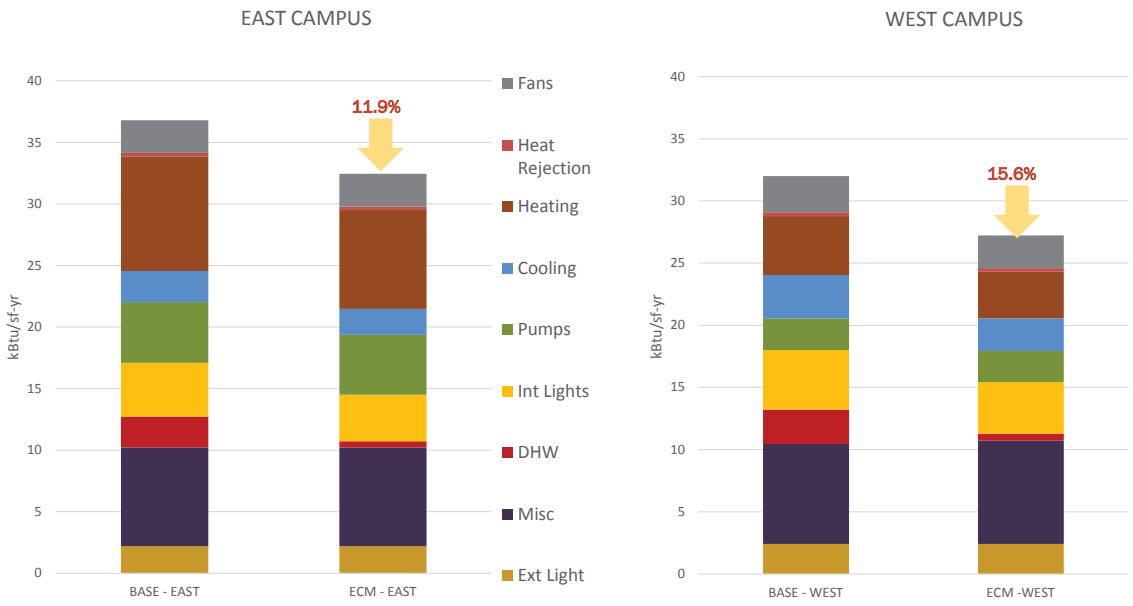
RENEWABLE ECMs

1. Solar Photovoltaic
2. Solar Hot Water

Sorted by Savings (most to least)

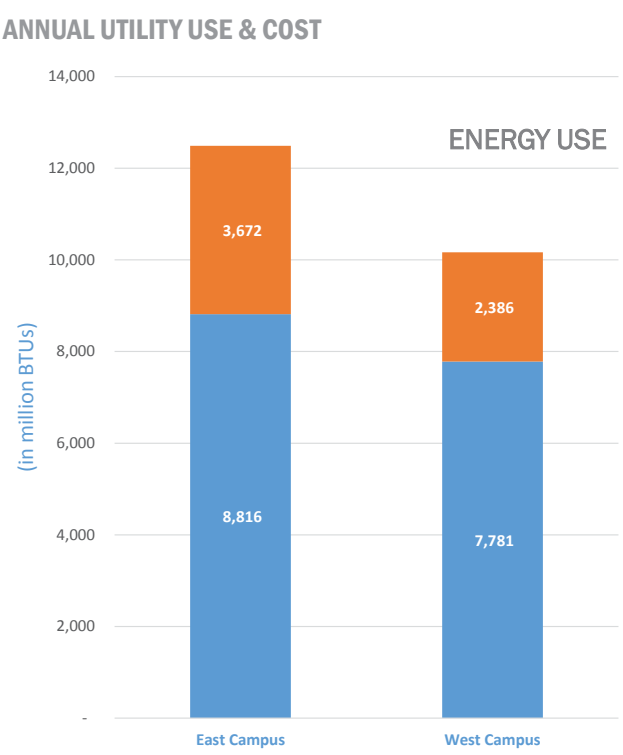
LOWELL HIGH SCHOOL

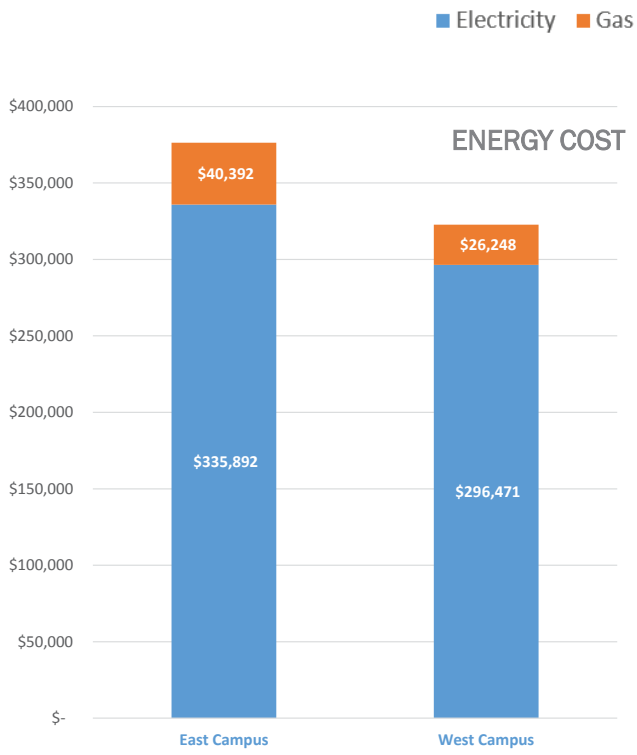
ENERGY CONSERVATION MEASURES



LOWELL HIGH SCHOOL

ANNUAL UTILITY USE & COST





LOWELL HIGH SCHOOL

MECHANICAL SYSTEMS OPTIONS STUDIED

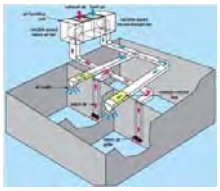
Baseline: Overhead VAV (Variable Air Volume) System with Boiler and Chiller Plants

Option 1: Displacement System with Radiant Cooling/Heating Panels with DOAS (Dedicated Outdoor Air System) and High-Efficiency Boiler & Chiller Plants

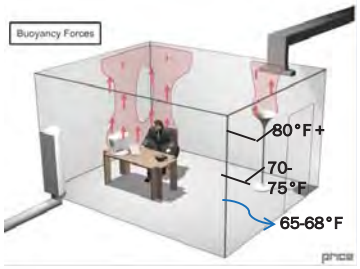
Option 2: Active Chilled Beams (Induction Units) with DOAS (Dedicated Outdoor Air System) & High-Efficiency Boiler & Chiller Plants

Option 3: Air-Source VRF (Variable Refrigerant Flow) System w/ DOAS (Dedicated Outdoor Air System)

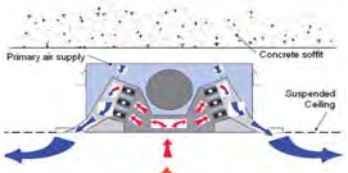
Option 4: Water-Source VRF (Variable Refrigerant Flow) System with DOAS (Dedicated Outdoor Air System) & Cooling Tower Plant w/ Supplemental High-Efficiency Boilers



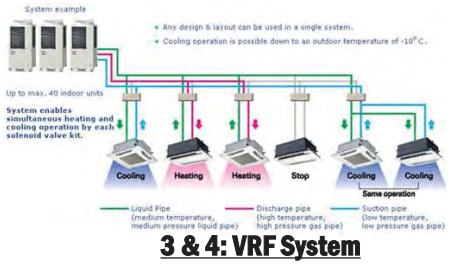
Baseline: VAV System



1. Displacement Ventilation



2.Active Chilled Beams



3 & 4: VRF System

GGD

LOWELL HIGH SCHOOL

MECHANICAL SYSTEMS OPTIONS PROS & CONS

Common Benefits for All Systems

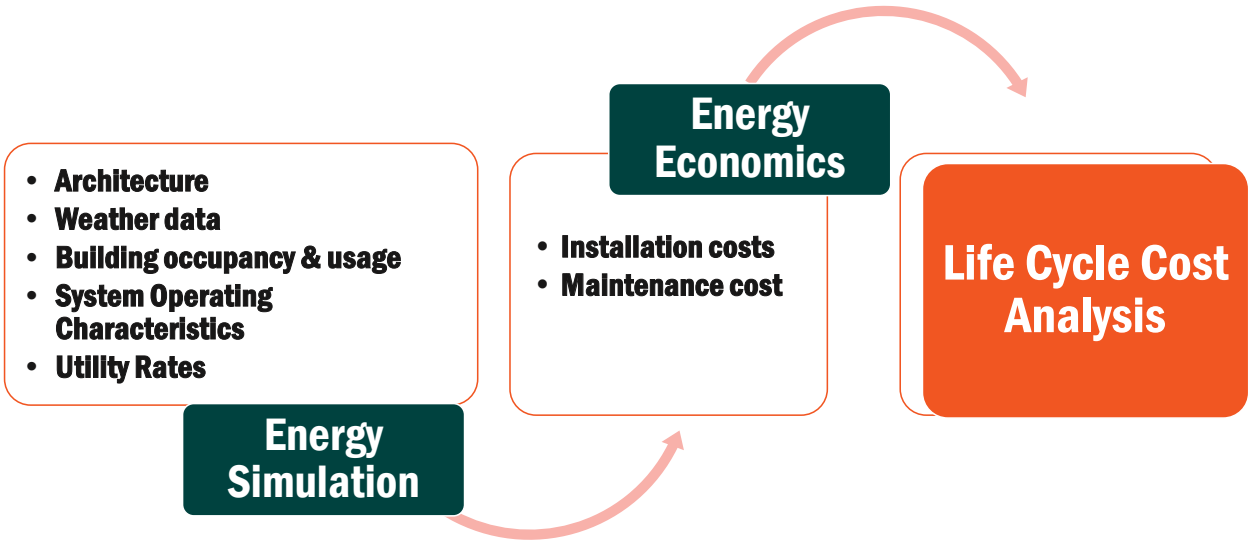
- High Energy Efficiency
- Improved Air Quality & Filtration
- High Level of Thermal Comfort
- Low Noise Operation
- New Automatic Temperature Control & Building Energy Management System

Unique Pro's	
Option 1	Lowest Operational Expenses, Lowest Maintenance, Highest Air Quality, Lowest Noise Operation, Reduced Cooling Loads
Option 2	Units Located in Ceiling, Moderate Maintenance
Option 3	Lowest Energy Use, Does Not Use Fossil Fuels for Heating, Units Located in Ceiling
Option 4	Lower Energy Use, Units Located in Ceiling

Unique Con's	
Option 1	Utilizes Fossil Fuels for Heating, Requires Coordination for Chases & Floor Mounted Diffuser Locations
Option 2	Utilizes Fossil Fuels for Heating, Highest Energy Use, Condensate Maintenance
Option 3	Highest Operational Expenses, Highest Maintenance, Highest Noise Operation, Condensate Maintenance
Option 4	Higher Operational Expenses, Higher Maintenance, Highest Noise Operation, Utilizes Fossil Fuels for Heating of Condenser Plant, Condensate Maintenance

LOWELL HIGH SCHOOL

ENERGY ECONOMICS METHODOLOGY



LOWELL HIGH SCHOOL

MECHANICAL SYSTEM PAYBACK SUMMARY

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Gas Cons. (MBTU)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility $/s.f.	Annual kBTU/ s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings**	Discounted Payback (Years)***
Baseline	Overhead Variable Air Volume (VAV) with Hot Water Reheat Coils	**$33.7 M**	5.8 M	13 K	$700 K	$118 K	$826 K	$1.33	**52.7**	$89 K	**$916 K**	-	**-**	-
1	**Displacement Ventilation with Passive Chilled/Hot Water Radiant Panels**	**$31.7 M**	4.9 M	6 K	$632 K	$67 K	$699 K	$1.12	**36.4**	$88 K	$787 K	$129,030	**$6.3 M**	Instant***
2	**Active Chilled Beam (Induction) Units**	**$33.7 M**	5.0 M	6.3 K	$656 K	$70 K	$726 K	$1.17	**37.9**	$125 K	$851 K	$64,584	**$3.0 M**	Instant***
3	**Air-Cooled Variable Refrigerant Flow (VRF) Unit (All Electric)**	**$30.0 M**	5.5 M	1.9 K	$713 K	$21 K	$734 K	$1.18	**33.1**	$194 K	$927 K	-$11,666	**$4.7 M**	Instant***
4	**Water-Cooled Variable Refrigerant Flow (VRF) Unit**	**$32.5 M**	5.4 M	2.5 K	$705 K	$27 K	$732 K	$1.18	**33.7**	$195 K	$927 K	-$11,061	**$2.7 M**	Instant***

LOWELL HIGH SCHOOL

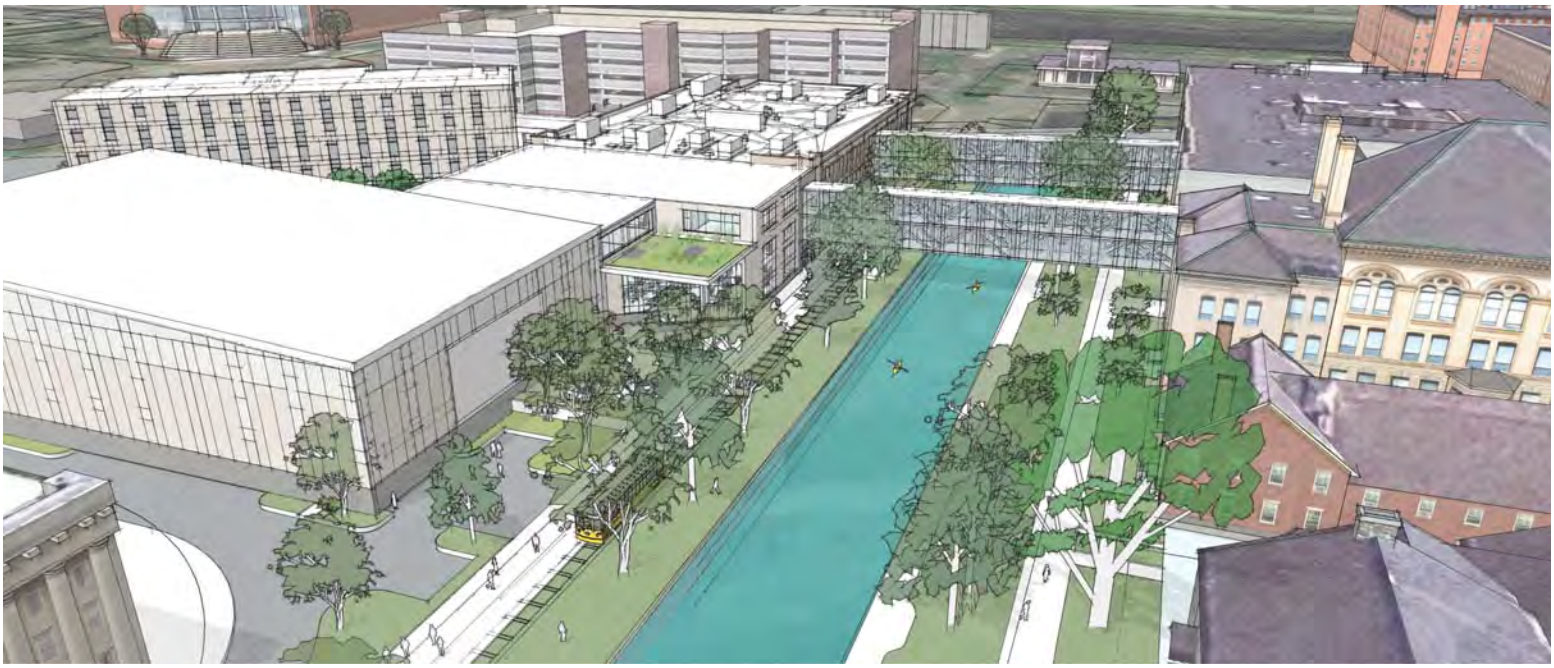
MECHANICAL SYSTEMS SELECTION

- Working Group Mechanical Systems Recommendations:
  - **Option 1 - Displacement Ventilation:** **7 Votes**
  - Option 2 – Active Chilled Beam 0 Votes
  - **Option 3 – Air Cooled VRF (All Electric):** **4 Votes**
  - Option 4 – Water Cooled VRF: 0 Votes

- SBC Decision on System Recommendation by Working Group

LOWELL HIGH SCHOOL

TWO STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH



LOWELL HIGH SCHOOL

ONE STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH

LOWELL HIGH SCHOOL

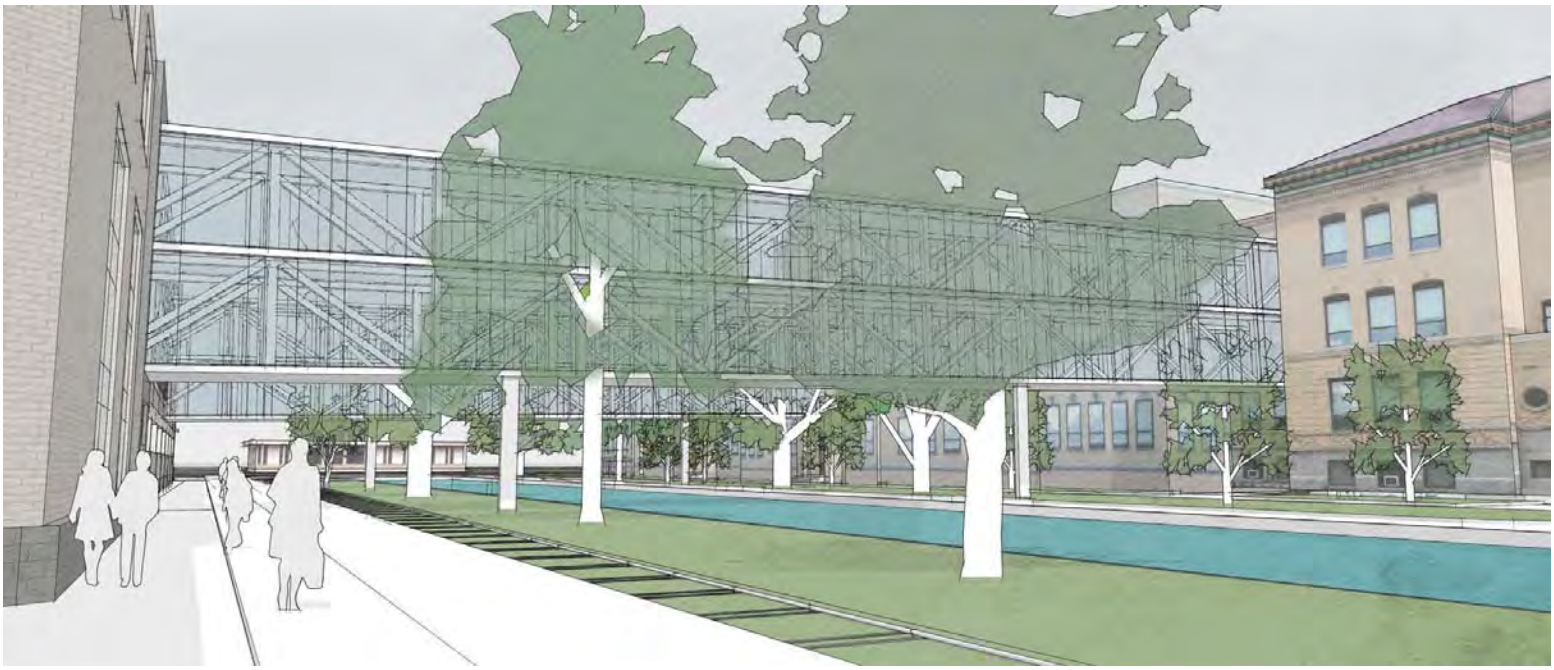
TWO STORY BRIDGE OPTION- VIEW FROM ACROSS FATHER MORISETTE BOULEVARD

LOWELL HIGH SCHOOL

ONE STORY BRIDGE OPTION- VIEW FROM ACROSS FATHER MORISETTE BOULEVARD

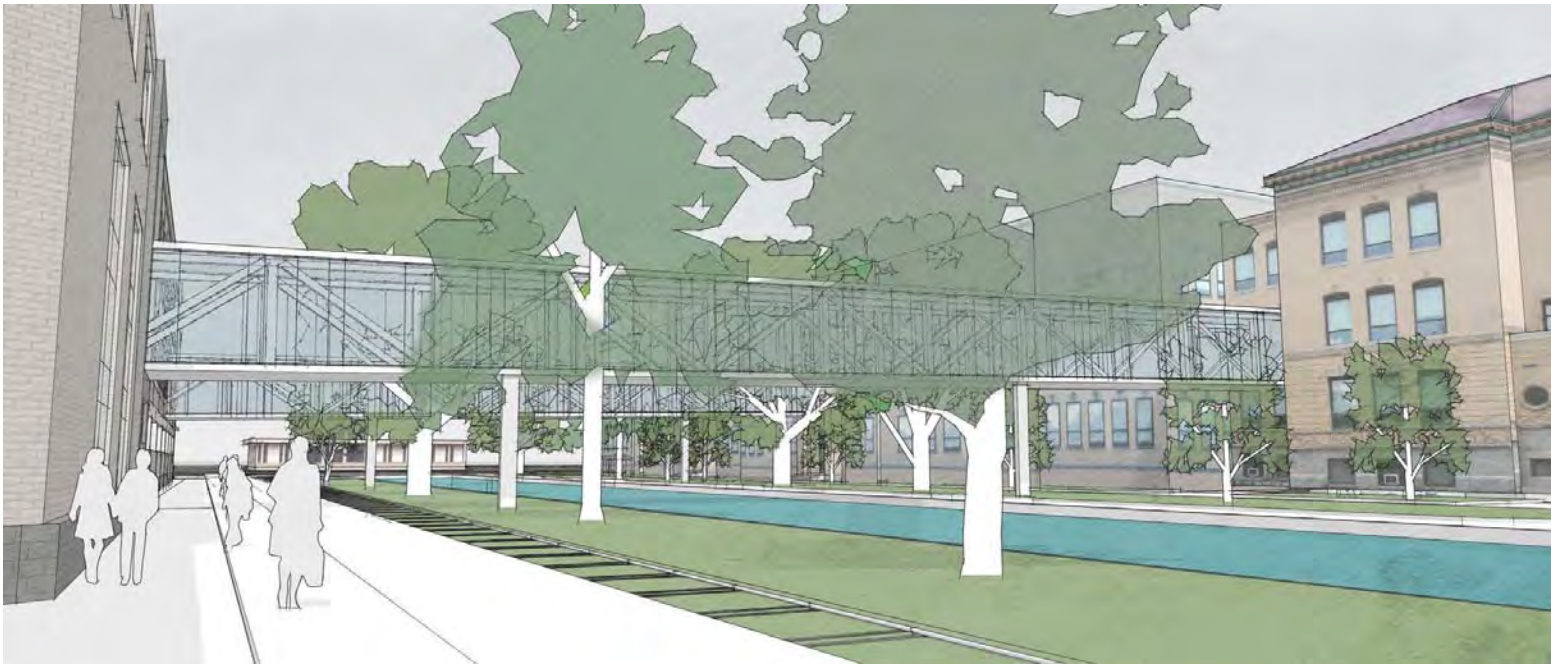
LOWELL HIGH SCHOOL

TWO STORY BRIDGE OPTION- EYE LEVEL VIEW FROM SOUTH



LOWELL HIGH SCHOOL

ONE STORY BRIDGE OPTION- EYE LEVEL VIEW FROM SOUTH



LOWELL HIGH SCHOOL

ONE VS. TWO STORY BRIDGES

- Educational Plan:
  - One Story = Connectivity on one level, longer travel distance
  - Two Story = Connectivity on two levels, shorter travel distances
- Historic:
  - One Story = Increased View Corridor at Canal
  - Two Story = Decreased View Corridor at Canal
- Cost:
  - One Story = +/- $4,300,000
  - Two Story = +/- $7,200,000
- SBC Decision One vs. Two Story Bridges

LOWELL HIGH SCHOOL

NEXT STEPS

- 11/7: Faculty Focus Group Meetings
- 11/7: ISD/Fire/Police/Traffic Meeting
- 11/19-12/14 Existing Conditions Investigations 75 Arcand Drive
- *Note: No Working Group Meeting scheduled in November at this time.*
- 12/5: Student Forum
- 12/15: Lowell Historic /Planning & Development Meetings
- 12/6: SBC Meeting – General Updates
- 12/17: Pricing Package to Estimators

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Eileen Donoghue
City Manager

Kara Keefe Mullin
Assistant City Manager

School Building Committee - *Meeting Minutes*

Date: December 6, 2018
Time: 5:30 PM
Location: City Council Chamber

1. Meeting called to order by City Manager Donoghue at 5:35 PM.

2. Roll Call

Eileen Donoghue, William Samaras, Councilor Rodney Elliott, School Committee Member Connie Martin, Conor Baldwin, Maryann Ballotta, Marianne Busteed, Christine Clancy, James Cook, Jeannine Durkin, Jay Mason, Ben Opara, Sgt. David Peaslee, Dianne Tradd, Billie Jo Turner, Richard Underwood, Mike Vaughn, Jeffrey Wilson. Roll call shows 18 School Building Committee members present.

Others in Attendance from the City:

Kara Keefe Mullin, Alex Magee

Project Team Member Associates in Attendance:

Skanska: Mary Ann Williams

3. City Manager Donoghue introduced 3 new School Building Committee Members. Sgt. David Peaslee, who is in charge of the School Resource Office program at the Lowell Police Department, Jeffrey Wilson, who is a commissioner on the Lowell Commission on Disability, and Ben Opara, who is an active community member. She thanked the 3 new members for their commitment to this important project. She discussed briefly the purpose of today's meeting, which was to take a vote on construction methodology, and asked Mary Ann Williams of Skanska to come up and briefly speak on the issue.

4. Mary Ann Williams of Skanska spoke about the two major construction methodologies which are considered for public building projects of this magnitude – the Design-Bid-Build (D-B-B) method and the Construction Manager at Risk (CM at Risk) method. She noted historically projects were built using the D-B-B method, and often went over on both time and budget. She noted the main difference between methods. She spoke of the benefits of CM at Risk, including better feedback to the owner during construction, the better use of phased occupied

construction, and better overall communication. M. Williams noted there are only 6 or 7 construction managers in the state that are able to even afford a bond for a project as large as the Lowell High School project. She noted having a construction manager helps with efficiencies throughout the project, and includes better planning which makes the project more cost effective. E. Donoghue asked M. Williams to address the starting point of construction. M. Williams noted that construction can begin much earlier while utilizing a CM at Risk methodology, because of the phasing you are able to begin construction while planning continues on later phases of the project. She noted that using the CM at Risk method would allow the LHS project to pick up about one school years' worth of time for the overall project. She noted that this method requires full buy in from the owner's group to make sure all needs are balanced. Ben Opara asked about the timeline to bringing a construction manager onboard, and wanted clarification if the same people used during preconstruction would be used during the project. M. Williams noted they use state guidelines and are able to pre-select contractors based on those guidelines. She also noted the guaranteed max price is based on the scope of the project, which is driven by the education plan provided by the district.

Rodney Elliott asked about the D-B-B method and how it locks the project into a price. He noted that cost is obviously important, but is time what really gives the CM at Risk method the biggest advantage? M. Williams said it was one of the advantages, yes, but that there were others as well. R. Elliott asked what effect market conditions had on fees associated with these projects. M. Williams noted the ability to bring aspects of the project to where they are ready to bid based on the projects overall schedule. R. Elliott then asked about change orders, noting in his line of work he deals with them all the time, and if they were more prevalent with one method over the other. M. Williams stated the CM at Risk method mitigates but does not remove altogether change orders. She said there is usually a contingency built into a project for changes. She said construction drawings will never be 100% perfect, and changes will need to be made throughout the process, but a construction manager helps solve the problems before they arise during design phases.

R. Elliott then asked about the experience in Lexington. M. Williams noted the project was not done yet, but was on budget, and they saved money based on vetting subcontractors before eliciting bids. The process of vetting their subcontractors gave the owner better control over their money.

R. Elliott then asked about the impact of construction method on borrowing and timing of borrowing. Conor Baldwin stated it should not have a big impact on the project. He stated cash flows will be financed with notes, and will bond the project as necessary. M. Williams noted they will develop cash flow projects early. C. Baldwin then said they

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Eileen Donoghue
City Manager

Kara Keefe Mullin
Assistant City Manager

will sell debt based on each phase so they will not be paying debt service on work that is not being done.

Jay Mason asked about the timing of hiring a construction manager, and if it would happen in the spring, and how that timing coincided with the guaranteed maximum price. M. Williams noted the drawings thus far have been very high level. The guaranteed max price will be available when 100% of the bid documents are available. She said there is still a roughly 20 month design process, which is needed to develop the project and review it at all levels with all stakeholders involved. J. Mason asked if this was a 3 year process. M. Williams stated that if approved by the MSBA in April of 2019 as expected, they will anticipate a construction start sometime during the 2021 building season. J. Mason confirmed when bid docs were completed would have a guaranteed maximum price. M. Williams noted that if the economy were to go into a recession, the markets would become more competitive.

E. Donoghue asked M. Williams to confirm if the consultants Skanska, who she works for, and Perkins Eastman (the Architect) recommended utilizing the CM at Risk method, which M. Williams confirmed they did. E. Donoghue entertained a motion to vote to approve of the CM at Risk method, which was made by Mayor Samaras and seconded by J. Mason.

Construction Methodology Vote - Roll Call for CM at Risk Method		
	Yes	No
Eileen Donoghue	X	
Mayor William Samaras	X	
Councilor Rodney Elliott	X	
School Committee Member Connie Martin	X	
Conor Baldwin	X	
Maryann Ballotta	X	
Marianne Busteed	X	
Christine Clancy	X	

James Cook	X	
Jeannine Durkin	X	
Jay Mason	X	
Ben Opara	X	
Sgt. David Peaslee	X	
Diane Tradd	X	
Billie Jo Turner	X	
Richard Underwood	X	
Michael Vaughn	X	
Jeffrey Wilson	X	

CM at Risk was chosen with 18 votes in favor, 0 opposed.

E. Donoghue entertained motion to adjourn at 6:07, motion by Mayor Samaras, seconded by James Cook.

Karen M. Moynihan
expires : 5/14/2021

SKANSKA

Public School Construction in Massachusetts




CM at Risk Delivery Method

Lowell High School SBC Presentation November 1, 2018

SKANSKA

Presentation Overview



- Construction Delivery Methods Defined
- Comparison of Design–Bid–Build vs. CM at Risk
- The CM Advantage
- Chapter 193 – Massachusetts Construction Reform

Construction Delivery Methods Defined



Types of Construction Delivery Methods

- Design – Bid – Build (Chapter 149)
- Construction Management at Risk (Chapter 149A)
- Design – Build (Public Works Projects)
- Construction Management Agency (Not Used in MA)

Construction Delivery Methods Defined

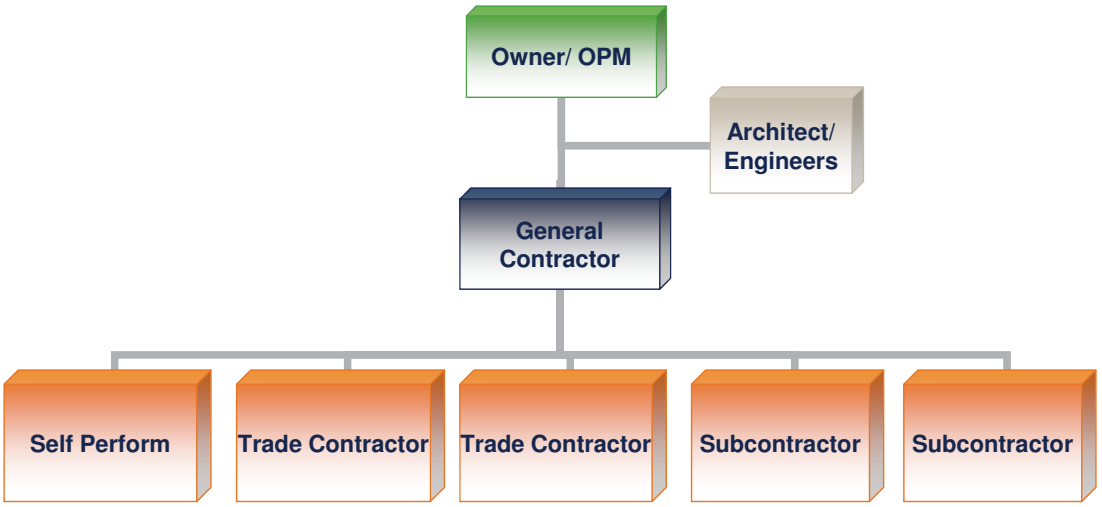
Design-Bid-Build (D-B-B)

- "Traditional approach" for construction of schools
- Project designed by a team of Architects and Engineers to 100% Construction Documents
- Once plans are completed, bids are solicited from General Contractors and Trade Contractors
- A complete set of design documents is finished before the builder becomes involved
- Low "responsive" bidder is awarded project
- Contract is based on a "Lump Sum" amount

"This method is the one with which most Owners are familiar. It is a linear process where one task follows completion of another with no overlap possible. Plans and specifications are completed by the architect and then bids are issued. Contractors bid the project exactly as it is designed with the lowest responsible, responsive bidder awarded the work."
– Getting the best value for our construction dollars, A primer on construction delivery methods for owners, Maricopa Community Colleges

Construction Delivery Methods Defined

Design-Bid-Build (D-B-B)



Construction Delivery Methods Defined

Construction Management at Risk (CMr)

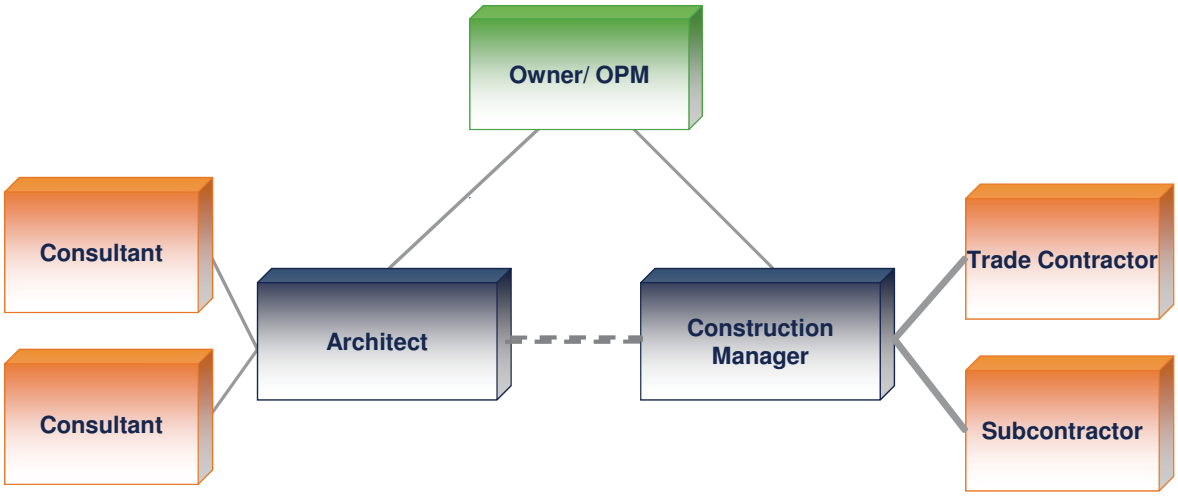
- Hired early in design process
- CM provides design phase and preconstruction services
- CM becomes builder of project (Contractor)
- CM has ability to “drive” the entire process
- Owner participates in Trade and Subcontractor selections
- Option for phased or fast-track schedule
- Contract is based on “Guaranteed Maximum Price” (GMP)
- Open book accounting

“A construction manager-at-risk is intended to assume the risk for construction at the contracted price in the same manner as a general contractor; but also provides consultation to the school district regarding construction during and after the design of the facility”

- *Construction Delivery Methods for Texas School Districts, Pfluger Associates Architects P.L.L.C.*

Construction Delivery Methods Defined

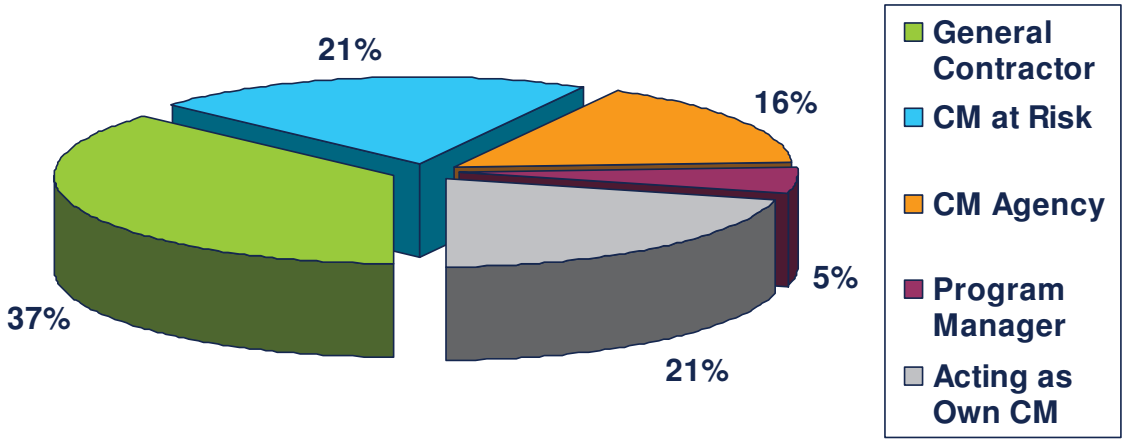
Construction Management at Risk (CMr)



Construction Delivery Methods Defined

Delivery Method Usage Nationally

Courtesy – FMI/CMAA 8th Annual Survey of Owners



Comparison of D-B-B vs. CMr

Design-Bid-Build

Advantages

- Familiar delivery method
- Simpler process to manage
- Fully defined project scope for construction
- Lowest price proposed and accepted; pricing, including contractor fee and overhead, secured competitively; “best price”
- Owner can completely control design
- **BEST SUITED FOR**: less complicated projects that are budget sensitive but are not schedule sensitive and not subject to change.

Disadvantages

- Linear process means longer schedule duration than other methods
- “Hard” price not established until bids are received; may require redesign and rebid if bids exceed budget.
- Not a schedule or budget driven process
- No builder input in design, planning or budgets
- The designer may have limited ability to assess scheduling and cost ramifications as the design is developed which can lead to a more costly final product
- Quality of Trade contractors and subcontractors not assured
- Fosters adversarial relationships between all parties and increases probability of disputes
- Prone to changes and claims which may increase final project cost

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Comparison of D-B-B vs. CMr

Construction Management at Risk

Advantages

- Construction Manager selected based on qualifications, experience and proposed team rather than low cost
- Design phase assistance with budgeting, planning and constructability results in ability to influence outcome by addressing issues early
- Early cost estimates and feedback to help in the design development process resulting in a more accurate cost model earlier
- Fast Track schedule delivery possible
- Team concept with owner and designer
- **BEST SUITED FOR:** new or renovation projects that are schedule sensitive, difficult to define or subject to potential changes; also for projects requiring a high level of construction oversight due to multi phases, technical complexity or multi-discipline coordination

Disadvantages

- Requires an OPM or Owner with an understanding of experience in CM process and GMP mechanics
- Difficult for the Owner to evaluate the GMP and determine if best price achieved
- Potential for higher up front cost due to “filling holes” in scope and/or documents (with result of eliminating future change orders and associated delays)
- Potential adversarial relationship when design intent is challenged when “design-to-budget” or “price cutting” is pushed
- Owner or OPM must be versed in pricing negotiations

Comparison of D-B-B vs. CMr

Lump Sum vs. Guaranteed Maximum Price (GMP)

Lump Sum

- Based on cost of the work, general conditions and desired profit of GC
- Price fixed at lump sum bid amount with additions for change orders
- Price based on "plans and specs", or exactly what is indicated on contract documents. GCs look at documents as "black and white"
- Savings on actual costs below the bid "lump sum" amount become contractor profit
- No opportunity or incentive for negotiation

"One pitfall to look for is that sometimes builders will intentionally bid low in order to win the project and then hope to make up the loss in profits through change orders."
-Construction Contracts and Delivery Methods, New Hampshire Department of Education

Guaranteed Maximum Price (GMP)

- Based on bids for work packages, general conditions, contingency and set fee
- Essentially a "cost-plus" contract with guaranteed maximum
- Final price is based on actual bids received, amount of contingency used, and agreed upon general conditions/fee
- Any savings on actual costs revert to the owner
- All items of GMP are negotiable with the exception of the CM fee and Trade Contractor Bids
- Can include allowances for work that is unclear or undefined to ensure no financial surprises

The CM Advantage

TWO YEARS AND STILL COUNTING: The Wachusett Regional High School project was supposed to be completed in August 2006.

The high school renovation project in Falmouth is more than two years behind schedule.
Cape Cod Times/Steve Heaslip

The CM Advantage




The old so-called design-bid-build process was so notorious for problems…. contractors derisively referred to the system as "design-bid-build-sue."

Robert Petrucelli, president of Associated General Contractors of Massachusetts

A number of school building committees… have reported problems with shoddy or overdue work. In some instances, fed-up town officials booted general contractors from job sites, and the disputes have led to costly court battles.

Boston Globe, New Rules for School Contracts, November 30, 2006

"It's the same names that keeping popping up again and again," said Katherine Craven, executive director of the Massachusetts School Building Authority. "Repeated poor performance is getting rewarded with more business, and that's bad."

Katherine Craven, Executive Director, Massachusetts School Building Authority

The CM Advantage

"Cost savings can be realized in a number of ways. By hiring the CM during the design phase, early coordination is possible, which can increase the speed of the project and strengthen coordination between the Architect/Engineer and the CM. Since the client hires the construction manager based on qualifications, it ensures a CM with a strong allegiance to the client, because their business relies on references and repeat work. Finally, transparency is enhanced, because all costs and fees are in the open, which diminishes adversarial relationships between components working on the project"

- Issue Brief - Construction Management at Risk, Current Issue Position and Analysis, American Institute of Architects

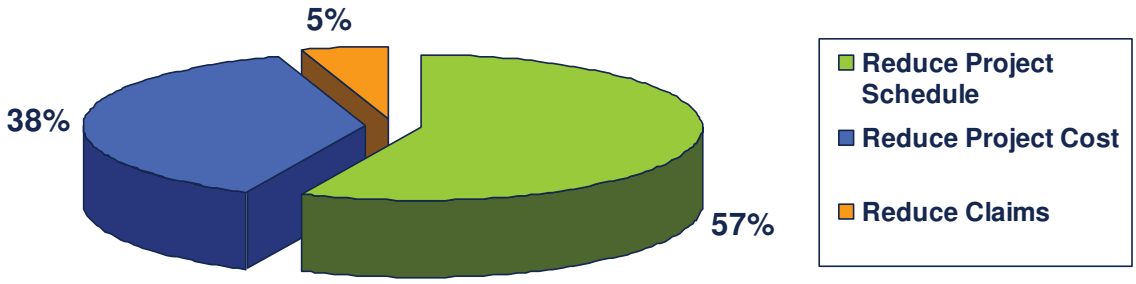
"The ability of the CM to input constructability reviews, construction phasing, material availability, and cost estimating throughout the design process reduces the probable occurrences of change orders, project construction delays, and increased project costs due to contractor identification of these elements in the design phase instead of the construction phase."

- Construction Management at Risk: An Innovative Project Delivery Method at Stormwater Treatment Area in the Everglades, Florida, Young H. Kwak, Ph.D. and Randal Bushey, P.E.

The CM Advantage

Primary Reason for Considering Alternative Delivery Methods

Courtesy – PinnacleOne U.S Public Construction Survey

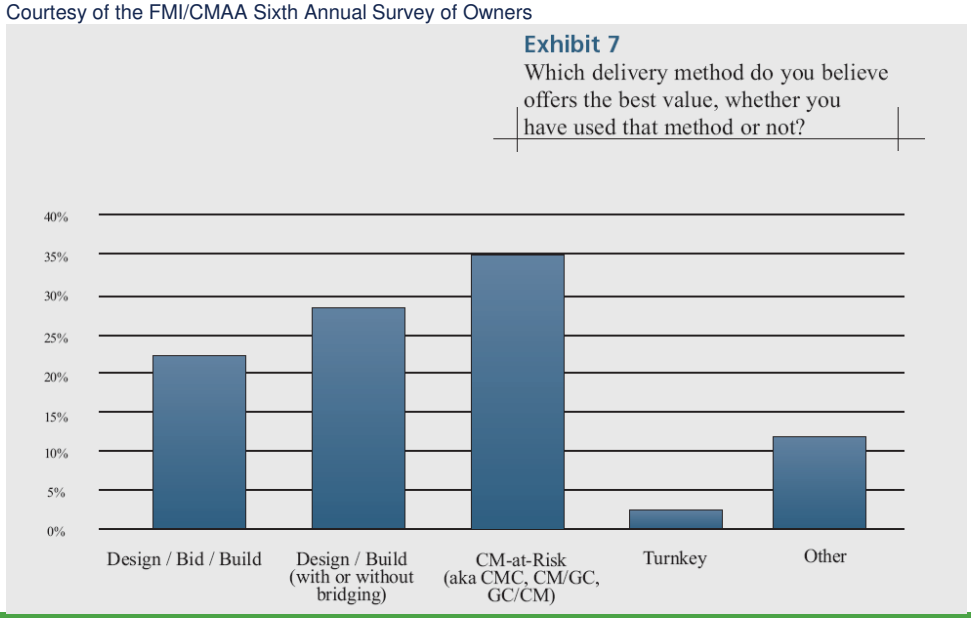


"According to the results of this year's survey, owners are also recognizing that there are alternative construction delivery methods that will achieve their goals. For instance, we found that 66% of respondents use the design-bid-build delivery method most often, but only 23% believe that that method offers the best value…it makes sense that, over time, more owners will migrate to the delivery method that offers the best value.
-FMI/CMAA Sixth Annual Survey of Owners

The CM Advantage

A question of value

Courtesy of the FMI/CMAA Sixth Annual Survey of Owners



The CM Advantage



Key Drivers

- Team Approach
- Cost Factors
- Schedule Considerations
- Subcontracting
- Quality

The CM Advantage

Team Approach

- CM Process based on relationships and teamwork
- CM motivation is project success because future work is solely tied to references and past experience
- Cost reimbursement structure and fixed fee promotes CM as advocate of owner

"The CM at Risk process is based on team building between the owner, the design architect/engineer, and the contractor-construction manager from the beginning of the project conceptual design through the final construction and operation or occupancy of the facility. The team approach provides for input from all of the team members throughout the design and the construction phases."

- Construction Management at Risk: An Innovative Project Delivery Method at Stormwater Treatment Area in the Everglades, Florida, Young H. Kwak, Ph.D. and Randal Bushey, P.E.

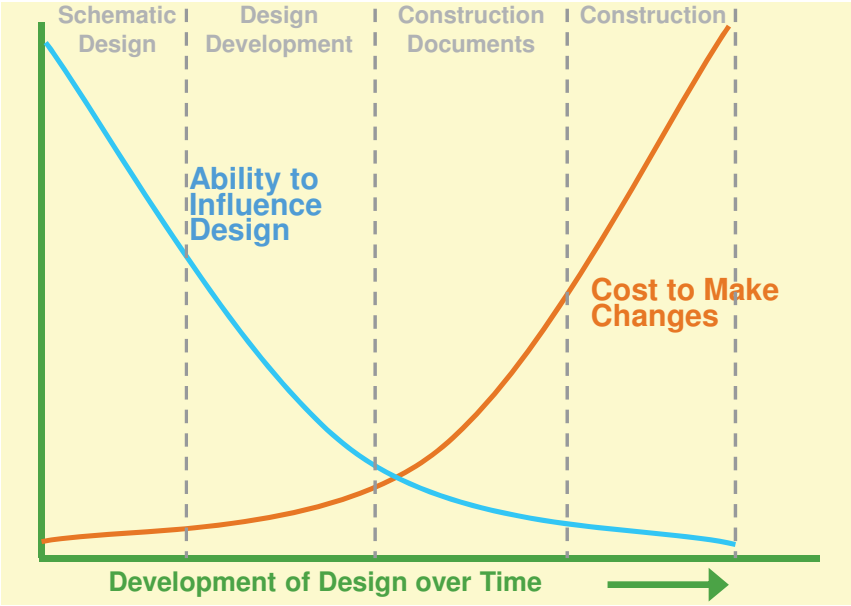
The CM Advantage

Cost Factors

- Fee set at time of contract. No motivation for CM to "inflate" costs because savings revert to owner
- GC motivated to find "holes" in documents to reduce bid amount and make up with later change orders
- CM involvement in preconstruction to assist design team in maintaining budget and optimizing value/constructability
- Continuous budget feedback and control
- Open book accounting and purchasing
- Ability to obtain GMP earlier in process than traditional bid
- More ability to handle change in design and scope
- Minimizes changes and claims once in construction

The CM Advantage

Cost and the Ability to Influence Design



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Value Management Savings

Owner/Project	Accepted Value Management Proposals	Initial Estimate Per Design	Value Management Savings (Capital Costs Only)	Preconstruction Fee	Percent Savings	Return on Precon Investment (Capital Cost Only)	Additional Schedule Reduction	Life Cycle Cost Savings
University of West Georgia Wellness Center	Steel Frame, Shallow Foundations, Increasing Size of Metal Panels, etc. ILO Opposite	$29,789,295	$6,781,368	$148,946	23%	4552.89%	4 Weeks	N/A
Virginia Tech Engineering Research Laboratory	Various: All Building Systems	$27,083,551	$3,933,000	$135,418	15%	2904.35%	Not Specified	N/A
Dept. General Services State of CA Central Plant Renovation	Build New Facility ILO Renovate Existing	$211,000,000	$30,000,000	$1,055,000	14%	2843.60%	36 Weeks	✓
Brandon School District Burt/Swanson Elementary School Roof Replacement	Liquid-Applied Neogard System Coating ILO Total Roof Replacement	$590,000	$295,000	$14,750	50%	2000.00%	2 Weeks	N/A
Miami-Dade County Public Schools Miami Senior High School Additions and Renovations	Various: All Building Systems	$111,563,984	$9,755,226	$557,820	9%	1748.81%	26 Weeks	✓
Harbor Towers HVAC Rehabilitation	"Slip-In" Replacement Fan Coil Unit ILO Extensive Wall/Window Sill Demolition	$50,500,000	$2,500,000	$252,500	5%	990.10%	24 Weeks	✓
Trinity Health Services St. Joseph's Hospital Lab Renovation	Build Exterior Areaway and Permanent Access to Improve Materials/Workers Path of Travel	$3,963,058	$394,000	$49,788	10%	791.35%	Not Specified	N/A
Southest Oregon Regional Airport New Terminal	Various: All Building Systems	$22,758,137	$5,307,137	$682,744	23%	777.32%	8 Weeks	N/A
Royal Oak Public Schools Royal Oak Northwood Elementary School	Air Cooled Chiller ILO Water Cooled Chiller w/ Cooling Tower and Mechanical Room Addition	$12,358,187	$948,580	$123,582	8%	767.57%	Not Specified	✓
Kimpton Hotels Hotel Marlowe	Horizontal Low Voltage Cabling ILO Empty EMT Conduit to Each Room	$30,000,000	$1,030,000	$150,000	3%	686.67%	3 Weeks	N/A
T.F. Green Airport Security & Baggage Handling Upgrades	Various: All Building Systems	$72,534,968	$2,480,000	$362,675	3%	683.81%	Not Specified	N/A
Harvard Real Estate Services Inn at Harvard	Shotcrete Foundation Wall ILO Wall Cast with Two-Sided Form	$12,100,000	$100,000	$121,000	1%	82.64%	Not Specified	N/A

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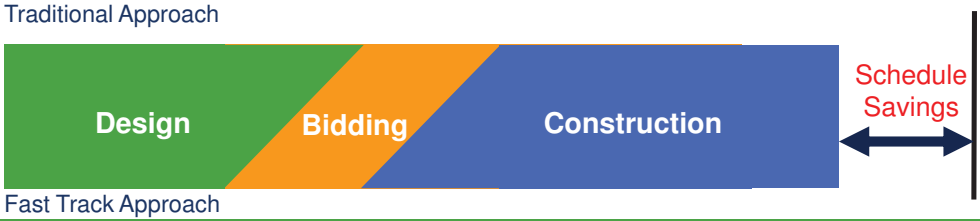
The CM Advantage

Schedule Considerations

- Builders viewpoint on “how to build” for planning and logistics integration into design
- Opportunity for fast-tracking and prepurchase of equipment
- CM Design-phase input allows for facilitation of biddable fast-track package documents

Traditional Approach



Fast Track Approach

The CM Advantage

Subcontracting

- CM leads subcontractor bidding and manages bid process.
- CM involvement in prequalification of Trade Contractors
- Allows owner "screening" of subs through review of bid lists and qualifications
- Significant bid coverage for all trades due to CM relationships in marketplace
- With GC process, Filed Sub-Bidders do not know who GC is at time of bidding
- Ability for CM to create specific scopes of work for subcontractors as basis for bidding
- Early involvement and knowledge of project helps CM mitigate gaps in purchased scope
- Ability to perform "scope debriefs" to ensure bidder understanding of documents and expectations

The CM Advantage

Subcontracting

"The basic difference between a construction manager and a general contractor is in their approach to managing subcontractors and in keeping the owner's costs down. A true construction manager, whose fee is not affected by the result, will attempt to negotiate the best value for the owner in selecting subcontractors. A general contractor will tend to negotiate in a way that maximizes his profit."

- Construction Contracts and Delivery Methods, New Hampshire Department of Education

"Many contractors who call themselves construction managers will expect to self perform significant portions of the project. That means that they will use their own firm's employees, rather than subcontractors, to do much of the actual construction work. This arrangement may not result in the best value to the owner. A good rule of thumb is that if the firm owns anything larger than a pickup truck, they are not construction managers"

- Construction Contracts and Delivery Methods, New Hampshire Department of Education

Specific Scopes of Work, excerpts from electrical scope:

7. This Subcontractor shall refer to the mechanical and plumbing drawings for coordination with electrical for a complete and functional system.
8. Provide all miscellaneous steel for hanging of electrical devices, equipment, and light fixtures, etc.
9. This Subcontractor will furnish and layout access panels required for his Work.
10. Provide all code required service switches whether indicated or not.
11. Provide all necessary coring, fireproofing, and firesafing at all penetrations in connection with this Work to maintain appropriate fire rating.
12. Include setting embeds or drilling for floor junction boxes.
13. Include temporary electrical system complete, including removal of temporary lights. Temporary heat detectors tied into the fire alarm system are included.
14. This Subcontractor includes sufficient temporary light and power to meet the requirements of all trades working on the project including maintenance. Temporary power will be brought into the building from an existing location on the site. This includes power for temporary hookup for the interior elevator during the construction phase.
15. This Subcontractor shall bag smoke detectors at installation, then remove bag and clean smoke detectors prior to inspection and testing as directed by the Construction Manager.
16. This subcontractor shall install a temporary heat detector loop complete in buildings 1, 2, 3, and 4 (all floors). Heat Loop system to be tied into Masterbox and Dialer for notification to the Fire Department.
17. Removal and refeed work indicated in detail 1/E4n.1d is included. The “D2” note is incorrectly tagged to this run.

The CM Advantage

Quality

- CM Selection process is based on qualifications, experience, proposed team and success on past projects
- Lump Sum process promotes cost cutting to increase profit
- With General Contracting, heavy owner involvement is required to ensure no “cutting corners” on quality
- GC bids are based on “plans and specs” with no opportunity for scope clarification
- CM early involvement in project leads to greater understanding of complex logistics and design details
- Review of constructability during design phase utilizes builder’s knowledge of means and methods and subcontractor abilities to ensure a design that will result in a “buildable” high quality product

The CM Advantage

Quality

"The absence of a contractor's input into the project design may limit the effectiveness and constructability of the design. Important design decisions affecting both the types of materials specified and the means of construction may be made without full consideration of a construction perspective."

- Choosing the Best Delivery Method for your Project, Construction Management Association of America

Massachusetts Construction Reform

Chapter 193 of the Acts of 2004

"An Act Further Regulating Public Construction in the Commonwealth"

- Enacted July 19, 2004
- Most comprehensive construction reform since 1981
- Higher thresholds for general and filed sub-bidders
- DCAM Certification requirements for filed sub-bidders
- Prequalification requirements for bidders and sub-bidders
- OPM requirements
- MBE/WBE requirements
- New Statute: Chapter 149A to permit the use of the Construction Management at Risk alternative delivery method

Massachusetts Construction Reform

Chapter 149A

- Allows for the use of CMr for building contracts of $5 Million or more
- Requirement for advance approval by the Inspector General's Office to use CMr
- Two phase process for selecting CM: Prequalification & Proposal
- Two part proposal: Technical and Price
- Agency contracts with highest ranked firm with which committee concludes successful "non-fee" negotiations
- Inspector General's October, 2009 Report to the Legislature on CM at Risk and Construction Reform. http://www.mass.gov/ig/creform/refinfo.htm

Massachusetts Construction Reform

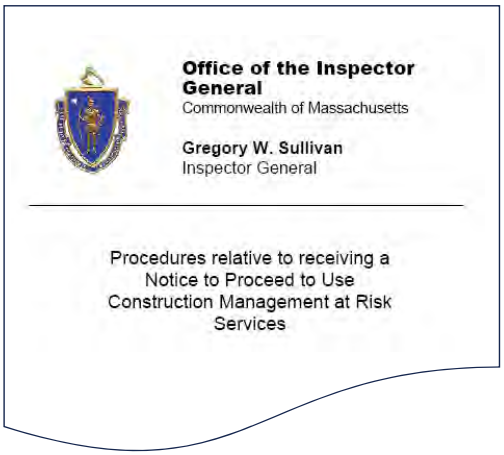
Steps for approval of CMr approach

- Contract with OPM
- Contract with designer
- Perform feasibility study
- Finalize project funding with MSBA
- Obtain community approval for project
- Initiate Application to Proceed process for CMr delivery method

Massachusetts Construction Reform

Planning Steps for Application Process

- Prepare feasibility study including proposed budget
- Establish proposed schedule
- Plan CMr "oversight" organization (how will contract, change orders, gmp be handled)
- Create CMr plan and procedures on how project will be managed
- Establish reporting and record-keeping systems
- Establish project organization chart and roles/responsibilities
- Obtain authorization from "governing body"



- Submit project specific Application to Proceed to Inspector General for consideration
- IG has 60 days from receipt of complete application to approve or deny request

Massachusetts Construction Reform

Criteria for Inspector General approval

"The Office of the Inspector General will issue a Notice to Proceed when the public agency has demonstrated that:

a. The public agency has authorization from its governing body to enter into a contract with a construction management at risk firm. The authorization shall include the results of any public vote if applicable.

b. The public agency has the capacity, a plan and procedures in place and approved of by the governing body, where appropriate, to effectively procure and manage construction management at-risk services for the specific project and has retained the services of a qualified owner's project manager.

c. The public agency has in place procedures to ensure fairness in competition, evaluation and reporting of results at every stage in the procurement process.

d. The building project has an estimated construction value of $5,000,000 or more.

e. The public agency has determined that the use of construction management at risk services is appropriate for the building project and states in writing the reasons for the determination."

Massachusetts Construction Reform

Steps in CM procurement process

1. Establish prequalification committee (OPM, Designer, at least two public representatives)
2. Prepare and advertise RFQ
3. Evaluate responses and prequalify at least three CMs
4. Establish a selection committee (can be same as prequalification committee)
5. Prepare RFP and distribute to prequalified firms
6. Receive, evaluate and rank proposals (interviews are permitted if conducted with all proposers)
7. Negotiate non-fee terms with selected proposer and award contract

Summary

CM at Risk creates the opportunity to:

- Hire a sophisticated, experienced team member based on qualifications
- Save time on the schedule through fast tracking and prepurchase
- Design a “buildable” building with a great deal of thought about value, quality, durability and user benefits
- Manage the budget process and see all costs via open book accounting
- Have a greater opportunity to select and prequalify subcontractors for the project resulting in significant quality improvement
- Reduce changes and claims through preconstruction involvement, design-to-budget, and effective purchasing and scope delineation
- Engage in a positive and collaborative design and construction process
- Gain an advocate looking out for your interests

Contact information:

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Boston, MA 02210
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M: 617-293-6869

Mary Ann Williams
Program Executive
E: maryann.williams@skanska.com

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Eileen Donoghue
City Manager

Kara Keefe Mullin
Assistant City Manager

School Building Committee - *Meeting Minutes*

Date: February 7, 2019
Time: 5:30 PM
Location: City Council Chamber

I. Attendance:

Present: Eileen Donoghue, William Samaras, Edward Kennedy, Rodney Elliott, Connie Martin, Conor Baldwin, Maryann Ballotta, Marianne Busteed, Christine Clancy, James Cook, Jeannine Durkin, Jay Mason, Ben Opara, Maria Sheehy, Ralph Snow, Diane Tradd, Billie Jo Turner, Michael Vaughn, Jeff Wilson

Also in attendance:

City: Michael Geary, Alex Magee
Skanska: Maryann Williams, Jim Dowd
Perkins Eastman: Joe Drown, Robert Bell

II. Accept Minutes of December 6, 2018 SBC Meeting

City Manager E. Donoghue called meeting to order at 5:34 PM. She entertained a motion to accept and place on file the minutes from the Dec. 6 School Building Committee, motion by J. Cook, 2nd by J. Mason, all voted in favor.

III. Presentation of Schematic Design Submittal

E. Donoghue spoke about the timeline of the submission of Schematic Design to the MSBA. E. Donoghue turned over to J. Drown of Perkins Eastman for presentation on Schematic Design. J. Drown introduced team including himself and R. Bell of Perkins Eastman, and M. Williams and J. Dowd of Skanska. J. Drown gave a recap of the schematic design process thus far, including site plan and building design. J. Drown spoke about working with the community over the last several months, including working groups, focus groups, and specialty items meetings. He noted they have met with many stakeholders throughout the community. He spoke about the process starting in 2016 and showed a timeline to date showcasing the process thus far. Preliminary design including relevant cost estimates; Preferred Schematic Report (PSR) which included cost estimates; and now very near to the end of schematic design process. He also noted we have

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begun the Construction Manager at Risk process and noted Skanska would speak to this shortly. J. Drown noted the April 10 vote at the MSBA to move the project into the Detailed Design phase. He noted cost estimates would be redone at 60% and 90% of "construction documents", i.e. during the detailed design phase of the project. He noted they have been keeping the budget on target to date and noted the desire to design to the budget throughout the project. J. Drown spoke of cost estimating as a design tool, and how estimating will be done against the budget three more times during detailed design phase. He also noted this is a large project made up of smaller projects, which include phases – for example the gymnasium will be a 12-18 month project once construction starts and the Freshman Academy will be another 18 month project after that.

M. Williams spoke about CM at Risk. Noted we had already received the OK from the Inspector General's office to utilize the construction method. M. Williams spoke to the process of sending out Requests for Qualifications to the building firms large enough to bond a project like this, and noted the potential of multiple companies joining to become a joint venture to bid on the project.

R. Bell began design portion of presentation, going through school at current schematic design. He noted some key documents previously presented to this SBC committee, including the space summary that had been reviewed and approved; he noted the need to submit Special Education plans to DESE; he discussed the ongoing challenge of figuring out what spaces are still non-reimbursable, which include very small parts of this project, and arguing for more reimbursements from the MSBA.

R. Bell then outlined education program. He spoke about the need to design the school to meet the education plan's needs, including bringing freshman academy into the campus; creating a heart of the school at center of school; collaborative clusters including STEM and humanities clusters; house administrations positioning being easy to access and able to provide presence where needed in buildings. He noted the need to get daylight into all classrooms, using light wells. He spoke of floor plans, including total transformations of the existing space, turning basement into brand new space; re-clustering arts, studios, creating suites for similar academics; positioning Freshman Academy with North-South orientation for optimal daylight and efficiency.

R. Bell noted student arrival through a security check at heart of school; the design includes layers of block off capability as a security feature. Redesigned main lobby/heart of school is a chance to connect to outdoor quad and green space. He noted you can see the whole side of the campus from here including gym, freshman academy, etc.

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R. Bell then noted the design is essentially creating new building within the walls of 22 building. Freshman will be organized in clusters on all 4 floors. He noted the new media center and other technology centers within the design. R. Bell spoke about eliminating windowless classrooms in 1980s building by bringing light wells into space, allowing school to connect to STEM. He spoke of a green roof, clean energy lab, terrace with possible gardens or other renewable technology education spaces, about possibility to add outdoor learning spaces here. He noted the site plan hasn't changed much. R. Bell then showed diagrams of various spaces as designed, showcasing features such as light wells, security measures, welcome plaza and other highlights. He discussed a closer vision of the quad – free movement of students around the quad, some potential uses and the natural amphitheater. He noted the first level of the school will have lots of glass and solid security barrier from outside. Lots of natural light. He showcased space for athletic buses. He showcased the canal and extra bridge. R. Bell also spoke about the 1922 building, including adding new windows (which would be historically accurate); tearing out inside of wall to reinsulate, rebuild walls; and completely transforming the interior while restoring the exterior. Updating accessibility. Restoring façade on French St. to include disabled accessibility. He then showed the video of aerial flyover of building and spoke to design features of campus as video progresses. R. Bell asked the group for questions on design.

J. Mason – question on sustainability, pointing out when in schematic design, aspirations come out. He didn't see any solar, was hoping to have concept or placeholder for solar and bike racks. Wants to point out sustainable aspects of design and not lose track during design. R. Bell noted they were making sure new construction is solar ready. Said it was not in budget now but will be prepared for future. He also said regarding bike racks that there were lots of them throughout the site.

W. Samaras requested Mr. Bell to please speak to community uses of building. Also to speak about renovation, and to distinguish renovation. Are you talking just painting or an entire gut renovation. R. Bell noted in the industry they call this a "full gut reno". Tearing down to the structure and rebuilding entire building from within. W. Samaras then asked R. Bell to speak about terrazzo floors. R. Bell noted the 1922 building has terrazzo floors, which he said are extremely expensive and last forever. He said they look really good and will attempt to hold this floor intact and maintain it for future use. W. Samaras then asked about community uses. R. Bell stated the ground floor level contains community spaces – school store, restaurant, cafeteria, student support services - controlled entry but communal use spaces. Community spaces close to entry, open to community without opening or compromising student-only areas of school. Doing

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similar design at auditorium and gymnasium – can be used independent of rest of school for same reasons. W. Samaras noted it is currently difficult for service trucks to access school now, and asked Mr. Bell to please address this issue in the design. R. Bell replied by stating they are creating enough maneuverability along backside of fieldhouse on a new access road. Tractor trailers can deliver and pass through. He said this will all be remedied in new plan.

J. Mason asked a follow up question regarding light wells, if they are they too small. R. Bell said they are doing studies on daylight, and the wells are bigger than they look in the design.

IV. Presentation of Total Project Budget Draft

E. Donoghue moved on to discuss the budget, inviting J. Drown to speak about the overall budget breakdown. J. Drown noted the 622,000 square foot project contained 388,000 square feet of renovation at an estimated $358.55 per square foot and 234,000 of new construction at an estimated $485.29 per square foot. He noted site and building takedown costs total approximately $17 million. The total estimated construction budget of about $273 million, and a combined per square foot price of about $434.26 per square foot. He noted the overall project costs are down to about $343 million, $2 million lower than earlier projections due to the City's decision to remove a $2 million carrying cost.

W. Samaras noted the costs are lower than estimates and people are concerned with escalating costs. He asked how do these costs stay under control. J. Drown noted many contingencies built into the budget for design, construction, labor, and pricing. He said the bottom line will remain but costs will move from contingency to actual cost. He noted contingencies for each portion of the budget. He noted he believes the budget has been built and will support the entire project going forward and will account for escalations. W. Samaras then asked about his record of meeting budget goals, to which J. Drown replied 100%.

E. Kennedy noted we are getting a $343 million high school for a $129 million cost to the city. He noted we are saving big money by keeping the shell of the 1922 building, saving a lot of money by keeping the shell versus all new construction. J. Drown noted that was correct, the design includes all new systems in the renovation, but are savig lots by not having to build an all new envelope.

R. Elliott noted contingency costs were not included in the breakdown and wondered why not, what percentages did they account for? M. Williams noted various contingencies and their confidence in these numbers. She discussed the two independent cost estimates, reconciled tougher, vetted together, and projected out based on other very large projects led to the final cost

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estimate. She noted the MSBA will not allow going over budget once it is approved. She noted the total budget being a concern. She noted she has never gone over budget or missed a schedule, it is part of their reputation and how they continue to find work. R. Elliott noted his concerns given the national market, and asked M. Williams about square foot cost comfort, to which she replied she is comfortable with the estimates. She said there may be fluctuations within the total, but is comfortable with the bottom line $270 million construction cost. She knows it is in the best interest of the city to spend all available money, as this increases the value received due to the state paying large reimbursement rate. She noted that because the state will be delivering somewhere around $216 million, everyone is watching, and this is a very significant project. R. Elliott noted pricing differences with other current projects. He asked if Skanska is doing any other similar projects. M. Williams noted the very efficient building, that they projected the trends forward. She also noted a third, independent cost estimator shared the combined opinion of Skanska and Perkins Eastman's cost estimators. She noted that we purposely are reusing as much structure as possible in order to save. She noted that money is tight in many communities.

R. Elliott asked for summarized budget figures. E. Donoghue noted when the city submits to the MSBA and get numbers back, will present a more detailed budget to the SBC and City Council for approval. M. Williams detailed the budget submission and reconciliation procedure with the MSBA, who will return with their cost estimates. She noted this project has already been seriously vetted. J. Cook wanted to note that whatever the cost was, the city was only paying around 20% of it. He also wanted to make another point, that when this goes to the MSBA in April, that is Lowell's shot at getting 80% funding. If we miss that benchmark we could fall to the back of the line for a new school.

A. Descoteaux (audience member, School Committee member) questioned whether a roof project would be part of the new school build. M. Williams noted this project was bid and designed separately and is not part of this project. E. Donoghue noted the city will see if the roof can remain. At least part of it will be retained, but the city had no choice based on condition. A. Descoteaux then asked about studio space. J. Drown noted new dance studio space, and R. Bell noted retaining height of rooms and rebuilding them would occur.

R. Elliott wanted to follow up on reimbursement rate, whether we would see a full 80% or not. He stated we are closer to 63%. M. Williams noted this was due to ineligible costs. The MSBA reduces the ineligible spaces based on square foot. She noted the bank, store, Katie's closet, Lowell Community Health, etc. are all non-reimbursable. The state only reimburses certain costs and requires the community to carry the rest.

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E. Kennedy wanted to point out LHS accredited now. He cited problems with the facility. Everyone is aware that the facility has had major systems failures recently. We only have one high school, we need an accredited high school, without one property values would plummet. This is a tremendous opportunity, the city cannot afford to pass on it. He noted this project is an important economic driver, and if we balk now the MSBA at some point would lose patience. He noted if we had to start this process all over, he doesn't know what would happen and we may need to pick up 100% of the cost.

E. Donoghue noted the design is a state of the art school, an urban campus with many unique aspects, one of the most outstanding high schools in the state and beyond. It is quite a large project, with lots of interest from construction firms. She noted she is looking forward to entering the process. She noted, from her position as City Manager, she faced gas leak emergencies at LHS on her very first day on the job. She noted the huge costs to get those fixed, to keep heat on in the school. She noted it was unfortunate this wasn't done 10 or more years ago, and that the building systems will not last any longer. She noted that this was a very thoughtful process. She entertained a motion to approve the submission to the MSBA. ***E. Kennedy made motion to vote, second by W. Samaras.***

V. Vote to Approve Submission of Schematic Design Submittal to MSBA

Roll Call Vote – Approve of Submission of Schematic Design to MSBA		
	Yes	No
Eileen Donoghue	X	
William Samaras	X	
Edward Kennedy	X	
Rodney Elliott	X	
Connie Martin	X	
Conor Baldwin	X	
Maryann Ballotta	X	
Marianne Busteed	X	

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Christine Clancy	X	
James Cook	X	
Jeannine Durkin	X	
Jay Mason	X	
Ben Oparas	X	
Maria Sheehy	X	
Ralph Snow	X	
Diane Tradd	X	
Billie Jo Turner	X	
Michael Vaughn	X	
Jeff Wilson	X	

Vote to submit Schematic Design to MSBA passed 19-0, all in favor.

VI. Next Steps

M. Williams spoke about next steps including hiring a construction manager and meeting with the MSBA regarding state participation and final budget numbers. E. Donoghue noted the city's intention to move this forward as quickly as possible, and that every week we lose is not just cost but also the inconvenience of being in a school that is not what it should be. She noted once sent to the MSBA by the SBC, the City Council should follow suit.

Motion to adjourn by E. Kennedy, seconded by W. Samaras. Meeting Adjourned at 6:40.

A TRUE COPY ATTEST

Michael Q. Geary
City Clerk, Lowell, MA

PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE | COMMUNITY MEETING

LOWELL HS PROJECT

7 FEBRUARY 2019

LOWELL HIGH SCHOOL

SCHEMATIC DESIGN UPDATE- AGENDA

- ACCEPT MINUTES OF DEC. 6, 2018 SBC MEETING
- PRESENTATION OF SCHEMATIC DESIGN
  - PROCESS
  - PROGRAM & PLAN
  - SITE DESIGN
  - BUILDING DESIGN
- PRESENTATION OF TOTAL PROJECT BUDGET DRAFT
- VOTE TO APPROVE SUBMISSION OF SCHEMATIC DESIGN SUBMITTAL TO MSBA
- NEXT STEPS

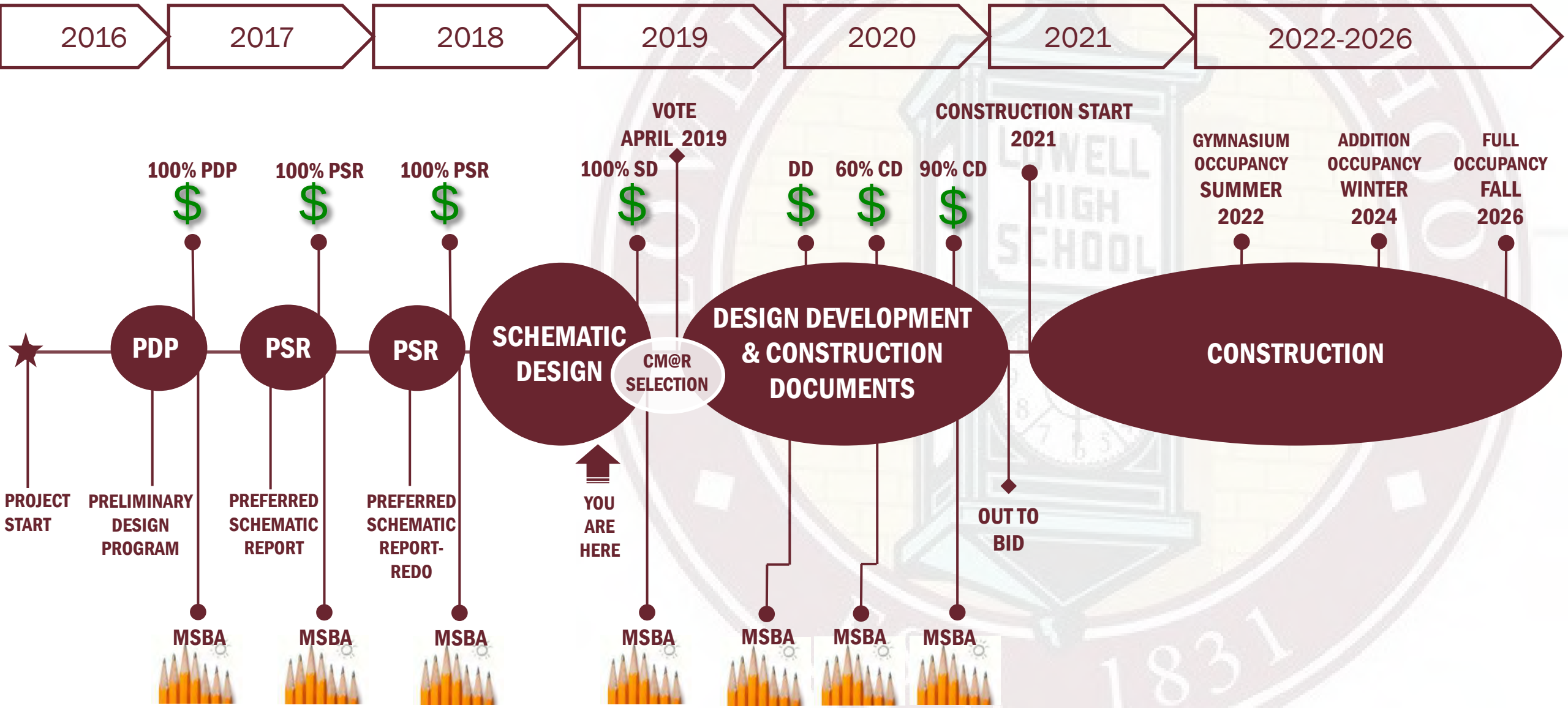
LOWELL HIGH SCHOOL

SCHEMATIC DESIGN RECAP

	AUGUST '18	SEPTEMBER '18	OCTOBER '18	NOVEMBER '18	DECEMBER '18	JANUARY '19
SBC MEETINGS	●	●	●	●		
ELT/WORKING GROUP MEETINGS	● ●	● ●	● ●			
FOCUS GROUP MEETINGS		● ●	● ●			
LOWELL HISTORIC/ NATIONAL PARKS		●	●	●		
ISD/FIRE/POLICE				●		
PLANNING & DEVELOPMENT				●		
EX. CONDITIONS (75 ARCAND)				●		● ●
STUDENT FORUM					●	
SECURITY MTG					●	

LOWELL HIGH SCHOOL

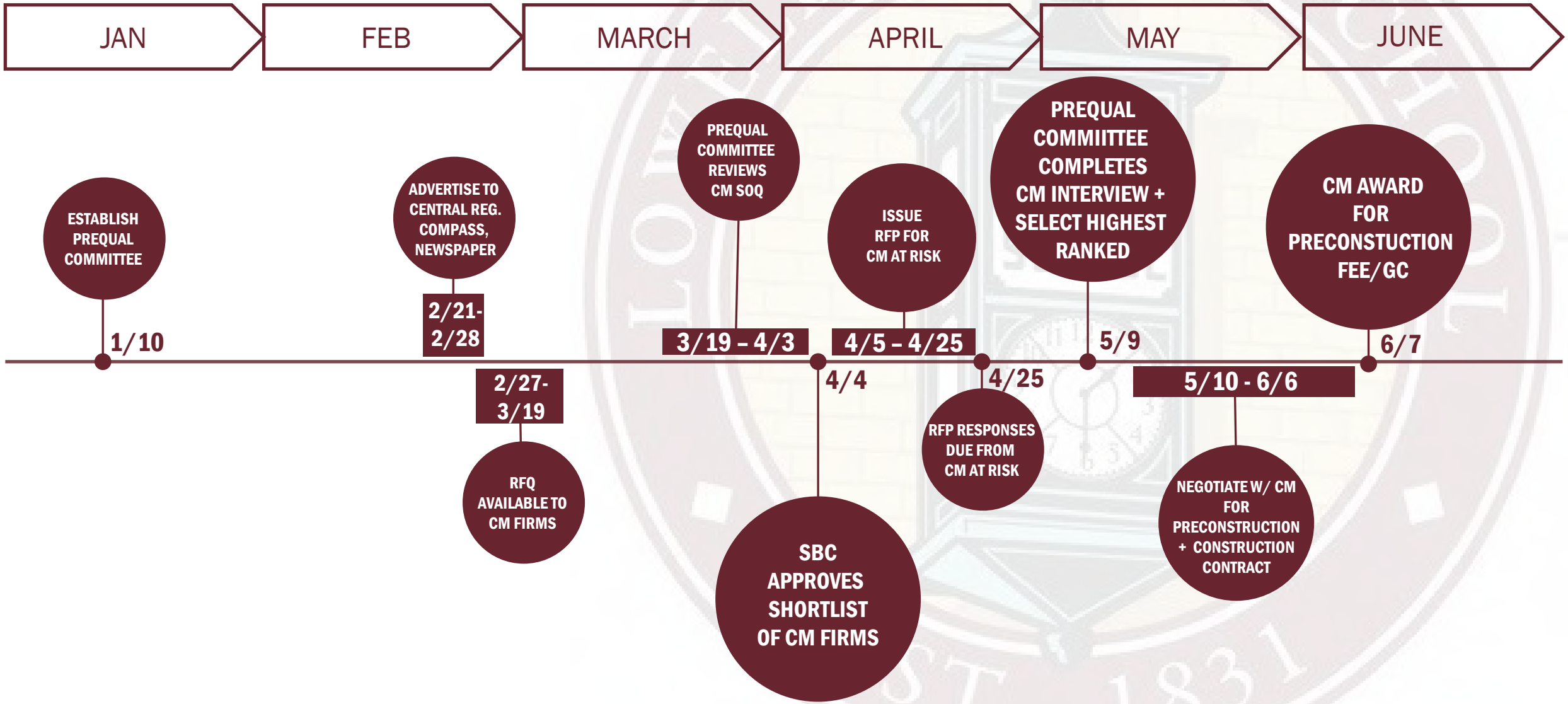
OVERALL SCHEDULE



LOWELL HIGH SCHOOL

CONSTRUCTION MANAGER AT RISK

2019



LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

SPACE SUMMARY

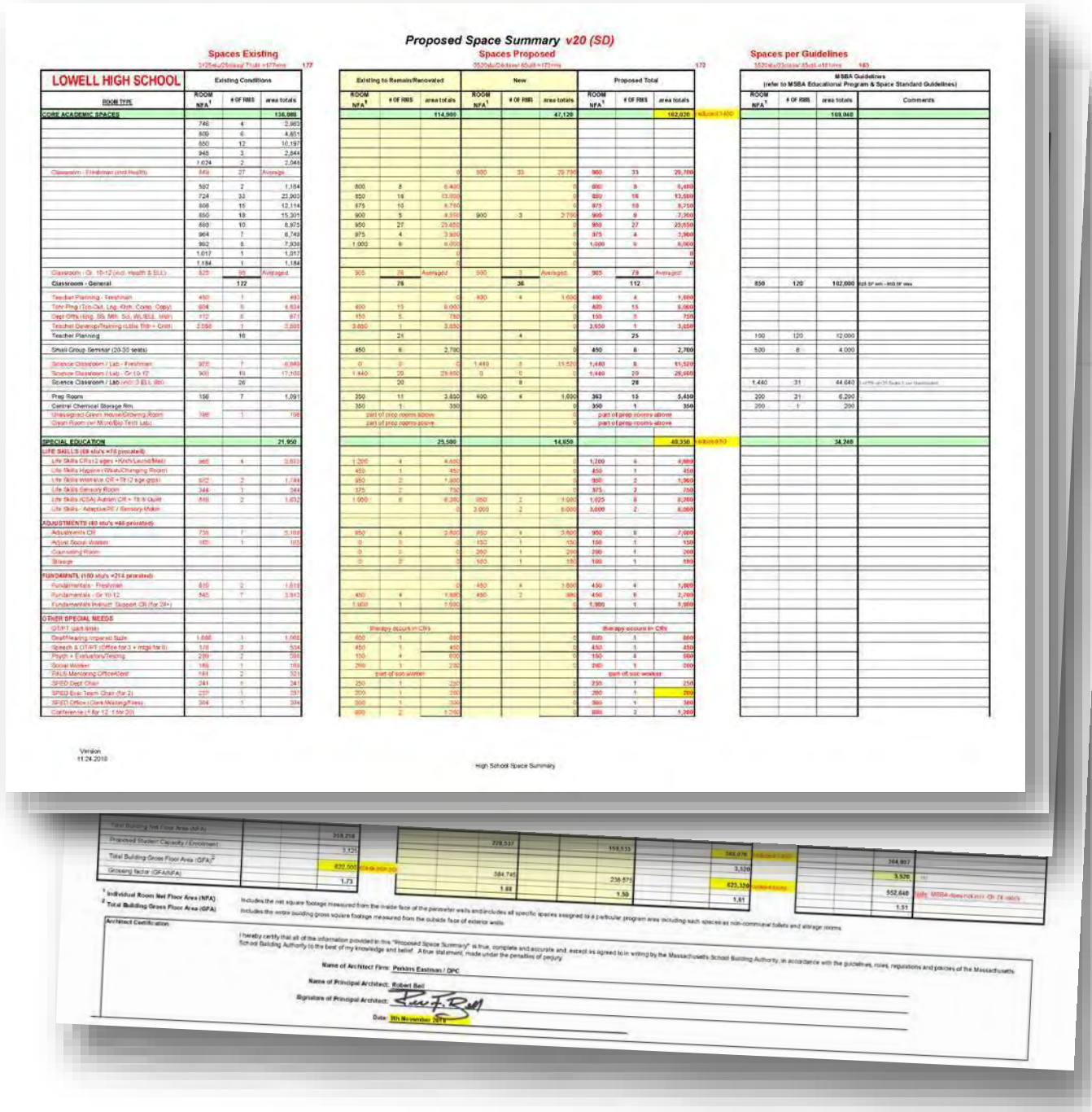
MSBA Reviewed with Few Exceptions:

Core Academics - unchanged
Special Educ. – subject to DESE
Art & Music - unchanged
Voc. & Tech. - unchanged
Health & PE - unchanged
Media Center - unchanged
Aud. & Drama - unchanged
Food Service - unchanged
Medical - unchanged
Admin & Guid - unchanged
Cust. & Maint. - unchanged
Other – unchanged, few ineligibles

Ineligible = 4k of 388k net sf (1%)

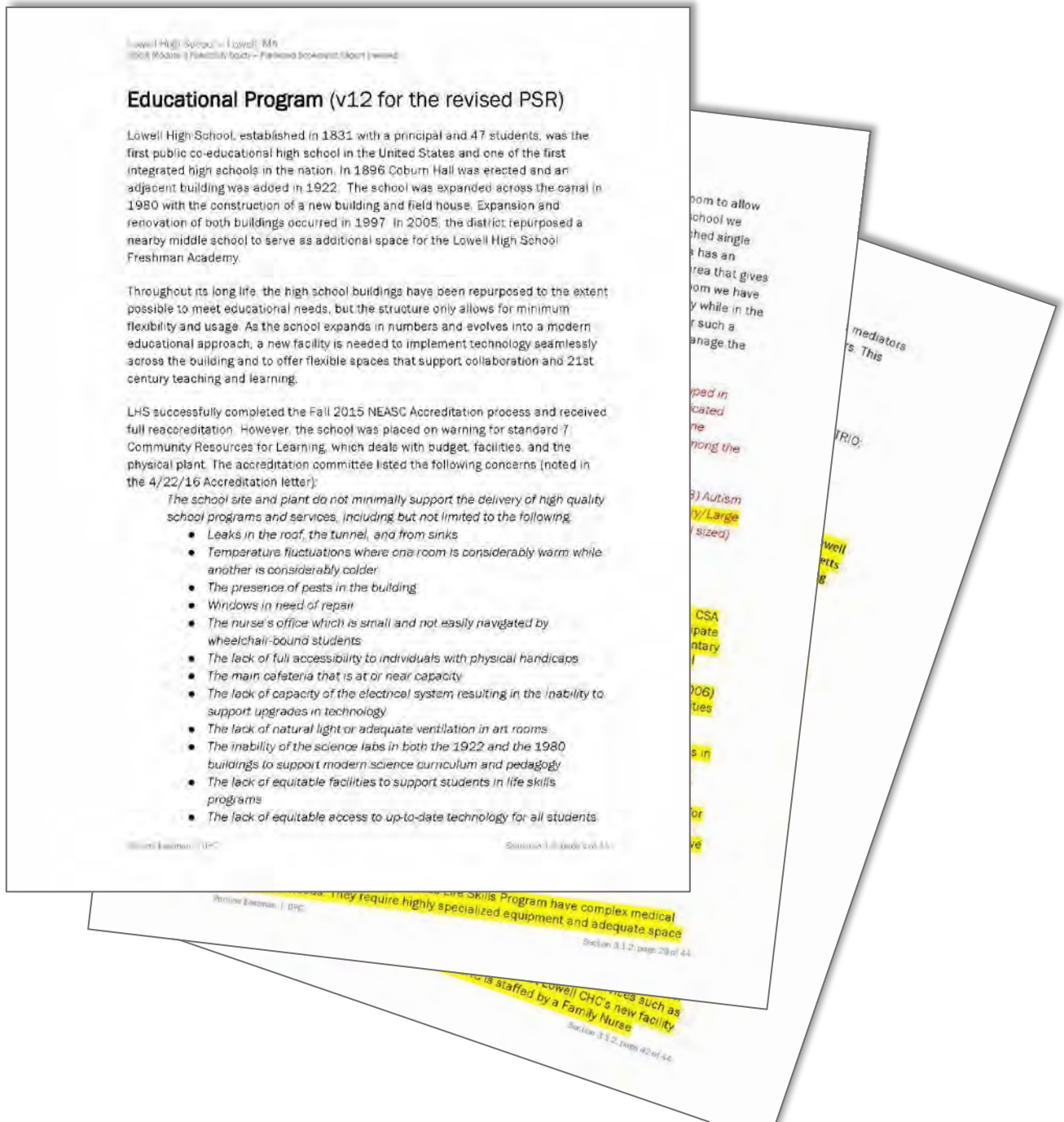
Gross Sf - updated per Bldg. Scan

- Existing Updated (628k to 614k)
- Proposed Updated (622k to 623k)



EDUCATIONAL PROGRAM

- Connected Freshmen Academy
- Zone for Community Use / Lock-Off
  - Access to Media Center & Food Service
  - Daytime Public Access
- Create Hub/Heart to the School
- Organize for Interdisciplinary Collaboration
  - 9th Grade Core Academic Teams
  - STEM & Humanities Planning Clusters
  - Integrated SPED, ELL, Health & Flexible Learning Spaces
  - Clustered Fine Arts, Digital Media, ROTC & World Language
- Accessible House Model for Admin/Support
- Provide Good Daylight/Orientation
- Minimize Educational Disruption



Educational Program (v12 for the revised PSR)

Lowell High School, established in 1831 with a principal and 47 students, was the first public co-educational high school in the United States and one of the first integrated high schools in the nation. In 1896 Coburn Hall was erected and an adjacent building was added in 1922. The school was expanded across the canal in 1980 with the construction of a new building and field house. Expansion and renovation of both buildings occurred in 1997. In 2005, the district repurposed a nearby middle school to serve as additional space for the Lowell High School Freshman Academy.

Throughout its long life, the high school buildings have been repurposed to the extent possible to meet educational needs, but the structure only allows for minimum flexibility and usage. As the school expands in numbers and evolves into a modern educational approach, a new facility is needed to implement technology seamlessly across the building and to offer flexible spaces that support collaboration and 21st century teaching and learning.

LHS successfully completed the Fall 2015 NEASC Accreditation process and received full reaccreditation. However, the school was placed on warning for standard 7 Community Resources for Learning, which deals with budget, facilities, and the physical plant. The accreditation committee listed the following concerns (noted in the 4/22/16 Accreditation letter):

The school site and plant do not minimally support the delivery of high quality school programs and services, including but not limited to the following:

- *Leaks in the roof, the tunnel, and from sinks*
- *Temperature fluctuations where one room is considerably warm while another is considerably colder*
- *The presence of pests in the building*
- *Windows in need of repair*
- *The nurse's office which is small and not easily navigated by wheelchair-bound students*
- *The lack of full accessibility to individuals with physical handicaps*
- *The main cafeteria that is at or near capacity*
- *The lack of capacity of the electrical system resulting in the inability to support upgrades in technology*
- *The lack of natural light or adequate ventilation in art rooms*
- *The inability of the science labs in both the 1922 and the 1980 buildings to support modern science curriculum and pedagogy*
- *The lack of equitable facilities to support students in life skills programs*
- *The lack of equitable access to up-to-date technology for all students*

LOWELL HIGH SCHOOL

BASEMENT PLAN - TRANSFORMATION

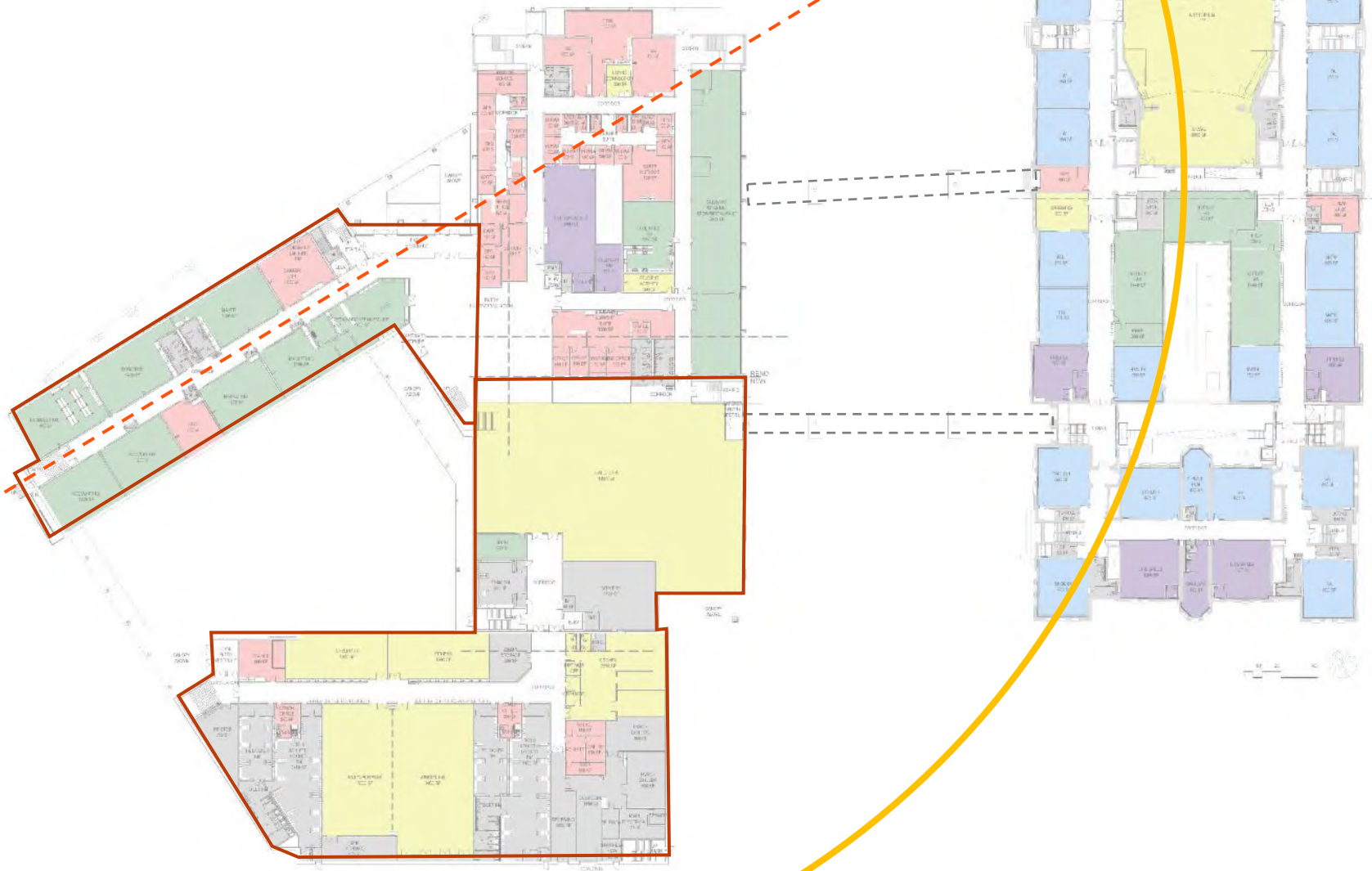
Ayer-Shirley HS - SMMA

Quaker Meeting Hs & Arts Center – Kieran Timberlake

LOWELL HIGH SCHOOL

LEVEL-1 PLAN – NEW ADDITIONS

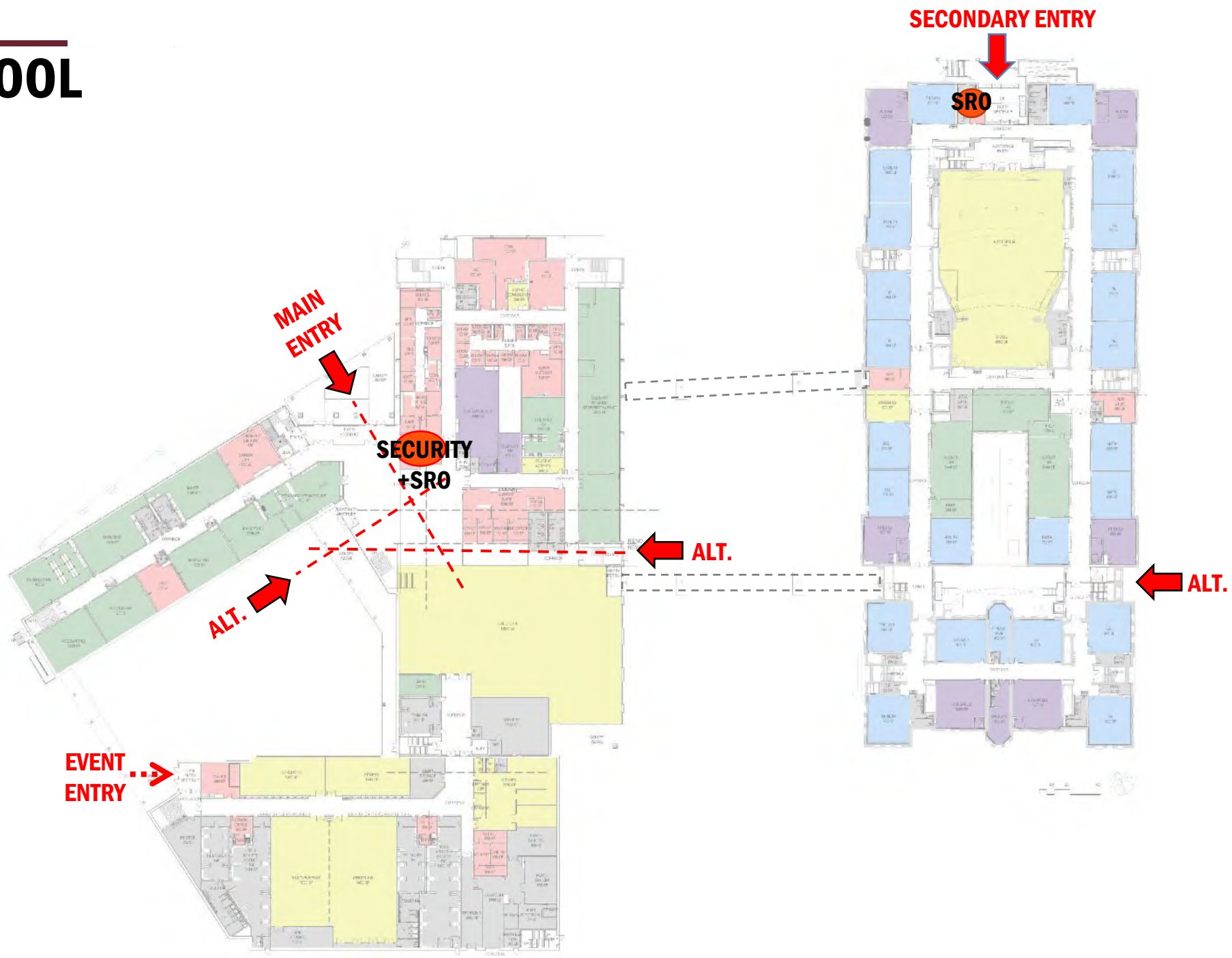
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-1 PLAN – ENTRY / ACCESS

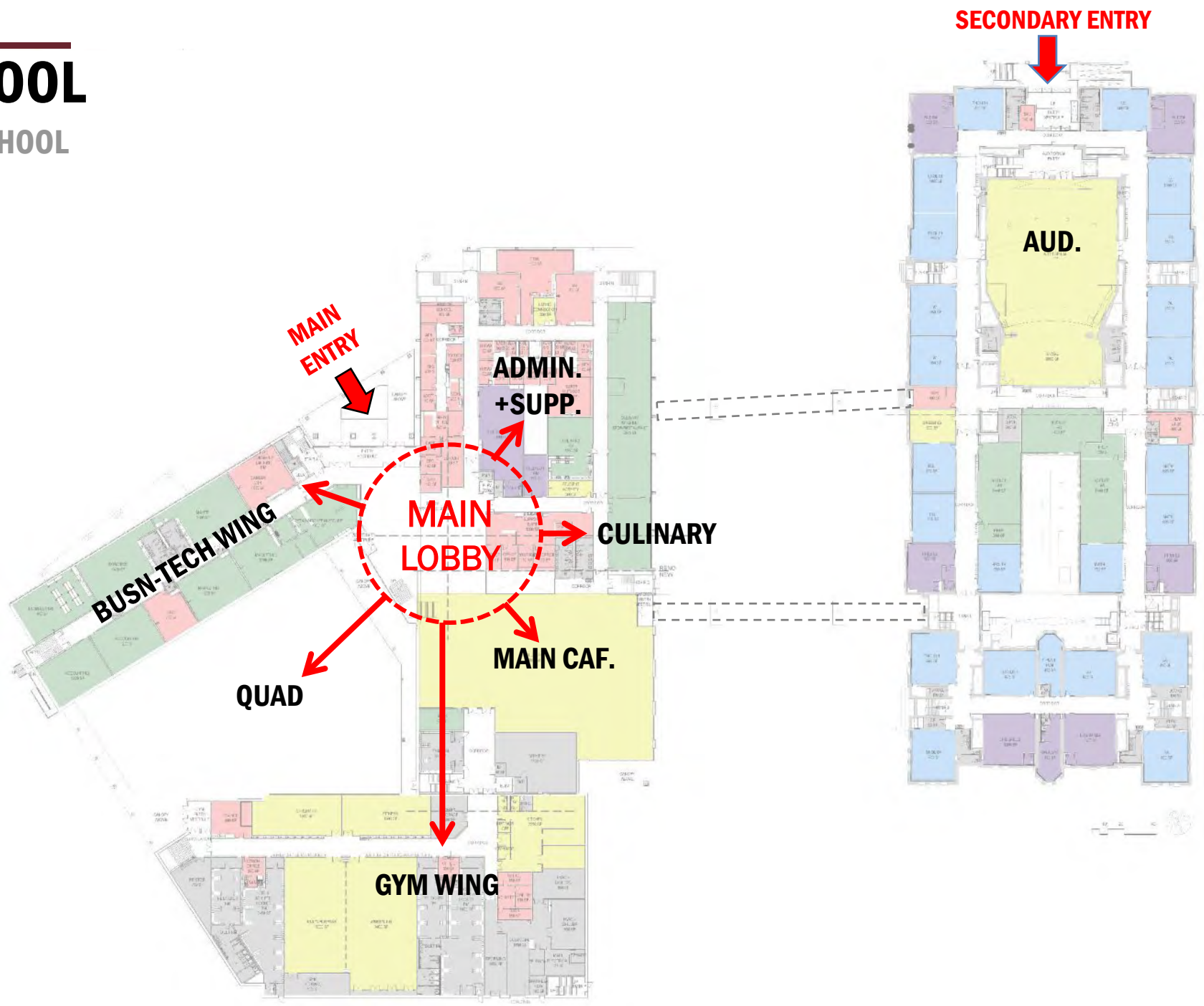
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

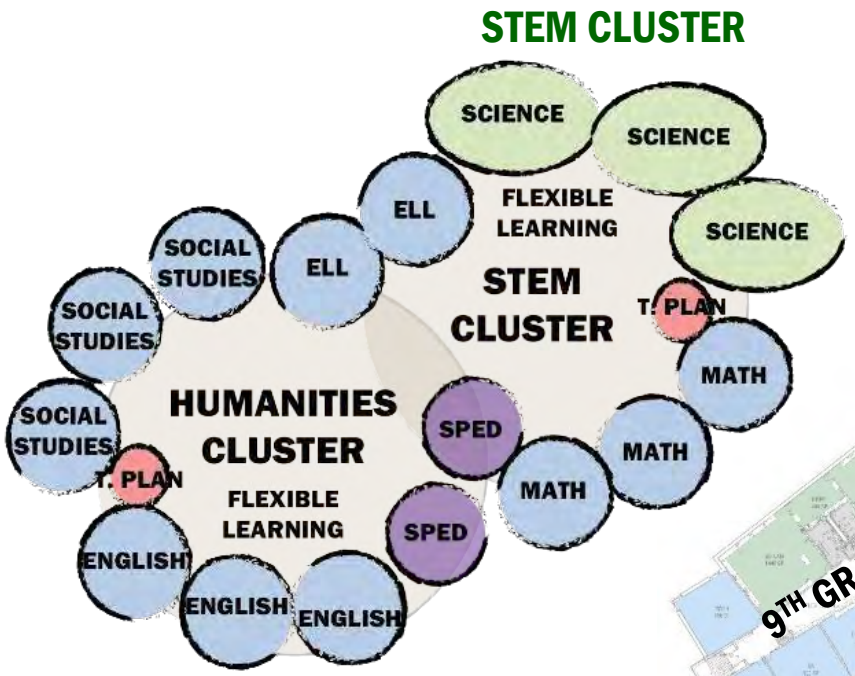
LEVEL-1 PLAN – HEART OF THE SCHOOL

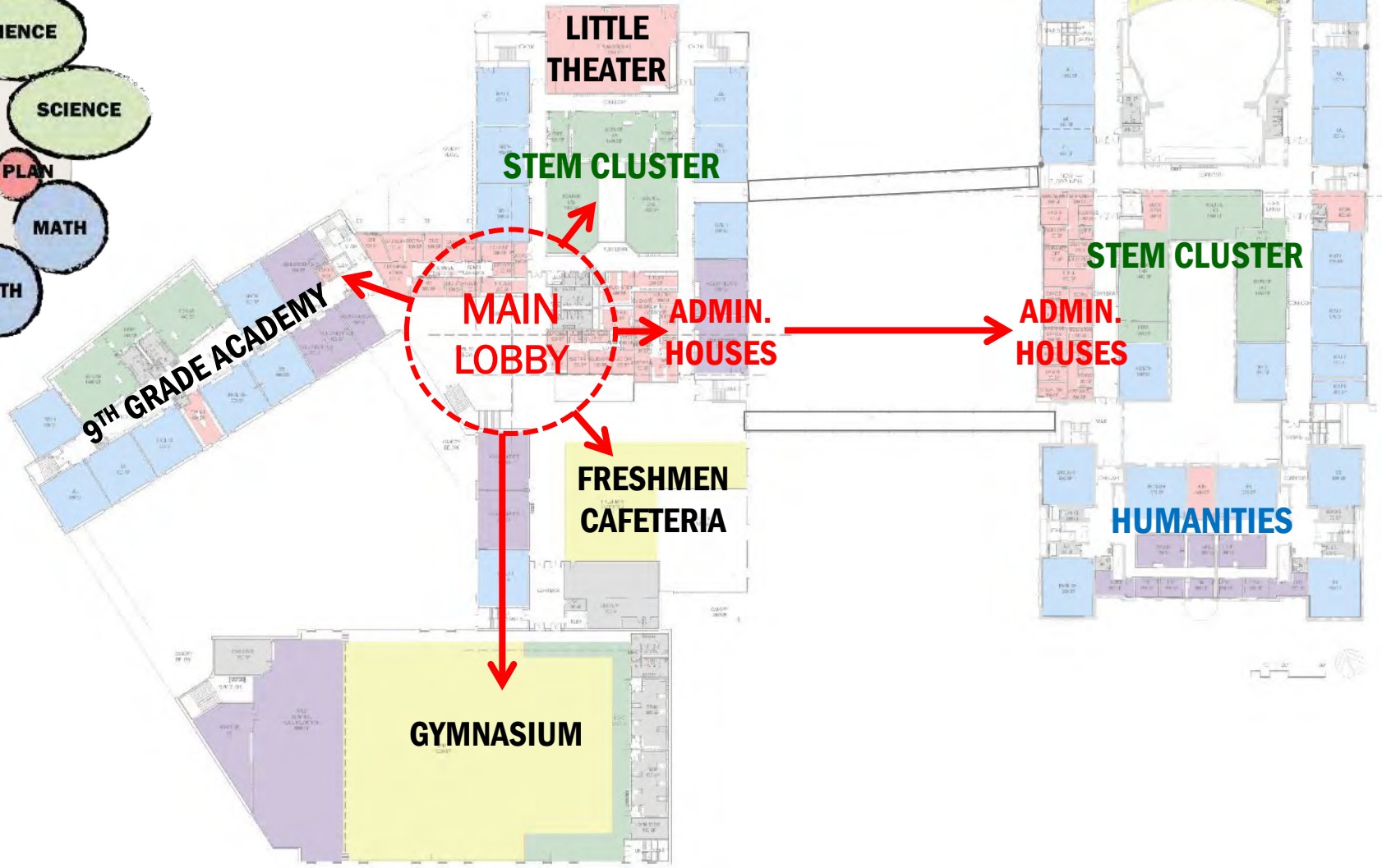
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-2 PLAN & ACADEMIC CLUSTERS

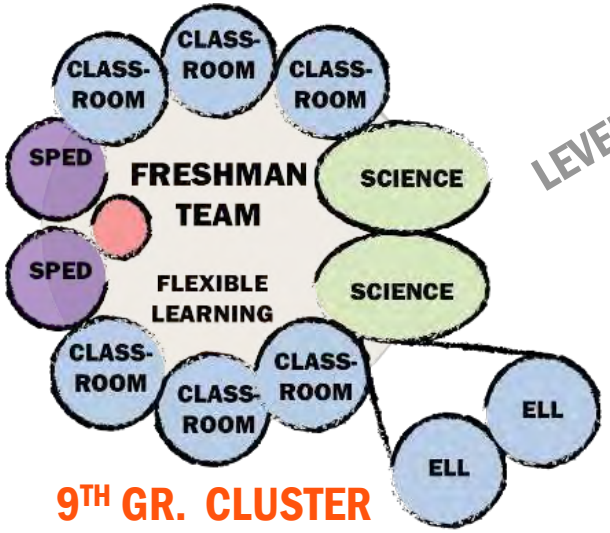




LOWELL HIGH SCHOOL

LEVEL 3 PLAN

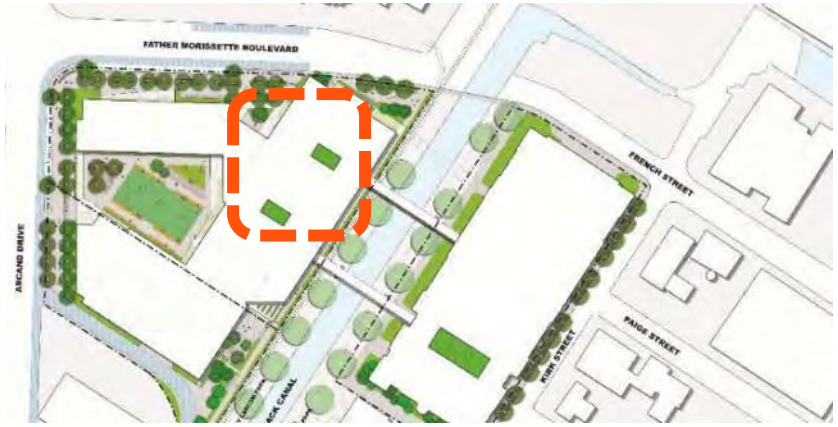
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



9TH GR. CLUSTER

LANDSCAPE OPPORTUNITIES

“THE LIGHT WELLS”



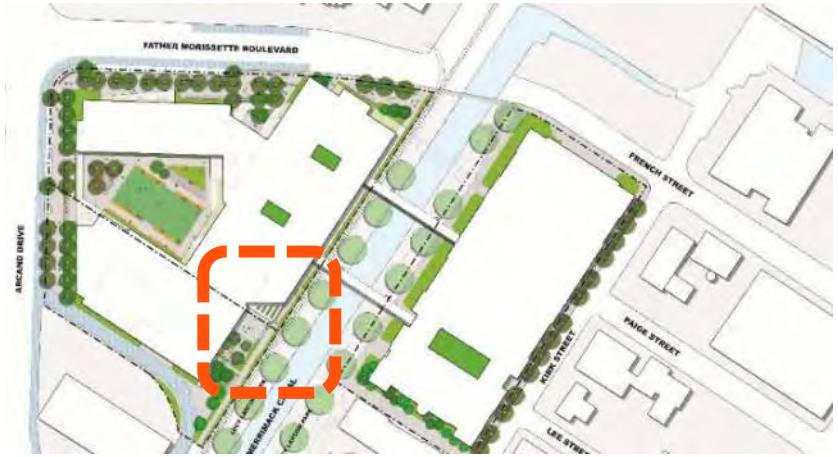
Tahari Courtyards,
Millburn NJ

Tahari Courtyards,
Millburn NJ

Site Specific Installation,
Velvet Da Vinci San Francisco

LANDSCAPE OPPORTUNITIES

“THE ROOFTOP”

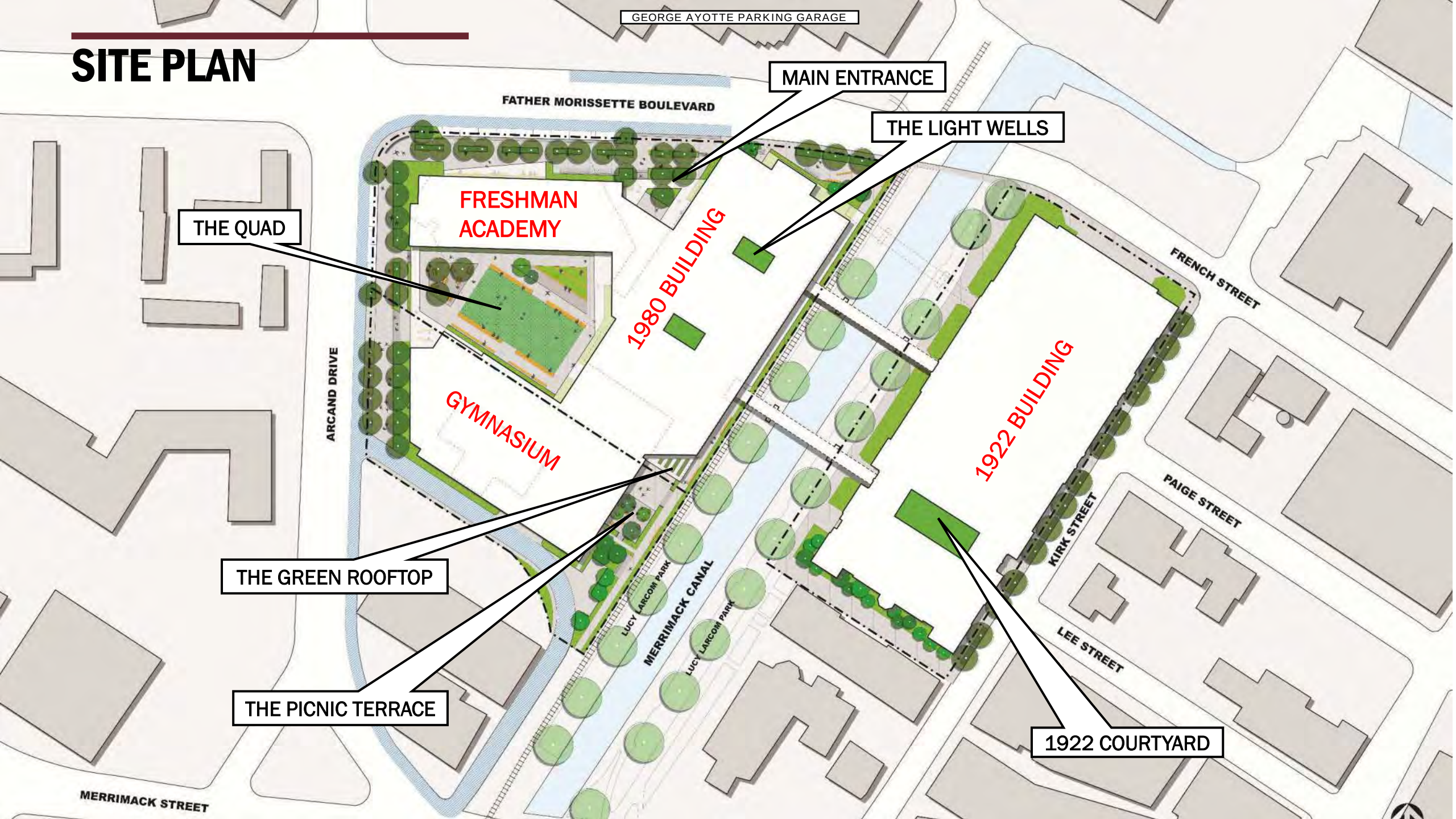


Adelaide High School Roof Terrace,
Adelaide, Australia

Alexandria Center for Life Sciences,
NYC, NY

Fenway Farms,
Boston, MA

SITE PLAN


GEORGE AYOTTE PARKING GARAGE
MAIN ENTRANCE
FATHER MORISSETTE BOULEVARD
THE LIGHT WELLS
FRESHMAN ACADEMY
THE QUAD
1980 BUILDING
FRENCH STREET
ARCAND DRIVE
GYMNASIUM
1922 BUILDING
PAIGE STREET
KIRK STREET
THE GREEN ROOFTOP
LUCY LARCOM PARK
MERRIMACK CANAL
LUCY LARCOM PARK
LEE STREET
THE PICNIC TERRACE
1922 COURTYARD
MERRIMACK STREET

LANDSCAPE OPPORTUNITIES

MAIN ENTRANCE

LANDSCAPE OPPORTUNITIES

“THE QUAD”

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

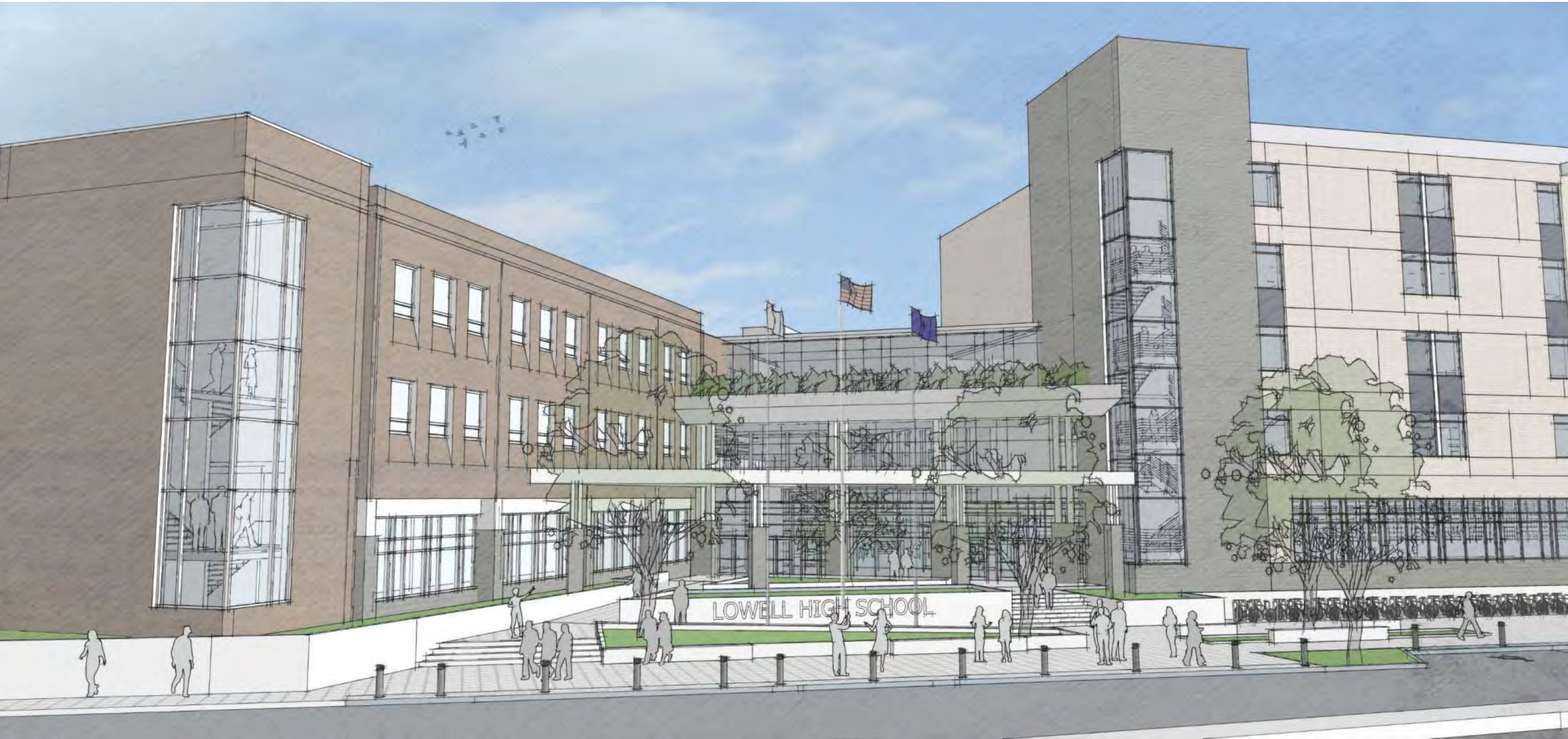
GYMNASIUM VIEW FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW OF GYMNASIUM FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

BIRDSEYE VIEW FROM SOUTH

LOWELL HIGH SCHOOL

1922 BUILDING FROM FATHER MORISSETTE

LOWELL HIGH SCHOOL

1922 BUILDING FROM KIRK STREET

LOWELL HIGH SCHOOL

SUMMARY OF PROJECT COSTS

TOTAL GROSS SQUARE FEET	622,777 S.F.				
SQUARE FEET OF RENOVATED SPACE	388,262 S.F.			* ($/SF)	$358.55 /SF
SQUARE FEET OF NEW CONSTRUCTION	234,515 S.F.			* ($/SF)	$485.29 /SF
SITE, BUILDING TAKEDOWN, HAZMAT ETC.		* ($)	$17,423,246		
ESTIMATED TOTAL CONSTRUCTION **		* ($)	$270,444,856	* ($/SF)	$434.26 /SF
ESTIMATED PROJECT COSTS		($)	$343,399,220		
LOCAL SHARE		($)	$129,267,512		

* Marked Up Construction Costs

** Does Not Include Construction Contingency

LOWELL HIGH SCHOOL

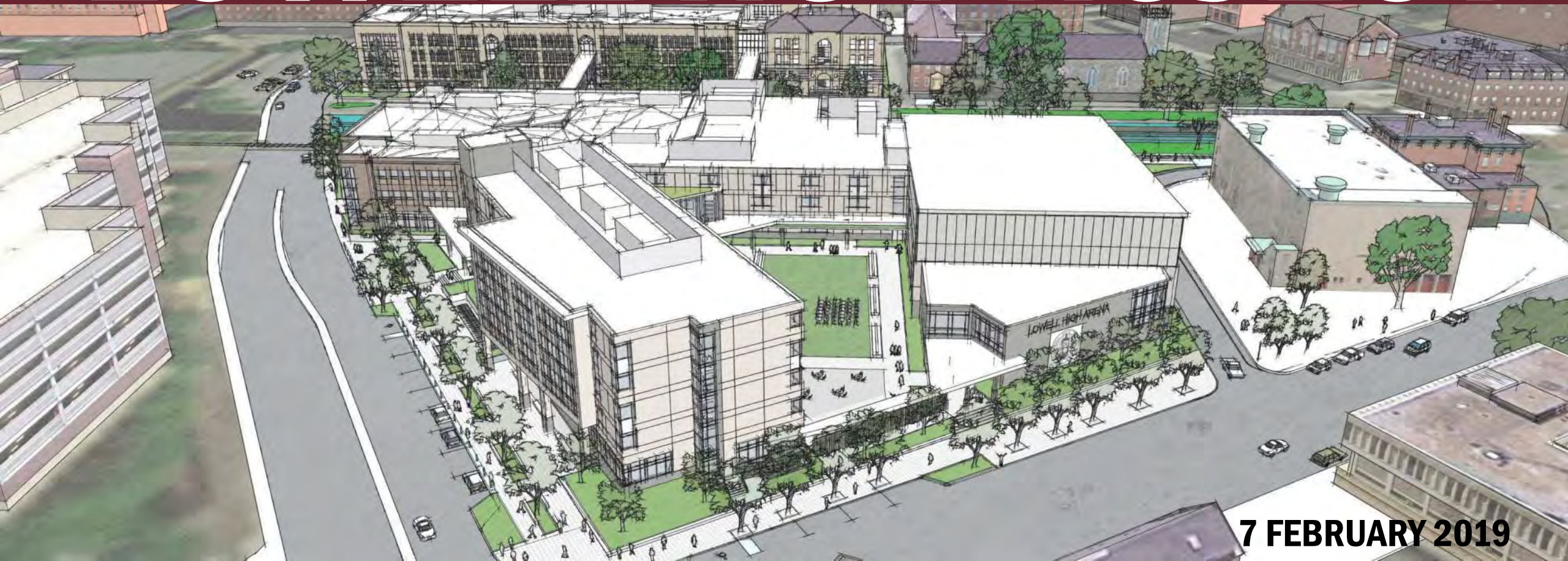
NEXT STEPS

- 2/7 SCHOOL BUILDING COMMITTEE MEETING (VOTE)
- 2/12 CITY COUNCIL MEETING (VOTE)
- 2/20 SCHEMATIC DESIGN SUBMISSION TO MSBA
- TBD PROJECT SCOPE & BUDGET MEETING
- 4/10 MSBA BOARD MEETING
- 4/24 CITY COUNCIL MEETING (APPROVAL)
- 4/25 OPM & A&E NOTICE TO PROCEED
- 5/2019 – 2/2021 DESIGN
- 6/2019 CM AWARD
- 3/2021 – 7/26 CONSTRUCTION

PERKINS EASTMAN

SCHOOL BUILDING COMMITTEE | COMMUNITY MEETING

LOWELL HS PROJECT



7 FEBRUARY 2019

Office of the City Clerk
City Hall • 375 Merrimack Street • Lowell, MA 01852
P: 978.674.4161 • F: 978.970.4007
www.LowellMA.gov

Lowell City Council
Regular Meeting Minutes

Michael Q. Geary
City Clerk

Date: **January 22, 2019**
Time: **6:30 PM**
Location: **City Council Chamber, 375 Merrimack Street, 2nd Floor, Lowell, MA**

1. ROLL CALL

Roll Call showed 9 present.

M. Samaras presiding.

2. CITY CLERK
2.1. Minutes of Zoning SC January 15th; City Council Meeting January 15th, for acceptance.

In City Council, minutes read, **Motion** "To accept and place on file" by C. Kennedy, seconded by C. Elliott. So voted.

Motion by C. Mercier, seconded by C. Cirillo to take Item #9.1 out of order. So voted. C. Elliott requested that Item #7.1 be taken out of order under suspension. No objections. So voted.

3. AUDITOR BUSINESS
3.1. Communication - FY19 YTD Budget Report - December.

In City Council, **Motion** "To accept and place on file" by C. Milinazzo, seconded by C. Elliott. So voted. C. Milinazzo questioned Election Department expenses. City Solicitor O'Connor noted added expenses were result of recounts. C. Milinazzo questioned school side accounting. Auditor Perry noted that the data does not indicate any area of concerns. C. Kennedy questioned if school personnel are provided the same report. Auditor Perry indicated all parties receive the information and noted he was available for questions from any party.

4. COMMUNICATIONS FROM CITY MANAGER

4.1. Motion Responses.

In City Council, **Motion** "To accept and place on file" by C. Kennedy, seconded by C. Milinazzo. So voted.

A) Paris Accord – C. Cirillo noted the report. Kathleen Moses (DPD) outlined the report and noted City has reduced its carbon footprint substantially.

B) Energy Savings Performance Contract – None.

C) CTI Presentation – C. Mercier noted presentation will be before Council and it would be informative in terms of youth homelessness.

D) HCID Parking Judicial Center – C. Nuon commented on the report as it relates to short and long term parking solutions. Joe Giniewicz (DPD) identified temporary lots. C. Nuon questioned the use of private parking garage. Mr. Giniewicz noted that the City owns parcels of land which could be used as a private parking garage. C. Nuon questioned the use of public transportation to ease parking restraints. Mr. Giniewicz recognized significant parking issues in the area and that all means to alleviate the situation should be utilized. C. Mercier questioned status of land use for parking on National Park site. Manager Donoghue noted construction on court house is behind schedule. C. Mercier commented on the use of Cawley Stadium as a transportation area to bus individuals downtown and noted that such an increase in traffic for that area was not acceptable during high school discussions. C. Mercier noted that if the Lowell Charter School were to make any money on parking then the City should share in that revenue. C. Elliott noted that private parking would be beneficial to the development as it eases costs on the taxpayers. Manager Donoghue noted forthcoming report regarding private parking. C. Milinazzo questioned if developers were including parking as part of their plans. Mr. Giniewicz noted that Winn Development design did not include parking and that the City would provide 200 spaces for them. C. Milinazzo noted recent discussions surrounding the possibility of parking garages not being needed in 10 to 15 years.

4.2. Informational

E) LHS Project Update- Manager Donoghue outlined progress and future of the project and introduced the consultants Perkins/Eastman and Skanska to present PowerPoint entitled "City Council – Lowell HS Project". The presentation reviewed the process; outlined the plans; reviewed site and building design; outlined time frame of project; and tabulated cost estimates. The consultants noted the Inspector General application process and the process to name construction manager of the project. The educational

element of the project was reviewed and presented with the use of images and discussion of natural light into the design. There was a review of the landscape plan and safety design for the buildings. C. Mercier questioned construction of Freshmen Academy in terms of square footage costs for new versus rehab construction. C. Mercier questioned if new heating systems would be installed. C. Leahy questioned replacement of roofs for project and currently in terms of reimbursement. C. Leahy questioned size of light wells and rehabbing of Kirk Street entrances. C. Milinazzo thanked the presenters and commented on selection of construction manager and phased construction schedule. C. Conway noted need to stay within historic design scheme and aesthetic input from the community. C. Conway questioned type of warranty on the building. C. Cirillo questioned phasing stages of the construction. M. Samaras questioned pedestrian bridges connecting the schools. Manager Donoghue noted that body would be updated every step of the process and noted that the rehabilitation is a gut down to frame.

4.3. Communication-Reappoint JoAnn Howell-CTI to Hunger Homeless Commission.

In City Council, **Motion** "To accept and place on file" by C. Mercier, seconded by C. Kennedy. So voted.

4.4. Communication-Appoint Helen Littlefield to Pollard Memorial Library Board of Trustees.

In City Council, read, **Motion** to adopt by C. Kennedy, seconded by C. Cirillo. Adopted per Roll Call vote 9 yeas. So voted. Ms. Littlefield was present and thanked the Council. C. Conway recognized the appointment.

4.5. Communication - City Manager request Out of State Travel (1) LPD.

In City Council, read, **Motion** to adopt by C. Kennedy, seconded by C. Milinazzo. Adopted per Roll Call vote 9 yeas. So voted.

5. VOTES FROM THE CITY MANAGER

5.1. Vote-Authorize City Manager Ex. License Agreement Enterprise Bank and Trust Co.-overhanging signs.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Kennedy, seconded by C. Conway. Adopted per Roll Call vote 9 yeas. So voted.

5.2. Vote-Authorize Mgr. Ex. MOU Traffic Supervisors 7.1.18-6.30.21.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Elliott, seconded by C. Kennedy. Adopted per Roll Call vote 9 yeas. So voted. C. Leahy requested information on the vote. Manager Donoghue outlined contract and noted that the pay was in line with surrounding communities and that it would allow for more applicants for the positions.

5.3. Vote-Transfer funding for DPW for Public Building, Schools and Fleet.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Elliott, seconded by C. Milinazzo. Adopted per Roll Call vote 9 yeas. So voted. C. Milinazzo noted the transfer and planning for employment in the future. Manager Donoghue noted the immediate needs of the schools. Conor Baldwin (CFO) noted transfer was possible due to departure of some department heads. C. Leahy lauded the efforts of school custodians over last cold spell. Manager Donoghue commented on issues developed over last weekend.

6. RESOLUTIONS

6.1. Resolution-City Council Support Massachusetts Senate Docket 101, the Education Promise Act.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Cirillo, seconded by C. Mercier. Adopted per Roll Call vote 9 yeas. So voted. C. Kennedy requested copies of resolution and requested copies on school side resolution as well.

7. REPORTS (SUB/COMMITTEE, IF ANY)

7.1. Animal Advisory Commission Report.

In City Council, C. Elliott provided the report commenting on attendance and discussion regarding action of the Commission which included oversight of pitbulls and other services provided to community. Michael Hearly (MSPCA), member of the Commission, commented on regulations to improve community and noted the development of Lowell Partnership for Pets Program. Mr. Hearly noted it was grant funded and identified all of the partners involved. C. Elliott noted it was a pro-active approach. Allison Reverend (MSPCA) outlined the services and resources available through the program. **Motion** to accept the report as a report of progress by C. Conway, seconded by C. Kennedy. So voted.

Motion by C. Kennedy, seconded by C. Cirillo to take Item #4.4 out of order. So voted.

7.2. Environment & Flood Issues SC January 22, 2019.

In City Council, C. Cirillo provided the report commenting on attendance and discussion regarding gage placement on the river and freezing of bladder dam. The following motions were adopted by the subcommittee: **Motion** by C. Elliott, seconded by C. Cirillo to request Representative Trahan provide letter to USGS or any other regulatory agency and to Enel relative to relocating the existing measuring gage on the river and to have City Council request City Manager designate personnel to oversee the resolution of existing issues with Enel and the use of the dam; and **Motion** by C. Kennedy, seconded by C. Elliott to request City Manager inform Enel of possible freezing at the dam and outline process when such an even may happen and in addition have City Manager research costs of new gages and/or relocation of existing gages. **Motion** to accept the report as a report of progress and adopt motion supported by the subcommittee by C. Kennedy, seconded by C. Mercier. So voted.

7.3. Wire Insp. - Verizon NE - Request installation of underground conduit to replace overhead services at 165 Thorndike Street and Highland Street.

In City Council, **Motion** to accept and adopt accompanying report and recommendation by C. Kennedy, seconded by C. Elliott. So voted.

8. PETITIONS

8.1. Misc. - David St. Hilaire, Jr. request amendment of City ordinances to allow residents to keep miniature pigs as pets.

In Council, **Motion** to refer to Animal Advisory Commission for report and recommendation by C. Kennedy, seconded by C. Mercier. So voted. C. Mercier noted petitioner was present earlier and had to leave. C. Kennedy noted prior discussion of the issue.

9. CITY COUNCIL - MOTIONS

9.1. C. Mercier - Req. State Senator and State Representatives revisit the State's bullying policy, Chapter 71, Section 370, to amend the section which does not allow the perpetrators fate to be disclosed to the victims' parents.

In City Council, seconded by C. Cirillo, referred to City Manager, Education Partnerships SC and Youth Services SC. So voted. Registered speaker, Summer Graham, addressed the body and provided handout entitled "No Bully Zone Kidz". C. Mercier commented on the need to revisit policy regarding transparency for the victims and their parents so that their rights are protected and that a message is sent that

bullying will not be tolerated. C. Cirillo questioned if teachers were trained on these matter. M. Samaras noted there were programs and that they would be presented before the body. **Motion** by M. Samaras, seconded by C. Mercier to refer matter to Education Partnerships SC to present bullying program. So voted. C. Conway commented on the program and steps that were done during his tenure at the high school. C. Conway invited the registered speaker, Ms. Graham, to appear before Youth Services SC. C. Nuon noted the need to enforce and enhance the policy. C. Milinazzo commented on article in the local paper which was informative. C. Elliott noted the need for continued discussions and that there are several positive recommendations that would be helpful and it is important to remain diligent on this matter. C. Leahy noted the need to stay on top of the problem and never give up dealing with these issues. C. Kennedy recognized the need to update the legislation. C. Kennedy recommended a subcommittee be established to assist with developing programs to prevent bullying and to strengthen current policies. M. Samaras noted he would be establishing a mayor's commission for that reason and that members of Council and School Committee would be place on it. C. Conway noted the increase in cyber bullying throughout the years and that school resource officers should be part of any discussion regarding these policies.

9.2. C. Conway - Req. City Council solicit the opinion, through a ballot question, of the voters of the City of Lowell on whether they want to maintain the City of Lowell's present municipal election representation or direct the City to develop a new municipal election representation for the City.

In City Council, seconded by C. Elliott, **Motion** to refer to Executive Session on January 22, 2019 by C. Milinazzo, seconded by C. Kennedy. Adopted per Roll Call vote 9 yeas. So voted. M. Samaras noted the motion concerns itself with current litigation and requested opinion regarding if matter should be discussed publically. City Solicitor O'Connor noted the matter should be discussed in Executive Session. C. Conway did not agree with the opinion and noted he wished to speak to inform voters of possible pending changes to the system. M. Samaras noted the need to go into Executive Session. **Motion** by C. Milinazzo, seconded by C. Kennedy to refer matter to Executive Session. Adopted per Roll Call vote 9 yeas. So voted. C. Kennedy noted that matter could go public after discussion in Executive Session. C. Conway questioned process to release minutes of the Executive Session. C. Kennedy noted that the Council had the authority to release minutes.

9.3. C. Cirillo - Req. City Mgr. work with the LRTA to incorporate a courtesy button program which will provide buttons for our elderly, disabled and pregnant riders, to allow them to have priority seating on the bus.

In City Council, seconded by C. Kennedy, referred to City Manager. So voted. C. Cirillo noted other communities who have such a program. C. Mercier noted the seniors were confused regarding motion as they did not see it as an issue and further noted that there is a policy in the LRTA that supports the program and that drivers are trained on it as well. C. Milinazzo noted that the LRTA could use the program as a marketing tool.

9.4. C. Cirillo - Req. City Mgr. have the proper department review the, "Age Friendly Boston Action Plan 2017" and provide a report to the City Council as to preparing an "Elderly Friendly Lowell Action Plan" for achieving a more elderly-friendly Lowell.

In City Council, seconded by C. Kennedy, referred to City Manager/Senior Citizens SC. So voted. C. Cirillo commented on the extensive Boston plan and that Lowell could use elements of it. **Motion** by C. Kennedy, seconded by C. Elliott to refer matter to Senior Citizens SC as well. So voted. C. Elliott noted that members of the Council of Ageing should be involved in the discussions before the subcommittee.

9.5. C. Leahy - Req. City Mgr. report to City Council regarding a plan to reorganize the DPW and the Parks Department.

In City Council, seconded by C. Nuon, referred to City Manager. So voted. C. Leahy noted the need to reorganize the department to increase efficiency. C. Kennedy noted the restructuring of DPW with the custodians at the schools. Manager Donoghue noted that the review is taking place and will move quicker when new commissioner begins his employment with the City.

9.6. C. Kennedy - Req. City Mgr. instruct DPD to provide City Council with a report regarding all pending and potential economic development projects going on in the City currently.

In City Council, seconded by C. Cirillo, referred to City Manager/Economic Development SC. So voted. C. Kennedy commented on the need to identify businesses throughout the City. **Motion** to refer to Economic Development SC by C. Kennedy, seconded by C. Nuon. So voted.

9.7. M. Samaras - Req. City Mgr. have proper department look into the installation of a bus shelter at the LRTA stop on Broadway Street near the Lowell Senior Center.

In City Council, seconded by C. Cirillo, referred to City Manager. So voted. M. Samaras noted the need. C. Mercier commented on issues present on prior attempts to install shelter. C. Kennedy noted that solution should be sought.

10. CITY COUNCIL - EXECUTIVE SESSION

10.1. Executive Session - Regarding matter of litigation, namely Huot et al v. City of Lowell, public discussion of which could have a detrimental effect on the City's position.

In City Council, M. Samaras stated reason for Executive Session, **Motion** by C. Cirillo, seconded by C. Milinazzo to enter Executive Session for stated purpose and adjourn from Executive Session (9:30 PM). Adopted per Roll Call vote 9 yeas. So voted. M. Samaras stated that body would adjourn from the Executive Session.

11. ANNOUNCEMENTS

None.

12. ADJOURNMENT

In City Council, Meeting was adjourned in Executive Session as to objections to waive Rule 5 of the City Council Rules stating no discussion of matters beyond 10 PM.

Meeting adjourned at 10:00 PM from Executive Session.

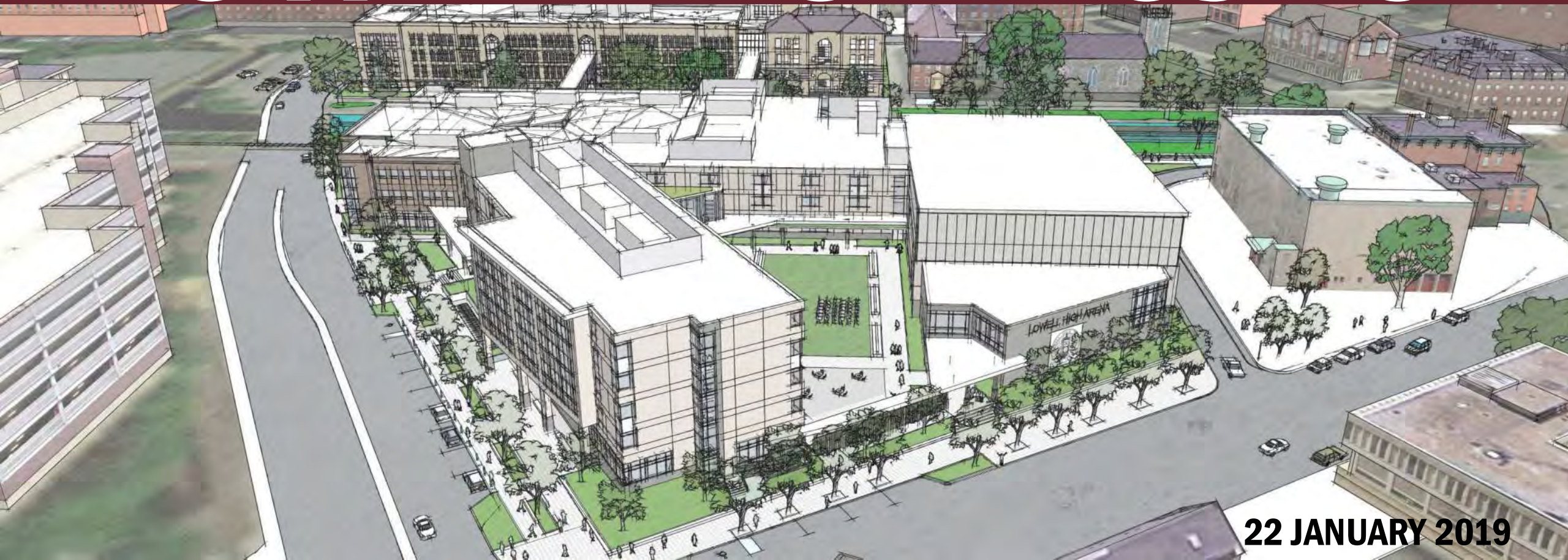
_____

Michael Geary, City Clerk

PERKINS EASTMAN

CITY COUNCIL

LOWELL HS PROJECT



22 JANUARY 2019

LOWELL HIGH SCHOOL

SCHEMATIC DESIGN UPDATE- AGENDA

- PROCESS
- PROGRAM & PLAN
- SITE DESIGN
- BUILDING DESIGN
- NEXT STEPS

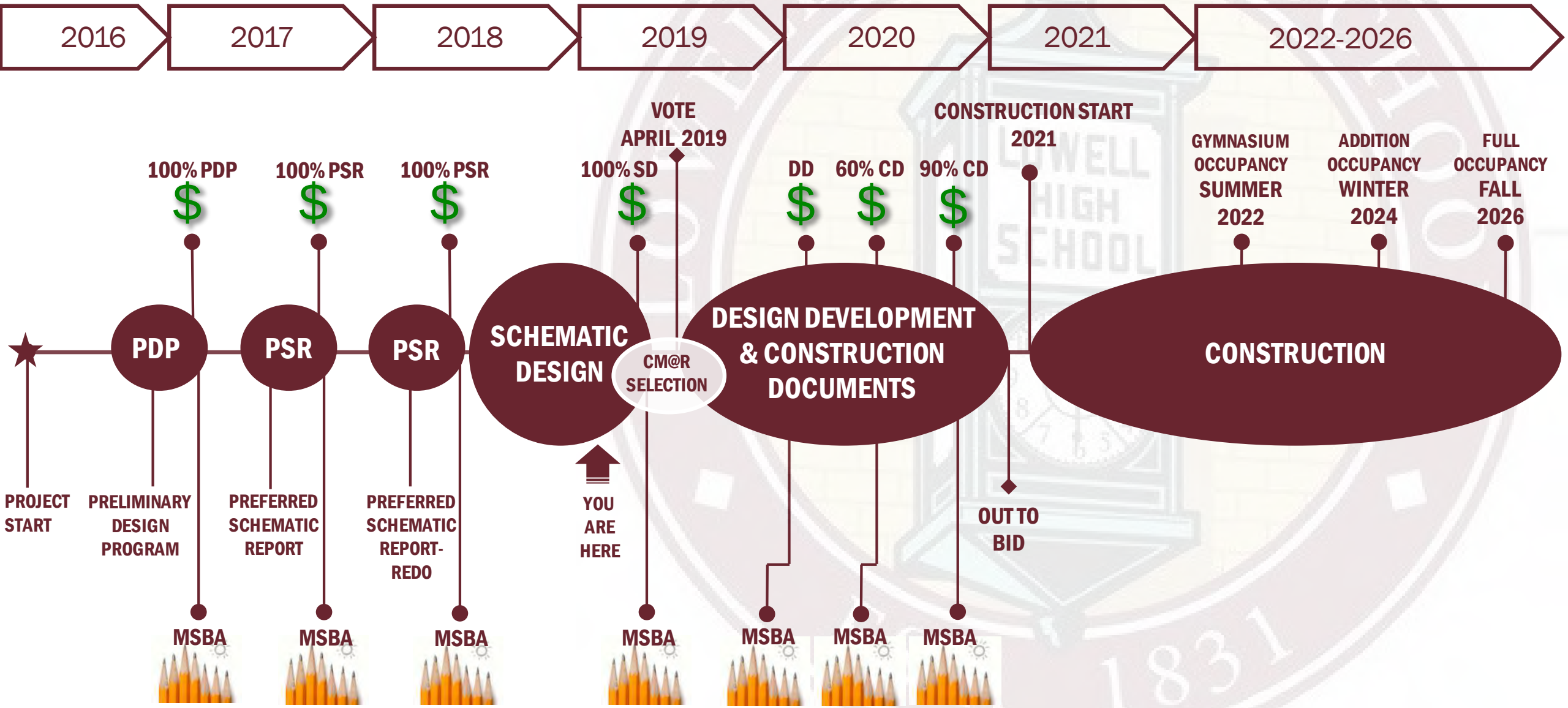
LOWELL HIGH SCHOOL

SCHEMATIC DESIGN RECAP

	AUGUST '18	SEPTEMBER '18	OCTOBER '18	NOVEMBER '18	DECEMBER '18	JANUARY '19
SBC MEETINGS	●	●	●	●		
ELT/WORKING GROUP MEETINGS	● ●	● ●	● ●			
FOCUS GROUP MEETINGS		● ●	● ●			
LOWELL HISTORIC/ NATIONAL PARKS		●	●	●		
ISD/FIRE/POLICE				●		
PLANNING & DEVELOPMENT				●		
EX. CONDITIONS (75 ARCAND)				●		● ●
STUDENT FORUM					●	
SECURITY MTG					●	

LOWELL HIGH SCHOOL

OVERALL SCHEDULE



LOWELL HIGH SCHOOL

CONSTRUCTION MANAGER AT RISK

2019

JAN | FEB | MARCH | APRIL | MAY | JUNE

- **1/10** — ESTABLISH PREQUAL COMMITTEE
- **2/21-2/28** — ADVERTISE TO CENTRAL REG. COMPASS, NEWSPAPER
- **2/27-3/19** — RFQ AVAILABLE TO CM FIRMS
- **3/19 – 4/3** — PREQUAL COMMITTEE REVIEWS CM SOQ
- **4/4** — SBC APPROVES SHORTLIST OF CM FIRMS
- **4/5 – 4/25** — ISSUE RFP FOR CM AT RISK
- **4/25** — RFP RESPONSES DUE FROM CM AT RISK
- **5/9** — PREQUAL COMMIITTEE COMPLETES CM INTERVIEW + SELECT HIGHEST RANKED
- **5/10 - 6/6** — NEGOTIATE W/ CM FOR PRECONSTRUCTION + CONSTRUCTION CONTRACT
- **6/7** — CM AWARD FOR PRECONSTUCTION FEE/GC

LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

SPACE SUMMARY

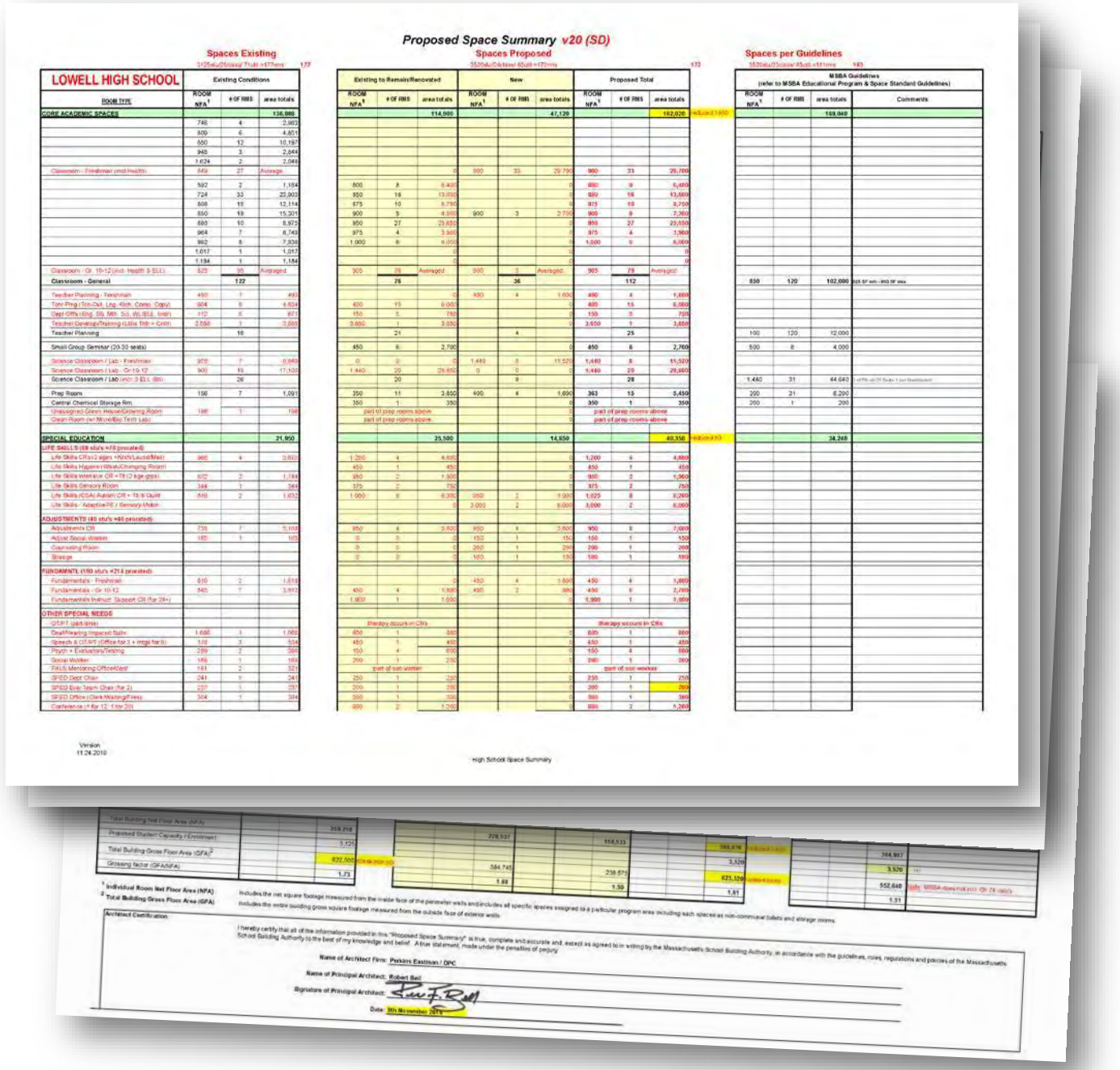
MSBA Reviewed with Few Exceptions:

Core Academics - unchanged
Special Educ. – subject to DESE
Art & Music - unchanged
Voc. & Tech. - unchanged
Health & PE - unchanged
Media Center - unchanged
Aud. & Drama - unchanged
Food Service - unchanged
Medical - unchanged
Admin & Guid - unchanged
Cust. & Maint. - unchanged
Other – unchanged, few ineligibles

Ineligible = 4k of 388k net sf (1%)

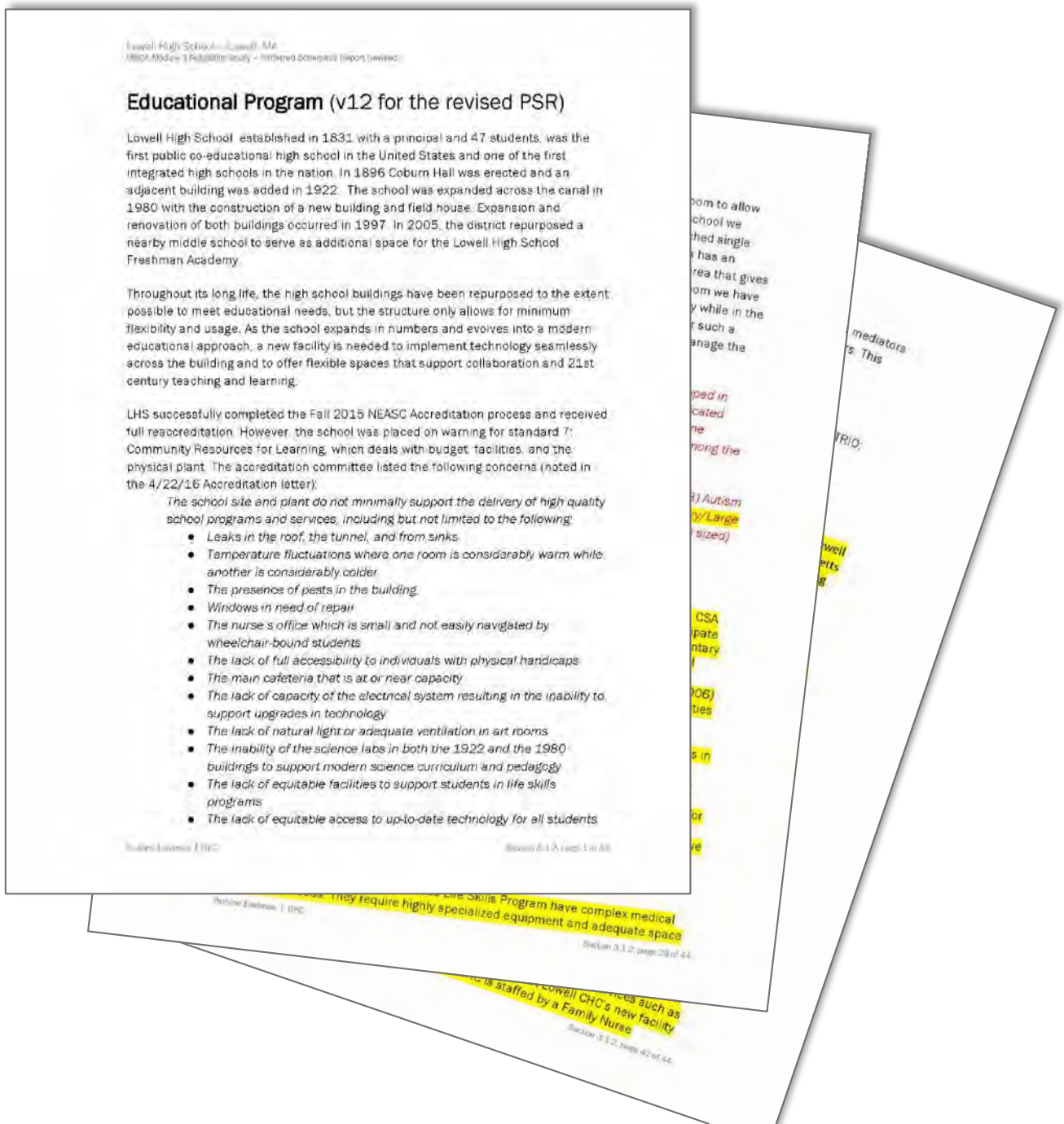
Gross Sf - updated per Bldg. Scan

- Existing Updated (628k to 614k)
- Proposed Updated (622k to 623k)



EDUCATIONAL PROGRAM

- Connected Freshmen Academy
- Zone for Community Use / Lock-Off
  - Access to Media Center & Food Service
  - Daytime Public Access
- Create Hub/Heart to the School
- Organize for Interdisciplinary Collaboration
  - 9th Grade Core Academic Teams
  - STEM & Humanities Planning Clusters
  - Integrated SPED, ELL, Health & Flexible Learning Spaces
  - Clustered Fine Arts, Digital Media, ROTC & World Language
- Accessible House Model for Admin/Support
- Provide Good Daylight/Orientation
- Minimize Educational Disruption



Educational Program (v12 for the revised PSR)

Lowell High School established in 1831 with a principal and 47 students, was the first public co-educational high school in the United States and one of the first integrated high schools in the nation. In 1896 Coburn Hall was erected and an adjacent building was added in 1922. The school was expanded across the canal in 1980 with the construction of a new building and field house. Expansion and renovation of both buildings occurred in 1997. In 2005, the district repurposed a nearby middle school to serve as additional space for the Lowell High School Freshman Academy.

Throughout its long life, the high school buildings have been repurposed to the extent possible to meet educational needs, but the structure only allows for minimum flexibility and usage. As the school expands in numbers and evolves into a modern educational approach, a new facility is needed to implement technology seamlessly across the building and to offer flexible spaces that support collaboration and 21st century teaching and learning.

LHS successfully completed the Fall 2015 NEASC Accreditation process and received full reaccreditation. However, the school was placed on warning for standard 7: Community Resources for Learning, which deals with budget, facilities, and the physical plant. The accreditation committee listed the following concerns (noted in the 4/22/16 Accreditation letter):

The school site and plant do not minimally support the delivery of high quality school programs and services, including but not limited to the following:

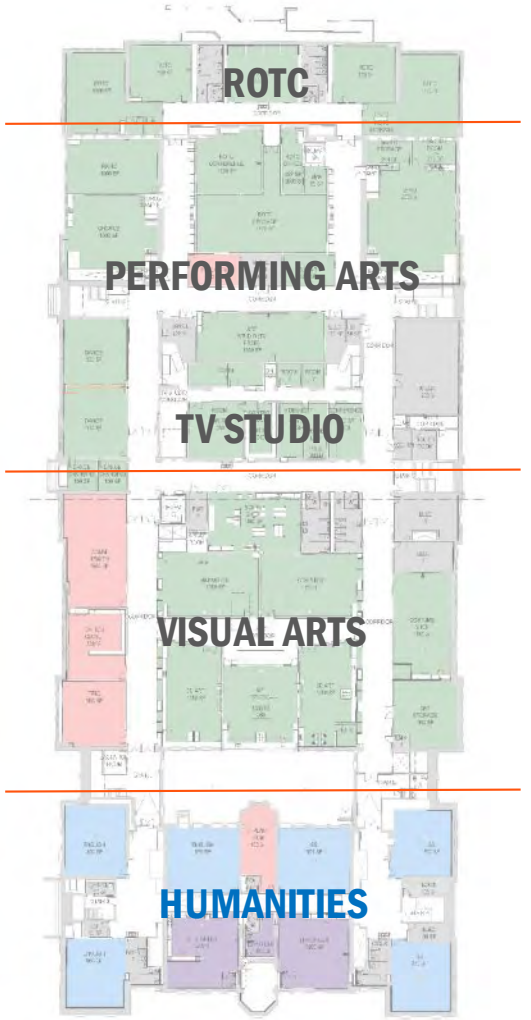
- *Leaks in the roof, the tunnel, and from sinks*
- *Temperature fluctuations where one room is considerably warm while another is considerably colder*
- *The presence of pests in the building*
- *Windows in need of repair*
- *The nurse's office which is small and not easily navigated by wheelchair-bound students*
- *The lack of full accessibility to individuals with physical handicaps*
- *The main cafeteria that is at or near capacity*
- *The lack of capacity of the electrical system resulting in the inability to support upgrades in technology*
- *The lack of natural light or adequate ventilation in art rooms*
- *The inability of the science labs in both the 1922 and the 1980 buildings to support modern science curriculum and pedagogy*
- *The lack of equitable facilities to support students in life skills programs*
- *The lack of equitable access to up-to-date technology for all students*

LOWELL HIGH SCHOOL

BASEMENT PLAN - TRANSFORMATION

Ayer-Shirley HS - SMMA

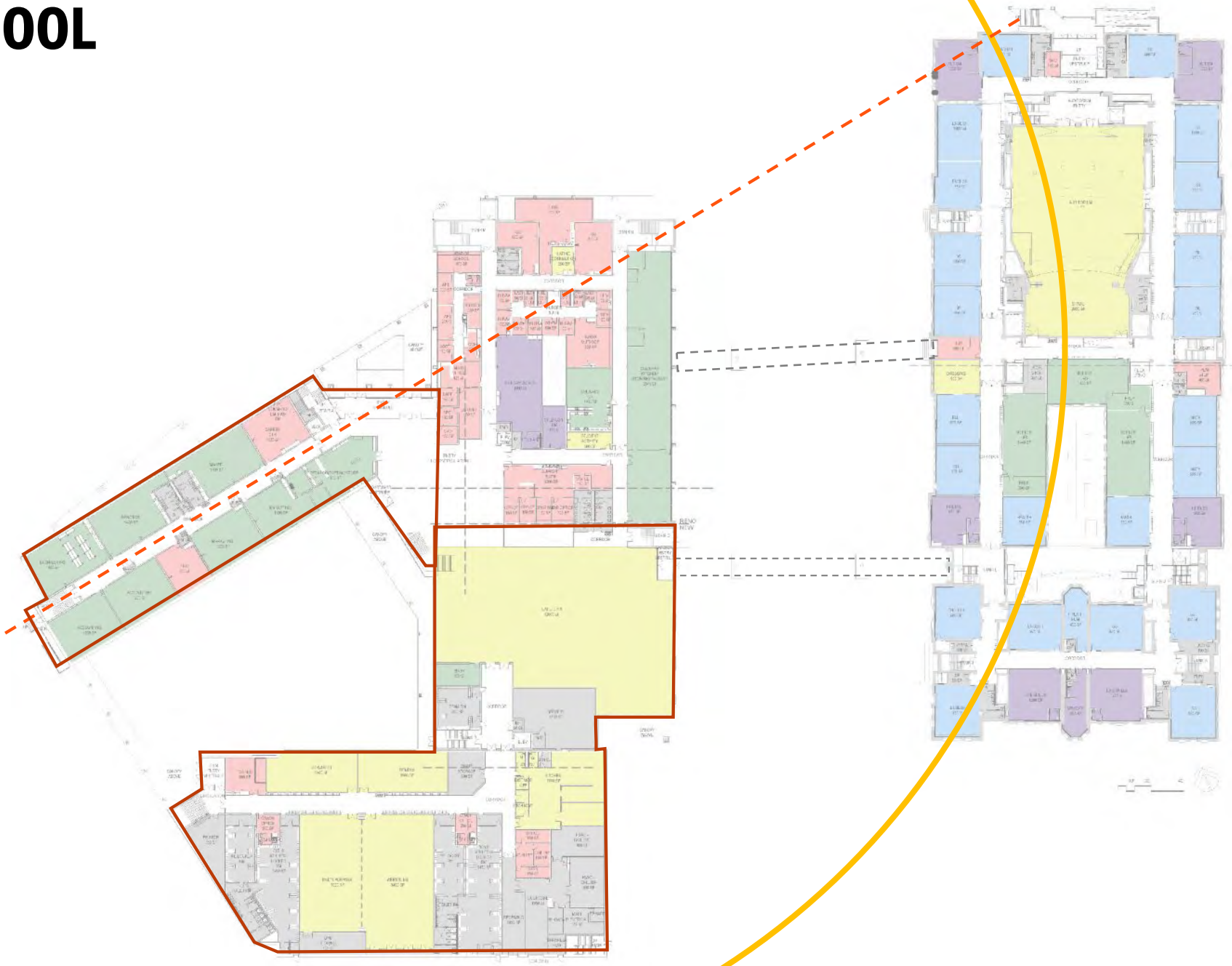
Quaker Meeting Hs & Arts Center – Kieran Timberlake



LOWELL HIGH SCHOOL

LEVEL-1 PLAN – NEW ADDITIONS

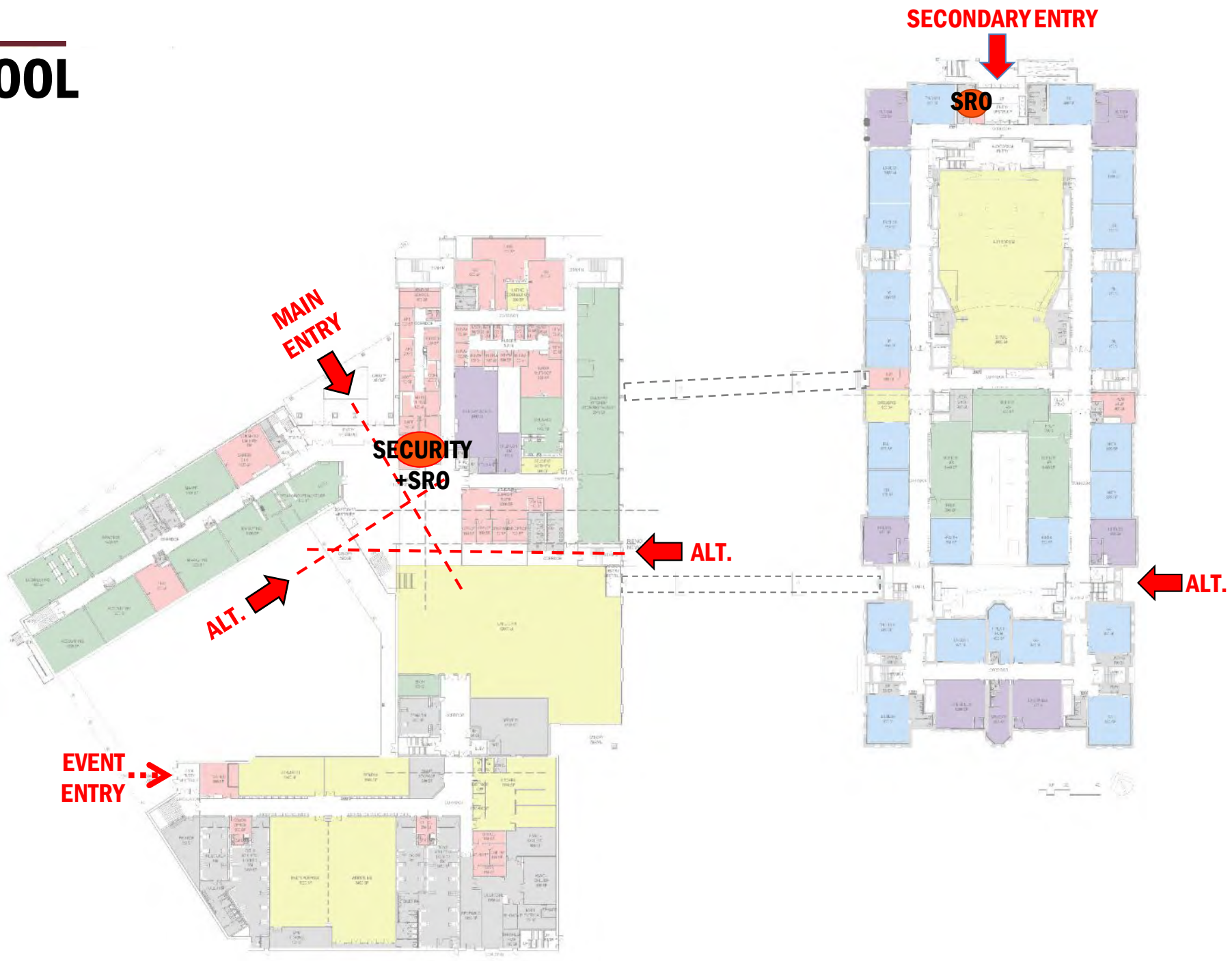
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-1 PLAN – ENTRY / ACCESS

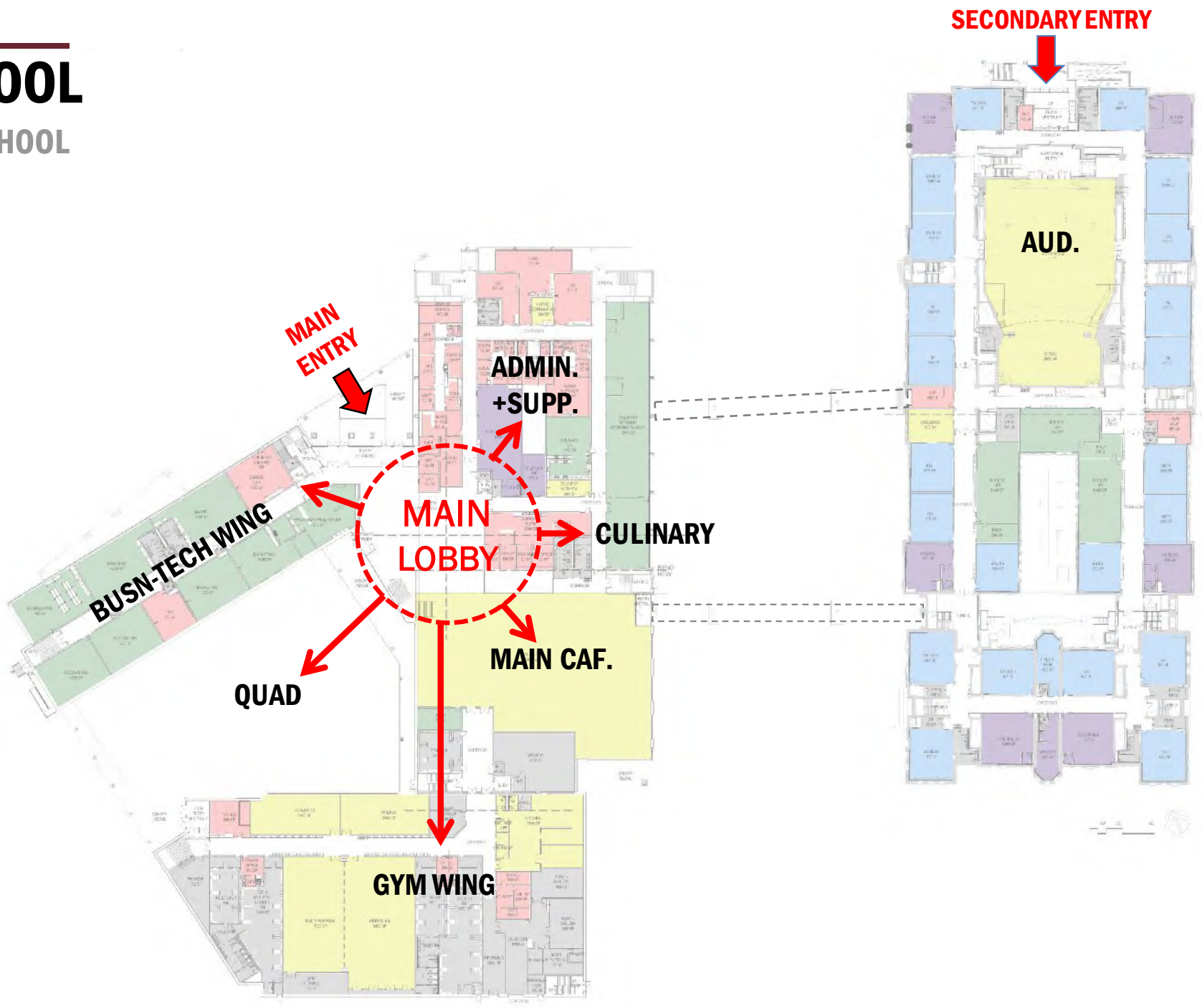
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

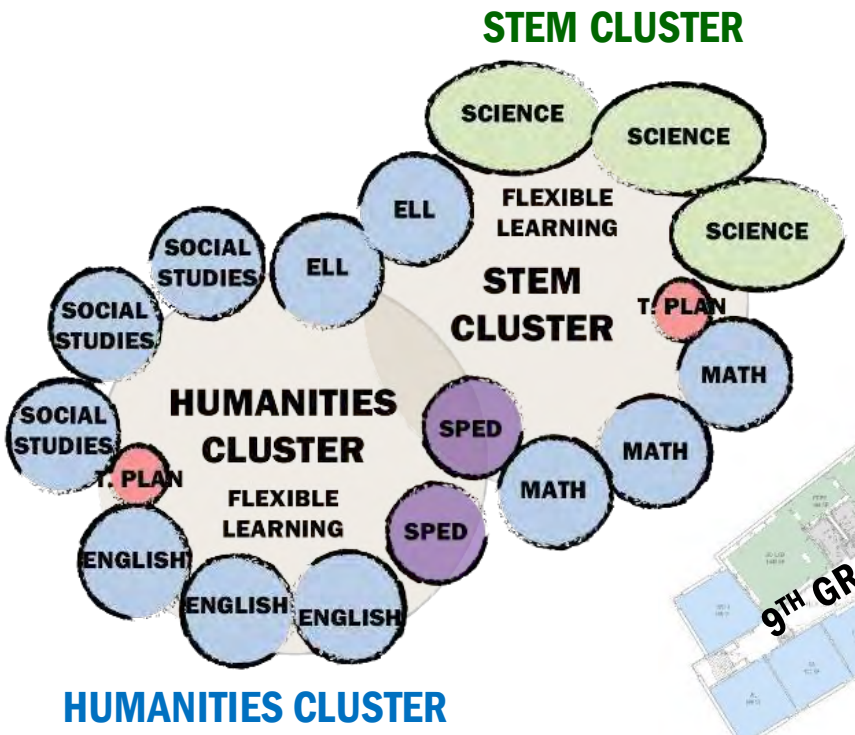
LEVEL-1 PLAN – HEART OF THE SCHOOL

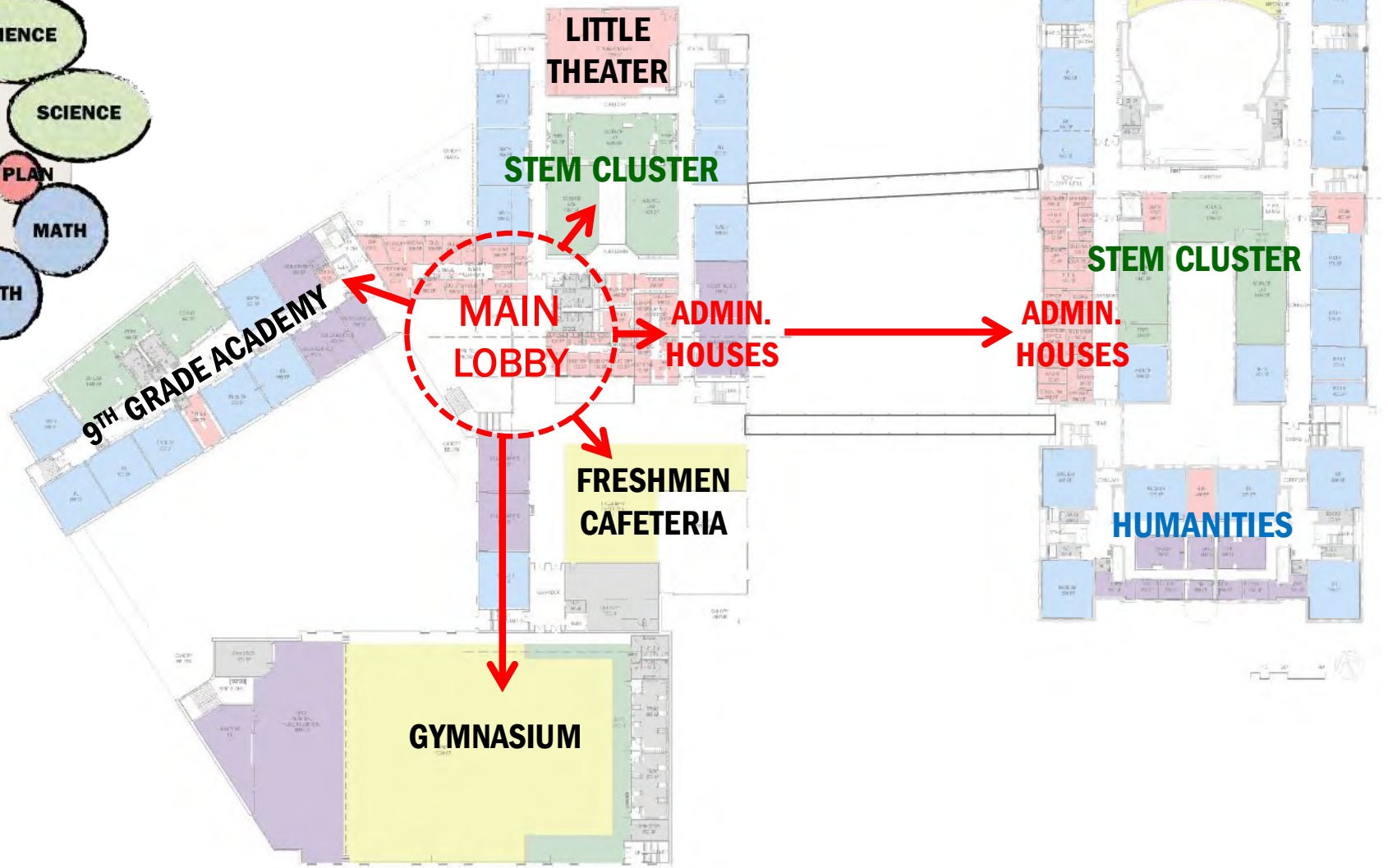
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-2 PLAN & ACADEMIC CLUSTERS

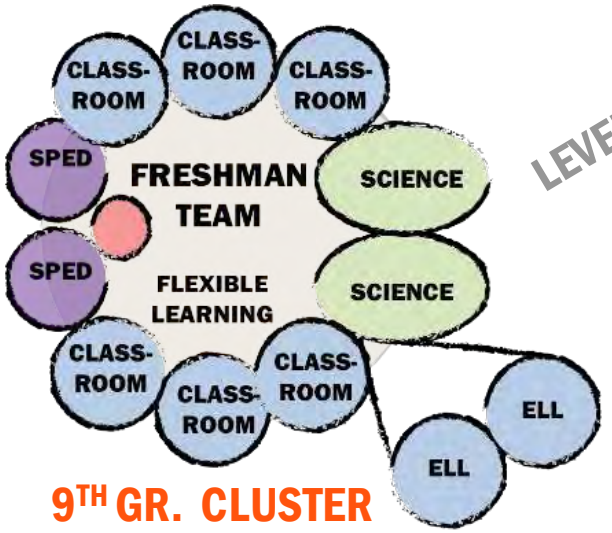




LOWELL HIGH SCHOOL

LEVEL 3 PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

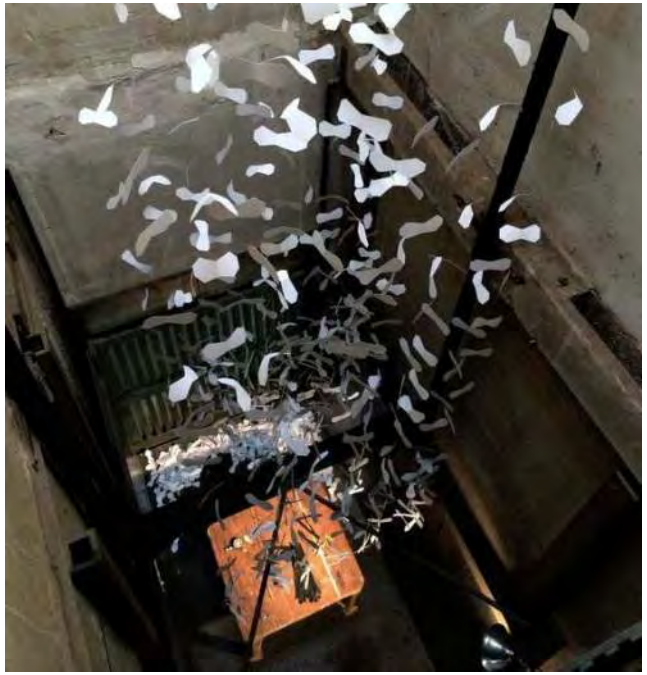


LANDSCAPE OPPORTUNITIES

"THE LIGHT WELLS"

Tahari Courtyards,
Millburn NJ

Tahari Courtyards,
Millburn NJ



Site Specific Installation,
Velvet Da Vinci San Francisco

LANDSCAPE OPPORTUNITIES

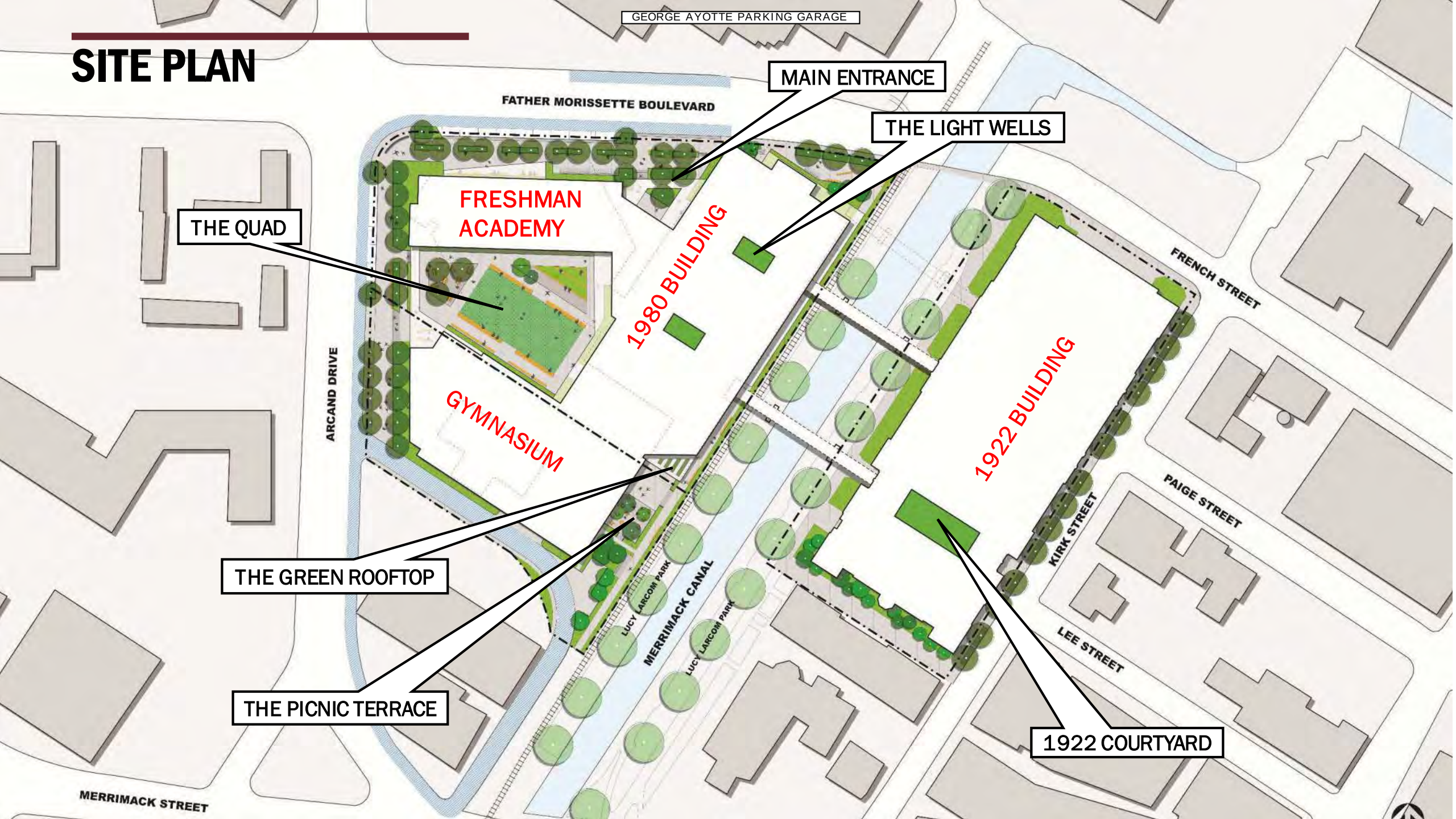
"THE ROOFTOP"

Adelaide High School Roof Terrace,
Adelaide, Australia

Alexandria Center for Life Sciences,
NYC, NY

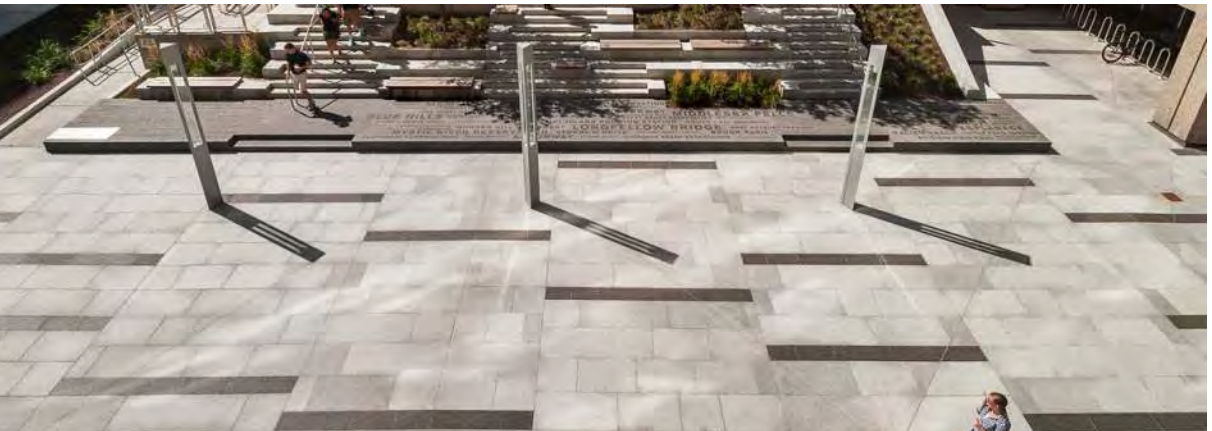
Fenway Farms,
Boston, MA

SITE PLAN


GEORGE AYOTTE PARKING GARAGE
MAIN ENTRANCE
FATHER MORISSETTE BOULEVARD
THE LIGHT WELLS
FRESHMAN ACADEMY
THE QUAD
1980 BUILDING
FRENCH STREET
1922 BUILDING
ARCAND DRIVE
GYMNASIUM
PAIGE STREET
KIRK STREET
THE GREEN ROOFTOP
LUCY LARCOM PARK
MERRIMACK CANAL
LUCY LARCOM PARK
LEE STREET
THE PICNIC TERRACE
1922 COURTYARD
MERRIMACK STREET

LANDSCAPE OPPORTUNITIES

MAIN ENTRANCE



LANDSCAPE OPPORTUNITIES

“THE QUAD”

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

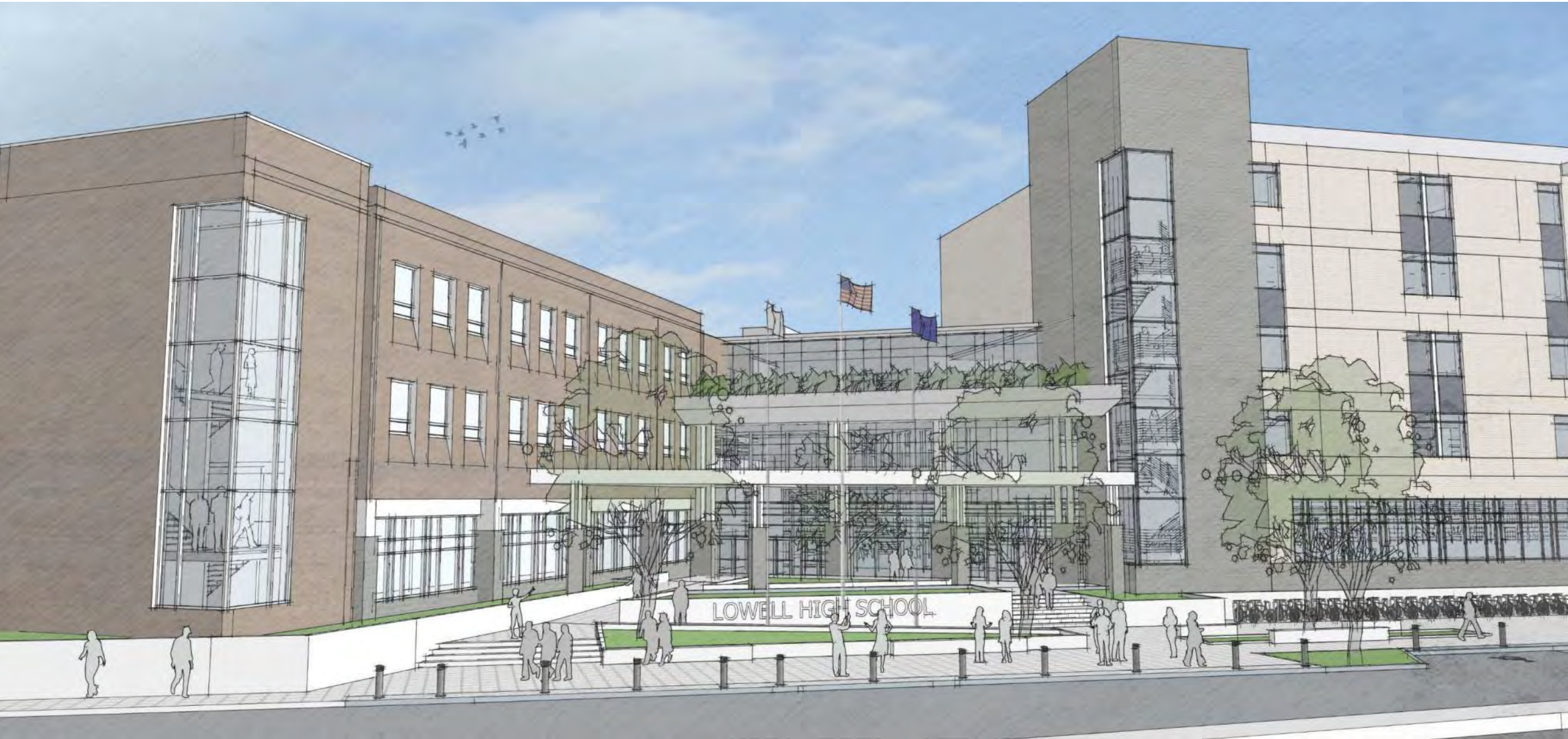
GYMNASIUM VIEW FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW OF GYMNASIUM FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

BIRDSEYE VIEW FROM SOUTH

LOWELL HIGH SCHOOL

1922 BUILDING FROM FATHER MORISSETTE

LOWELL HIGH SCHOOL

1922 BUILDING FROM KIRK STREET

LOWELL HIGH SCHOOL

NEXT STEPS

- 1/23 PE & SKANSKA COST REVIEW AND RECONCILIATION
- 1/25 – 2/1 VALUE MANAGEMENT (IF REQUIRED)
- 1/31 SBC VM MEETING (IF REQUIRED)
- 2/7 SBC MEETING (VOTE)
- 2/12 CITY COUNCIL MEETING (VOTE)
- 2/20 SCHEMATIC DESIGN SUBMISSION TO MSBA
- 4/10 MSBA BOARD MEETING

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Office of the City Clerk
City Hall • 375 Merrimack Street • Lowell, MA 01852
P: 978.674.4161 • F: 978.970.4007
www.LowellMA.gov

Lowell City Council
Regular Meeting Minutes

Michael Q. Geary
City Clerk

Date: **February 14, 2019 (Postponed from February 12, 2109)**
Time: **6:30 PM**
Location: **City Council Chamber, 375 Merrimack Street, 2nd Floor, Lowell, MA**

1. ROLL CALL

Roll Call showed 7 present, 1 absent (M. Samaras). C. Nuon was absent after discussion regarding Item #5.3.

C. Mercier presiding per Council request. No objections.

Motion to suspend rules by C. Milinazzo, seconded by C. Nuon to take Item #5.3 out of order. So voted. **Motion** by C. Milinazzo, seconded by C. Leahy to remain under suspension of rules to allow discussion regarding Winterfest 2019. So voted. Henri Marchand (Special Events Coordinator) provided details regarding Winterfest 2019.

2. CITY CLERK
2.1. Minutes of Transportation SC February 4th; City Council Special Meeting February 5th; City Council Meeting February 5th, for acceptance.

In City Council, minutes read, **Motion** "To accept and place on file" by C. Cirillo, seconded by C. Kennedy. So voted.

2.2. Vote-Cancel Council Meeting of February 19, 2019.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Milinazzo, seconded by C. Kennedy. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras; C. Noun). So voted.

3. AUDITOR BUSINESS
3.1. Vote-Reappoint Bryan Perry to the position of City Auditor.

In City Council, **Motion** to refer to City Council meeting February 26, 2019 by C. Milinazzo, seconded by C. Leahy. So voted. C. Elliott questioned reason for referral. C. Milinazzo note it was a courtesy to M. Samaras request.

4. COMMUNICATIONS FROM CITY MANAGER
4.1. Motion Responses.

In City Council, **Motion** "To accept and place on file" by C. Elliott, seconded by C. Kennedy. So voted.

A) Motion Response - Voting Equipment – C. Leahy commented on the report. Eda Matchak (Elections Department) provided report regarding voting equipment.

B) Motion Response - No Parking Zones on Pawtucket Blvd. – None.

4.2. Communication-Reappoint Aurora Erickson to Historic Board-Historical Society Rep.

In City Council, read, **Motion** to adopt by C. Cirillo, seconded by C. Conway. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted.

4.3. Communication - City Manager request Out of State Travel (1) Career Center; (1) Law Dept.

In City Council, read, **Motion** to adopt by C. Elliott, seconded by C. Conway. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted.

5. VOTES FROM THE CITY MANAGER
5.1. Vote-Accept MGL c.40 s.5B 4th paragraph.

In City Council, Given 1st Reading. **Motion** to refer to Public Hearing on February 26, 2019 at 7 PM by C. Conway, seconded by C. Milinazzo. So voted.

5.2. Vote-Auth CM Ex Temp Access Agreement-150 Douglas Road-surveying services.docx.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Cirillo, seconded by C. Conway. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted.

5.3. Vote-Authorize Submission of Schematic Design to MSBA.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Kennedy, seconded by C. Conway. Adopted per Roll Call vote 8 yeas, 1 absent (M. Samaras). So voted. Perkins Eastman (Consultants) provided report entitled "City

Council Lowell HS Project" which outlined the following aspects of the project: Educational Program; Schedules; Cost Estimates; and Next Steps. Following registered speakers address the Council: Ken Woodrow (Cobblestones) and Ricard Healy. C. Kennedy requested to look at Cobblestones' concerns. **Motion** by C. Kennedy, seconded by C. Conway to request City Manager have discussions with Cobblestones regarding their concerns and work towards resolution of those concerns. So voted. Manager Donoghue noted there have been long discussions with the business and they will continue to engage Cobblestones. C. Elliott noted he had spoken with the owners of Cobblestones and commented on the concerns; especially with parking. C. Elliott questioned the design and owners contingency funds and how the operate. C. Leahy commented on the number of entrances for the high school. C. Leahy commented on the selection of the construction management team as well as the concerns of Cobblestones. C. Milinazzo noted the need to work with established businesses in the community. C. Milinazzo commented on MSBA construction costs guidelines and if the City were meeting them and further commented regarding projected costs as well as possible increase of the reimbursement rate. C. Mercier relinquished Chair to C. Elliott at 7:15 PM. C. Mercier questioned if MSBA would change the latest projections and noted that she supports the process going forward though it was not her ideal choice. C. Conway commented on Cobblestones' concerns as well as costs per square foot of the project. C. Elliott returned Chair to C. Mercier at 7:20 PM.

6. ORDERS FROM THE CITY MANAGER
6.1. Order-60 Day Trial (various).

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Kennedy, seconded by C. Leahy. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted.

7. ORDINANCES FROM THE CITY MANAGER
7.1. Ordinance-Quarterly Traffic-January 2019.

In City Council, Given 1st Reading. **Motion** to refer to Public Hearing on February 26, 2019 at 7 PM by C. Kennedy, seconded by C. Conway. So voted. C. Elliott questioned certain items in the Ordinance. Natasha Vance (Transportation Engineer) commented on the identified sections.

8. RESOLUTIONS

8.1. Resolution-Support Veterans Commission by affording them notice, decisions or actions and opportunities to be heard on issues affecting vets.

In City Council, Read twice, full reading waived with no objections. **Motion** to adopt by C. Kennedy, seconded by C. Cirillo. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted.

9. REPORTS (SUB/COMMITTEE, IF ANY)

9.1. Public Safety SC February 12, 2019.

In City Council, Matter postponed to February 26, 2109 at 5:15 PM.

C. Mercier relinquished Chair to C. Elliott at 7:40 PM.

10. CITY COUNCIL - MOTIONS

10.1. C. Mercier - Req. City Mgr. have proper department consult with the gas utility company to see if possible to install gas pressure relief valve safety whistle to alert customers if gas line is over pressurized.

In City Council, seconded by C. Conway, referred to City Manager. Adopted per Roll Call vote 7 yeas, 2 absent (M. Samaras, C. Nuon). So voted. C. Mercier commented on recent explosion and the need for increased safety and outlined the product and its use and requested the City Manager explore options with National Grid. C. Cirillo noted the product was not on the market or patented and as such would have problem with support. Gerard Whitman, product inventor, replied to questions before him and outlined the use of his product. C. Kennedy noted that product had not hit the market but the motion is appropriate as it should be part of a discussion. C. Cirillo noted her support based upon further discussion.

10.2. C. Mercier - Req. City Mgr. have proper department provide a report regarding the status and progress of all sewer, water, gas and electricity tie-ins for parcels located in the Hamilton Canal Innovative District; report to include name of contractors and other interested parties as well as time lines for each utility.

In City Council, seconded by C. Leahy, referred to City Manager. So voted. C. Mercier noted that she did not need lists of contractors and just requesting update as to hook ups with services. C. Elliott returned Chair to C. Mercier at 7:55 PM.

10.3. C. Nuon - Req. City Mgr. work with Middlesex North Register of Deeds, Richard Howe, Jr., to compile a report regarding amount of money paid to the Community Preservation Acts (CPA) by Lowell residents.

In City Council, **Motion** by C. Cirillo, seconded by C. Kennedy to refer to Council meeting on February 26, 2019. So voted.

10.4. C. Leahy - Req. City Mgr. provide update regarding renovations at the Lowell police department headquarters.

In City Council, seconded by C. Elliott, referred to City Manager. So voted. C. Leahy requested update and status report on project. C. Elliott noted prior funding earmarked by the State. Manager Donoghue commented on prior earmarks.

10.5. C. Leahy - Req. City Mgr. provide an update regarding the previous motion to allow retired policemen to work details.

In City Council, seconded by C. Milinazzo, referred to City Manager. So voted. C. Leahy requested update and noted that program was successful in other communities.

10.6. C. Milinazzo - Req. City Mgr. have the CFO prepare a report highlighting costs associated with salary and wages for the school department budget for the last 2 contract periods (6 years) including teachers, administrators, and custodial staff.

In City Council, seconded by C. Cirillo, referred to City Manager. So voted. C. Milinazzo noted frustration with Teachers Union representative going before various boards and not providing accurate information. C. Milinazzo noted that information would illustrate the City's effort with the schools. Manager Donoghue noted the response by the City regarding the petition of the union. C. Leahy commented on the number of repairs being done. C. Elliott noted that information should also be provided with the response regarding the Maintenance of Effort by the City.

10.7. C. Milinazzo - Req. City Mgr. prepare a list of work items that could potentially be completed by an outside contractor for both maintenance and custodial work throughout our municipal and school buildings.

In City Council, seconded by C. Cirillo, referred to City Manager. So voted. C. Milinazzo commented on contracted services of prior budgets and noted that pressure must be relieved on the part of City workers as the work needs to be completed. C. Kennedy noted that list should be reviewed as to who can do the work; costs to do the

work; and time line to complete the work. Manager Donoghue noted difficulty in hiring personnel. C. Leahy noted that second shift workers could supplement appropriately.

11. ANNOUNCEMENTS

In City Council, C. Kennedy noted Winterfest.

12. ADJOURNMENT

In City Council, **Motion** to Adjourn by C. Kennedy, seconded by C. Elliott. So voted.

Meeting adjourned at 8:15 PM.

Michael Geary, City Clerk

A TRUE COPY ATTEST

Michael Q. Geary
City Clerk, Lowell, MA

PERKINS EASTMAN

CITY COUNCIL

LOWELL HS PROJECT

14 FEBRUARY 2019

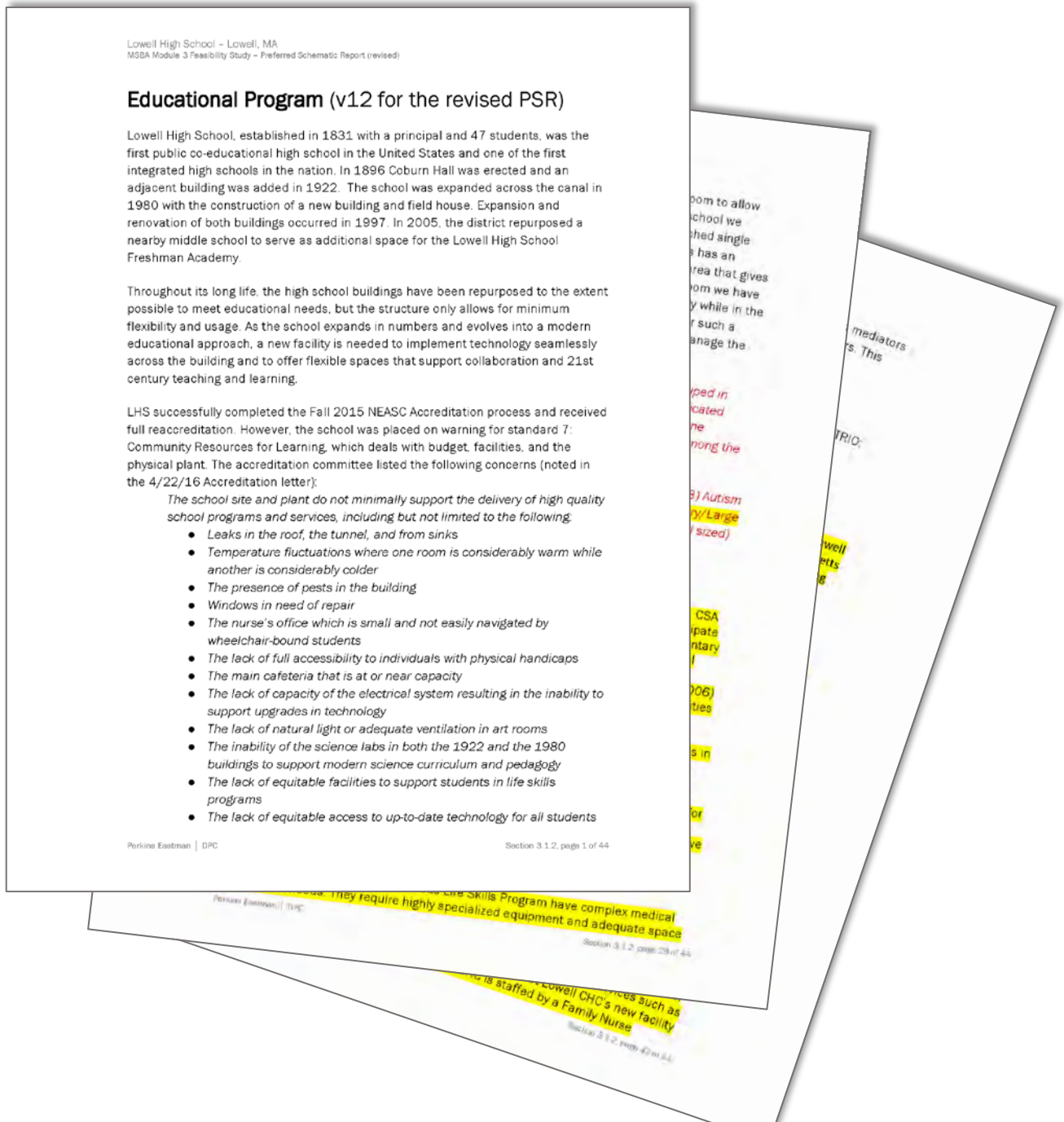
LOWELL HIGH SCHOOL

SCHEMATIC DESIGN UPDATE- AGENDA

- DESIGN RECAP
- OVERALL SCHEDULE
- PRESENTATION OF TOTAL PROJECT BUDGET DRAFT
- VOTE TO APPROVE SUBMISSION OF SCHEMATIC DESIGN SUBMITTAL TO MSBA
- NEXT STEPS

EDUCATIONAL PROGRAM

- Connected Freshmen Academy
- Zone for Community Use / Lock-Off
  - Access to Media Center & Food Service
  - Daytime Public Access
- Create Hub/Heart to the School
- Organize for Interdisciplinary Collaboration
  - 9th Grade Core Academic Teams
  - STEM & Humanities Planning Clusters
  - Integrated SPED, ELL, Health & Flexible Learning Spaces
  - Clustered Fine Arts, Digital Media, ROTC & World Language
- Accessible House Model for Admin/Support
- Provide Good Daylight/Orientation
- Minimize Educational Disruption



Lowell High School – Lowell, MA
MSBA Module 3 Feasibility Study – Preferred Schematic Report (revised)

Educational Program (v12 for the revised PSR)

Lowell High School, established in 1831 with a principal and 47 students, was the first public co-educational high school in the United States and one of the first integrated high schools in the nation. In 1896 Coburn Hall was erected and an adjacent building was added in 1922. The school was expanded across the canal in 1980 with the construction of a new building and field house. Expansion and renovation of both buildings occurred in 1997. In 2005, the district repurposed a nearby middle school to serve as additional space for the Lowell High School Freshman Academy.

Throughout its long life, the high school buildings have been repurposed to the extent possible to meet educational needs, but the structure only allows for minimum flexibility and usage. As the school expands in numbers and evolves into a modern educational approach, a new facility is needed to implement technology seamlessly across the building and to offer flexible spaces that support collaboration and 21st century teaching and learning.

LHS successfully completed the Fall 2015 NEASC Accreditation process and received full reaccreditation. However, the school was placed on warning for standard 7: Community Resources for Learning, which deals with budget, facilities, and the physical plant. The accreditation committee listed the following concerns (noted in the 4/22/16 Accreditation letter):

The school site and plant do not minimally support the delivery of high quality school programs and services, including but not limited to the following.

- *Leaks in the roof, the tunnel, and from sinks*
- *Temperature fluctuations where one room is considerably warm while another is considerably colder*
- *The presence of pests in the building*
- *Windows in need of repair*
- *The nurse's office which is small and not easily navigated by wheelchair-bound students*
- *The lack of full accessibility to individuals with physical handicaps*
- *The main cafeteria that is at or near capacity*
- *The lack of capacity of the electrical system resulting in the inability to support upgrades in technology*
- *The lack of natural light or adequate ventilation in art rooms*
- *The inability of the science labs in both the 1922 and the 1980 buildings to support modern science curriculum and pedagogy*
- *The lack of equitable facilities to support students in life skills programs*
- *The lack of equitable access to up-to-date technology for all students*

Perkins Eastman | DPC

Section 3.1.2, page 1 of 44

LOWELL HIGH SCHOOL

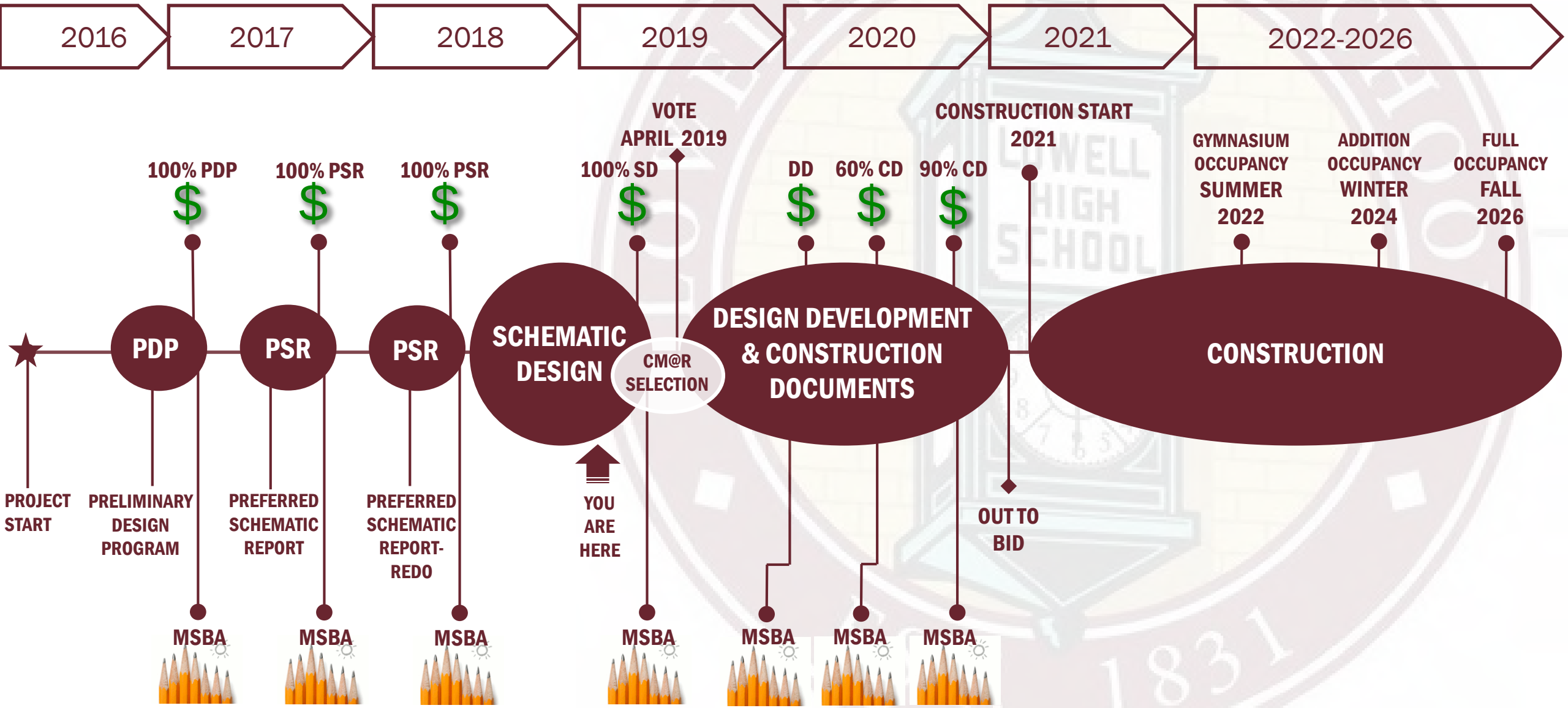
AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

OVERALL SCHEDULE



LOWELL HIGH SCHOOL

SUMMARY OF PROJECT COSTS

TOTAL GROSS SQUARE FEET	622,777 S.F.				
SQUARE FEET OF RENOVATED SPACE	388,262 S.F.			* ($/SF)	$358.55 /SF
SQUARE FEET OF NEW CONSTRUCTION	234,515 S.F.			* ($/SF)	$485.29 /SF
SITE, BUILDING TAKEDOWN, HAZMAT ETC.		* ($)	$17,423,246		
ESTIMATED TOTAL CONSTRUCTION **		* ($)	$270,444,856	* ($/SF)	$434.26 /SF
ESTIMATED PROJECT COSTS		($)	$343,399,220		
LOCAL SHARE		($)	$129,267,512		

* Marked Up Construction Costs

** Does Not Include Construction Contingency

LOWELL HIGH SCHOOL

NEXT STEPS

- 2/14 CITY COUNCIL MEETING (VOTE)
- 2/20 SCHEMATIC DESIGN SUBMISSION TO MSBA
- TBD PROJECT SCOPE & BUDGET MEETING
- 4/10 MSBA BOARD MEETING
- 4/24 CITY COUNCIL MEETING (APPROVAL)
- 4/25 OPM & A&E NOTICE TO PROCEED
- 5/2019 – 2/2021 DESIGN
- 6/2019 CM AWARD
- 3/2021 – 7/26 CONSTRUCTION

PERKINS EASTMAN

CITY COUNCIL

LOWELL HS PROJECT

14 FEBRUARY 2019

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
City Manager Overview
MEETING MINUTES

MEETING #1 | OCTOBER 4, 2018 | 4:00 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Joe Drown, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Eileen Donoghue Present Kara Keefe Mullin | City Present Diane Tradd | City Present Claire Ricker | City Present Joe Drown | PE Present Bob Bell | PE Present Dawn Guarriello | PE Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. PEDESTRIAN BRIDGE AIR RIGHTS/RENOVATION

DISCUSSION	Group discussed the status of the air rights for the two bridges. The City has easements for the existing South bridge over the tracks and over the canal. The existing Northern most bridge which will preferably be relocated has an easement from the NPS for air rights over the tracks however an easement does not exist for air rights over the canal which will be required from DCR via Article 97. Kara Keefe Mullin stated that the City is working with NPS to get written authorization from NPS that the Northern easement will allow relocation of the bridge. Historic board and NPS have expressed concerns over bridges being expanded from 1 story to 2 stories. PE explained how 2 stories are preferred for connectivity, however state and federal approvals will be required.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. DEPARTMENT OF PLANNING AND DEVELOPMENT

DISCUSSION	Diane Tradd and Claire Ricker provided a list of 25 comments from DPD regarding the site plan, see attached. Dawn Guarriello discussed how Site plans will be addressed in several meetings with City departments scheduled for next Tuesday 10/9. Group discussed that it has been difficult to get ConCom to day meetings. Landscaping

	security options were discussed. Mary Ann Williams inquired if school guard glass would be explored. Joe Drown replied that school guard glass will be explored and that safety is inherent in the design. Group discussed suggestion that bridge be installed to parking garage but it was concluded to not be feasible within MSBA scope. Perkins Eastman inquired about the planning department process. Diane Tradd responded to email her after the meeting and she will provide the process description. Photovoltaic panels were discussed and PE stated that 1980s and 1920s building's roof structures will not be able to carry the weight per code.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. EMINENT DOMAIN

DISCUSSION	Perkins Eastman stated that they are looking to get geotechnical and hazmat/environmental exploratory work at 75 Arcand Drive as soon as City possesses the property. It was explained that work will include borings through asphalt that will need to be patched as well as sampling of building materials inside the building for testing. Claire Ricker stated that scope of hazmat investigatory work should be sent to her for review by Sarah Brown and issuance of a license.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. RAILROAD EASEMENT

DISCUSSION	Group discussed the railroad easement on the edge of 75 Arcand property along the Masonic temple border and Arcand drive. Jim Dowd explained how an opinion was obtained from the City Solicitor's office that the easement is deemed abandoned and/or deemed null due to the eminent domain taking. City Solicitor's Office provided opinion in April 2017 and issue was revisited for confirmation in March 2018.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. SCHEMATIC SCHEDULE

DISCUSSION	Joe Drown reviewed schedule of meetings going forward, see attached. Estimating scheduled to start on 12/3 was discussed, and PE noted drawings related to 75 Arcand investigation may lag due to late start because of access. Eileen Donoghue stated that it would be preferable to have the design team update the City Council on the schematic design progression in early December. Group discussed potentially updating City Council at Tuesday Dec 7 meeting.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

MEETING AGENDA

Perkins Eastman
Architects DPC

Date Prepared	10/3/2018	
Project Name	Lowell High School, PE #67150	
Subject	City Manager Overview	
Meeting Location	City Hall	
Meeting Date	10/4/2018	
Prepared By	Alicia Caritano	a.caritano@perkinseastman.com
Participants	Eileen Donoghue, Kara Keefe Mullin, Mary Ann Williams, Jim Dowd, Joe Drown, Bob Bell, Alicia Caritano, Dawn Guarriello	

TIME	ISSUE	COMMENT/DESCRIPTION
	Eminent Domain	City to update re schedule - need site access ASAP for additional existing conditions investigations. Targeting +/- 11/19. City to notify owner that access is required for borings in the site, and hazardous materials sampling in the building. Note: The City may need to patch asphalt or landscape areas pending boring locations.
	Article 97/Bridges	City to update on legal/approvals, Bridges: location of North Bridge, 1 story vs. 2 (historic/cost/program)
	Enul	Nitsch Engineering tried to contact Enul in April about required approvals; they didn't respond. Can city reach out to Enul?
	Rail Road Easement	Corner of the 1980 Building on Arcand is located w/in Rail Road easement. Jim Dowd is following up with the City.
	Site Plan Review	Site Plan and Elevations will be presented at the 10/23 Working Group and 11/1 SBC, what is process with Planning Dept?
	Conservation Commission	Process pending 10/18 meeting
	Lowell Historic	Process pending 10/10 meeting
	School Committee	Pending significant adjustments to Space Summary

DATE	MEETINGS /MILESTONES	COMMENT/DESCRIPTION
10/4	SBC	• Pre-engineered building update • Exterior update • Exterior Material Options • Interior Material Options • Building Systems
10/9	Landscape Meetings w/ City	Historic,Trolley,Traffic, NPS
10/16	Focus Group Meetings #2	PE confirming if these meetings are required

PERKINS EASTMAN

10/18	Civil Meetings w/ City	• Lowell Regional Water Utility, • Lowell Regional Wastewater Utility • City Engineer/DPW • Conservation Commission
10/23	National Grid	Targeting meeting +/- 11:30 am to have National Grid input prior to Working Group meeting at 2:00 pm to select HVAC System.
10/23 11/1	Working Group/ SBC	• Site Plan • HVAC Follow-up w/ Life Cycle Analysis • Energy
Wk 11/6 date tbd	Inspectional Services/Fire/Police	Review Site Plan and Building plans
11/15- 12/16	Lowell Historic	Review project / draft Project Notification Form
11/2-12/14	Pricing Documents	Design Team Develops Documents for Estimators: initial package to estimators 12/3
11/16- 11/23	75 Arcand Existing Conditions Investigations	Add Services Include: Geotechnical (drilling), Civil Soils (digging), Hazardous Materials(Building access), possible Geoenvironmental pending PE discussions w/ Nobis.
11/17- 12/14	75 Arcand Pricing Documents	Design team develops pricing documents for estimators
12/5	Student Forum	Update/interactive session
12/6	SBC	• Updates • Interior Materials?
12/17- 1/17	PNF/Project Notification Form	Submit 12/17, MA has 30 days to respond
12/10 1/3	Working Group/ SBC	• Updates • Security • Sustainability Update
1/2/19- 1/31/18	Estimate Reconciliation	
Dec/January tbd	Lowell Disability Commission	Review plans and any required variances for existing conditions
January tbd	Community Meeting	Updates w/ Pricing
2/7/19	SBC Recommendation/ Council Vote	Vote on SD Project Scope & Budget
2/20/19	MSBA SD Submission	

cc:

Attachments:

Distributed to Skenska at October 4, 2018

LOWELL HIGH SCHOOL – SITE PLAN COMMENTS

Department of Planning and Development
September 4, 2018

1. What was the mandate/program provided to the architects/designers? What stated programmatic goals, academic and otherwise, are met with this site plan/massing?
2. Can agenda and minutes from previous meetings be made available if they are not already?
3. How have prescribed MSBA requirements affected the site plan?
4. What waivers and/or relief from prescribed MSBA design requirements and assumptions have been made or will be sought based on the urban context and spatial constraints of the Downtown site?
5. What waivers and/or relief from prescribed MSBA design requirements and assumptions have been made or will be sought based on the large number of students currently served and projected to be served by a single city high school in an urban context?
6. What contextually appropriate modern urban high school precedents were considered in development of the site plan? Dunbar Public High School in Washington, DC for example.
7. How have modern security concerns/requirements affected the site plan/massing?
8. The design and concept development process thus far has differed significantly from the City's usual processes for evaluating building projects. What are the schedule milestones and the overall project timeline moving forward?
9. Does the MSBA require a public participation plan/process? Will there be a required "25%" design public hearing for example? If not, what is the plan for public engagement moving forward? How will public comments be acknowledged and integrated into the site plan design?
10. What, if any, consideration has been given to how the High School site and buildings will interact with Downtown Lowell at the street level? Is there an opportunity for "storefronts" at street level for a school store, school café, or student art gallery?
11. The proposed new main entrance of the high school orients to a single doorway into the Ayotte garage. Does the proposed entrance make sense for students who walk, ride transit, bike, etc? Does the proposed entrance make sense when evaluated based on the origin/mode of the student commute? Is any data available on how students get to the school and from where? If so, can the City be provided the data and related analysis that supports the entrance location and orientation?
12. Has the corner of Father Morisette and Arcand, or the Arcand Drive side through the "quad" been considered for the main entrance? If so, why were those locations eliminated?
13. Currently the site plan shows three separate bus drop off areas; is there a way to consolidate the bus drop-offs so that other street amenities can be considered? Do the bus stop areas make sense and serve the appropriate LRTA routes such that busses can travel in the most efficient traffic patterns?

14. Has a pick up/drop off area on Arcand Drive been considered? If so, why was it eliminated? Is there an opportunity to modify the traffic pattern to better facilitate circulation of all vehicles involved in pick-up/drop off including LRTA busses?

15. The current site plan shows a curb cut out along Father Morisette westbound that is labeled "bus stop" and "handicap parking." Are both uses planned? Will there be parking during some hours and bus pick-ups only at the start and end of the school day?

16. The "access drive" to the south of the gymnasium seems overbuilt. Is there an opportunity to access the recycling and dumpster area from Dutton Street (City ROW)?

17. Can the "access drive" to the south of the gymnasium be used for student drop-off/pick up in a loop with Arcand Drive?

18. Has the possibility of a skybridge between the Ayotte Garage and the 1980 building been evaluated? If so, why was it eliminated?

19. The Freshman Academy building is the closest building to Father Morisette/Ayotte Garage, why is this given that freshmen don't drive and the community will presumably utilize the garage and public street access to the gymnasium for events?

20. What goals, academic or otherwise, are met by building a separate Freshman Academy *building*, rather than allocating existing space for a freshmen academy? For example, allocating the lower floors of the 1922 building for freshmen would reserve the new building for state of the art facilities for STEAM learning that is accessible to all students.

21. Lack of windows and large "blank walls" will negatively impact streetscape and school building interface with Arcand Drive, will additional windows be installed?

22. Has a view study been done to evaluate the viewshed from the upper floors? Is there an opportunity for river views from classrooms or hallways?

23. Site plan still shows "double decker" sky bridges between buildings but Historic Board has been very critical of any increase in size to the bridges, has this issue been resolved?

24. Is the proposed courtyard large enough for athletic activities currently taking place at Cox Circle? If so, which activities, athletic and otherwise, can a space that size support?

25. Moving forward, please detail the process for submission and resolution of Department of Planning and Development comments, as well as comments from other City Departments, on project design and construction documents.

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LOWELL HIGH SCHOOL PROJECT
Landscaping Meetings 4 NPS
MEETING MINUTES

MEETING #4 | OCTOBER 9, 2018 | 3:00 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview: National Park Service
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | Assistant City Manager Present Steve Stowell | Lowell Historic Board Administrator Present Peter Aucella | Director NPS Present Charles Tonetti| Park Architect, NPS Present Johanna Barthmaier | Traverse Landscape Architects Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Alicia Caritano | PM, Perkins Eastman Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Alicia Caritano (AC) presented and described the overall site plan. AC made note of the RR easement on the 75 Arcand property. Peter Aucella (PA) stated that Dutton used to extend to Fr. Morrissette Blvd and stated that extending Dutton along the canal is not a good idea. PA stated that delivery road behind gym tied into Dutton appeared to be a good idea and stated that the City owns the parking area in front of Cobblestones. AC stated that Natasha Vance was approving of the loading area road tied to Dutton and Merrimack Streets. JB described the discussion earlier in the day about the landscaping around the trolley tracks with Christine Bruins from NPS. PA stated NPS sends a letter to HS every year that trolley is starting up again on march 1. PA stated that the school does a good job communicating to students in regard to the trolley. JB stated that Christine Bruins described to the groups earlier the upcoming Capital Projects and that we also spoke of the 75 Arcand easement. PA noted that St. Anne's Church has the rights to their property along Lucy Larcom Park. PA stated that if the North bridge get relocated we will need to be aware of the art. CT stated that NPS owns the art. JB inquired if there was a drawing cataloging the art. PA stated yes and that art is by Ellen Rothenberg and Charlie can provide a drawing cataloging it. Charlie Tonetti (CT) stated he will have someone look into the NPS archives for a survey of the art.
CONCLUSIONS	

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE

2. BRIDGE EASEMENTS

DISCUSSION	AC suggested that the group start the Bridge Easement discussion. PA stated that he presumes that the easements have been reviewed. AC stated the City has reviewed them. PA provided a graphic of the French Street to Merrimack Street areas with the National Park borders depicted. PA pointed out that the graphic shows the 75 Arcand easement as no longer in use. When the intersection of Arcand and Fr. Morrissette was reconstructed, NPW(?) was asked if the track needed to remain through the intersection and NPS responded no. PA stated that his

	sense is that the 2 relevant deeds are from 2004. The first deed is for the NPS acquiring the tracks. The 2nd deed was written to establish the North foot bridge easement over the tracks, as it was discovered at that time that the easement did not exist. Both deeds were written by David Funk of the NPS. NPS purchased the tracks from the railroad for $396,000. In regard to the City moving the North bridge PA stated that they don't have it in writing from NPS solicitors yet but if the City owns the servient estate, which it does, the City can relocate the bridge easement as long as the track easement is not infringed upon. PA stated that the City would need a permit from NPS for construction over the tracks relocating the bridge and the permit would need to be issued by Christine Bruins. PA stated they have received this position from the NPS Land Division but need it from the Interior Dept. solicitor's office which they are awaiting. PA stated he thinks they will receive clearance from the Dept. of the Interior for the bridge relocation. Mary Ann Williams (MAW) asked about NPS position on a two story bridge. Steve Stowell stated that there should not be a two story bridge. PA stated the NPS owns the 75 Arcand track easement and has no intention of reusing the easement. Lowell NPS informed NPS Solicitors office that they are glad to let City beautify the area over the easement and asked what mechanism can give the city these rights from NPS. PA stated that he has been informed by the NPS solicitor that a land swap is the only method of conveying rights to the City for the easement. PA stated that his understanding is that the City needs full control of the property. AC stated that control of the property is needed by April 10, 2019. PA stated the question was asked what if the City paves over the easement and response from the solicitor was that NPS would have the right to sue for infringement. PA stated the question is how the NPS can get the City the rights they need for the project. PA is hoping for an opinion in a week or two from the Dept. of the Interior on both issues. PA stated one possibility is that the government could possibly enter in a covenant with the City not to sue over an infringement of the easement by the City. Diane Tradd asked if it was possible to do a land swap quickly. PA responded they will have an opinion back to them in a couple of weeks. Kara Keefe Mullin (KKM) stated the DCR Air Rights legislation will hopefully be filed in January. PA reiterated that NPS is working with their lawyers to solve the 75 Arcand easement issue.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. HS AUDITORIUM

DISCUSSION	PA inquired as to what NPS needs to do to get involved in the HS Auditorium design. AC stated that the design is developing and the project team can run the auditorium drawings by NPS through Kara. PA stated that NPS is concerned about the new design because the NPS Summer Music Series currently has difficulty getting equipment into the HS auditorium. Jim Dowd stated that the same concerns have been requested to be addressed by LHS band and drama faculty.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

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LOWELL HIGH SCHOOL PROJECT
Landscaping Meetings 1 Historic
MEETING MINUTES

MEETING #1 | OCTOBER 9, 2018 | 10:00 AM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Scope Review: Lowell Historic & Planning and Development Department
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | Assistant City Manager — Present Diane Tradd | Assistant City Manager/ DPD Director — Present Steve Stowell | Lowell Historic Board Administrator — Present Johanna Barthmaier | Traverse Landscape Architects — Present Mary Ann Williams | Skanska — Present Jim Dowd | Skanska — Present Alicia Caritano | PM, Perkins Eastman — Present

AGENDA TOPICS

1. REVIEW OF OVERALL SITE

DISCUSSION	Johanna Barthmaier (JB) from Traverse Landscape Architects discussed/presented drawing L.1.0 with an overall review of landscape architecture for the site. JB discussed that new quad area will have a synthetic turf surface. Lucy Larcom Park was discussed that it will remain a grass surface as it exists. Steve Stowell (SS) noted that there are currently some benches and barrels that need to be replaced by the City. SS stated that if a pedestrian bridge is relocated the existing footings will need to be completely removed. SS also noted that we need to keep a close eye on protecting the art which is owned by the NPS. NPS can provide a list of the art in Lucy Larcom Park. SS stated the cobbled area between St. Anne's church and Coburn all is an attractive area that should receive attention. Group discussed the new quad space. JB stated that they are looking to maximize use of the quad area. SS inquired if the area was gated. Alicia Caritano (AC) stated yes. JB stated the quad area is also focused on being a community entrance off hours. Architects and landscape architects are still coordinating use of quad as an off hours entrance. AC stated the design team is looking to tie in all sides of the school to the City. AC also noted that the design is preliminary and still being developed including reviews at the upcoming Working Group and School Building Committee. DT asked about the South façade area of the Freshman Academy (FA). JB described the facade area possibly using a proposed screen area adjacent to the South façade (NE corner of quad); the Design Team is still exploring this option, and the best location for this "screen." DT stated that students hangout after school around plaza at City Hall/Police Station and could use new quad instead. DT inquired about sleeves for volleyball nets on quad. JB responded that sleeved can be installed but weighted bases may be a better application.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. STUDENT PICKUP/DROPOFF AREA(S)

DISCUSSION	SS inquired about pickup and drop-off areas. AC explained why the pickup and drop-off is remaining in the same approximate existing location, but noted that the team is speaking to Traffic at 1:00 this date. Diane Tradd (DT) inquired about a drop-off on Arcand. AC replied that we are here to discuss drop-offs further. SS stated that if the gym is moving it makes sense to move a pickup and drop-off area near the new gym. DT agreed with SS. JD stated that the pickup/drop-off near gym could just be for off hours not primary morning and afternoon area.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. 1922 BUILDING LANDSCAPING

DISCUSSION	SS asked what is the plan for landscaping along Kirk Street. JB responded that the area essentially remains the same. SS stated that Kirk Street is a core NPS stretch that we need to be careful with. JB stated that Kirk Street is a minimal touch area but we will look to match the rest of the campus. AC stated that we are in Schematic Design and still at a point where adjustments can be made. AC stated that we need to define what areas are out of scope and what areas we can and should address. DT stated don't touch Lucy Larcom Park as part of the scope and stated that the park goes from the HS façade to the canal. JD stated that a 10'-20' strip around the building will be needed for construction on the façade. Kara Keefe Mullin (KKM) stated we need to come to an agreement with NPS as to how we will work with them during the project. JD asked if Lucy Larcom Park is owned by the City but utilized by NPS? DT replied yes. JD suggested the portion of Lucy Larcom park may be needed for construction laydown area. SS replied yes we can work that out with NPS. JD stated we need to define project limits for MSBA. KKM asked what are the project limits. AC stated the limits are the property lines. MAW stated it would also be helpful to know what other projects are taking place in the immediate area, for example a sidewalk project on the West side of Arcand has been mentioned. JB inquired about the courtyard of the 1922 building. MAW asked if this courtyard will get roof railings in this year's separate reroofing project of the 1922 building. KKM stated the masonry work will be done first. Work may not start until April and we may want to put it off until next year for reimbursement. AC stated that PE did not carry a new 1922 roof in the PSR drawings. KKM stated a majority of the work is masonry. JB asked about the cobbled area South of Coburn Hall. SS stated the cobblestones were just reset but it should be looked at. JB stated that accessibility over the cobbles may need to be addressed. SS stated that the area is technically a street.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. 1980, FA, GYM SIDE LANDSCAPING

DISCUSSION	AC noted that she did not feel all of the parking spaces need to be HC accessible as currently shown and that this will be discussed with Traffic and ISD. JB stated that we need to make sure that all requirements for accessible spots are met. DT asked what is shown at the rear of the cafeteria. JB replied terrace flexible space with trees, which is not all hardscape and the terrace spills onto the sidewalk along the canal. SS asked about the location of the loading dock. JB described the loading area at the rear of the gym.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. HISTORIC REVIEW

DISCUSSION	AC asked SS what was needed for local historic review as the project will be resubmitting the PNF|Project Notification Form to MA historic in December. SS replied that before a resubmittal is sent to MA Historic, the project team needs to sit down and review with Charlie Tonetti from NPS, DT and myself. AC stated that 1922 windows will not be able to be an exact original profile as it would be cost prohibitive. SS replied that windows will need to be mill windows but not custom. MAW inquired if there is an example window. SS replied that he can provide a sample, that Boot Mill has standard detail aluminum windows. They are not divided lights and are 1 or 1. Windows are made by Universal in Marlborough. AC stated we need a baseline and 2 equals. SS stated that he would send drawings and specifications for +/- 3 appropriate/affordable windows he has used in the past. SS stated that we are looking at building as a mill building and just an aluminum window. JB asked what about the windows in the 1997 addition? SS stated those should be same as 1997 installation with 1922 being different. AC stated Coburn will be like original 1886 windows, 1922 like 1922 windows and 1997 like 1997 windows. AC asked if there was any historic purview within the buildings. SS stated no. AC asked if there was any historic considerations on 1980s side. SS stated no they would just like some permeable storefronts on canal. AC explained potential security concerns with storefronts and multiple access points that would need to be reviewed with the School. DT recommended student food carts. SS stated that the East side of the 1980's building needs to be "activated."
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

6. NEW MAIN ENTRANCE

DISCUSSION	DT asked about the new main entrance. JB described the main entrance from curb to front doors with built in benches and slopes that are not "ramps" that make up the 3' elevation change from curb to door. SS suggested that seating be integrated into granite walls that avoid damage from plows. AC stated they are looking at seat/wall combinations, and that the design is still in progress. SS suggested design team look at Appleton Mills courtyard. JD asked if there is any stock pile of old granite in the City that could be utilized. AC stated they were informed by the City previously it could not be used by the project. DT suggested that old granite may be unearthed by the Project that could then be utilized. SS stated that the area across the street in the new private dorm unearthed a lot of granite. JB stated they are designing the entrance area for durability but to tell a historic story. AC asked if there were any bike paths planned through the site? DT stated no master plan for bikes at this point but question should be brought up in transportation meetings.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

7. PLANNING AND DEVLOPMENT REVIEW

DISCUSSION	AC inquired as to what is the Planning & Development Department process for approval of the Project. DT replied that a dedicated Planning & Development meeting should be set up at this time. AC stated that parking issues may need variances and that need to review the overall process for approval. JD stated we should set up a meeting with DPD. AC replied yes as we need to discuss any required variances. Group established that a meeting with DPD will take place on 11/15 at 1:30pm and that a Historic meeting will take place at 10am on 11/15.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

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LOWELL HIGH SCHOOL PROJECT
Landscaping Meetings 2 NPS-Trolley
MEETING MINUTES

MEETING #2 OCTOBER 9, 2018 11:00 AM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Scope Review: Trolley and Capital Improvement Projects
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | Assistant City Manager Present Diane Tradd | Assistant City Manager/DPD Director Present Christine Bruins| Community Planner NPS Present Johanna Barthmaier | Traverse Landscape Architects Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Alicia Caritano | PM, Perkins Eastman - Present

AGENDA TOPICS

1. TRACKS ALONG CANAL

DISCUSSION	Johanna Barthmaier inquired if the tracks remaining as they are with crushed/rip-rap stone works for the NPS . Christine Bruins (CB) responded that the direction from NPS is that the area is to be improved as long as the tracks still remain fully operational. NPS does not prefer paving around tracks. JB stated that pavement would not be called out around tracks however a walkway access across the tracks will be sought should there be a sidewalk along the canal. JB asked if the trolley has ever had to stop for students on the tracks. CB replied yes, that the students hang out and eat lunch on the tracks. The trolley operation has drivers and flaggers for the 18 grade crossings in the system. CB stated that a lot of kids also walk along the tracks from Dutton Street. JB asked if there is a precedent for keeping people off the tracks. CB stated they reach out every year to abutters of the tracks before the start of the trolley season on March 1. Student groups have been proactive about getting message out to stay off tracks. JB asked if there were any proactive physical barriers. CB replied just signage is employed.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. UPCOMING TROLLEY PROJECTS

DISCUSSION	CB stated that NPS is looking to get 3 track improvement projects in the area of the high school funded for work between 2020 and 2025. Project 1. Replace defective RR ties along the 1980s building. Work may be able to be funded in 2020. RR tie replacement requires 10-15' access path along canal side of tracks to remove old ties then slide new ties in. MAW stated it would be best if this work is performed in 2020. CB stated 200' of track tie

	replacement goes quickly. Project 2. Wooden poles being replaced with steel poles. JB asked where are these poles. CB stated right next to the track with the utility being the NPS. JB asked how many poles in the area of the project. CB stated 15. Project 3. Rework of wires and tracks at French Street Y crossing. Would involve a 4-6 week closing of French Street. Work would be coordinated with a repaving of French Street by the City. AC asked when this would take place. CB stated the time frame is not known because it is dependent on funding. If Fr. Morrissette was being repaved that would be a positive to sequence timing of NPS project to coordinate. CB stated Fr. Morrissette, French and Post Office Rd (east side of garage) would all need to be shutdown. NPS can't perform work over summer as trolley needs to be out of service for work to be performed.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. 75 ARCAND TRACK EASEMENT

DISCUSSION	CB stated that there is also a track easement along the 75 Arcand Property, with no intention of NPS to use tracks, however NPS land rights cannot be given up. Only way of removing the easement from the property would be a land exchange. Kara Keefe Mullin (KKM) stated that in speaking with Peter Aucella the NPS is working on a letter from NPS to the City regarding the air rights to be relocated along the tracks for the North bridge that is moving. This same letter may need to address the 75 Arcand easement. CB stated we don't know what the NPS solicitor's office will say in regard to the easement. CB stated NPS will not be able to give a permit to build on the 75 Arcand easement. KKM inquired what will be needed with the 75 Arcand easement. AC stated that the access road for the loading area, and the SW corner of the gym sits on the easement currently, but is currently being shifted out of the easement). CB stated we have no plans to use the easement but cannot relinquish the rights. JD stated we may need to just adjust the gym off the easement and speak with the City Solicitor's office regarding landscaping/access road on easement.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

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LOWELL HIGH SCHOOL PROJECT
Landscaping Meetings 3 Traffic
MEETING MINUTES

MEETING #3 OCTOBER 9, 2018 1:00 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview: Traffic
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | Assistant City Manager Present Diane Tradd | Assistant City Manager/DPD Director Present Natasha Vance| Traffic and Transportation Engineer Present Christine Clancy | City Engineer Present Elizabeth Lavoie| Bryant Associates, Inc. Present Johanna Barthmaier | Traverse Landscape Architects Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Alicia Caritano | PM, Perkins Eastman - Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Alicia Caritano (AC) stated that we are looking to update previous discussions with Nick Bosonetto. AC noted that Project was told that there will be no more additional studies nor traffic improvements as part of the high school project because there is minimal change to the enrollment and that there were already traffic mitigations in progress in the area of the school. AC discussed drawings showing pickup and drop-off at Fr. Morrissette Blvd and stated that Project has been asked to discuss pickup/drop-off at Arcand drive. AC explained plan for phasing as well as the loading area. AC sated the Project team is looking for input on scope at street edges. Natasha Vance (NV) asked if the primary parking was still planned for the Ayotte garage. AC answered yes, with some parking on site. AC stated the Project is reviewing how many parking spaces can be added on site and street, and how many need to be HC accessible.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. PICKUP-DROPOFF

DISCUSSION	Johanna Barthmaier (JB) inquired about the pickup/drop-off on Kirk Street. Kara Keefe Mullin (KKM) replied that buses load and unload there. Elizabeth Lavoie (EL) stated that LRTA buses are on Paige Street and special education school buses are on Kirk Street. There are also school buses on Fr. Morrissette Blvd. NV inquired that current drawings show drop-off and HC spaces on Fr. Morrissette. JB stated that we are looking to see if we can

	have drop-off in an area other than along Fr. Morrissette, in particular looking at possible drop-off on rear of gym with access from Dutton Street. NV stated that Cobblestones regards that as their parking lot. KKM asked where does the LRTA drop off. JB stated LRTA drops off at Fr. Morrissette, however it tends to cause gridlock at 7:30am and 2:30pm. NV stated that she would support no drop-off on Fr. Morrissette and stated that Dutton to rear of gym is possible drop-off. JB stated that maybe a bus lane on Fr. Morrissette is possible, however comingling with parent drop-off become a problem. JB inquired if we can test options. NV sated a lot of students are walking and that drop-off is on 20-30%. EL input that some people are picking up and dropping off outside the study area in order to avoid congestion. JB suggested separating buses and pickup/drop-off. KKM stated that there is no visitor parking nor 15 min. parking. EL stated that on afternoon pickup there are people waiting all over Downtown in cars for parent pickup. Along with lots of people in the Cox Circle for pickup. NV suggested a pickup/drop-off lane active only at 7:30 and 2:30. Christine Clancy inquired about a bus lane. NV stated the pickup/drop-off lane on Arcand would only be for 45 min in AM and PM and then a through lane remainder of time. NV stated Everett has successfully used this type of lane. KKM asked if a bus lane was possible on Fr. Morrissette given the fixed median. KKM stated possibility of a bud lane on Fr. Morrissette in AM that becomes 15 min. parking afterward. CC stated that Boston and Cambridge utilize the bus lane the parking area at different times approach. EL stated that French and Paige streets are also utilized for drop-off. NV suggested we look at separating parent and bud drop-off. EL stated we have a lot less buses than parents. NV inquired about the number of parent pickups/drop-offs. EL stated it is estimated at 1,200 in AM and 400 in PM. Jim Dowd (JD) suggested buses drop-off in rear of gym from Dutton with parents on Fr. Morrissette. EL stated that 8 or 9 LRTA buses cue on Paige. JD stated that the Kirk/Paige bus pickup drop-off seems to work. AC stated yes, its Fr. Morrissette where the havoc seems to be. NV suggested different locations for AM vs. PM. CC asked how long drop-off is. EL stated that AM drop-off is 7:15 to 8:15, while PM pickup is 2:30 to 3:30. CC questioned channeling 1,200 cars in the AM. NV stated we would need Arcand Dr. and Fr. Morrissette for parent drop-off. KMM suggested the rear of gym be a drop off area in clockwise direction existing to Dutton. JB stated that if parent drop-off is at rear of gym loading dock road then buses can be on Fr. Morrissette. Diane Tradd asked how drop-off works now? EL responded that drop-off and pickup is not great, new school is forecast to have 8% more students and the traffic signals in the area are at capacity. NV asked if students bike to school. EL stated walking and biking are considered the same in the study. NV stated that it would make sense to have bike lanes on Fr. Morrissette and French however they are not funded until 2023. NV asked where we are at with the discussion. AC responded discussion has progressed to live parent drop-off in loading/gym road in AM, need parking on Fr. Morrissette for HC and 15min., need dedicated live parking only drop-off lanes on Fr. Morrissette and Arcand in AM and PM. NV asked if a bump out can be used on Arcand. JB responded that a bumpout can be looked at. CC suggested that meter sticks with video cameras be used at HC spots. AC stated there is no inset on Arcand but we could use 15 min spots there. NV reminded group of no parking within 20' of an intersection. JB stated if loading dock road is utilized then sidewalks will be required on both sides, along with two crosswalks. CC stated the crosswalks should be textural. AC suggested that the buses on Paige and Kirk stay where they are. CC reminded the group of afternoon athletic buses. NV suggested athletic buses cue on loading area road. NV stated that parent drop off on North side of Fr. Morrissette, westbound traffic, must be taken into account. NV suggested the textural crosswalks with LHS symbol as has been utilized with UML.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. PEDESTRIAN TRAFFIC

DISCUSSION	CC brought up that pedestrians methods of crossing outside the crosswalks on Fr. Morrissette is problematic and that they use the RR crossing as a crossing location. JB stated that tabling or changing the material of the crosswalks may be helpful. NV stated that the city has had lots of conversations about tabling crosswalks but the option is not favorable to DPW and LFD. Ideally more bus use and walking should be incentivized. KKM stated limiting drop-offs would be best. JB stated it is best to look at small improvements.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. NEXT STEPS

DISCUSSION	JB inquired where do we go from here. AC stated we will draw up the concepts from this meeting and present them to the Working Group. CC stated we need to look further at bike facilities. A inquired about who the Design team should speak with about bikes. DT stated the City will have a study done. NV

	stated there is the Lowell Bike coalition. AC asked if there were any requirements for number of bike racks. NV stated no requirements, yet. CC stated that UML bike ridership has skyrocketed. JB inquired about bike sheds. CC inquired about Uber drop-off. EL responded that Uber is not in the study. NV asked if Dutton rights still exist. CC stated they can look into it. AC stated/questioned that we are doing no more traffic studies. NV stated correct – no additional study is required.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
Civil Engineering Meeting
MEETING MINUTES

MEETING #1 OCTOBER 18, 2018 10:00 AM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Alex Magee| City Present Christine Clancy| City Present Kevin Dillon | ConCom Present Diane Tradd | City Present Paul Pires | Water Dept. Present Mark Young | Wastewater/Water Dept. Present Mike Stuer | Water Dept. Present Bill Maher| Nitsch Present Alicia Caritano | PE Present Joe Drown | PE Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Alicia Caritano (AC) provided an introduction of the current status of the Project that the design team is working on schematic heading into estimating in December. AC stated that the purpose of the meeting is to define scope and the approvals process. AC described the plan for the phased project with a construction start date targeted for 2021. Bill Maher (BM) the Civil Engineer with Nitsch Engineering provided an agenda, see attached, and drawings of existing conditions for discussion. Property lines of the school were defined on the presented drawings and discussed. BM pointed out all of the existing utilities and the color coding on the drawings provided. BM described how test pits on the West side of the 1922 building uncovered various waterlines that are not believed to be active but need to be verified. BM discussed the sanitary sewer line leaving the 1922 building and also noted that how the storm drains in the courtyard are tied into the system is unknown. Mark Young (MY) asked what the limits of the property lines are. BM discussed the property lines in depth. BM discussed the utility lines entering and exiting the 1980's building and noted that the 1980s building has storm and sanitary separated. Christine Clancy (CC) asked if the drawing presented is just a survey. BM stated the drawings are just a survey from info provided from City/utilities with visuals on manholes, with no ground penetrating radar used.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. STORMWATER

DISCUSSION	BM noted that the 1922 side is just a renovation but the impervious square footage for the overall site will be 8,157 square feet. BM described the planned impervious and pervious areas, noting that a number of different infiltration systems are planned. BM stated that they are also looking at infiltration systems on the South and West sides of the 1922 building. BM noted that a new storm drain line will exit the 1922 building to French Street. MY asked how the locations described above were selected. BM responded based on accessibility. CC asked if the courtyard in the 1922 will remain. BM replied yes, and that it will be connected to a new storm drain system. MY asked how many rainleaders are in the 1922 building. BM described both the interior and exterior rainleaders in the 1922. MY asked if the building is open air in the middle. AC replied yes. MS stated that the high school is a challenging site and suggested smaller diameter stormwater pipe along with storage within the high school system. MS stated that an hour or two of stormwater detention is needed. MY stated that we are a CSO community so any detention and infiltration will help. MS further stated that any control of inflow to the extent practical is helpful. BM stated that is fine. MS asked if the canal has been looked into for stormwater. AC stated that we have been essentially told to stay away from the canal and that it is owned by Enel. MY stated the new courthouse stormwater drains into the Pawtucket Canal. Jim Dowd (JAD) asked how the Project would go about establishing permission to drain into the canal. MY asked Alex Magee (AM) how that process would work. AM stated they would need to check with the City Solicitor's Office. MY stated they have spoken with the City Solicitor's Office before and they were told that taking water from the canal is a problem but depositing water into it is not. BM stated they would like to have the stormwater discharge into the canal. AC stated that once the canal walls are touched the Army Corps of Engineers may need to get involved. BM stated that based on past experience the Army Corps would need to get involved. MY stated that the Army Corps has been cooperative with the City on past projects, but understands that the more permitting the more complications. (later in meeting)-JAD suggested that group discuss discharging stormwater into the canal given that Elliott Veloso (EV) from the Law Dept. has joined the meeting. JAD recapped the previous discussion. MS stated that discharging from the 1980's side may not be advantageous. EV asked if the 1922 side would be advantageous. MS replied yes. EV stated that they would need to look at what permission process was required for the new courthouse. KKM asked if that would have been through DCAMM. EV replied yes. BM stated that Nitsch was the Civil Engineer for the courthouse and he can inquire at Nitsch about the process. (The project for the work near the courthouse was performed by another firm prior to Nitsch working on the courthouse site). EV asked if stormwater would be treated or untreated. BM replied treated. CC stated they can look into another recent City project that discharges into a canal. BM stated that there is plenty of stormwater capacity on the 1980 side and that the cafeteria will have an on-site exterior grease trap for kitchen waste flows from the cafeteria/kitchen..
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. 1922 BASEMENT STORMWATER BACKUP ISSUE

DISCUSSION	AC asked about the issue with stormwater backing up into the basement of the 1922 Building through floor drains. AC stated that Project team was informed that work orders had been put in regarding the issue. CC stated that drain backup up work orders had not been brought to her attention, but she will check with Ricky Underwood. AC stated that the Project Team was informed that water was coming up through floors drains along Kirk Street. AM asked what information the Project Team needs. AC stated that we need to know about any work performed on these drains to date and any subsequent work. Kara Keefe Mullin (KKM) stated she will speak with Jim Donnison as this issue sounds like work that will not be performed in house. MY stated that they should video inspect this issue and asked if Shannon was aware of the issue? KKM stated the issue happens during heavy rain storms. Joe Drown (JD) stated that the floor drains currently have plastic plugs in them. MY stated that he needs to speak to Shannon and they will do investigative work through Ricky Underwood. MY asked if there were any other issue. AC stated no, this is the big issue. KKM asked if it is a sewer issue would it be covered by the Project or City budget. AC suggested that given the time before the Project will be in the 1922 building for construction they City may need to address the issue. KKM stated that we need to see if any immediate drain repair costs can be included in the Project. KKM stated the roof repair may be pushed to the Spring. JD stated that funding projects now would be based on when the Project Funding Agreement is in place and noted that site work is capped at 8%. KKM stated that roof repairs wouldn't be delayed for funding but they may be delayed due to weather. CC stated there are ways we may be able to work around a faster fix. JAD asked how the designers are planning the new stormwater system and if the floor drains will end up off line. JD stated that the design team has been discussing that because all of the plumbing should be

	replaced. JD stated that the existing lines will be videoed or scanned and floor drain along with piping will likely be replaced in the 1922 building.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. POTABLE WATER

DISCUSSION	MY requested to discuss domestic water. BM stated that flow tests have been performed and asked if we should plan on leaving the water service lines as is. Paul Pires (PP) stated that he hasn't seen the flow test results but any 6" feeds should be okay, however he needs to see the numbers. BM stated he would send out the flow test results this afternoon. MY asked BM what his assessment of the flow test was. BM responded that they tested all of the connections on all of the surrounding streets and found the flows to be good. PP stated any existing 4" feeds to the building should be replaced and asked if there will be pumps. JD asked Fire Protection or Domestic. PP stated both. JD stated it looks like the project will be within the 5 story limit for a fire pump. PP stated 4" lines should be upgraded because they don't have enough volume. AM asked if the fixture count will go up. JD stated yes as the population will be increasing. BM stated that we will need to factor in that there will be more efficient fixtures. PP stated that fire and domestic feeds need to be separated. JAD stated to Perkins Eastman that we need to factor in with contract documents that new code requires fire protection trade owns connection to main in the street now. PP stated that we need to verify the size of the domestic line along tracks on the 1980s side as the Nitsch drawing shows 6" but he believes it is a 16". PP also stated that cut ins should be used not tapping sleeves for new services. CC asked if the 16" line is tied into the 20". PP replied yes. AC stated it would be helpful to know if the line is a 16" or 6". MY asked if the 1980's building was moving closer to the canal. AC replied no, the building line is not moving.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. EQUIPMENT AND MATERIAL SPECIFICATIONS

DISCUSSION	BM stated he will reach out to PP and MY for material and equipment specifications. AC inquired about fire hydrants. BM stated he will speak with LFD. PP stated that LFD will provide information on where they want fire hydrants. BM asked if there were any problematic hydrants that need replaced. PP said the two that encountered problems during the flow tests were replaced. BM asked about street openings. CC stated to go through Engineering Dept. for paving, street opening and trench permits. BM asked if lines 10' off building need to be ductile or PVC. MY replied that ductile is only required for shallow conditions. BM asked if stormwater and sanitary grates will be Lowell standard. MY replied yes. BM asked if bituminous cover on catch basin structures as well as sewer structures is required. MY replied not required. CC stated no preference.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

6. WETLANDS

DISCUSSION	MS stated that Nitsch will need to get the infiltration standard because the area is considered wetlands and that group will need to inquire with Kate from ConCom. BM asked if everything within 100' of canals is considered wetlands. MS replied yes. AC stated that has been the understanding. MS stated Project needs to figure out what is needed for Wetland Protection Act Requirements and that the City would like an overflow to the public drainage system.
CONCLUSIONS	

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE

7. SANIATARY SEWER

DISCUSSION	BM stated that we have spoken of sanitary sewer lines exiting each building, are there any issues with the sewer? MY stated no, but that when there are projects in an area the City will inspect the lines. MY also stated that they time their repair projects with repaving in areas. MS stated that per Shannon we are not aware of any issues. AC asked if there was any other follow up for ConCom. KD stated that he does not have any other questions. KD stated he will speak with Kate Biedron about the canal and the Wetlands Protection Act. MY stated that we should all sit down with ConCom and review how the Wetlands Protection Act is interpreted. BM stated all his questions have been answered. BM stated that just so everyone is aware prior to submissions they like to meet with all departments to review plans and specs. AC stated they appreciate the proactive approach.
CONCLUSIONS	

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

CIVIL AGENDA

Lowell High School

Thursday, October 18, 2018

Introductions

Purpose of the Meeting:

a. **Review SD to comply with City Standards/Establish Budget**
b. **Review required approvals for SD**

Project Overview by Perkins Eastman, Site Utility Overview by Nitsch

Water

- What type of water pipe shall be used, specifically the class (thickness of pipe)?
- Is there a water pipe manufacturer you prefer not to use?
- What type (manufacturer) of gate valves should be used?
- What type (manufacturer) of hydrants should be used?
- Do you have any concerns regarding:
  - Drinking water quality?
  - Fire or domestic water pressure?
  - Water volume?
  - Hydrant conditions or locations? Do any need to be replaced?
- What is the age of existing water infrastructure?
- Have there been any recent upgrades to water infrastructure in the area?
- Who is the contact person for the water system?
- Street Opening Trench Permits? One individual for each separate utility or one person for all utilities?

Stormwater

- What is the receiving stormwater body (on-site wetlands, municipal systems, downstream river or pond, etc.)?

- Do you have any concerns regarding:
  - Stormwater system capacity on site?
  - Stormwater system capacity off site?
  - Stormwater entering the building?
  - Do you know how the roof drains are connected?

- What is the age of existing stormwater infrastructure?

- Have there been any recent upgrades to stormwater infrastructure in the area?

- Is the stormwater system regularly maintained (clean catch basins, etc.)?

- Are there any foundation drains or sump pumps?

- What type of drain pipe should be used? RCP, HDPE? PVC?

- Do you require ductile iron within the first 10-feet of building foundation?

- Who is the contact person for the stormwater system?

- Will City standard catch basin frames & grates and manhole frames & covers be used on the site?

- Will drain manholes require bituminous water proofing on the outside of the structures?

- What type of subsurface infiltration systems is preferred, perforated pipe and stone wrapped in fabric or chambers and stone wrapped in fabric?

Sewer

- Do you have any concerns regarding:
  - Sewer system capacity on site?
  - Sewer system capacity off site?

- What is the age of the existing sewer infrastructure?

- Have there been any recent upgrades to the sewer infrastructure in the area?

- Has there been any history of sewer backups on the site?

- Are there any ejector pumps in the building or on the site?

- Do you require ductile iron within the first 10-feet of building foundation?

- Who is the contact person for the sanitary sewer?

- Will City standard manhole frames & covers be used on the site?

- Will this project require I/I separation? There is a combined sewer line on the westerly side of the 1920's building w/ storm drain connections from the building? Will we need to provide a separate storm drain line for site and roof discharge?

- Clarify scope of work in progress by DPW or others related to combined Sewer on Kirk Street, school is reporting drain back-ups in the basement of 1922 building

Regulatory

- Conservation Commission requirements would only be the filing of an RDA (Request for Determination of applicability);

- Would the propose work require one meeting or two?

Preliminary Drainage Area Calculations

PREDEVELOPMENT AREAS		POSTDEVELOPMENT AREAS		CHANGE	
TOTAL SITE AREA	335885	TOTAL SITE AREA	335885		
ROOF AREA	174263	ROOF AREA	197005	ROOF AREA	22742
PAVEMENT AREA	107064	PAVEMENT AREA	92479	PAVEMENT AREA	-14585
GREEN ROOF AREA	0	GREEN ROOF AREA	5485	GREEN ROOF AREA	5485
LANDSCAPE AREA	54557.8	LANDSCAPE AREA	40916.35	LANDSCAPE AREA	-13641.4
TOTAL IMPERVIOUS AREA	281328	TOTAL IMPERVIOUS AREA	289484	TOTAL IMPERVIOUS AREA	8157
TOTAL PERVIOUS AREA	54558	TOTAL PERVIOUS AREA	46401	TOTAL PERVIOUS AREA	-8157

Preliminary HydroCAD Calculations

	PREDEVELOPMENT	POSTDEVELOPMENT	CHANGE
TOTAL SITE AREA	335885 S.F.	335885 S.F.	
ROOF	174263 S.F.	197005 S.F.	22742 S.F.
GREEN ROOF	0 S.F.	5485 S.F.	5485 S.F.
PAVEMENT	107064 S.F.	92479 S.F.	-14585 S.F.
LANDSCAPE	54558 S.F.	40916 S.F.	-13642 S.F.
IMPERVIOUS	281327 S.F.	289484 S.F.	8157 S.F.
PERVIOUS	54558 S.F.	46401 S.F.	-8157 S.F.
2-YEAR FLOW	31.5 CFS	32.19 CFS	0.69 CFS
VOL	67847 CF	70433 CF	2586 CF
10-YEAR FLOW	50.83 CFS	51.38 CFS	0.55 CFS
VOL	112574 CF	115103 CF	2529 CF
25-YEAR FLOW	62.86 CFS	63.35 CFS	0.49 CFS
VOL	140634 CF	143075 CF	2441 CF
100-YEAR FLOW	81.25 CFS	81.66 CFS	0.41 CFS
VOL	183612 CF	185899 CF	2287 CF

Application for Street Opening and Trench Permits

City of Lowell

Massachusetts
Office of the Commissioner of Public Works

All Fields below are REQUIRED

Property Owner(if applicable)	**Contractor(Excavator)-Applicant**
Owner's Name:	Contractor Name:
Owner's Address:	Contractor Address:
Property Address:	Phone/cell Number:
	DIG SAFE
	Bonds Expiration Date:
Start Date:	Insurance Co. & Exp Date:
End Date: (no more than 60 days)	

Applying for the following Permit(s):

Street Opening ☐ Trench ☐ Street Closing ☐

See City Ordinance Art. VI, Sec. 243 p31-65 See 520 CMR 14.00 Is this EMERGENCY work Y N

Applicant Classification

MassDOT		General contractor	
Water		Utility	
Stormwater		CSO	
		Sewer	

Type of Work and Fee

Water	New	Repair	
Water on or off			*
Final Meter Reading			*
Opening Hydrant			*
Hydrant Flow Test			*
Water Mark Out			*
Entry fee per unit			*
Irrigation Meter			*
Water Service > 1"			
Water Service < 1"			
Fire Service			
Sprinkler			

Sewer	New	Repair
Sewer Service		
Sewer Extension (ft)		
Grinder Pump		
Force Main (ft)		
Sewer Manhole		
Sewer Main		
Drainage		
Catch Basin		
Drain Extension(ft)		
Drain Manhole		
Drain Main		
Miscellaneous		
Dumpster		
Crane		
Special Events		
Other		

Utilities (Cable/Elec/Tel)	New	Repair
Service		
Manhole Type ( )		
Duct Bank		
Gas		
Service		
Mainline		
Corrosion Control		
Repair Grade( )		
Other		
Curb Cuts		
Driveway		
Sidewalk Modification		
Other		

TOTAL DUE ☐

* To apply for these items, go directly to DPW, 1365 Middlesex St.

Information to be attached to application:

Additional information required (per Lowell City Sec. 243-34 & DPW Permit Manual) with every application. Applicant is responsible for supplying all necessary documentation. Permit will not be issued without this supplemental information. A set of plans, or a sketch (drawn to scale), is required under the new trench regulations.

Application for Street Opening and Trench Permits

City of Lowell

Massachusetts
Office of the Commissioner of Public Works

Traffic Requirements

Police Details	Contractor to make arrangements
Work Hours	M-F 7:00AM to 5:00PM Per City Ordinance 243-45 Work Hours. Prior DPW permission required for work outside these hours.
Signs Required	Yes No
Other	

Inspections Required 24 hour notice required
Yes _____
No _____

Notification of Commencement of Work 48 hours per City Ordinance 243-47

Inspector's Notes:

Flow fill receipt: or compaction test results

Owner, and Contractor (Excavator)/Applicant request that we may be permitted under the terms and conditions of Lowell City Code relating to openings and excavations in streets (Sections 243.31 through 243.65) to do the above work and we, jointly and severally, agree to fully indemnify the City of Lowell against all claims for damages for injuries to persons or property, and against all cost, expenses, and losses occasioned by, or arising from such occupancy and the use of said street or streets, and we, jointly and severally, further agree to pay all cost, and damages which may be recovered against the City of Lowell, by reason of, or on account of our occupancy of said property. We, jointly and severally, further agree to restore and maintain for a period of five (5) years said street opening to City standards and specifications. We, jointly and severally, further certify that we are familiar with and shall comply with 520 CMR 14.00 and 29 CFR 1926.620 (OSHA) and applicable City Code provisions and DPW Permit Manual. Applicant(s) acknowledge awareness of applicable regulation requirements.

THIS APPLICATION DOES NOT CONSTITUTE A STREET OPENING/TRENCH PERMIT

_____ _____
Signature of Contractor (Excavator)/Applicant Signature of Owner (if applicable)

Approvals Required

_____ _____
City Engineer (first signature) Date of Application:

_____ _____
Water Utility Wastewater Utility

_____ _____
Traffic Control Officer Fire Chief

_____ _____
Parking Director Transportation Engineer

_____ _____
Building Commissioner DPW Commissioner (last signature)

Sign In

LHS Project - Civil Mtg.

10/18/18

Name	Company	phone
Jim Doud	Stantec	617-573-5352
Alex Magee	City Mgr.	978 674 1003
Kevin Dillon	Conservation Commission	978 866 1622
ALICIA CARDANO	PERKINS EASTMAN	617-449-4001
Paul Pires	Water Dep.	978-674-4242
Bill Maher	Nitsch Eng	617-338-0063
MARK YOUNG	WASTEWATER/WATER	978-674-1601/1675
Mike Stuer	Lowell Water	978-674-1606
Christine Clancy	City of Lowell	978-674-1206
JOE BROWN	PERKINS EASTMAN	617-669-5154
Elliott Veloso	City of Lowell Law Dept.	978-674-4050

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
National Grid Meeting
MEETING MINUTES

MEETING #1 OCTOBER 29, 2018 10:00 AM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Mary Ann Williams , Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Alex Magee| City Present Sean McGloin | Ngrid Present Magda Lelek| Andelman & Lelek Present Alicia Caritano | PE Present Joe Drown | PE Present Dan Arons | PE Present Carlos DeSousa | GGD Present Dominick Puniello | GGD Present Mary Ann Williams| Skanska Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Perkins Eastman described the layout of the campus split by the canal and proposed construction: • West: One side of the canal is a New Gymnasium Wing,New Freshman Academy Wing, and an additions to the south of the 1980's Lord Building totaling +/- 70% new construction and additions and 30% renovation of the Lord Building . • East: The other side of the canal will be the renovations of the basement and 3 stories above ground of the 1922 Building. • Phased/occupied project and campus assumes 5 year schedule and 5 phases: final scheduling pending CM. • All occupied spaces will be air conditioned. • Usage of the buildings will be similar to current usage with some summer use. • Design enrollment is for 3,520 students • New windows, roofing and all new systems • Will be looking to improve the envelop system of the renovated buildings • The design will occur all at once • One permit
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

2. MEMORANDUM OF UNDERSTANDING

DISCUSSION	NGRID will be looking for the Memorandum of Understanding (MOU) to be signed by the Designer, Tenant/Customer • The project has significant potential to save energy beyond the energy code requirements • On projects over 100,000sf, NGRID charges a 25% copay of the energy modeling cost. • If the owner participates, the 25% copay is subtracted from the utility incentive at project completion. • It is suggested that the Construction Contractors not take upstream incentives • No limit to strategies for energy savings as long as practical as cost effectiveness is a critical consideration • Measures are identified and payback periods are evaluated and has to meet the cost benefit ratio. • Energy source is reviewed so the utility company is not building more infrastructure than what is needed • Request of NGRID: They can send baseline document that provides guidance. Use the energy code as the starting point. • The incentive is tied to the current code in effect at the time of permitting the project • Budget incentive is not known. • Design has to be sufficient enough to allow assessment o Lighting controls mandated by code o Occupancy sensors o Automatic daylighting harvesting • Discussed having a Green Charette in January 2019 • Big picture items o Can change the envelope o Maximize insulation trade offs o Establish schedule of what items need to be decided on and when o DDC Controls – starting point is what code already requires o Equipment is not all bought at once so phased incentive • One permit o May want to consider different approach o Incentives based on overall project o East existing – limited solar shading o West new – more flexibility o Could have 2 separate meters and one model or separate models for east and west campus o Could treat as 2 separate buildings o Would like MOU signed before the Green Charette NGRID Community Resource Contact: Susan Griffin at 978-725-0751 City of Lowell may be applying to be their own program manager, if so they would not participate in this Incentives Program.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

Mass Save New Construction Program Offering City of Lowell HighSchool

1

Safety First and Always

Who We Are

- Mass Save® is a collaborativeof the State, electric and natural gas utilities
- Its initiative is to help Massachusetts' residents, businesses and communities, save energy
- Through the Mass Save Program, the Program Administrators (PAs), which aremostly utilities, collaborateto help reduce building-related energy consumption

2

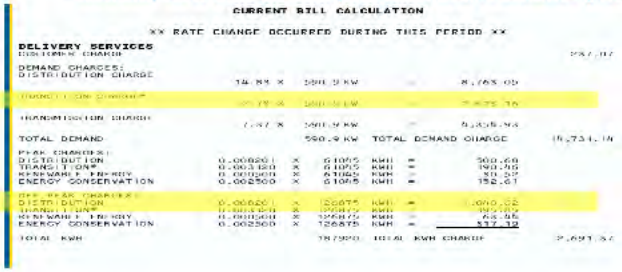
2

Safety First and Always

Mass SaveProgram Review

EVERSOURCE ENERGY
nationalgrid

- Through the Mass Save Program, the Program Administrators (PAs), which are mostly utilities, collaborateto help reduce building-related energy consumption
- As part of the Massachusetts Green Communities Act, a system benefit surchargeis applied to all gas and electric utility bills
  - Funds are collected and turned aroundto customers in theform of technical assistance and incentives
  - Retrofit, New Construction,and Technical Assistance programs



CURRENT BILL CALCULATION

xx RATE CHANGE OCCURRED DURING THIS PERIOD xx

DELIVERY SERVICES					
DISTRIBUTION CHARGE					937.02
DEMAND CHARGES:					
DISTRIBUTION CHARGE	14.88	X 590.9 KW	=	8,793.19	
TRANSITION CHARGE	0.79	X 590.9 KW	=	466.81	
TRANSMISSION CHARGE	7.97	X 590.9 KW	=	4,709.94	
TOTAL DEMAND		590.9 KW	TOTAL DEMAND CHARGE		13,969.94
PEAK CHARGES:					
DISTRIBUTION	0.00620	X 61065 KWH	=	378.60	
TRANSITION	0.00320	X 61065 KWH	=	195.41	
RENEWABLE ENERGY	0.00080	X 61065 KWH	=	48.85	
ENERGY CONSERVATION	0.00250	X 61065 KWH	=	152.67	
OFF PEAK CHARGES:					
DISTRIBUTION	0.00620	X 52875 KWH	=	327.82	
TRANSITION	0.00320	X 52875 KWH	=	169.20	
RENEWABLE ENERGY	0.00080	X 52875 KWH	=	42.30	
ENERGY CONSERVATION	0.00250	X 52875 KWH	=	132.19	
TOTAL KWH		113940 TOTAL KWH CHARGE			2,691.32

mass save
Savings through energy efficiency

3

Safety First and Always

Baseline for Determining Savings

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- Referencethe Mass Save Baseline Document – publicly available on www.masssave.com
  - Generallyreflects Massachusetts Energy Code (IECC 2015 with Massachusetts amendments)
- Incentivedollars are based on savings
- Program targets at least 10% whole building savings on total BTU basis.

4

Safety First and Always

Whole Buildings Program Components

EVERSOURCE ENERGY
nationalgrid

- Energy Charrette
  - Opportunity to consider energy savings opportunities early in design
  - Outcome is a list of measuresto be studied
- Energy Analysis/Energy Modeling
  - Obtain proposal from Mass Save preferred vendor for modeling services
  - Analysis includes amid design review at end of DD and a final report based on 90%CDs
  - Final report and model show Mass Save program savings and determineincentives

5

Safety First and Always

Whole Building Approach Large Building – Support & Incentives

EVERSOURCE ENERGY
nationalgrid

Large Building Customer Incentives*

Savings Beyond Code	$/kwh	$/therm
Berkshire Gas[3], Cape Light Compact, Columbia Gas[3], Eversource, Unitil Service Territories		
≥30%	$0.50	$2.10
20-30%	$0.40	$2.00
10-20%	$0.30	$1.90
<10%	$0.20	$1.80
Berkshire Gas[4], Columbia Gas[4], Liberty Utilities, and National Grid Territories		
All Projects	$0.35	$1.70

*Projects must be cost effective to receive full incentive and are subject to applicable PA budget

[3] When Eversource is the lead electric utility.
[4] When National Grid is the lead electric utility.

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Safety First and Always

Whole Building Approach
Large Building – Support & Incentives

EVERSOURCE ENERGY
nationalgrid

Large Building Design Team Incentives*

Savings Beyond Code	$/kwh	$/therm
Berkshire Gas[a], Cape Light Compact, Columbia Gas[a], Eversource, Unitil Service Territories		
≥30%	$0.07	$0.34
10-30%	$0.04	$0.20
Berkshire Gas[c], Columbia Gas[c], Liberty Utilities,and National Grid Territories		
≥10%	$0.07	$0.34

*Each PA capped at $15,000

§ Paid to Design Teamlead (Architect) todisburse to MEP/others

§ 50% paid at point of customerincentivePre-Approval and final 50% paid upon Construction Completion/Cof O

7

Safety First and Always

Whole Building Approach
Large Building – Support & Incentives

EVERSOURCE ENERGY
nationalgrid

Example: Project in Lowell , MA with National Grid Electric and National Grid Gas

From final energy model we determine:

-BaselineEnergy Consumption = **1,000,000kwh** and **150,000 therms site energy usage annually (representing 18,413 MMBTU)**

-ProposedDesign Energy Consumption = **600,000 kwh and 120,000 therms site energy usage annually (representing 14,048 MMBTU)**

Savings =400,000 kwh and 30,000 therms(representing 4,365 MMBTU or a 24% MMBTU savings

8

Safety First and Always

Whole Building Approach
Large Building – Support & Incentives

EVERSOURCE ENERGY
nationalgrid

Large Building Customer Incentives*

Savings Beyond Code	$/kwh	$/therm
Berkshire Gas[3], Cape Light Compact, Columbia Gas[4], Eversource, Unitil Service Territories		
>30%	$0.50	$2.10
20-30%	$0.40	$2.00
10-20%	$0.30	$1.90
<10%	$0.20	$1.80
Berkshire Gas[4], Columbia Gas[4], Liberty Utilities, and National Grid Territories		
All Projects	$0.35	$1.70

*Projects must be cost effective to receive full incentive and are subject to applicable PA budget

400,000 kwh savings x Rate of **$.35/kwh = $140,000** for NGRID electric customer incentives

30,000 therm savings xNGRID Rate of **$1.70/therm = $51,000** for gas customer incentives

Total Combined Customer Incentive = **$191,000**

9

Safety First and Always

Mass SaveTechnicalAssistance Process

EVERSOURCE ENERGY
nationalgrid

1. Charrette– TBD
2. City of Lowell and architect must sign the Large Buildings Program MOU.
3. Design teams consider charrette feedback and proceed with design. A&L /NGRID availablefor questions and to provide feedback.
4. As a result of a energy charrette ECM list is identified, Mass Savevendor prepares a proposaland Engineering Services Application (ESA) for the detailed Mass Save TA study and energy model.
5. NGRID/ City of Lowell review study proposal and determine whether to proceed.
6. NGRID approves cost share for study and obtain customer signature on Engineering Services Application affirming customer cost share.
7. Mass Savevendor Constructs Energy Model
8. Mass Savevendor Issues Interim Report (end of DD). Possible conference call with team to discuss results.
9. Final Model and Report Issuedbased on 90% CD set. NGRID reviews.
10. GRID approve predicted savings.

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Safety First and Always

Customer Incentive Process

1. City of Lowell signs and submits a Custom Application for incentives.
2. NGRID sends City of Lowell an incentive offer letter & MRDs. City of Lowell must sign MRDs.
3. NGRID make design team(s)aware of any available designteam incentives and willpay 50% of those incentives at this time.
4. Project construction
5. Toward end of construction, City of Lowell sends approved/final submittals and invoices for certain equipment to NGRID
6. NGRID post inspection
7. Post Install Signature NeededOn CustomApps & MRDs
8. Customer incentivespaid uponoccupancy(there may be some portion of incentiveretained pending submission of trend data – usually 20%)
9. Design team(s) eligible for remaining 50% of design team incentive.

Under this Whole Buildings Program, allincentives will be offered "downstream" payable to the customer. Contractors should not pursue or accept ANY "Upstream" incentives offeredat the distributor level.

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Safety First and Always

Next Steps

- Design team incorporates ECMsinto thought process/design process.
- Mass Savevendor toprepare proposal for Mass Save Technical Assistance/modelingservices based on arefined ECM list.
- Architectto send invoice forcharrettestipend to NGRID (totaling $3,000). Include project nameand note "energy charrette" on invoice.

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Safety First and Always

NATIONAL GRID MEETING
CITY HALL

10/29/18

NAME	COMPANY	EMAIL
ALICIA CARITANO	PERKINS EASTMAN	a.caritano@perkinseastman.com
DAN ARONS	PERKINS EASTMAN	d.arons@perkinseastman.com
JOE DRONN	PERKINS EASTMAN	j.dronn@perkinseastman.com
Mary ANN WILLIAMS	Skanska USA	maryann.williams@skanska.com
Kara Keefe Mullin	City of Lowell - Asst City Manager	KKeefemullin@lowellma.gov
Sean McGlobin	National Grid	sean.mcglobin@nationalgrid.com
Carlos DeSousa	GGD Engineers	Carlo_desousa@g-g-d.com
DOMINICK PUNIELLO	GGD ENGINEERS	dom_puniello@g-g-d.com
ALEX MAGEE	CITY MGRS DEPT.	amagee@lowellma.gov
MAGDA LELEK	ANDELMAN AND LELEK ENG.	MAGDA@ANDELMANLELEK.com

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
ISD, Police, Fire & Traffic Meeting
MEETING MINUTES

MEETING #1 NOVEMBER 7, 2018 3:00 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Joe Drown, Perkins Eastman
NOTE TAKER	
ATTENDEES	Kara Keefe Mullin | City Present Alex Magee| City Present Chief Winward | LFD Present Lt. Steve Gendreau | LPD Present Sgt. Dave Peaslee| LPD Present SRO Dan Otero | LPD Present Natasha Vance| Traffic Present Comm. David Fuller | Building Dept. Present Eric Slagle | Development Svcs Present Carlos DeSousa | GGD Present Joe Drown | PE Present Kevin Hastings | Hastings Consulting Present Johanna Barthmaier | Traverse Present Frank Stramaglia | VAV Present Todd Brayton | Bryant Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Joe Drown (JD) provided an introduction to the project with an overview of the Project and the forecasted schedule. JD provided an aerial view of the existing campus for reference, see attached. JD stated that the project is being approached as two separate buildings for the mechanical system with and East campus building (1922) and West campus building (1980s, Freshman Academy & Gym). JD reviewed the current potential 5 year phasing plan for the Project. Current 3D view of design of new campus presented and discussed, see attached. JD explained how 1/3 of the existing 1980s building will be demolished as part of the construction of the new cafeteria and "heart" of the school. JD reviewed 3D rendering of the new main entrance as well as the quad and new gym entrance.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. SITE CIRCULATION

DISCUSSION	Johanna Barthmaier (JB) described the overall traffic flow around the school, see attached. Discussed parent drop off on Fr. Morrissette Blvd. JB reviewed plan for AM dropoff, see attached, and noted that there has been a lot of discussion about dropoff. JD pointed out the envisioned main emergency access points at Fr. Morrissette Blvd. (1980s) and French St. (1920s). Chief Winward (CW) stated that the emergency access to the 1920s building has always been from Kirk Street where the Fire Alarm panel is located. JB reviewed the PM pickup plan, see attached athletic buses would pickup on Arcand. Buses on Kirk and Paige remain as they are today. Eric Slagle (ES) asked about the status of the parking in front of Cobblestones. Natasha Vance (NV) stated that is City property on

	Dutton is not designated Cobblestones parking. Jim Dowd (JAD) noted that if current parking needs to be a pickup/dropoff travel lane it could possibly be off hours parking. NV asked what is the intent regarding traffic counts and additional studies. JD stated that further studies can be done if required during the next design phase of the project but none is planned at this time. NV stated that we need to look at the ADA accessible parking situation and suggested ADA spots could possibly be added in the loading dock area. NV expressed concern about buses blocking ADA spaces. JB pointed out that the pink lines are designated temp 15 minute parking spaces on current design being discussed, see attached. NV noted that the overall goal should be improvement as fixing all the traffic issues is not feasible. JD noted that the current drawings are an overview and that more in depth design will take place that will be reviewed with everyone. NV stated that some of the signal timing may also be able to be reconfigured at pickup/dropoff time periods. JB stated that the biggest question for today is where parent dropoff should be designated and how to deal with parent dropoff on the service road with students passing in front of cars. NV stated that the Dutton/Service Rd route should not run counterclockwise as the left onto Arcand would be too difficult. NV noted that dropoff of students regarding crossing in front of cars in manageable and that students are not elementary school. JB asked what if Service Rd/Dutton was bus only. NV replied that would be fine. NV noted that they were looking to find an additional parent dropoff location, however. Officer Dan Otero (DO) noted that the biggest issue at dropoff is parents and buses jostling for position on Fr. Morrissette Blvd. JAD asked that getting buses off Fr. Morrissette Blvd. and on the new Service Rd/Dutton would solve this problem. DO replied yes. JB inquired about issues with jaywalking on Fr. Morrissette Blvd. NV stated that it is not that bad given that parking garage exits to main crosswalk. JB asked if there are any issues on Paige street. ES replied that it's not bad as people tend to avoid the area. Lt. Steve Gendreau (SG) stated that Fr. Morrissette Blvd. is the issue. NV stated that idea of putting buses on service road is not off the table but that it is preferred that parent dropoff be on the Service Road. JD stated that student dropoff would have access into school from Service Rd. near along Lucy Larcom Park which provides access to the school through the new Dining Common. NV stated maybe we should look at putting the buses from Fr. Morrissette Blvd. on the Service Rd. JB stated that a sweep turn study was completed and buses can easily be directed to the Service Rd., whereas directing parents on the Service Rd. could be difficult. DO stated that last week at dropoff cones were added on Fr. Morrissette to block off bus dropoff which improved things. NV stated that buses can easily get onto the Service Rd. from Arcand and then exit on Dutton. JD stated that this discussion is progressing well and we can review further in the next design stage. JB stated they will start designing with the Fr. Morrissette buses on the Service Road. CW asked if anyone has looked into the Cobblestones parking on Dutton. ES stated the spots in front of Cobblestones have never been officially set up by the City as parking. JAD asked if busses on Paige and Kirk will stay the same. NV replied that yes Paige and Kirk will remain as is. JB asked about police parking. SG replied that a majority of police parking is in the Masonic lot. ES stated the Masonic lot is staying. SG stated that the 75 Arcand lot is used for late shift parking.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. EMERGENCY ACCESS AND LIFE SAFETY REQUIREMENTS

DISCUSSION	JD stated that he would like to discuss fire department vehicle circulation. JD stated that emergency vehicle access is pretty much the same except for the addition of the service road. CW noted that the fire department trucks need a 20 ft. wide drive minimum. JB responded the drive is 20 ft. CW asked if there was parking on the Service Road. JB replied no parking on the Service Road. JB asked if emergency vehicle access would be required into the new quad. CW replied that access would not typically be needed in the quad and that he will discuss further with the department. SG asked if there would be temporary modular classrooms. JD replied that there will not be any modulars.DO inquired about a temporary gym. JD explained how a temporary gym would not be required. Kevin Hastings (KH) of Hastings Consulting, the code consultant identified the project is divided into 3 buildings for building code purposes. The 1922 building is identified as one building, the 1980's building, the associated additions and freshman academy is the second building and the gymnasium is the third building. The 1922 building will remain as currently designed regarding construction type. Smoke doors will be located on each end of the bridges. The gymnasium will be separated with a fire wall allowing IIB construction. The remaining existing 1980's building, additions and freshman academy will receive spray fireproofing providing IIA construction. Frank Stramaglia (FS) of VAV the plumbing and fire protection engineer noted that all buildings are planned to be sprinkled. The East and West campuses will receive separate fire protection services. The five story freshman academy will require a fire pump and a fire command center near the main lobby because it is considered a high rise building per the building code. CW indicated they use 4 " Storz type fire department connections. Carlos DeSousa of Garcia Galuska DeSousa the electrical engineer noted that two separate fire alarm systems are planned. One for each campus. The fire alarm panel in 1922 will be located in the electrical room with remote annunciator

	panels located in the main vestibules. Notification systems will have overrides. The fire alarm panel serving the West Building will be in Fire Command Center Room JD provided plans showing fire alarm locations for review by the Chief and also discussed the planned fire alarm panel locations. JD stated that he also wanted to discuss fire wall separations. CW asked if students will be in buildings during construction. JD replied yes and described how the construction and occupied areas are usually separated with a fire rated wall and a second wall for sound separation. CW asked about how the fire alarm panels will be set up. CD replied that there will be 2 Fire Alarm panels networked together. CD explained fire separation between the buildings. CD explained the Fire Alarm Command Center at what will be the new Main Entrance on the West side of the canal. An annunciator panel will be at the loading dock. A Fire Alarm Panel and Know box will also be located in the 1922 Building with a remote annunciator in the main electric room of the 1922 Building. JD stated that all structural steel in 1980s building will be spray fireproofed, and will be separated from the gym from the 1980's building with a fire separation wall. JD explained the phasing plan and separation of construction zones from occupied zones. JD stated these plans will be developed further once a Construction Manager is hired. SG asked if the project will have 1 floor of a building have a construction zone and an occupied zone at the same time. JAD stated yes and explained that all states of phasing will have specific drawings depicting each phased condition with each of those drawings being code reviewed so that the buildings separation is code compliant at all times. JD stated that PE is planning on stairwells going to the roofs of the Freshman Academy, 1980s and 1922 Buildings. CW asked if the stairwells will be pressurized. Kevin Hastings (KH) stated that given the new Code and the building being "high rise" but under 75 ft the stairwells don't have to be pressurized. KH stated there will be a smoke removal system, though. CD stated that in a high rise the HVAC system will have smoke evacuation on all floors. CD asked if the HS will be classified as a shelter and stated that either way there will be an emergency generator. CW stated that the HS is currently the second shelter after the Senior Center. CD asked if it is a FEMA qualified shelter? CW stated it is FEMA. JD stated that preliminary reviews show that building for FEMA qualified will be a $1M upgrade. CW stated the City would likely not take that route. CW inquired about safety systems in the cafeteria. KW explained fire separations in the cafeteria. CW stated that the main concern is maintaining fire separations between construction and the students. CD stated the BDA will plan on having 4 channels. CW stated there are 7 channels (2 fire, 3 police, 1 ambulance, 1 paramedic) needed and that he will email them to CD. CD stated he will include the channels in the specification. JD provided a set of the current plans to CW. JD reviewed planned construction methodologies and fire partitions. JD noted that steel at the remaining CMU exterior partitions will not be able to be fireproofed on the concealed masonry side. JAD inquired about roof railings at light wells. JD stated that the skylights will have rails and the design team will review fall protection at the 1922 building. CW asked if all corridors will have fire doors. JD replied yes and stated that in that context the design team will also work with school officials to position corridor doors so as to properly secure the building for after hour's functions.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. SECURITY

DISCUSSION	SG asked if a lockdown can be achieved during construction. CD replied yes and inquired about putting mass notification within the new fire alarm system. CD explained options for a mass notification system and stated the design team will work with City officials to set up the system needed. CW stated they will want to review such a system further. JD explained how a specialized security consultant is being brought in for the design. CW asked if there will be security cameras. CD explained that there will be a full CCTV system. CD stated that if there is a City standard for security/camera systems they can start the process for establishing a proprietary system. CD explained how they have utilized systems with 2 Knox boxes, 1 Fire and 1 Police. JD explained how there will be a Fire Command Center because of the high rise condition in the Freshman Academy. CD stated the Command Center will be next to the Security Command Center at the Fr. Morrissette Main Entrance.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS —
EASTMAN

November 7, 2018
City of Lowell Inspectional Services, Fire, Police and Traffic Meeting
Lowell High School

Agenda

1. Introductions
2. Schedule
3. Overall Project Orientation
4. Site Design
    a. Site Circulation
    b. AM Movement
    c. PM Movement
    d. First Responders Points of Arrival
5. Building Design
    a. East
        i. Building Construction Type
        ii. Fire Protection
        iii. Alarm
    b. West
        i. Building Construction Type
        ii. Fire Protection
        iii. Alarm
        iv. Fire Wall Location
        v. High Rise Implications

Perkins Eastman
Architects DPC

PERKINSEASTMAN.COM

Boston
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Chicago
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Dubai
Guayaquil
Los Angeles
Mumbai
New York
Pittsburgh
San Francisco
Shanghai
Stamford
Toronto
Washington DC

Perkins Eastman

LOWELL HIGH SCHOOL

SIGN-IN SHEET

TOPIC: Inspectional Services / Fire / Police / Traffic

DATE: 7-Nov-18

	ATTENDEE	ORGANIZATION	TITLE	EMAIL ADDRESS
1	Joseph Drown	Perkins Eastman	Architect	j.drown@perkinseastman.com
2	Kevin Hastings	Hastings Consulting	Code Consultant	kevin@hastings-consulting.com
3	Jonana Barthmaier	Traverse Landscape Architects	Landscape Architect	jbarthmaier@traversela.com
4	Frank Stramaglia	VAV International	Plumbing/Fire Protection Enginee	fstramaglia@vavint.com
5	Todd Brayton	Bryant Associates	Traffic Consultant	tbrayton@bryant-engrs.com
6	Carlos DeSousa	Garcia Galuska DeSousa	Mechanical and Electrical	carlos_desousa@g-g-d.com
7	Jim Dowd	Skanska	OPM	jim.dowd@skanska.com
8	Stephen Gendreau	City of Lowell PD	Lieutnint	sgendreau@lowellma.gov
9	Kara Keefe Mullin	City of Lowell	Assistant City Manager	KKeefeMullin@lowellma.gov
10	~~Kelly Richardson~~	City of Lowell	Superintendent of Police	krichardson@lowellma.gov
11	Eric Slagle	City of Lowell	Dir. of Developemnt Services	eslagle@lowellma.gov
12	Natasha Vance	City of Lowell	Transportation Engineer	nvance@lowellma.gov
13	Jeffrey Winward	City of Lowell	Fire Chief	~~jwinw@lowellma.gov~~ jeffwinw@lowellma.go
14	Dan Otero	City of Lowell PD	520	Dotero@Lowellma.gov
15	DavePeasley	City of Lowell PD	SST.	DPeasley@Lowellma.gov
16	David Fuller	City of Lowell	Bldg Commissio	dfuller@Lowellma.gov
17				
18				
19				
20				

PERKINS EASTMAN

ISD/FIRE/POLICE/TRAFFIC MEETING

LOWELL HS PROJECT

EXISTING IMAGERY COURTESY OF GOOGLE EARTH

7 NOVEMBER, 2018

LOWELL HIGH SCHOOL

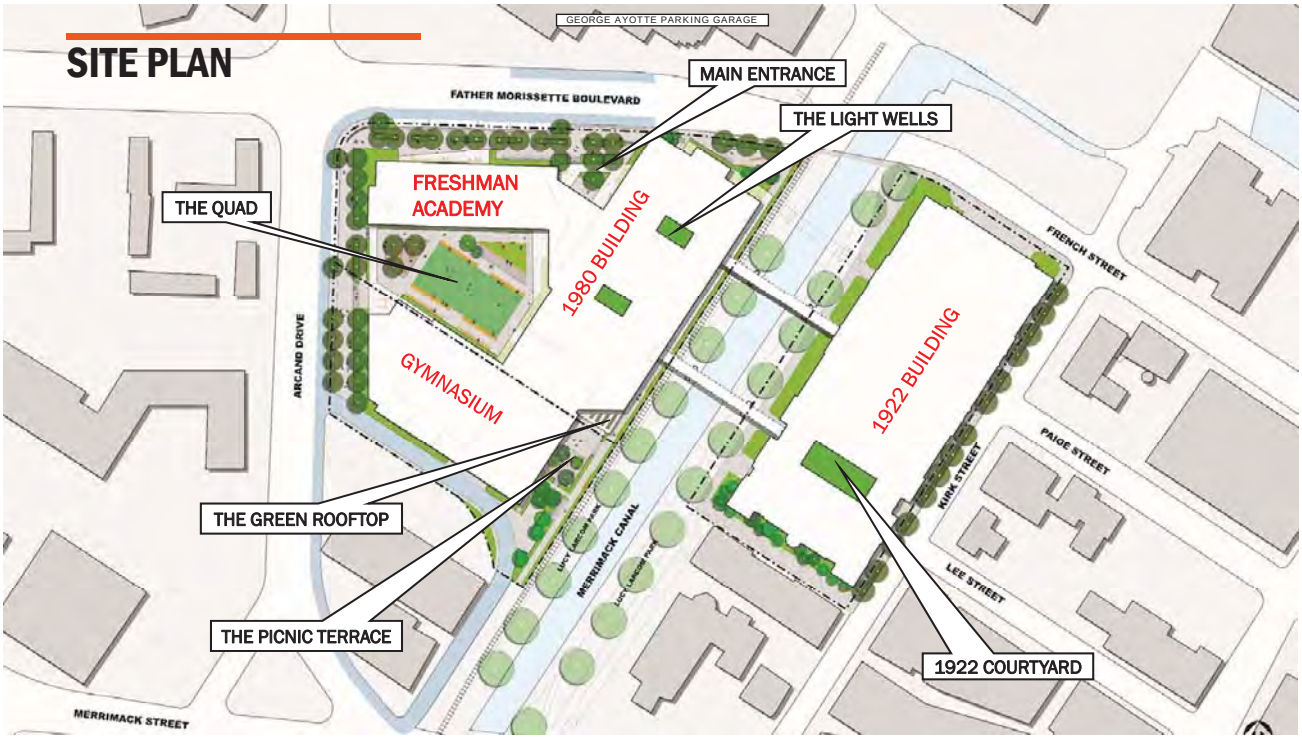
SCHEDULE

- 6/2019 – 2/2019 SD
- 2/2019 MSBA SUBMISSION
- 4/2019 MSBA BOARD MEETING
- 8/2019 – 5/2021 DD/CD
- 7/2021 – 6/2026 CONSTRUCTION

LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

SITE PLAN

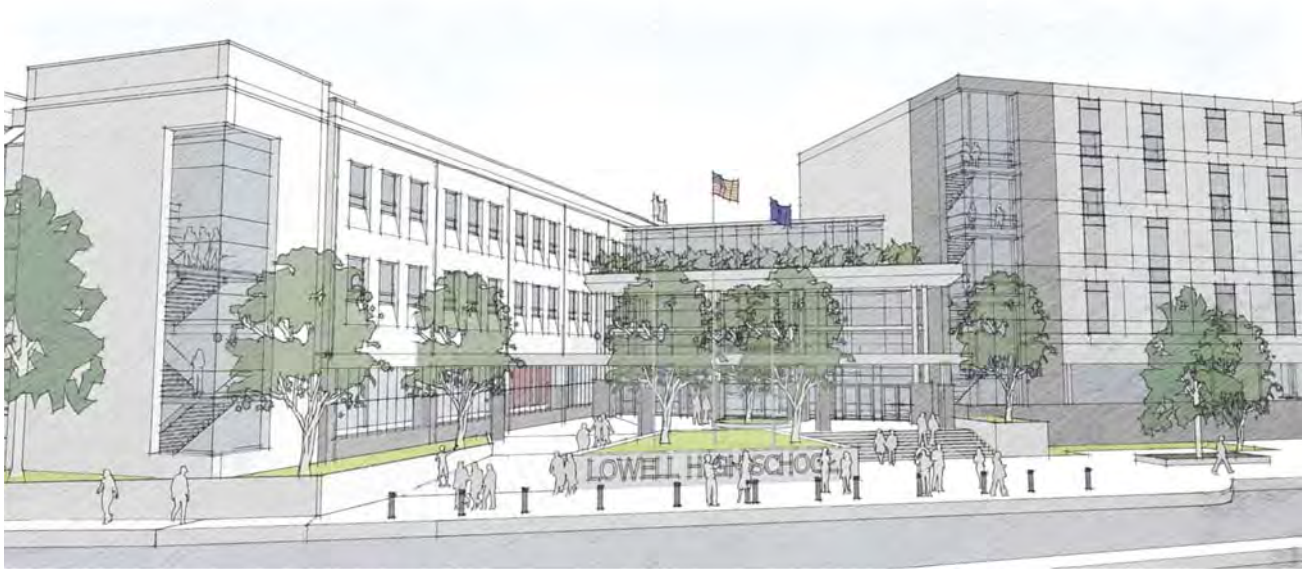


LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

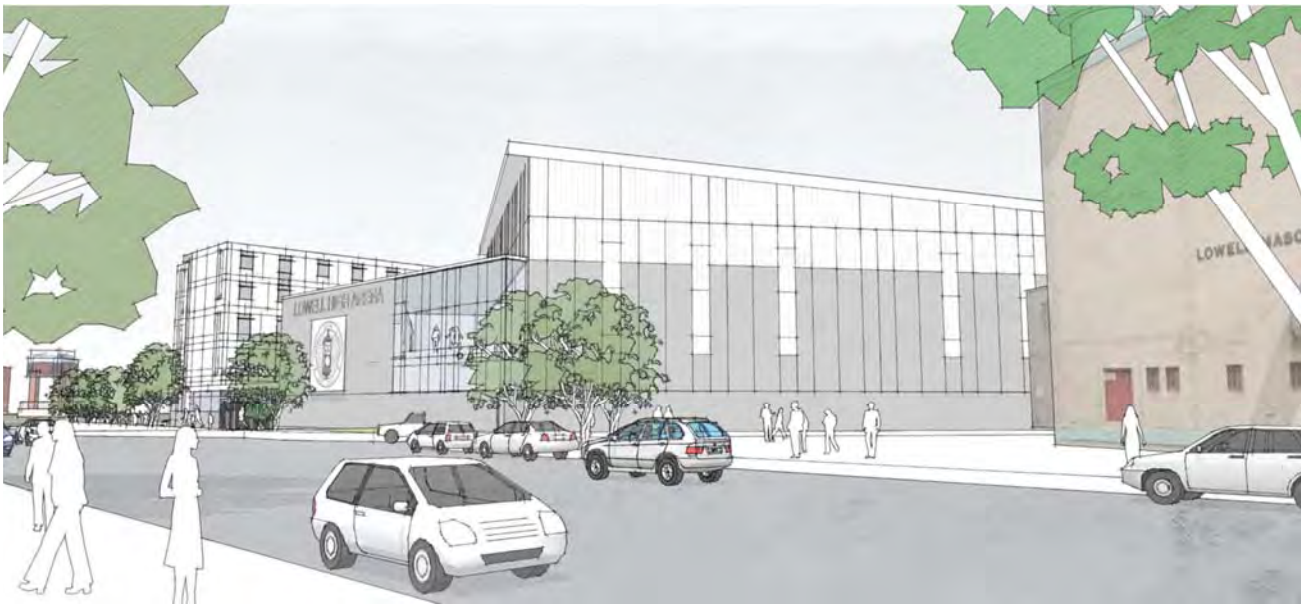
FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND SOUTH FAÇADE OF FRESHMAN ACADEMY

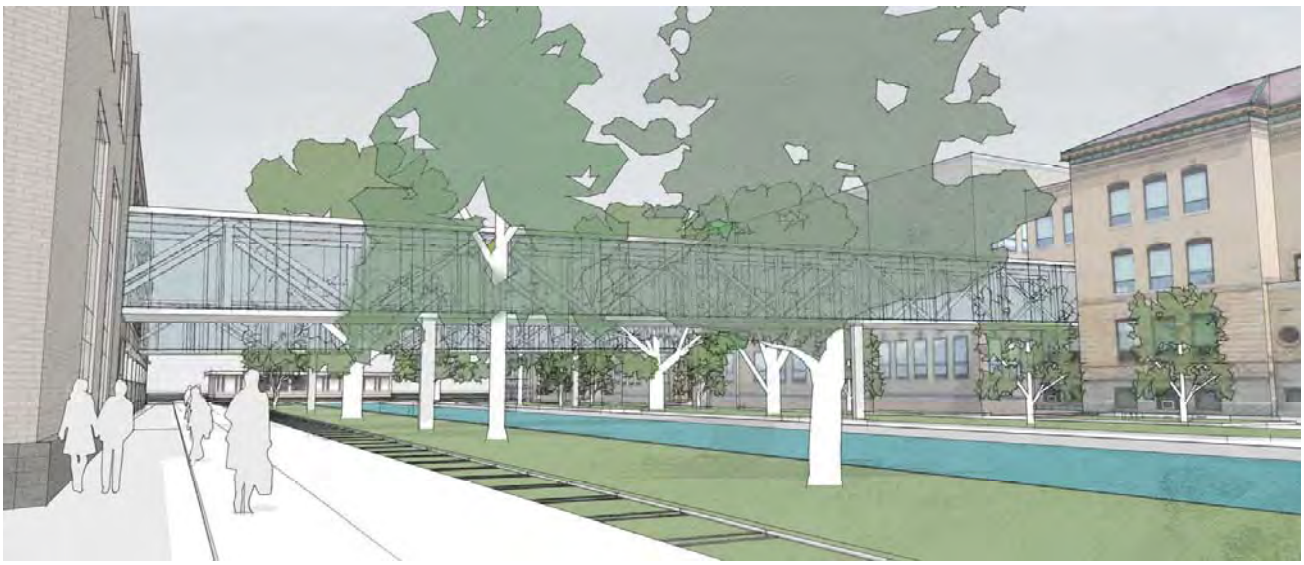
LOWELL HIGH SCHOOL

VIEW FROM ARCAND DRIVE



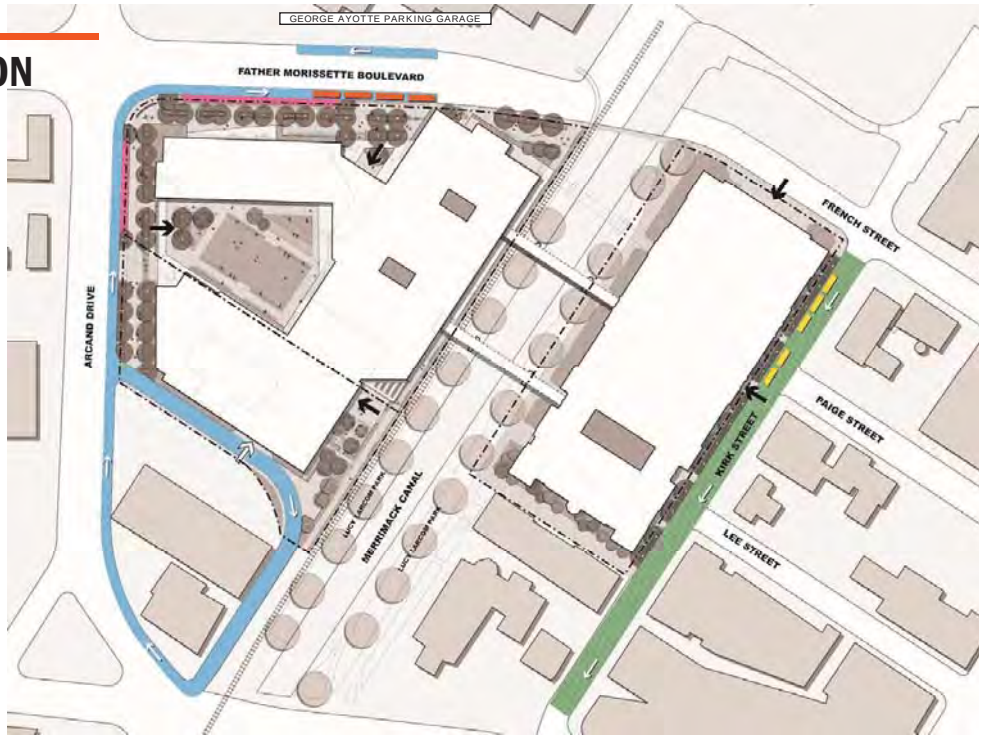
LOWELL HIGH SCHOOL

BRIDGE - EYE LEVEL VIEW FROM SOUTH



AM CIRCULATION

AM TRAFFIC CONGESTION CAUSED BY PRIVATE CAR DROP OFF

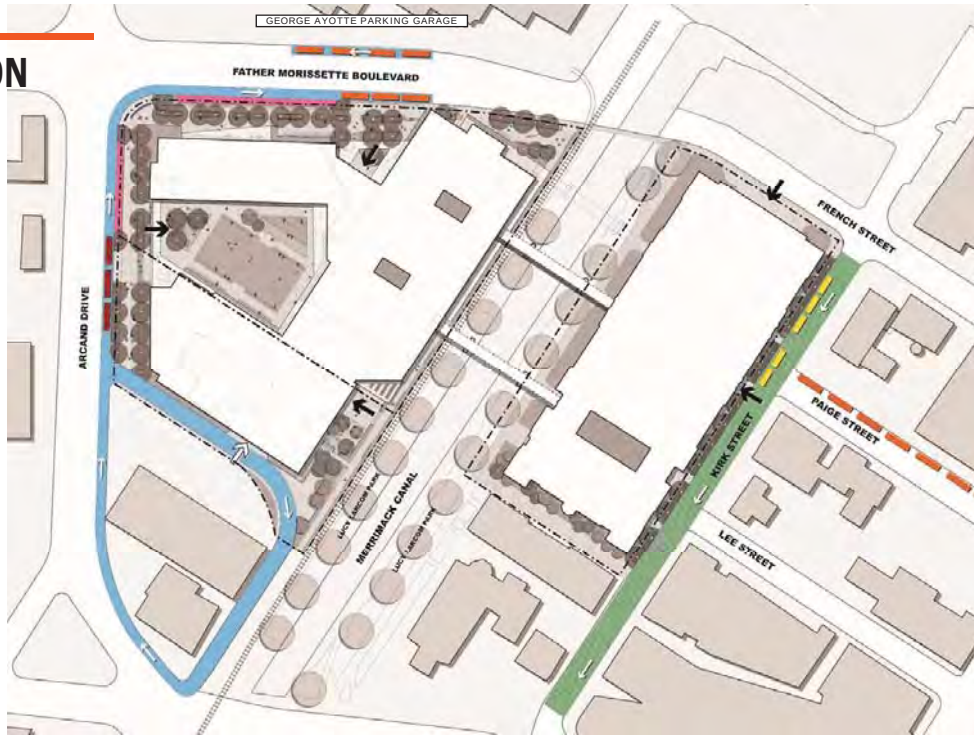


AM PICKUP / DROPOFF CIRCULATION

- Loading Entrance
- Primary Entrance
- LRTA Public Bus
- Special Education Bus
- Athletic Program Bus
- DEDICATED CAR DROP OFF LANES
- Short Term + Handicap Parking
- Temporary Traffic Reversal
- Traffic Flow

PM CIRCULATION

PM TRAFFIC CONGESTION CAUSED BY LRTA AND ATHLETIC BUS PICKUP



PM PICKUP / DROPOFF CIRCULATION

- Loading Entrance
- Primary Entrance
- LRTA Public Bus
- Special Education Bus
- Athletic Program Bus
- Dedicated Bus Pickup Lanes
- Dedicated Car Pickup Lanes
- Short Term + Handicap Parking
- Temporary Traffic Reversal
- Traffic Flow

SKANSKA USA BUILDING
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PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
City of Lowell Historic
MEETING MINUTES

MEETING #1 NOVEMBER 15, 2018 10:00 AM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Bob Bell, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Steve Stowell | City Present Peter Aucella | NPS Present Charles Tonetti| NPS Present Bob Bell | PE Present Joe Drown | PE Present Alicia Svenson| BCA Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Joe Drown (JD) provided an update of the Project status to date. Bob Bell (BB) explained how the design team is in the process of completing the schematic design. JD explained how the full design schedule runs through May of 2021. JD stated that construction is scheduled to run from 2021 through August 2026. JD stated how the phasing approach avoids the need for temporary classrooms or a temporary gymnasium. BB reviewed an aerial rendering of the existing school and then presented a rendering of the new school from the same perspective, see attached. JD explained how the street edge of the design is reinforcing the urbanality of the school. BB explained that there is a lot more green space and accommodations for pedestrians. BB reviewed the design rendering for the new main entrance which is pulled forward towards Fr. Morrissette Blvd. avoiding the cavernous appearance of the current entry. Peter Aucella (PA) explained asked if the 1980s building is remaining to the left of the main entrance. BB explained that the 1980s building is remaining and renewed the improvements that will be made including the ground level façade and the opening with glass of the existing NW corner stairwell.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. LANDSCAPING/SITE DESIGN

DISCUSSION	BB explained how the utilization of glass at the first level will liven up the street level view, while utilizing security measures in landscaping to maintain safety. BB explained how the design team plans on utilizing the 1920's building to inspire the 1st level exterior design of the 1980's and Freshman Academy buildings without exactly replicating the yellow brick. PA asked if the project is cutting into the road at Fr. Morrisette. JD answered no that Fr. Morrissette remains the same width and the site is cut into. Charles Tonetti (CT) asked about the narrow sidewalk on Arcand Drive. BB agreed that the sidewalk appeared narrow on the rendering and that it will be addressed. BB stated that the design team is looking for input on natural but defensive measures to keep people away from the 1st floor façade. Steve Stowell (SS) stated that square cobbles have worked well in the past around

	benches at canals. CT stated that utilizing plantings along façades can be effective at first but ends up as being problematic in the long run because of maintenance. CT stated that hardscape is more effective and creates positive ad hoc activities in the area. SS suggested that green space be primarily reserved for within the quad and outside quad have raised planters. BB agreed stating they can use hardy durable plantings outside the quad but not a lot of plantings. BB reviewed the fenced entrance to the quad area, see attached, including reviewing the canopy running from the Freshman Academy to the new Gym. BB reviewed the Arcand entrance to the gym which can be used as an off hours entrance with the gym isolated from other parts of the buildings. CT noted that sidewalks depicted in renderings have square corners at intersections and stated that the sidewalks should all be rounded at corners given that most pedestrians cut the corner.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. BUILDING FACADES

DISCUSSION	PA asked if the FA is 5 or 6 stories. BB responded that the FA will be 5 stories and provided a full description of the building. CT asked if the FA exterior will be yellow bricks like the 1922 building. BB replied no but the intent is to have the FA as a lighter shaded brick. CT stated that is good. JD stated that the 1980's and FA façade bases will have a reference to the 1922 style. CT asked if the base will be granite. JD stated granite is cost prohibitive. PA asked how protection from graffiti will be addressed. SS stated that the high school building and downtown overall don't tend to get hit with graffiti, as he only recalls the high school having graffiti once which was quickly cleaned up. SS added that any base material should not be porous so as to avoid any permanent issues should there be graffiti incidents. PA stated that designing up against the back side of the Masonic temple is a challenge.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. BRIDGES

DISCUSSION	BB stated that the City has made the decision for the bridges to remain at 1 story and presented a rendering of 1 story bridges, see attached. SS stated that he likes the rectangular more transparent bridges depicted. PA inquired about the bridge columns. BB stated that the South bridge columns will be the same, but the North bridge columns will be relocated as the bridge is moving south, with same amount of columns planned. PA stated that NPS will require a Special Use Permit for Construction be obtained from the NPS for construction of the new bridge and renovation of the South bridge. PA stated that the City currently has two of these permits with NPS for other ongoing projects. JAD asked if Christine Bruins with NPS is the point person for obtaining this permit. PA replied yes and stated that the Project Team should walk the site with Christine prior to establishing the agreement. PA asked if the bridges will be square vs. the existing round. BB stated yes and that they are looking at possible moving the South Bridge approx.. 10 ft North to line up with the edge of the opening in the 1922. JAD pointed out that the existing South Bridge runs perfectly on center into a column in the 1922 building. CT suggested that the end of the bridge be splayed to avoid the column but leave the bridge in its current position. BB asked if the original arches in the façade of the 1922 above where the bridge enters the building should be restored or left as curtainwall. CT stated you should look at bringing back the arches.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. WINDOWS & DOORS

DISCUSSION	BB presented a historic photo of the 1922 Building for discussion. JAD stated that it appears the original windows were 12 over 12. SS replied yes and provided a description of the type of windows that should be used in the new construction, in which sample shop drawings have already been provided to PE. JD

	asked about spring loaded hardware and if windows opening out could be used. SS replied that the window must be double hung or with a fixed top sash. SS stated that the 3 buildings (Coburn, 1922, 1993 addition) should each have different windows to distinguish them. JAD stated so Coburn will be 2 over 2, 1922 12 over 12, and 1993 1 over 1. SS stated yes and the basement will be 8 over 8. PA stated that we may want to keep the 1993 as 12 over 12 so as not to draw the eye to the difference. SS suggested that we look at 1993 further as rendering are further developed in design. SS stated the window treatments should be dark on the outside face. PA asked about the exterior doors. JD stated doors will be styled to match the original. BB explained photos of Coburn Hall exterior from 1800's, see attached. SS explained how row houses originally occupied the lots where the 1922 building is. JD asked if louvers in the façade for mechanical rooms are a problem. SS stated no that they have worked around louvers for mechanical rooms in the past. BB showed historical photos of the 1922 building. BB provided a rendering of the 1922 building and noted the existing entrance on Kirk Street between Coburn and 1922. BB stated that this entrance is currently at ground level and the intent is to have this as a handicap accessible entrance. JD noted that grades will slope away from the entrance. BB sated that they are looking to address the small alleys behind the French street ramp entrance as they are a security concern. BB explained that the ramps will be reworked to address this and other issues. PA inquired about stage access. JAD stated that stage access is a concern of the LHS Band also and that the design team is addressing the issue which will also serve the needs of NPS Summer Music Series. PA stated a larger lobby for the auditorium would also be helpful. BB stated that auditorium lobby is being reworked regarding stairs, ramps and the stairwell to the balcony. JD added that the ability is there to rework the entrance. PA asked how NPS can get information on how the auditorium access is being redesigned. BB stated that once Schematic Design is complete the Design Team can review the drawings which NPS, which leaves plenty of time to address comments and concerns. PA expressed concerns about getting a grand piano onto the auditorium stage. JD described how there are different sizes of grands and baby grand pianos. PA stated he would get information on exactly what size grand will need access. BB explained how there will now be a freight elevator to the stage. BB showed a picture with the 1993 addition windows, see attached. JAD suggested that the 2/3 over 1/3 windows are not pleasing to the eye. SS stated yes we can go with balanced 1 over 1.
CONCLUSIONS	

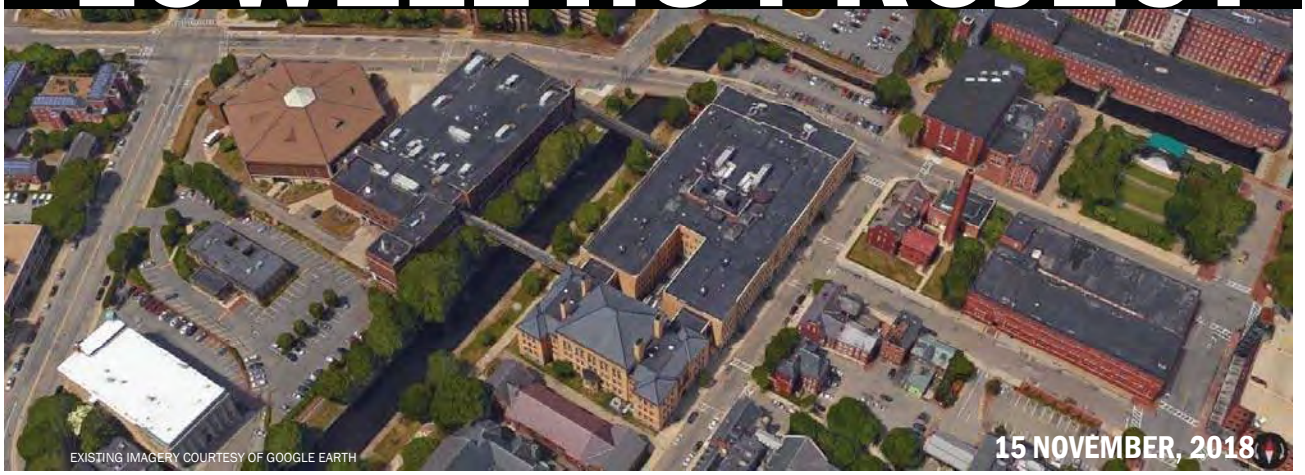
ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

HISTORIC MEETING

LOWELL HS PROJECT



15 NOVEMBER, 2018

LOWELL HIGH SCHOOL

SCHEDULE

- 6/2019 – 2/2019 SD
- 2/2019 MSBA SUBMISSION
- 4/2019 MSBA BOARD MEETING
- 8/2019 – 5/2021 DD/CD
- 7/2021 – 6/2026 CONSTRUCTION

LOWELL HIGH SCHOOL

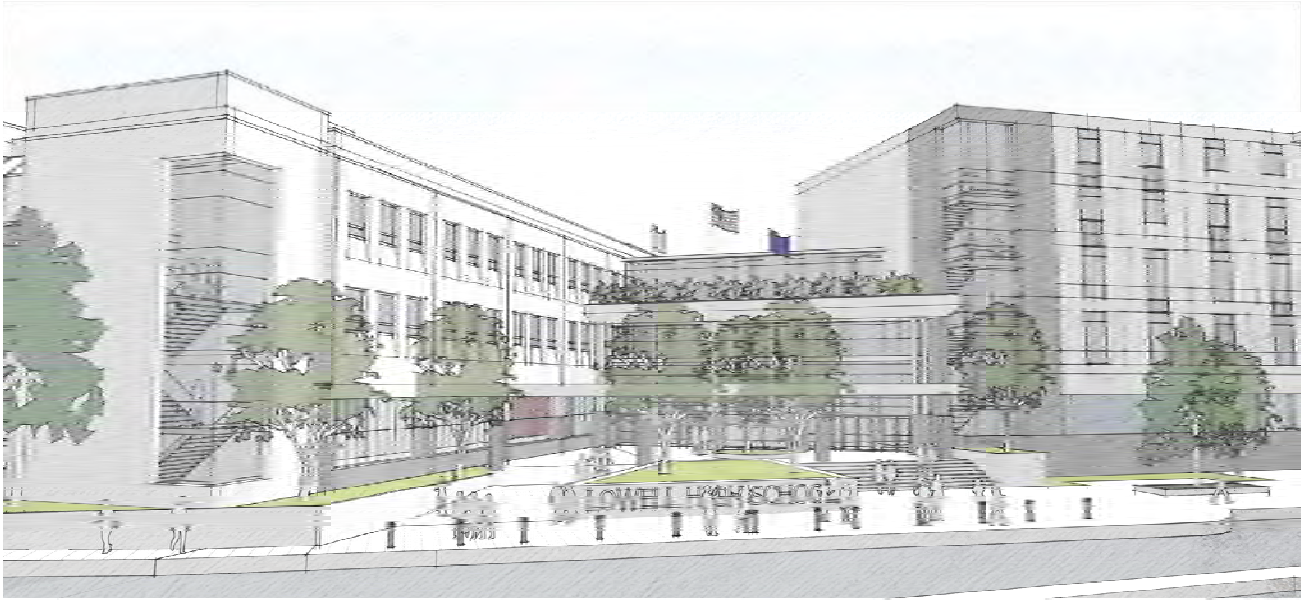
AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND SOUTH FAÇADE OF FRESHMAN ACADEMY

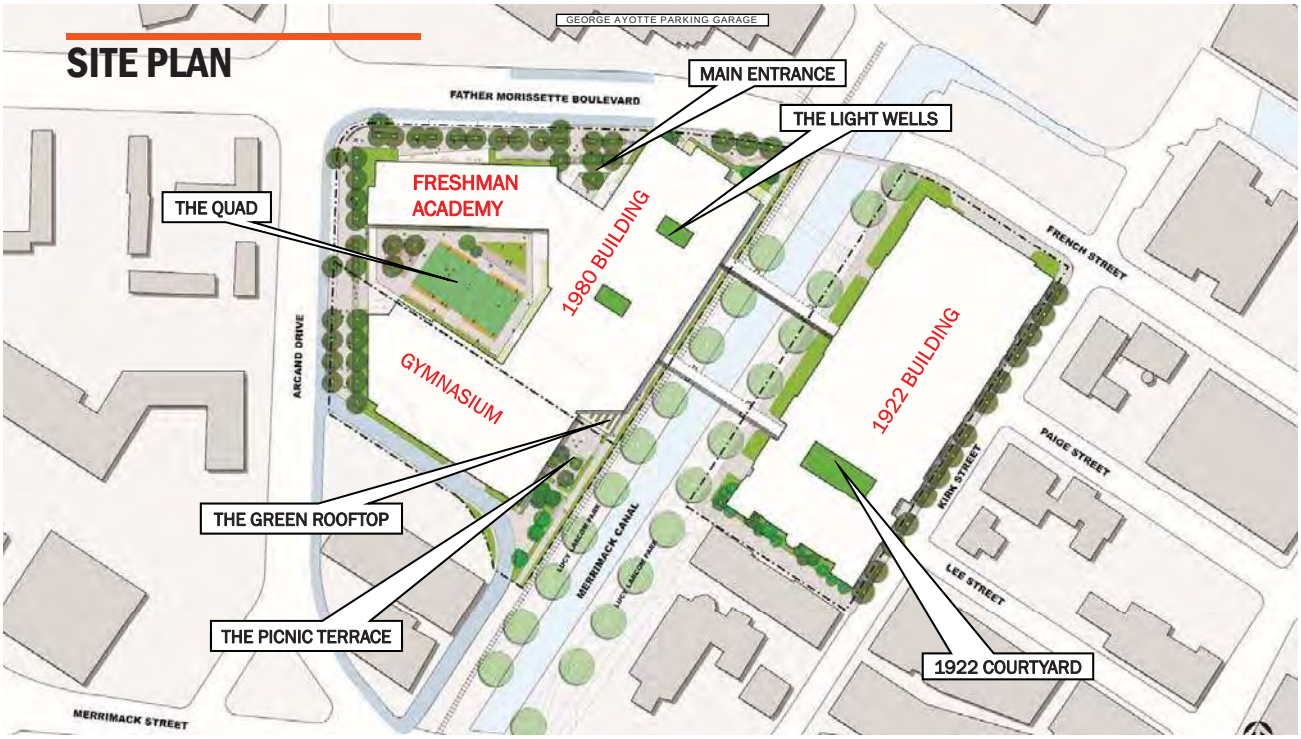
LOWELL HIGH SCHOOL

VIEW FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

BRIDGE - EYE LEVEL VIEW FROM SOUTH

SITE PLAN

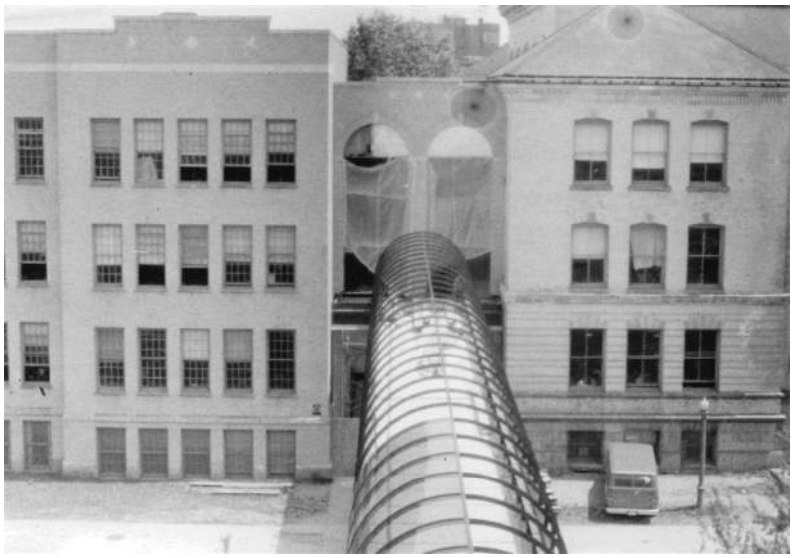


LOWELL HIGH SCHOOL

HISTORIC 1922 BUILDING

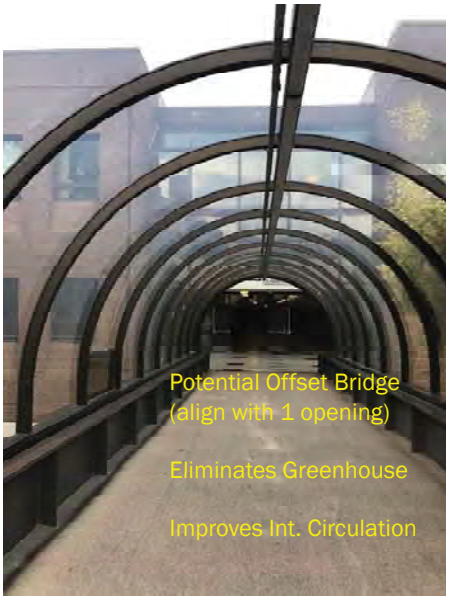
LOWELL HIGH SCHOOL

HISTORIC 1922 BUILDING AND BRIDGE CONNECTION



LOWELL HIGH SCHOOL

KIRK STREET/SPECIAL EDUCATION ENTRY

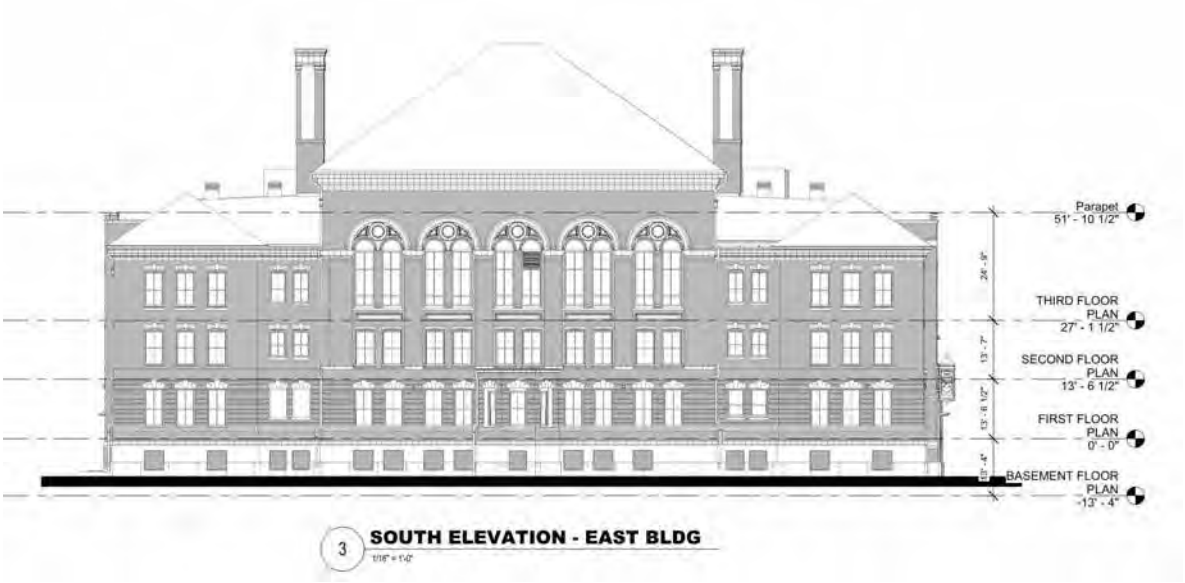


LOWELL HIGH SCHOOL

HISTORIC COBURN HALL

LOWELL HIGH SCHOOL

SOUTH ELEVATION COBURN HALL

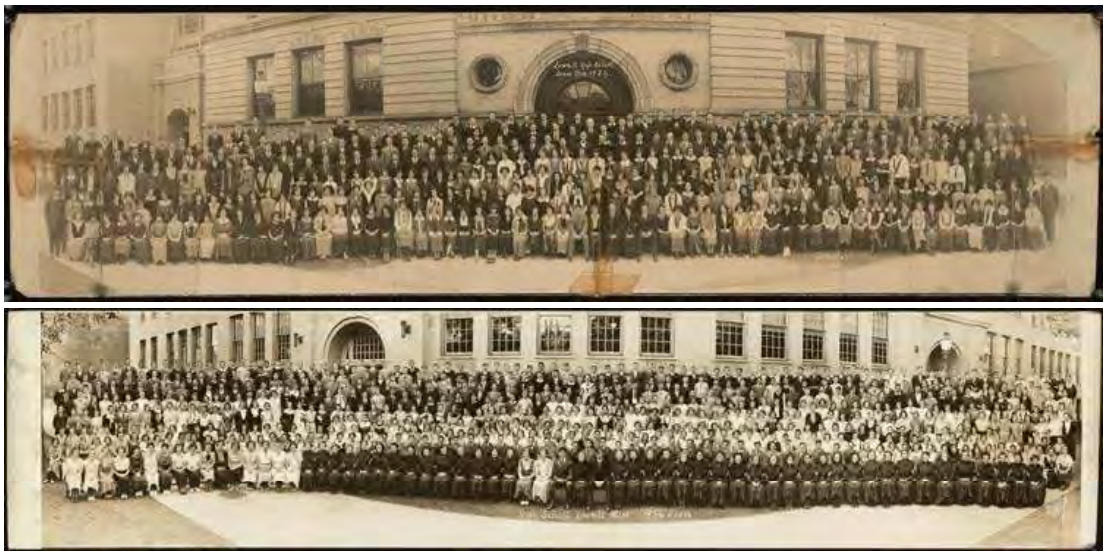


LOWELL HIGH SCHOOL

WEST ELEVATION 1922 BUILDING / COBURN HALL

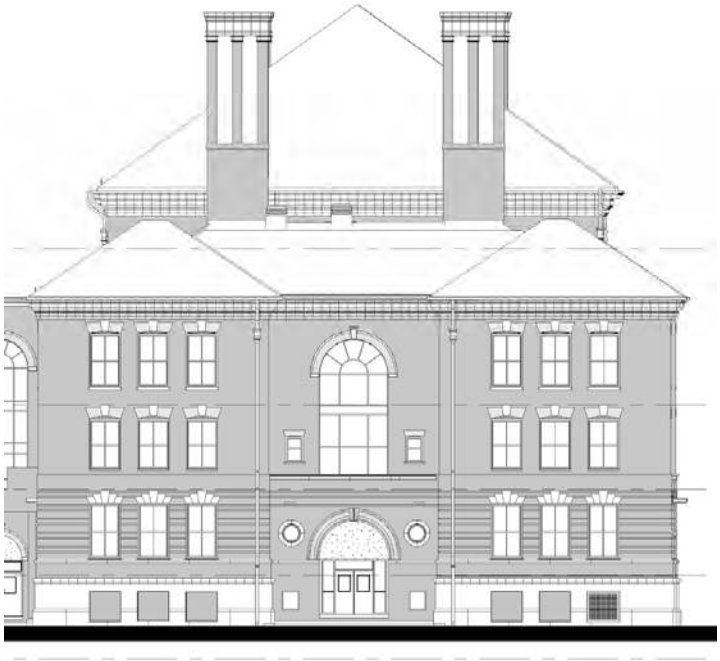
LOWELL HIGH SCHOOL

HISTORIC COBURN HALL



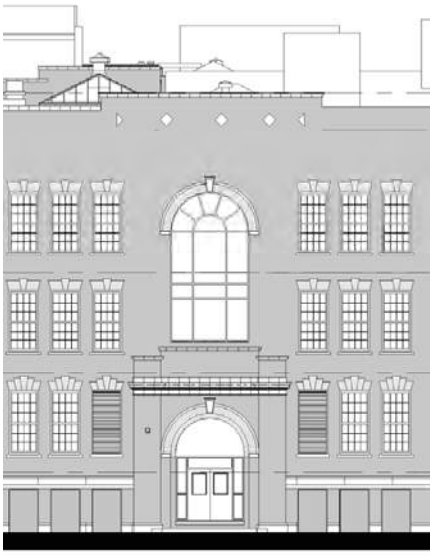
LOWELL HIGH SCHOOL

PARTIAL WEST ELEVATION COBURN HALL



LOWELL HIGH SCHOOL

PARTIAL WEST ELEVATION 1922 BUILDING



LOWELL HIGH SCHOOL

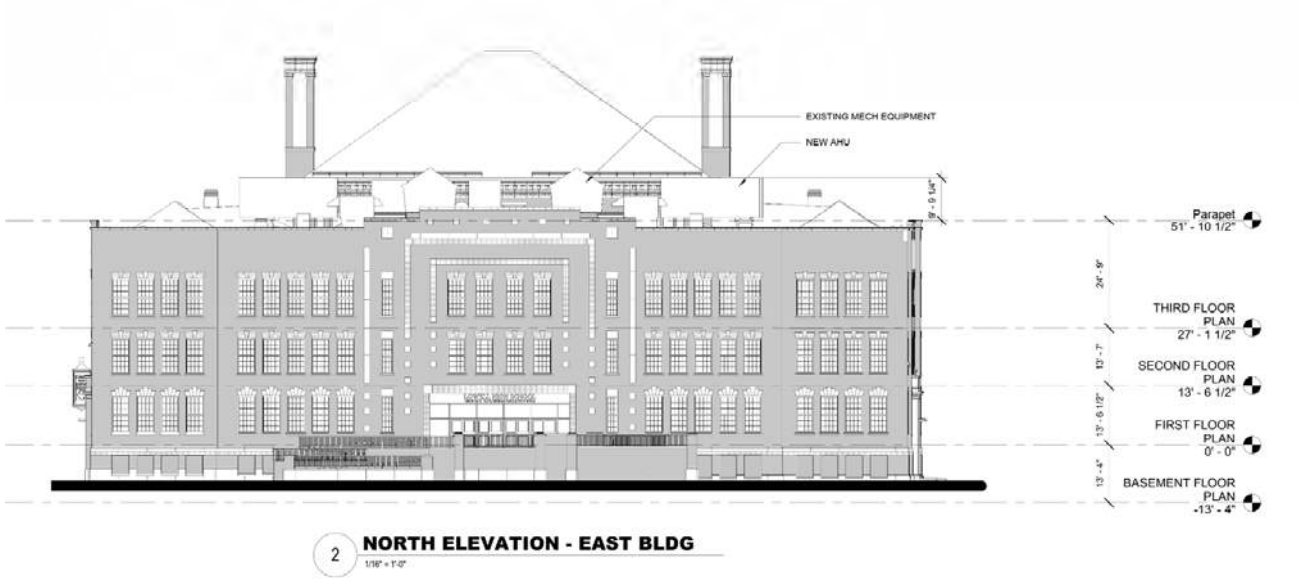
EAST ELEVATION 1922 BUILDING / COBURN HALL

LOWELL HIGH SCHOOL

KIRK STREET/SPECIAL EDUCATION ENTRY

LOWELL HIGH SCHOOL

NORTH ELEVATION 1922 BUILDING ADDITION



LOWELL HIGH SCHOOL

AUDITORIUM ENTRY

Perkins Eastman

LOWELL HIGH SCHOOL

SIGN-IN SHEET

TOPIC: Historic

DATE: 15-Nov-18

	ATTENDEE	ORGANIZATION	TITLE	EMAIL ADDRESS
1	Joseph Drown	Perkins Eastman	Architect	j.drown@perkinseastman.com
2	Robert Bell	Perkins Eastman	Architect	r.bell@perkinseastman.com
3	Kara Keefe Mullin	City of Lowell	Assistant City Manager	KKeefeMullin@lowellma.gov
4	Jim Dowd	Skanska	OPM	jim.dowd@skanska.com
5	~~Mary Ann Williams~~	Skanska	OPM	maryann.williams@skanska.com
6	✓ Alicia Svenson	BCA Building Conservation Associates, Inc.	Historic Preservation	asvenson@bcausa.com
7	Peter Acella	National Parks Service	ASSISTANT SUPT ~~Director~~ FOR DEVELOPMENT	peter aucella@nps.gov
8	Charlie Tonetti	National Parks Service	Architect	CHARLES_TONETTI@NPS.GOV
9	~~Bryce Waldrop~~	~~National Parks Service~~	~~Architect~~	
10	Steve Stowell	City of Lowell	Historic Board	sstowell@lowellma.gov
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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
Planning and Development
MEETING MINUTES

MEETING #1 NOVEMBER 15, 2018 1:30 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	Project Overview
FACILITATOR	Bob Bell, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Diane Tradd | City Present Eric Slagle | City Present Christine McCall | Present Bob Bell | PE Present Ashley Iannucelli | Traverse Present Joe Drown | PE Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Joe Drown (JD) provided an update of the Project status to date. JD reviewed aerial view renderings of the main entrance, Freshman Academy and quad entrance, see attached. Arcand Entrance to the gym was reviewed including how the gym can be isolated for off hours use. JD reviewed renderings of single level bridges and explained how the Northern bridge is being moved South. Bob Bell (BB) stated that the Historic Review meeting this morning was favorable as many of the requests have already been addressed in the design
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. LANDSCAPING/SITE DESIGN

DISCUSSION	Ashley Iannucelli (AI) presented an overview of the site landscaping, see attached. Proposed drop off areas, overhangs for student shelter and bio retention areas. The landscaping plan for the main entrance area was thoroughly reviewed, see attached rendering. AI requested input of suggestions from the group. AI reviewed the proposed quad design and discussed how underground may be used for stormwater storage. Christine McCall (CM) asked if the stormwater would be treated before discharging into the City system. AI stated that she will confirm with Nitsch, the project civil engineer, that stormwater will be pretreated. JD stated that the design team is looking at the gym side of the quad for being utilized as a projection screen for outdoor movies. JD explained how the east side of the 1980's building was being looked at for movies along the canal but that there is insufficient space. AI presented a close up rendering of the quad fenced/gated access area along Arcand Drive, see attached. AI explained that they are looking at what size vehicles will need access to the Quad. Jim Dowd JAD stated that the project team will need to finalize with Chief Winward on whether or not fire apparatus will require access. AI agreed and stated that should fire access be required it could be accommodated on the North side. AI stated that the City may be looking at the Quad for farmers markets which may require vehicle access. Diane Tradd (DT)

	stated that having Farmer Markets in the Quad would be advantageous and that vehicular access would be required for Farmers Markets.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. EXTERIOR LIGHTING

DISCUSSION	AI asked if there was a City standard for light poles. DT stated that the City needs to explore if the standard Historic District gas light will be used at the High School or if a new style will be set up for the high school. Eric Slagle stated that the community is going to be looking for a lot of light around the high school. Kara Keefe Mullin (KKM) asked if programmable control of exterior lights can be provided or motion detectors can be utilized. KKM stated that Councilor Leahy recently expressed concerns about the current exterior lighting at the high school. ES stated the amount of permanent exterior lighting should be significant to address lighting concerns. DT asked if the Project Team spoke about lighting at the Historic meeting earlier in the day. JD stated that lighting was not addressed but reviewed the topics of discussion from the Historic meeting. AI explained how ambient exterior light from lights on benches and railings can be utilized.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. OUTDOOR SPACES

DISCUSSION	AI stated that fencing is being worked in as being inviting while still serving its intended purpose. AI reviewed the proposed "promenade" along the canal, see attached. AI explained how work at Lucy Larcom park will be minimal. JD stated that Historic liked the idea of hardscape and wanted team to focus on Hardy plantings. BB stated that Historic requested a natural barrier be provided as a deterrent to people walking up to 1st floor windows. DT noted that tree grates can be problematic as they don't get upgraded as required. BB stated that they have seen some soft solutions to the tree grate issue which do not require upgrades over time. AI stated that porous pavement can also be a tree grate alternative/solution. BB stated that teachers at the school have requested outdoor learning space along the canal side of the 1922 building, that they are looking for a natural area for gathering. AI stated they will look into such a space outside the 1922 at Lucy Larcom. AI provided a review of the proposed "picnic terrace" at the cafeteria/gym intersection on the canal side, see attached. DT inquired if the furniture on the terrace would be moveable. AI stated that recent projects have had problems with secured furniture but that if the area is fenced they can look at unsecured furniture. JAD mentioned earlier that the terrace should be fenced for security and school operations reasons. DT asked if moveable exterior furniture would be MSBA reimbursable as other state agencies don't reimburse for movable furniture. JAD responded that it is reimbursable as FFE. AI stated that the project also has to provide enough bike racks to meet MSBA requirements. DT asked if the terrace area will receive sunlight. AI stated given as it is southern facing it will receive a lot of sunlight.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. CANAL

DISCUSSION	AI inquired if there were any issues with the canal. CM stated that the canal is not really an issue. JD stated that it has been noted that the canal is drained periodically. CM stated draining is controlled by the hydro plant. DT asked if art can be incorporated into the terrace area. BB stated they are looking at that and also looking to integrate relevant quotes into hardscape. CM stated that Lucy Larcom benches have quotes that were established by NPS and Historic Board. CM stated that UMass Lowell held a competition for local artists to design bike racks which worked out well. JD requested stormwater discharge into canal be discussed. CM stated that using any existing outfalls into canal is straight forward. Hamilton Canal project just created a new stormwater outfall into a canal and that required ConCom approval. JAD asked if Army Corps of Engineers

	approval is required. CM stated that as canals are not considered navigable the Corps is not involved. ES asked if there are any existing outfalls into canal. Project team needs to look into if any exist. JAD noted that from previous meeting with Water/Sewer Dept. it was stated that outfall into canal would be preferable on 1922 side as 1980 side has capacity.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

6. GREEN ROOFS

DISCUSSION	AI stated the design team is looking at green roofs, in particular how they will be used and what level of maintenance will be required. ES stated that Mill City Grows has programs with several elementary schools. CM stated that some of the elementary schools have had trouble with their programs as there is no maintenance in the summer. AI stated that project team will need to make sure that HS is 100% on board if the type of green roof is higher maintenance otherwise low maintenance options can be utilized. DT suggested that "Cold Frames" be utilized in the roof top gardens. BB stated that the proposed roof top garden will be located near the energy lab. DT asked what kind of riling will be used. BB replied that the railing has not yet been designed. AI stated that planters could be used as part of the perimeter railing system. DT stated that the project team should reach out to Mill City Grows.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

7. COMPOSTING

DISCUSSION	JD asked if there is interest in developing a composting program. DT replied that composting has been discussed and there could possibly be a requirement in the future. CM stated that the City is working on urban agriculture programs and composting may be a part of those programs. AI asked where composting at the High School would take place. CM asked composting could be part of the green roof terrace. ES stated that transporting the compost to the roof could be problematic. JD stated that other projects are looking at composting companies picking up the compost to avoid issues related to onsite composting. CM stated that locally Offbeet Composting from Dracut offers a pickup service. ES stated the project team should look into a temporary storage location for compost within the school. JD explained how they are working with the kitchen design consultant on improvements to food preparation and the overall kitchen.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

8. LIGHT WELLS

DISCUSSION	AI stated that the group should discuss the light wells in the 1980s building. DT stated that courtyards in the middle schools have become problematic regarding maintenance. AI stated that they are working on a design that will involve minimal maintenance. ES asked what rooms border the light wells and are they accessible. BB stated that all of the light wells will need to be accessible from the 1st floor The nurse and cafeteria front the 1st floor light wells, with science classrooms on upper floors. DT stated that the courtyard could be a calming place for students.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

9. PICKUP/DROPOFF CIRCULATION

DISCUSSION	AI presented the current plan for pickup/dropoff locations for parent and buses, see attached. AI explained how the team is looking at several considerations. It is understood that AM congestion is more car related while PM congestion is bus related. Design team has been working with Lowell Traffic Engineer Natasha Vance on improvements. AI thoroughly discussed all the options and idea for pickup dropoff improvements. AI discussed buses on the Service Rd./Dutton street loop but expressed concerns about dropoff crossing in front of buses for access to the school. JD stated that this design is currently fluid with the main objective being the separation of cars and buses as the SRO's stated that the buses can be directed to the Service Road. However, it has been noted that dropoff and entrance near the loading dock is not preferable. JD noted that after the last Traffic meeting the team went in the direction of bus dropoff on the service road, however several concerns have arisen. AI stated that dropping of at "back of house" is not a good approach. ES stated that vehicles exiting the service road onto Arcand will have a very difficult left turn. BB stated that that left is difficult and that if traffic is in the opposite direction bus dropoff is on the wrong side of the Service Road. CM asked if busing was expanding. ES stated that busing will remain the same. BB asked if the PM buses are staggered. CM stated that athletic buses are about 15-20min after dismissal. ES how many LRTA buses are utilized. AI responded that it is understood that there are 8 LRTA buses. AI asked what about buses on Arcand and parents on Fr. Morrissette. ES stated that dropoff utilizing a median separating buses and parents with parents on the outside has worked at other schools. AI stated that we need to avoid students crossing in front of buses. AI stated they have looked at adding an additional inside lane on Arcand dedicated to bus dropoff. JAD stated that lane on Arcand could be utilized as after hours pickup for parents near the gym. BB asked if there have been any conversations with Cobblestones. ES replied yes. CM stated that Cobblestones parking at 75 Arcand will be going away. It was asked if parking on the service road has been discussed. JAD stated that Chief Winward was quite clear that there should be no parking on the service road to allow for emergency vehicle access. AI stated that required handicap parking is to be provided near the main entrance. CM asked if every entrance will be HC accessible. BB reviewed all of the entrances. CM asked further about 1922 entrances. BB explained how the French Street ramp entrance will be reconfigured and that the Kirk Street entrance at the junction between the Coburn and 1922 additions is nearly at street level which can be made accessible. BB states other current entrances to the building will be stair exits. JD stated that all the 1980s exits will be HC accessible. DT stated concern about security on the South side of the new gym. BB presented a partial rendering and the area was discussed.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

10. ZONING

DISCUSSION	JD presented a zoning summary, see attached. JD asked if there is anything formal that needs to be submitted at this time. FAR is within requirements. CM stated that a variance is not required for parking because of the garage. CM stated that the design team can requested DPD issue a letter concerning parking. JD stated the design team will need that letter. CM noted the parking letter can be provided administratively. JD stated that it is know that a Site Plan Review will be required and that the plan is to submit that at the Design Development stage. ES stated that Site Plan review at the DD stage is appropriate. CM stated that Site Plan Review is not discretionary and that it is best presented when the plans are more concrete. CM suggested that a "pre-application" review be submitted so that the Planning Board is fully informed earlier on. ES stated to make sure ample time is allotted for the Site Plan Review. JD asked if ConCom review is before the Planning Board review. CM stated that ConCom is after all other reviews are set. CM asked if there are any building projections near property lines as it has been a recent issue. BB stated that there are no projections within ten feet. ES stated that this district allows for building to the property line. JD asked if there is any agency or group that has been missed. DT stated that the project team need to speak with Historic about lighting. CM asked if the high school sits on more than 1 lot. JAD replied that it is more than 1 lot. CM stated that ZBA approval is required to building within 50' of a body of water. ES stated that past project reviews in the City have not had the canals deemed bodies of water.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

PLANNING DEPARTMENT MEETING

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

SCHEDULE

- 6/2019 – 2/2019 SD
- 2/2019 MSBA SUBMISSION
- 4/2019 MSBA BOARD MEETING
- 8/2019 – 5/2021 DD/CD
- 7/2021 – 6/2026 CONSTRUCTION

LOWELL HIGH SCHOOL

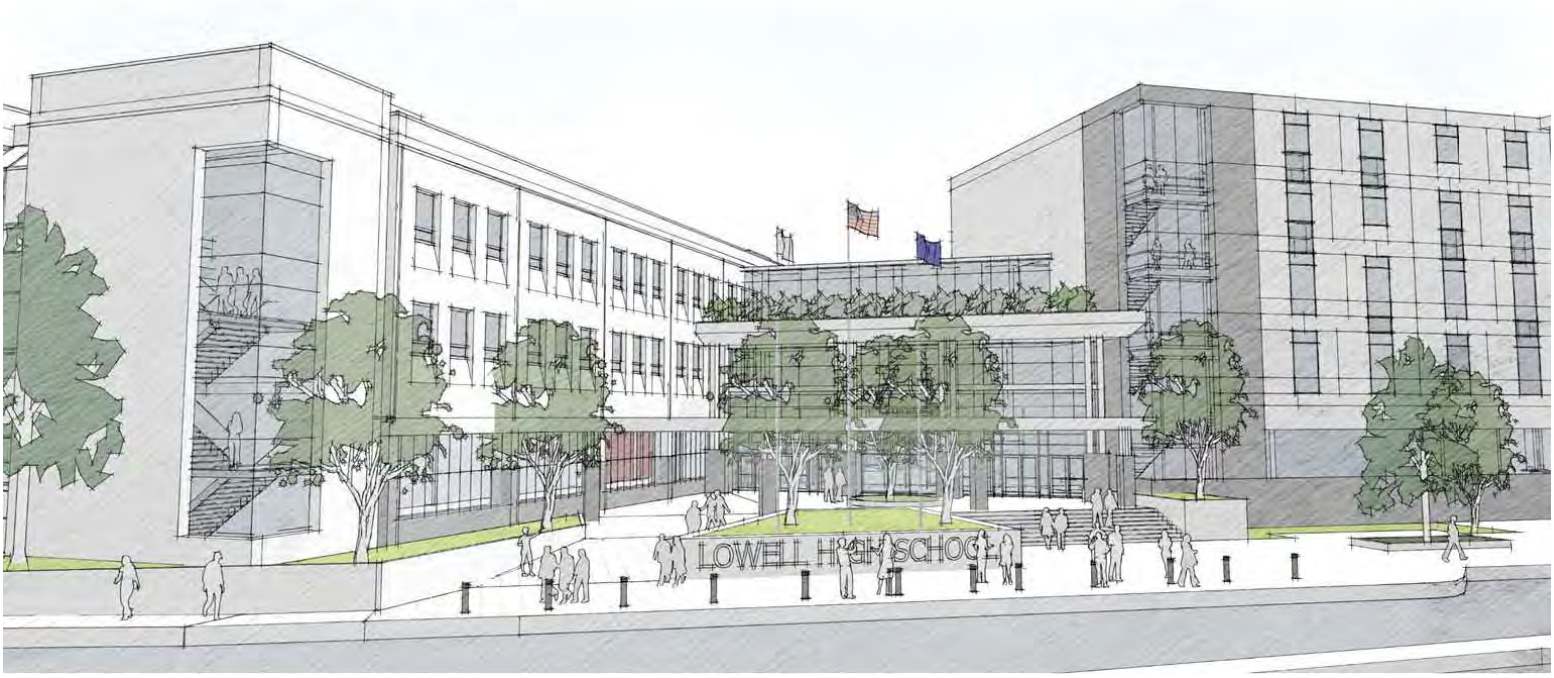
AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

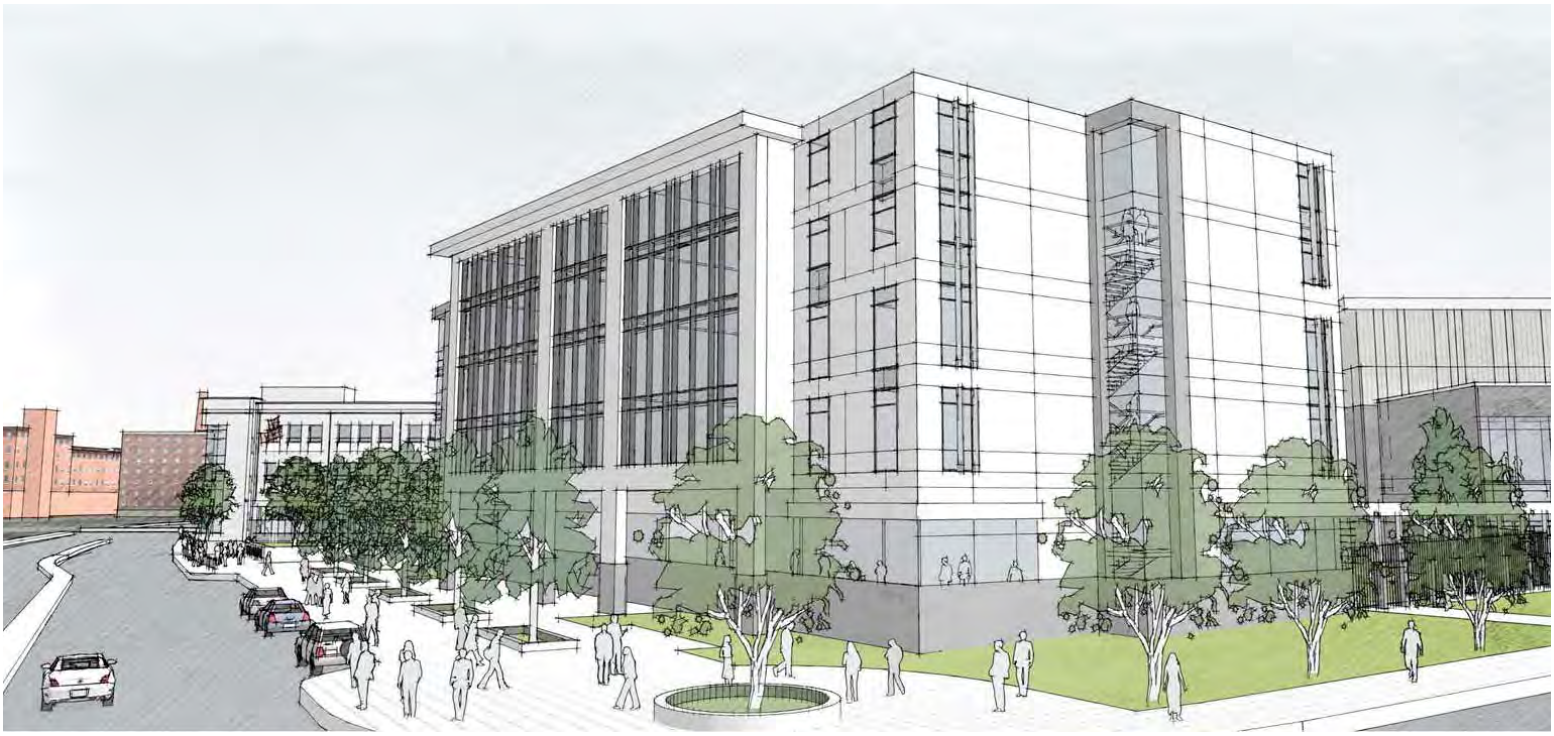
LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

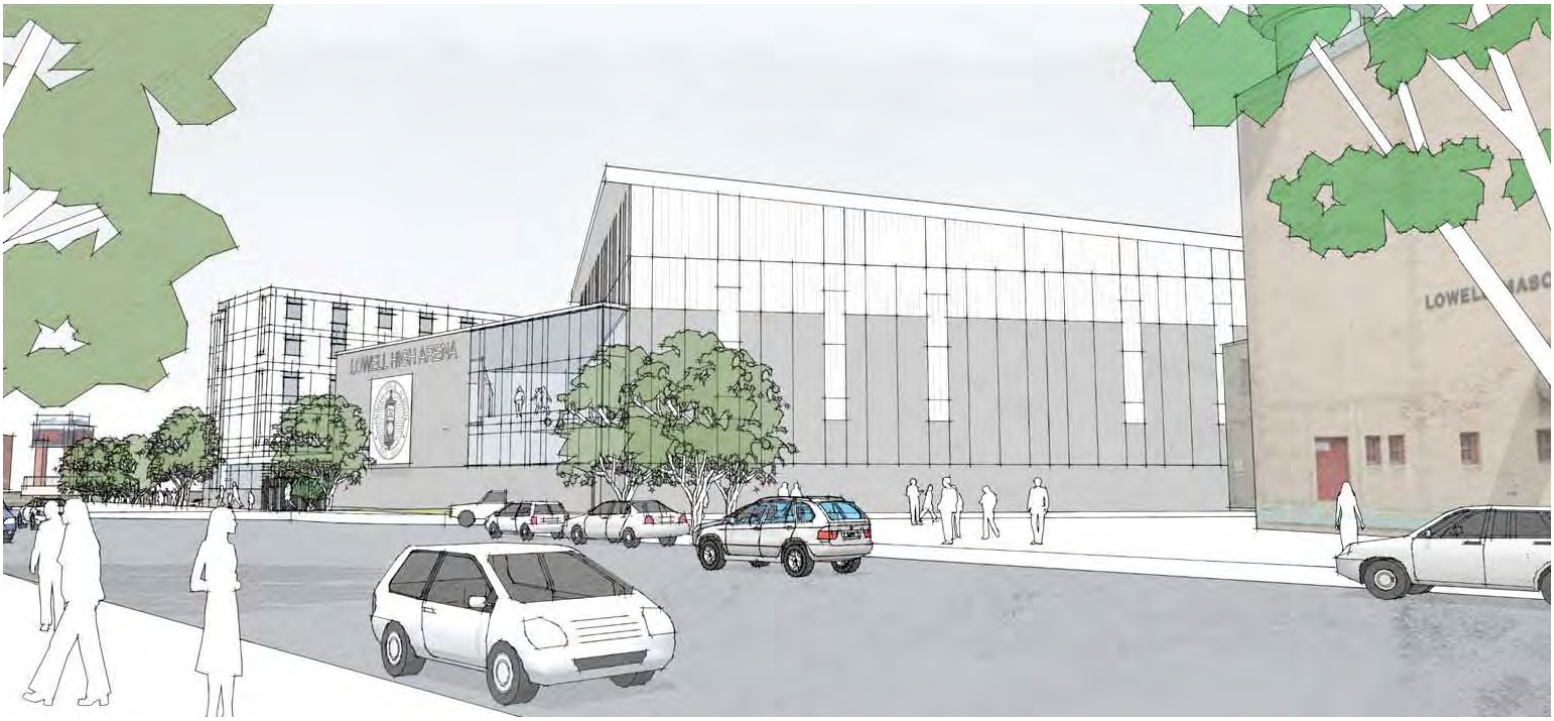


LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND SOUTH FAÇADE OF FRESHMAN ACADEMY

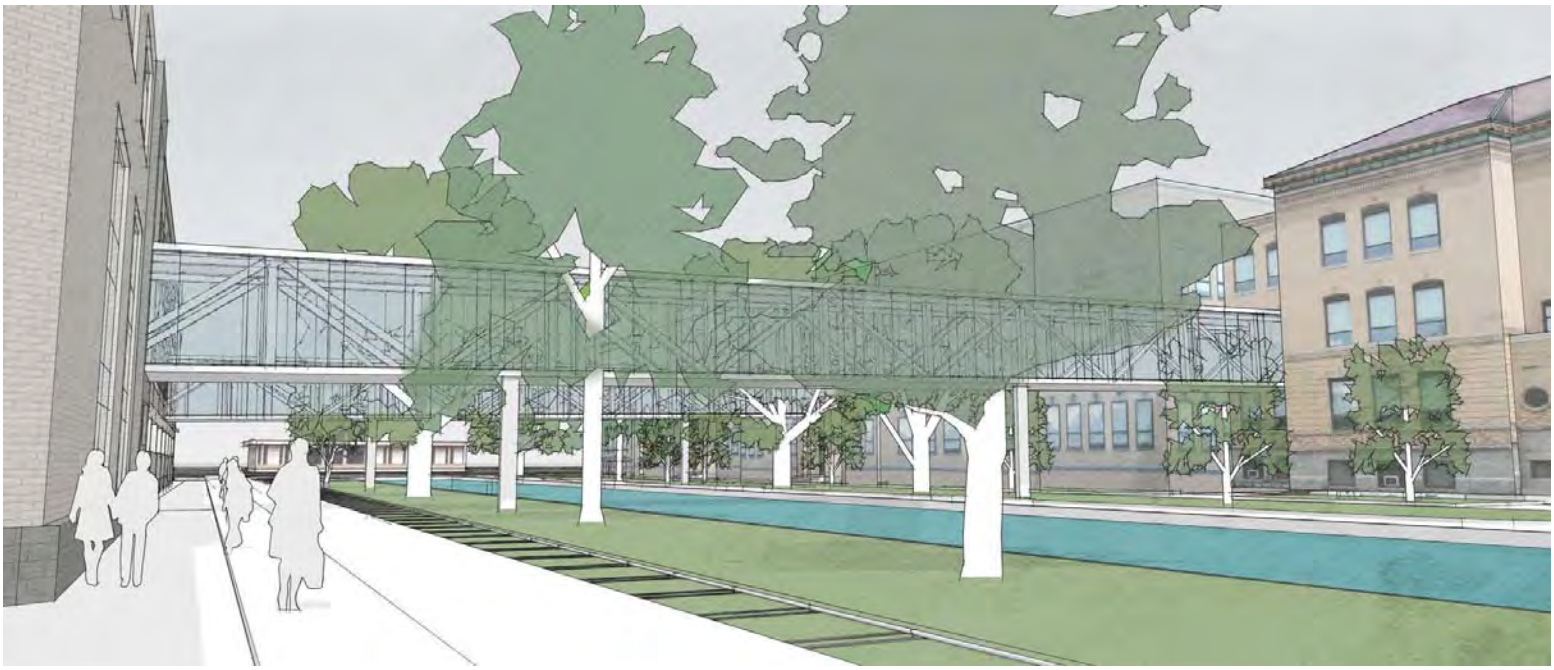
LOWELL HIGH SCHOOL

VIEW FROM ARCAND DRIVE

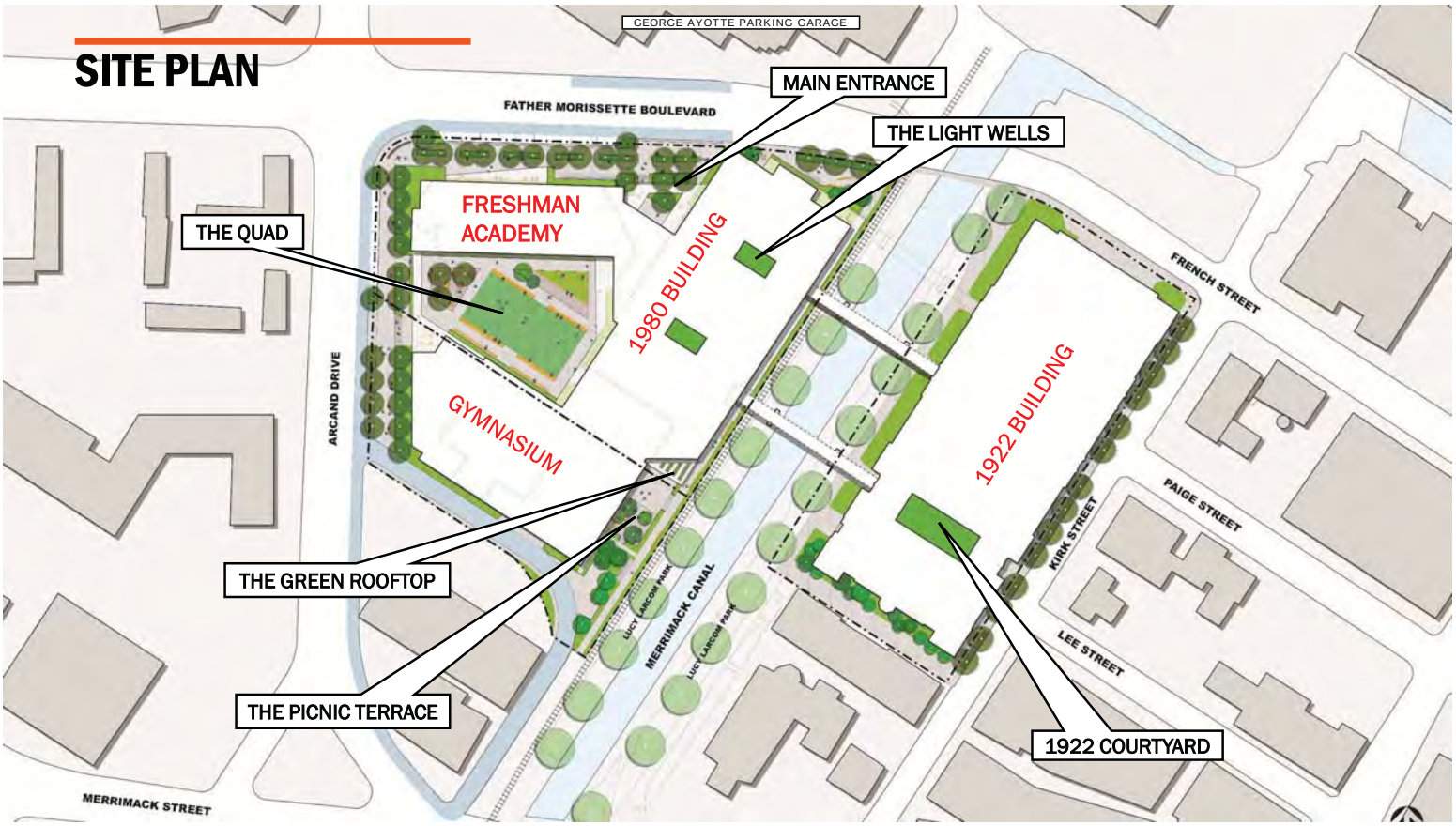


LOWELL HIGH SCHOOL

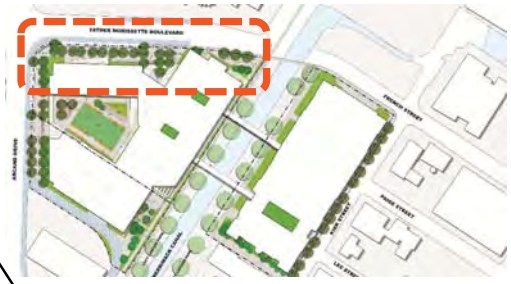
BRIDGE - EYE LEVEL VIEW FROM SOUTH

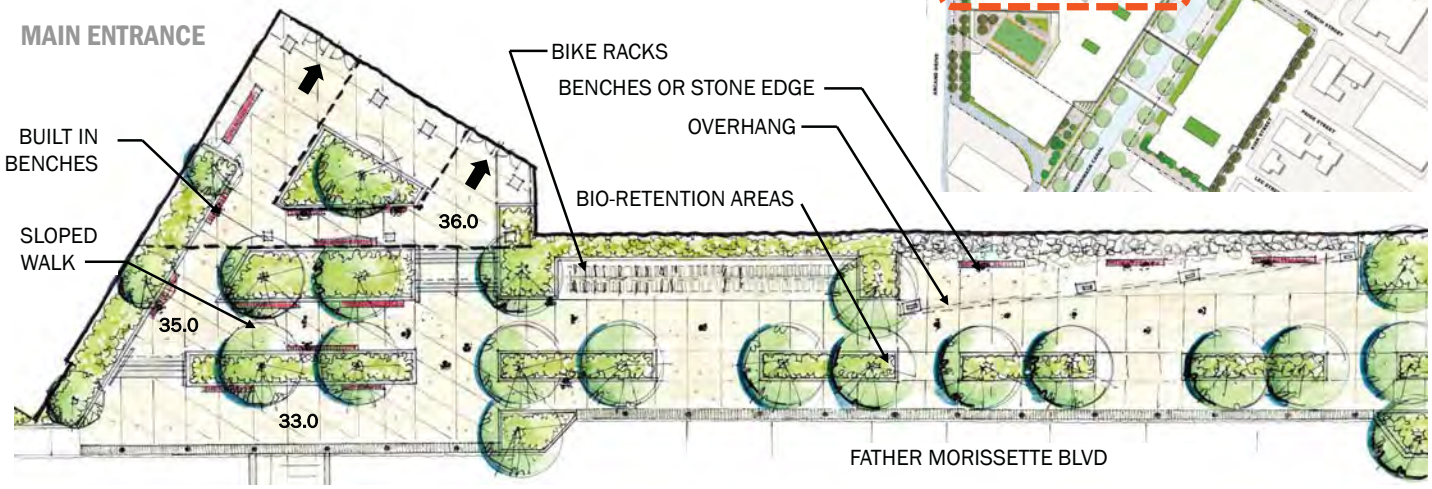


SITE PLAN



LANDSCAPE OPPORTUNITIES





LANDSCAPE OPPORTUNITIES

LANDSCAPE OPPORTUNITIES

"THE GROVE" AND QUAD ENTRANCE

LANDSCAPE OPPORTUNITIES

"THE PROMENADE"

LANDSCAPE OPPORTUNITIES

"THE PICNIC TERRACE"

LANDSCAPE OPPORTUNITIES

"THE ROOFTOP"

Adelaide High School Roof Terrace,
Adelaide, Australia

Alexandria Center for Life Sciences,
NYC, NY

Fenway Farms,
Boston, MA

LANDSCAPE OPPORTUNITIES

"THE LIGHT WELLS"

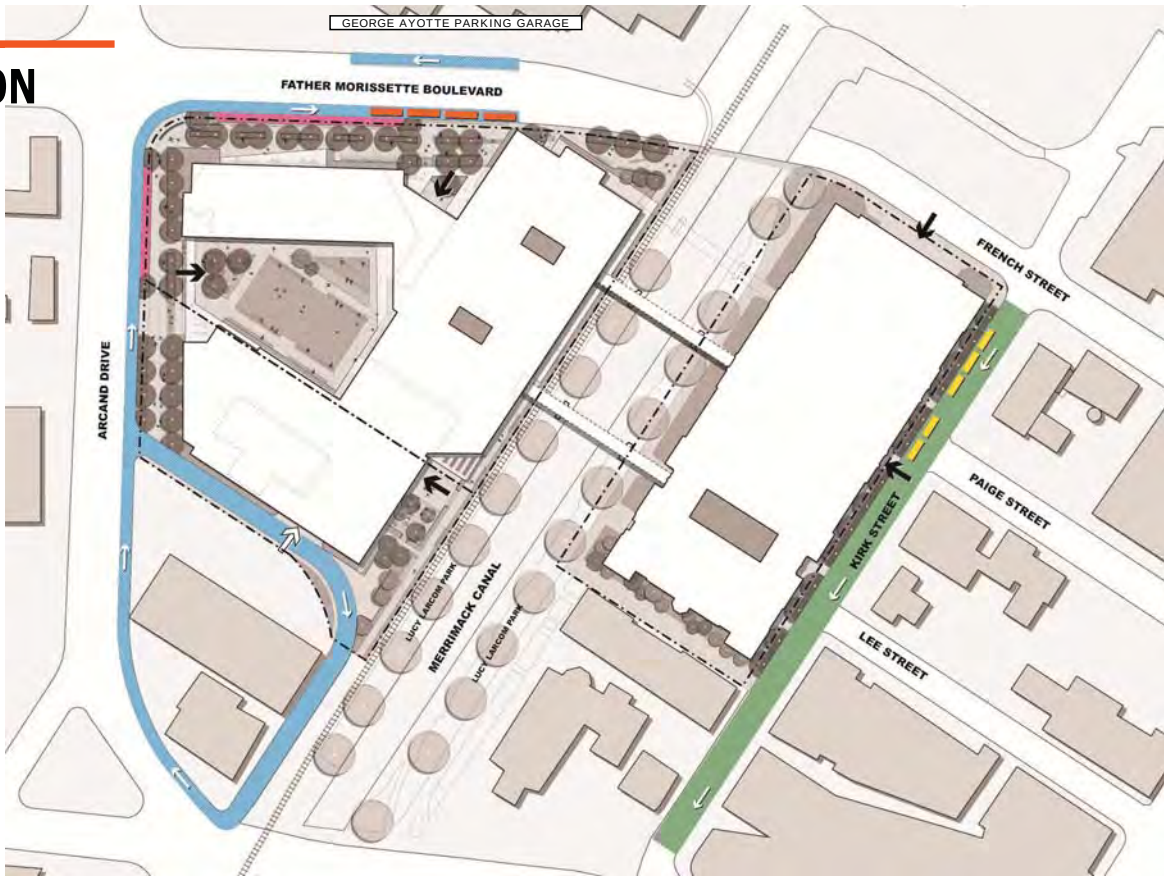
Tahari Courtyards,
Millburn NJ

Tahari Courtyards,
Millburn NJ

Site Specific Installation,
Velvet Da Vinci San Francisco

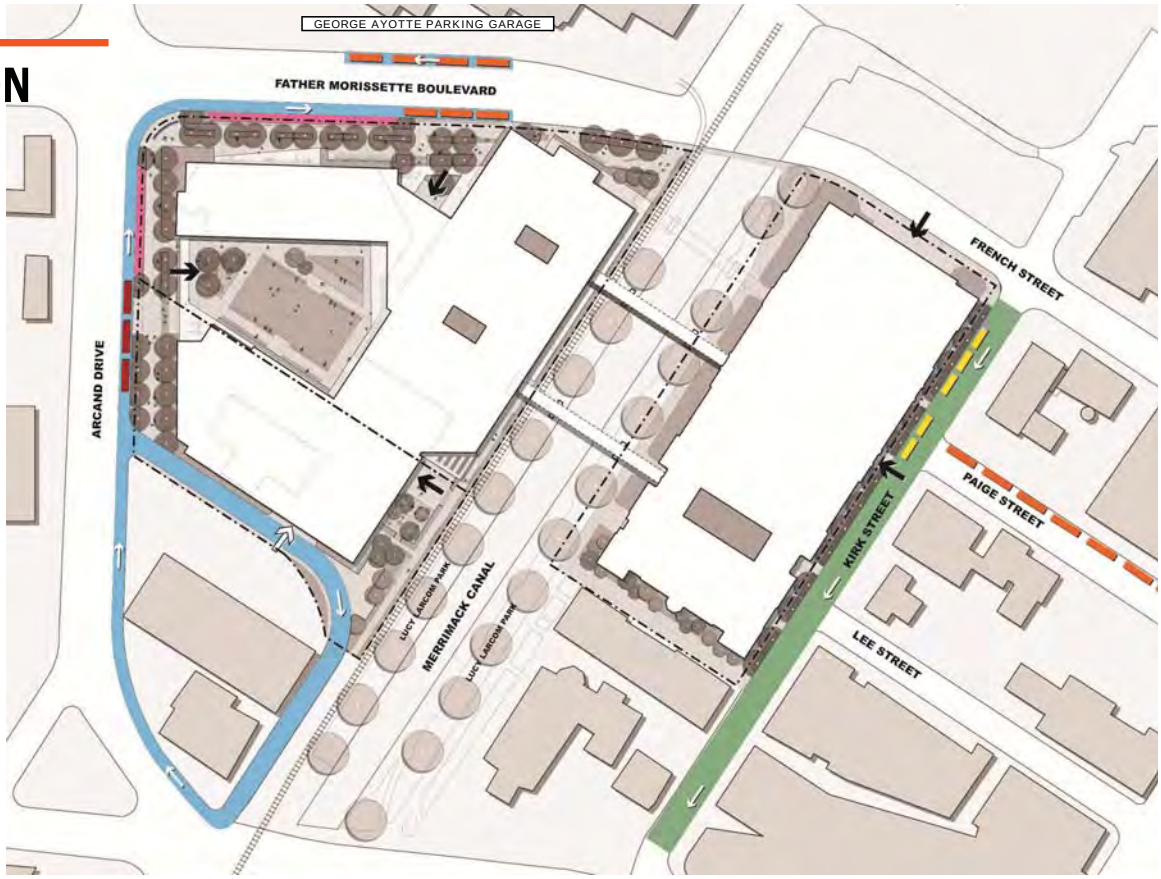
AM CIRCULATION

AM TRAFFIC CONGESTION CAUSED BY PRIVATE CAR DROP OFF



PM CIRCULATION

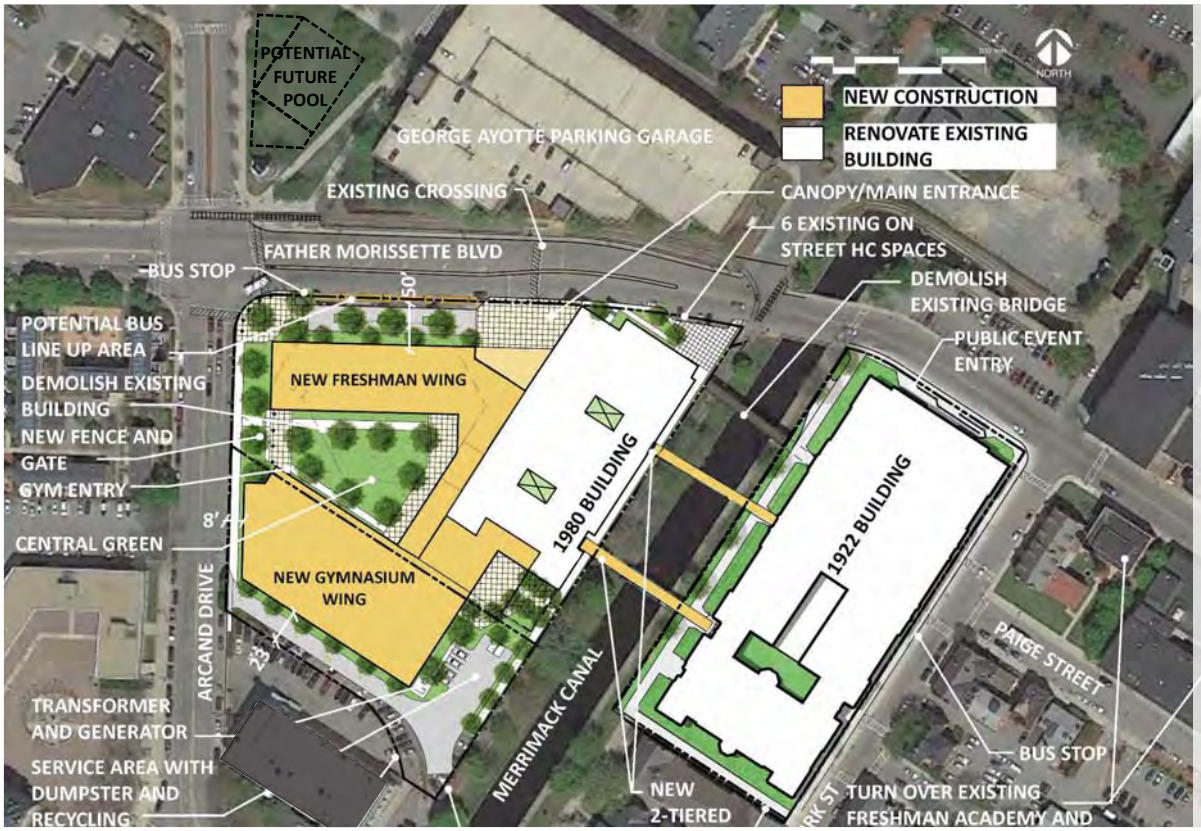
PM TRAFFIC CONGESTION CAUSED BY LRTA AND ATHLETIC BUS PICKUP



LOWELL HIGH SCHOOL

ZONING SUMMARY

	Allowable/ Required	Existing	Provided
GSF	1,292,512 GSF		±614,353 GSF
FAR	4		±1.69
Parking	1,296 spaces based on 216 proposed instructional spaces	203 existing instructional spaces requiring 1,218 spaces	2 on-site, 14 direct adjacent sidewalk, off-site garages
Site Plan Review			Will be required since addition exceeds 10,000 sf



ADD/RENO 3A EXPANDED SITE

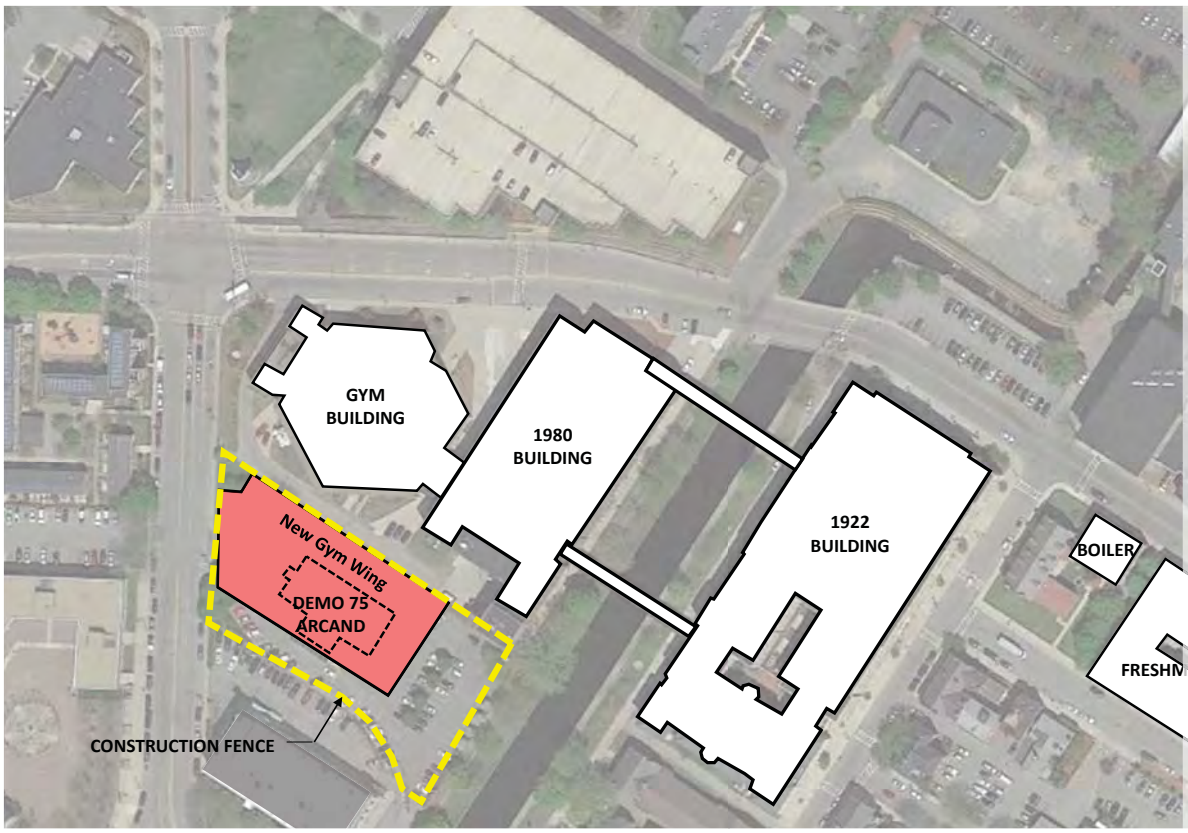
Updated Educ Program
(pool removed)

PRELIM. PROS/CONS:

+ **Consolidated Campus**
  (new freshman academy)
+ **No Windowless Labs**
+ **Added Green + Loading**
—**Gym Areas More Remote**
—**Eminent Domain**

Phasing Est 5yrs
(but only 3 years on school site)

Note: Actual design pending study- Diagrams are adaptations from previous Feasibility Study for reference only to facilitate discussion about revised option scope.

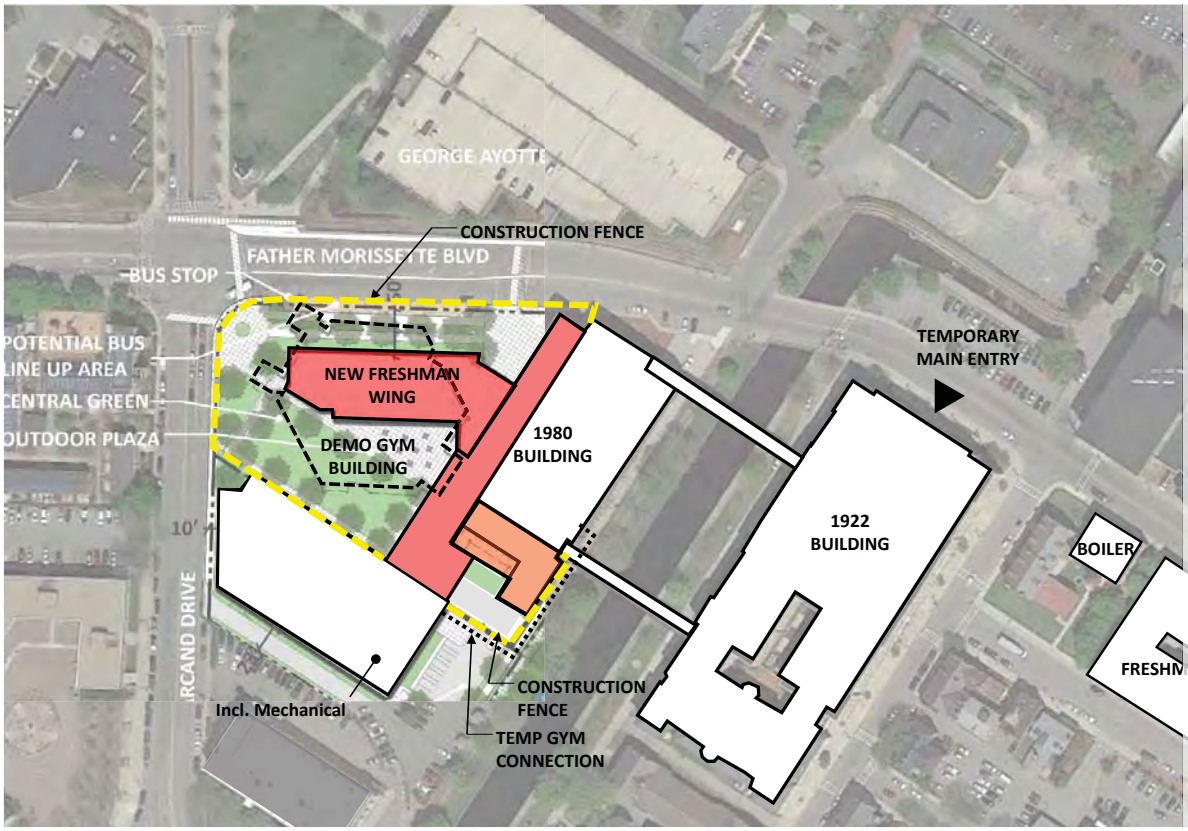


ADD/RENO 3A EXPANDED SITE

PHASE-1 Jul-Aug (2yrs 2mo)

- **DEMO 75 ARCAND IN SUMMER**
- **BUILD NEW GYM BLDG OFF-SITE**

Note: Phasing is for conceptual purposes only based on preliminary information. Actual determinations will be the responsibility of the Construction Manager

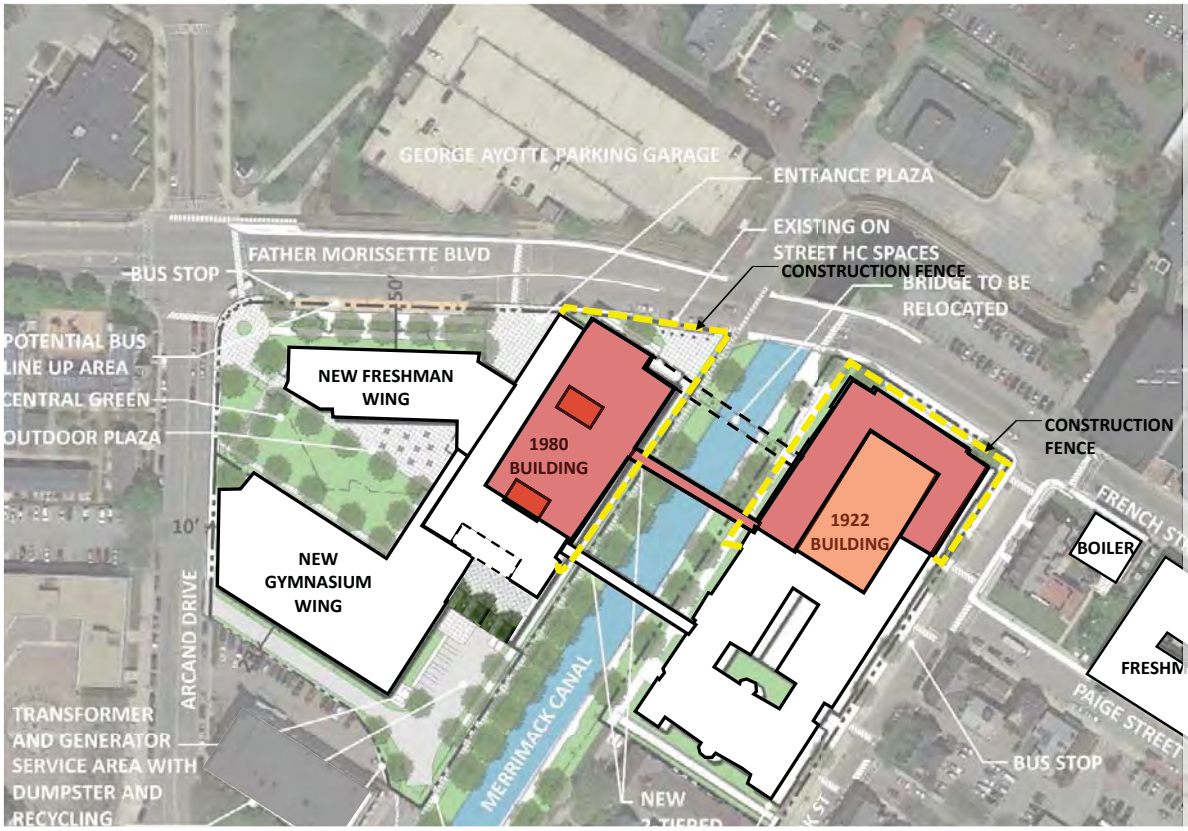


ADD/RENO 3A EXPANDED SITE

PHASE-1 Jul-Aug (2yrs 2mo)
- DEMO 75 ARCAND IN SUMMER
- BUILD NEW GYM BLDG OFF-SITE

PHASE-2 Jul-Dec 1yr 6mo (2mo overlap)
- DEMO FIELD HOUSE IN SUMMER
- VACATE INTERIOR CLASSRMS
- BUILD NEW FRESHMAN ACADEMY
- RENOVATE WEST SIDE OF LORD (SOUTH END RENO IN SUMMERS)

Note: Actual design pending study- Diagrams are adaptations from previous Feasibility Study for reference only to facilitate discussion about revised option scope.



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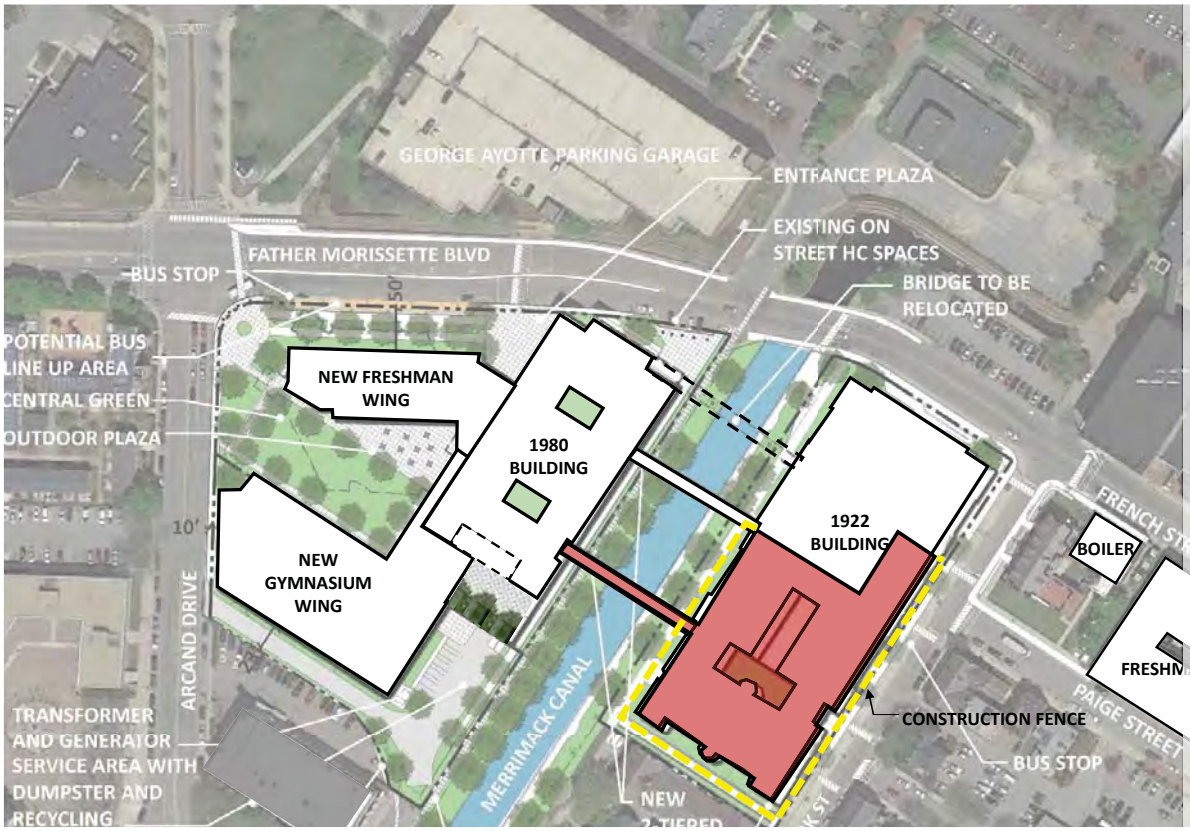
PHASE-1 Jul-Aug (2yrs 2mo)
- DEMO 75 ARCAND IN SUMMER
- BUILD NEW GYM BLDG OFF-SITE

PHASE-2 Jul-Dec 1yr 6mo (2mo overlap)
- DEMO FIELD HOUSE IN SUMMER
- VACATE INTERIOR CLASSRMS
- BUILD NEW FRESHMAN ACADEMY
- RENOVATE WEST SIDE OF LORD (SOUTH END RENO IN SUMMERS)

PHASE-3 Jul-Aug 1yr 2mo (2mo overlap)
- RENOVATE REMAINDER OF LORD
- RENOVATE NORTH END OF 1922 (AUDITORIUM IN SUMMERS)
- BUILD NEW NORTH BRIDGE

Note: Phasing is for conceptual purposes only based on preliminary information. Actual determinations will be the responsibility of the Construction Manager



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- DEMO 75 ARCAND IN SUMMER
- BUILD NEW GYM BLDG OFF-SITE

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- DEMO FIELD HOUSE IN SUMMER
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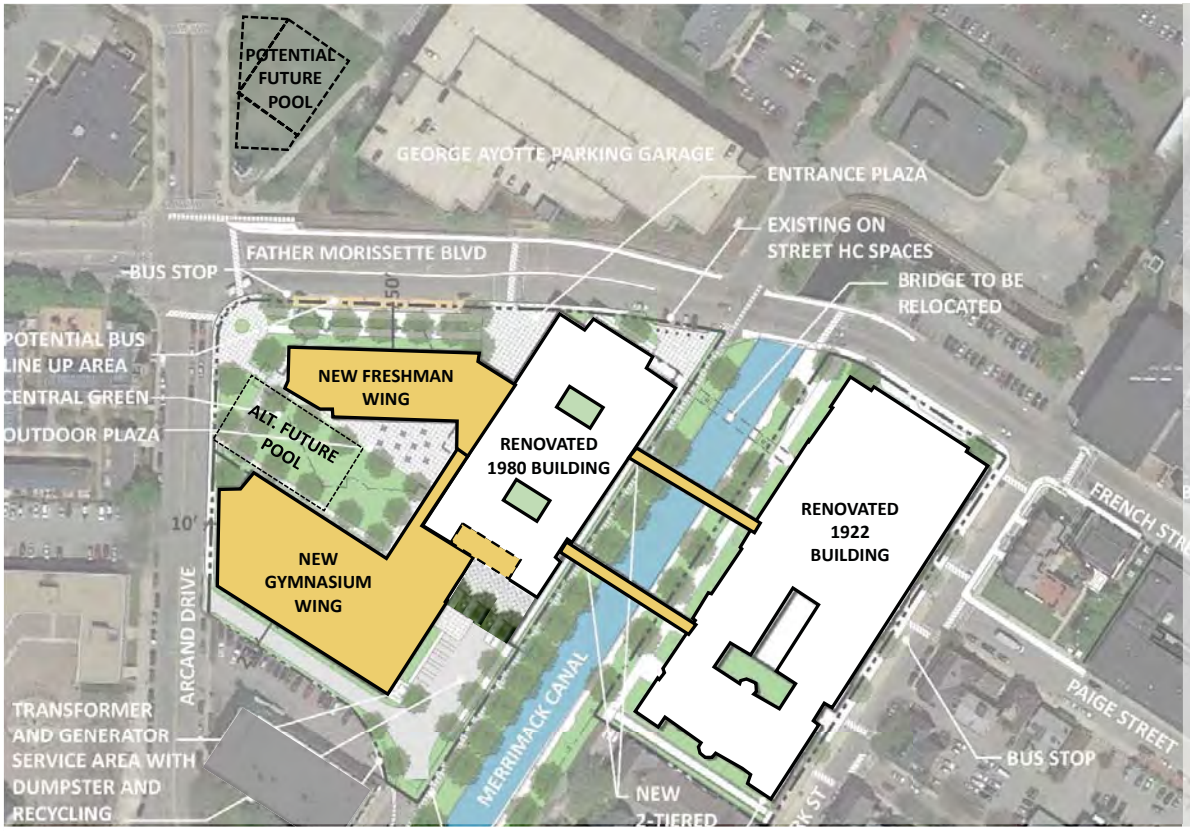
- BUILD NEW FRESHMAN ACADEMY
- RENOVATE WEST SIDE OF LORD (SOUTH END RENO IN SUMMERS)

PHASE-3 Jul-Aug 1yr 2mo (2mo overlap)
- RENOVATE REMAINDER OF LORD
- RENOVATE NORTH END OF 1922 (AUDITORIUM IN SUMMERS)
- BUILD NEW NORTH BRIDGE

PHASE-4 Jul-Aug 1yr 2mo (2mo overlap)
- RENOVATE REMAINDER OF 1922
- BUILD NEW SOUTH BRIDGE

Note: Phasing is for conceptual purposes only based on preliminary information. Actual determinations will be the responsibility of the Construction Manager



ADD/RENO 3A EXPANDED SITE

PHASE-1 Jul-Aug (2yrs 2mo)
- DEMO 75 ARCAND IN SUMMER
- BUILD NEW GYM BLDG OFF-SITE

PHASE-2 Jul-Dec 1yr 6mo (2mo overlap)
- DEMO FIELD HOUSE IN SUMMER
- VACATE INTERIOR CLASSRMS
- BUILD NEW FRESHMAN ACADEMY
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PHASE-3 Jul-Aug 1yr 2mo (2mo overlap)
- RENOVATE REMAINDER OF LORD
- RENOVATE NORTH END OF 1922 (AUDITORIUM IN SUMMERS)
- BUILD NEW NORTH BRIDGE

PHASE-4 Jul-Aug 1yr 2mo (2mo overlap)
- RENOVATE REMAINDER OF 1922
- BUILD NEW SOUTH BRIDGE

FINISHED FACILITY
Total Duration = 5 years (4 on site)

Note: Phasing is for conceptual purposes only based on preliminary information. Actual determinations will be the responsibility of the Construction Manager

Perkins Eastman

LOWELL HIGH SCHOOL

SIGN-IN SHEET

TOPIC: Planning

DATE: 15-Nov-18

	ATTENDEE	ORGANIZATION	TITLE	EMAIL ADDRESS
1	Joseph Drown	Perkins Eastman	Architect	j.drown@perkinseastman.com
2	Robert Bell	Perkins Eastman	Architect	r.bell@perkinseastman.com
3	Kara Keefe Mullin	City of Lowell	Assistant City Manager	KKeefeMullin@lowellma.gov
4	Jim Dowd	Skanska	OPM	jim.dowd@skanska.com
5	~~Mary Ann Williams~~	~~Skanska~~	~~OPM~~	~~maryann.williams@skanska.com~~
6	Diane Tradd	City of Lowell	Director	dtradd@lowellma.gov
7	~~Claire Ricker~~	~~City of Lowell,~~	~~Chief Design Planner~~	~~cricker@lowellma.gov~~
8	Eric Slagle	City of Lowell	Director, Dev. Svcs	eslagle@lowellma.gov
9	Christine McCall	City of Lowell	Senior Planner	cmccall@lowellma.gov
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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
WORKING GROUP
MEETING MINUTES

MEETING #1 AUGUST 14, 2018 2:00 PM LHS, HEAD OF SCHOOL CONFERENCE ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	LHS Working Group
FACILITATOR	Joe Drown, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Diane Tradd | City Present David Cunningham | SBC Present Jay Mason | SBC Mary Payne | LPS Present Marianne Busteed | LPS Present Christine Clancy | City Sarah Brown | City Present Roxanne Howe | LPS Present Richard Underwood | LPS Present Michelle Harvey | LPS Present Joe Drown | PE Bob Bell | PE Present Dawn Guarriello | PE Alicia Caritano, PE Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present

AGENDA TOPICS

1. INTRODUCTION: GOAL OF MEETING – MOVING FORWARD

DISCUSSION	Bob Bell started the discussion by explaining that as the Project design continues to develop to a Schematic level, the ELT working group (which previously was primarily focused on the Educational Plan) has evolved into a Working Group which includes members of the City Manager's Office, Planning and Development, Lowell Public Schools and School Building Committee. The Ed Plan is the "Basis of Design" and has been the driver for informing the design. Location of program spaces will be finalized over the next few weeks and the team will progress to uncover all items that need to have a cost put to them. ELT group no longer exists as the Working Group has taken over going forward. Focus Group Meetings do not require Working Group to attend. Kara Keefe Mullin asked who determines the Focus Group attendees. Project Team replied Head Of School determines invitees with Focus on Curriculum and Department Heads, along with teachers and other end users.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. PLAN REVIEW –
SITE/BUILDING LAYOUT

DISCUSSION	PE presented the proposed campus layout of buildings, see attached presentation. Bob described the progression of the drawings and the layout of the proposed new construction and renovated buildings. Described how proposed phasing sequence avoids temporary modular classrooms by Phase 1 construction of the new gymnasium, Phase 2 demo'ing the existing FH and construction of a new Freshman Academy (FA) wing, Phase 3 renovation of 1980's Building, Phases 4 and 5 renovation of 1922/Coburn Buildings. The new FA wing will be used as swing space as construction progresses through 1980's, 1922 and Coburn Buildings. Diane Triad inquired as to site layout and why decisions were made to the layout as proposed. Bob Bell explained how the 1st objective was to get the FA onto campus which resulted in the new 5 story wing with 60 classrooms. Moving and sequencing of phases was discussed. It was noted that decisions from the Working Group will influence the phasing as will input from the Construction Manager when they are hired. Process involves 2 years of design 2019-2021 and 5 years of construction 2021-2026. 1980's building will be a complete gut/reno on interior and possibly gut of exterior façade. Light wells will be included in 1980's to remedy center classrooms/labs lacking daylight. Location of FA wing is based on proper solar orientation. Plan is for South bridge to remain with North bridge being relocated further South. Possibility of footbridge over canal at ground level was discussed, however it will require an additional permitting/rights process. Main entry is being reworked to be more prominent. Goal of landscaping is to connect high school to the fabric of the City. New delivery area between gym wing and 1980's will be developed for easier deliveries. Discussed potential for green energy lab and green roof scape. Described potential for plazas at entry and canal side.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. PLAN REVIEW –
FLOOR PLANS

DISSCUSSION	PE reviewed current status of floor plans focusing on latest revisions/updates, see attached. Bob described how the floor plans meet the Ed Plan. Floor plans were reviewed detailing the classroom groupings in clusters. Plans are driven by the Ed Plan and Educational vision. Classroom cluster layout pattern is repeated throughout the entire school, with all classrooms being flexible and interchangeable. PE is looking to create a heart of the school while maintaining security controls. Access can be controlled to maintain safety and security. Freshman Academy is on Floors 2-5 of FA wing. Bob explained how placing other required labs and administration on 1st floor of FA wing eliminated need for an additional new wing. Bob explained proposed entrances as requested by Diane Triad. Bob discussed how 1st Floor kitchen is slightly removed from Grades 10-12 cafeteria on First Floor and that Freshman cafeteria is on 2nd Floor. New boiler room and kitchen are included in Phase 1 construction in order to accommodate phasing logistical requirements. Bob suggested touring other recently completed high schools to see how concepts employed in LHS design have worked in other schools. Locating ROTC and Gymnasium in adjacent spaces as requested is proving to be difficult as space is not available to accommodate the request. Culinary/restaurant has been moved closer to canal. TV Studio, Art and music are in 1922 basement and can take advantage of high ceilings. Kalwal ceilings in center of 1922 basement at lightwells will provide opportunity for art classrooms. Little Theatre and existing Auditorium will remain. Auditorium in existing FA will not be replicated due to state design guidelines. Marianne Busteed is concerned about space for large gatherings during day given loss of FA auditorium. Group discussed options in utilizing temporary partitions in existing auditorium, using cafeteria or media center for gatherings, as well as relocating dance temporarily from current/future auditorium stage class location. School Store/Catie's Closet have been moved off of main lobby and located together, however they can be separated if required. Group discussed that locating Catie's Closet in a more private location separate from store may be preferable. Group requested that PE explore possibility of a Freshman Only entrance.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. PROJECT WEB SITE

DISCUSSION	Kara Keefe Mullin requested that the web site be updated to include straightforward timeline of phasing. Also, requested that using html's versus PDF's. Jim Dowd will work with Heather Varney and web host company to update. Team discussed how all web site postings will be qualified as proposed as the design and phasing are a fluid process that are continually evolving.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. NEXT STEPS

DISCUSSION	Bob explained that next presentation will focus more on facades of buildings. Marianne Busteed requested that Bob/PE present project status to teachers on 8/27 at 8am, which Bob will do. Diane Triad requested next meeting (8/30) presentation be provided a couple days in advance in order to review.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEW BUSINESS

7.

DISCUSSION	
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEXT MEETING: Tuesday 8/30 at 2:00 pm at LHS Head of School Conference Room.

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

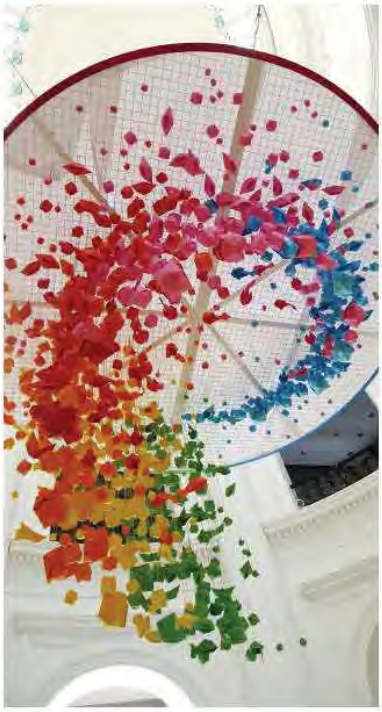
LOWELL HIGH SCHOOL

LOWELL HIGH SCHOOL : OPPORTUNITIES

GREEN ROOF/ROOFTOP AGRICULTURE

LOWELL HIGH SCHOOL : OPPORTUNITIES

ATRIUMS



LOWELL HIGH SCHOOL : OPPORTUNITIES

CAMPUS GREEN

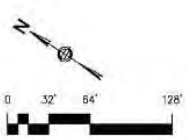
LOWELL HIGH SCHOOL : OPPORTUNITIES

PLAZA OVERLOOKING THE CANAL

LOWELL HIGH SCHOOL

BASEMENT PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

BASEMENT PLAN

- 🟥 ADMIN/TEACHER AREAS
- 🟦 GENERAL CLASSROOMS
- 🟪 SPECIAL EDUCATION
- 🟩 SCIENCE
- 🟨 GYM/CAF/LIBRARY/OTHER

LOWELL HIGH SCHOOL

LEVEL-1 PLANS

- 🟥 ADMIN/TEACHER AREAS
- 🟦 GENERAL CLASSROOMS
- 🟪 SPECIAL EDUCATION
- 🟩 SCIENCE
- 🟨 GYM/CAF/LIBRARY/OTHER

LOWELL HIGH SCHOOL

LEVEL-1 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

LOWELL HIGH SCHOOL

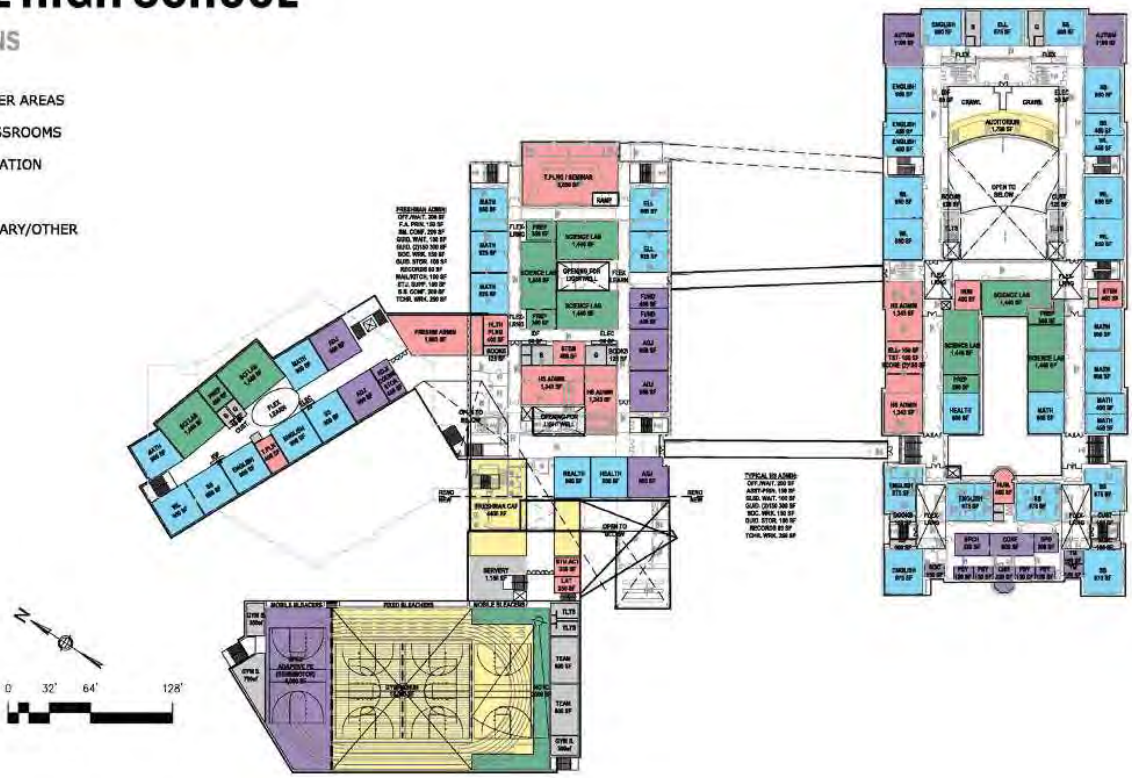
LEVEL-1 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

LOWELL HIGH SCHOOL

LEVEL-2 PLANS

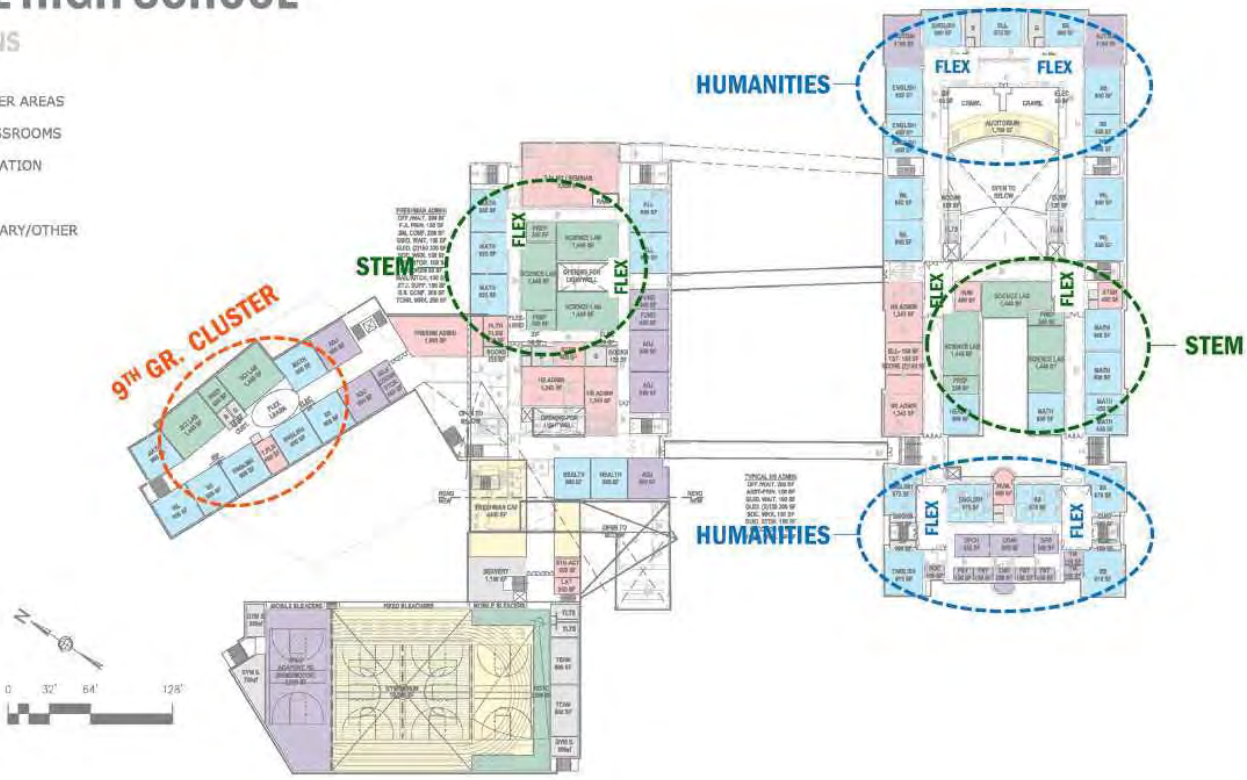
- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
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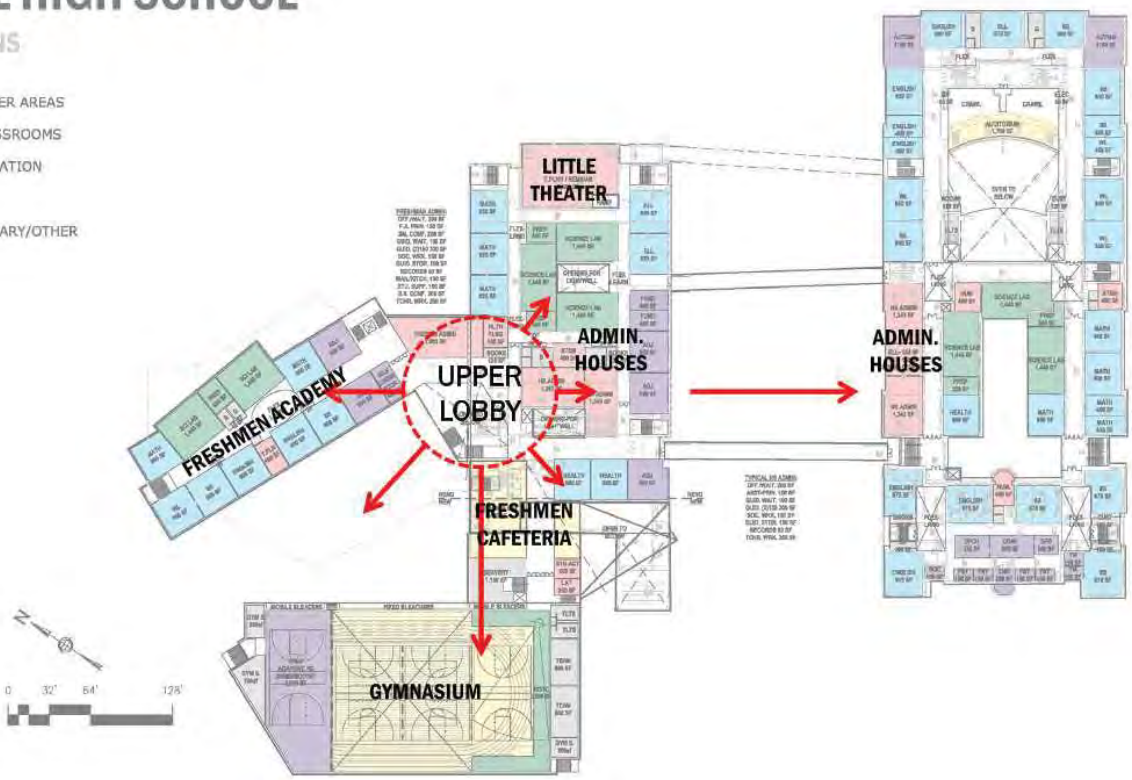
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH

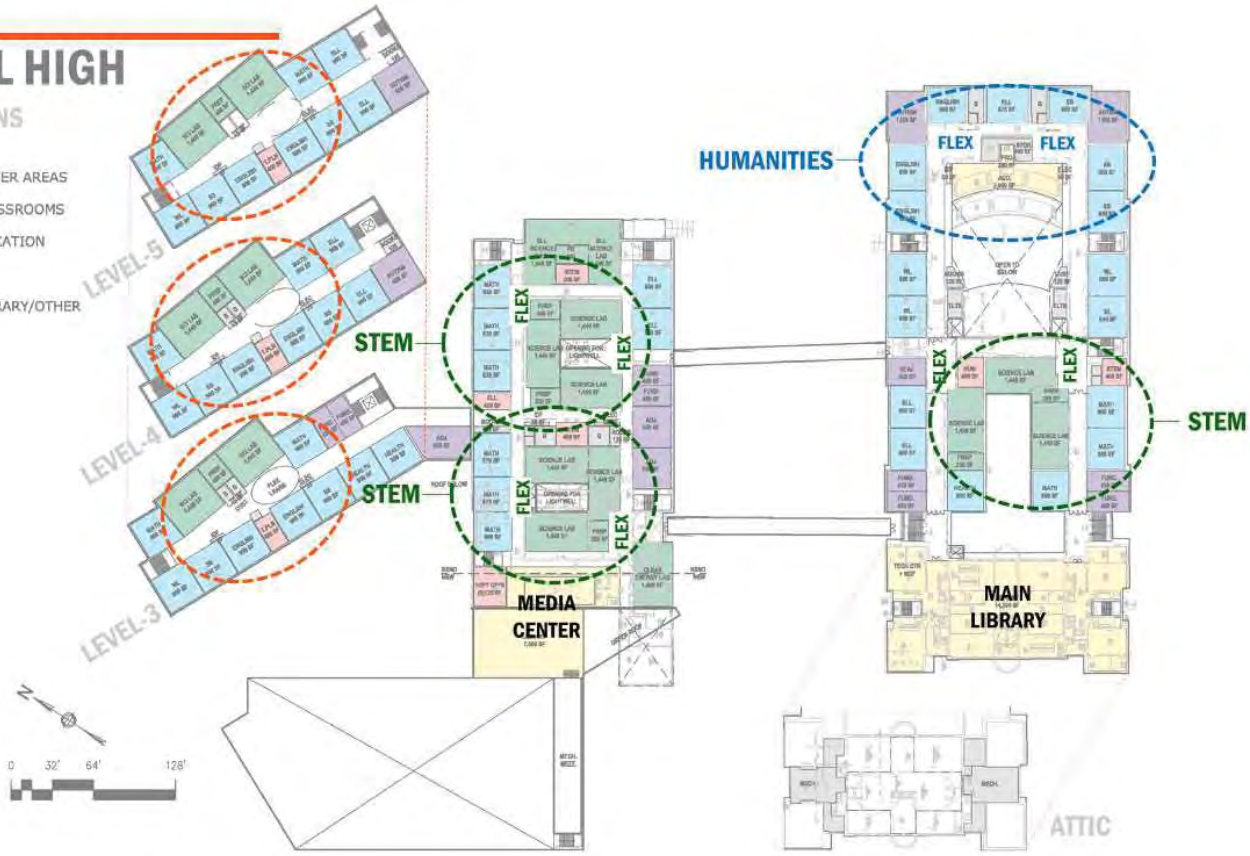
LEVEL-3 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

LOWELL HIGH

LEVEL-3 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



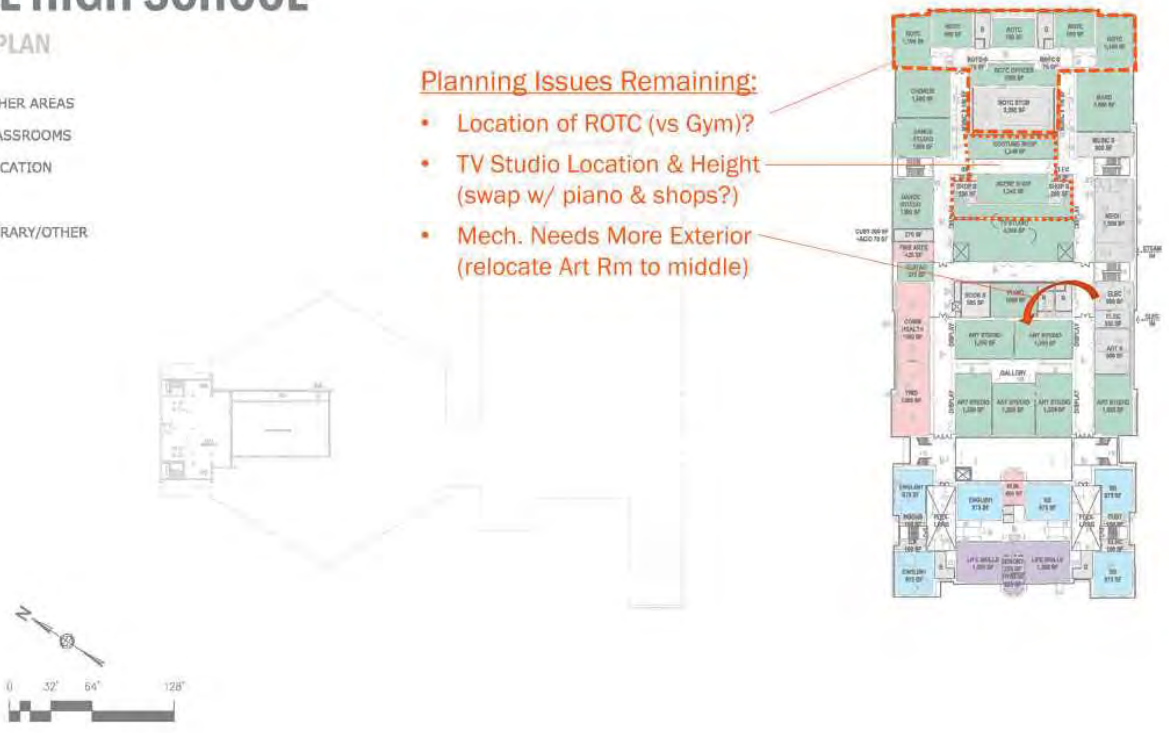
LOWELL HIGH SCHOOL

BASEMENT PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

Planning Issues Remaining:

- Location of ROTC (vs Gym)?
- TV Studio Location & Height (swap w/ piano & shops?)
- Mech. Needs More Exterior (relocate Art Rm to middle)



LOWELL HIGH SCHOOL

LEVEL-1 PLANS

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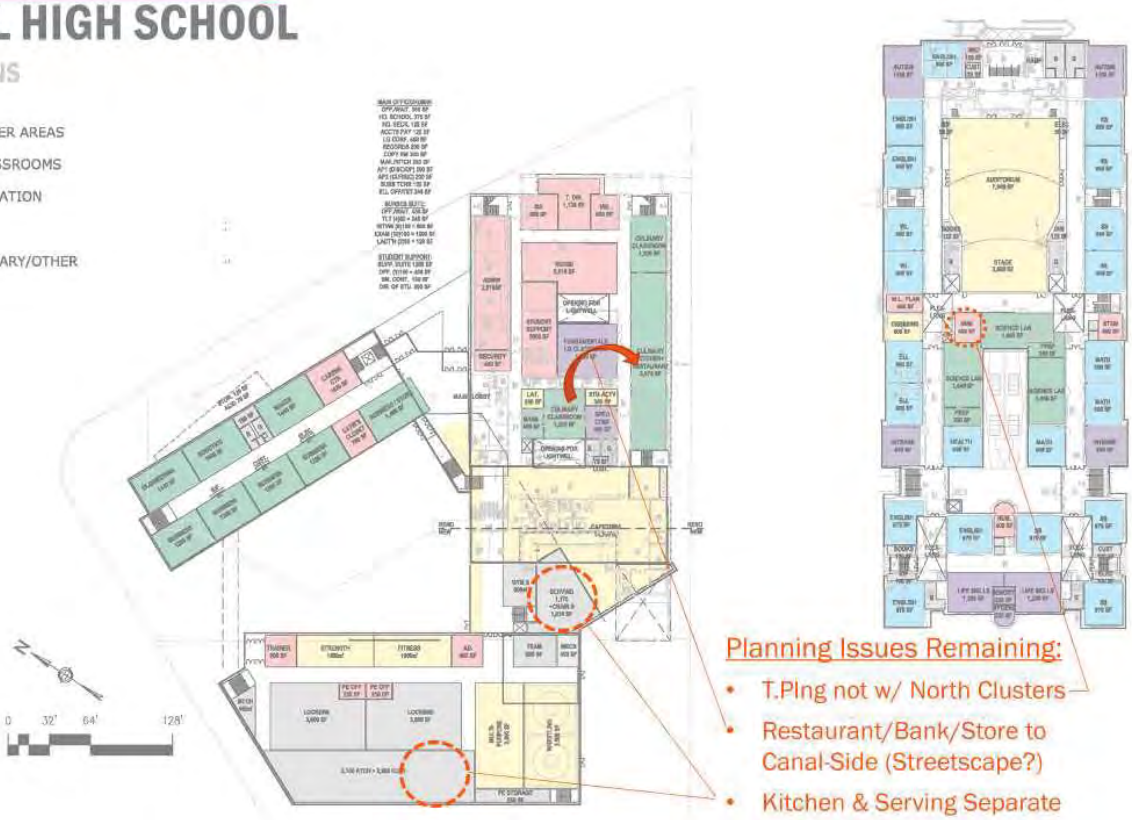

Planning Issues Remaining:

- T.Plng not w/ North Clusters
- Restaurant/Bank/Store to Canal-Side (Streetscape?)
- Kitchen & Serving Separate

LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

Planning Issues Remaining:

- Need to Split SPED Cluster

LOWELL HIGH

LEVEL-3 PLANS

LOWELL HIGH SCHOOL

NEXT STEPS

- 8/14: ELT Meeting / Plan Updates
- 8/30 ELT/Working Group (Massing & Exteriors)
- 9/6: SBC Meeting (Massing & Exterior Updates)
- 9/11: ELT/Working Group (Sustainability Priorities)
- 9/18+20 Faculty Focus Groups
- 9/25 ELT/Working Group (Building Systems & Interiors)
- 10/3 Student Focus Group
- 10/4 SBC Meeting (Building Systems & Interiors)
- 10/11 ELT/Working Group (Sustainable Energy Options)
- 10/16+18 Faculty Focus Groups
- 10/23 ELT/Working Group (Sustainability & Security)

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT WORKING GROUP MEETING MINUTES

MEETING #2 | AUGUST 30, 2018 | 2:00 PM CITY HALL, MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	LHS Working Group
FACILITATOR	Dawn Guarriello, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Heather Varney | City Present Diane Tradd | City Present David Cunningham | SBC Jay Mason | SBC Mary Payne | LPS Marianne Busteed | LPS Christine Clancy | City Present Sarah Brown | City Present Roxanne Howe | LPS Present Richard Underwood | LPS Present Joe Drown | PE Present Bob Bell | PE Present Dawn Guarriello | PE Present Alicia Caritano, PE Present Mary Ann Williams | Skanska Jim Dowd | Skanska Present

AGENDA TOPICS

1. EXTERIOR MATERIALS/MASSING – FRESHMAN ACADEMY

DISCUSSION	Dawn Guarriello (DG) opened meeting by explaining that the intent of meeting is to discuss massing and materials for the exterior of the school. She stated that the presentation is entirely conceptual and intended to get input from the Working Group. The massing was presented in black and white as there are no preconceived notions for the exterior and materials, just looking for input, see attached 3D sketchup presentation. DG presented photos of other existing buildings in Downtown to show how PE looks at surrounding architecture for influence and to fit into the area. DG stated lots of the buildings are stone and brick with punched windows. DG next presented photos of newer buildings in the surrounding area and how they were influenced by the older architecture in the Downtown area. Many of the examples were from UMass Lowell recent construction projects. DG presented 3D view of Freshman Academy (FA) Building from street view perspective at intersection of Arcand Drive and Fr. Morrissette Blvd., explaining that 1st floor exterior will be different from above floors because of labs on 1st floor and need for more durable materials at street level. Discussed potential façade materials for the FA.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. EXTERIOR MATERIALS/MASSING – GYMNASIUM

DISCUSSION	DG presented Gymnasium precedents, see attached, and explained potential building structural systems, such as a pre-engineered building, verses traditional steel framing. DG stated that a preengineered system is pursued, that one of the façade options could be metal on the upper floors, and the base would be a more durable materials such as masonry or stone for durability. It was explained/noted on the 3D rendering that the West end of building at Arcand Drive has a lower roof because the interior spaces at that location do not need the high gym roof. The Design team is still pursuing structural systems and façade materials for the gym.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. EXTERIOR MATERIALS/MASSING – 1980 MAIN EXTRANCE – CAFETERIA ADDITION

DISCUSSION	DG presented an aerial view of the entire campus from the Fr. Morrissette/Arcand Drive intersection, see attached. DG explained that the connection from the 1980 building to the new gym is shown in all glass. Diane Tradd (DT) asked for further description about the connection of the 1980 building to the new gym. DG explained that the cafeteria addition will abut the gym with an expansion joint, that the first floor will be kitchen space with a hallway and the second floor will essentially be a wide bridge to the gym. Bob Bell (BB) explained that PE is using the cafeteria addition to draw the gym into the rest of the building for those standing in the main lobby. DG presented the Main Entry on Fr. Morrissette Blvd. and showed entry from green space on Arcand Drive. DT inquired about student pickup/drop off at the gymnasium on Arcand and explain that the City Traffic Engineer will be reviewing the plans. Christine Clancy (CC) asked about the main entry seat wall on the left side. DG responded that the area is a work in progress with the landscape architect for the seating areas in the entrance plaza. BB inquired about method of snow removal in plaza. Rick Underwood (RU) responded that snow is removed with a bobcat. RU inquired if skate guards will be installed on seat walls. DG replied yes on skate guards. Joe Drown (JD) explained that the courtyard design will go through several iterations and input from City. RU asked if there will be vehicle access barriers in the plaza. BB explained that barriers will be purposely in place but will be hidden in other functions such as stairs and seating. DT suggested that public art may also be used as physical barriers. BB asked if the entrance has ice problems given that it is North facing. RU explained that there haven't been any unusual ice issues.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. EXTERIOR MATERIALS/MASSING – WEST FAÇADE WINDOWS

DISCUSSION	DT inquired as to why there are no windows on the Arcand Drive side of the FA and the Gym. DG explained that fewer windows are placed on West facade to avoid afternoon sun issues and that the programming of the rooms in the FA and gym lead to windowless walls on the west side of the spaces.

	DT stated that providing the students in the FA with a windows on the West to view UML may be a good option. DG explained that afternoon light would need to be controlled for West windows. RU asked if glass is more expensive than regular wall. BB explained that yes glass is more expensive and that PE aims to limit glass to +/-25% of the façade, utilizing glass only where it is highly effective in bringing light into the building. BB suggested that possibly windows could be provided at street level of the FA and gym along Arcand Drive. DG input that utilizing glass on the NW corner of the FA may address concerns about lack of glass on west façade. DT inquired if the flat roof area can be utilized at the West end of the gym building. BB explained that the area is not easily accessible and would require an additional stair and elevator. RU stated that the primary view of the high school for people is the West end at Fr. Morrissette Blvd. and along Arcand Drive. DG stated that PE will conduct a study to update the West end windows. DG explained what "punch windows" are to the group (single or groups of window openings in a wall surrounded by a façade materials, verses a larger field of glass such as curtainwall or ribbon windows).
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. EXTERIOR MATERIALS/MASSING – FAÇADE MATERIALS

DISCUSSION	DG presented durable façade base materials, see attached presentation, as well as providing physical samples for review by group. Other panel materials more suitable to upper areas were also presented. DG stated that they don't want to mimic the 1922 building, however they need to connect the new buildings to the 1980 building and 1922 with facade materials and colors. The FA and gym will be modern but the materials need to be compatible with existing buildings. DG stated one way of tying in materials to existing building is utilizing them in a freestanding main entrance sign. This can also be a method for employing more expensive materials in limited cost effective manner. BB explained how PE used local stone in a modest amount at the base of their Mt. Greylock school project. BB stated that more costly materials can be used sparingly but in a manner that provide impact. RU inquired about the construction of the Lowell courthouse façade. DG explained rain screen facades to the group. DT stated we should start with defining what exterior material is wanted and then work back into the interior of the walls in the design. Alicia Caritano (AC) explained how the building wall system has a great impact on the energy efficiency of the building and the sizing of the HVAC system. She, also stated that the use of glass needs to be strategic, and the overall cost of envelope and systems must be looked at with respect to budget. JD explained that glass studies will be conducted as design progresses and reiterated that use of glass needs to be strategic. DT stated that the use of glass needs to be designed around how light impacts students in classroom. DG agreed that classrooms are designed around how light enters the room and the impact on the students in the classrooms. DG stated a critical aspect of the overall classroom design is how the windows function regarding light entering the classroom. BB explained how the 1980's building is 18' floor to deck and that the FA is currently designed to line up with the 1980's building floor levels.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

6. EXTERIOR MATERIALS/MASSING – WALL SECTIONS

DISCUSSION	BB discussed the construction of modern walls regarding cladding, vapor barriers, sheathing studs and insulation and relation to efficiency as well as the energy code. BB stated that brick walls with CMU backup are no longer how buildings are constructed. DT explained how a major aspect of the design process involves the wall section and specialist consultants provide input. AC explained how the walls impact the design of the HVAC system. Sarah Brown inquired how modern walls age, given problem with the 1980's building walls. JD explained the issues with the 1980's wall construction. DT explained how PE looks at how materials have performed on past buildings. AC explained how a lot of modern materials while new to the US have been used for a long time in Europe. RU asked what is meant by

	used for a longer time. BB replied they have been used for over 50 years. BB stated that PE will provide lifespan data on materials discussed for selection. DT requested additional photos be provided of recent school projects. JD explained how the design for the 1980's building exterior walls are no longer utilized. Christine Clancy asked about ice damming. JD explained how ICE dams are typical caused by heat escaping the building and that with newer wall systems that is typically not a problem. DG explained the two stories of glass in the new cafeteria area on the canal side.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

7. EXTERIOR
MATERIALS/MASSING –
SITE PLAN

DISCUSSION	DT inquired about the plazas. DG showed the overall site plan, see attached, and discussed the plaza at the canal as well as the plaza between the FA & Gym. BB explained the terrace at the clean energy lab as well as the restaurant being relocated to the canal side. BB explained how the loading dock is evolving and has moved to the South side of the gym, not south end of the 1980 building. BB asked if a physical loading dock is required or just a delivery area. RU responded that a dock makes things easier. DT inquired if composting area is required. DG responded that it is not required but many districts have them. Roxanne Howe stated that the school does not pursue composting because of potential rodent issues. Roxanne also state that the theme is a school campus idea. She stated that even if new buildings are modern the entire school needs to be connected with a theme. BB stated the PE is designing the project as a unified campus while still respecting the character of each side of the canals.. BB inquired if there are any graffiti issues at West side of 1922. RU stated there are not.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

8. EXTERIOR
MATERIALS/MASSING –
NEXT STEPS

DISCUSSION	DT stated that next week (SBC meeting) PE can show a Study on windows on the West facades of FA and gym along with more information on light in classrooms. PE will show several different scenario sketches of different materials on 3D images of the building. DT stated the Historic board typically does not want a repeat of other historic buildings. DG stated that PE wants to design what the City wants and for the building to be durable. BB reiterated that PE is not locked into any material. RU suggested that Steve Stowell be involved. DG stated that they have already met with Steve and will meet with him again. Kara Keefe Mullin requested that all questions for the Project Team be routed through the City Manager's Office.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEXT MEETING: Tuesday 9/11 at 2:00 pm at LHS Head of School Conference Room.

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

WORKING GROUP MEETING- MASSING & EXTERIOR MATERIALS

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

AERIAL VIEW OF CAMPUS

LOWELL HIGH SCHOOL

DOWNTOWN LOWELL ARCHITECTURE

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY PRECEDENTS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

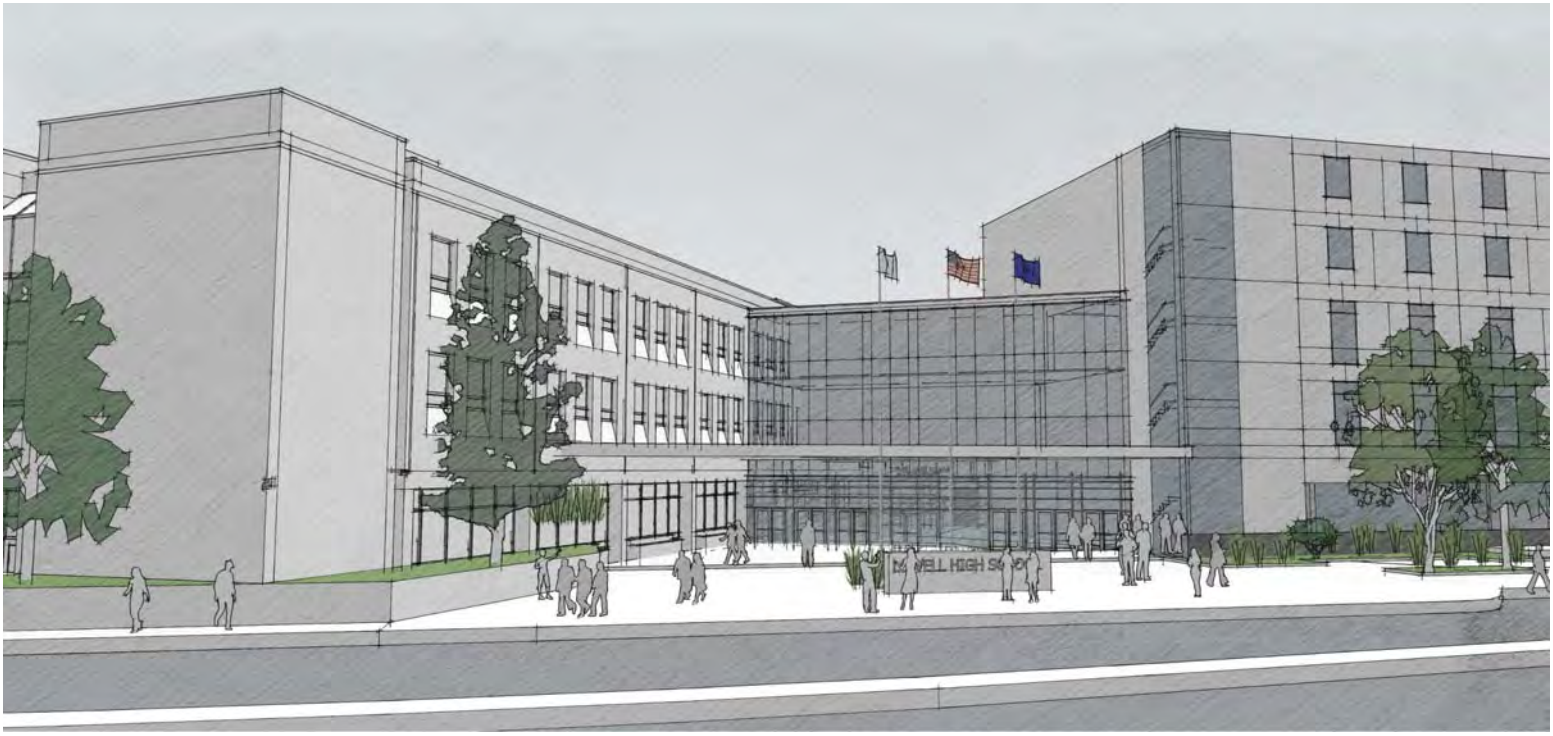
GYMNASIUM PRECEDENTS

LOWELL HIGH SCHOOL

VIEW OF OPEN GREEN SPACE AND GYMNASIUM BUILDING

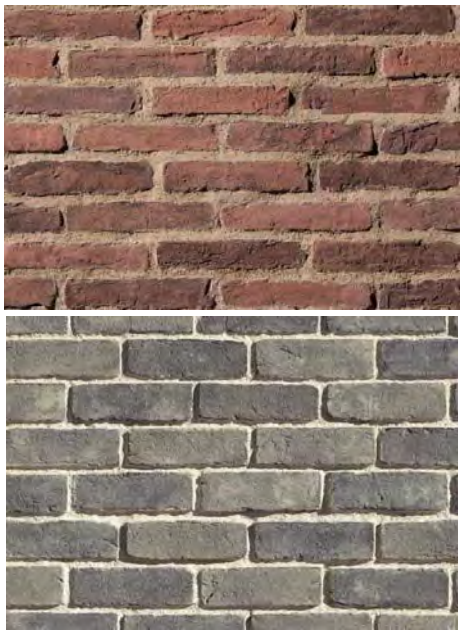
LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

DURABLE BASE MATERIALS



BRICK VENEER

STONE VENEER

LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

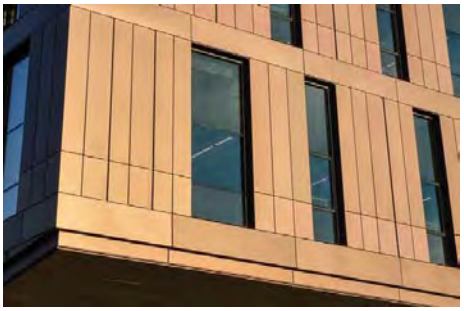
FACADE MATERIALS

PHENOLIC PANEL RAINSCREEN- SOLID

BRICK

HIGH DENSITY FIBER CEMENT PANEL

PHENOLIC PANEL RAINSCREEN- WOOD



INSULATED METAL PANEL

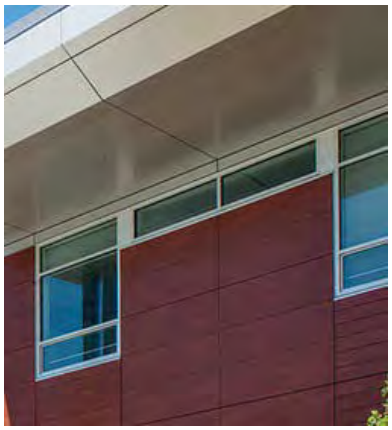
CORREGATED METAL

LOWELL HIGH SCHOOL

GLASS & GLAZING





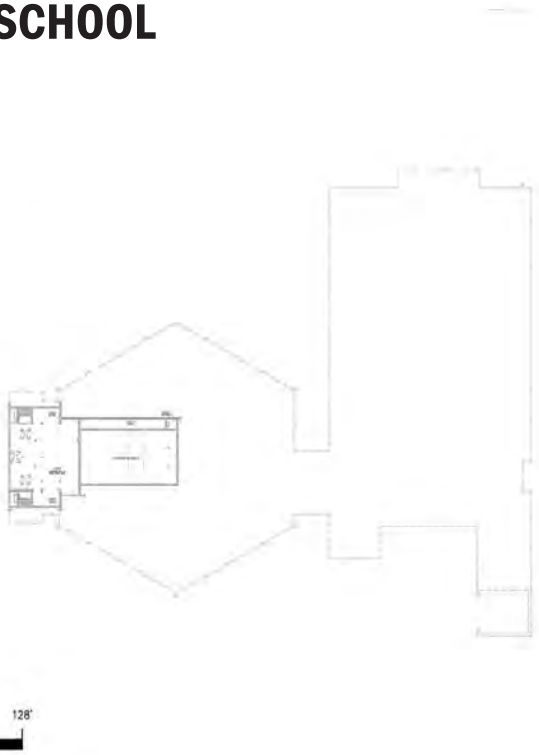

LOWELL HIGH SCHOOL

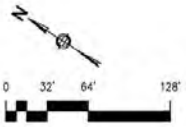
SITE PLAN

LOWELL HIGH SCHOOL

BASEMENT PLAN

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

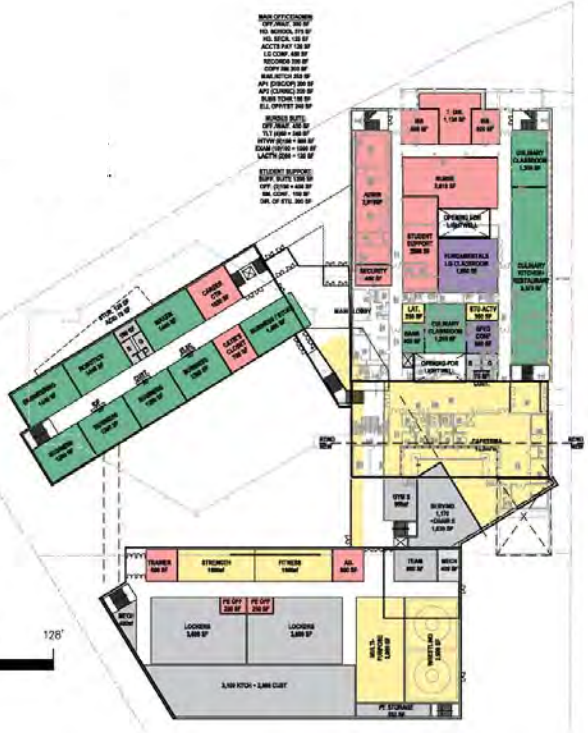


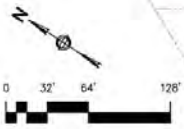


LOWELL HIGH SCHOOL

LEVEL-1 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

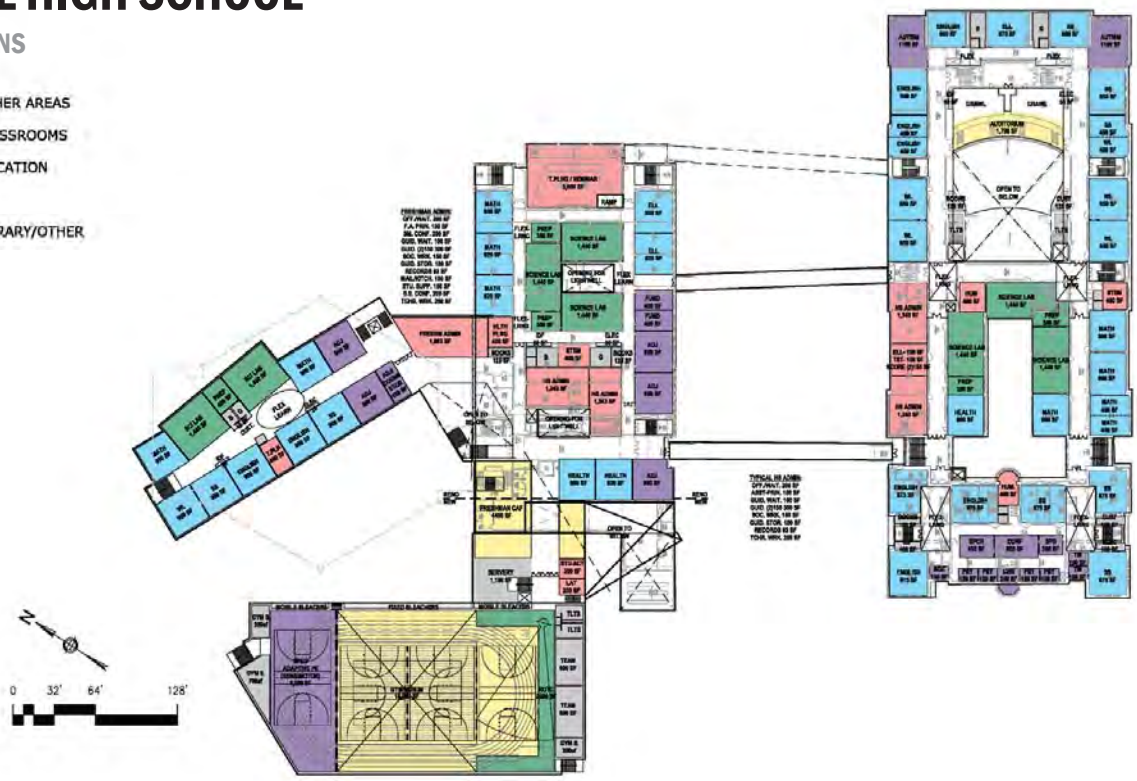




LOWELL HIGH SCHOOL

LEVEL-2 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER



LOWELL HIGH

LEVEL-3 PLANS

- ADMIN/TEACHER AREAS
- GENERAL CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE
- GYM/CAF/LIBRARY/OTHER

SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT WORKING GROUP MEETING MINUTES

MEETING #3 | SEPTEMBER 11, 2018 | 2:00 PM LHS, HEAD OF SCHOOL CONFERENCE ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	LHS Working Group
FACILITATOR	Bob Bell, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Heather Varney | City Diane Tradd | City Present David Cunningham | SBC Jay Mason | SBC Present Mary Payne | LPS Marianne Busteed | LPS Present Robin Desmond | LPS Present Christine Clancy | City Present Sarah Brown | City Present Roxanne Howe | LPS Present Richard Underwood | LPS Present Joe Drown | PE Bob Bell | PE Present Dan Aarons | PE Present Dawn Guarriello | PE Alicia Caritano, PE Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Carlos DeSousa | GGD Present Colleen Soden | Soden Present Frank Stramaglia | VAV Present Dominick Puniello | GGD Present Ashley Iannuccili | Traverse Present John Sousa | Crabtree McGrath Present

AGENDA TOPICS

1. SUSTAINABLE DESIGN - INTRODUCTION

DISCUSSION	Dan Aarons (DA) provided meeting introduction establishing the goals of the meeting to focus on discussion more than presentation in order to find out what the Working Group/City are thinking about regarding sustainability for the new school. Looking to establish a consensus around sustainability. DA stated we will be looking at how much performance we can get out of the buildings. Part of sustainability process is to set targets and to prioritize Sustainable items the City is focused on. Bob Bell (BB) added that the school will be LEED certified minimum because it is required by the MSBA. Question is where the City wants to focus sustainability and if we go further than the base requirements. Alicia Caritano (AC) provided an overview of the project status to date with the MSBA process relative to Sustainability, see attached timeline in presentation. AC noted that the RFQ required that the project exceed the Energy Code by 10% and meet LEED S v 4 or NECHPS. AC stated that we need to establish priorities and metrics in our current Module 4 Schematic Design.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. SUSTAINABLE DESIGN - STANDARDS

DISCUSSION	Colleen Soden (CS) from Soden Sustainability, the LEED consultant for the Project, explained the Sustainability Standards, see attached presentation. CS noted that Lowell is a green community requiring Stretch Code be met and described how the design team is working with "Sustainable Lowell 2025" program. CS explained the Sustainable Categories: - Location and Transportation - Sustainable Sites - Water Efficiency - Energy and Atmosphere - Materials and Resources - Indoor Environmental Quality CS also described how everyone can look at all 6 categories to merge education into them. Potential Goals have been identified, see presentation. Explained how Sustainability should not stop at the end of construction and that future operations & maintenance play a big role.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. SUSTAINABLE DESIGN - BRAINSTORMING

DISCUSSION	DA stated we don't want to lecture about sustainability we want to hear from the School and the City as to what is a Sustainable Lowell High School in your minds. DA noted that as professionals PE will design a sustainable building but we need to be told by the City and School how to prioritize the sustainable design for what the City wants. DA and BB moderated a Green Charrette in which Working Group input their ideas for sustainability in the six categories, see photos below of charrette. At the conclusion of presentation near end of meeting all were asked to prioritize items on charrette with color coded stickers, see charrette below.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. SUSTAINABLE DESIGN – ENERGY USE

DISCUSSION	DA reviewed EUI, energy use intensity, see attached. Showed energy use comparison of where LHS existing building are at and metrics for high performance schools . DA showed that existing building EUI is at 63 kBtu/sf-yr and first look puts New/Reno Opt. 3 at 42 kBtu/sf-yr. Examples were shown of high performance school that are in 20-30 kBtu/sf-yr range. Dan noted that the EUI is a blended number for the project, and that it is important to understand there are some limitations related to the existing buildings, vs. the new construction. It was noted that key factors in the energy usage are equipment installed and the plug loads.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

5. SUSTAINABLE DESIGN – OPTIMIZING ORIENTATION

DISCUSSION	DA discussed how the building orientation assists in energy savings. While 1980 and 1922 orientations are set, FA has been oriented to get the best orientation for the classrooms. Optimizing fenestration and the role of daylight were also reviewed, see attached presentation. BB discussed how façade typically averages +/- 25 % glass with North & South in 30's for % and East & West in teens for %. PE noted that most buildings are over glazed.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

6. SUSTAINABLE DESIGN – ENERGY SYSTEMS AND RENEWABLE ENERGY

DISCUSSION	DA discussed alternative energy system studies, see attached. Programs from DOER were discussed regarding wind, solar and geothermal. The LHS site and existing buildings would need to be studied to see if these are possible, and what can be achieved within the construction budget and what may need to occur after the MSBA project is complete. Engaging occupants in energy usage and occupants impact on energy usage was reviewed, see attached, and it was noted that the occupants' behavior is very important to sustainability. It was quoted that Buildings are not net zero, Occupants are net zero.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

7. SUSTAINABLE DESIGN – METRICS/TARGETS AND EXAMPLES

DISCUSSION	DA presented sample schools and their sustainability highlights , see attached. Items discussed were alternative transportation, use of daylighting, heat island effect. Use of sustainable materials such as polished concrete, light colored finishes and reclaimed wood was discussed by group. Rainwater re-use utilized in other schools was reviewed. Sustainable Lowell 2025 was discussed including use of murals.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

8. SUSTAINBLE DESIGN – NEXT STEPS

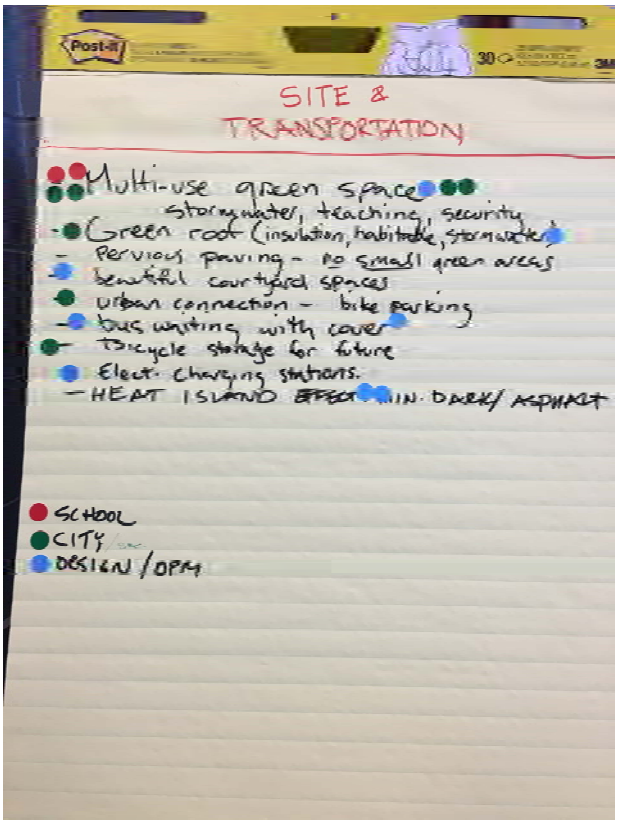
DISCUSSION	Design team will be thoroughly reviewing the charrette and utilizing today's discussion to implement sustainable priorities and metrics as well as establishing ECM's (Energy Conservation Measures). Next Working Group meeting is 9/25
CONCLUSIONS	

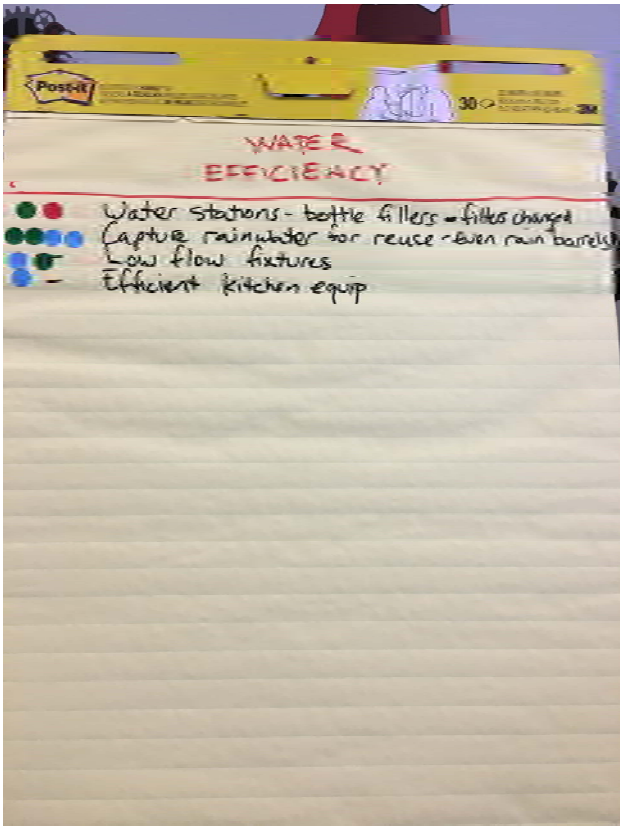
ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEXT MEETING: Tuesday 9/25 at 2:00 pm at LHS Head of School Conference Room.

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

Green Charrette





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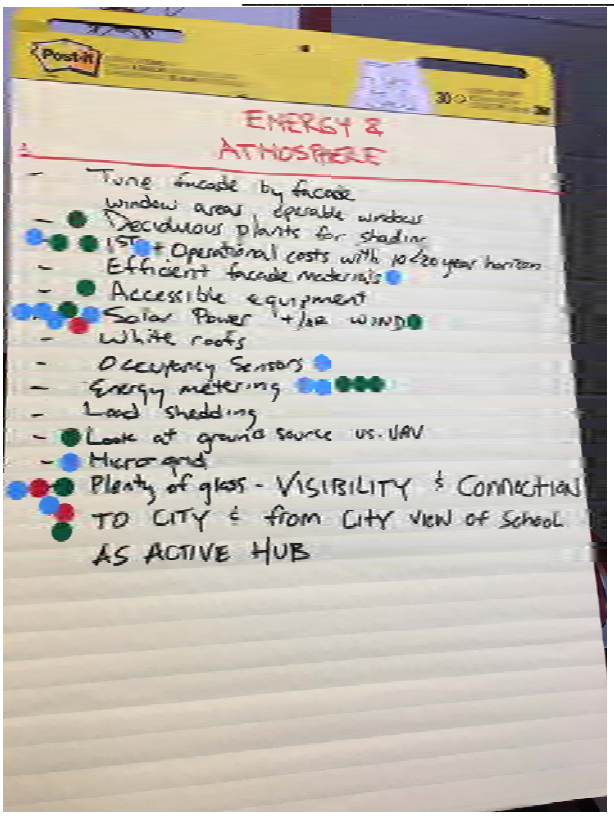
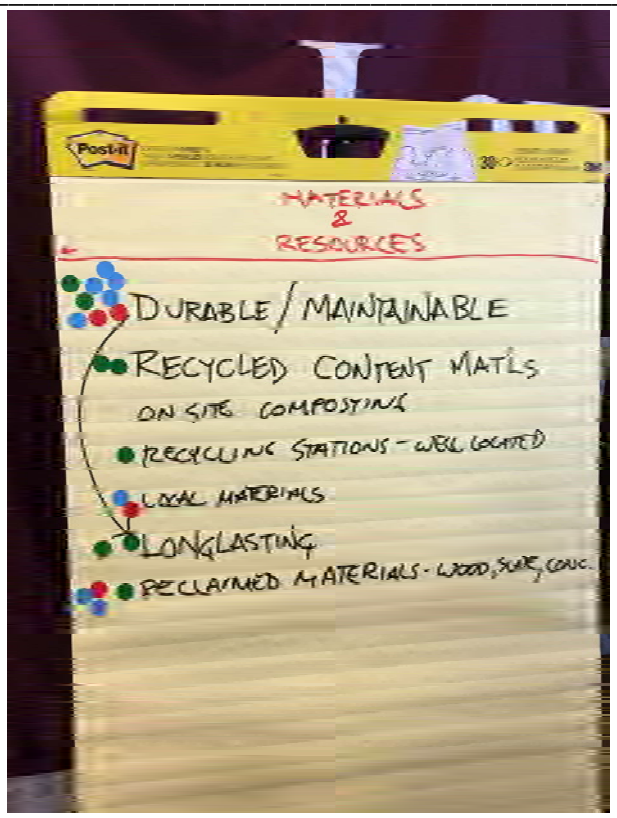
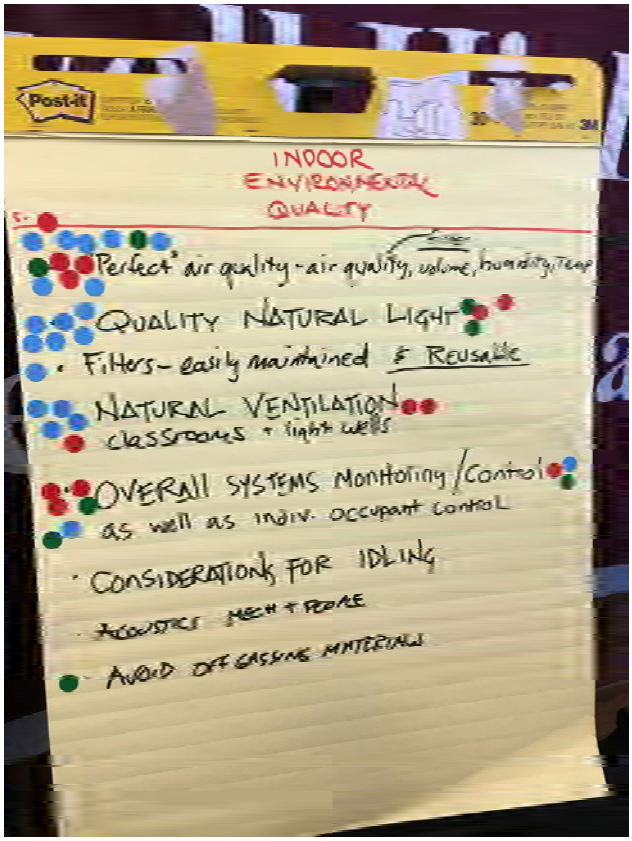
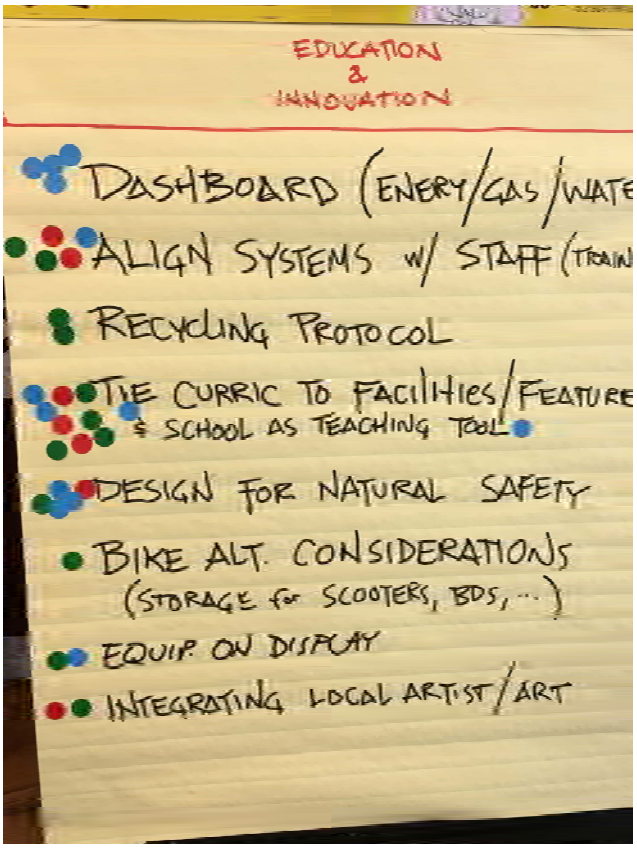




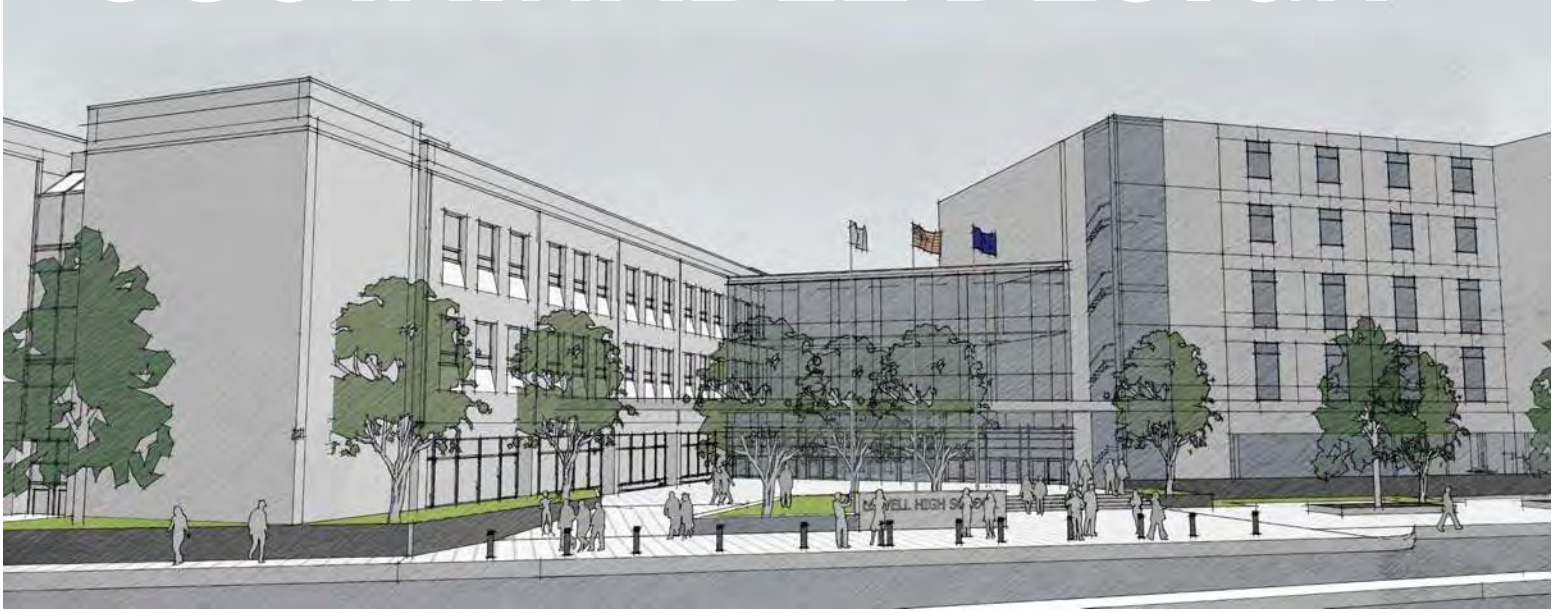




LOWELL HIGH SCHOOL – SEPTEMBER 11, 2018

PERKINS EASTMAN
Human by Design

SUSTAINABLE DESIGN



INTRODUCTIONS

City of Lowell: Kara Keefe Mullin, Diane Tradd, Christine Clancy, Sarah Brown

LHS: Mary Payne, Marianne Busteed ,Roxane Howe, Rick Underwood

School Committee Members: David Cunningham, Jay Mason

Perkins Eastman: Robert Bell, Alicia Caritano, Dan Arons

Soden Sustainability: Colleen Soden

Birchwood Design Group (Landscape): Ashley Iannuccilli

GGD (Electrical, Mechanical, Technology): Carlos DeSousa, Dominic Puniello

VAV International (Plumbing/Fire Protection): Frank Stramaglia

SUSTAINABLE DESIGN SUCCESS

15 Min
Introductions
Sustainable **Timeline**
Categories of sustainability (like LEED, but NOT LEED)
Standards - Lowell 2025, LEED for Schools v4

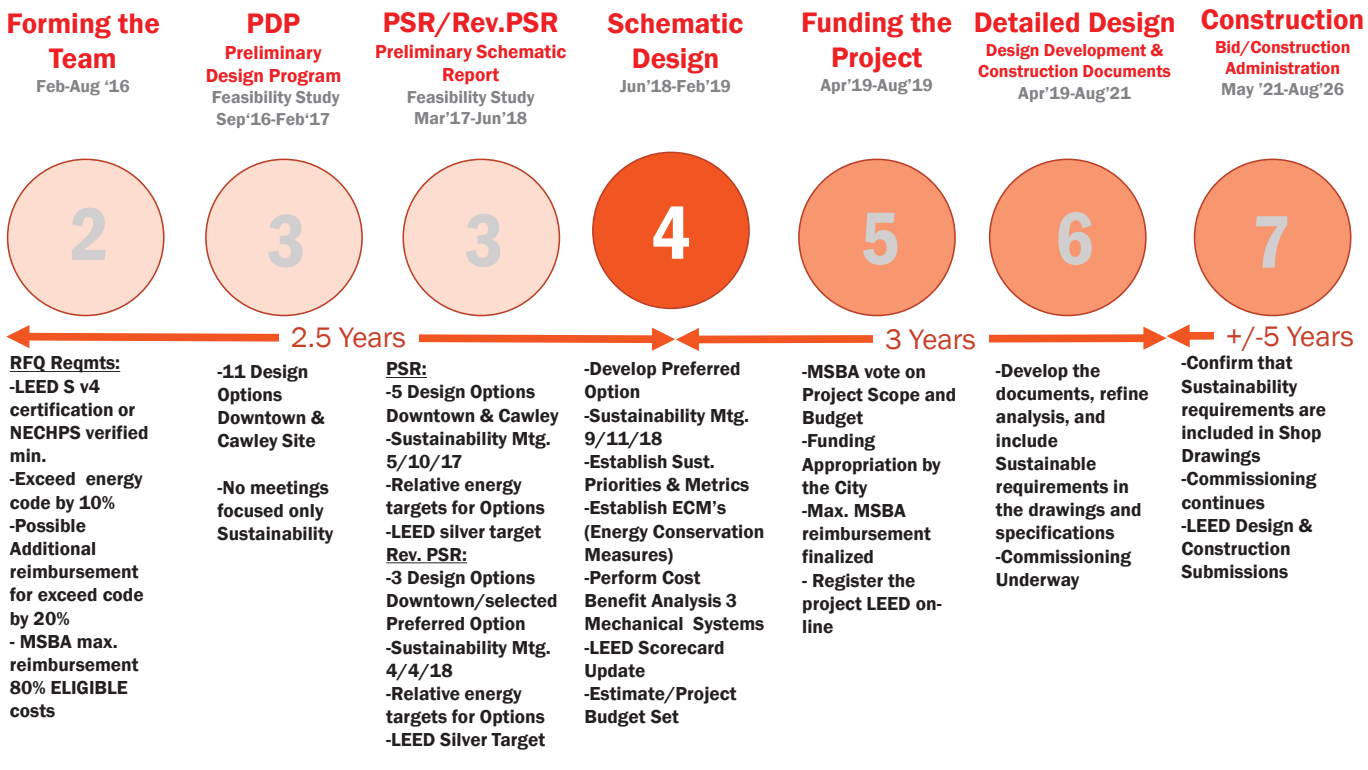
30 Min
Brainstorming: what do you think will make LHS a **sustainable success?**

20 Min
Energy efficient design **process**
Sustainable school **case studies**

20 Min
Sustainable **goal prioritization**
Recap of priorities and discussion of **metrics**

5 Min
Next steps

SUSTAINABILITY TIMELINE



SUSTAINABILITY STANDARDS

Stretch Code Compliance-
The Stretch Code requires projects to exceed ASHRAE 90.1-2013 by 10%

MSBA Requirements
LEED certified or NE-CHPS verified
Potential Additional reimbursement available if the energy efficiency is 20%

LEED Certification

Sustainable Lowell 2025

SUSTAINABILITY CATEGORIES

- LOCATION AND TRANSPORTATION
- SUSTAINABLE SITES
- WATER EFFICIENCY
- ENERGY AND ATMOSPHERE
- MATERIALS AND RESOURCES
- INDOOR ENVIRONMENTAL QUALITY

EDUCATION

POTENTIAL GOALS IDENTIFIED TO DATE

Pedestrian and bicycle connections

Reducing waste in operations and construction, promoting composting, waste to energy

Pre-occupancy and post occupancy study to look at air quality

Open space plazas creating outdoor classrooms for active learning

Water reuse from stormwater

Green roof or living wall

Commissioning and operations turnover optimization

Balance Sustainability with the Budget

Partnering with the local utilities

Creating circulation spaces that can be used as gathering space by students

Renewable Energy

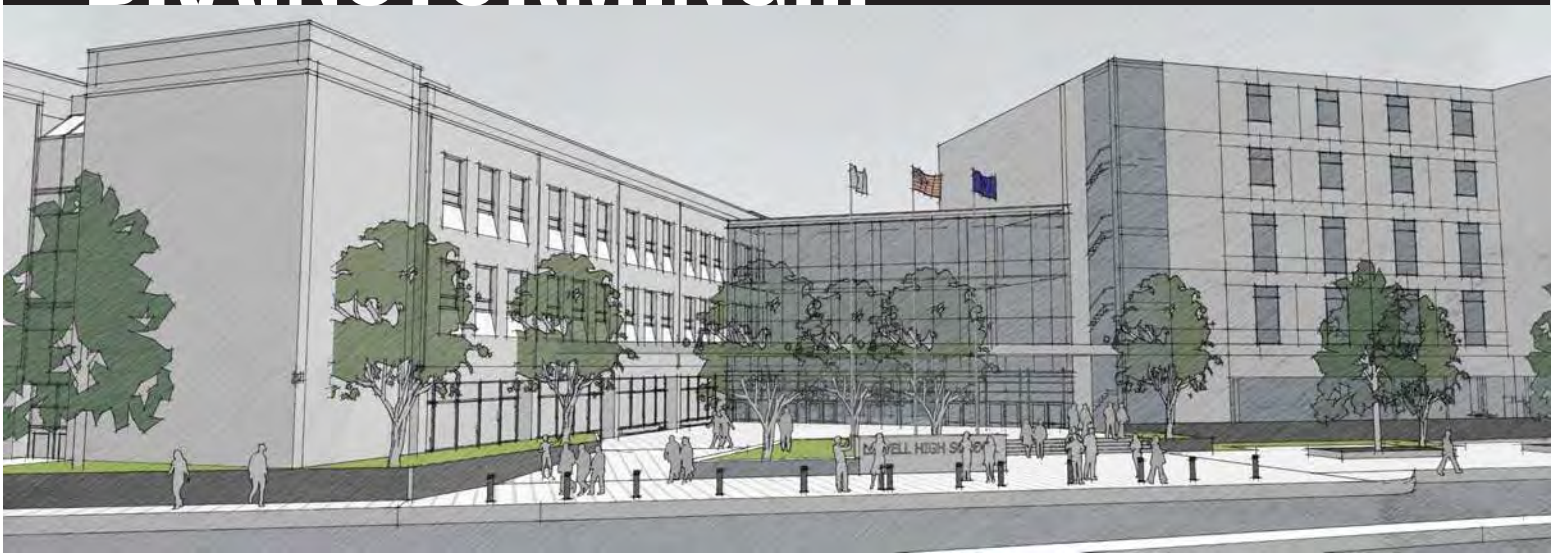
Low flow water fixtures

Durable Materials

Harvest daylight

Vegetable gardens with science and culinary programs

BRAINSTORMING...



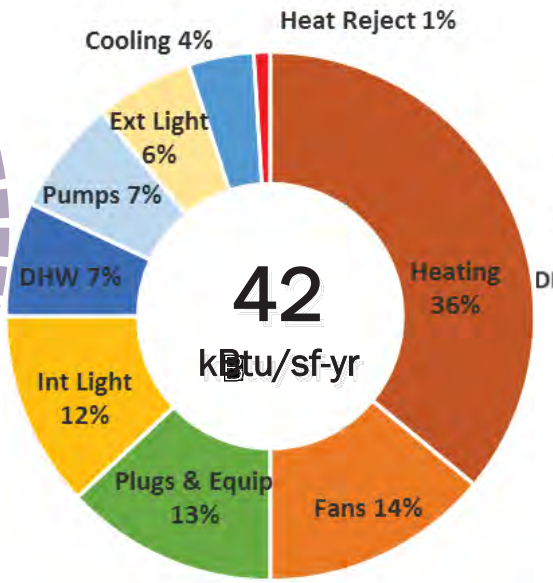
ENERGY USE INTENSITY

Set Targets
- New Building
- Existing Building
- Blended

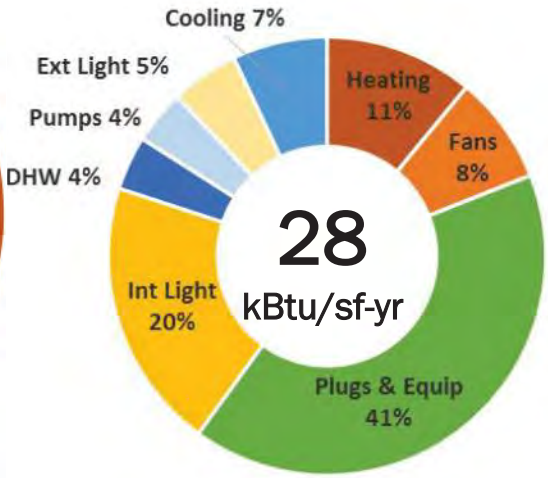
Existing
LHS

63
kBtu/sf-yr

New + Reno
Option 3

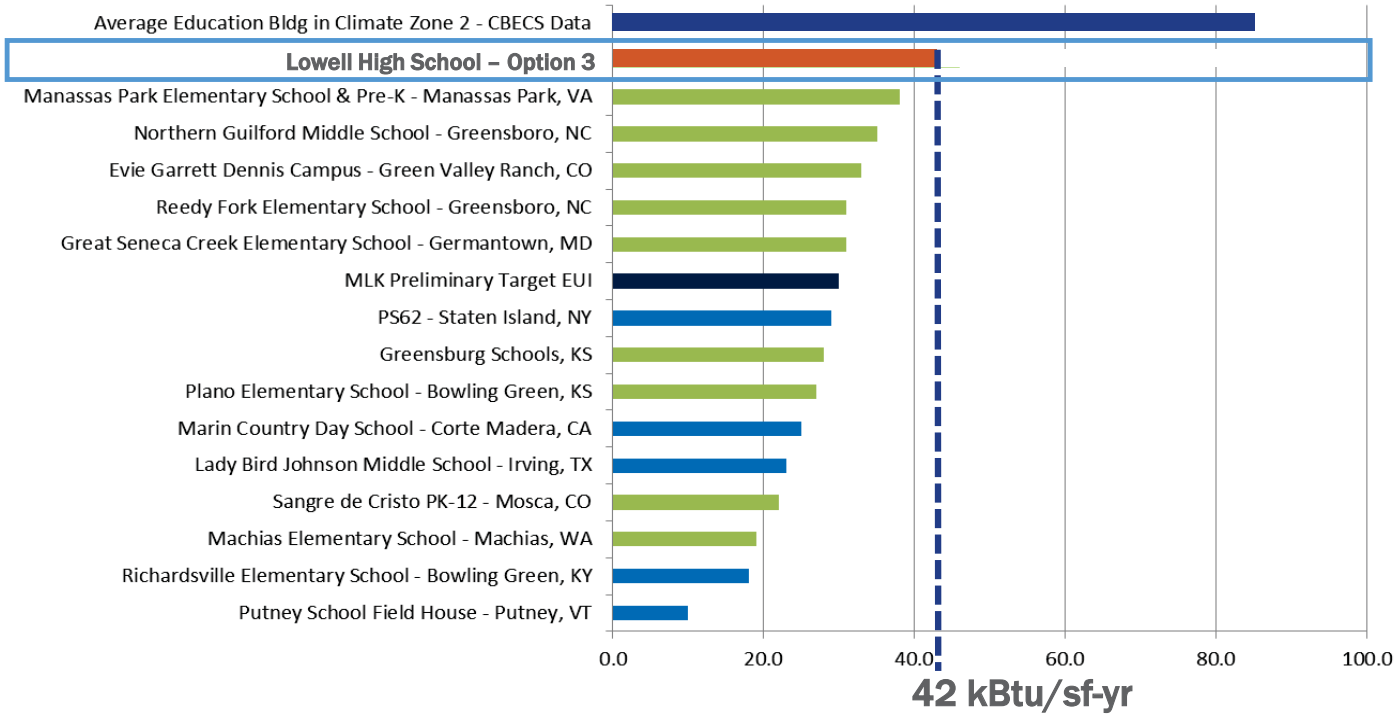


MLK School
New Construction
(Example)

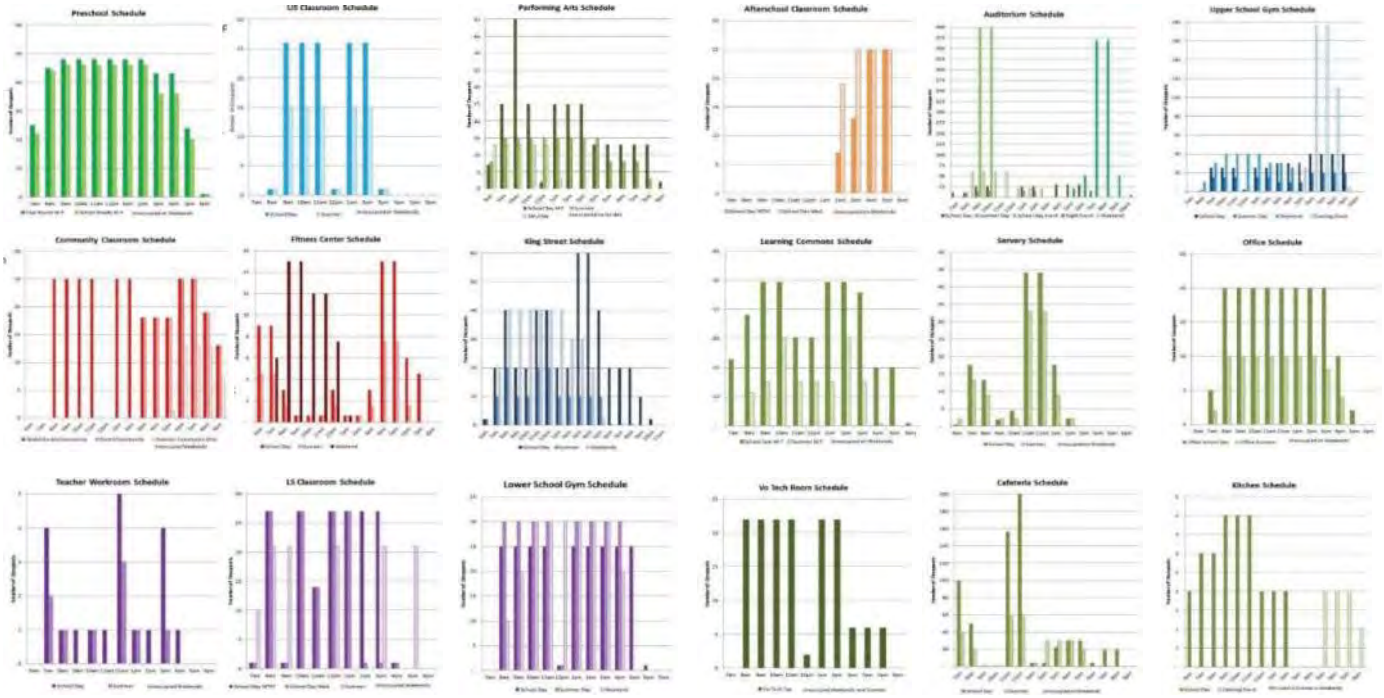


ENERGY BENCHMARKING

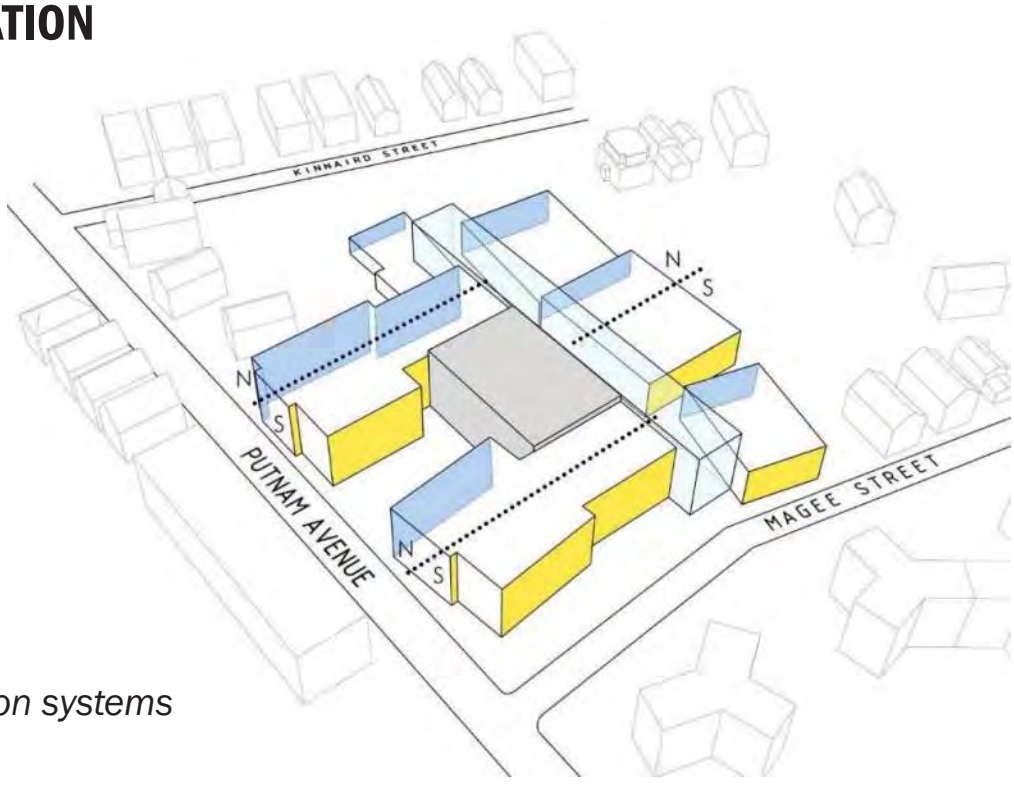
OTHER COMMUNITIES



IDENTIFY KEY ENERGY COMPONENTS

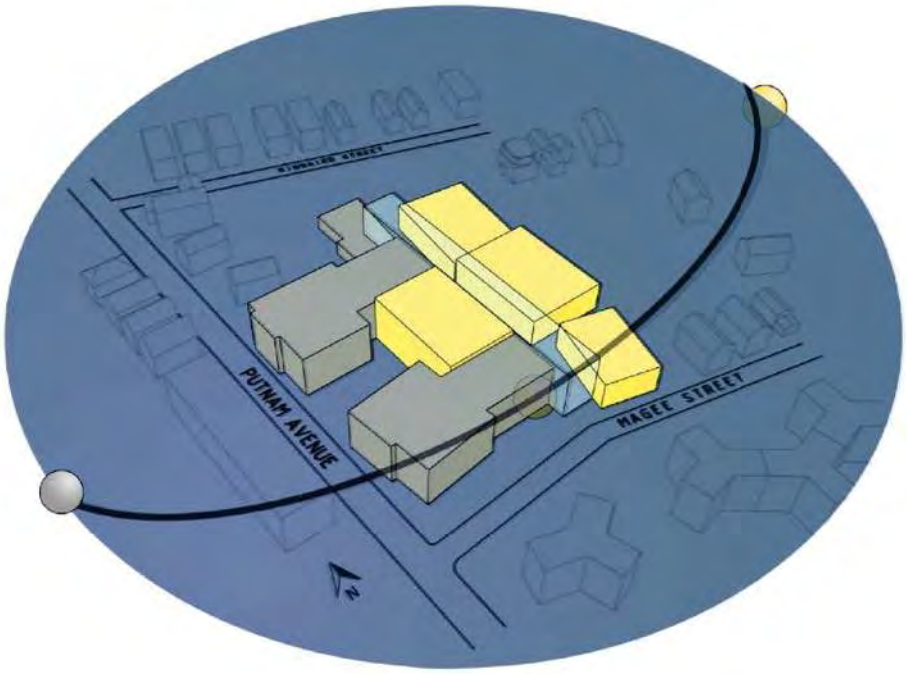


OPTIMIZE BY ORIENTATION



Reduce loads & demands on systems

OPTIMIZE BY ORIENTATION AS POSSIBLE



OPTIMIZE FENESTRATION

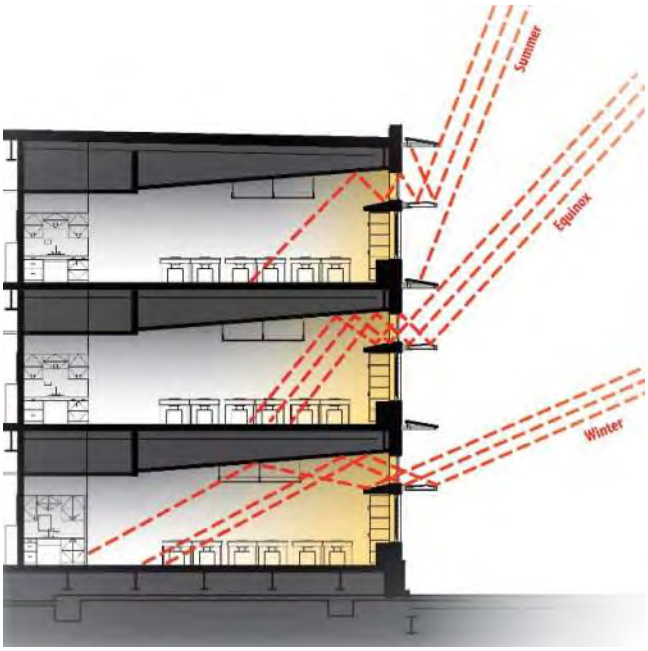
25-30% Target ?

Glazing Targets:

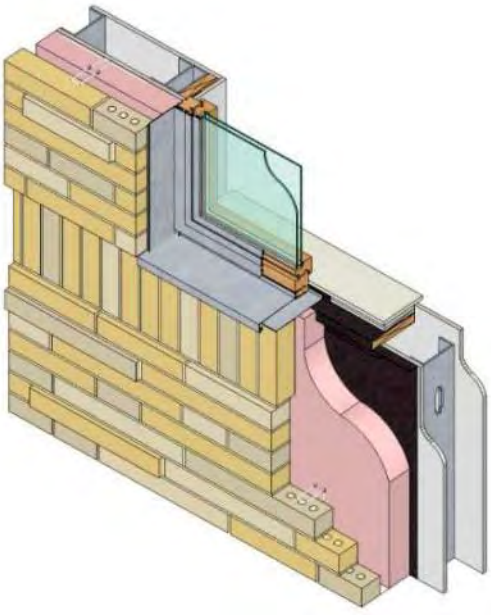
- North/South – 35%
- East/West – 25%

- **MLK Average = 31.7%**

THE ROLE OF DAYLIGHT

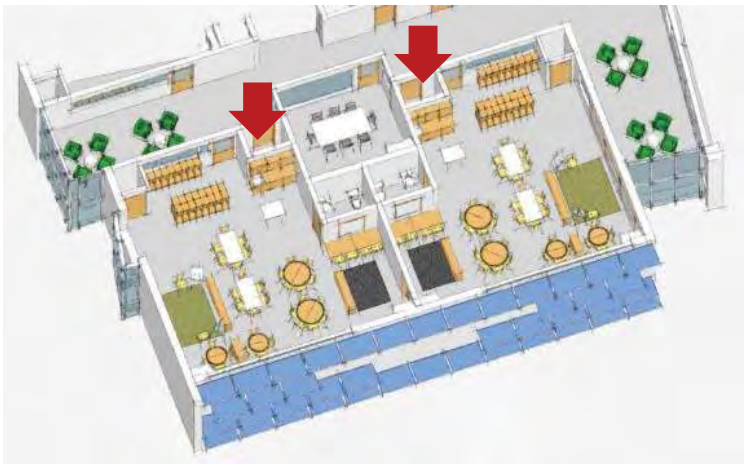


OPTIMIZE NEW WALLS

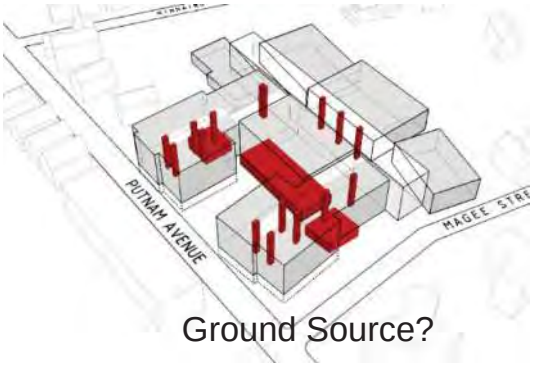


HVAC SYSTEMS

Low first cost, low maintenance, high efficiency



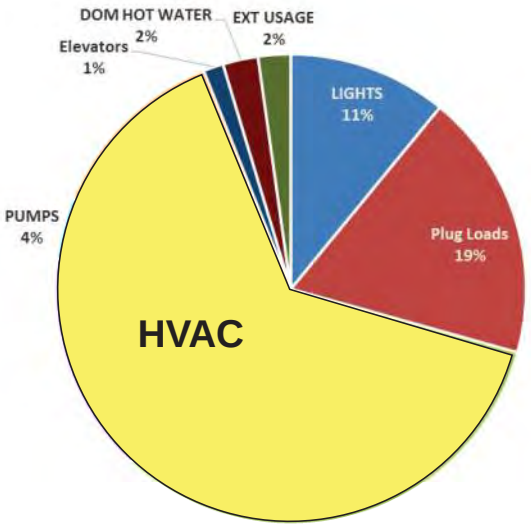
Air Source



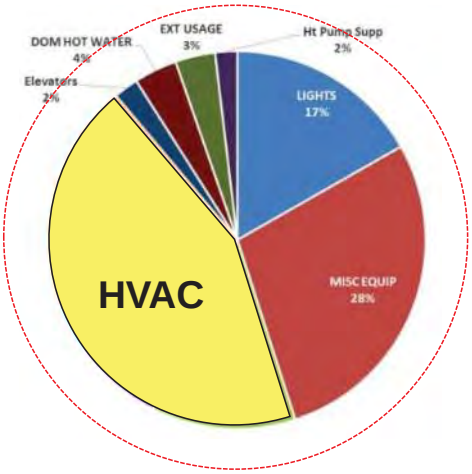
Ground Source?

OPTIONAL ENERGY SYSTEM STUDIES

Optimized Design System Option A
54% More Site Energy



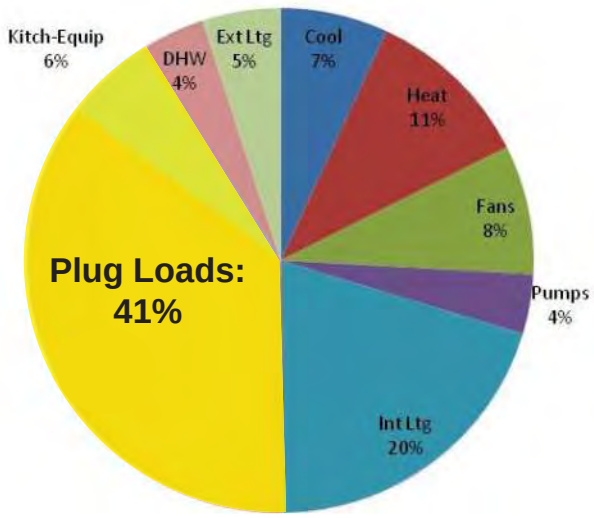
Optimized Design with System Option B



RENEWABLE ENERGY POTENTIAL

- Initial cost
- Life cycle cost
- Alternative funding or future-ready

OCCUPANTS AND ENERGY CONSUMPTION



OCCUPANT ENGAGEMENT

Orientation

- "Welcome to Your Room" Instructions

Learning for Public & Students

- "Building as a Teaching Tool" Interpretive Signage
- Dashboards

Ongoing Maintenance

- Building Management Systems

MANASSAS PARK SCHOOL

Metrics

Estimated percent of occupants using public transit, cycling or walking: 87%

Daylighting at levels that allow lights to be off during daylight hours: 43%

MARIN COUNTRY DAY SCHOOL

Metrics

Total pEUI: 20 kBtu/sf-yr

Net pEUI: 7 kBtu/sf-yr

Percent Reduction from National Median EUI for Building Type (predicted): 82%

Lighting Power Density: 0.17 watts/sf

GREENSBURG SCHOOLS/KIOWA COUNTY SCHOOLS

Metrics

Daylighting at levels that allow lights to be off during daylight hours: 90%

Within 15 feet of an operable window: 50%

Percent of rainwater from maximum anticipated 24 hour, 2-year storm event that can be managed onsite: 99%

SIDWELL FRIENDS SCHOOL

Notable

Life cycle analysis performed – building structure reused

Reclaimed materials used to re-clad exterior, flooring and decking

More than 80 regionally appropriate species were introduced into the campus landscape.

ESSEX TECHNICAL HIGH SCHOOL

Notable

Rainwater Reuse – 60,000 gal tank

Daylight utilization and control

MOUNT GREYLOCK REGIONAL SCHOOL

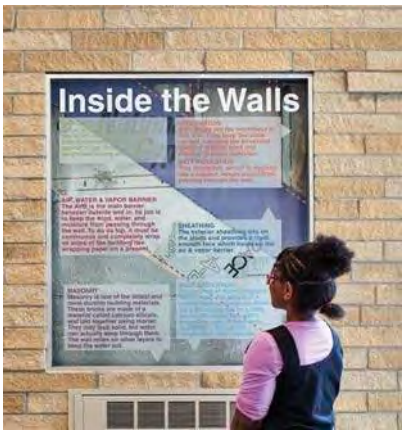
Notable

Local stone

Reclaimed Wood

Connection to landscape

MLK SCHOOL



Notable

Informative displays about building systems – mechanical, plumbing and architectural.

Enhanced indoor air quality.

Natural light and views

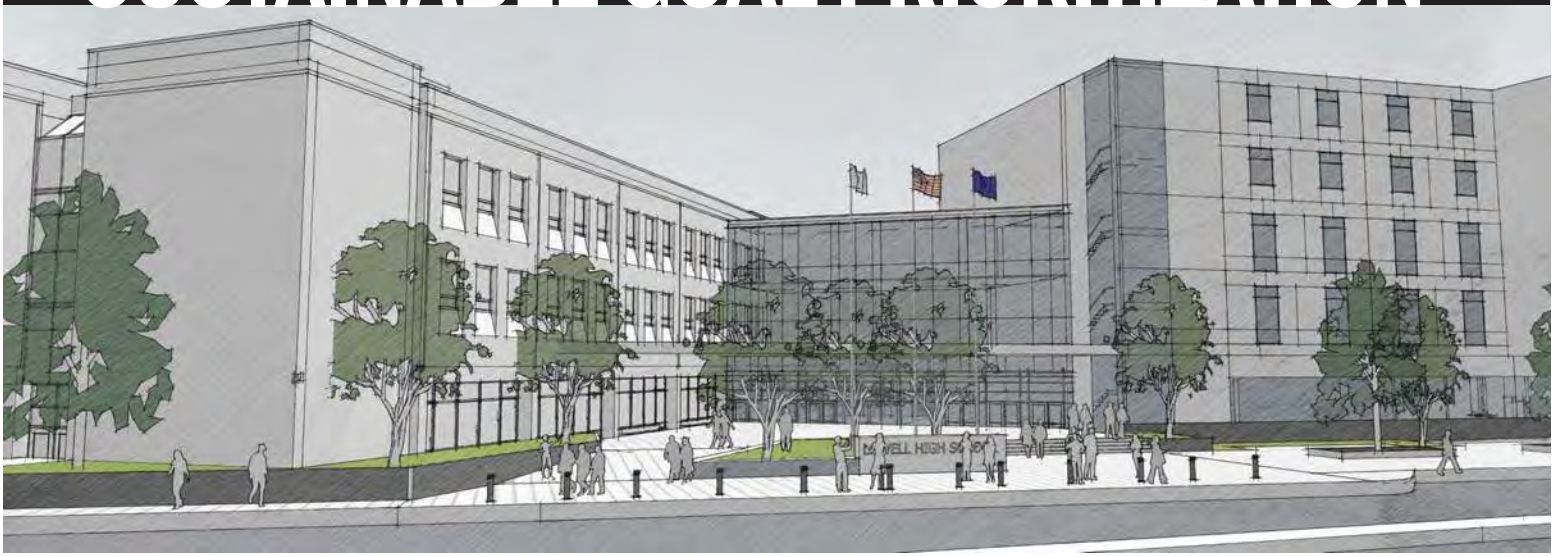
ZERVAS SCHOOL

Metric
24% Window-to-Wall Ratio

Community spaces for breakout – Net to Gross Strategy

EUI 29 kBtu/sf-yr

SUSTAINABLE GOAL PRIORITIZATION



NEXT STEPS

September: Implement Sustainable Priorities and Metrics from 9/11 Sustainable Design Meeting, Establish ECM's (Energy Conservation Measures)

9/25/18 Working Group: Design Updates/ Mechanical Systems/Interior Materials

10/4/18 School Building Committee: Design Updates/ Mechanical Systems/Interior Materials

October/November: Run Energy Model, Cost Benefit Analyses for 3 Mechanical Systems

December Dates tbd: Overall Project Update including Sustainability

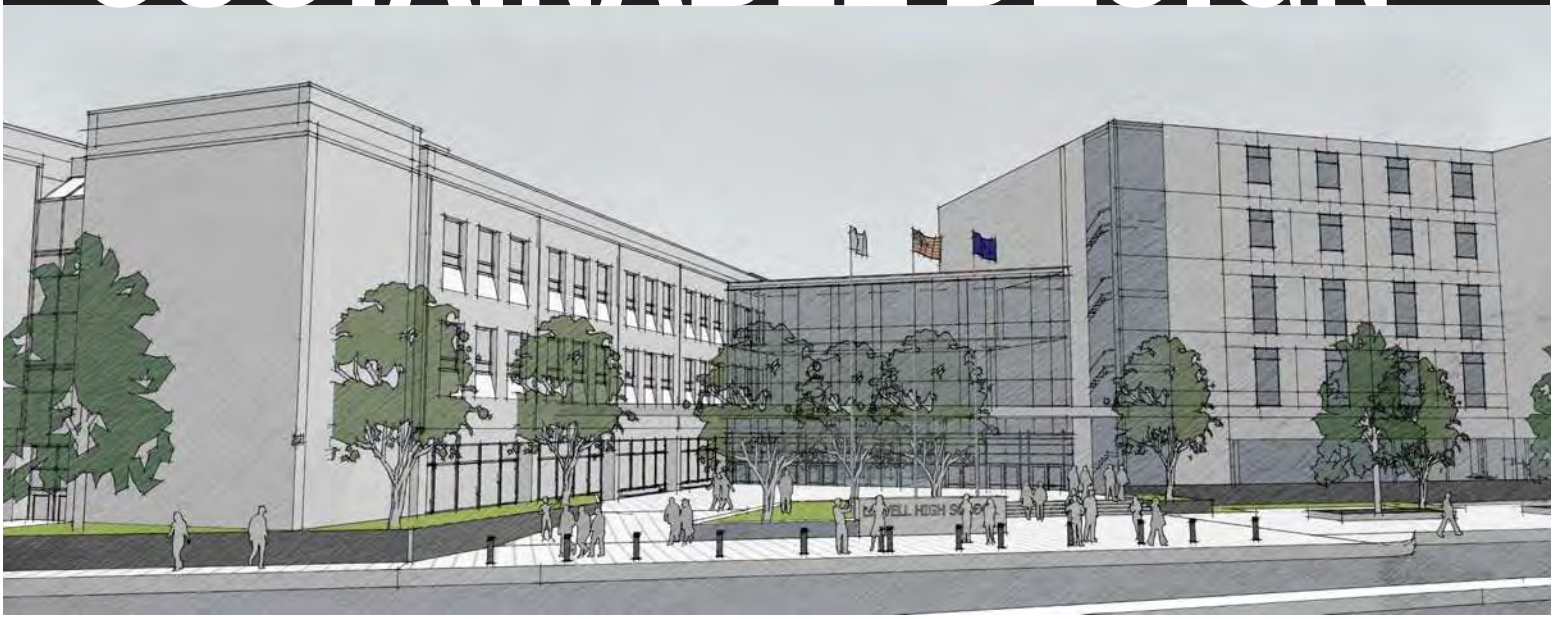
12/1/18 – 1/31/19: Estimate/ Reconciliation

2/20/19 MSBA Schematic Design Submission

LOWELL HIGH SCHOOL – SEPTEMBER 11, 2018

PERKINS EASTMAN
Human by Design

SUSTAINABLE DESIGN



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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT
WORKING GROUP
MEETING MINUTES

MEETING #4 SEPTEMBER 25, 2018 2:00 PM LHS, HEAD OF SCHOOL CONFERENCE ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	LHS Working Group
FACILITATOR	Dawn Guarriello, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Heather Varney | City Diane Tradd | City Present Jay Mason | SBC Present Mary Payne | LPS Marianne Busteed | LPS Present Robin Desmond | LPS Present Christine Clancy | City Present Jim Donison | City Present Sarah Brown | City Present Roxanne Howe | LPS Present Richard Underwood | LPS Present Joe Drown | PE Present Bob Bell | PE Dan Aarons | PE Present Dawn Guarriello | PE Present Alicia Caritano, PE Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Carlos DeSousa | GGD Present Frank Stramaglia | VAV Present Dominick Puniello | GGD Present

AGENDA TOPICS

1. BUILDING SYSTEMS & INTERIOR MATERIALS – INTRODUCTION- EXTERIOR UPDATE

DISCUSSION	Alicia Caritano (AC) stated that the meeting will include an update on Building Massing and materials, Options for HVAC systems, Interior materials and an update on the pre-engineered gym building options. Dawn Guarriello (DG) stated that PE is presenting updates on the building massing to show the work taking place between meetings. DG explained revisions from previous meetings to West façade of gym along Arcand Drive and Freshman Academy along Fr. Morissette Blvd. (FA) The main entrance was identified as a potential location to include a green roof, see presentation attached. 1980 building needs new column covers on exterior and a new durable base. DG reviewed durable bases cost per sf, durability, maintenance, and lifecycles. DG explained how interior finishes will be discussed and that they are starting with general materials with discussion progressing over several meetings. Joe Drown (JD) explained how brick walls are now rain screen veneers and not 3 ft thick of solid brick as they were years ago. JD discussed sealant joints in brick and how they need to be maintained. DG discussed that simulated stone could tie into the look of Coburn Hall limestone base , and also described how different types of CMU could be used to achieve the same result. Jim Donison inquired why CMU lifecycle is shorter than brick. JD explained how waterproofing material built into CMU mix requires maintenance over time. Brick has waterproofing in it inherently by the manufactured baking/firing process. Diane Tradd (DT) asked about CMU options. DG explained the CMU color range and finishes. Jim Dowd asked if CMU we are speaking of is a full block or veneer. DG replied

	speaking of both. Jim Donison asked if there are examples of recent school with CMU. DG described recent schools by PE which utilized CMU. AC input that vendors can provide examples of other recent schools with CMU also. DG explained corrugated metal panels, phenolic panels and fiber cement panels, see attached presentation. DG stated that these materials tend to be used on higher elevations and not at base locations where building materials can be susceptible to abuse. DG discussed attributes of each, see attached. DG stated for the schematic estimate we need a range of what type of material so that pricing can be in line. DG inquired of the group if there was any material they don't like? Input that it would help to narrow it down. Working Group did not indicate dislike of any materials. DG explained that every building has metal on the exterior the question is how much. DT asked if the materials can be replaced in 30 years. DG stated that the panels, especially with exposed fasteners, can easily be replaced. JD input that replacing materials is problematic do to inherent fading in all of them. DG input that phenolic panels are super durable. Kara Keefe Mullin (KM) inquired if we have estimates on the materials yet. AC replied they have not yet had costs estimated. KM stated that at the next SBC meeting be prepared to have an idea of the overall cost difference between materials. AC stated that relative costs are being looked at, at this time, with all costs being relative until the estimate is completed. DG stated that further along we will have different material scenarios with associated costs once the SD estimate is completed. Maryanne Busteed (MB) inquired as to what lifespan was being designed for. DG responded that for MSBA lifespan design is 50 years. DG also stated that PE specifies materials that make sense for public schools relative to lifespan and maintenance. Mary Ann Williams (MAW) stated that we are tasked with designing to the budget. Jay Mason (JM) stated that we also need to recognize that we have 4 buildings, with 4 different facades. JM asked what the design team's thoughts on glass pricing were. JD responded Curtainwall is $135/sf, metal windows $90-$95/sf and Storefront $90-$95/sf. DT asked for pricing on different façade combinations. DG stated we need to narrow it down but we can present different facade scenario elevations in sketches. DG stated that we need to tie the yellow brick of the 1922 into the newer buildings and that it has been stated that yellow brick is not desired in the new buildings. DG in conclusion stated that rain screens are assumed for the new buildings but we need to narrow down the materials.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. BUILDING SYSTEMS &
INTERIOR MATERIALS –
INTERIOR MATERIALS

DISCUSSION	DG started with explaining materials for typical classrooms, see attached presentation. DG stated that typical ceiling are acoustical ceiling tile (ACT) with walls as painted abuse resistant drywall. Flooring materials of linoleum, VCT and rubber were thoroughly discussed. JM inquired about concrete. DG responded that every time polished concrete starts in the design it ends up getting removed. DG stated that polished concrete in the 1980s building would require a topping slab over the existing structural slab. It is $11/sf and medium maintenance. Sarah Brown asked what the best flooring is to stand on all day. DG responded that rubber is the best to stand on, but it is the least durable. DG also stated that polished concrete is typically not used in classrooms. Roxanne Howe (RH) asked about terrazzo. AC stated we are hoping to save the terrazzo in the 1922 building. Dg stated new terrazzo is $30/sf. DG stated linoleum has less maintenance than VCT and rubber. DT inquired about using different colors in flooring. DG stated they always use multiple color combinations throughout buildings for flooring. DG presented Restroom finishes, see attached. DG presented that ideas for finishes were drywall ceilings, painted CMU walls and epoxy floors. DG input that epoxy can be more expensive than tile, see attached. DG inquired if there were any strong opinions on particular materials? DG stated the one strong opinion has been, no carpet except for administrative offices, conference rooms and the media center.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. BUILDING SYSTEMS & INTERIOR MATERIALS – PRE-ENGINEERED BUILDING UPDATE

DISCUSSION	JD stated that at the last SBC meeting they were asked to review the costs between pre-engineered structures for the gymnasium versus a traditional structure. JD stated the review yielded that pre-engineered results in a savings of approximately $168,000. JD stated that pre-engineered buildings are intended to be free standing and when they are, offer a benefit of a shorter construction duration however the pre-engineered walls and roof cannot be used in our application because of the energy code. JD stated that when you deviate from the standard pre-engineered building package including the walls you lose the cost benefits. Given these conditions where the typical benefits are not being realized PE suggested going with standard construction for the gymnasium. JD stated that pre-engineered was chosen earlier on because of anticipated cost savings however after further review with the project cost estimator and a leading pre-engineered building manufacturer that is not the case.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. BUILDING SYSTEMS & INTERIOR MATERIALS – HVAC SYSTEMS

DISCUSSION	Dominick Puniello (DP) the mechanical engineer from GGD presented potential options for HVAC systems and life cycle economic analysis, see attached. Baseline system is a VAV system with Options being: 1. Displacement System, 2. Active Chilled Beams, 3. Air Source VRF, 4. Water Source VRF, see attached. DP reviewed the existing HVASC system for contract to the new options. DP stated that all system being looked at are state of the art and proven. DP discussed all the common features of the systems being looked at, see attached. DT asked how displacement system is for the physical durability of the units in rooms. DP explained that heavy gauge metal is used for the enclosures and that this system first originated in industrial applications. DG input that displacement and chilled beam systems are really quiet, which is a benefit in a classroom application. Carlos DeSousa (CD) stated that these two systems have all filters at the rooftop units. DP reviewed the mechanical plant for options 1 and 2 with a plant located on each side of the canal for both options. DP inquired just like the materials, are there any of these systems you love or hate? JM inquired if options 3 and 4 are more efficient. DP responded that an overall system analysis needs to be done before that question can be addressed. JM suggested solar power being included with the VRF option. SB inquired if we could get enough solar to power the heating system. SB asked about the lifespan of a photovoltaic panel. CD replied 25-40 years. DP presented that an Option 5 Ground Source Well Field was looked at but the well field itself would require more acreage than the entire campus encompasses including buildings, making the option not feasible. DP review Building Automation system, see attached. CD stated the lighting and HVAC will be on the same management system. DP reviewed photovoltaic options and stated they are still working on additional study. He noted that PV adds 12 lbs/sf to the roof. MAW input that code requires that the building be PV ready but that this is non-reimbursable. CD stated they always provide provisions for PV. DP stated that PV's can be mounted above rooftop units (RTUs). CD stated that PV would make sense if the VRF Option is selected. DG inquired if GGD had designed a building with Option 3 VRF recently. DP stated that King Open project is partially electric with VRF. JM inquired about use of batteries in system. CD stated that batteries take up a lot of space. Dan Aarons stated that we need to study all of the options further, especially costs and how much square footage the equipment related to each system will occupy. CD stated they are also looking at a trigen system but that could only be utilized with Options 1 and 2.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEXT MEETING: Tuesday 10/23 at 2:00 pm at LHS Head of School Conference Room.

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

WORKING GROUP

LOWELL HS PROJECT

LOWELL HIGH SCHOOL

AGENDA

- Exterior Updates
- Exterior Material Options
- Interior Material Options
- Pre-Fabricated Building Update
- Building Systems

LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

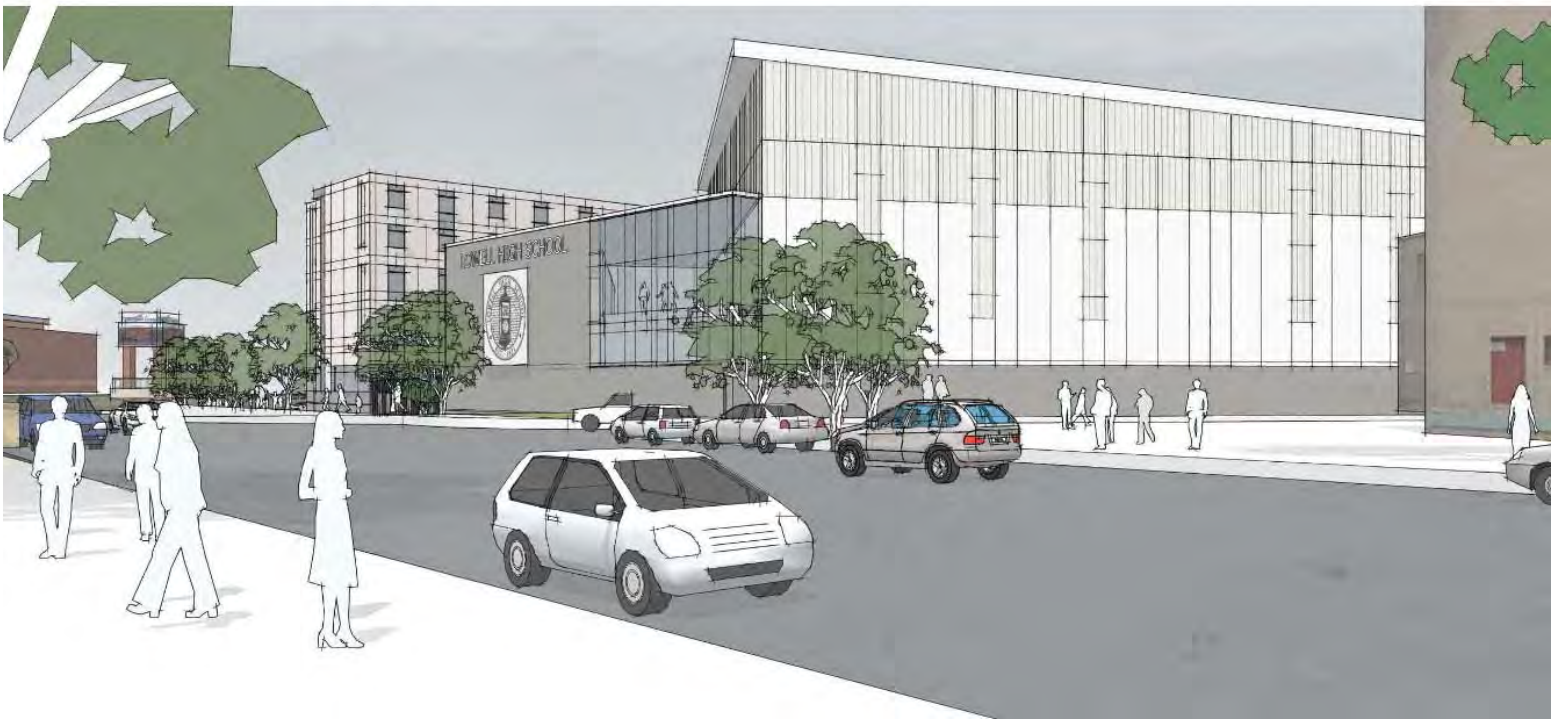
FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

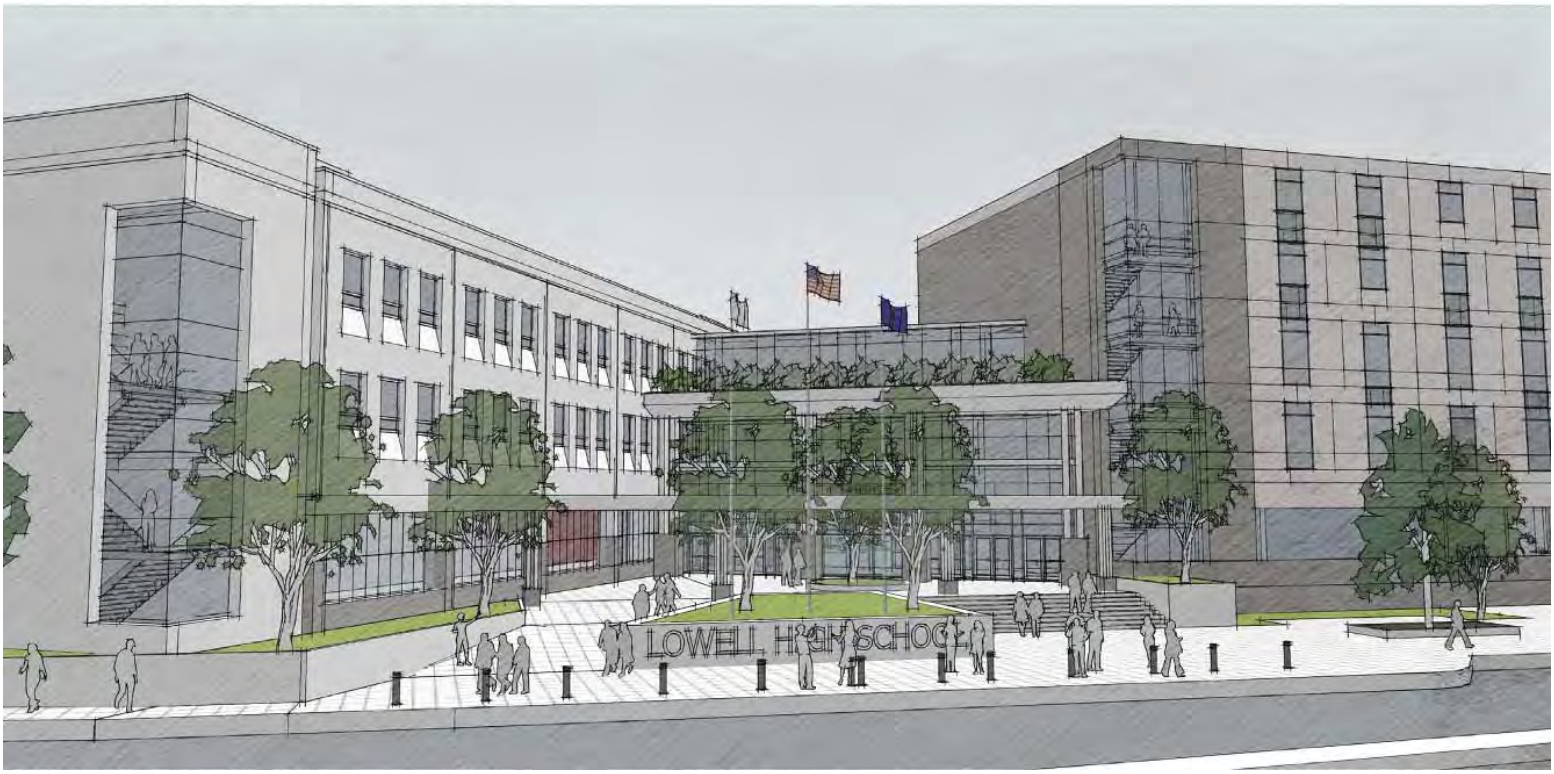
VIEW OF OPEN GREEN SPACE AND GYMNASIUM BUILDING

LOWELL HIGH SCHOOL

VIEW TOWARD FROM ARCAND DRIVE



LOWELL HIGH SCHOOL



LOWELL HIGH SCHOOL

EXTERIOR MATERIALS INFORMATION

EXTERIOR MATERIALS

- DURABILTY
- COST
- MAINTENANCE
- LIFE CYCLE

BRICK VENEER | STONE VENEER | LIMESTONE/ SIMULATED STONE

LOWELL HIGH SCHOOL

DURABLE BASE

	BRICK	SIM. STONE	CMU
DURABILITY :	**HIGH**	**MEDIUM**	**HIGH**
ABOVE AVERAGE:	STRENGTH, DURABILITY, WEARABILITY MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A	STRENGTH, DURABILITY, WEARABILITY MOISTURE, CHEMICAL AND STAIN RESISTANCE
AVERAGE:	N/A	STRENGTH, DURABILITY, WEARABILITY MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
BELOW AVERAGE:			
ESTIMATED COST :	**$35-50/SF**	**$48/SF**	**$30-$40/SF**
MAINTENANCE:	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING	**MEDIUM** PERIODIC RESEALING, POWERWASHING AND REPOINTING
LIFE CYCLE :	**75 YEARS**	**45 YEARS** DEPENDS ON THICKNESS	**50 YEARS**

LOWELL HIGH SCHOOL

FACADE MATERIALS

DURABILITY :	**MEDIUM**	**HIGH**	**MEDIUM**
ABOVE AVERAGE:	MOISTURE AND STAIN RESISTANCE	STRENGTH, DURABILITY, WEARABILITY, RESISTANCE	MOISTURE, CHEMICAL AND STAIN RESISTANCE
AVERAGE:	STRENGTH AND HEAT ABSORPTION	N/A	STRENGTH AND DURABILITY
BELOW AVERAGE:	DURABILITY AND WEARABILITY	HEAT ABSORPTION	HEAT ABSORPTION
ESTIMATED COST :	**$48/SF**	**$65/SF**	**$35/SF**
MAINTENANCE RATING:	**HIGH** PERIODIC RESEALING, POWERWASHING	**MEDIUM** PERIODIC RESEALING, POWERWASHING (AND OILING JOINTS IF SCORED)	**LOW**
LIFE CYCLE :	**30 YEARS**	**50 YEARS**	**40 YEARS**

LOWELL HIGH SCHOOL

INTERIOR MATERIALS INFORMATION

LOWELL HIGH SCHOOL

TYPICAL CLASSROOM FINISHES

DURABILITY :	**HIGH**	**MEDIUM**	↑
ABOVE AVERAGE:	N/A	N/A	
AVERAGE:	DURABILITY, STAIN RESISTANCE, WEARABILITY	STRENGTH, DURABILITY, WEARABILITY	
BELOW AVERAGE:	STRENGTH AND MOISTURE RESISTANCE	MOISTURE, CHEMICAL AND STAIN RESISTANCE	**SEE NEXT SLIDE FOR MULTIPLE FLOOR OPTIONS**
ESTIMATED COST :	**$6.50/SF**	**$4.00/SF**	
MAINTENANCE RATING:	**MEDIUM** BETTER ACOUSTICS	**HIGH** DAILY SWEEPING AND WET MOPPING MONTHLY WAXING AND BUFFING SEMI-ANNUAL SCRUBBING AND STRIPPING	
LIFE CYCLE :	**VARIES**	**VARIES**	↓

LOWELL HIGH SCHOOL

TYPICAL CLASSROOM AND CORRIDOR FLOORS

DURABILITY :	**HIGH**	**MEDIUM**	**HIGH**
ABOVE AVERAGE:	DURABILITY, WEARABILITY, MILDEW RESISTANCE	N/A	STRENGTH, WEARABILITY, MOISTURE RESISTANCE
AVERAGE:	STRENGTH, MOISTURE AND STAIN RESISTANCE	STRENGTH, DURABILITY, WEARABILITY	MILDEW RESISTANCE
BELOW AVERAGE:	N/A	MOISTURE, STAIN, AND MILDEW RESISTANCE	DURABILITY
ESTIMATED COST :	**$5-7/SF**	**$4.00/SF**	**$11.50/SF**
MAINTENANCE RATING:	**MEDIUM** DAILY SWEEPING AND WET MOPPING ANNUAL WAXING AND BUFFING	**HIGH** DAILY SWEEPING AND WET MOPPING MONTHLY WAXING AND BUFFING SEMI-ANNUAL SCRUBBING AND STRIPPING	**MEDIUM** DAILY SWEEPING MONTHLY WET MOPPING
LIFE CYCLE :	**30 YEARS**	**15 YEARS**	**10 YEARS**

LOWELL HIGH SCHOOL

TYPICAL RESTROOM FINISHES

DURABILITY :	**LOW**	**HIGH**	**HIGH**
ABOVE AVERAGE:	N/A	MILDEW RESISTANCE	STRENGTH, DURABILITY, WEARABILITY
AVERAGE:	N/A	STRENGTH, DURABILITY, WEARABILITY	MOISTURE, CHEMICAL AND STAIN RESISTANCE
BELOW AVERAGE:	ALL	MOISTURE, CHEMICAL AND STAIN RESISTANCE	N/A
ESTIMATED COST :	**$.90- 3.50/SF**	**$24.00/SF**	**$12/SF**
MAINTENANCE RATING:	**HIGH** PATCHING REQ'D IF DAMAGED	**MEDIUM** PERIODIC SCRUBBING, PAINTING AND RE-POINTING	**LOW** DAILY SWEEPING WEEKLY WET MOPPING MONTHLY SCRUBBING
LIFE CYCLE :	**VARIES**	**VARIES**	**12 YEARS**

HVAC SYSTEMS OVERVIEW

Lowell High School
Lowell, MA

LOWELL HIGH SCHOOL

LIFE CYCLE ECONOMIC ANALYSIS

- Comparison of different HVAC systems in comparison to a Baseline code HVAC system (Overhead VAV with Hot water Heating and Chilled Water Cooling Plants)
- Analysis of:
  - First Costs,
  - Operating Costs, and
  - Maintenance Costs
- Options compared to determine the lowest overall cost of ownership over 30 years

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Consulting Engineers Inc.

LIFE CYCLE COST ANALYSIS HVAC SYSTEM OPTIONS

HVAC System Options Overview

1. Baseline: VAV System
2. Option 1: Displacement System with Radiant Cooling/Heating Panels with DOAS (Dedicated Outdoor Air System)
3. Option 2 –Active Chilled Beams (Induction Units) with DOAS (Dedicated Outdoor Air System)
4. Option 3 – Air-Source VRF (Variable Refrigerant Flow) System with DOAS (Dedicated Outdoor Air System)
5. Option 4 – Water-Source VRF (Variable Refrigerant Flow) System with DOAS (Dedicated Outdoor Air System)

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EXISTING HVAC SYSTEM ISSUES

1. Systems are Old and/or Failing and in need of Replacement
2. Low Overall Energy Efficiency
3. Inadequate Ventilation in Many Areas
4. Poor Filtration
5. Lack of Air Conditioning in Most Areas
6. Antiquated Control System

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NEW HVAC SYSTEM OPTIONS
COMMON FEATURES

1. Improved Air Quality
2. Improved Level of Filtration
3. High Energy Efficiency
4. High Level of Thermal Comfort
5. Low Noise Operation
6. New Automatic Temperature Control and Building Energy Management System

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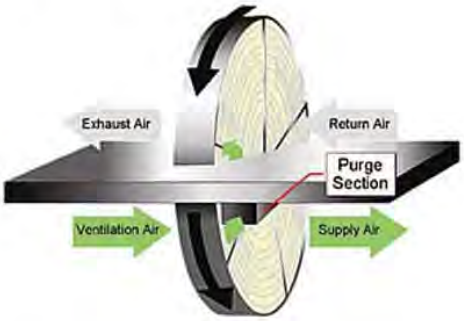
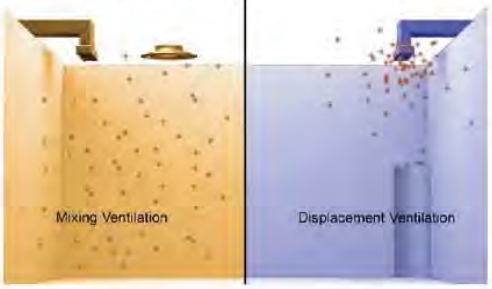
ROOFTOP AND INDOOR AIR HANDLING UNITS DOAS (DEDICATED OUTDOOR AIR SYSTEMS)



- Ventilation air is provided from Rooftop and Indoor Air Handling Units
- Hot water heating and Chilled water cooling (Baseline and Options 1 & 2)
- DX Heat Pump Coil heating and cooling (Option 3 & 4)
- Energy recovery wheel sections
- High Level of Filtration

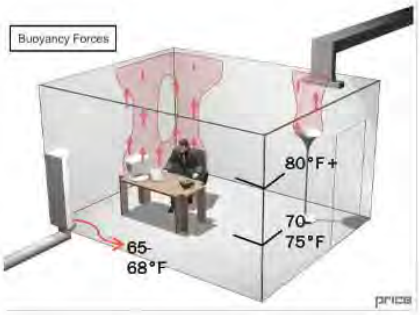
OPTION 1 - DISPLACEMENT SYSTEM WITH RADIANT HEATING & COOLING

- Ventilation air from Dedicated Outdoor Air Handling Units (DOAS)
- Air is delivered at low velocity and at low levels within the space
- Natural buoyant forces within the space create a vertical rise of the air throughout the space.
- Displaces room air upward
- Air rises with pollutants to ceiling
- Air returns at ceiling back to air handling unit



Mixed Systems E_c= 0.8

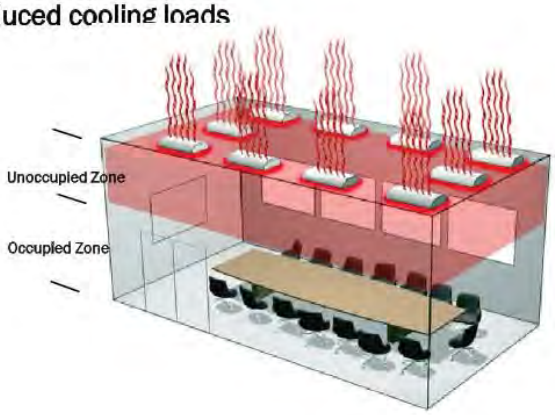
DV Systems E_c=1.2 - 1.4



DISPLACEMENT SYSTEM

Pros:

- Excellent pollution removal
- Very low noise levels
- Very low air velocity
- Low moisture levels
- Reduced initial cost
- Variable volume reheat is not required
- High ventilation effectiveness
- High energy efficiency
- Reduced cooling loads

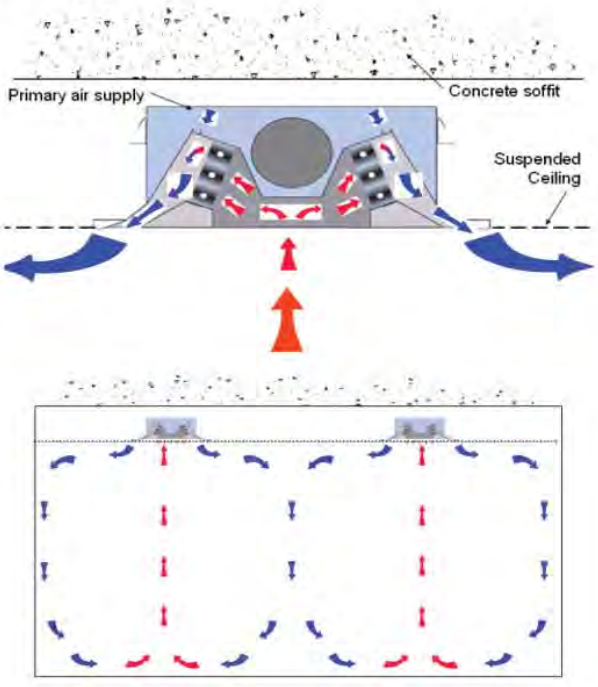


Cons:

- Requires perimeter radiation heating/cooling panels
- Requires coordination for chases and floor mounted diffuser locations

OPTION 2 – ACTIVE CHILLED BEAMS

- Ventilation air is provided from high efficiency DOA units
- Primary (Ventilation) Air is supplied to plenum and discharges through nozzles
- Room air is induced through the heating/cooling coils
- Mixture of Primary and Room air is delivered to room through diffuser slots.
- Condensate drain pans and piping system for condensate removal



OPTION 2 – ACTIVE CHILLED BEAMS

Pros:

- High energy efficiency
- Ventilation air & ductwork minimized
- Low Noise Levels
- Flexibility of Installation
- Moderate first cost
- Simplified Controls (No Fans in Occupied Zones)
- Lower Maintenance (No Terminal Filters)

Cons:

- Requires increased coordination with "ceiling" system. (e.g. additional piping, HW, CHW & condensate piping)
- Requires additional ventilation air in some cases
- Potential for condensate at units if humidity levels are not properly controlled

HIGH EFFICIENCY HEATING HOT WATER AND CHILLED WATER PLANT (SIMILAR FOR OPTIONS 1 & 2)

Boiler Plant

- High efficiency (90%+) gas-fired condensing boilers
- Boiler temperature reset controls
- Variable speed pumps with VFD's

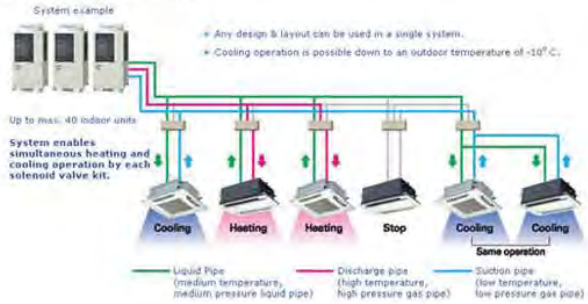
Chiller Plant

- High efficiency water cooled or air-cooled chiller
- Variable speed pumps with VFD's

OPTION 3 – AIR-SOURCE ELECTRIC VRF (VARIABLE REFRIGERANT FLOW)

Pros:

- Lower piping installed costs due to refrigerant piping system only
- Boiler/chiller plants and distribution not required
- Single cabinet can be utilized for both heating and cooling applications.
- Simultaneous heating and cooling.
- Smaller central ventilation ductwork
- High energy efficiency
- Modular design allows for level of redundancy
- No site emissions



Cons:

- Individual fan motors in space
- Slightly higher noise levels in occupied space
- Quarterly filter changes per unit
- Condensate drain maintenance for terminal units
- Maintenance of equipment in occupied area
- Higher Electrical energy use due to increased electric heating
- Potentially Larger Emergency Generatorz

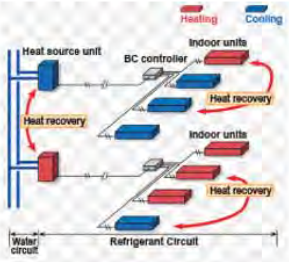
OPTION 4 – WATER-SOURCE VRF (VARIABLE REFRIGERANT FLOW)

Pros:

- Lower piping installed costs due to refrigerant piping system
- Chiller plant and distribution systems not required
- Use Cooling Tower instead of Condensing Units; Extends life of Equipment
- Single cabinet can be utilized for both heating and cooling applications.
- Simultaneous heating and cooling.
- Smaller central ventilation ductwork
- High energy efficiency utilizing hot water boilers during peak heating season. Reduced Boiler size.
- High energy efficiency
- Modular design allows for level of redundancy
- Reduced site emissions

Cons:

- Individual fan motors in space
- Slightly higher noise levels in occupied space
- Quarterly filter changes per unit
- Condensate drain maintenance for terminal units
- Maintenance of equipment in occupied area
- Higher Electrical energy use due to increased electric heating



OPTION 5 – GROUND SOURCE WELL FIELD

- Closed Loop Wells
- Compatible with all Options
- 1922 Building:
  - 140 Wells @ 500 ft depth
  - 56,000 SF (1.29 Acres)
- 1980 Building & Additions:
  - 183 Wells @ 500 ft depth
  - 73,200 SF (1.68 Acres)

Pros:

- **Higher Energy Efficiency**
- **Eliminate noise from Condensing Equipment**
- **Long lifespan of underground piping**
- **Wells used for Heating and Cooling**

Cons:

- **High First Cost of Well Field**
- **Additional Maintenance (Reduced with Closed loop design)**
- **Large site area requirement**
- **Potential Construction Phasing Impacts**

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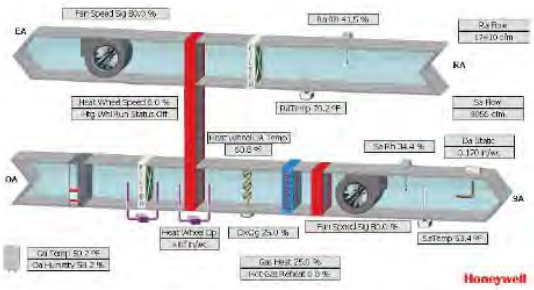
Consulting Engineers Inc.

BUILDING AUTOMATION AND ENERGY MANAGEMENT SYSTEM

- System (Zone) Scheduling
- Occupied-Unoccupied Control
- Night Setback Operation
- Lighting Control System Integration
- Increased Energy Savings
- Integrate with Preventative Maintenance Scheduling



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PHOTOVOLTAIC ARRAY (PV) SYSTEM

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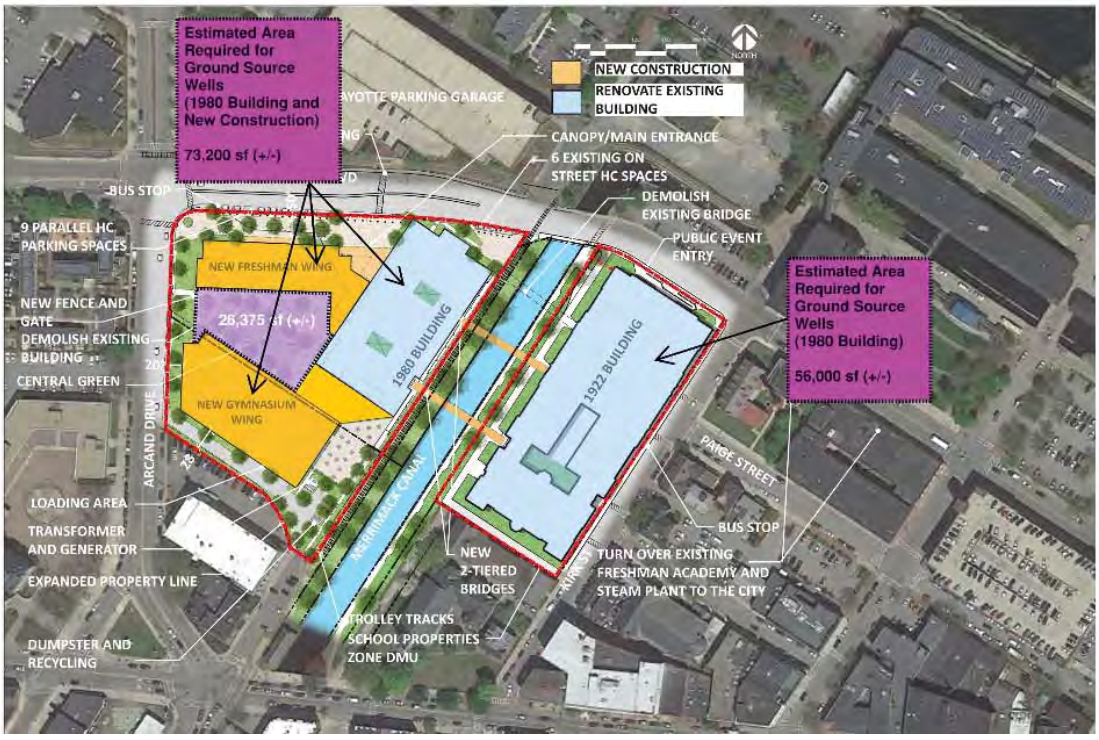
LOWELL HIGH SCHOOL

GEOTHERMAL DISCUSSION



Thank You

Questions and Discussions

GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

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SKANSKA USA BUILDING
101 SEAPORT BLVD. BOSTON, MA 02210
SKANSKA INTEGRATED SOLUTIONS
PHONE: 617-574-1400

LOWELL HIGH SCHOOL PROJECT WORKING GROUP MEETING MINUTES

MEETING #5 | OCTOBER 29, 2018 | 2:00 PM CITY HALL MAYOR'S RECEPTION ROOM

MEETING CALLED BY	Perkins Eastman
TYPE OF MEETING	LHS Working Group
FACILITATOR	Alicia Caritano, Perkins Eastman
NOTE TAKER	Jim Dowd, Skanska USA Building, Inc.
ATTENDEES	Kara Keefe Mullin | City Present Heather Varney | City Alex Magee | City Present Diane Tradd | City Present Katherine Moses | City Present Jay Mason | SBC Present Mary Payne | LPS Marianne Busteed | LPS Present Robin Desmond | LPS Present Christine Clancy | City Present Jim Donison | City Present Sarah Brown | City James Green | City Present Roxanne Howe | LPS Present Richard Underwood | LPS Present Joe Drown | PE Present Bob Bell | PE Dan Aarons | PE Present Dawn Guarriello | PE Alicia Caritano | PE Present Ashley Iannuccilli | Traverse Present Mary Ann Williams | Skanska Present Jim Dowd | Skanska Present Carlos DeSousa | GGD Present Vamshi Gooje | Thornton Present Keith Lane | GGD Present Dominick Puniello | GGD Present

AGENDA TOPICS

1. INTRODUCTION

DISCUSSION	Alicia Caritano (AC) started the meeting with an introduction of project progress to date and stated that today's meeting will cover Follow Up on 9/10 Sustainability Meeting, Landscape Site Design Update, Energy Modeling Update, GGD Review of Mechanical System Options and Review of 1st vs. 2 Story Pedestrian Bridges. AC provided a summation of the Sustainability Priorities from the 9/10 Meeting, see attached. AC noted that High Level of Air Quality was first and that the Design Team will continually reference this list during design to insure that the design reflects the priorities.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

2. LANDSCAPE SITE DESIGN

DISCUSSION	Ashley Iannuccilli (AI) discussed the guiding principles of the site design: Connecting the Campus to the Community and to History. AI reviewed Community and History connection to the site design, see attached presentation. AI provided a bird's eye view of the campus and explained how overlays and city lines are employed in the design. Traffic circulation and student pickup and dropoff were reviewed thoroughly, see attached. Presentation showed opportunities for utilizing gym "service road" tied into Dutton Street. AC asked if AI could explain dedicated dropoff lane on Arcand Drive. AI reviewed the time specific pickup/dropoff land on Arcand Drive, see attached. Joe Drown (JD) noted that the lane pushes the sidewalk in towards the building and does not take away from any current lanes of traffic. AC stated that we still need to work out the logistics for the lane acting as short term dropoff/pickup in AM and PM. Jay Mason (JM) asked if this plan had been run by the traffic department. AI stated yes and that the discussion with Traffic and other City DepartmentsJim Dowd (JAD) explained that the tie in to Dutton Street is not an extension of Dutton Street but a connection to a "service road" behind the gym for drop off only, as general traffic will not be allowed to access the area. AI concurred with JAD's explanation of the Dutton tie in. Diane Tradd asked if Cobblestone's parking went away. AIstated that Traffic and the City are still reviewing this and other issues.. AC further explained the "service road" usage behind the gym tied into Dutton. AI explained the design for the quad utilizing synthetic turf, see attached. AI highlighted that the turf portion of the quad will be stepped down to a lower elevation relative to the surrounding areas in the quad, see attached. AI explained the planned main entry to the school, including the grand stair case, as well as the tapered slope avoiding the need for a specific HC ramp. Main entrance will have walls that can also be used as seating. 300 bike racks are to be provided on the campus. AI reviewed the Arcand Drive entrance, see attached, and noted that the quad will not be open to the general public. AI reviewed potential fencing options for the quad/Arcand Drive border. AI described what is being referred to as the "promenade" along the canal. AI described the picnic terrace in the area between the new gym and the canal. Mary Ann Busteed (MAB) asked if the picnic terrace would be visible from the cafeteria. AC replied that the cafeteria wall will be glazed so there is a direct view. AI asked if the terrace should be fenced off from the canal promenade. MAB replied yes. JAD asked for clarification that the 300 bike racks are 300 spaces not 300 racks. AC stated correct +/-300 spaces. AI described the proposed roof gardens, see attached. Roxanne Howe (RH) asked what is the practicality of roof gardens. AI replied that you need to look at how it will work in with the curriculum. Christine Clancy (CC) asked is there are local examples of high schools using roof gardens. AC stated PE just had one at the Martin Luther King Jr. school in Cambridge. Dan Aarons stated that garden can have some annuals and some perennials that are studied over the long term. AI stated that we need to establish buy in from the high school so that we don't build something that won't be used. RH stated the HS currently has some growing inside. AI reiterated the buy in is need and stated the roof garden can be reduced. JM asked if the design team has looked at the roof garden area relative to percentage of roof using solar as roof garden can't be everywhere. AC the design team is only proposing roof gardens in select areas. AI reviewed the 1980's building proposed light wells, see attached. MAB asked what else can be done with the roof gardens. AI replied that areas could be used as outdoor classrooms with perimeter year round planters. MAB stated that is a great idea as an unused roof garden is not a good condition.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**
		ongoing

3. PEDESTRIAN BRIDGES

DISCUSSION	AC presented sketches of the canal area depicting both 1 and 2 story bridges. AC presented the Pros and Cons of both options. MAB stated the volume of traffic on the bridges is the main problem not just connectivity. AC presented the costs of 1 story vs. 2 story, see attached. JAD suggested that possibly a design in line with other local mill pedestrian bridges between buildings may be more appealing historically. RH stated that 2 story is much more appealing from the schools perspective. RH also stated that the existing northern most bridge is in an odd location. AC agreed and stated it is being relocated. MAB stated that 1 story, but with a ground level footbridge would work. AC requested that the City to advise the Design Team as to the feasibility of footbridges relative to footbridges that span the canal, and confirm (by 11/15) if they would like to pursue this option.

CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

4. ENERGY ANALYSIS

DISCUSSION	Vamshi Gooje (VG) reviewed the Energy Analysis of the buildings which was performed, see attached. VG explained Energy Conservation Measures (ECM) and which ECMs were found to be priorities, see attached. VG explained how building loads were analyzed and that building ventilation was found to be the biggest load. VG stated that improvements in ventilation will therefore accomplish the most energy conservation. DA stated that they have made a computational model and that we are starting in the middle and working back out. VG stated we are looking to reduce loads on the HVAC system before we even decide what the system will be. VG explained that the 1922 side and 1980's side were reviewed and presented separately because the 1922 side is a historical renovation and the 1980's side is new along with full gut renovation. VG presented recommendations and next steps, see attached. VG presented the best ECMs found in the study, see attached. JM asked you are suggesting 10,000 sf of solar hot water and 40,000sf of PV? DA stated these are not recommendations these are what the systems would require for solar. Solar installed depends on what the appetite is for taking that option. Carlos DeSousa (CD) stated you need to look at the building overall usage to evaluate solar.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

1. HVAC SYSTEM OPTIONS

DISCUSSION	Dominick Puniello presented the Energy Economics Methodology, see attached. DP explained the 4 options for HVAC systems under consideration and the base line VAV system. A Life Cycle Cost Analysis of all 4 Options was presented, see attached, which included up front installation costs as well as yearly maintenance costs. DP stated that of the Life Cycle analysis was based on 30 years with the 5 systems studied, Option 3 is the least expensive up front with Option 1 having the most lifecycle cost savings. DP noted that Option 3 has the lowest energy usage. CD requested DP explain the 5 systems. DP explained the 5 systems. DA asked DP that the base system is not something that would be recommended? DP stated it would not be recommended and with the existing floor to ceiling heights it is likely not feasible in some locations of the existing buildings. DA asked that final costs be explained. DP that Option 3 VRF is the lowest cost up front being $1.7M less than 2nd lowest Option 1. DP stated that all of the systems are very efficient and reviewed the entire system pay back summary for all 4 Options. DP stated that Options 1 and 2 have very little maintenance at the end units. DP explained the maintenance required for all 4 systems. DP noted that all 4 systems although having different components will each require capital replacements of some equipment at 15 years. Jim Donison (JimD) asked what is the maintenance on Option 4. DP explained the maintenance items on Options 3 and 4, including VRF unit fans, condensate pumps, and filters needs maintenance at each terminal unit. JimD asked what are the Pros and Cons. DP stated the previous presentation described these in depth and then provided a summary. DP stated that the displacement Option 1 system is quiet with low maintenance. DP stated with the VRF you need to move more air. DP stated Option 2 has more potential air contaminant issues as it is a mixed air system. AC asked what are the pros for Option 2. DP stated they are all energy efficient and the results show highest rated systems are Option 1 and 3. Option 3 and 4 have the lowest EUI. JM asked if the loads include gas for cooking. DP replied yes. JM asked if DOER assistance that may be available for VRF is included. AC stated it is not. DP stated they will work off of 1 letter of intent for rebates with Ngrid. Katherine Moses (KM) stated the letter of intent will be after an Option is selected. RH stated that Option 1 appears to excel in all categories. RH stated that the 1 big factor with Opt. 1 is that it has the lowest maintenance cost. RH stated we want reliability, low noise and low maintenance. RU asked about the maintenance required. DP explained maintenance. KM asked is the city will get Operations and Maintenance manuals for all systems. DP replied yes. KKM asked if maintenance could be contracted out. DP explained that in Option 3 and 4 you need to be a certified technician to work on the refrigerant based VRF systems. Options 1 and 2 are water based giving you more maintenance options. DP explained how Options 3 and 4 tie you into parts from 1 specific manufacturer while Options 1 and 2 system are have more interchangeable replacement parts. Jim Green (JG) explained that they are currently having trouble getting replacement parts of the City Hall AC VRF system. KKM stated that this

	is a major decision, what are other projects choosing. DP stated they are seeing more displacement systems. JimD stated the initial plan with Option 3 would be to provide the required $197,000/yr in maintenance but that would eventually get ramped down. DA stated that all systems have assumptions on long term energy costs and that you are essentially playing the lottery with whatever energy source is chosen. JM asked how solar costs can be applied in to the calculations. DP stated they are looking at domestic hot water solar but a heat exchanger would be needed to dump heat if used for HVAC hot water heating. JM stated that thermal is not as big as PV. KM stated there is not enough room for PV to cover the required usage. DA stated when looking at PV you need to look at redundant energy sources. DA presented an "active" matrices that weighted the 4 options based on preferred factors, see attached. Group members expressed their priorities and a consensus could not be reached. DA suggested a vote be taken. Working Group members (not consultants) voted 7 for Option 1 and 4 for Option 3, Options 2 and 4 received 0 votes.
CONCLUSIONS	

ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**

NEXT MEETING: Monday 12/10 at 1:00 pm at City Hall – Mayor's Reception Room.

Please review these Meeting Minutes for omissions and/or inaccuracies and advise note taker.

PERKINS EASTMAN

WORKING GROUP

LOWELL HS PROJECT

EXISTING IMAGERY COURTESY OF GOOGLE EARTH

29 OCTOBER 2018

LOWELL HIGH SCHOOL

AGENDA

- 2:00 – 2:05: Sustainable Priorities Update
- 2:05 - 2:35: Site Updates
- 2:35 – 2:55: Energy Model
- 2:55 – 3:50: Mechanical Systems
  - System Alternatives/Questions
  - Select Recommended System
- 3:50 – 3:55: One Story vs. Two Story Bridges
- 3:55 – 4:00 Next Steps

LOWELL HIGH SCHOOL

SUSTAINABLE PRIORITIES FOLLOW-UP

Strategies	School	City	Design Team	Total
High Level Air Quality	4	2	7	13
Curriculum Tied to Building Facilities/Features	3	4	4	11
Quality Natural Light	2	2	6	10
Durable/Maintainable, Materials	2	2	5	9
Systems Monitoring & Control	4	3	2	9
Natural Ventilation & Light Wells	3	0	4	7
Solar Power & Wind Power	1	2	4	7
Multi-use Green Space-Stormwater, Teaching Opp	2	4	1	7
Plenty of Glass-Visibility	2	2	2	6

LOWELL HIGH SCHOOL

SITE DESIGN

GUIDING PRINCIPALS

"CONNECTIONS"

CAMPUS TO COMMUNITY

CAMPUS TO HISTORY

OUR TEAM LOOKS FORWARD TO WORKING WITH THE SCHOOL AND THE COMMUNITY TO EVOLVE AND DEVELOP A DESIGN TOGETHER THAT IS INCLUSIVE, COMPREHENSIVE, ROBUST AND MUCH-LOVED.

CAMPUS TO COMMUNITY

- In many ways Lowell High School is the "Center" of Lowell, not just geographically, but as a hub **education, growth and community**.
- The new campus will offer a wide variety of spaces both intimate and open. The site will support everyday use and enjoyment while also providing spaces that **bring together** cutting-edge educational and social programming within a diverse group of students and community members.
- Our objective is to create a holistic **sense-of-place**, unique to the Campus and the City of Lowell.

LOWELL HIGH SCHOOL

GRID OF THE CITY "LINES"

CAMPUS TO HISTORY

LOWELL HIGH SCHOOL

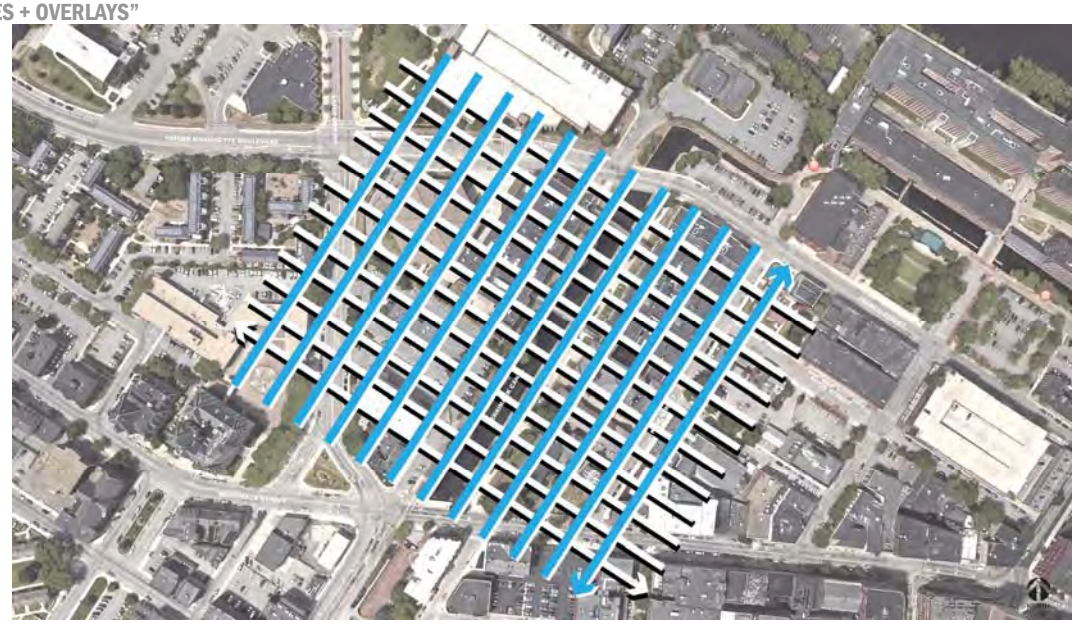
CAMPUS TO HISTORY

GRID OF THE CANALS "OVERLAYS"

LOWELL HIGH SCHOOL

CAMPUS TO HISTORY

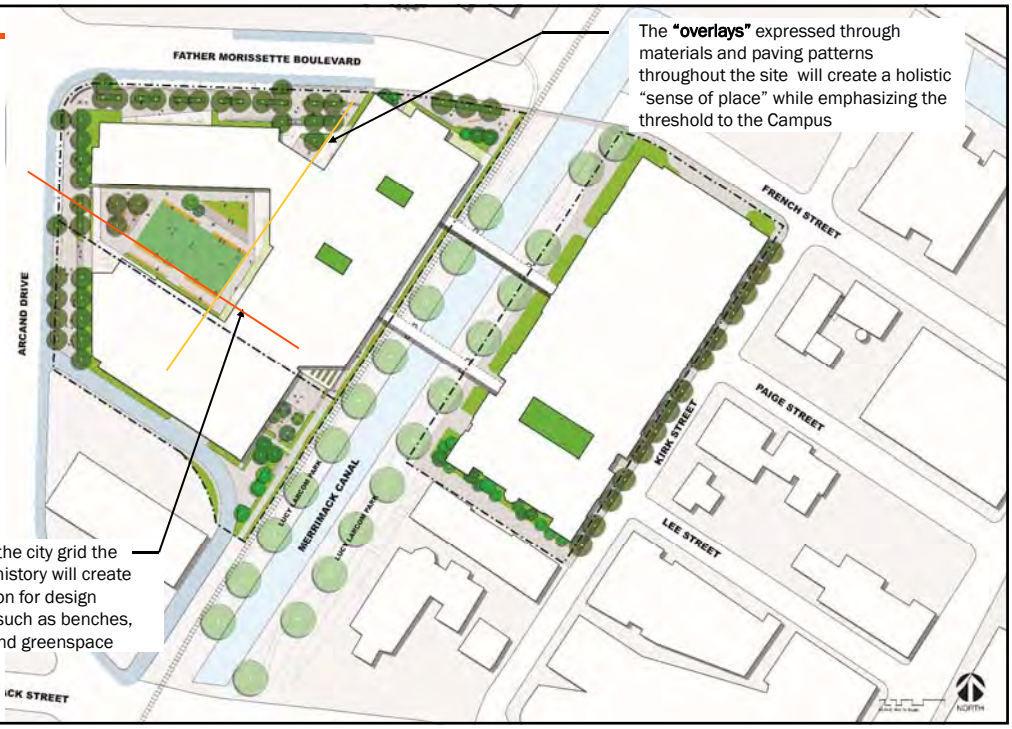
"LINES + OVERLAYS"



SITE PLAN

The linear and angular forms found on site are a geometric response to an urban grid tailored by a highly engineered system of canals fed by the Merrimack River.

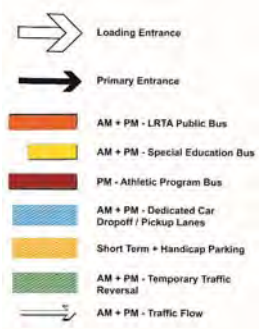
The City grid is a historic feature echoing decades of industry, growth and resiliency-**Taking formal inspiration from this significant framework,** or lines of history, will bolster the campus's connection to the city and provide reference to Lowell's deep history.

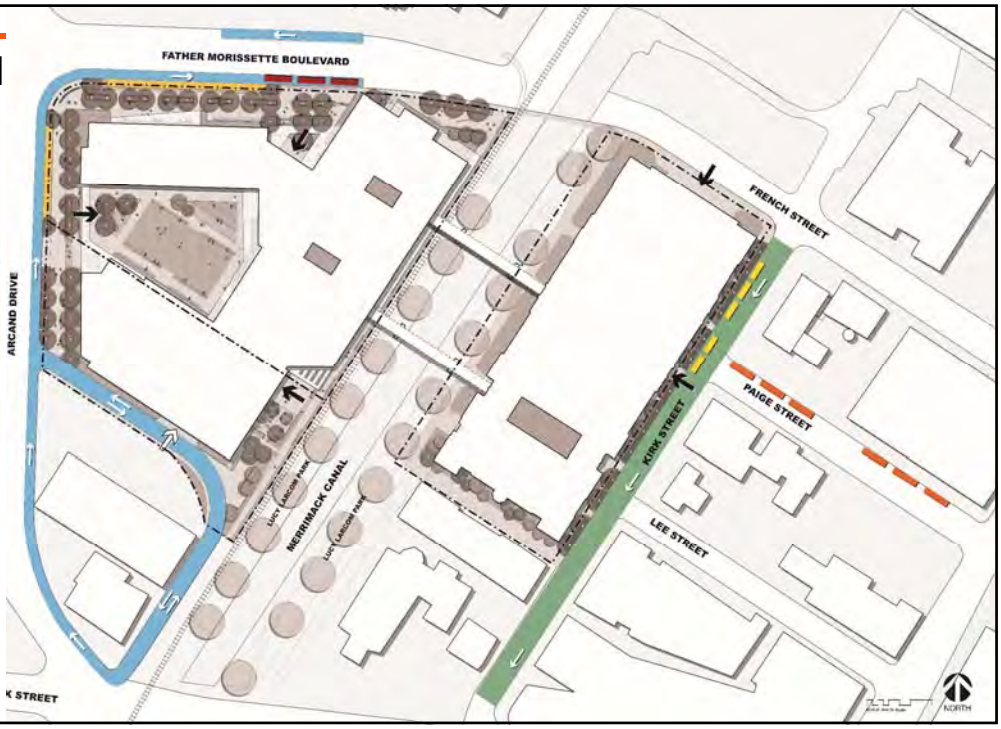


The **"overlays"** expressed through materials and paving patterns throughout the site will create a holistic "sense of place" while emphasizing the threshold to the Campus

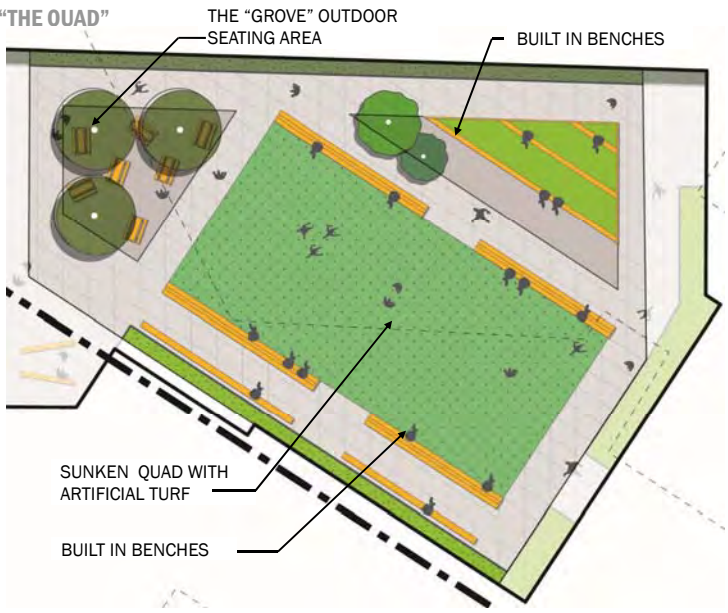
Based on the city grid the **"lines"** of history will create organization for design elements such as benches, planters and greenspace

CIRCULATION

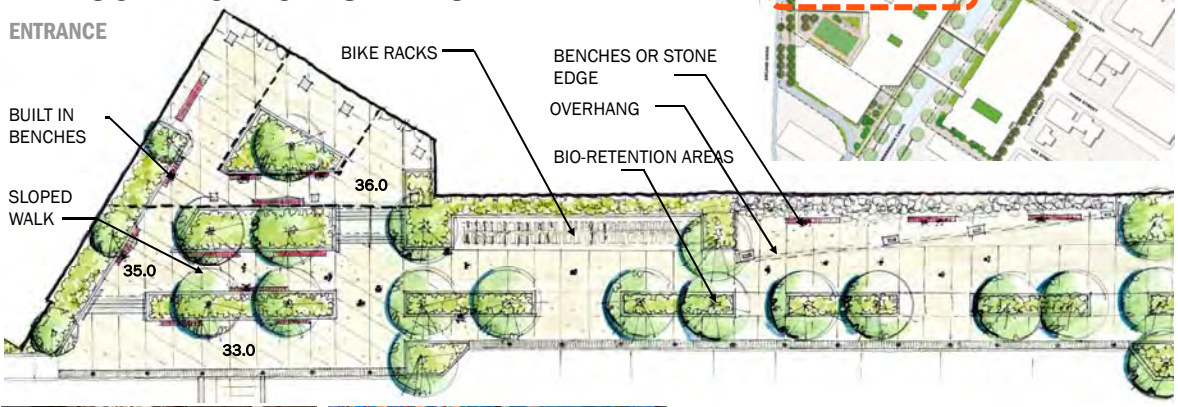


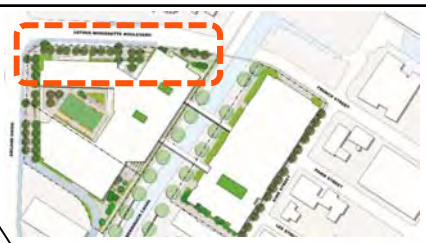


LANDSCAPE OPPORTUNITIES



LANDSCAPE OPPORTUNITIES



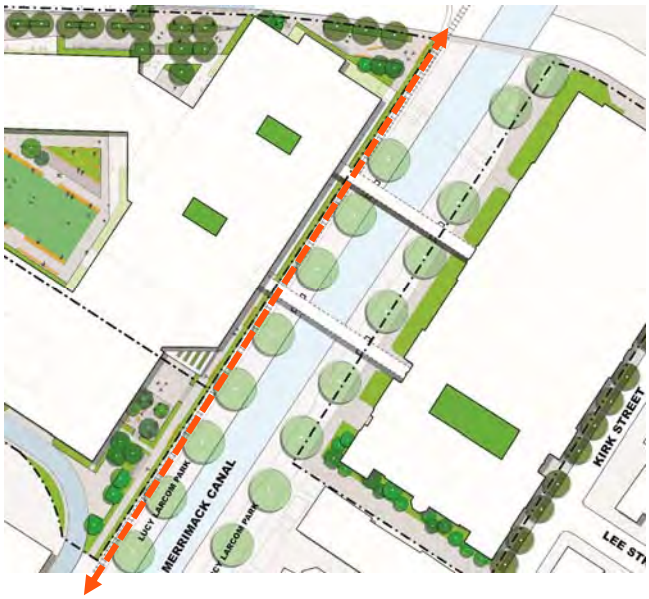


LANDSCAPE OPPORTUNITIES

"THE GROVE" AND QUAD ENTRANCE

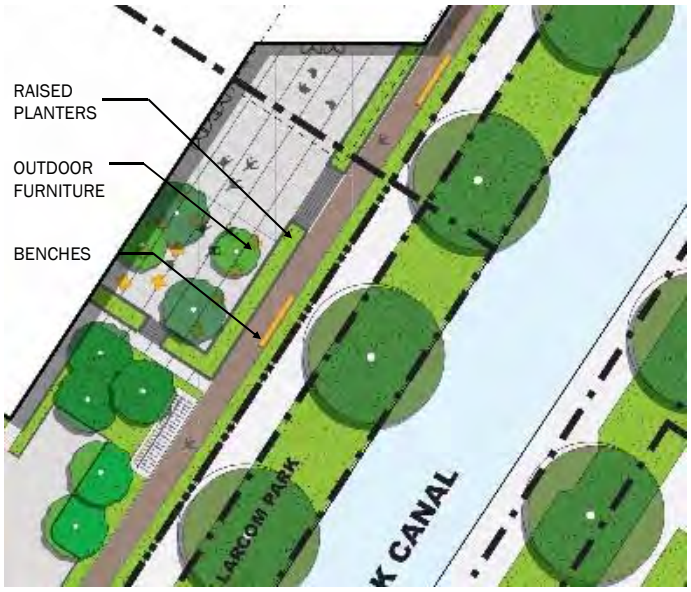
LANDSCAPE OPPORTUNITIES

"THE PROMENADE"



LANDSCAPE OPPORTUNITIES

"THE PICNIC TERRACE"



LANDSCAPE OPPORTUNITIES

"THE ROOFTOP"

LANDSCAPE OPPORTUNITIES

"THE LIGHT WELLS"

LOWELL HIGH SCHOOL

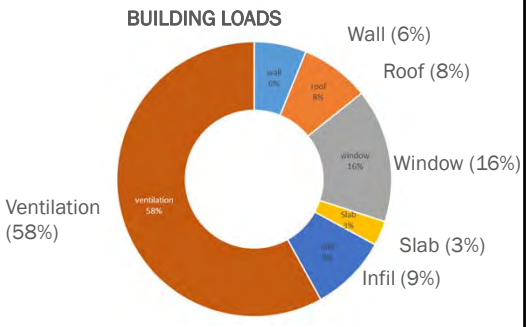
ENERGY ANALYSIS

Goal: Evaluate impact of Energy Conservation Measures (ECM) on energy performance of the Proposed Design.

Summary:

- Analysis of selected ECMs is separated for the west and east campuses.
- The west campus uses approximately **15%** less energy than the east Campus.
- Natural Ventilation & Demand Controlled Ventilation ECMs provide greatest savings due to large portion of building loads from ventilation.

BUILDING LOADS



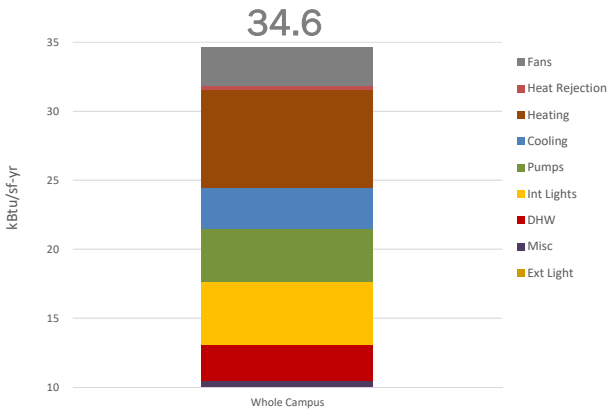
ENERGY CONSERVATION MEASURES

1. Interior Lightshelves
2. Solar Shading Devices
3. Replace Exterior Walls 1980 Building
4. Insulate Exterior Walls 1980 Building
5. Triple Glazed Windows
6. Natural Ventilation
7. MAU - Borrowed Air
8. Demand Controlled Ventilation (DCV)
9. DCV via Aircuity
10. Solar Hot Water

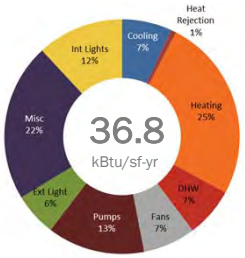
LOWELL HIGH SCHOOL

ENERGY USE INTENSITY

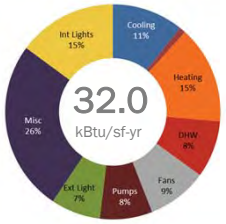
WHOLE CAMPUS



EAST CAMPUS - EUI



WEST CAMPUS - EUI

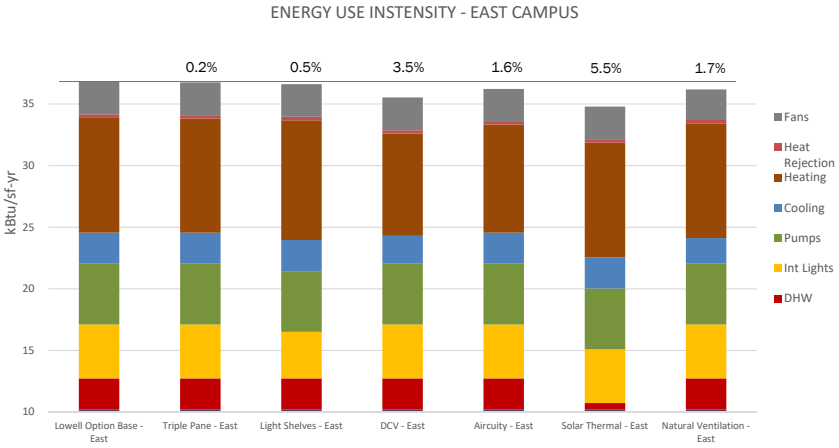


LOWELL HIGH SCHOOL

EAST CAMPUS - ECMs

Savings from envelope ECMs are small. However, potential improvements could include:

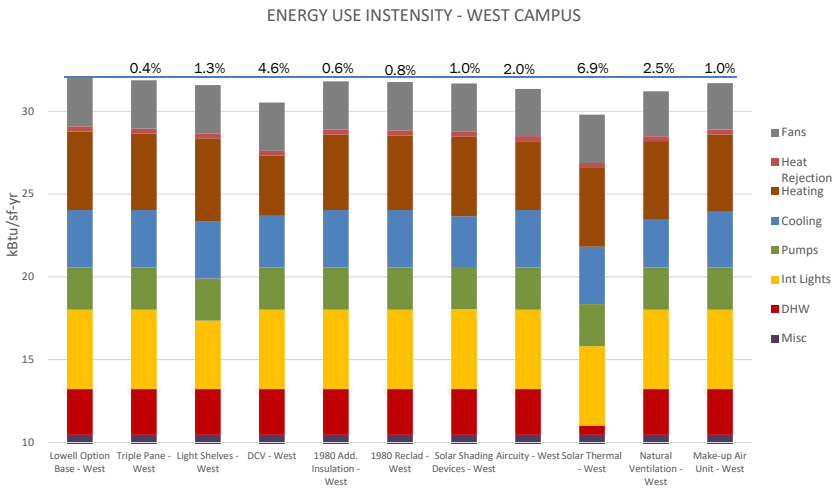
- Thermal comfort
- Eliminate perimeter heating
- Reduce HVAC system sizing



LOWELL HIGH SCHOOL

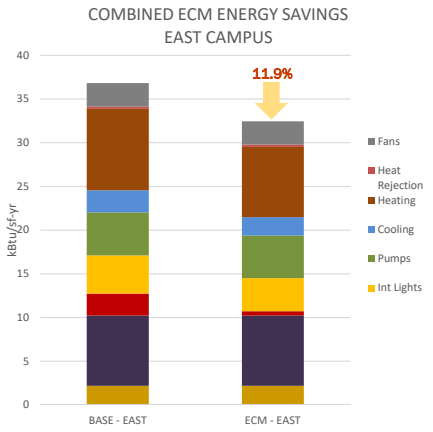
WEST CAMPUS - ECMs

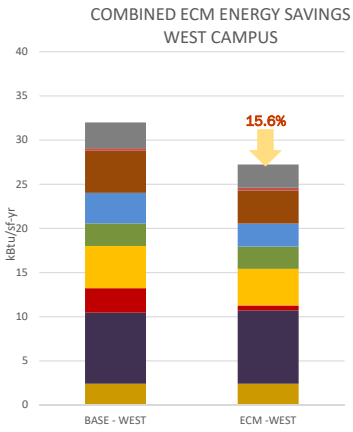
The west campus, due to new addition, has more flexibility to optimize the envelope than on the east campus.



LOWELL HIGH SCHOOL

CUMULATIVE SAVINGS OF ECMs

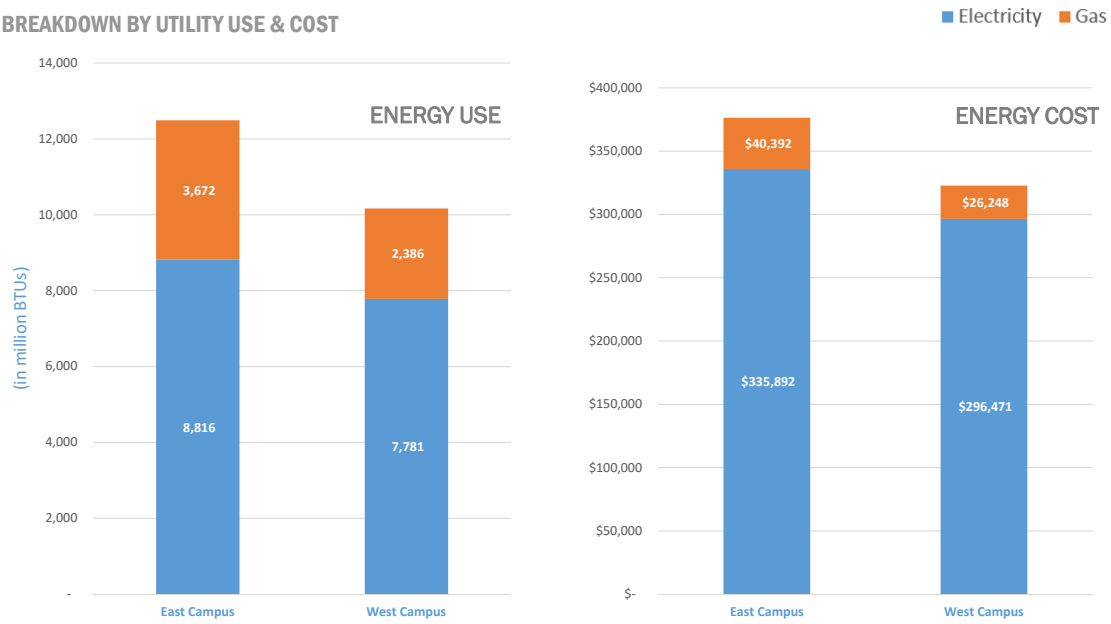




- Cumulative savings include interactive effects of ECMs with each other and will be less than aggregated savings of individual ECMs.
- West campus can achieve up to 15.6% reduction in energy savings with all ECMs incorporated into the design. The east campus shows 11.9% savings.

LOWELL HIGH SCHOOL

BREAKDOWN BY UTILITY USE & COST



LOWELL HIGH SCHOOL

RECOMMENDATIONS & NEXT STEPS

ECMs are sorted by savings, most to least:

ENVELOPE ECMs
1. Interior Lightshelves
2. Solar Shading Devices
3. Replace Exterior Walls 1980 Building
4. Insulate Exterior Walls 1980 Building
5. Triple Glazed Windows

VENTILATION ECMs
1. DCV
2. Natural Ventilation
3. DCV via Aircuity
4. MAU - Borrowed Air

RENEWABLE ECMs
1. Photovoltaics
2. Solar Hot Water

NEXT STEPS
1. Optimization of envelope
2. HVAC-specific ECMs once the system is chosen

Photovoltaic

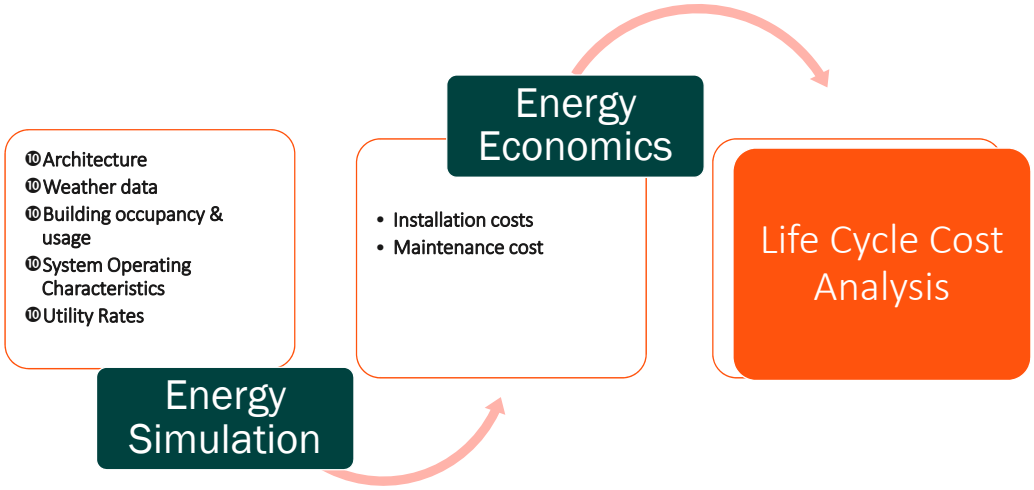
EUI Offset	Area (SF)	Size
5%	20,850	~ 280 KW
10%	41,700	~ 550 KW
15%	62,550	~ 830 KW

Solar Thermal

HW reduction	Area (SF)
90%	10,000

LOWELL HIGH SCHOOL

ENERGY ECONOMICS METHODOLOGY



GGD

LOWELL HIGH SCHOOL

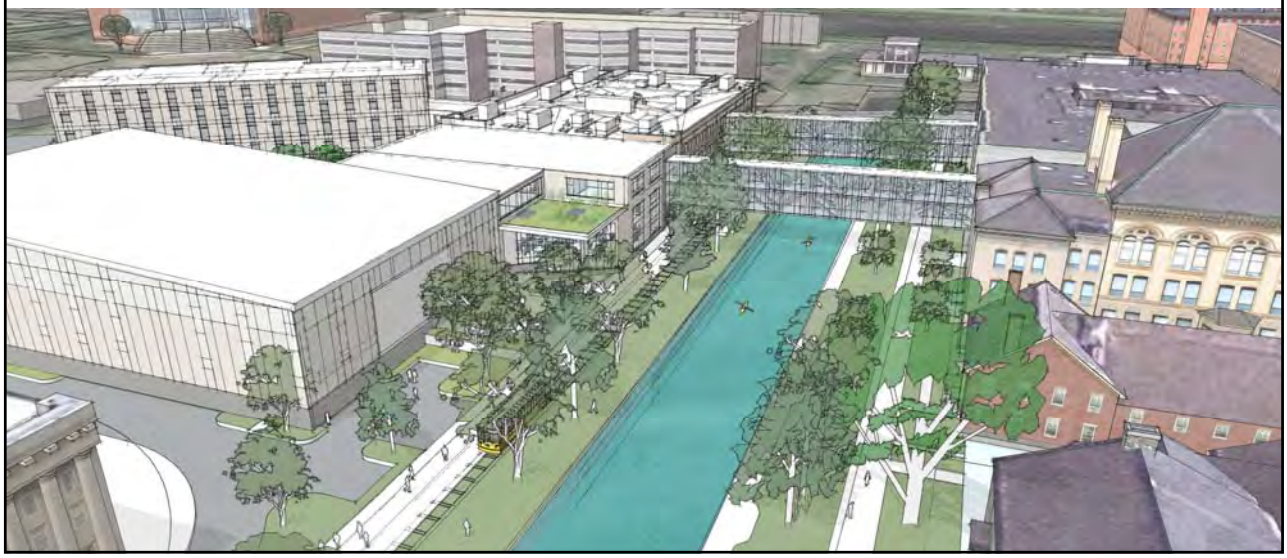
MECHANICAL SYSTEM PAYBACK SUMMARY

Baseline	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Gas Cons. (MBTU)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	Overhead Variable Air Volume (VAV) with Hot Water Reheat Coils	$33,736,056	5,764,910	13,095	$708,279	$118,174	$826,453	$1.33	52.7	$89,175	$915,628	-	-	-

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Gas Cons. (MBTU)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	Displacement Ventilation with Passive Chilled/Hot Water Radiant Panels	$31,774,914	4,864,326	6,058	$632,362	$66,636	$698,998	$1.12	36.4	$87,600	$786,598	$129,030	$6,352,858	Instant*****
2	Active Chilled Beam (Induction) Units	$33,697,599	5,045,697	6,368	$655,941	$70,053	$725,994	$1.17	37.9	$125,050	$851,044	$64,584	$3,063,669	Instant*****
3	Air-Cooled Variable Refrigerant Flow (VRF) Unit (All Electric)	$30,049,155	5,485,568	1,874	$713,124	$20,620	$733,744	$1.18	33.1	$193,550	$927,294	-$11,666	$4,767,267	Instant*****
4	Water-Cooled Variable Refrigerant Flow (VRF) Unit	$32,569,104	5,421,702	2,483	$704,822	$27,317	$732,139	$1.18	33.7	$194,550	$926,689	-$11,061	$2,753,255	Instant*****

LOWELL HIGH SCHOOL

TWO-STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH



LOWELL HIGH SCHOOL

ONE-STORY BRIDGE OPTION- BIRDSEYE FROM SOUTH

LOWELL HIGH SCHOOL

TWO-STORY BRIDGE OPTION- VIEW FROM ACROSS FATHER MORRISETTE

LOWELL HIGH SCHOOL

ONE-STORY BRIDGE OPTION- VIEW FROM ACROSS FATHER MORRISETTE

LOWELL HIGH SCHOOL

ONE VS. TWO STORY BRIDGES

- Educational Plan:
  - One Story = Connectivity on one level, longer travel distance
  - Two Story = Connectivity on two levels, shorter travel distances
- Historic: One Story = Increased View Corridor at Canal
  - Two Story = Decreased View Corridor at Canal
- Cost:
  - One Story = +/- $4,300,000
  - Two Story = +/- $7,200,000

LOWELL HIGH SCHOOL

NEXT STEPS

- 11/1: SBC Meeting
  - Site/Sustainable Priorities/ Energy/Mechanical Systems/One vs. Two Story Bridges
- 11/7: Faculty Focus Group Meetings
- 11/15: ISD/Fire/Police/Traffic Meeting/ Planning Dept. Meeting
- 11/19-12/14 Existing Conditions Investigations 75 Arcand Drive
- Note: No Working Group Meeting in November
- 12/5: Student Forum
- 12/17: Pricing Package to Estimators

Date Prepared	10/1/2018	
Project Name	Lowell High School	
Project Number	67150.00	
Subject	Focus Groups - Round 2 (Schematic Design)	
Meeting Location	LHS Lord Building Head of School Conference Room	
Meeting Dates	9/18/2018	
	9/20/2018	
Prepared By	Dawn Guarriello	d.guarriello@perkinseastman.com
	T: 617-712-2192	F: 617-449-4049
Participants	Perkins Eastman: Robert Bell & Dawn Guarriello (all meetings), Point Line Space: Peter Constable, Jake Constable Crabtree McGrath: John Sousa- Culinary & Foodservice only Cavanaugh Tocci: Alex Bagnall- Fine Arts, Auditorium, TV Studio only LHS: See specific meetings below.	

Agenda Items		Notes
11/15/16 & 11/16/16 09/18/18 & 09/20/18	**All Focus Groups**	LHS Attendees: Refer to specific Focus Groups attendees noted below.
		Focus Group Update: We are now in Schematic Design (SD) and the process of drawing the building will take an additional couple of years. SD is the phase where the budget is set. Perkins Eastman gave a project update with Site Plan and Floor Plans. Focus Group Process Overview: The LHS design & drawing process will take approximately 3 years before proceeding into construction. We are currently in the earliest phase, called Feasibility Study. We are gathering information, determining the space needs and developing goals/objectives with the City, School & Community. Through the design & drawing process, we will be meeting with LHS in the form of Focus Groups (+/- 4 times during the design process) and as full faculty forums (first one 12/7). Our objective in this first round of meetings is to understand the spaces needed, where they should be located & and any major equipment of functional requirements that might affect the shape/size and position of rooms. Current enrollment +/- 3,128 students. MSBA planned enrollment 3,520 students. MSBA average is 23 students per classroom. We will design layouts for average of 28-

		32 students per classroom LHS is currently experiencing. Current LHS teacher contracts are for 5 of 7 periods which is 71% efficiency. MSBA requires 85% efficiency & effective non-ownership of classroom. Refer to attached Process Overview Form with questions that were distributed prior to the meeting that serves as a framework for these Focus Group Meetings.
11/15/16 7:15-8:00 09/16/18 9:35-9:55	Safet;y & Security	LHS Attendees: ~~Jeannine Durkin Deputy Superintendent~~, Roxane Howe DIS/OPS, David Peaslee-LPD
		• Showed Essex Command Center image. Location is critical. • Reviewing Safety audit currently (2012 & 2016) • Places of Learning not prison feeling. • Visibility important- controlled visibility. • Natural safety & security. Define campus • Typical classroom- door is closeable but sidelight of window. • Compromise- Doors in locked position but open. • Front Entry, SRO w/ Admin behind (possible Command Center there) • Semi-main entry at the 1922 building- Controlled vestibule- satellite security, not SRO. • Two separate offices now. SRO=Police. Dective and Police. DARE=SRO. 4 police. 1 freshman, 2 main + supervisor. • Workroom for 3 plus an office. • If Main SRO held all security cameras, eliminates Security office they have. • Landscape fence- controlled access. • Possibility add elevator @ “public entry” of gymnasium • At the start of the day students/staff come into both buildings; only main entrance is manned. • Future goal is to secure all entrances per recommendation in safety audit; 32 entrances exist • Existing sign-in sheet at security desk (Raptor), not totally secure • Plan is for freshman to be part of campus in future; separate entrance pending layout • Kirk St. one entrance is open currently for Gr.9 travel between bldgs • Over 10,000 visitors per year • Vestibule control options; fully controlled w/ check-in and separate manned security as opposed to reporting to administration office; astounding number of people pass through the building in a day; would prefer secure vestibule in each building. • Restaurant: Current Public access to restaurant from Kirk Street with a buzzer but no security, students can provide access via buzzer. Future possible storefront at restaurant for visibility/draw for restaurant as well as security. Ideal design would have visibility of security desk. • Also public access to bank and store • TV studio and maker space no public draw currently • Field House Auditorium & Cafeteria need thought re; after hours; design should allow for zoning & controlled access • Deliveries occur from multiple access points currently: maintenance area (not always manned), main entrance, & freshman academy; bulk of deliveries at Lord Building currently – difficult access for trucks that requires shuffling cars, delivery would need to be reconfigured.

		• Security Space Needs: Existing 3 in Lord Building – Police/Security/Dare and 1 at Freshman Academy. Future: ideally 1 for Freshman Academy if remote, SRO offices w/ meeting space approx. 150 sf, computer is remote w/ a couple of monitors, some schools secure command and control center w/ consoles or interior bunker type locked and secured room. Security Staff: also space for a couple of security staff, DARE is same space -needs to feel welcoming and accessible to students • Other security space needs pending Lobby design • House offices have a lot of traffic and would be good to be centrally located near the entrance • Student support office for enrollments also very busy and should be located near entrance • Field House has a lot of traffic and should be near security office • Unique challenges of canal & trolley including response time due to remoteness of buildings, if staffing permits would be beneficial to have staff in each building. • Multi-level bridges would help alleviate congestion and keep students in the buildings • Some open dining on the west side of the canal; a few incidents of issues with kids adjacent to tracks; option for cafeteria w/ contained outdoor dining (currently no recess option for air and sunshine; existing cafeteria is very contained and crowded and outdoors is a release- perhaps double duty space for outdoor dining and classes • No current student roof access • Special safety / security equipment: licenses by FCC use of the radios, need 1 antenna for repeater of the radios (currently roof of the old building)
11/15/16 8:00-9:00 09/18/18 8:45-9:35	Health & Bioscience Pathway	LHS Attendees: ~~Roger Morneau-Dept. Chair~~, Killian McAnaney-Science Teacher, Stephanie Selvaggio, Roxane Howe
		• Mill City Grows, Farm to Table • Engineering externships- Environmental. Trying to get a Sustainability Pathway, Natural Learning opportunities (bioswales?) • Set up labs for up to 26 students. 30-32 students is WAY too many. Up to 28 would be ok (as an increment of four) • No ownership of classrooms, organized in STEM clusters. 3 SCI + 3 MATH, with T. PLAN nearby. • T PLANNING- want each teacher to have their own spaces within the T planning room. • Microbio, BioTech, Health Asst. Astronomy, Froensic- new to the Dept head position, hard to talk specifics about what needs to be in them. • Consider ductless fume hoods? More work, but less ductwork. Save energy overtime. Makes all labs interchangeable (unless you need services) • Send intermediate information prior to next meeting if possible, we'll do layouts to make next meeting more productive. • Likes the vertical greenhouse images and horizontal (maybe in bridges?) • Pathway created after building was designed, so current configuration is not ideal • Core course microbiology; currently 1 room Bio Lab scheduled, future ideally micro & bio tech lab w/ clean room

		• Vision for pathway: medical side like teaching hospital demonstration /mock-training area or patient, if get Certified Nursing Assistant (CAN) program which is a goal, regular lab w/ curtained off area and exam table • CNA Training Area would need to be authorized by department of Education; LHS to confirm if this space should be included • Would like health and bioscience cluster in each building, • MSBA standard for lab 1440 sf plus Prep Room 400sf: Lab is one large space w/ fixed perimeter casework and loose interior furniture which can include mobile demonstration tables which floats, and prep room with 2-sided fume hoods, and standardized sizes gas etc. • Microbiology: ideally specialized Clean Room w/ fume hoods • New Clean Energy Pathway w/one course spearheaded by Killian; idea to include renewable teaching tool in building i.e. PV, geothermal, wind. PE noted that if budget does not allow for renewables at outset could plan for renewables to be included in the future. Collaborating w/ U Mass Lowell and Middlesex Community College – speakers and field trips. Part of class is field development, and getting credits. Curriculum is developing. • Clean Energy is a grant from Mass Clean Energy Center: **LHS to provide copy of Grant.** • Grants received would be subtracted from MSBA reimbursement • # of students in pathway varies; students can get in and out of pathways, hard to predict number currently, need to understand space needs pathway vs. larger science curriculum (can design to fit up to 28) • Combined Old "Kouloheras" Building East Side of Campus: no Health and Bioscience, Room 304A, 1 chemistry mixed use room 314, 304 mixed use • Flex Teaching Room could be lab room; medical terminology & procedures • State mandate: nobody owns a room, typically need to plan for 85% utilization (maybe less for Science due to labs) • Central Department Room: possibly a collaborative space for teachers that is not just for Science; proximity helps with efficiency • Organizational Models: Want collaborative clusters w/ Science in each, STEM school. Science is critical organizer because of specific rooms that are not interchangeable, possibly cluster w/ disciplines ie. Biology, Physics, Chemistry • Other Specialty Needs: Greenhouse, growing, rooftop equipment i.e. Weather Monitor • Big push in Lowell for gardens as a teaching tool; D House/coffee center (was a plant room), and greenhouse space Plant Room 650 – both are too small and not utilized; green space could tie to all levels of Bio and honors genetics, both existing spaces too small • Weather Center would be beneficial for Meteorology classes • Can the Canal/Bridges be featured in the design & educational mission / Building as a Teaching Tool i.e. hydroelectric power for clean energy, deflection of bridges, PV panels on bridge portions elevations (energy & shading) • Student and Department Input That Would be Beneficial: Future of teaching and learning? Students learning at their own pace? The flipped classroom? • Technology: Target at this time; 1 to 1- timing pending funding. • Biotech: None at this time, but was previously discussed with MCC, would like to pursue this – possible certified pathway. MCC Biotechnician program. Need to confirm if this program will be included in planning. • Microbiology vs. Biotech: both would need a clean room. • 9th grade: teams of 4 or 5 classrooms including a science lab? • Dual Enrollment: biology, U Lowell removed credit because LHS has no physical labs & resources for credit; UML Chemistry and Biology

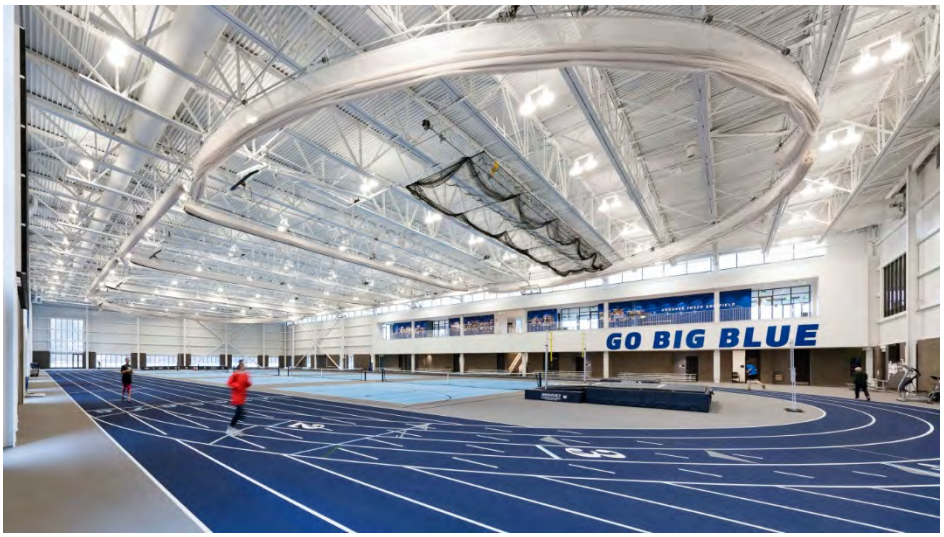
		• Offices: currently Dept. Head in Teacher's Dept. Mezzanine in old building • **LHS to coordinate representation from U Mass Lowell & Possibly Middlesex Community College in next round of Focus Group Meetings.**
11/15/16 9:00-10:00 09/16/18 9:55010:45	Freshman Academy	LHS Attendees: ~~Jill Lang-Director~~, Bopha Boutselis-9th Grade Math Teacher, ~~Mark Cullen-9th Grade History Teacher~~ Kerri Morales, Jill Rothschild, Michelle Harvey, Roxane Howe
		• Freshman Admin at second floor- Office includes guidance. Check-ins happen at the SRO. • Freshman have their own Cafeteria with server. • Makerspace on 1st floor with Labs. • Media Center split into two spaces. • Controlled visibility from Classrooms/Corridors. • Need large lockers, Athletic storage in classrooms now. Possibility of having a variety of sizes available. • Possibility of having lockers at corridor for storage at Gymnasium. Same for Music. • More filling stations for water bottles- requires a city worker to change filters. Available without filter? Low maintenance. • Use other spaces for planning, conference, and cafeteria? Etc. • Need a place like the theater for all Freshman (~800) presentations/performances. • Show multiple classroom layouts for next Meeting. • Very important that Freshman Academy is separate: Freshman Academy model separates Freshman to accomplish a smooth transition between middle school and high school • Statistically separation helps; students need extra support beyond that of house model • Currently 760 students, typically 750-850, highest was 1000, surge anticipated next year • Currently 3 teams organized in clusters, originally 4 teams of 8 , 4th cluster removed a few years ago due to staffing cuts; plan for 4 clusters of 8 teachers of 110 students • Director w/ 2 support staff per cluster helps minimize behavioral incidents • Course offerings were less, now have more high honors, geometry and algebra • Team: Math, Science, English, Social Studies • Outside of clusters: 2 full time and 1 part-time Specialists, 2 specialist classrooms + 2 SPED that work w/ all classes, full-time suspension, balanced literature teacher, adjustment program, emotional disabilities (moved to main building 2 years ago due to space shortage but should be with FA) ,3? foreign language (spanish, Kamir, French) and 2 health, Missing Latin Lyceum, and ELL spaces (separate now due to space) – need direct connection to FA • Key to have guidance and social worker in Academy for quick response time to correct behavioral issues • Existing FA was middle school so layout does not reflect current HS needs. • Smaller communities w/in each cluster helps minimize class cuts and improve behavioral issues, staff recognizes students and knows who should/shouldn't be on the floor • Currently separate cafeteria and theatre; inherited the theatre which is currently used for seminar and assemblies but not crucial for future • Some Freshman activities on Main Campus help ease students into upper class campus: existing - gym, library & theatre, future possibly others i.e. Foreign Language?

		• Cafeteria: distributed dining w/ choice and scaled social dining vs. large area w/ multiple seatings. What is the ideal for the FA? Possibly dine on main campus? Need to explore safety benefits of smaller cafeteria but possible benefits of larger integrated cafeteria Freshmen can be vulnerable and need a safe space that is not too crowded. Freshman start as timid and unsure and some may not feel comfortable eating lunch in a large scale situation with all classes together; explore both separate and integrated dining. • Teachers Rooms: Currently 1 large teachers room on 1st floor. May be difficult to convince teachers not to have their own rooms for belongings, materials books etc. and time to travel to common area. Also concerned with space to leave their materials. State provides 100 sf / teacher/classroom for space for teacher. Friday 11/18 tour to Essex Tech w/ teacher planning rooms outside of the classrooms. Planning space includes some limited file cabinets/storage. Storage planned into classrooms as well as additional general storage. • Would like some separate area w/in room for multiple situations/flexibility i.e. separate cubicles for tests. • Teacher space: shared technology • Classrooms: how to personalize and share space? Concept "primary ownership" 85% utilization, plan for flexibility • Still have 100 sf/ for teachers which could be Teacher Planning Rooms or other • Classrooms: Flexibility, possible break out or pull-out /spaces (enclosure could vary), option shared space in the corridor w/ good visibility. • Existing Corridors: A bit small and can cause congestion, but also intimacy and no nooks and easy teacher insertion to prevent incidents, no cross corridors and no unsupervised areas, only one near nurses in existing, easy to supervise id and makes for good eye/contact and conversation w/ teachers, all corridors visible good line of site no hiding • Maker Space: created last year, part of integrated science used by science ea. cluster and Latin Lyceum, functions as a lab and need to schedule, directly related w/ curriculum, 3-D and laser printers w/ lab tables, large touch screen monitor part of a grant • Maker Space: Space can vary greatly pending on district needs.Where should space be located- proximity to 9th grade classrooms is part of Grant, adjacent to Media Center? could be beneficial to entire campus. **Roger to provide copy of Grant.** • Media Center: FA uses Main Campus library currently • Computer Lab: Rms 810 and 903, issues, 903 not enough room for notebooks at desks, State does not have an allowance for general computer labs that are not specific i.e. Graphics, expect this to be in Library or other space. Currently need to schedule rooms for classes to use this space. Alternate Idea: computer carts in each classroom, technology FFE/Technology budgets for computers etc. • Guidance/Social Work: Office 716A, 717Teachers: currently separated but not desired, just an existing space constraint • Main Office: 800, In-House Suspension 715, 1st,middle office Cluster 7 / ELL, next Rose Cluster 8 Guidance, last Gina Social Worker, Side Office Storage, Reception is 1 Clerk, need a security and check in office not currently available, all buzz in and go to Main Office; ideally want separate waiting room for parents separate from Office and students/ copy etc. 800 main office: 1 person works there, top left office 100 was 2nd student support specialist that was eliminated budget cuts would be beneficial, Student Support, Special Ed Testing, Conference,

		• Rm 811: Gear Up and Talent Search w/ Middlesex Community College: small classroom, need an office and a few desks and small table; need to check if Grant extends / funding, good to include office for outside partner or school counselors, but then would need large office and no classroom • Rm 902: Was teacher's room, now used for screen testing, hearing and vision, plus 2 nurses office 1 has 2 cots, the other has none • Rm 901: science but no classes scheduled, used sim to Maker Space, kitchen not used –was inherited, includes large lab tables which are missing in existing science rooms • Rm 852: Copy Room and Teachers' Lounge • Rm 850 / 851: captured room in back, now used as teacher room but not teaching because open and acoustical issues • Storage above theatre used as dressing rooms associated w/ Fine Arts dept.; MCC rents the theatre too, would need storage and props storage if theatre stays, • Special Ed & Testing: speech and testing, varies from year to year • 859 Room for speech and hearing impaired, this is not only a freshman class (in FA due to space issue); some freshman but also upper class
11/15/16 10:15-11:15 09/16/18 10:45-11:35	**ELL/Foreign Language**	LHS Attendees: ~~Stephen Gervais ELL/Foreign Language Dept. Chair~~, Barbara Hodgson-ELL, Jeannine Ameduri-French Teacher, Roxane Howe
		• ELL paired throughout building (as opposed to all together) WL is more like a department. Classrooms are 900sf, renovated spaces but made bigger. • ELL could use pullout not inside the classrooms, tutors need to pull out. Alcove desired. Tutor has to be in a room with a teacher. Tutors are not certified teachers. • Small alcove between classrooms- use furniture w/ sound absorption and a door between the classrooms. • Tutors only at the lowest proficiency. ~4 total, so two groupings. • Look for locations in renovation for rooms that may be larger to accommodate alcoves. • State does not recognize Labs ass pullout space. Current Computer Lab is like a Classroom, a language lab. All students use headphones at the same time. No one can hear each other. • "Listenwise" allows students to stop, replay, repeat, etc. • Technology Lab- use one of the ELL classrooms? Maybe two. Carols in all rooms and one or two full technology labs. • Consider operable partitions between a couple rooms for smaller classrooms if needed. • "Lightwells/Courtyards"- Rainwater tube and barometric pressure • Will have distinct Freshman Academy currently 3 teachers (French, Spanish, Kumai – currently feeling isolated) teachers are there because of shortage of rooms on Main Campus • ELL:many ELL students have tutors (currently 8 tutors), would like adjoining pull-out area not in classroom for extra help/attention, law is no wall or door allowed between tutor & teacher, would like 3-4 normal sized student study rooms for before & after school tutoring and projects during day, also would like another Language Lab w/ integrated technology for daily ELL use (currently in room 237 in "Kouloharas" building, trend is mobile labs, like carrels for writing and listening and helps overcome shyness, privacy encourages students to speak w/out intimidation, also fewer distractions then

		mobile labs, Room 237 is not a scheduled room currently, one lab shared by 2 departments, the state doesn't fund dedicated labs(they expect media center to be used, but we can make the case for language labs) • Carrels would not work well in the classrooms • ELL: like these distributed/integrated in pairs of 2(for a buddy) as opposed to ELL wing which can be isolating and "against the law". The students sometime feel that they "are not part of LHS", Also good for teachers to integrate w/ other teachers in their discipline. Students need to be exposed to what students in Gen Ed classes are doing. • Foreign Language: How should this be organized – an area or wing, a cluster on the cusp of academic classrooms? Either could work, need to query other teachers. Benefits to collaboration. We can test options. Foreign language tends to want to be accessible and possible on the cusp of academic language similar to science (would have windows). Like to collaborate in a language cluster. • Flexible Learning; want more Independent Spaces w/ good visibility. Won't work in a corridor but could work in smaller pull-out or study space that is not a traditional classroom for smaller groups of students. Need some separation i.e. an arch that provides some enclosure but is not full wall. • ELL/Foreign Language: "Lab" surround sound, or sound proof; existing requirements for sound are much higher than older traditional classroom designs, also options integrated sound security in a classroom need to discuss the value of this vs. budget constraints, sound reinforcement – wire separate system w/ speakers and teacher wears device, every room short throw data projection w/ built-in sound reinforcement, centralized sound system center room picks up sound system (acoustical consultant part of team to help create effective learning environments and also evaluate acoustics for mechanical systems – issues w/ rooms on courtyard currently) • ELL enrollment can creep from 16-30+ during the year; can some rooms be expandable? • Teacher Work Rooms and Offices: Most located in the Mezzanine of "Kouloheras", would like to be with other Academic Chairs Colleagues. Idea of large Teacher Center or dispersed Teacher Centers. There used to be a Foreign. Language common meeting areas. • Student Support area: Need to acknowledge distance and privacy when considering teacher center design. • Other spaces: Storage, Dept. Offices, would like central storage or w/in classroom areas, text books are still used. Some storage can be included in rooms. • Lockers: need places to store and lock things up. Like the old built-in cabinets form the 1922, like the glass for visibility and helps with dust.
11/15/16 11:15-12:15 **09/16/18 11:35-12:25**	**Wellness & Physical Education**	LHS Attendees: ~~Jim DeProfio PE Chair/AD, Pat Swett PE Teacher, Krisi Keegan PE Teacher/Coach~~ Dave Lezenski, Pat Swett, Roxane Howe
		• Conference, Suite of Rooms, AD appears the State has accepted, know that they can still come back to change their mind. • Tight Gymnasium, but are able to get bleachers in, matched approximate of what is there now. More fixed, less mobile than what exists. • Locker Rooms are smaller than what we typically see, but becauses teams travel to fields. • Dave to update Team list who is on campus/when.

- Storage, Storage, Storage- never enough storage
- Cheerleading and Wrestling Mats aren't the old heavy mats. (7) 6' rolls- kids can lift them now. Baseball and softball lower from the ceiling.
- Lockers in the corridor for daily storage.
- Need an equipment room.
- 18'-0" floor to floor- be creative about vertical height for storage.
- Training Room
- High Density Equipment storage. Peter to send cuts to Perkins Eastman. GearBoss- by Wenger.
- Coordinate w/ ROTC and SPED- Look at Phillips Andover Field House solution for partitions that drop.



- Not an Officials Room- use Coaches or Athletic Directors office.
- Wrestling pats right up to the wall, that's ok. 42'x42' minimum. Planned on 42'x84', pad all the walls.
- Multi-purpose gymnastics, how does it get laid out? Can it open up to wrestling? Balance Beam, Vault, Horse, No rings, Uneven Parallel bars. Full sized competitive gymnastics.
- Fitness- 1500sf
- Weights- 1500sf Previous hired Gronk Fitness or NE Fitness to lay out.
- Maybe Fitness & Weights can be combined for one big space. Ability to have film study and media inside of that room.
- Assume all equipment should be new.
- Just bought new banners. 4x8 banners- design for them and more!
- Scoreboard- just bought one. Would like to repurpose.
- PE Offices like a workroom
- Team Rooms and Locker Rooms need to be laid out.
- Training Room- Hot & Cold water, 5-6 tables, whirlpool, Wally Collins to help design it. Current training Room is terrible/unusable.
- MSBA funds Physical Education including 12,000 sf gyms but not "Field Houses" or Athletic Team locker rooms
- Want flexibility
- Desire to get mats up off of floor to use space for Zumba or other
- Athletics only permanent equipment set up is gymnastics

		• Have both a boys and girls interscholastic team, beyond that separate rooms off of gym are all used for PE program with athletics use after school and weekends • All spaces well utilized between 8am-8pm • Plan diagram provided is ideal sketch (not to scale) reviewed w/ all coaches and tried to be realistic and practical. PE noted that this diagrams contained more stations than is typically funded by MSBA • Gym: synthetic floor w/ lines to delineate basketball and track • Long jump (LJ) and triple jump (TJ) have are sand pits that can be closed w/ covers for PE application. • If need to compress footprint could be on multiple floors • Wrestling 42x84 full set up with soft divider • Gymnastics need layout assist: **LHS to provide diagram** • Yoga/Weigh Functional Strength: 35-37 students at a time, current room is a little small • Weight Room: Olympic lift/traditional type room free weights, weight training more than core training, kettle bells, weights, storage on perimeter, fitness balls, medicine balls, • Desire small size instruction, variety of very active kids • Functional vs. weight separate rooms: should there be transparency? • Long wall looking out into gym: top safety glass & bottom solid, opportunity for shades for privacy on glazing • Mens' / Womens' Room: want to avoid students returning to the locker room mid-period, would like return to be monitored w/ teacher supervision; don't want students left unsupervised, • Main gym lacking system of dividers– curtains or others; hard vs. soft options • State standards: plan for 23 avg. size; state considers 1 gym station 3,000 sf; diagram shows 8 stations, will explore validated square footage and see how to divide to accommodate stations • State doesn't fund natatoriums • Locker/Shower Rooms: showering is activity dependent, Pool / swimming they shower, lockers are divided for PE and Athletics, Lockers are used during gym period (students bring own lock) # lockers is enough for 1 PE period = +/- 35. Varsity Locker room used in season. • Ofices for PE: There are no athletic offices, there is one PE office in each locker room, and one at pool, 1 at Varsity, and one in the hallway. Offices are shared for 2 people, some are for 3. Coaches share the spaces with the PE teachers. Envision gender offices for PE/Coaches. Seriously missing in current design is a teacher / coach spaces to change and shower that is separate from students; would like private adult dress/shower. • Storage: 2 specific types, Cage Storage for teacher instruction, open w/ locks for nets racquet sports, jump ropes etc., also permanent bleachers w/ storage below, slop sinks, Zamboni machine, storage for teachers. • Access to outside: Only green space adjacent is green triangle at Tsongas Center. Teachers would like outdoor space; creative ideas- turf top of garage. Need field space to enhance instruction. • Overlap w/ ROTC –marching upstairs in the morning in Field House • Options to lift things into the ceiling; existing baseball cage is lifting into the ceiling and used for baseball and softball, have 1 cage that lifts. • Other large equipment: Indoor shot putt (plastic casing filled w/ buckshot) needs to be caged in. Functional strength – have some equip in weight that was donated.

		• Functional training/fitness; moving the body in ways similar to your daily activity (picking up groceries, twisting, turning, walking carrying), PE which designed to manage physical demands of real life. Need an open space, with things that move kettle bells, sleds, medicine balls, climbing ropes, each class can re-invent itself/not structured, can change by grade level and need, could have turf. • Natatorium: 6 lanes @ 25 yards, looking for 8 @ 25, and a diving well in 2 lanes, or bump-out diving well, for Phys Ed reward is to go learn diving, also large part of program for interscholastic teams. Range – some students may not want to put their face in the water. Intent is to level the playing field for all of the kids that don't belong to gyms or have private lessons. Range: learning to swim, water polo diving, instruction life guards; divide lines to provide flexibility. • Ethnic / Cultural Specific Considerations: Changing / showering – some cultures have difficulties participating in PE because locker rooms are open space. What to plan for to accommodate these cultural issues? No gang showers. Would prefer fewer shower heads if it means more privacy – may increase participation. Existing girls room changing stalls; most use these; would like to see these again. Boys individual also get used to change; only 2 existing. • Refer to attached "Lowell High School Physical Education/Athletics Plan for Focus Group provided by Jim DeProfio that includes additional "pencil"/lowercase PE notes.
11/15/16 12:45-1:30 09/16/18 23:30-3:20	ROTC	LHS Attendees: Eileen Ironfield-Senior Instructor, David Smith-Instructor, Roxane Howe
		• ROTC drills in Gym, Other spaces in Basement of 1922 building. • 6:30am is Drill Team • Drills is part of ROTC+ Uniform- can report • Gym Equip is now in 30x25= 750sf • Send an enlarged ROTC plan to them- plus overall floor plan. • Check in with ROTC on 10/16 meeting day • Basement ok because spill out into corridor- there is less traffic in those basement corridors. • Existing = 4 classrooms + cadet staff/conference classroom + classroom for supply + office + bathroom taken over for gym • 385 students in ROTC, 4 instructors (5th mandated at 350); had 232 15 yrs. ago, has increased gradually. When HS was 4000, they had 475 cadets • Students begin and end in classrooms, but they pull-out typically for inspection, drills (in hallways… they get interrupted), PT • Drills need a gym space (2500sf regulations based on units of 100) • Drill space needs height for rifle toss • 6:45am gym used for drill (to not conflict with PE/Athletics but teachers used to run, creating conflicts). Gym is used 5 of 7 periods and before school by necessity (drill, inspections) • ROTC cadets train for numerous events • See regulations; noting they are minimums and based on 2 instructors and 100 cadets. Classrooms (CR) capped at 32 seats/CR • Cadet Staff/Conf area for 14 computer carrells, 24 seat conference (also used for counseling). Could probably change to laptops if school goes that route, except for use of Turning Point Software (not mac friendly) used for teaching classes • Cadet staff have jobs, must interact with US Air Force website

		• ROTC office should be for 4 instructors + Director • Ideal location is with gym/drill space, but also at ground-level with access to outside
9/16/18	Main Administration & Nurse	LHS Attendees: Roxane Howe, David Robinson (Student Support), Mary McLauflin (Nurse)
		Nurse: • It's important to have natural light. In space • More space than currently have- now shoulder to shoulder. • Currently have 5 cots. An observation room to see the sickest. Called the "nursey" • Want 6 cots, 2 toilets, a lactation room, room for approx… 6 people for private meetings. • Waiting area- try to take right away. • 6 cots. Curtains. Exam Rooms (2) Toilets (2) Storage- Wheelchairs (2) + Supplies • Full Size lockable Refrigerator + Ice Machine • Lockable medicine cabinet • 3 Scales • Emergency bag taken out in evacuation • Larger entry ways (42") • Stretcher access to cot area. • Files—have (4) 4-drawer files, (6) 2 drawer desks. Need to increase for freshman. Also does not include SPED Files. Interested in a File Room. Student Support: • Main Office of student support to have three stations (parent liaisons) + waiting. Large TV in Waiting Room and also in Conference Room. • Enrollment Clerk to have own office- Office with desk + table & chairs • ELL assessments- need an enclosed area for that. • Conference Room for 15 people • Student Support Services Office (David) desk + table • Records Room (12) four drawer files • Student ID in it's own roomor at least a dedicated spot. • Couple smaller conference Rooms now. Like to have a hoteling office or offices (2 or 3) if possible. • Bathroom for families as they are waiting. Proximity, could be right outside the suite.
11/15/16 1:30-2:30 09/16/18	Student Support Services	LHS Attendees: ~~Dave Robinson – Coordinator Student Support Services~~, Roxane Howe, ~~Tim O'Keefe-House Dean~~, ~~Maria Bejar,~~ Heather Brunner-Guidance Counselor, Maureen Schwartz-Social Worker, Karyn Cassidy-College & Career Counselor, ~~Mary McLaughlin – Nurse~~, Pat Noonan-SSS Clerk, Lisa McHugh-Clerk Scheduler, ~~Cindy Obika-House Clerk,~~ ~~Darmery Montoya-Parent Liaison~~ David Robinson, Roxane Howe
		House Offices: • Distributed Adminn Suites. Two sets of two. • Need a meeting room in each house office. A place to meet with families. • Break up the T Work room to create a conference room plus an area for work off the corridor. • Tardy Station. Two clerks within waiting area. LHS to discuss further • Conference access of waiting area is ok. Conference for 8 with a couple extra chairs to squeeze in. • Waiting chairs- combine general and guidance waiting.

		• Records in another room not a good thing. Open to see students coming in might be nice. Some files in offices. (6) Total 4 drawer cabinets. Vote to keep it all within the Guidance Counselors offices. Final decision to do a hybrid- show space for files in GC offices, but also have files out in the open for any dean or counselor to access. • 4 House offices (Dean, 2 guidance, clerk/scheduler, house clerk & social worker); 2 clerks in the general house office/waiting. Would like a small conference. Waiting for 10-12 with tardy computer station. Would like kitchenette • Note houses are just a way to break down the large no. of students into manageable groups, same support • Need separate copy machines • Consider house offices located off of main lobby (closer to entry) • Deans, Guidance & Social Work needs enough for meeting w/4 • Each guidance has about 4 or 5 lateral files • Nurse suite (waiting for 8-10, counter/desk area for 4.5, 2 private rooms for exam/conference, 6 cots, 2 bathrooms, storage for supplies, ice-maker. Need files/records • Locate nurse near Student Support; might want to locate teen clinic nearby also • Lactation room near nurse • Would like nurse access to outside for student pick-up • Student Support needs main office w/ clerk, separate registration/waiting area, (2-3) separate ELL testing cubicle areas, 4 liaison desks in open office, student support office, conference for 12-15, need room for 7yrs of student records (graduate, withdrawn, etc.); for 40 lateral files • Student Support should be located near security, main lobby, but acoustically separate • Once a year parents registering students for a week, spills into halls Career Center: • 1st floor of Freshman Academy. Accessible to all. How to break up? • Presentation/Workshop Room. Possible to have a separate computer room? Main Office Area • Multi-Use space, dividable room? Shared computer room with workshop room- separate from the Main Career Room. Two Rooms ~500sf Two spaces- one shared computer room + Presentation. The other the “main office” area for two staff + conference table for students. • Bookcases, Staff desks, files. Locking cabinet for test materials. • Need storage room for testing materials- Follow-up on MCAS materials Storage. • Catie’s Closet- discrete and accessed only with an adult. • College Career Center (CCC) currently is an extension of guidance, they help students with workshops, fairs, testing, etc. Currently use 2 classrooms with 3 full-time staff, 1 room is multi-purpose conference (need for 10-15) + several students computers, other room is 24 computer station lab with desk. Would like secretary/reception. • CCC needs large space w/ secretary and large laptop area with presentation capability, space lined w/ the individual offices and conference space (Nashua HS North). Locate near guidance for monthly Naviance training. Need kitchenette
		•
11/15/16 2:45-3:45	**Athletics**	LHS Attendees: ~~Jim DeProfio, Jen McGlauflin,~~ Paul McCarthy, Tim Patterson, Damon Amato, ~~Kevin Donahue, Jessie,~~ Dave Lezenski, Roxane Howe

09/16/18 1:40-2:30		
		• Public entry- larger, elevator, tickets, etc. • Wet Room- for people without access to the entire training room. • Coach's Office direct off the corridor with a glass - connection to the locker room via door only. PE Teacher prefers a window into the Locker Room. • Think about wrestling room location in relation to canal. • Climbing walls? Plan for it. • Jim to provide full athletic program/season with participation (subsequently provided by Jim via email on 11/29/16) • Main Gym can have upward of 300 students at any one time; inter-scholastic needs are greater than PE (Gym boys/girls indoor track = 200 alone + Basketball + Cheerleading). Need water jug filler and ice-machine area for coaches • Wood Floor Gym w/ one competition basketball and 3 volleyball. Should have spectator stands on one side, not opposite • Equipment/Uniform Storage needed w/ laundry. Football is done at the stadium, but everything else done on-site • Frustrating/inefficient to bus students and commandeer other MS • Crowd control and flow is an issue, many ways to get in/out and up/down floors • A lot of space in the existing Field House is unused/inefficient • Functional Room – non cardio, more natural movement space • Weight Room to be slightly bigger than existing, size for 50+ (Jim to provide inventory); like combo Olympic lift station as one element • Cheer/Yoga space for 36 students and Cheer meet mats (45x45) • Wrestling should have subfloor suitable for dance; mat lift is ideal or space to roll-up mats. Plan for (2) 42x42 layouts • Gymnastics part-time on-site, girls off-site. Rents gym (half equipment is broken), they have about 80 kids sign-up. Needs 6000sf set up**. Jessie to send layouts.** • Trainer about 1200sf w/ separate exam room and toilet. Also need a number of taping stations • Natatorium – needs to accommodate meets (8 lanes + separate diving well w/ 2 1meter boards, separate bathrooms and 150 spectators, ideally up above pool deck, alongside); Locker/shower area can overlap and be part of main locker area. • Pool needs separate PE and athletic storage, noting the wet nature of items • See attached Physical Education / Athletics Plan for Focus Group provided by Jim DeProfio w/ additional PE handwritten notes in pencil.
11/16/16 7:15-8:00 09/20/18	**Custodial**	LHS Attendees: Rick Underwood-Operations & Maintenance Director, ~~Alan Sayer-Custodian.~~ Patrick Harrigan, Roxane Howe
		• Each building/each floor parking for riding scrubbers for drainage and power for machine will fit through a traditional door. One close to the gym. • Currently have two trailers for storage and gas. • Look at moving kitchen/custodial closer to Caf. • Drive in/Backout? Still looking at, maybe flow through? Maybe turn around. • Snowblowers, leaf blowers. Stand alone shed. Will need a ride on mower. • Acid Neutralization? Will scope centralized system- one per building. • Don't necessarily need water filter on bottle fillers.

		• Recycling- Student run. Cafeteria does not recycle- City has single stream, School does not. Would need more dumpsters too. 40 & (2) 10s. FA has another 8yds that will need to be added. • Epoxy Floors preferred in TRs, Lockers, Showers, Kitchens, etc. • Phenolic dividers, highly durable partitions in TRs. • Loading Dock is both kitchen and custodial. Existing not big enough • Large (30yd.) mixed recycling, (2) 10yd. exist. Need more recycling dumpster. No composting • Recycling program is in all CRs, two bins each room. Tuesday barrels into hall and student group collects. • Maneuvering space for trucks not enough (2 -44' storage sheds and dumpster don't allow enough room for maneuvering) • Full tractor trailer deliveries; daily milk, bi-weekly Sysco, trash daily/recycling 1/week (not enough) • Kitchen deliveries direct to kitchen, School supplies direct to custodial. Custodial storage too small; supplies ordered as needed • Other than small custodial closets, no other major distributed storage, except basement of 1922 building (supplies and major equipment) • Gas storage is out in 44' storage (4-5 snow blowers, mowers, weed wackers, light bulbs) • Salt stored under each stairs at entry areas • One office w/ bathroom; small locker area, bathrooms and showers (need unisex) • Need freight elevator; need to accommodate pallets • Ideally distribute cleaning equipment w/ charging each floor (ride-on, walk behinds, Kaivac -bathroom machine) • Interested in non-waxable finishes • Have 2 genie lifts (one in gym, one in 1922 stair), plus an old scissor lift in the gym • Auditorium lights drop-down • Boilers on the roof of Lord; the steam plant is for freshman and Kouloheras • No neutralization tanks known • Would like access to bathroom chases; if major work required, walls/finishes will get destroyed and not replaced • Problem with drywall in classrooms, teachers move desks against walls
11/16/16 8:00-8:45	**Business/Culinary**	LHS Attendees: Margaret Overlan-Restaurant, Jacqui Taylor-School Store, Roxanne Howe Roxane Howe & Jill Taylor (Business) Seth Bernier (Culinary), John Sousa (Crabtree McGrath)
		Culinary • See attached meeting notes date 09/20/18 from Crabtree McGrath • Open Kitchen, Prep Area, partition and then ala carte. Dry Storage, Pot washing. Baking program take place in Prep area. Deck Oven in main line area- bake directly on the surface. Baking program: Get into baking rolls. • Quick Service area or a deli in the restaurant close to the line. Display for baked goods. • Retail- coffee for staff, brewers. Latte maker. Display case for baked goods. One is a cooler • Seating Area- 40-50 seats Using seating area for teacher. Need a whiteboard and projector. Double period block- 100minutes. • Home Simulation0 Consumer Science Classroom. Demo area • Laundry- Special Ed does it in Life Skills area

- Office for two people. Develop recipes, take tests, online menus.
- Marketing is only Ch.74 program, but Culinary program follows Ch.74 guidelines
- Students have 2 periods a row in am, program is M/T breakfast, W-F breakfast and lunch
- Culinary has front of house and back, includes restaurant w/ point of sale, bakery, kitchen w/prep (sections are split between front/back of house)
- 36-40 is their current capacity; need 25 minimum
- Bathrooms needed nearby (for students, staff and patrons)
- 1 upright fridge and freezer in kitchen (too small); distance to dry storage and walk-ins too far (good size, but remote.
- Classroom is also too far. Would like dining room to double as Classroom, with full capability
- Class sizes are 18-20, would like to grow program
- Students do deliveries around the school
- Public access not ideal, not direct or controlled. Should have open to public, but secure door from restaurant to kitchen could be done
- Location is near down town streets; might want to be toward main lobby, make showcase. The primary patrons are the school
- Note; culinary program cannot compete with school's food service for students.
- See attached Culinary diagram provided by LHS.

See to attached Crabtreee McGrath Foodservice Equipment Meeting Minutes for 11/22/16 meeting.

School Store

- School store w/ classroom attached (for 25 max) and secure storage and small office. As many as 10 might work in the store at one time
- Classroom equipment has large format printing, heat press, need large layout tables, need secure inventory room (sweatshirts/ t-shirts).
- Would like computer stations in classrooms (currently have ipads)
- Store should be connected to Classroom (one teacher supervises);
- Sink needed in the store for cookies; they back with small toaster/convection ovens. They sell water, soda. Need small cooler and freezer
- Store needs better display; location is ideal near cafeteria and bank with visibility outside along main entry. Needs more direct/secure public access. Would like peg or slat wall system and good lighting
- Existing school store size is ok
- Need two registers
- Classroom needs student storage/cubbies for belongings
- Store room needs to lock

Business

- Flexible Classrooms- laptops in future?
- Projectbased desk space. Stoage for projects & supplies.
- Projector. Store space. Need inventory space. Store with Office & Storage. Then a learning lab. Poster and Cooking (Cookies) Countertop convection oven in behind the scenes....kitchen area (sink & drying)
- Glass Office open to store and Classroom.
- Inventory- Store (30%) and Back of House (70%) vending machines (3) in the building.
- Heat press, large format printing.

		• Accounting. Textbook online- all digitalized. Standard Classroom Storage- lockable cabinets, large project table, no rolling chairs. • Marketing classes are more project based. Finance and Accounting are more traditional classrooms. • Digital touch map. Application for phone with maps and information. • Media wall- celebration wall. • Display Cases for School store near the gymnasium for product. • Current rooms are primarily fixed labs (need more flexibility) • Ideal existing room has multiple LCD TV's (not on a central pole) on multiple walls with students facing different directions • Could look at perimeter computers and central
11/16/16 8:45-9:45 09/20/18	Special Education	LHS Attendees: Diane Chandonnet-Dept. Chair, Donna Newcomb-SPEDTeacher, Lenny Rapone-SPED Teacher Lenny (Life Skills), Shonii , Roxane Howe
		• Overall program has about 10% IEP, the concern is that the percent is not growing but students are shifting between programs (towards more severe needs) Acoustic treatment, between and among spaces is key, not just for SPED student needs, but also for loud/behavioral School needs multiple elevators in each building, sometimes one goes down. Also would like main lobby/multi-level ramp access for all Substantial-Separate Program (includes: Fundamentals, Adjustments & Lifeskills) Fundamentals (190 students) • Like a regular classroom- access to regular curriculum just maybe at a different pace. • 2 math, 2 eng, 2 history,2 instructional support, 1 reading, & 3 freshman academy classrooms exist. Typically 8 rooms per classroom, but growing to 12+ lately. These could be half classrooms. Locate near regular academics, incl. science, math, etc. • 1 instructional support classroom (tutoring) & transitional support to prepare for real world. Room has 2 teachers and many resources (books, computers, work tables, a few break-out/tutoring rooms connected, etc.); classes range from 12 to 22, needs larger than classroom size ("learning career enrichment center") Autism: • Classroom has individual corral around the classroom for a sheltered learning environment. Consider solid wall, not furniture (kids take apart) provide some padding in there for more aggressive students. Something durable. • Half room set up as individual learning, half for sensory, bean bag, stimulus. • Adjustments (40 students 9-12 grade w/ emotional or behave disability) • Similar to traditional classroom setting, small room off to the side. Just smaller classroom population. Emotional students, "time out" rooms • Located near House Admin. These are social/emotional students- can become dangerous. Access to House Admin is great. •

- 7 CRs exist with about 12 students each, rooms should be set up with main space, but need a few quiet areas/cubbies w/in the room. Need flexibility for more PBL (Project Based Learning)
- Traditional classroom setting, but need flexibility to do group instruction, break-out and 1:1
- Storage is important; differentiated instruction requires many means
- Social Worker associated with program, should be nearby, but also need counseling space for 8-10
- Locate dispersed w/in classroom wings for integration, but would like not to be in remote corners, if somewhat close to each other, they can cross-communicate
- Access to life skills kitchen suite would be beneficial (sign-up for as a pull-out lab)

Life Skills (69 students); CRs are div 14-17 & 18-22

- Intensive SPED (2 CRs) 14-17 has 7 students, 18-22 has 4 in ea. classroom
  - Half students in wheel chairs, feeding issues, tubes
  - Need sinks w/ hot water
  - Need bathrooms and young adult changing tables; need one at these rooms and two in other locations (nurse & cafeteria)
  - Both rooms need to be joined with Sensory Room attached w/ large equipment closet (250sf)
  - Would like operable wall between rooms
- Autism (2 CRs) younger has 4, older has 8 in ea. Classroom
  - Rooms have sectioned-off quite areas
  - Need direct toilet rooms (still potty training)
  - Need regular sized rooms, despite less students per room
- Life Skills (4 CRs) younger has 12, older has 12 in each CR
- Hygiene Lab? Not just the Life Skills kids who need help with that.
- Medically challenged student need (Intensive) need sinks in their classrooms.
- Life Skills- Separate access to use Hygiene Lab. Should have two private showers (can be curtain rod) Sink for each shower. Both showers to be accessible. These are for kids with independat skills
- Intensive needs changing table and lifts. More medically challenged.
- Life Skills- Kitchens- also used as labs for say Adjustment program. Don't want kitchen IN the Classroom, accessible from but not inside of it. One Lab per Life Skills pair each with two kitchen stations. So four kitchens total.
- One large table in the middle for eating.
- Laundry Room? Domestic Cleaning. Washing Machines. W/D as an offshoot of Classroom.
- If space is available to set up area as a Living Room and a mock bed, that would be great. A suite used to exist. Kitchen, Living Room, Laundry Area + Classroom.
- One massive suite of kitchens- prefer to have one giant room.
- Intensive Rooms- Sensory Room- important aspect (quiet) ~200-s50sf, specialized hammocks, mat beds. Lighting (Mindy runs it) Connected to Intensive Classrooms- Functioning sinks- need to clean equipment (feeding tubes, etc) Bathrooms need changing areas.
- Enough space to facilitate room for all students in the room in wheelchairs. Wider doorways, auto openers on the Intensive Classrooms. Plan for ceiling mounted swings. Capability to hang things from ceiling and walls (furring) Intensive Room needs a closet for pads, equipment.
  - Program seems to be growing

		○ Older student classrooms set up as dual classrooms w/suite of kitchen area, mail room and laundry. The suite should be separate but adjacent. ○ Would like to see it as full service laundry with ironing, folding tables, closets to practice, etc. Mail room would also like to be more of a center w/ copy center, computers, filing, etc. (as work environment); would also like living center with media and reward ○ Would like to see hygiene lab with toilet, showers, sinks that could be used by any of the 3 major SPED groups • Need Speech Specialist w. asst. (need small office and small teaching space) • Need OT/PT space • Deaf & Hard of Hearing office • SPED Admin Team (ideally a suite, but currently dispersed a bit) ○ Department Chair ○ 1 clerk ○ 2 psych ○ 2 evaluator team chair ○ 2 evaluators ○ Conference (for 16-18) ○ 3 Testing rooms (for eval and psych, unless space in offices) • 2nd social worker
11/16/16 10:00- 11:00 09/20/18 10:45- 11:35	Fine Arts	LHS Attendees: Sharon Clark-Fine Arts Dept. Chair, ~~Pat Fitzpatrick~~ Rose Sheehan, Jim Lutz, Alex Bagnall (Cavanaugh Tocci)
		Visual Arts • Art in basement of 1922 building. Substatially rebuild the roof structure to bring in daylight from above. • PE to develop a 3 dimensional view to understand the suite and spaces. • Fine Art Storage- 600sf in addition to what is within the Classrooms. • Dance- Two rooms + Stage. Possible to close off the stage with a partition? Also consider an intermediate partition in the Auditorium. • Band- 2000sf, separate guitar and piano rooms. • TV production room near the TV Studio. • Freight Elevator- needed for not just scenes, but also instruments. • Desire to have freight lift on Kirk to bring in large items. • Coral prefers to be flat. • Like to have volume, ramp down into lower part. • Raised conductor not super important. • Single level is better for moving instruments. • Dance Room- Changing space is desired. Changing between rooms? Ideal to have two rooms together. Changing near stage too. • Dance- Marlee or Kiwi floors? • Dance where Chorus is now. Chorus wants flat- move to nearby. • Chorus also does show choir. Flat floor is better. ~65 st in Chorus with max of 115. • Built-in Sound system in all rooms. Dance, play back, Music would be recordable. • Dance still needs a presentation wall. Lots of recording. Using an iPad now. USB camera somewhere, pull out to teacher station. Visual recording at Chorus and Band too.

- Storage a huge concern. Use gravity vent space for storage at lower level for music storage.
- Piano Lab is full size, digital pianos. Look like uprights.
- Auditorium- Front of house lighting system- Capability for a catwalk doubtful but will look into.
- Alex and John Buhl need to talk in order to talk about improving structure and ability to hang.
- All LED lighting system- DPW does work for them, not a competent theatrical electrician.
- Counterweight rigging system- what they have now. Mechanical system not good if it breaks, it doesn't get fixed.
- Originally a hemp house (stage left)
- Rigging company came in- adult supervised, student run.
- Stage Doors- 10' tall and at least 6'-0 wide. Can be acoustic doors or garage doors.
- Sound system- mono or stereo. Sharon to get back to us.
- Projection Screen at front, with short throw projector for scenery. Different projector for presentations. Capability to use.
- Lighting and stage management up in Control Booth, sound down with the seats.
- Storage for sound board- lockable room accessible to stage.
- Risers stored at the Music Classroom.
- Chandeliers salvaged- possible re-use?

Dance Studios

- Would like sprung/resilient floor. Discussed Kiwi flooring being used on BAA project.
- Classroom AV system should include typical classroom presentation system (under Technology) supplemented by audio playback system with Bluetooth. Signal routing for a USB camera in middle of mirror wall is desirable to allow instructor to record dance sessions.

Band and Chorus Classrooms

- Classroom Av system should include typical classroom presentation system (under Technology) supplement by an audio playback and recording system. Signal routing for a USB camera in middle of teaching wall is desirable.
- Discussed material handling needs to get large musical instruments both into/out of the street and to/from the stage.

Irish Auditorium

- In favor of new all-LED theatrical lighting system. This will solve noise, heat and space problems created by the dimmer rack on stage right.
- Discussed merits of various control locations for lighting, sound and stage management. Ease of travel from control booth to auditorium is important.
- Equipment located at in-house control positions should be either secured in place or wheeled out of auditorium into lockable storage.
- Discussed merits of monoaural versus stereo for main PA system in the auditorium. Sharon to consider this for further discussion.
- Discussed material handling needs to get goods to/from the scene shop and trucks.
- Discussed desire to easily move a grand piano from stage to area in front of stage.

- While the rigging system needs replacement, the school is in favor of keeping with a traditional manual counterweight rigging system because of maintenance issues with motorized systems.

TV Studio

- Discussed how the TV studio and the control room could use a small window for visibility as opposed to the large one they currently have.
- School to verify height of pipe grid in current studio. The current grid height is ideal for their use.
- Current studio has a standard definition workflow. All new equipment would need to be purchased to transition to a high definition workflow.
- Currently have 3 Art rooms (1 sculpture w/ kiln & storage, 2 drawing/studio rooms); Class sizes run 25 to 26, Sr. portfolio is smaller. Sculpture needs 3 or 4 potting wheels
- All rooms need storage within.
- 1 Digital Photography Lab, including animation. Class sizes run 25-28; need flexible furniture for group an individual
- Photography and drawing need access to outside
- Have graphic design lab is regulation Classroom w/ 25 mac desktop computers (all digital); need flexible furniture
- Graphics has a lot of in-school program for group an individual
- TV production CR (separate from TV production studio), but should be connected. Classes range from 15-25; room set-up w/ cameras, 25 desktop computers & flexible furniture
- TV studio falls under Communication
- Ideal location for lots of light (skylights?) and not in disruptive area
- They have cross-curricula within arts, but not as much w/ academics because mixed age classes which doesn't work for cross-grade level content

Performing Arts (they are in basement, don't mind location)

- Band has classes of 63, holding steady. They have been able to fit 115 students in existing. Current sizes are good; Band room also used for world drums and string ensemble
- Current instrument storage is good; student instruments kept in school. Doorways need to be wide enough for tympani (60" wide). Also need easy ramp and elevator pathways to auditorium
- Choir has classes of 65, also steady. They have been able to fit 115 students in existing. Current sizes are good, but want flat floor with platform risers that could be set up or taken down for show choir/movement.
- Guitar Lab occurs in the choral room (back corner); for 20. not sure if dedicated room required
- 1 Dance room, sized for 30 students (over 240 students); note existing room 137 has hardwood floors
- Auditorium is used for dance also; changing via nearby restrooms
- Piano/Digital audio has classes of 20; room has 20 digital piano's (2 rows of 10)
- Spaces need to be near auditorium
- Drama is taught in the Choral Rm; classes in low 20's. Freshman Academy has 350 seat theater that is used like a black box. They learn light, props & costume
- Auditorium balcony has odd storage spaces (scenery flats); Costume storage in the basement, with some sewing/workspace.
- Want more sewing/workspace
- Acoustic shell is stored there

		• Check height/width of storage • Auditorium has 4 electrics that can be lowered. No catwalk or stage lights over the house • Would like <u>all</u> Performing arts space/storage located together in basement • Scene building is dome in hallways and on-stage • Check heights
11/16/16 11:00- 11:45 09/20/18 11:35- 12:25	**Humanities**	LHS Attendees: Suzanne Keefe-English Dept. Chair , Robert DeLossa-Social Studies, Deanna Stanford – Lead Teacher, Joseph Jussaume-Social Studies Teacher
		• Would like to see possibly lockers on one side of the corridors. • Need mobile flexible furniture. • 3&3 clusters, but teachers in rooms 2&3 periods. • Bridge not for loitering, but great place for teaching (like Logan) • Media Center could use media wall- interactive would be key. • Group likes outside use. • Consider outdoor classroom along Lucy Larcom as part of education. • Humanities as a unit but like inter-department (SS & ELA); groupings of 6 (3 and 3) are ideal with some shared space. • Like interdisciplinary, but also department working together • Need shared planning space useful for PLC clusters of 6 • Need more presentation space (want to get 2 or 3 classes together), spaces to accommodate 100 • Technology in classrooms (the existing central pole with 3 monitors facing different directions was not the original plan); would rather have 4 screens, one on each wall where presentation capability could be on any wall or all 4 for small group work. • Would like technology infrastructure and phased room set-ups if budget can't afford all rooms to be set up with screens • Would like laptop carts for every 3 CRs (district is mac committed, but they prefer laptop pcs or chrome books); especially if cost for macs would limit how many carts per room • Currently 32 rooms are set up with a technology grant • Department storage not needed, moving away from text books. ELA does have books (novels, more than text). Departments do need libraries for 400 volumes. • Need nearby bathrooms for faculty and students (too much time and lack of supervision otherwise). Also non gender specific. • Teachers use hallways, send student out on occasion now. • De-escalation spaces are needed within the general population. Flowing water is a huge part. Would be good to have an area within each classroom for a quiet space (alcove) • See attached Humanities notes provided by LHS.
11/16/16 11:45- 12:45 09/20/18 12:50-1:40	**STEM**	LHS Attendees: ~~Roger Morneau-Dept. Chair,~~ Tracy Estrella-Math Dept. Chair, Megan Vilcans-Sciene/English Teacher, ~~Sam Hor-Math Teacher,~~ Stephanie Selvaggio, Pat Morasse, Roxane Howe
		• Science interested in Demo stations. Demo stations have to be mobile per the state. Chemistry teachers are most concerned. Perimeter fixed cabinets, everything in the middle has to be moveable.

		• Engineering Labs- Flexibility, project based learning areas. Regular Classroom Area and project area- large flat area. Brainstorming and collaboration a "waiting room" space to sit and face each other. Corridor? • Accessibility to use power tools. Place to store and use them (sound proofing) Engineering- Project Lead the way school. Make boxes, programming. • Robotics- Vexkits.Engineering and Robotics to have Storage access. • Laser cutting in Makerspace. 3D printing- in storage room? Toxic+Noise. • Acoustic separation between Business and Engineering/Robotics. • Makerspace between Robotics and Engineering- connect with garage doors? • Moveable Acoustic Panels as part of furniture. • Architecture class where Robotics learns. Need a place to team them. Software based. • Engineering student population is growing. Averaging 26 right now. • Engineering, compressed air. Special ventilation. Want to get into sodering. • STEM is not actually a department • Science would like to be organized in sets of dispersed pods • Science storage is important • Math is wildly spread out, they would like some semblance of clustering • Larger/fewer planning rooms not as desirable as many small planning rooms located with each grouping of classrooms • CRs need flexibility to do on all walls; would like much taller MBs or better use of full wall height • The computer poles are difficult to work around • Some teachers already doing teaching/learning and pull-out in hallways • Math is moving toward performance/projects based work… actual projects, like airplane design/angles and launch calcs. They need flexible maker-type spaces. Ideal might be to co-locate with science to create flexibility and access to lab space • Computer Science is w/in Math Dept. – need to grow program • Engineering needs a lot of storage for many materials, types of medium, tools/equipment, robotics components. Room should be outfitted with lots of table/counter top and flexibility • Need separate area for cutting equipment (medal/wood), fine soldering capability. Don't currently have large, dimensional supplies like sheets of plywood, but might in future • Book storage space needed; consider combined (inter-department) book room for ease of inventory and dispersement
11/16/16 12:45-1:45 09/20/18	**Food Service**	LHS Attendees: Paula Trudeau – Lead Cook, Sharon Lagasse- Aramark Crabtree McGrath: John Sousa
		• See attached meeting notes date 09/20/18 from Crabtree McGrath • PE will look at options to connect directly from Kitchen to Caf. • Food Service and Culinary will be close to each other. • Desire to have all Patrons go through security. • Deliveries to Culinary are currently a problem. Deliveries will happen at Kitchen Area. Maybe not a "real" loading dock but need for lifts. • Freshman now just only accept products. Capacity for cooking? Not even a handwashing sink. Desire to have a steamer and an oven and at least a three door refidgeration, and warmer, hand sink. Need a three sink. About 850 students. Only about 500 eat. – Plan on 250-300 kids each lunch. John thinks it might be 3-4 lines. Walk in and then choose where to go. • 3 lunches, 3 lines. 25mins

		• Can do more made to order, toss to order. But if there is no access, they won't use it. Fajita, sandwiches, toss. • One traditional row. Flat counters, build up with pieces. • Can use tvs and visuals for decisions before they enter into. • Disposable wear. Bio degratable. We do not recycle currently. • Every school gets their own commodities. • Possible to have one large freezer. • Need refrigerator three times the size of what they have. • Dry Storage is adequate. • Currently distributing food. 500-600 meals for dinner about 6mo/year. • Cook on rack, wheel into warmer is ideal. • 12 stations for employees to work. 30 employees, 18 at a time. • Some prep in front of house, want to encourage that. Deli at deli, chop at chop. • Have grill and aroma into front of house. • Don't do own laundry. No W/D needed. • Kitchen does own clean up, hose bib needed, for buckets and mop sink. • Use braising. • Don't have a stovetop burner. We should have a 4 top burner. • Pot & pan washer & three bay sink. • Standard food processor- a couple, couple of slicers. • Only use mixer for mashed potatoes. Don't need a big one. Stay with a 60 w/ attachments. • No buffalo chopper needed. • 3 offices. Cash room (1 per) + 2 offices(1per +2per). Locker room • Breakfast- CEP.Continue Carts. Hot and Cold. Need to plug in. Registers on them. • Need cart storage in kitchen. Need a parking lot. Ideal to put in dry storage. • Dining Room seating- would like different seating, bar seating, community seating. Variety of seating. • Condiments- prefer pumps, built-in pumps. • 2300 students served including the freshman. ~60% breakfast is 600-700 up to 1000 in the winter. • Food service is federally funded program; they can't cross paths with other school programs. They are subject to same regulations as far as what they are allowed to serve. • They serve water, chips, ice-cream and cookies at register • The restaurant can't serve to students, but can serve what they want (to teachers and public) • Food/loading is a problem (mostly due to obstruction of dumpsters and storage); 10 palettes every Tuesday; need space for them and to break-down and distribute. Might work best to have an LHS specific dry goods storage vs District. • Major rodent concerns/issues • Do not have enough storage (walk-in or dry goods) • They are one of two schools where commodities come in • Kitchen/equipment is old, not most efficient, a bit chaotic • Would like to continue with grab/go, 4 breakfast carts are very successful. Stored in kitchen. • Like existing deck oven, takes up a lot of space. Might work to have a rotating oven that is smaller, but has same output • Need more prep stations • 2 steamers and 2 kettles are ok

		• Serving is wide open; separate serving stations is desired to cont. They don't want to corral and overly direct. The advertising piece is important, so students can make a decision and commit. Need LCD screens • If school is designed with pods; would like kitchen central so that time is not spent delivering • They have 85% participation that may impact the idea of satellite serving, which is typically cold food. • Labor is one of the biggest expenses. They need to look at how to maximize efficiency and accommodate service points • Freshman Academy will want its own kitchen (it's a school of 1000 students) • Need 3 offices (cook & manager & cash counting), currently 27 staff (4 at freshman) • Need toilets, locker area • Pressure to start more wet waste/composting • Serve 21 cultures • See attached Food Service diagram provided by LHS. • See attached Crabtree McGrath notes for additional Foodservice meeting on 11/22 @ 2:30 pm.
11/16/16 **1:45-2:45** 09/20/18	**Communications Pathway & Library Media Center**	LHS Attendees: Kathy Downey-Library Media Specialist, Bryan Wilkins-Dreegan Media , Faye O'Leary-Digital Media / Graphics Design Teacher, ~~Sharon Clark~~, Roxane Howe
		• Bryan- is a school employee but students contribute to tv in Lowell. Support classes in technology (centralized server) Bryan's salary and teacher's salary are by Comcast money given to the city. MSBA has seemed to approve the space. Confirm existing, may be able to go down a little without negative impact. • Lighting grid now is ideal, size 50-60 teachers in there recently. • Improvement to get Communications next to Fine Arts pathways. Daylight- Only Offices for Staff working would benefit from window. Window from Control Room to Studio is often shaded. Nice when not doing production. • Might not need window between Control Room and TV Studio. Easier to manage class with the window? Does it get trumped by acoustic improvement without it. Maybe just a smaller window. One Art Class (Digital Media) switch with Scene Shop to get Studio directly adjacent to the TV Studio? Costume is more quiet than scene shop. Side by Side is ideal for Digital Media & TV Studio. • Both Coax and IP – straddling the line. Look at building going IP. • Central Space that brings multi-media together- like the lobby/waiting area that exists. A collaboration of all the media. • Student TV Truck- safe, protected parking • Classroom for Video is not ideal. Space for standing, presenting and then film philosophy teaching area. • Would like entire digital/media spaces set up as a cluster to share space and resources, including a shared network for redundancy • Location in a quite area, doesn't necessarily need to be right with auditorium, but could envision an arts building • Outdoor space for presentation, performance & events might be of interest, but exists already across the street (across freshman academy); maybe an enhanced area off of lobbies • Would like gallery space for student work or themed shows • Video on demand available to the whole district, is managed by Media Studio. They supply multiple local cable channels (coax to every classroom internally and out to the City)

- TV Production classroom (see notes within Art)
  - Needs layout similar to Graphic Design
- TV/Media Studio (operates Cable Access channel)
  - Full size studio and control room (current sizes are good), but would like room for multiple sets (live music vs interviews vs other)
  - They develop video; requires desktops and utilize separate server as redundant/back-up
  - Eight editing suites (50 to 100sf each); 3-4 students computers with additional audio mikes, large display monitors
  - Need major equipment storage (2 rooms now)
  - TV/Media CR needs flexibility as a lab, but open floor space for camera set-up, or class/lecture setting
  - 3 staff have offices, they work in classrooms
  - Conference room (for 15)
  - Lobby area with waiting; also used for brainstorming/collaborating. Space has soft seating and flat screen
- Graphic Design (see notes within Art)
  - 25 computers + teacher; could see it going toward laptops. Like the idea of being more mobile
  - Have projection capability, but would like multiple LCDs
  - Current room proportions drive the layout
  - Would like movable tables
  - Need locking storage
- Digital Photo & Animation (see notes within Art)
  - Would like a digital media cluster (right now sep. digital, graphic and media studio locations)
  - Need more exhibition space (and variety of media); cork walls in rooms, but also in corridors
  - Would like small area for portrait photography or stop-motion work area (shared)
  - Plan for 25 seats/computers
  - Need ability to connect tablets (computers)
- Digital Journalism (occurs in computer lab); they do podcasting
- Digital Audio occurs in piano lab
- Public Speaking occurs in regular classroom
- Band sound system is portable and rolled into the gym (gym system has failed). ROTC also uses the Band's system. Show Choir also has a portable system. Cafeteria has a fixed sound system, not used.

Library Media Center

- FA doesn't utilize as much as they should. There is no more Staff. Only Kathy (in district) going to be hard to manage from a staff standpoint.
- Any second Floor of the Main Library? Kathy's Office
- Projection area (up to three classes worth)
- 25k volumes now, most are pre-1990. Not sure how many will be in new library. Look at current collection and weed out. 500-1000 kids walk through door everyday.
- User friendly, a great place to be. Not currently enough space
- Open reading area to be expanded. Durable fabric
- 30 Computers
- Project Area
- Desk area- centrally located
- 42"-48" high bookcases.

		• Tech Center to move to Media Center "Annex" IT Staff, run the network. • Additional space for additional computers, most kids don't have computers. 15-20 additional computers. • Only one librarian, considers herself mobile but the media center and resources as stationary (not necessarily dispersed) • Need to prepare students to be able to use college library and how to use on-line catalogs. How to use database, how to be efficient and effective researchers • Volumes are reducing, they are going more digital. Estimate about 25k volumes • Currently can accommodate 3 or 4 classes; librarian can • Before and after school tutoring program occurs. Library also used during lunch • Library might want to accommodate maker space (like freshman academy's) • Need a balance of quite areas, collaboration areas and meeting areas • Computer area, table area and presentation area (each accommodated a class) • Would need 50 to 60 laptops (depending on time of year, students are relying on library for comp access) • Would like a dedicated reading area; with soft seating/casual • Need docking stations for charging phones. • Every discipline (except math) tends to use the Library • LHS archive and artifacts in a 250sf space • Would need security system (currently 3M system); books, computers and equipment need to be coded • See attached: Media Center Process Overview form notes,volume notes, and Media Center Studio notes provided by LHS.
11/15/16 3:00-4:00	**Outside Programs**	LHS Attendees: ~~Colleen Winn-Gear Up Trio,~~Andrea Laskey-Lowell Community Health Clinic, Henry Och – Lowell Community Health Clinic COO, Anne Marie Bisson-Catie's Closet President & Jeanne D'Arc Credit Union VP Marketing & Financial Aid
		Lowell Community Health Center (room 22): • Similar location to existing. 1500sf is a good size, can do a lot with that space. • Need to clarify where PE buildout ends and Comm. Health begins. • Dept Public Health has requirements. Comm Health has own architect. Will layout and provide services. • 8-10 air exchanges • Currently heavily supported by School IT- goal to have own. • 7-3:30pm • Some spaces need to be secured (key fab) • Funded by Massachusetts Department of Public Health • Licensed under ospices of the health center, subject to regulations incl. design/layout of spaces • **Health Center to send specs** • Currently 2 exams rooms, 1 recovery room (student needs to go home), clean room to store stuff and a utility room. • Need bathroom within the suite • Need waiting area and separate office space (privacy) • Clinical social worker office • They have separate contracts for operations (medical waste, etc) • No direct exterior access

- Because health center is in renovation they have waivers now, but might not have them if it is in new construction
- Services provide (primary care including immunization, physicals, STI, chronic disease management refugee management) staffed by medical assistant. They do individual and group therapy
- Funds are not part of Dept. of Public Health; there may be federal funds available
- Ideal location is to be separate and private, but some visibility
- Need to discuss the future of health services (adding dental, vision, looking at utilization ratio of patients to student visits based on exam rooms)

Catie's Closet:

- Currently in 2 locations because of the building division with freshman academy. If 1 building, maybe 1 location, but bigger.
- Ideally 400-500sf serving main building + 250sf for freshman
- Each as one big space, lockable. They outfit themselves w/ rods, storage counters and equipment.
- Space was provided instead of scholarship in the name
- Ideal location; privacy is important, typically near nurses station but not on a main path. Currently good location across from Social Worker

St. Jean D'Arc Credit Union:

- Current location is perfect; students need quick/easy access
- They also help the school with deposits
- Shape is odd; teller too close together, vault is exposed (need to lock-off) area.
- Need larger than existing at 300sf
- The credit union would build out the interior; they will also provide the layout
- Need to bring in cables/electric direct from outside would like a bathroom nearby
- They serve anyone inside the school
- They need nearby doorway for currier and armored car access near
- Alarm/electrical needs specifics

Gear-Up/Talent Search/Upward Down (Trio):

- Trio, located down at the lower level with windows. One suite, all three together
- Serve about 200 kids in FA. Possible to still in FA for an office? To work directly with the Freshman students.
- Ideal to have separate offices- with a WB in the room. Some confidentiality. 6 offices. Common Area for meetings ~500sf with a few (7 or 8) computers for students. Large project table for 10ish students.
- Upward Bound-Math & Science wants to use Robotics Classroom (5 periods a day)
- One Classroom (based on schedule) 10-15 students. Varies. Size for 16-18 students.
- Storage- paper and books. Files provided by Middlesex Community College.
- Ideal to have Upward Bound M&S to have space in FA.
- They serve well over 1000 students
- Level funded, federal grants for each
- Cannot provide their own furniture per federal regulations
- 3 spaces needed
    - Rm 811, but could be smaller; Need 150sf in freshman academy (desk, computer, small group)
    - Rm 206 suite, need space for 6 offices, work one on one with students (discuss financial situations) + common area for meetings with 12 staff. Need several computers for college career guidance.

		Similar to career center, but not part of guidance. They supplement and focus services on coll. o Rm 126 classroom; just upward bound; includes two teachers + 2 advisors and tutors come in. They provide intensive academic support. Ideally would have separate office for 4 + CR for 20-25. • Would like all 3 to be closer together, but need one in freshman academy. They also work closely w/ guidance/career ctr.
11/15/16 & 11/16/16	Other Broad Planning Items	
		• Need to plan for MSBA standards • Need to plan for flexibility • Classrooms: will prioritize natural light and ventilation • This is first year Alternative School is offered as independent choice: may need this as an option in new school that is completely separate, a facility within a facility w/separate entrance. • Currently a separate "Therapeutic" school exists off site. • Library is considered by some to be very small • Cafeteria: Need larger cafeteria, prefer smaller spaces and an overflow area that is multi-purpose room. State allows seating for 1/3 population; currently have 4 seatings. Currently a lot of ELL students eat in the hallway during lunch 2. Will design larger but scaled and easily visible/supervised space. Would like to go outside w/ designed seating and eat in the "National Park"-outdoor experience beneficial • General School thought: lots of testing all the time, how is this handled, retesting MCASTS, national Latin Testing, currently use Little Theatre, meeting space for 50-60 students to discuss options career Foreign Languages • Issues w/ HC lift at North entry & HC access to auditorium need to be resolved • School needs multiple elevators in each building, sometimes one goes down (general use & Special Ed) • **Peer Mediation: This group was mentioned. LHS to clarify**

END OF MEETING RECORD

Next Meeting: TBD

Cc: LHS: Marianne Busteed, Roxane Howe
Skanska: Mary Ann Williams, Jim Dowd
City of Lowell: Eileen Donogue, Kara Keefe Mullin
Perkins Eastman: Robert Bell, Joseph Drown, Alicia Caritano, Dawn Guariello
Design Team

Attachments: Crabtreee McGrath Foodservice Equipment Meeting Minutes for 09/20/18 meeting

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October 1, 2018

CRABTREE MEETING NOTES

DATE OF MEETING: September 20, 2018 at 8:55 AM

Please contact Crabtree McGrath with any added comments or corrections.

Serveries

1. The Freshman class servery space will be remote. The kitchen staff stated that cooking will be required in the remote servery.
    - Convection oven
    - Steamer
    - Hot and cold holding with the typical compliment of serving stations.
2. Freshman class to be 850 students in three waves with 25-minute lunch period.
3. Total population is approximately 3500 students.
4. In general, all serving stations to be similar to the high school servery in term of equipment composition. Station to be fajita station with flexibility to shift to other menu offerings.
    - Grab and go item prepackaged and wrapped
    - Deli station
    - Traditional hot lines to have minimum of 4 hot wells and full compliment of cold wells.
5. Disposable trays will be used. They will not be foam trays.
6. Recycling will be implemented, and further discussion is warranted.

Kitchen

7. In general, the kitchen needs a larger cooler and freezer than what is currently available. Commodity storage items will be distributed throughout the district, so a large dedicated commodity freezer is not required here.
8. The kitchen will prepare food and shit to eight other sights. This needs to be taken into consideration when sizing the kitchen.
9. A roll-in rack oven is something the kitchen will use to prepare meals in bulk.
10. The kitchen will have 30 employees. Lockers will be needed for each.

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mail@crabtree-mcgrath.com

11. Multiple food preparation station will be needed.
12. The kitchen staff said that some preparation can happen in the servery spaces.
13. No washer or drying is needed for kitchen use.
14. The kitchen will need its own mop closet.
15. Roll-in refrigerator and hot boxes will be used. The roll-in hot boxes will compliment the roll-in ovens and reduce labor, time, and be safer when handling hot sheet pans.
16. Prep equipment will consist of the following
    - Two slicers in the kitchen and more if preparing in the servery deli stations.
    - 60 quart mixer & 20 quart for smaller batches
    - Food processors with slicing blades.
17. Offices will include:
    - One secure cash counting room
    - One managers office
    - Two person district office.
18. The seating area will house the condiment stands. Pumps are typically used. Multiple counters will be needed.

Culinary

19. Culinary program will be split into two main disciplines. Baking and Ala cart with both programs supporting the retail restaurant space.
20. The Instructors asked that the two spaces have more separation. A common area between the two could be use for food preparation and instruction. This area was referred to as a classroom space.
21. An academic classroom was requested for instruction. Traditional desks and the room would be equipped with computer terminals for test taking and recipe research.
22. Bother the academic classroom and the food lab must be equipped with smart boards.
23. The filming of lessons for review at a later date by student was requested.
24. All hand sinks must have some form of hands free faucet operation. Knee or foot pedals are preferred.
25. Baking equipment needs:
    - Convection oven
    - Rotating rack oven
    - Wood topped tables
    - Stainless steel tables
    - Baking tables with sufficient power to plug and play various pieces of small counter top equipment.

- Four burner range
- Demo tables with mirrors

26. Ala Carte will be open to seating area. Equipment needs:
    - 2 Fryers with built in filter
    - Char broiler
    - Griddle
    - Steamer
    - 12 open burners for sauté work
    - Salamander back shelf broiler
    - Finishing oven on the line
    - A complete chefs line to support the ala carte cooking and serve pick up station.
    - A cold line to support desserts and salads

27. The Ala carte support (food lab) area shall include:
    - A kettle for stock and sauces preparation
    - Tilt braising pan for bulk production, soups, sauces etc.
    - Reuse the two existing trunion kettles
    - A range for small batch stockpot work.

28. A required pot and pan washing area convenient to both the baking program and the ala carte program is needed.
29. Dishwashing needs to be convenient to the retail dining room area. This is in addition to the pot washing area.
30. Both programs will share walk-in refrigeration and dry goods storage. Within the refrigerated rooms separation of program will be achieved with the use of aluminum fencing typical to this type of operation.
31. Both programs will support the retail restaurant space. Retail space needs
    - Pizza warmer
    - Cold display space
    - Hot food buffet space
    - Cold food buffet space (salad bar) with two soup wells
    - Retail counter for coffee service and other retail sales
    - Back support counter with support equipment.
32.
33. Office space for three staff. Can be one large office.
34. Student will need cubbies to place personal belongings.
35. The flooring system must be a non-slip type floor. Altro sheet vinyl and epoxy flooring were discussed as options.
36. The staff requested no carpet in the dining area.

This concludes our notes.

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Date Prepared	11/7/2018	
Project Name	Lowell High School	
Project Number	67150.00	
Subject	Focus Groups - Round 2 (Schematic Design)- Follow-up Meetings (in BLUE)	
Meeting Location	LHS Lord Building Head of School Conference Room	
Meeting Dates	11/7/2018	
Prepared By	Dawn Guarriello	d.guarriello@perkinseastman.com
	T: 617-712-2192	F: 617-449-4049
Participants	Perkins Eastman: Robert Bell & Dawn Guarriello (all meetings), Point Line Space: Peter Constable, Jake Constable Crabtree McGrath: John Sousa- Culinary & Foodservice only Cavanaugh Tocci: Alex Bagnall- Fine Arts, Auditorium, TV Studio only LHS: See specific meetings below.	

Agenda Items		Notes
11/15/16 & 11/16/16 09/18/18 & 09/20/18	**All Focus Groups**	LHS Attendees: Refer to specific Focus Groups attendees noted below.
		Focus Group Update: We are now in Schematic Design (SD) and the process of drawing the building will take an additional couple of years. SD is the phase where the budget is set. Perkins Eastman gave a project update with Site Plan and Floor Plans. Focus Group Process Overview: The LHS design & drawing process will take approximately 3 years before proceeding into construction. We are currently in the earliest phase, called Feasibility Study. We are gathering information, determining the space needs and developing goals/objectives with the City, School & Community. Through the design & drawing process, we will be meeting with LHS in the form of Focus Groups (+/- 4 times during the design process) and as full faculty forums (first one 12/7). Our objective in this first round of meetings is to understand the spaces needed, where they should be located & and any major equipment of functional requirements that might affect the shape/size and position of rooms. Current enrollment +/- 3,128 students. MSBA planned enrollment 3,520 students. MSBA average is 23 students per classroom. We will design layouts for average of 28-

		32 students per classroom LHS is currently experiencing. Current LHS teacher contracts are for 5 of 7 periods which is 71% efficiency. MSBA requires 85% efficiency & effective non-ownership of classroom. Refer to attached Process Overview Form with questions that were distributed prior to the meeting that serves as a framework for these Focus Group Meetings.
11/15/16 7:15-8:00 09/16/18 9:35-9:55	Safet;y & Security	LHS Attendees: ~~Jeannine Durkin Deputy Superintendent~~, Roxane Howe DIS/OPS, David Peaslee-LPD
		• Showed Essex Command Center image. Location is critical. • Reviewing Safety audit currently (2012 & 2016) • Places of Learning not prison feeling. • Visibility important- controlled visibility. • Natural safety & security. Define campus • Typical classroom- door is closeable but sidelight of window. • Compromise- Doors in locked position but open. • Front Entry, SRO w/ Admin behind (possible Command Center there) • Semi-main entry at the 1922 building- Controlled vestibule- satellite security, not SRO. • Two separate offices now. SRO=Police. Dective and Police. DARE=SRO. 4 police. 1 freshman, 2 main + supervisor. • Workroom for 3 plus an office. • If Main SRO held all security cameras, eliminates Security office they have. • Landscape fence- controlled access. • Possibility add elevator @ “public entry” of gymnasium • At the start of the day students/staff come into both buildings; only main entrance is manned. • Future goal is to secure all entrances per recommendation in safety audit; 32 entrances exist • Existing sign-in sheet at security desk (Raptor), not totally secure • Plan is for freshman to be part of campus in future; separate entrance pending layout • Kirk St. one entrance is open currently for Gr.9 travel between bldgs • Over 10,000 visitors per year • Vestibule control options; fully controlled w/ check-in and separate manned security as opposed to reporting to administration office; astounding number of people pass through the building in a day; would prefer secure vestibule in each building. • Restaurant: Current Public access to restaurant from Kirk Street with a buzzer but no security, students can provide access via buzzer. Future possible storefront at restaurant for visibility/draw for restaurant as well as security. Ideal design would have visibility of security desk. • Also public access to bank and store • TV studio and maker space no public draw currently • Field House Auditorium & Cafeteria need thought re; after hours; design should allow for zoning & controlled access • Deliveries occur from multiple access points currently: maintenance area (not always manned), main entrance, & freshman academy; bulk of deliveries at Lord Building currently – difficult access for trucks that requires shuffling cars, delivery would need to be reconfigured.

		• Security Space Needs: Existing 3 in Lord Building – Police/Security/Dare and 1 at Freshman Academy. Future: ideally 1 for Freshman Academy if remote, SRO offices w/ meeting space approx. 150 sf, computer is remote w/ a couple of monitors, some schools secure command and control center w/ consoles or interior bunker type locked and secured room. Security Staff: also space for a couple of security staff, DARE is same space -needs to feel welcoming and accessible to students • Other security space needs pending Lobby design • House offices have a lot of traffic and would be good to be centrally located near the entrance • Student support office for enrollments also very busy and should be located near entrance • Field House has a lot of traffic and should be near security office • Unique challenges of canal & trolley including response time due to remoteness of buildings, if staffing permits would be beneficial to have staff in each building. • Multi-level bridges would help alleviate congestion and keep students in the buildings • Some open dining on the west side of the canal; a few incidents of issues with kids adjacent to tracks; option for cafeteria w/ contained outdoor dining (currently no recess option for air and sunshine; existing cafeteria is very contained and crowded and outdoors is a release- perhaps double duty space for outdoor dining and classes • No current student roof access • Special safety / security equipment: licenses by FCC use of the radios, need 1 antenna for repeater of the radios (currently roof of the old building)
11/15/16 8:00-9:00 09/18/18 8:45-9:35 11/07/18	Health & Bioscience Pathway	LHS Attendees: ~~Roger Morneau-Dept. Chair~~, Killian McAnaney-Science Teacher, Stephanie Selvaggio, Roxane Howe
		Hlth & Bio Sci (11/7 updates): • Health Classrooms, same as typical CR's. Would like to teach CAN (Hlth Asst) • Health Asst, set up like a lab with nursing beds, mock toilet • Like Health CRs as a cluster or at least in pairs, use common resources and like to collaborate. • Some PE teachers teach Health, so some rooms near Gym is ideal • Would like 2 in the Freshman Academy • Most Health CRs are truly at 30 • Typ Science Labs - MSBA guidelines reviewed. Layouts will show 28, but could fit more • Concern for limited marker board, would like wide teaching wall and don't locate eyewash/shower on same wall. Would like sliding marker to maximize. • Would like interactive/distant learning capability (UML Bio, Chem & Physics) • Chemistry (gas services) should be outfitted in 4 or 5 of the Science Labs. For flexibility provide 6 labs (3 in each building), even if only 2 might be scheduled for Chem. Chem storage via lockable/flammable cabinets for flexibility. • Fume hoods will be provided to all Science Labs, but will check where needed • Bio Tech looks good; noted mock, not true clean room • Micro Biology also good Hlth & Bio Sci • Mill City Grows, Farm to Table

- Engineering externships- Environmental. Trying to get a Sustainability Pathway, Natural Learning opportunities (bioswales?)
- Set up labs for up to 26 students. 30-32 students is WAY too many. Up to 28 would be ok (as an increment of four)
- No ownership of classrooms, organized in STEM clusters. 3 SCI + 3 MATH, with T. PLAN nearby.
- T PLANNING- want each teacher to have their own spaces within the T planning room.
- Microbio, BioTech, Health Asst. Astronomy, Froensic- new to the Dept head position, hard to talk specifics about what needs to be in them.
- Consider ductless fume hoods? More work, but less ductwork. Save energy overtime. Makes all labs interchangeable (unless you need services)
- Send intermediate information prior to next meeting if possible, we'll do layouts to make next meeting more productive.
- Likes the vertical greenhouse images and horizontal (maybe in bridges?)
- Pathway created after building was designed, so current configuration is not ideal
- Core course microbiology; currently 1 room Bio Lab scheduled, future ideally micro & bio tech lab w/ clean room
- Vision for pathway: medical side like teaching hospital demonstration /mock-training area or patient, if get Certified Nursing Assistant (CAN) program which is a goal, regular lab w/ curtained off area and exam table
- CNA Training Area would need to be authorized by department of Education; LHS to confirm if this space should be included
- Would like health and bioscience cluster in each building,
- MSBA standard for lab 1440 sf plus Prep Room 400sf:
  Lab is one large space w/ fixed perimeter casework and loose interior furniture which can include mobile demonstration tables which floats, and prep room with 2-sided fume hoods, and standardized sizes gas etc.
- Microbiology: ideally specialized Clean Room w/ fume hoods
- New Clean Energy Pathway w/one course spearheaded by Killian; idea to include renewable teaching tool in building i.e. PV, geothermal, wind. PE noted that if budget does not allow for renewables at outset could plan for renewables to be included in the future. Collaborating w/ U Mass Lowell and Middlesex Community College – speakers and field trips. Part of class is field development, and getting credits. Curriculum is developing.
- Clean Energy is a grant from Mass Clean Energy Center: **LHS to provide copy of Grant.**
- Grants received would be subtracted from MSBA reimbursement
- # of students in pathway varies; students can get in and out of pathways, hard to predict number currently, need to understand space needs pathway vs. larger science curriculum (can design to fit up to 28)
- Combined Old "Kouloheras" Building East Side of Campus: no Health and Bioscience, Room 304A, 1 chemistry mixed use room 314, 304 mixed use
- Flex Teaching Room could be lab room; medical terminology & procedures
- State mandate: nobody owns a room, typically need to plan for 85% utilization (maybe less for Science due to labs)
- Central Department Room: possibly a collaborative space for teachers that is not just for Science; proximity helps with efficiency
- Organizational Models: Want collaborative clusters w/ Science in each, STEM school. Science is critical organizer because of specific rooms that are not interchangeable, possibly cluster w/ disciplines ie. Biology, Physics, Chemistry
- Other Specialty Needs: Greenhouse, growing, rooftop equipment i.e. Weather Monitor

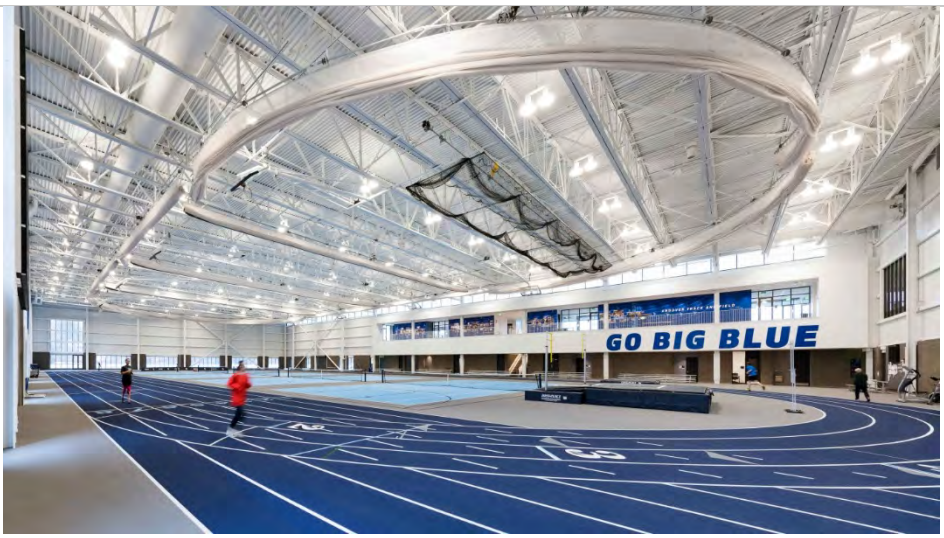
		• Big push in Lowell for gardens as a teaching tool; D House/coffee center (was a plant room), and greenhouse space Plant Room 650 – both are too small and not utilized; green space could tie to all levels of Bio and honors genetics, both existing spaces too small • Weather Center would be beneficial for Meteorology classes • Can the Canal/Bridges be featured in the design & educational mission / Building as a Teaching Tool i.e. hydroelectric power for clean energy, deflection of bridges, PV panels on bridge portions elevations (energy & shading) • Student and Department Input That Would be Beneficial: Future of teaching and learning? Students learning at their own pace? The flipped classroom? • Technology: Target at this time; 1 to 1- timing pending funding. • Biotech: None at this time, but was previously discussed with MCC, would like to pursue this – possible certified pathway. MCC Biotechnician program. Need to confirm if this program will be included in planning. • Microbiology vs. Biotech: both would need a clean room. • 9th grade: teams of 4 or 5 classrooms including a science lab? • Dual Enrollment: biology, U Lowell removed credit because LHS has no physical labs & resources for credit; UML Chemistry and Biology • Offices: currently Dept. Head in Teacher's Dept. Mezzanine in old building • **LHS to coordinate representation from U Mass Lowell & Possibly Middlesex Community College in next round of Focus Group Meetings.**
11/15/16 9:00-10:00 09/16/18 9:55010:45	Freshman Academy	LHS Attendees: ~~Jill Lang-Director~~, Bopha Boutselis-9th Grade Math Teacher, ~~Mark Cullen-9th Grade History Teacher~~ Kerri Morales, Jill Rothschild, Michelle Harvey, Roxane Howe
		• Freshman Admin at second floor- Office includes guidance. Check-ins happen at the SRO. • Freshman have their own Cafeteria with server. • Makerspace on 1st floor with Labs. • Media Center split into two spaces. • Controlled visibility from Classrooms/Corridors. • Need large lockers, Athletic storage in classrooms now. Possibility of having a variety of sizes available. • Possibility of having lockers at corridor for storage at Gymnasium. Same for Music. • More filling stations for water bottles- requires a city worker to change filters. Available without filter? Low maintenance. • Use other spaces for planning, conference, and cafeteria? Etc. • Need a place like the theater for all Freshman (~800) presentations/performances. • Show multiple classroom layouts for next Meeting. • Very important that Freshman Academy is separate: Freshman Academy model separates Freshman to accomplish a smooth transition between middle school and high school • Statistically separation helps; students need extra support beyond that of house model • Currently 760 students, typically 750-850, highest was 1000, surge anticipated next year • Currently 3 teams organized in clusters, originally 4 teams of 8 , 4th cluster removed a few years ago due to staffing cuts; plan for 4 clusters of 8 teachers of 110 students • Director w/ 2 support staff per cluster helps minimize behavioral incidents

		• Course offerings were less, now have more high honors, geometry and algebra • Team: Math, Science, English, Social Studies • Outside of clusters: 2 full time and 1 part-time Specialists, 2 specialist classrooms + 2 SPED that work w/ all classes, full-time suspension, balanced literature teacher, adjustment program, emotional disabilities (moved to main building 2 years ago due to space shortage but should be with FA) ,3? foreign language (spanish, Kamir, French) and 2 health, Missing Latin Lyceum, and ELL spaces (separate now due to space) – need direct connection to FA • Key to have guidance and social worker in Academy for quick response time to correct behavioral issues • Existing FA was middle school so layout does not reflect current HS needs. • Smaller communities w/in each cluster helps minimize class cuts and improve behavioral issues, staff recognizes students and knows who should/shouldn't be on the floor • Currently separate cafeteria and theatre; inherited the theatre which is currently used for seminar and assemblies but not crucial for future • Some Freshman activities on Main Campus help ease students into upper class campus: existing - gym, library & theatre, future possibly others i.e. Foreign Language? • Cafeteria: distributed dining w/ choice and scaled social dining vs. large area w/ multiple seatings. What is the ideal for the FA? Possibly dine on main campus? Need to explore safety benefits of smaller cafeteria but possible benefits of larger integrated cafeteria Freshmen can be vulnerable and need a safe space that is not too crowded. Freshman start as timid and unsure and some may not feel comfortable eating lunch in a large scale situation with all classes together; explore both separate and integrated dining. • Teachers Rooms: Currently 1 large teachers room on 1st floor. May be difficult to convince teachers not to have their own rooms for belongings, materials books etc. and time to travel to common area. Also concerned with space to leave their materials. State provides 100 sf / teacher/classroom for space for teacher. Friday 11/18 tour to Essex Tech w/ teacher planning rooms outside of the classrooms. Planning space includes some limited file cabinets/storage. Storage planned into classrooms as well as additional general storage. • Would like some separate area w/in room for multiple situations/flexibility i.e. separate cubicles for tests. • Teacher space: shared technology • Classrooms: how to personalize and share space? Concept "primary ownership" 85% utilization, plan for flexibility • Still have 100 sf/ for teachers which could be Teacher Planning Rooms or other • Classrooms: Flexibility, possible break out or pull-out /spaces (enclosure could vary), option shared space in the corridor w/ good visibility. • Existing Corridors: A bit small and can cause congestion, but also intimacy and no nooks and easy teacher insertion to prevent incidents, no cross corridors and no unsupervised areas, only one near nurses in existing, easy to supervise id and makes for good eye/contact and conversation w/ teachers, all corridors visible good line of site no hiding • Maker Space: created last year, part of integrated science used by science ea. cluster and Latin Lyceum, functions as a lab and need to schedule, directly related w/ curriculum, 3-D and laser printers w/ lab tables, large touch screen monitor part of a grant • Maker Space: Space can vary greatly pending on district needs.Where should space be located- proximity to 9th grade classrooms is part of Grant, adjacent

		to Media Center? could be beneficial to entire campus. **Roger to provide copy of Grant.** • Media Center: FA uses Main Campus library currently • Computer Lab: Rms 810 and 903, issues, 903 not enough room for notebooks at desks, State does not have an allowance for general computer labs that are not specific i.e. Graphics, expect this to be in Library or other space. Currently need to schedule rooms for classes to use this space. Alternate Idea: computer carts in each classroom, technology FFE/Technology budgets for computers etc. • Guidance/Social Work: Office 716A, 717Teachers: currently separated but not desired, just an existing space constraint • Main Office: 800, In-House Suspension 715, 1st,middle office Cluster 7 / ELL, next Rose Cluster 8 Guidance, last Gina Social Worker, Side Office Storage, Reception is 1 Clerk, need a security and check in office not currently available, all buzz in and go to Main Office; ideally want separate waiting room for parents separate from Office and students/ copy etc. 800 main office: 1 person works there, top left office 100 was 2nd student support specialist that was eliminated budget cuts would be beneficial, Student Support, Special Ed Testing, Conference, • Rm 811: Gear Up and Talent Search w/ Middlesex Community College: small classroom, need an office and a few desks and small table; need to check if Grant extends / funding, good to include office for outside partner or school counselors, but then would need large office and no classroom • Rm 902: Was teacher's room, now used for screen testing, hearing and vision, plus 2 nurses office 1 has 2 cots, the other has none • Rm 901: science but no classes scheduled, used sim to Maker Space, kitchen not used –was inherited, includes large lab tables which are missing in existing science rooms • Rm 852: Copy Room and Teachers' Lounge • Rm 850 / 851: captured room in back, now used as teacher room but not teaching because open and acoustical issues • Storage above theatre used as dressing rooms associated w/ Fine Arts dept.; MCC rents the theatre too, would need storage and props storage if theatre stays, • Special Ed & Testing: speech and testing, varies from year to year • 859 Room for speech and hearing impaired, this is not only a freshman class (in FA due to space issue); some freshman but also upper class
11/15/16 10:15-11:15 **09/16/18 10:45-11:35**	**ELL/Foreign Language**	LHS Attendees: ~~Stephen Gervais-ELL/Foreign Language Dept. Chair~~, Barbara Hodgson-ELL, Jeannine Ameduri-French Teacher, Roxane Howe
		• ELL paired throughout building (as opposed to all together) WL is more like a department. Classrooms are 900sf, renovated spaces but made bigger. • ELL could use pullout not inside the classrooms, tutors need to pull out. Alcove desired. Tutor has to be in a room with a teacher. Tutors are not certified teachers. • Small alcove between classrooms- use furniture w/ sound absorption and a door between the classrooms. • Tutors only at the lowest proficiency. ~4 total, so two groupings. • Look for locations in renovation for rooms that may be larger to accommodate alcoves.

		• State does not recognize Labs ass pullout space. Current Computer Lab is like a Classroom, a language lab. All students use headphones at the same time. No one can hear each other. • "Listenwise" allows students to stop, replay, repeat, etc. • Technology Lab- use one of the ELL classrooms? Maybe two. Carols in all rooms and one or two full technology labs. • Consider operable partitions between a couple rooms for smaller classrooms if needed. • "Lightwells/Courtyards"- Rainwater tube and barometric pressure • Will have distinct Freshman Academy currently 3 teachers (French, Spanish, Kumai – currently feeling isolated) teachers are there because of shortage of rooms on Main Campus • ELL:many ELL students have tutors (currently 8 tutors), would like adjoining pull-out area not in classroom for extra help/attention, law is no wall or door allowed between tutor & teacher, would like 3-4 normal sized student study rooms for before & after school tutoring and projects during day, also would like another Language Lab w/ integrated technology for daily ELL use (currently in room 237 in "Kouloharas" building, trend is mobile labs, like carrels for writing and listening and helps overcome shyness, privacy encourages students to speak w/out intimidation, also fewer distractions then mobile labs, Room 237 is not a scheduled room currently, one lab shared by 2 departments, the state doesn't fund dedicated labs(they expect media center to be used, but we can make the case for language labs) • Carrels would not work well in the classrooms • ELL: like these distributed/integrated in pairs of 2(for a buddy) as opposed to ELL wing which can be isolating and "against the law". The students sometime feel that they "are not part of LHS", Also good for teachers to integrate w/ other teachers in their discipline. Students need to be exposed to what students in Gen Ed classes are doing. • Foreign Language: How should this be organized – an area or wing, a cluster on the cusp of academic classrooms? Either could work, need to query other teachers. Benefits to collaboration. We can test options. Foreign language tends to want to be accessible and possible on the cusp of academic language similar to science (would have windows). Like to collaborate in a language cluster. • Flexible Learning; want more Independent Spaces w/ good visibility. Won't work in a corridor but could work in smaller pull-out or study space that is not a traditional classroom for smaller groups of students. Need some separation i.e. an arch that provides some enclosure but is not full wall. • ELL/Foreign Language: "Lab" surround sound, or sound proof; existing requirements for sound are much higher than older traditional classroom designs, also options integrated sound security in a classroom need to discuss the value of this vs. budget constraints, sound reinforcement – wire separate system w/ speakers and teacher wears device, every room short throw data projection w/ built-in sound reinforcement, centralized sound system center room picks up sound system (acoustical consultant part of team to help create effective learning environments and also evaluate acoustics for mechanical systems – issues w/ rooms on courtyard currently) • ELL enrollment can creep from 16-30+ during the year; can some rooms be expandable? • Teacher Work Rooms and Offices: Most located in the Mezzanine of "Kouloheras", would like to be with other Academic Chairs Colleagues. Idea of large Teacher Center or dispersed Teacher Centers. There used to be a Foreign. Language common meeting areas.

		• Student Support area: Need to acknowledge distance and privacy when considering teacher center design. • Other spaces: Storage, Dept. Offices, would like central storage or w/in classroom areas, text books are still used. Some storage can be included in rooms. • Lockers: need places to store and lock things up. Like the old built-in cabinets form the 1922, like the glass for visibility and helps with dust.
11/15/16 11:15-12:15 09/16/18 11:35-12:25 11/07/18	Wellness & Physical Education	LHS Attendees: ~~Jim DeProfio PE Chair/AD, Pat Swett PE Teacher, Krisi Keegan PE Teacher/Coach~~ Dave Lezenski, Pat Swett, Roxane Howe
		Athletics (updates 11/7) • Look into outside access storage for sports/programs like hockey, skiing, etc. • Might want to relocate the AD suite (swap with trainer) • Hitter's cage + softball cage + shotput net + mat lift • Traverse wall (reinforced), see PLS Project Adventure cuts • (4) volleyball cross-courts, (1) competition (carbon fiber insert) • (1) center scoreboard cluster + (2 sets) wall mounted each cross court • Would like wireless scoreboards and audio for voice and music (although CTA mentioned concern that battery depletion would impact intelligibility and recommends wired). Scorer should be opposite main bleachers • MP/Gymnastic, Fitness/Strength would need local sound systems • Outside quad needs sound, not just PA system • Need dishwasher (for bottle washing, etc) with Trainer • Locker rooms allow for 250 each, 500 total (9 PE classes of 35 only = 315) Athletics • Conference, Suite of Rooms, AD appears the State has accepted, know that they can still come back to change their mind. • Tight Gymnasium, but are able to get bleachers in, matched approximate of what is there now. More fixed, less mobile than what exists. • Locker Rooms are smaller than what we typically see, but becauses teams travel to fields. • Dave to update Team list who is on campus/when. • Storage, Storage, Storage- never enough storage • Cheerleading and Wrestling Mats aren't the old heavy mats. (7) 6' rolls- kids can lift them now. Baseball and softball lower from the ceiling. • Lockers in the corridor for daily storage. • Need an equipment room. • 18'-0" floor to floor- be creative about vertical height for storage. • Training Room • High Density Equipment storage. Peter to send cuts to Perkins Eastman. GearBoss- by Wenger. • Coordinate w/ ROTC and SPED- Look at Phillips Andover Field House solution for partitions that drop.



- Not an Officials Room- use Coaches or Athletic Directors office.
- Wrestling pats right up to the wall, that's ok. 42'x42' minimum. Planned on 42'x84', pad all the walls.
- Multi-purpose gymnastics, how does it get laid out? Can it open up to wrestling? Balance Beam, Vault, Horse, No rings, Uneven Parallel bars. Full sized competitive gymnastics.
- Fitness- 1500sf
- Weights- 1500sf Previous hired Gronk Fitness or NE Fitness to lay out.
- Maybe Fitness & Weights can be combined for one big space. Ability to have film study and media inside of that room.
- Assume all equipment should be new.
- Just bought new banners. 4x8 banners- design for them and more!
- Scoreboard- just bought one. Would like to repurpose.
- PE Offices like a workroom
- Team Rooms and Locker Rooms need to be laid out.
- Training Room- Hot & Cold water, 5-6 tables, whirlpool, Wally Collins to help design it. Current training Room is terrible/unusable.
- MSBA funds Physical Education including 12,000 sf gyms but not "Field Houses" or Athletic Team locker rooms
- Want flexibility
- Desire to get mats up off of floor to use space for Zumba or other
- Athletics only permanent equipment set up is gymnastics
- Have both a boys and girls interscholastic team, beyond that separate rooms off of gym are all used for PE program with athletics use after school and weekends
- All spaces well utilized between 8am-8pm
- Plan diagram provided is ideal sketch (not to scale) reviewed w/ all coaches and tried to be realistic and practical. PE noted that this diagrams contained more stations than is typically funded by MSBA
- Gym: synthetic floor w/ lines to delineate basketball and track
- Long jump (LJ) and triple jump (TJ) have are sand pits that can be closed w/ covers for PE application.
- If need to compress footprint could be on multiple floors
- Wrestling 42x84 full set up with soft divider
- Gymnastics need layout assist: **LHS to provide diagram**

		• Yoga/Weigh Functional Strength: 35-37 students at a time, current room is a little small • Weight Room: Olympic lift/traditional type room free weights, weight training more than core training, kettle bells, weights, storage on perimeter, fitness balls, medicine balls, • Desire small size instruction, variety of very active kids • Functional vs. weight separate rooms: should there be transparency? • Long wall looking out into gym: top safety glass & bottom solid, opportunity for shades for privacy on glazing • Mens' / Womens' Room: want to avoid students returning to the locker room mid-period, would like return to be monitored w/ teacher supervision; don't want students left unsupervised, • Main gym lacking system of dividers– curtains or others; hard vs. soft options • State standards: plan for 23 avg. size; state considers 1 gym station 3,000 sf; diagram shows 8 stations, will explore validated square footage and see how to divide to accommodate stations • State doesn't fund natatoriums • Locker/Shower Rooms: showering is activity dependent, Pool / swimming they shower, lockers are divided for PE and Athletics, Lockers are used during gym period (students bring own lock) # lockers is enough for 1 PE period = +/- 35. Varsity Locker room used in season. • Ofices for PE: There are no athletic offices, there is one PE office in each locker room, and one at pool, 1 at Varsity, and one in the hallway. Offices are shared for 2 people, some are for 3. Coaches share the spaces with the PE teachers. Envision gender offices for PE/Coaches. Seriously missing in current design is a teacher / coach spaces to change and shower that is separate from students; would like private adult dress/shower. • Storage: 2 specific types, Cage Storage for teacher instruction, open w/ locks for nets racquet sports, jump ropes etc., also permanent bleachers w/ storage below, slop sinks, Zamboni machine, storage for teachers. • Access to outside: Only green space adjacent is green triangle at Tsongas Center. Teachers would like outdoor space; creative ideas- turf top of garage. Need field space to enhance instruction. • Overlap w/ ROTC –marching upstairs in the morning in Field House • Options to lift things into the ceiling; existing baseball cage is lifting into the ceiling and used for baseball and softball, have 1 cage that lifts. • Other large equipment: Indoor shot putt (plastic casing filled w/ buckshot) needs to be caged in. Functional strength – have some equip in weight that was donated. • Functional training/fitness; moving the body in ways similar to your daily activity (picking up groceries, twisting, turning, walking carrying), PE which designed to manage physical demands of real life. Need an open space, with things that move kettle bells, sleds, medicine balls, climbing ropes, each class can re-invent itself/not structured, can change by grade level and need, could have turf. • Natatorium: 6 lanes @ 25 yards, looking for 8 @ 25, and a diving well in 2 lanes, or bump-out diving well, for Phys Ed reward is to go learn diving, also large part of program for interscholastic teams. Range – some students may not want to put their face in the water. Intent is to level the playing field for all of the kids that don't belong to gyms or have private lessons. Range: learning to swim, water polo diving, instruction life guards; divide lines to provide flexibility.

		• Ethnic / Cultural Specific Considerations: Changing / showering – some cultures have difficulties participating in PE because locker rooms are open space. What to plan for to accommodate these cultural issues? No gang showers. Would prefer fewer shower heads if it means more privacy – may increase participation. Existing girls room changing stalls; most use these; would like to see these again. Boys individual also get used to change; only 2 existing. • Refer to attached "Lowell High School Physical Education/Athletics Plan for Focus Group provided by Jim DeProfio that includes additional "pencil"/lowercase PE notes.
11/15/16 12:45-1:30 09/16/18 23:30-3:20 11/07/18	ROTC	LHS Attendees: Eileen Ironfield-Senior Instructor, David Smith-Instructor, Roxane Howe
		ROTC (11/7 updates): - Need changing either in Classrooms or in Corridor. ~40sf Need Rifle Storage - Rolling Racks in Storage (want one big open space) Uniforms for ~400 students - Enclosed corners in Storage Room - ~14 carrels for Cadets in conference room - Conference Room- with teaching wall - Built-in walls for trophies - PT Room- proper elec (treadmills, bikes, stairmasters) ~30 pieces - Visibility from Classroom out to Corridor - Tack surface on walls - Riffle ends are hit on the floor- check to see if it will damage - Typical desk/ teacher stations ok per Peter's description - Storage ~40sf of storage room within the PT room - Flagpole in Quad for ceremonies (9/11, Flag Day, Veteran's Day) - Worried about water coming into the basement. *See plan markups on Room Data Sheets* ROTC • ROTC drills in Gym, Other spaces in Basement of 1922 building. • 6:30am is Drill Team • Drills is part of ROTC+ Uniform- can report • Gym Equip is now in 30x25= 750sf • Send an enlarged ROTC plan to them- plus overall floor plan. • Check in with ROTC on 10/16 meeting day • Basement ok because spill out into corridor- there is less traffic in those basement corridors. • Existing = 4 classrooms + cadet staff/conference classroom + classroom for supply + office + bathroom taken over for gym • 385 students in ROTC, 4 instructors (5th mandated at 350); had 232 15 yrs. ago, has increased gradually. When HS was 4000, they had 475 cadets • Students begin and end in classrooms, but they pull-out typically for inspection, drills (in hallways… they get interrupted), PT • Drills need a gym space (2500sf regulations based on units of 100) • Drill space needs height for rifle toss

		• 6:45am gym used for drill (to not conflict with PE/Athletics but teachers used to run, creating conflicts). Gym is used 5 of 7 periods and before school by necessity (drill, inspections) • ROTC cadets train for numerous events • See regulations; noting they are minimums and based on 2 instructors and 100 cadets. Classrooms (CR) capped at 32 seats/CR • Cadet Staff/Conf area for 14 computer carrells, 24 seat conference (also used for counseling). Could probably change to laptops if school goes that route, except for use of Turning Point Software (not mac friendly) used for teaching classes • Cadet staff have jobs, must interact with US Air Force website • ROTC office should be for 4 instructors + Director • Ideal location is with gym/drill space, but also at ground-level with access to outside
9/16/18 **11/07/18**	**Main Administration & Nurse**	LHS Attendees: Roxane Howe, David Robinson (Student Support), Mary McLauflin (Nurse)
		Admin Areas (11/7 updates): • Dept Offices only needs 5, move ELL/WL w/ stu support and provide testing; eliminate redundant ELL office, but add 3rd FA Guidance • Move Hd of School secretary close to Hd of school • Main Office conference room to double as security room (like at Essex Tech) Nurse (11/7 updates): • Desire to switch T. Dining & ISS w/ Nurse's Suite for daylight and fresh-air, but the ELT does not feel the visibility is appropriate for the front of the building • Need good visibility from cots to main office area • Like sidelights for visibility from cots to interview • Swap corner exam and interview locations • Records storage combined observation • Need clearance for wheelchairs and stretchers, even with storage cabinets • (2) exam, (2) observation and (2) office • Need sinks in both cot rooms • Need tabletop or under counter ice machine (not just refrig. ice maker) • Need LCD display in waiting area • Need several scales, dedicated fax machine, white bd • Materials/surfaces to be abuse resist (punch-proof) and sanitary (FRP walls) anywhere a cot is next to wall • Lactation room ***See plan markups on Room Data Sheets*** Nurse: • It's important to have natural light. In space • More space than currently have- now shoulder to shoulder. • Currently have 5 cots. An observation room to see the sickest. Called the "nursey" • Want 6 cots, 2 toilets, a lactation room, room for approx… 6 people for private meetings. • Waiting area- try to take right away. • 6 cots. Curtains. Exam Rooms (2) Toilets (2) Storage- Wheelchairs (2) + Supplies • Full Size lockable Refrigerator + Ice Machine

		• Lockable medicine cabinet • 3 Scales • Emergency bag taken out in evacuation • Larger entry ways (42") • Stretcher access to cot area. • Files—have (4) 4-drawer files, (6) 2 drawer desks. Need to increase for freshman. Also does not include SPED Files. Interested in a File Room.
11/15/16 1:30-2:30 09/16/18 11/07/18	**Student Support Services**	LHS Attendees: ~~Dave Robinson – Coordinator Student Support Services~~, Roxane Howe, ~~Tim O'Keefe House Dean~~, ~~Maria Bejar,~~ Heather Brunner-Guidance Counselor, Maureen Schwartz-Social Worker, Karyn Cassidy-College & Career Counselor, ~~Mary McLaughlin – Nurse~~, Pat Noonan-SSS Clerk, Lisa McHugh-Clerk Scheduler, ~~Cindy Obika House Clerk,~~ ~~Darmery Montoya Parent Liaison~~ David Robinson, Roxane Howe
		Student Support (11/7 updates): • Discussed current layout vs relocation for better visibility • Need to increase the main student supp. suite (wider main desk) • Could eliminate one toilet (for more support suite) • Need more supply/storage with copier; add counter for fax and other tasks • Need coat closet • Provide side glass throughout • Need designated area for student ID's (alcove w/ computer/camera & wall space) • Need clerk office, ELL office, (2) smaller offices (other services, like homeless) • Need LCD screen in waiting *See plan markups on Room Data Sheets* Student Support: • Main Office of student support to have three stations (parent liaisons) + waiting. Large TV in Waiting Room and also in Conference Room. • Enrollment Clerk to have own office- Office with desk + table & chairs • ELL assessments- need an enclosed area for that. • Conference Room for 15 people • Student Support Services Office (David) desk + table • Records Room (12) four drawer files • Student ID in it's own roomor at least a dedicated spot. • Couple smaller conference Rooms now. Like to have a hoteling office or offices (2 or 3) if possible. • Bathroom for families as they are waiting. Proximity, could be right outside the suite. House Offices: • Distributed Adminn Suites. Two sets of two. • Need a meeting room in each house office. A place to meet with families. • Break up the T Work room to create a conference room plus an area for work off the corridor. • Tardy Station. Two clerks within waiting area. LHS to discuss further • Conference access of waiting area is ok. Conference for 8 with a couple extra chairs to squeeze in. • Waiting chairs- combine general and guidance waiting.

		• Records in another room not a good thing. Open to see students coming in might be nice. Some files in offices. (6) Total 4 drawer cabinets. Vote to keep it all within the Guidance Counselors offices. Final decision to do a hybrid- show space for files in GC offices, but also have files out in the open for any dean or counselor to access. • 4 House offices (Dean, 2 guidance, clerk/scheduler, house clerk & social worker); 2 clerks in the general house office/waiting. Would like a small conference. Waiting for 10-12 with tardy computer station. Would like kitchenette • Note houses are just a way to break down the large no. of students into manageable groups, same support • Need separate copy machines • Consider house offices located off of main lobby (closer to entry) • Deans, Guidance & Social Work needs enough for meeting w/4 • Each guidance has about 4 or 5 lateral files • Nurse suite (waiting for 8-10, counter/desk area for 4.5, 2 private rooms for exam/conference, 6 cots, 2 bathrooms, storage for supplies, ice-maker. Need files/records • Locate nurse near Student Support; might want to locate teen clinic nearby also • Lactation room near nurse • Would like nurse access to outside for student pick-up • Student Support needs main office w/ clerk, separate registration/waiting area, (2-3) separate ELL testing cubicle areas, 4 liaison desks in open office, student support office, conference for 12-15, need room for 7yrs of student records (graduate, withdrawn, etc.); for 40 lateral files • Student Support should be located near security, main lobby, but acoustically separate • Once a year parents registering students for a week, spills into halls Career Center: • 1st floor of Freshman Academy. Accessible to all. How to break up? • Presentation/Workshop Room. Possible to have a separate computer room? Main Office Area • Multi-Use space, dividable room? Shared computer room with workshop room- separate from the Main Career Room. Two Rooms ~500sf Two spaces- one shared computer room + Presentation. The other the “main office” area for two staff + conference table for students. • Bookcases, Staff desks, files. Locking cabinet for test materials. • Need storage room for testing materials- Follow-up on MCAS materials Storage. • Catie’s Closet- discrete and accessed only with an adult. • College Career Center (CCC) currently is an extension of guidance, they help students with workshops, fairs, testing, etc. Currently use 2 classrooms with 3 full-time staff, 1 room is multi-purpose conference (need for 10-15) + several students computers, other room is 24 computer station lab with desk. Would like secretary/reception. • CCC needs large space w/ secretary and large laptop area with presentation capability, space lined w/ the individual offices and conference space (Nashua HS North). Locate near guidance for monthly Naviance training. Need kitchenette
		•
11/15/16 2:45-3:45	**Athletics**	LHS Attendees: ~~Jim DeProfio, Jen McGlauflin,~~ Paul McCarthy, Tim Patterson, Damon Amato, ~~Kevin Donahue, Jessie,~~ Dave Lezenski, Roxane Howe

09/16/18 1:40-2:30		
		• Public entry- larger, elevator, tickets, etc. • Wet Room- for people without access to the entire training room. • Coach's Office direct off the corridor with a glass - connection to the locker room via door only. PE Teacher prefers a window into the Locker Room. • Think about wrestling room location in relation to canal. • Climbing walls? Plan for it. • Jim to provide full athletic program/season with participation (subsequently provided by Jim via email on 11/29/16) • Main Gym can have upward of 300 students at any one time; inter-scholastic needs are greater than PE (Gym boys/girls indoor track = 200 alone + Basketball + Cheerleading). Need water jug filler and ice-machine area for coaches • Wood Floor Gym w/ one competition basketball and 3 volleyball. Should have spectator stands on one side, not opposite • Equipment/Uniform Storage needed w/ laundry. Football is done at the stadium, but everything else done on-site • Frustrating/inefficient to bus students and commandeer other MS • Crowd control and flow is an issue, many ways to get in/out and up/down floors • A lot of space in the existing Field House is unused/inefficient • Functional Room – non cardio, more natural movement space • Weight Room to be slightly bigger than existing, size for 50+ (Jim to provide inventory); like combo Olympic lift station as one element • Cheer/Yoga space for 36 students and Cheer meet mats (45x45) • Wrestling should have subfloor suitable for dance; mat lift is ideal or space to roll-up mats. Plan for (2) 42x42 layouts • Gymnastics part-time on-site, girls off-site. Rents gym (half equipment is broken), they have about 80 kids sign-up. Needs 6000sf set up**. Jessie to send layouts.** • Trainer about 1200sf w/ separate exam room and toilet. Also need a number of taping stations • Natatorium – needs to accommodate meets (8 lanes + separate diving well w/ 2 1meter boards, separate bathrooms and 150 spectators, ideally up above pool deck, alongside); Locker/shower area can overlap and be part of main locker area. • Pool needs separate PE and athletic storage, noting the wet nature of items • See attached Physical Education / Athletics Plan for Focus Group provided by Jim DeProfio w/ additional PE handwritten notes in pencil.
11/16/16 7:15-8:00 09/20/18	Custodial	LHS Attendees: Rick Underwood-Operations & Maintenance Director, ~~Alan Sayer-Custodian.~~ Patrick Harrigan, Roxane Howe
		• Each building/each floor parking for riding scrubbers for drainage and power for machine will fit through a traditional door. One close to the gym. • Currently have two trailers for storage and gas. • Look at moving kitchen/custodial closer to Caf. • Drive in/Backout? Still looking at, maybe flow through? Maybe turn around. • Snowblowers, leaf blowers. Stand alone shed. Will need a ride on mower. • Acid Neutralization? Will scope centralized system- one per building. • Don't necessarily need water filter on bottle fillers.

		• Recycling- Student run. Cafeteria does not recycle- City has single stream, School does not. Would need more dumpsters too. 40 & (2) 10s. FA has another 8yds that will need to be added. • Epoxy Floors preferred in TRs, Lockers, Showers, Kitchens, etc. • Phenolic dividers, highly durable partitions in TRs. • Loading Dock is both kitchen and custodial. Existing not big enough • Large (30yd.) mixed recycling, (2) 10yd. exist. Need more recycling dumpster. No composting • Recycling program is in all CRs, two bins each room. Tuesday barrels into hall and student group collects. • Maneuvering space for trucks not enough (2 -44' storage sheds and dumpster don't allow enough room for maneuvering) • Full tractor trailer deliveries; daily milk, bi-weekly Sysco, trash daily/recycling 1/week (not enough) • Kitchen deliveries direct to kitchen, School supplies direct to custodial. Custodial storage too small; supplies ordered as needed • Other than small custodial closets, no other major distributed storage, except basement of 1922 building (supplies and major equipment) • Gas storage is out in 44' storage (4-5 snow blowers, mowers, weed wackers, light bulbs) • Salt stored under each stairs at entry areas • One office w/ bathroom; small locker area, bathrooms and showers (need unisex) • Need freight elevator; need to accommodate pallets • Ideally distribute cleaning equipment w/ charging each floor (ride-on, walk behinds, Kaivac -bathroom machine) • Interested in non-waxable finishes • Have 2 genie lifts (one in gym, one in 1922 stair), plus an old scissor lift in the gym • Auditorium lights drop-down • Boilers on the roof of Lord; the steam plant is for freshman and Kouloheras • No neutralization tanks known • Would like access to bathroom chases; if major work required, walls/finishes will get destroyed and not replaced • Problem with drywall in classrooms, teachers move desks against walls
11/16/16 8:00-8:45 11/07/18	Business/Culinary	LHS Attendees: Margaret Overlan-Restaurant, Jacqui Taylor-School Store, Roxanne Howe Roxane Howe & Jill Taylor (Business) Seth Bernier (Culinary), John Sousa (Crabtree McGrath)
		Cukinary (11/7 updates): • CMA reviewed layout; see (John Souza) notes • Own trenching for new waste/water and services • Identify major exhaust pathways (to roof?) • Overhead electrical at baking • Restaurant to include classroom/presentation capability • Have interior culinary CR to be domestic (home-ec like) and CR adjacent to restaurant as more commercial • Need culinary lockers (in corridor), can use toilets nearby Culinary • See attached meeting notes date 09/20/18 from Crabtree McGrath

- Open Kitchen, Prep Area, partition and then ala carte. Dry Storage, Pot washing. Baking program take place in Prep area. Deck Oven in main line area- bake directly on the surface. Baking program: Get into baking rolls.
- Quick Service area or a deli in the restaurant close to the line. Display for baked goods.
- Retail- coffee for staff, brewers. Latte maker. Display case for baked goods. One is a cooler
- Seating Area- 40-50 seats Using seating area for teacher. Need a whiteboard and projector. Double period block- 100minutes.
- Home Simulation0 Consumer Science Classroom. Demo area
- Laundry- Special Ed does it in Life Skills area
- Office for two people. Develop recipes, take tests, online menus.
- Marketing is only Ch.74 program, but Culinary program follows Ch.74 guidelines
- Students have 2 periods a row in am, program is M/T breakfast, W-F breakfast and lunch
- Culinary has front of house and back, includes restaurant w/ point of sale, bakery, kitchen w/prep (sections are split between front/back of house)
- 36-40 is their current capacity; need 25 minimum
- Bathrooms needed nearby (for students, staff and patrons)
- 1 upright fridge and freezer in kitchen (too small); distance to dry storage and walk-ins too far (good size, but remote.
- Classroom is also too far. Would like dining room to double as Classroom, with full capability
- Class sizes are 18-20, would like to grow program
- Students do deliveries around the school
- Public access not ideal, not direct or controlled. Should have open to public, but secure door from restaurant to kitchen could be done
- Location is near down town streets; might want to be toward main lobby, make showcase. The primary patrons are the school
- Note; culinary program cannot compete with school's food service for students.
- See attached Culinary diagram provided by LHS.

See to attached Crabtreee McGrath Foodservice Equipment Meeting Minutes for 11/22/16 meeting.

School Store

- School store w/ classroom attached (for 25 max) and secure storage and small office. As many as 10 might work in the store at one time
- Classroom equipment has large format printing, heat press, need large layout tables, need secure inventory room (sweatshirts/ t-shirts).
- Would like computer stations in classrooms (currently have ipads)
- Store should be connected to Classroom (one teacher supervises);
- Sink needed in the store for cookies; they back with small toaster/convection ovens. They sell water, soda. Need small cooler and freezer
- Store needs better display; location is ideal near cafeteria and bank with visibility outside along main entry. Needs more direct/secure public access. Would like peg or slat wall system and good lighting
- Existing school store size is ok
- Need two registers
- Classroom needs student storage/cubbies for belongings
- Store room needs to lock

		Business • Flexible Classrooms- laptops in future? • Projectbased desk space. Stoage for projects & supplies. • Projector. Store space. Need inventory space. Store with Office & Storage. Then a learning lab. Poster and Cooking (Cookies) Countertop convection oven in behind the scenes....kitchen area (sink & drying) • Glass Office open to store and Classroom. • Inventory- Store (30%) and Back of House (70%) vending machines (3) in the building. • Heat press, large format printing. • Accounting. Textbook online- all digitalized. Standard Classroom Storage- lockable cabinets, large project table, no rolling chairs. • Marketing classes are more project based. Finance and Accounting are more traditional classrooms. • Digital touch map. Application for phone with maps and information. • Media wall- celebration wall. • Display Cases for School store near the gymnasium for product. • Current rooms are primarily fixed labs (need more flexibility) • Ideal existing room has multiple LCD TV's (not on a central pole) on multiple walls with students facing different directions • Could look at perimeter computers and central
11/16/16 8:45-9:45 09/20/18 11/07/18	**Special Education**	LHS Attendees: Diane Chandonnet-Dept. Chair, Donna Newcomb-SPEDTeacher, Lenny Rapone-SPED Teacher Lenny (Life Skills), Shonii , Roxane Howe
		SPED (11/7 updates): Life Skills – all 4 rooms need 'classroom' set-up, with adjacent domestic living, - Sensory room only needed for intensive (connect to room if possible) - Layouts good with laundry/kitchen, living, etc. Intensive – see above, need nearby sensory room(s) for Intensive (for 1-10 stu); ideally one classroom size space, but could use (2) half classrooms - Need many plugs, mats, bean bags, exercise/manipulative, lighting control - Need beams overhead in CR for lifts and swings - Toilet room within needs to have a Hoyer Lift (built-in above changing table) - Need (10) full-size accessible lockers in corridor nearby - Need two nurse desks/files/supplies and storage- one Nurse area in each Intensive Room. - Need additional storage in building for PT positioning equip (takes up too much space in Classrooms) Adjustments – typically in pairs, locate near stairwells and near administrative - Adj. spaces should not be too far from each other, transitions between rooms is a big issue. Would like them all on the same floor or vertically direct Fundamentals – regular, half classroom Autism – rooms located in quieter corners. Subdivided with CR area, quite rooms SPED Suite – shown; looks good as one suite w/ conference Deaf/HI – not discussed *See plan markups on Room Data Sheets* Overall program has about 10% IEP, the concern is that the percent is not growing but students are shifting between programs (towards more severe needs)

Acoustic treatment, between and among spaces is key, not just for SPED student needs, but also for loud/behavioral

School needs multiple elevators in each building, sometimes one goes down. Also would like main lobby/multi-level ramp access for all

Substantial-Separate Program (includes: Fundamentals, Adjustments & Lifeskills)

Fundamentals (190 students)

- Like a regular classroom- access to regular curriculum just maybe at a different pace.
- 2 math, 2 eng, 2 history,2 instructional support, 1 reading, & 3 freshman academy classrooms exist. Typically 8 rooms per classroom, but growing to 12+ lately. These could be half classrooms. Locate near regular academics, incl. science, math, etc.
- 1 instructional support classroom (tutoring) & transitional support to prepare for real world. Room has 2 teachers and many resources (books, computers, work tables, a few break-out/tutoring rooms connected, etc.); classes range from 12 to 22, needs larger than classroom size ("learning career enrichment center")

Autism:

- Classroom has individual corral around the classroom for a sheltered learning environment. Consider solid wall, not furniture (kids take apart) provide some padding in there for more aggressive students. Something durable.
- Half room set up as individual learning, half for sensory, bean bag, stimulus.
-

Adjustments (40 students 9-12 grade w/ emotional or behave disability)

- Similar to traditional classroom setting, small room off to the side. Just smaller classroom population. Emotional students, "time out" rooms
- Located near House Admin. These are social/emotional students- can become dangerous. Access to House Admin is great.
-
- 7 CRs exist with about 12 students each, rooms should be set up with main space, but need a few quiet areas/cubbies w/in the room. Need flexibility for more PBL (Project Based Learning)
- Traditional classroom setting, but need flexibility to do group instruction, break-out and 1:1
- Storage is important; differentiated instruction requires many means
- Social Worker associated with program, should be nearby, but also need counseling space for 8-10
- Locate dispersed w/in classroom wings for integration, but would like not to be in remote corners, if somewhat close to each other, they can cross-communicate
- Access to life skills kitchen suite would be beneficial (sign-up for as a pull-out lab)

Life Skills (69 students); CRs are div 14-17 & 18-22

- Intensive SPED (2 CRs) 14-17 has 7 students, 18-22 has 4 in ea. classroom
  - Half students in wheel chairs, feeding issues, tubes
  - Need sinks w/ hot water
  - Need bathrooms and young adult changing tables; need one at these rooms and two in other locations (nurse & cafeteria)
  - Both rooms need to be joined with Sensory Room attached w/ large equipment closet (250sf)

		○ Would like operable wall between rooms • Autism (2 CRs) younger has 4, older has 8 in ea. Classroom ○ Rooms have sectioned-off quite areas ○ Need direct toilet rooms (still potty training) ○ Need regular sized rooms, despite less students per room • Life Skills (4 CRs) younger has 12, older has 12 in each CR • Hygiene Lab? Not just the Life Skills kids who need help with that. • Medically challenged student need (Intensive) need sinks in their classrooms. • Life Skills- Separate access to use Hygiene Lab. Should have two private showers (can be curtain rod) Sink for each shower. Both showers to be accessible. These are for kids with independat skills • Intensive needs changing table and lifts. More medically challenged. • Life Skills- Kitchens- also used as labs for say Adjustment program. Don't want kitchen IN the Classroom, accessible from but not inside of it. One Lab per Life Skills pair each with two kitchen stations. So four kitchens total. • One large table in the middle for eating. • Laundry Room? Domestic Cleaning. Washing Machines. W/D as an offshoot of Classroom. • If space is available to set up area as a Living Room and a mock bed, that would be great. A suite used to exist. Kitchen, Living Room, Laundry Area + Classroom. • One massive suite of kitchens- prefer to have one giant room. • Intensive Rooms- Sensory Room- important aspect (quiet) ~200-s50sf, specialized hammocks, mat beds. Lighting (Mindy runs it) Connected to Intensive Classrooms- Functioning sinks- need to clean equipment (feeding tubes, etc) Bathrooms need changing areas. • Enough space to facilitate room for all students in the room in wheelchairs. Wider doorways, auto openers on the Intensive Classrooms. Plan for ceiling mounted swings. Capability to hang things from ceiling and walls (furring) Intensive Room needs a closet for pads, equipment. ○ Program seems to be growing ○ Older student classrooms set up as dual classrooms w/suite of kitchen area, mail room and laundry. The suite should be separate but adjacent. ○ Would like to see it as full service laundry with ironing, folding tables, closets to practice, etc. Mail room would also like to be more of a center w/ copy center, computers, filing, etc. (as work environment); would also like living center with media and reward ○ Would like to see hygiene lab with toilet, showers, sinks that could be used by any of the 3 major SPED groups • Need Speech Specialist w. asst. (need small office and small teaching space) • Need OT/PT space • Deaf & Hard of Hearing office • SPED Admin Team (ideally a suite, but currently dispersed a bit) ○ Department Chair ○ 1 clerk ○ 2 psych ○ 2 evaluator team chair ○ 2 evaluators ○ Conference (for 16-18) ○ 3 Testing rooms (for eval and psych, unless space in offices) • 2nd social worker
11/16/16	Fine Arts	LHS Attendees: Sharon Clark-Fine Arts Dept. Chair, ~~Pat Fitzpatrick~~ Rose Sheehan, Jim Lutz, Alex Bagnall (Cavanaugh Tocci)

10:00- 11:00 09/20/18 10:45- 11:35 11/07/18		
		Visual Arts (11/7 updates): • Art room suites described with daylight and majority high glass between rooms • Kiln must be within 3D, but bulk storage ok across the hall • Would like the TV production to directly connect to the TV Studio • Very concerned for the acoustic separation of nearby Band/Chorus • Need direct door from TV control to studio (CR into Control Room) Performing Arts (11/7 updates) • Dance room size (current rooms ok, one larger (014) works best) • No chairs, students will sit on floor • Separate changing is good (so, smaller class sizes ok); make one accessible of corridor • Provide mirrors, dance bar and mirror • Band – make sure the timphonys & marimbas can navigate the ramp; ramp is shown 6' wide, but 5' should be fine and would help increase Band floor space • Storage described in room and off corridor • Uniform storage should be good at 350ish sf • If instrument and uniform storage is addressed with in room, corridor and sep storage room, then the remaining storage could become practice rooms for 6 • Chorus needs mirrors on walls for show-choir practice • Built-up wood floor would be best for dancers • Need lateral files • Piano + Guitar Rooms ok • Add acoustic separations, enhanced walls and doors at music vs TV areas • The lighting truss lowers (a couple times of year) *See plan markups on Room Data Sheets* Visual Arts • Art in basement of 1922 building. Substatially rebuild the roof structure to bring in daylight from above. • PE to develop a 3 dimensional view to understand the suite and spaces. • Fine Art Storage- 600sf in addition to what is within the Classrooms. • Dance- Two rooms + Stage. Possible to close off the stage with a partition? Also consider an intermediate partition in the Auditorium. • Band- 2000sf, separate guitar and piano rooms. • TV production room near the TV Studio. • Freight Elevator- needed for not just scenes, but also instruments. • Desire to have freight lift on Kirk to bring in large items. • Coral prefers to be flat. • Like to have volume, ramp down into lower part. • Raised conductor not super important. • Single level is better for moving instruments. • Dance Room- Changing space is desired. Changing between rooms? Ideal to have two rooms together. Changing near stage too. • Dance- Marlee or Kiwi floors? • Dance where Chorus is now. Chorus wants flat- move to nearby.

- Chorus also does show choir. Flat floor is better. ~65 st in Chorus with max of 115.
- Built-in Sound system in all rooms. Dance, play back, Music would be recordable.
- Dance still needs a presentation wall. Lots of recording. Using an iPad now. USB camera somewhere, pull out to teacher station. Visual recording at Chorus and Band too.
- Storage a huge concern. Use gravity vent space for storage at lower level for music storage.
- Piano Lab is full size, digital pianos. Look like uprights.
- Auditorium- Front of house lighting system- Capability for a catwalk doubtful but will look into.
- Alex and John Buhl need to talk in order to talk about improving structure and ability to hang.
- All LED lighting system- DPW does work for them, not a competent theatrical electrician.
- Counterweight rigging system- what they have now. Mechanical system not good if it breaks, it doesn't get fixed.
- Originally a hemp house (stage left)
- Rigging company came in- adult supervised, student run.
- Stage Doors- 10' tall and at least 6'-0 wide. Can be acoustic doors or garage doors.
- Sound system- mono or stereo. Sharon to get back to us.
- Projection Screen at front, with short throw projector for scenery. Different projector for presentations. Capability to use.
- Lighting and stage management up in Control Booth, sound down with the seats.
- Storage for sound board- lockable room accessible to stage.
- Risers stored at the Music Classroom.
- Chandeliers salvaged- possible re-use?

Dance Studios

- Would like sprung/resilient floor. Discussed Kiwi flooring being used on BAA project.
- Classroom AV system should include typical classroom presentation system (under Technology) supplemented by audio playback system with Bluetooth. Signal routing for a USB camera in middle of mirror wall is desirable to allow instructor to record dance sessions.

Band and Chorus Classrooms

- Classroom Av system should include typical classroom presentation system (under Technology) supplement by an audio playback and recording system. Signal routing for a USB camera in middle of teaching wall is desirable.
- Discussed material handling needs to get large musical instruments both into/out of the street and to/from the stage.

Irish Auditorium

- In favor of new all-LED theatrical lighting system. This will solve noise, heat and space problems created by the dimmer rack on stage right.
- Discussed merits of various control locations for lighting, sound and stage management. Ease of travel from control booth to auditorium is important.
- Equipment located at in-house control positions should be either secured in place or wheeled out of auditorium into lockable storage.

- Discussed merits of monoaural versus stereo for main PA system in the auditorium. Sharon to consider this for further discussion.
- Discussed material handling needs to get goods to/from the scene shop and trucks.
- Discussed desire to easily move a grand piano from stage to area in front of stage.
- While the rigging system needs replacement, the school is in favor of keeping with a traditional manual counterweight rigging system because of maintenance issues with motorized systems.

TV Studio

- Discussed how the TV studio and the control room could use a small window for visibility as opposed to the large one they currently have.
- School to verify height of pipe grid in current studio. The current grid height is ideal for their use.
- Current studio has a standard definition workflow. All new equipment would need to be purchased to transition to a high definition workflow.
- Currently have 3 Art rooms (1 sculpture w/ kiln & storage, 2 drawing/studio rooms); Class sizes run 25 to 26, Sr. portfolio is smaller. Sculpture needs 3 or 4 potting wheels
- All rooms need storage within.
- 1 Digital Photography Lab, including animation. Class sizes run 25-28; need flexible furniture for group an individual
- Photography and drawing need access to outside
- Have graphic design lab is regulation Classroom w/ 25 mac desktop computers (all digital); need flexible furniture
- Graphics has a lot of in-school program for group an individual
- TV production CR (separate from TV production studio), but should be connected. Classes range from 15-25; room set-up w/ cameras, 25 desktop computers & flexible furniture
- TV studio falls under Communication
- Ideal location for lots of light (skylights?) and not in disruptive area
- They have cross-curricula within arts, but not as much w/ academics because mixed age classes which doesn't work for cross-grade level content

Performing Arts (they are in basement, don't mind location)

- Band has classes of 63, holding steady. They have been able to fit 115 students in existing. Current sizes are good; Band room also used for world drums and string ensemble
- Current instrument storage is good; student instruments kept in school. Doorways need to be wide enough for tympani (60" wide). Also need easy ramp and elevator pathways to auditorium
- Choir has classes of 65, also steady. They have been able to fit 115 students in existing. Current sizes are good, but want flat floor with platform risers that could be set up or taken down for show choir/movement.
- Guitar Lab occurs in the choral room (back corner); for 20. not sure if dedicated room required
- 1 Dance room, sized for 30 students (over 240 students); note existing room 137 has hardwood floors
- Auditorium is used for dance also; changing via nearby restrooms
- Piano/Digital audio has classes of 20; room has 20 digital piano's (2 rows of 10)
- Spaces need to be near auditorium

		• Drama is taught in the Choral Rm; classes in low 20's. Freshman Academy has 350 seat theater that is used like a black box. They learn light, props & costume • Auditorium balcony has odd storage spaces (scenery flats); Costume storage in the basement, with some sewing/workspace. • Want more sewing/workspace • Acoustic shell is stored there • Check height/width of storage • Auditorium has 4 electrics that can be lowered. No catwalk or stage lights over the house • Would like <u>all</u> Performing arts space/storage located together in basement • Scene building is dome in hallways and on-stage • Check heights
11/16/16 11:00- 11:45 09/20/18 11:35- 12:25	**Humanities**	LHS Attendees: Suzanne Keefe-English Dept. Chair , Robert DeLossa-Social Studies, Deanna Stanford – Lead Teacher, Joseph Jussaume-Social Studies Teacher
		• Would like to see possibly lockers on one side of the corridors. • Need mobile flexible furniture. • 3&3 clusters, but teachers in rooms 2&3 periods. • Bridge not for loitering, but great place for teaching (like Logan) • Media Center could use media wall- interactive would be key. • Group likes outside use. • Consider outdoor classroom along Lucy Larcom as part of education. • Humanities as a unit but like inter-department (SS & ELA); groupings of 6 (3 and 3) are ideal with some shared space. • Like interdisciplinary, but also department working together • Need shared planning space useful for PLC clusters of 6 • Need more presentation space (want to get 2 or 3 classes together), spaces to accommodate 100 • Technology in classrooms (the existing central pole with 3 monitors facing different directions was not the original plan); would rather have 4 screens, one on each wall where presentation capability could be on any wall or all 4 for small group work. • Would like technology infrastructure and phased room set-ups if budget can't afford all rooms to be set up with screens • Would like laptop carts for every 3 CRs (district is mac committed, but they prefer laptop pcs or chrome books); especially if cost for macs would limit how many carts per room • Currently 32 rooms are set up with a technology grant • Department storage not needed, moving away from text books. ELA does have books (novels, more than text). Departments do need libraries for 400 volumes. • Need nearby bathrooms for faculty and students (too much time and lack of supervision otherwise). Also non gender specific. • Teachers use hallways, send student out on occasion now. • De-escalation spaces are needed within the general population. Flowing water is a huge part. Would be good to have an area within each classroom for a quiet space (alcove) • See attached Humanities notes provided by LHS.

11/16/16 11:45- 12:45 09/20/18 12:50-1:40	STEM	LHS Attendees: ~~Roger Morneau-Dept. Chair,~~ Tracy Estrella-Math Dept. Chair, Megan Vilcans-Sciene/English Teacher, ~~Sam Hor-Math Teacher,~~ Stephanie Selvaggio, Pat Morasse, Roxane Howe
		• Science interested in Demo stations. Demo stations have to be mobile per the state. Chemistry teachers are most concerned. Perimeter fixed cabinets, everything in the middle has to be moveable. • Engineering Labs- Flexibility, project based learning areas. Regular Classroom Area and project area- large flat area. Brainstorming and collaboration a "waiting room" space to sit and face each other. Corridor? • Accessibility to use power tools. Place to store and use them (sound proofing) Engineering- Project Lead the way school. Make boxes, programming. • Robotics- Vexkits.Engineering and Robotics to have Storage access. • Laser cutting in Makerspace. 3D printing- in storage room? Toxic+Noise. • Acoustic separation between Business and Engineering/Robotics. • Makerspace between Robotics and Engineering- connect with garage doors? • Moveable Acoustic Panels as part of furniture. • Architecture class where Robotics learns. Need a place to team them. Software based. • Engineering student population is growing. Averaging 26 right now. • Engineering, compressed air. Special ventilation. Want to get into sodering. • STEM is not actually a department • Science would like to be organized in sets of dispersed pods • Science storage is important • Math is wildly spread out, they would like some semblance of clustering • Larger/fewer planning rooms not as desirable as many small planning rooms located with each grouping of classrooms • CRs need flexibility to do on all walls; would like much taller MBs or better use of full wall height • The computer poles are difficult to work around • Some teachers already doing teaching/learning and pull-out in hallways • Math is moving toward performance/projects based work… actual projects, like airplane design/angles and launch calcs. They need flexible maker-type spaces. Ideal might be to co-locate with science to create flexibility and access to lab space • Computer Science is w/in Math Dept. – need to grow program • Engineering needs a lot of storage for many materials, types of medium, tools/equipment, robotics components. Room should be outfitted with lots of table/counter top and flexibility • Need separate area for cutting equipment (medal/wood), fine soldering capability. Don't currently have large, dimensional supplies like sheets of plywood, but might in future • Book storage space needed; consider combined (inter-department) book room for ease of inventory and dispersement
11/16/16 12:45-1:45 09/20/18	Food Service	LHS Attendees: Paula Trudeau – Lead Cook, Sharon Lagasse- Aramark Crabtree McGrath: John Sousa
		• See attached meeting notes date 09/20/18 from Crabtree McGrath • PE will look at options to connect directly from Kitchen to Caf. • Food Service and Culinary will be close to each other. • Desire to have all Patrons go through security.

- Deliveries to Culinary are currently a problem. Deliveries will happen at Kitchen Area. Maybe not a “real” loading dock but need for lifts.
- Freshman now just only accept products. Capacity for cooking? Not even a handwashing sink. Desire to have a steamer and an oven and at least a three door refidgeration, and warmer, hand sink. Need a three sink. About 850 students. Only about 500 eat. – Plan on 250-300 kids each lunch. John thinks it might be 3-4 lines. Walk in and then choose where to go.
- 3 lunches, 3 lines. 25mins
- Can do more made to order, toss to order. But if there is no access, they won’t use it. Fajita, sandwiches, toss.
- One traditional row. Flat counters, build up with pieces.
- Can use tvs and visuals for decisions before they enter into.
- Disposable wear. Bio degratable. We do not recycle currently.
- Every school gets their own commodities.
- Possible to have one large freezer.
- Need refrigerator three times the size of what they have.
- Dry Storage is adequate.
- Currently distributing food. 500-600 meals for dinner about 6mo/year.
- Cook on rack, wheel into warmer is ideal.
- 12 stations for employees to work. 30 employees, 18 at a time.
- Some prep in front of house, want to encourage that. Deli at deli, chop at chop.
- Have grill and aroma into front of house.
- Don’t do own laundry. No W/D needed.
- Kitchen does own clean up, hose bib needed, for buckets and mop sink.
- Use braising.
- Don’t have a stovetop burner. We should have a 4 top burner.
- Pot & pan washer & three bay sink.
- Standard food processor- a couple, couple of slicers.
- Only use mixer for mashed potatoes. Don’t need a big one. Stay with a 60 w/ attachments.
- No buffalo chopper needed.
- 3 offices. Cash room (1 per) + 2 offices(1per +2per). Locker room
- Breakfast- CEP.Continue Carts. Hot and Cold. Need to plug in. Registers on them.
- Need cart storage in kitchen. Need a parking lot. Ideal to put in dry storage.
- Dining Room seating- would like different seating, bar seating, community seating. Variety of seating.
- Condiments- prefer pumps, built-in pumps.
- 2300 students served including the freshman. ~60% breakfast is 600-700 up to 1000 in the winter.
- Food service is federally funded program; they can’t cross paths with other school programs. They are subject to same regulations as far as what they are allowed to serve.
- They serve water, chips, ice-cream and cookies at register
- The restaurant can’t serve to students, but can serve what they want (to teachers and public)
- Food/loading is a problem (mostly due to obstruction of dumpsters and storage); 10 palettes every Tuesday; need space for them and to break-down and distribute. Might work best to have an LHS specific dry goods storage vs District.
- Major rodent concerns/issues
- Do not have enough storage (walk-in or dry goods)
- They are one of two schools where commodities come in

		• Kitchen/equipment is old, not most efficient, a bit chaotic • Would like to continue with grab/go, 4 breakfast carts are very successful. Stored in kitchen. • Like existing deck oven, takes up a lot of space. Might work to have a rotating oven that is smaller, but has same output • Need more prep stations • 2 steamers and 2 kettles are ok • Serving is wide open; separate serving stations is desired to cont. They don't want to corral and overly direct. The advertising piece is important, so students can make a decision and commit. Need LCD screens • If school is designed with pods; would like kitchen central so that time is not spent delivering • They have 85% participation that may impact the idea of satellite serving, which is typically cold food. • Labor is one of the biggest expenses. They need to look at how to maximize efficiency and accommodate service points • Freshman Academy will want its own kitchen (it's a school of 1000 students) • Need 3 offices (cook & manager & cash counting), currently 27 staff (4 at freshman) • Need toilets, locker area • Pressure to start more wet waste/composting • Serve 21 cultures • See attached Food Service diagram provided by LHS. • See attached Crabtree McGrath notes for additional Foodservice meeting on 11/22 @ 2:30 pm.
11/16/16 1:45-2:45 09/20/18 11/07/18	**Communications Pathway & Library Media Center**	LHS Attendees: Kathy Downey-Library Media Specialist, Bryan Wilkins-Dreegan Media , Faye O'Leary-Digital Media / Graphics Design Teacher, ~~Sharon Clark~~, Roxane Howe
		Media Center • Computers (not just labs) need to be within the main library; handing out laptops to student's is too much of a management issue • Need 25 computers within main space • Make one CR area a computer area • Swap stacks with CR areas • Reading area; soft seating, comfortable chair area needed (shown as collab), but not walled-off • LHS archive needs to be a lockable area • Need, not just more power, but charging off all wall areas • Need 8 or so, small rooms for meetings, counseling, sm. Group, etc. Maybe have several in each library area. • Need grand, house lighting as well as wall sconces and tasks with dimmable controls along with electronic shading • Would like fiction layout to be different, non-symmetrical, for fiction vs non (currently have reading in the round… need volumes of fiction) TV Studio + Classroom • Explore potential to raise height (with Aud. Stage being above) • Edit area should have some enclosed space for 1 to 4, for acoustic • Would like door from TV classroom into control and control to studio • TV classroom set-up for visibility of perim. computers with project tables between and opp-side teaching wall • PLS to develop several versions

- Need a space for equipment vs server/broadcast channel room (7 or 8 racks, 6' tall), could narrow to 3 or 4.
- TV shoots range up to 3-camera positions and might include up to 10 people in the frame (meeting, performance, etc)
- See also CTA (Alex Bagnal) notes
- School ownership vs Ch 22; funds are primarily from Comcast ($100k/yr). LHS owns the educational access by housing it. Equipment is owned by Comcast, but the staff are paid by MSBA, and educational courses are taught by staff. The channel ownership is? Teacher and Digital Media Specialist are hired by staff.
- Direct fiber line exists for the institutional network, but sounds like ethernet

See plan markups on Room Data Sheets

Media Center

- Bryan- is a school employee but students contribute to tv in Lowell. Support classes in technology (centralized server) Bryan's salary and teacher's salary are by Comcast money given to the city. MSBA has seemed to approve the space. Confirm existing, may be able to go down a little without negative impact.
- Lighting grid now is ideal, size 50-60 teachers in there recently.
- Improvement to get Communications next to Fine Arts pathways.
  Daylight- Only Offices for Staff working would benefit from window. Window from Control Room to Studio is often shaded. Nice when not doing production.
- Might not need window between Control Room and TV Studio. Easier to manage class with the window? Does it get trumped by acoustic improvement without it. Maybe just a smaller window. One Art Class (Digital Media) switch with Scene Shop to get Studio directly adjacent to the TV Studio? Costume is more quiet than scene shop. Side by Side is ideal for Digital Media & TV Studio.
- Both Coax and IP – straddling the line. Look at building going IP.
- Central Space that brings multi-media together- like the lobby/waiting area that exists. A collaboration of all the media.
- Student TV Truck- safe, protected parking
- Classroom for Video is not ideal. Space for standing, presenting and then film philosophy teaching area.
- Would like entire digital/media spaces set up as a cluster to share space and resources, including a shared network for redundancy
- Location in a quite area, doesn't necessarily need to be right with auditorium, but could envision an arts building
- Outdoor space for presentation, performance & events might be of interest, but exists already across the street (across freshman academy); maybe an enhanced area off of lobbies
- Would like gallery space for student work or themed shows
- Video on demand available to the whole district, is managed by Media Studio. They supply multiple local cable channels (coax to every classroom internally and out to the City)

- TV Production classroom (see notes within Art)
  - Needs layout similar to Graphic Design
- TV/Media Studio (operates Cable Access channel)
  - Full size studio and control room (current sizes are good), but would like room for multiple sets (live music vs interviews vs other)

- They develop video; requires desktops and utilize separate server as redundant/back-up
- Eight editing suites (50 to 100sf each); 3-4 students computers with additional audio mikes, large display monitors
- Need major equipment storage (2 rooms now)
- TV/Media CR needs flexibility as a lab, but open floor space for camera set-up, or class/lecture setting
- 3 staff have offices, they work in classrooms
- Conference room (for 15)
- Lobby area with waiting; also used for brainstorming/collaborating. Space has soft seating and flat screen

- Graphic Design (see notes within Art)
  - 25 computers + teacher; could see it going toward laptops. Like the idea of being more mobile
  - Have projection capability, but would like multiple LCDs
  - Current room proportions drive the layout
  - Would like movable tables
  - Need locking storage
- Digital Photo & Animation (see notes within Art)
  - Would like a digital media cluster (right now sep. digital, graphic and media studio locations)
  - Need more exhibition space (and variety of media); cork walls in rooms, but also in corridors
  - Would like small area for portrait photography or stop-motion work area (shared)
  - Plan for 25 seats/computers
  - Need ability to connect tablets (computers)
- Digital Journalism (occurs in computer lab); they do podcasting
- Digital Audio occurs in piano lab
- Public Speaking occurs in regular classroom
- Band sound system is portable and rolled into the gym (gym system has failed). ROTC also uses the Band's system. Show Choir also has a portable system. Cafeteria has a fixed sound system, not used.

Library Media Center

- FA doesn't utilize as much as they should. There is no more Staff. Only Kathy (in district) going to be hard to manage from a staff standpoint.
- Any second Floor of the Main Library? Kathy's Office
- Projection area (up to three classes worth)
- 25k volumes now, most are pre-1990. Not sure how many will be in new library. Look at current collection and weed out. 500-1000 kids walk through door everyday.
- User friendly, a great place to be. Not currently enough space
- Open reading area to be expanded. Durable fabric
- 30 Computers
- Project Area
- Desk area- centrally located
- 42"-48" high bookcases.
- Tech Center to move to Media Center "Annex" IT Staff, run the network.
- Additional space for additional computers, most kids don't have computers. 15-20 additional computers.
- Only one librarian, considers herself mobile but the media center and resources as stationary (not necessarily dispersed)

		• Need to prepare students to be able to use college library and how to use on-line catalogs. How to use database, how to be efficient and effective researchers • Volumes are reducing, they are going more digital. Estimate about 25k volumes • Currently can accommodate 3 or 4 classes; librarian can • Before and after school tutoring program occurs. Library also used during lunch • Library might want to accommodate maker space (like freshman academy's) • Need a balance of quite areas, collaboration areas and meeting areas • Computer area, table area and presentation area (each accommodated a class) • Would need 50 to 60 laptops (depending on time of year, students are relying on library for comp access) • Would like a dedicated reading area; with soft seating/casual • Need docking stations for charging phones. • Every discipline (except math) tends to use the Library • LHS archive and artifacts in a 250sf space • Would need security system (currently 3M system); books, computers and equipment need to be coded • See attached: Media Center Process Overview form notes,volume notes, and Media Center Studio notes provided by LHS.
11/15/16 3:00-4:00	**Outside Programs**	LHS Attendees: ~~Colleen Winn-Gear Up Trio,~~Andrea Laskey-Lowell Community Health Clinic, Henry Och – Lowell Community Health Clinic COO, Anne Marie Bisson-Catie's Closet President & Jeanne D'Arc Credit Union VP Marketing & Financial Aid
		Lowell Community Health Center (room 22): • Similar location to existing. 1500sf is a good size, can do a lot with that space. • Need to clarify where PE buildout ends and Comm. Health begins. • Dept Public Health has requirements. Comm Health has own architect. Will layout and provide services. • 8-10 air exchanges • Currently heavily supported by School IT- goal to have own. • 7-3:30pm • Some spaces need to be secured (key fab) • Funded by Massachusetts Department of Public Health • Licensed under ospices of the health center, subject to regulations incl. design/layout of spaces • **Health Center to send specs** • Currently 2 exams rooms, 1 recovery room (student needs to go home), clean room to store stuff and a utility room. • Need bathroom within the suite • Need waiting area and separate office space (privacy) • Clinical social worker office • They have separate contracts for operations (medical waste, etc) • No direct exterior access • Because health center is in renovation they have waivers now, but might not have them if it is in new construction • Services provide (primary care including immunization, physicals, STI, chronic disease management refugee management) staffed by medical assistant. They do individual and group therapy

- Funds are not part of Dept. of Public Health; there may be federal funds available
- Ideal location is to be separate and private, but some visibility
- Need to discuss the future of health services (adding dental, vision, looking at utilization ratio of patients to student visits based on exam rooms)

Catie's Closet:

- Currently in 2 locations because of the building division with freshman academy. If 1 building, maybe 1 location, but bigger.
- Ideally 400-500sf serving main building + 250sf for freshman
- Each as one big space, lockable. They outfit themselves w/ rods, storage counters and equipment.
- Space was provided instead of scholarship in the name
- Ideal location; privacy is important, typically near nurses station but not on a main path. Currently good location across from Social Worker

St. Jean D'Arc Credit Union:

- Current location is perfect; students need quick/easy access
- They also help the school with deposits
- Shape is odd; teller too close together, vault is exposed (need to lock-off) area.
- Need larger than existing at 300sf
- The credit union would build out the interior; they will also provide the layout
- Need to bring in cables/electric direct from outside would like a bathroom nearby
- They serve anyone inside the school
- They need nearby doorway for currier and armored car access near
- Alarm/electrical needs specifics

Gear-Up/Talent Search/Upward Down (Trio):

- Trio, located down at the lower level with windows. One suite, all three together
- Serve about 200 kids in FA. Possible to still in FA for an office? To work directly with the Freshman students.
- Ideal to have separate offices- with a WB in the room. Some confidentiality. 6 offices. Common Area for meetings ~500sf with a few (7 or 8) computers for students. Large project table for 10ish students.
- Upward Bound-Math & Science wants to use Robotics Classroom (5 periods a day)
- One Classroom (based on schedule) 10-15 students. Varies. Size for 16-18 students.
- Storage- paper and books. Files provided by Middlesex Community College.
- Ideal to have Upward Bound M&S to have space in FA.
- They serve well over 1000 students
- Level funded, federal grants for each
- Cannot provide their own furniture per federal regulations
- 3 spaces needed
    - Rm 811, but could be smaller; Need 150sf in freshman academy (desk, computer, small group)
    - Rm 206 suite, need space for 6 offices, work one on one with students (discuss financial situations) + common area for meetings with 12 staff. Need several computers for college career guidance. Similar to career center, but not part of guidance. They supplement and focus services on coll.
    - Rm 126 classroom; just upward bound; includes two teachers + 2 advisors and tutors come in. They provide intensive academic support. Ideally would have separate office for 4 + CR for 20-25.

		• Would like all 3 to be closer together, but need one in freshman academy. They also work closely w/ guidance/career ctr.
11/15/16 & 11/16/16	Other Broad Planning Items	
		• Need to plan for MSBA standards • Need to plan for flexibility • Classrooms: will prioritize natural light and ventilation • This is first year Alternative School is offered as independent choice: may need this as an option in new school that is completely separate, a facility within a facility w/separate entrance. • Currently a separate "Therapeutic" school exists off site. • Library is considered by some to be very small • Cafeteria: Need larger cafeteria, prefer smaller spaces and an overflow area that is multi-purpose room. State allows seating for 1/3 population; currently have 4 seatings. Currently a lot of ELL students eat in the hallway during lunch 2. Will design larger but scaled and easily visible/supervised space. Would like to go outside w/ designed seating and eat in the "National Park"-outdoor experience beneficial • General School thought: lots of testing all the time, how is this handled, retesting MCASTS, national Latin Testing, currently use Little Theatre, meeting space for 50-60 students to discuss options career Foreign Languages • Issues w/ HC lift at North entry & HC access to auditorium need to be resolved • School needs multiple elevators in each building, sometimes one goes down (general use & Special Ed) • **Peer Mediation: This group was mentioned. LHS to clarify**

END OF MEETING RECORD

Next Meeting: TBD

Cc: LHS: Marianne Busteed, Roxane Howe
Skanska: Mary Ann Williams, Jim Dowd
City of Lowell: Eileen Donogue, Kara Keefe Mullin
Perkins Eastman: Robert Bell, Joseph Drown, Alicia Caritano, Dawn Guarriello
Design Team

Attachments: Crabtreee McGrath Foodservice Equipment Meeting Minutes for 09/20/18 meeting

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Focus Groups
Wednesday, November 7, 2018

7:55-8:45 ROTC Pathway Focus (follow-up)
- Eileen Ironfield
- David Smith

8:45-9:35 Main Administration & Nurse (follow-up)
- Marianne Busteed
- Roxane Howe
- Dave Robinson
- Mary McLauflin, Nurse

9:55-10:45 Special Education Focus Group (follow-up)
- Shonii DiFrancesco
- Donna Newcomb
- Lenny Rapone
- Mindy Kates

10:45-11:35 Health and Bioscience Pathway Focus Group (follow-up)
- Stephanie Selvaggio
- Kathy Nardoni

11:35-12:25 Fine Arts Focus Group (follow-up)
- Sharon Clark
- Rose Sheehan
- Jim Lutz

12:25-12:50 BREAK

12:50-1:40 Communications Pathway and Library Media Center (follow-up)
- Kathy Downey
- Bryan Wilkins
- Faye O'Leary
- Sharon Clark

1:40-2:30 Culinary/Business (follow-up)
- Roxane Howe
- Jill Taylor
- Seth Bernier

2:30-3:20 Wellness/Physical Education/Athletic Focus Group (follow-up)
- Dave Lezenski
- Pat Swett
- Krisi Keegan
- Paul McCarthy
- Tim Patterson
- Damon Amato

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NEED 40 SF STORAGE ROOM TO CHANGE OR CORRIDOR IN
• ALL CLASSROOMS
• ONLY LOCK CLASSES.
• CAMPUS FOR CADETS — ~14

Lowell High School

November 2018

ROTC OFFICE/CONFERENCE+ STORAGE

FUNCTIONAL CRITERIA

Description: Offices and Conference Room to support ROTC program
Area: approx. 3400sf (1600sf+1800sf)
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers and students/cadets
Adjacencies: ROTC Classrooms
Orientation: -
Views: -

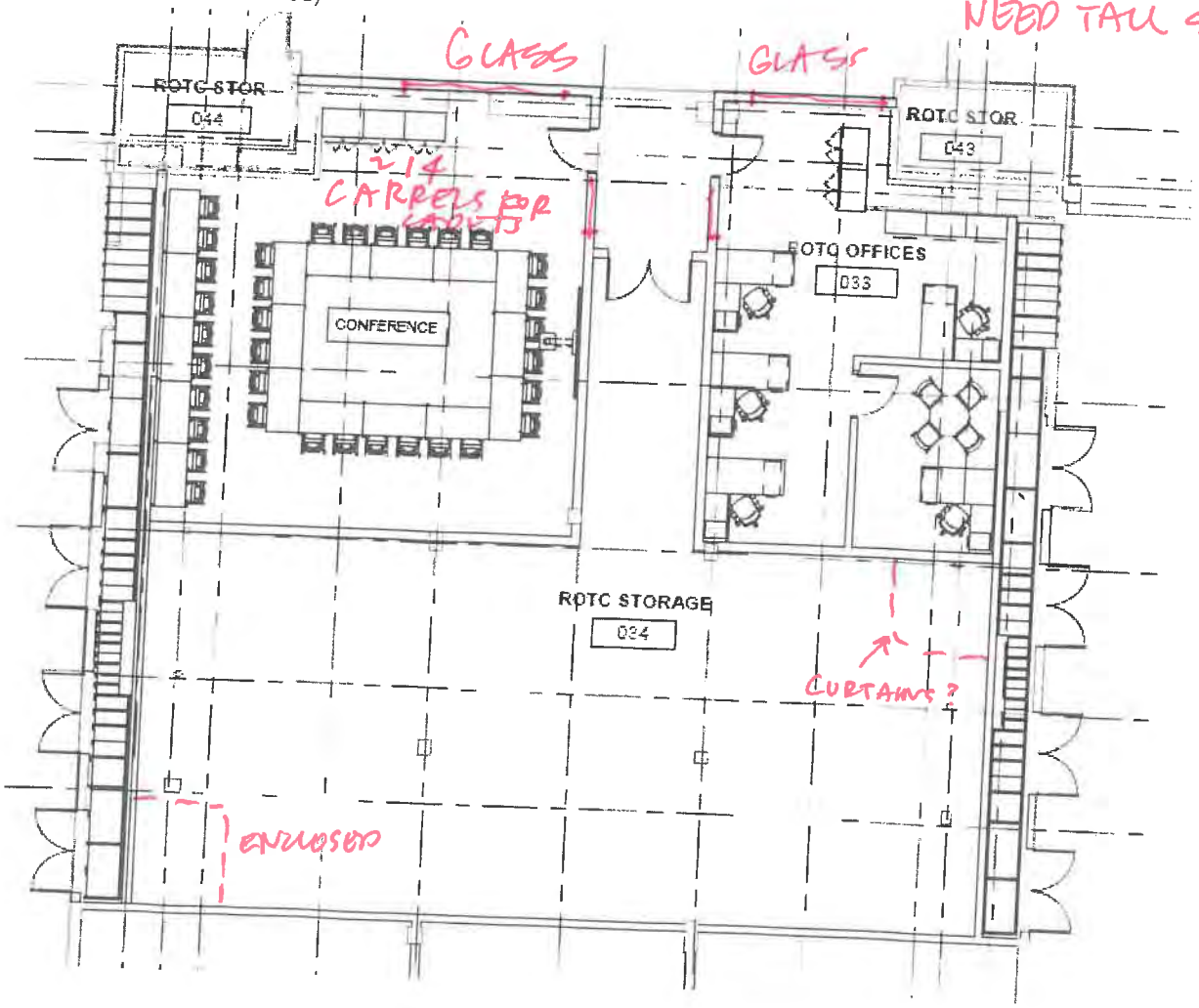
TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer AR-GWB wall board
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass at Suite entry and Conf. entry (with solid roller shades)
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: TBD
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: classroom - teacher desks/files/chairs, conference tables/chairs, bookcases, white boards, tack boards
Equipment: TBD
Storage: in-room cabinets as noted

NO BOOKCASES — NEED TALL STORAGE



Lowell High School

November 2018

ROTC CLASSROOM

FUNCTIONAL CRITERIA

Description:	primary teaching and learning space
Area:	approx. 900sf
Quantity:	5 (incl. PT)
Occupants:	-

LOCATION/ORIENTATION CRITERIA

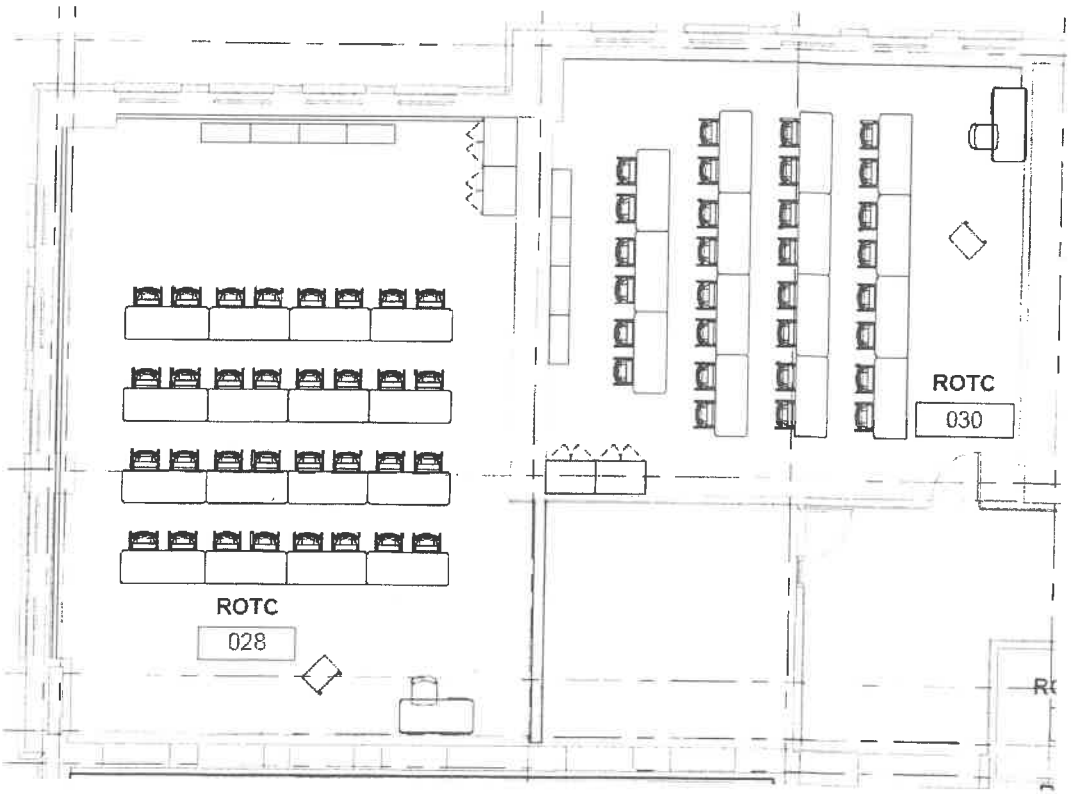
Users:	teachers and students/cadets
Adjacencies:	ROTC Offices, ROTC Conference, ROTC Storage
Orientation:	North
Views:	-

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor/ rubber base
Walls:	multi-layer AR-GWB wall board
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door and 3' wide sidelight (with solid roller shade)
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	classroom - telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock flex learning – LCD monitors, data outlets
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	upper/lower cabinets with sliding white board, tall storage units
Furnishings:	teacher desks/files/chairs, student tables/chairs, podium, bookcases, white boards, tack boards Equipment: TBD
Storage:	in-room cabinets as noted



Lowell High School

November 2018

ROTC MP/GYM

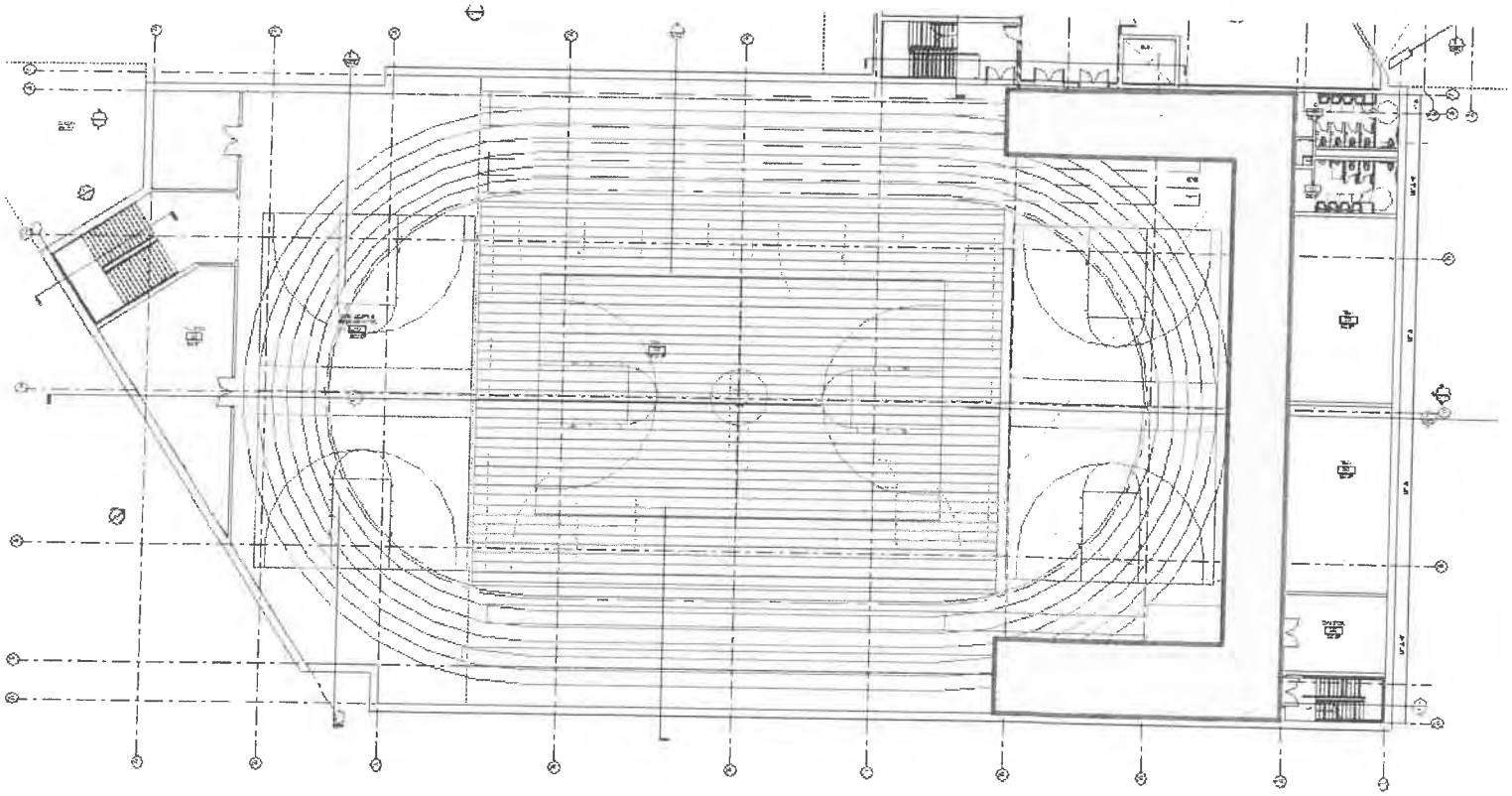
FUNCTIONAL CRITERIA
Description: Drill Space
Area: approx.. 2500sf
Quantity: 1
Occupants: –

LOCATION/ORIENTATION CRITERIA
Users: ROTC Teachers/Students
Adjacencies: Main Gym
Orientation: North/East/South
Views: -

TECHNICAL CRITERIA
Floor/Base: Synthetic Athletic Floor
Walls: CMU
Ceiling: Painted Exposed
Doors: -

Windows: Kalwall
Lighting: LED Pendants
Power: convenience outlets
Data/Com: -
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

MAIN OFFICE

FUNCTIONAL CRITERIA

Description: Main School Office
Area: approx. 3000sf
Quantity: 1 Suite: Office/Wait, Head of School, HD Secr, Accts Pay, Lg Conf, Records, Copy, Mail/Kitchen, AP1, AP2, Subs Tchr, Ell/Tst
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, potentially students
Adjacencies: Front Entry/Security
Orientation: North/West
Views: Entry Plaza

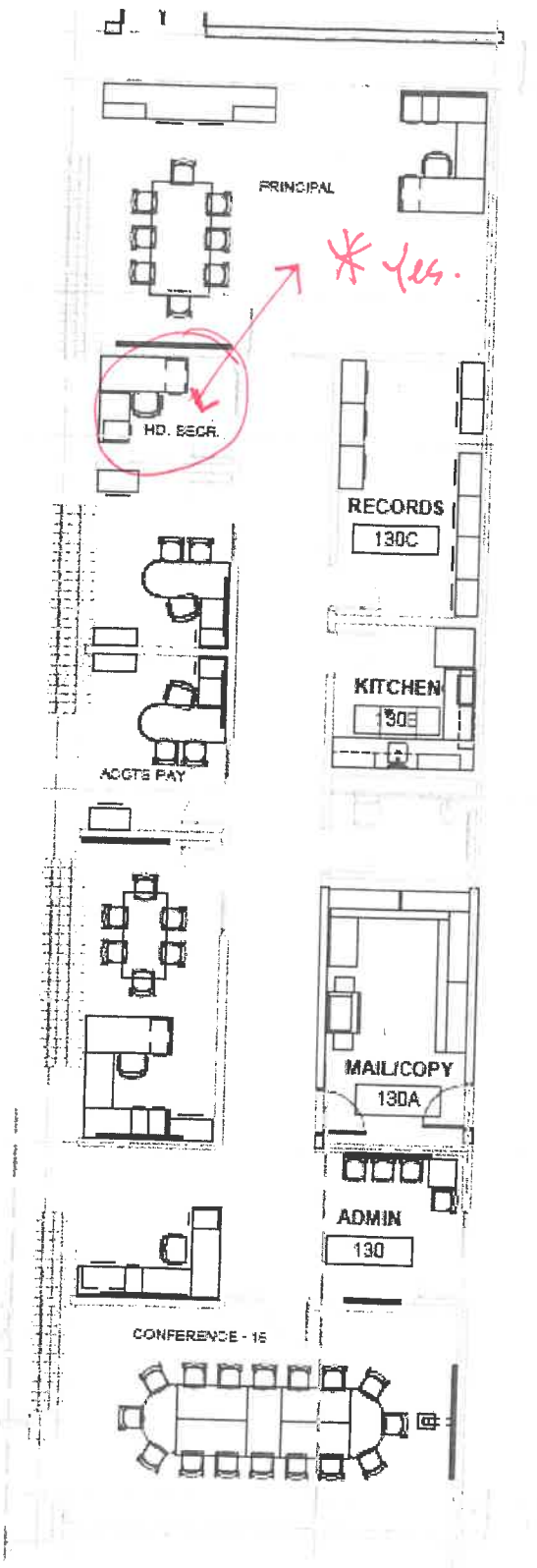
TECHNICAL CRITERIA

Floor/Base: linoleum tile floor? (or carpet) /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: TBD
Equipment: -
Storage: -

* CONF. TO DOUBLE AS SECURITY



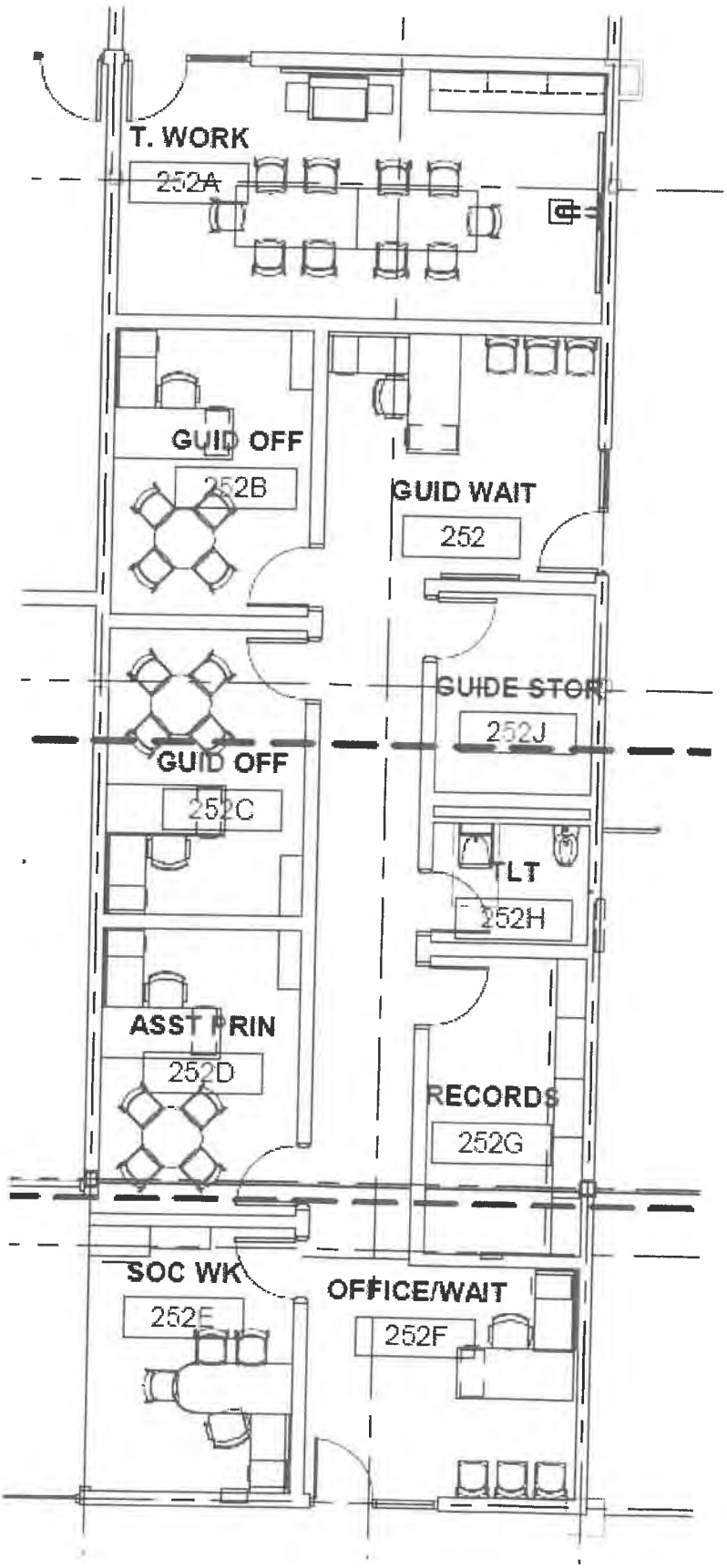
HOUSE OFFICES

FUNCTIONAL CRITERIA
Description: House Office
Area: approx. 1600sf
Quantity: 1 Suite;
Occupants: -

LOCATION/ORIENTATION CRITERIA
Users: teachers, students
Adjacencies: Front Entry/Security
Orientation: -
Views: Lightwell

TECHNICAL CRITERIA
Floor/Base: linoleum tile floor? (or carpet) /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: TBD
Equipment: -
Storage: -



Lowell High School **November 2018**

FRESHMAN OFFICES

FUNCTIONAL CRITERIA

Description:	Department Head Offices
Area:	approx. 2000sf
Quantity:	1 Suite; Office/Wait, FA Prin, Sm Conf, Guid Wait, Guid, Soc Work, Guid Stor, Records, Mail/Kit, Stu Support, SS Conf, Tchr work.
Occupants:	-

LOCATION/ORIENTATION CRITERIA

Users:	teachers, students, staff
Adjacencies:	Main Lobby
Orientation:	North
Views:	Entry Plaza

TECHNICAL CRITERIA

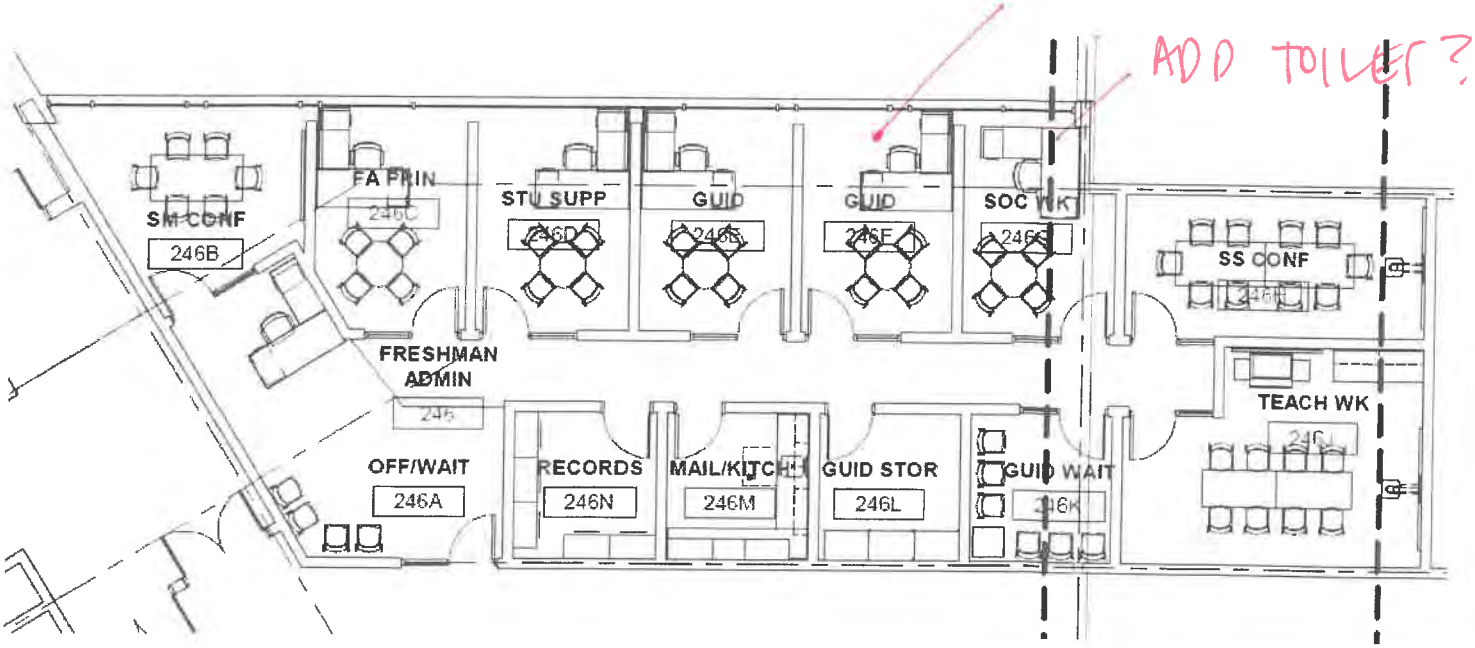
Floor/Base:	linoleum tile floor? (or carpet) /rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	TBD
Equipment:	-
Storage:	-

ADD 1 GUID. OFFICE.

ADD TOILET?



Lowell High School

November 2018

DEPT OFFICES

FUNCTIONAL CRITERIA

Description: Department Head Offices
Area: approx. 800sf
Quantity: 1 Suite; 6 Offices (Eng, SS, Math, Sci, ~~WL/ELL~~, Instr) 5+1
Occupants: -

LOCATION/ORIENTATION CRITERIA

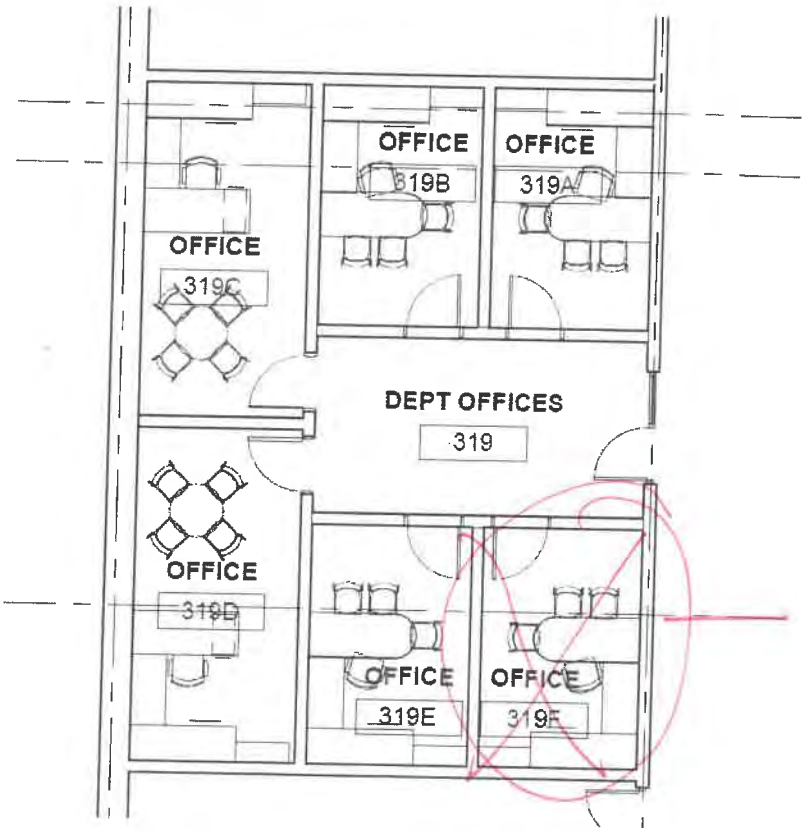
Users: teachers, potentially students
Adjacencies: central within academic wing
Orientation: -
Views: Quad

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor? (or carpet) /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: TBD
Equipment: -
Storage: -



Lowell High School

NURSE

November 2018

- LOOK @ SWAP W/ T. DINING
- ADD ADD'L LACTATION ROOM @ 1022

FUNCTIONAL CRITERIA

Description:	Nurses Suite
Area:	Approx. 2,610sf (including toilets)
Quantity:	1 suite
Occupants:	–

LOCATION/ORIENTATION CRITERIA

Users:	Nurse, Staff, Teachers, Students
Adjacencies:	Main Office
Orientation:	North
Views:	Lightwell

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile (?), Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 V);
Door/Frame:	solid wood doors
Windows:	Interior glazing into the adjacent lightwell and mesh roll down shade (10% open)

Lighting:	recessed strip LED with daylight dimming and occupancy sensors
Power:	Convenience Outlets
Data/Com:	Telephone, intercom, wireless access point, data outlets & wireless clock
Security:	Motion Detection
Acoustical:	high performance acoustical ceiling
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

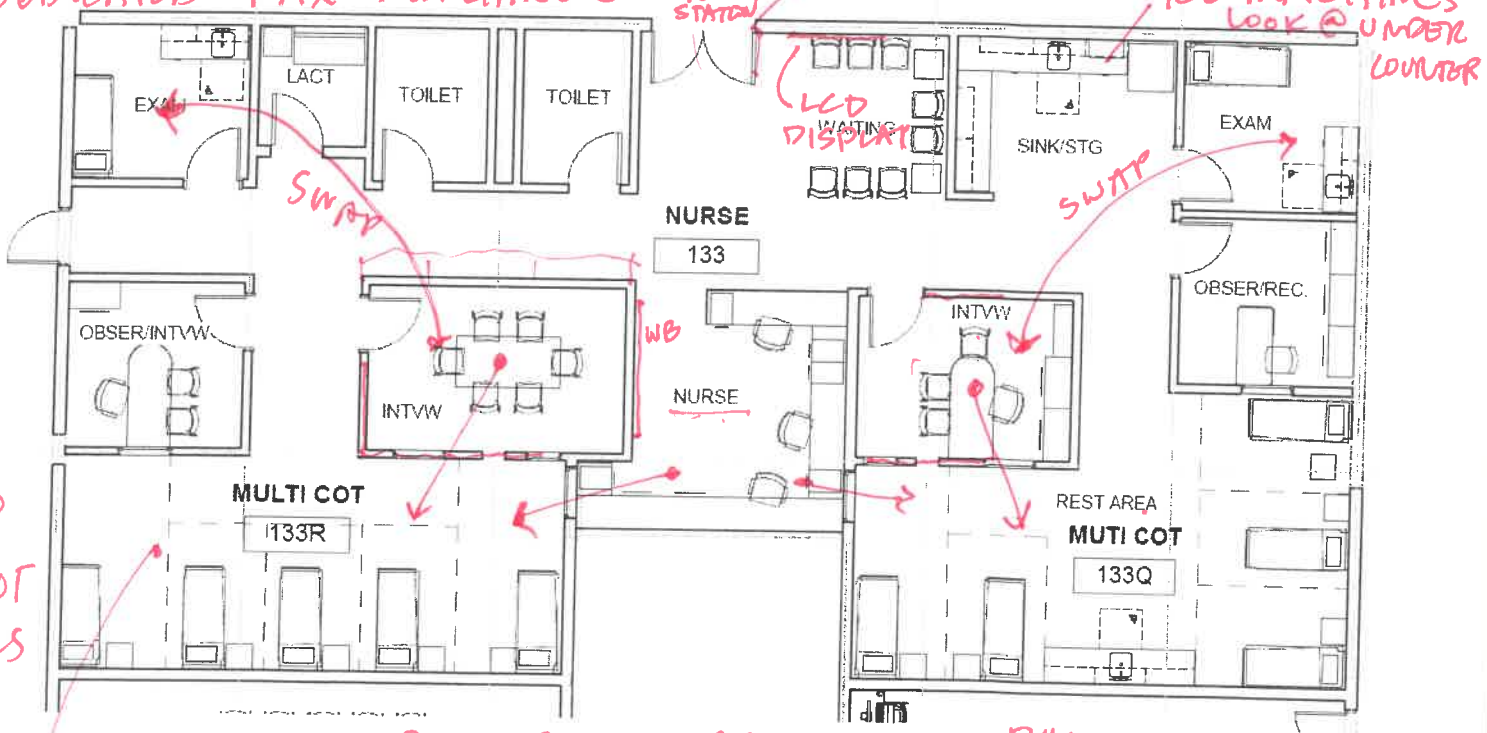
FIXTURES / FURNISHINGS

Casework:	Upper/lower cabinets w/sink, tall storage
Furnishings:	Office desk/chair/ filing, exam table, rest couches, student table/chairs, bookcases, tack boards
Equipment:	Refrigerator, microwave, medicine cabinet, medicine carts, teacher/staff computer
Storage:	in-room cabinets as noted

- SCALES @ COT ROOM (ONE @ EXAM)
- DEDICATED FAX MACHINE @ NURSE STATION

LARGER DOOR NEED REAL ICE MACHINES

LOOK @ UNDER COUNTER



FRP @ ALL COT WALLS INCL. EXAM ROOMS.

ADD SINK

- SOLID DOOR CASEWORK. PHENOLIC COUNTERS.
- EXAM ROOMS CLOSER TO NURSES STATION
- LOTS OF VISIBILITY FROM NURSES STATION

Lowell High School

November 2018

STUDENT SUPPORT

FUNCTIONAL CRITERIA

Description: Student Support Office
Area: approx. 2000sf
Quantity: 1 Suite: Supp Suite, 3 Offices, Sm Conf, Dir of Students
Occupants: -

LOCATION/ORIENTATION CRITERIA

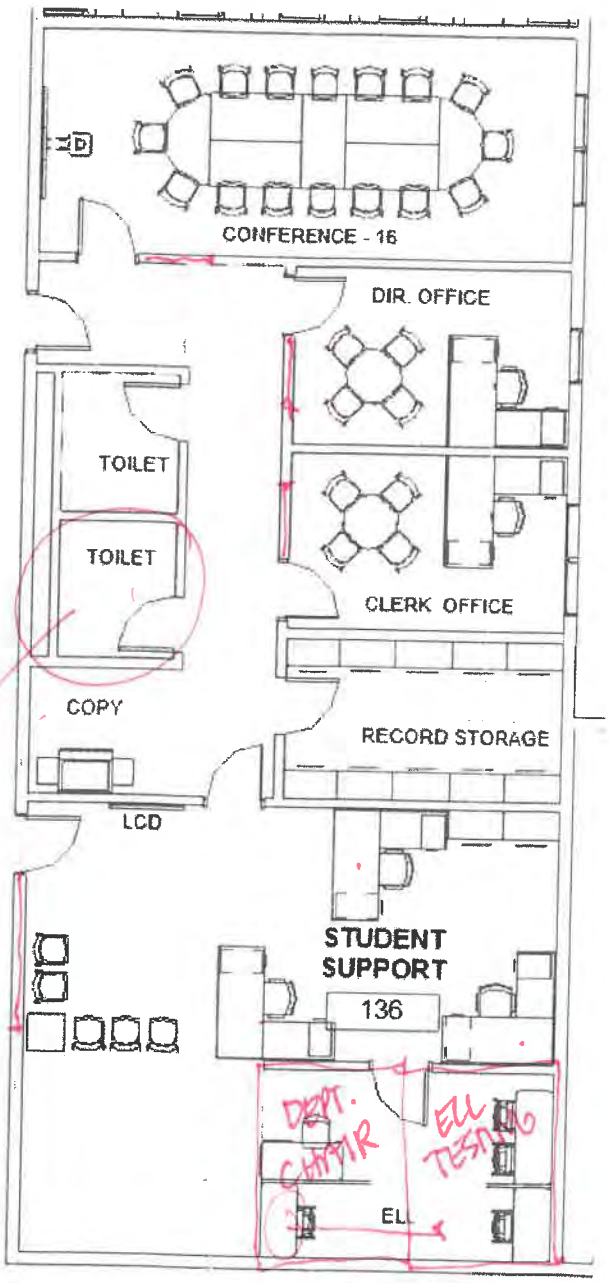
Users: teachers, potentially students
Adjacencies: Lobby/Security/ Main Office
Orientation: -
Views: Lightwell

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor? (or carpet) /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: TBD
Furnishings: TBD
Equipment: TBD
Storage: TBD



COULD GO.

- SMALL OFFICE FOR ADD'L STAFF (HOMELESS OR OUTSIDE ORG)
- CREDENZA IN CONF. ROOM
- DESIGNATED AREA FOR STUDENT IDS.
- CAMERA & BACKDROP.
- MOVE BEHIND MEDIA WALL
- COPY TO HAVE COUNTER FOR FAX & SUPPLIES.
- COAT CLOSET + STOR.

Lowell High School

November 2018

SPECIAL EDUCATION - LIFE SKILLS

FUNCTIONAL CRITERIA

Description:	specialized instruction suite for students with severe needs to get hands-on guided learning toward domestic independence
Area:	approx. 2900SF
Quantity:	2
Occupants:	-

LOCATION/ORIENTATION CRITERIA

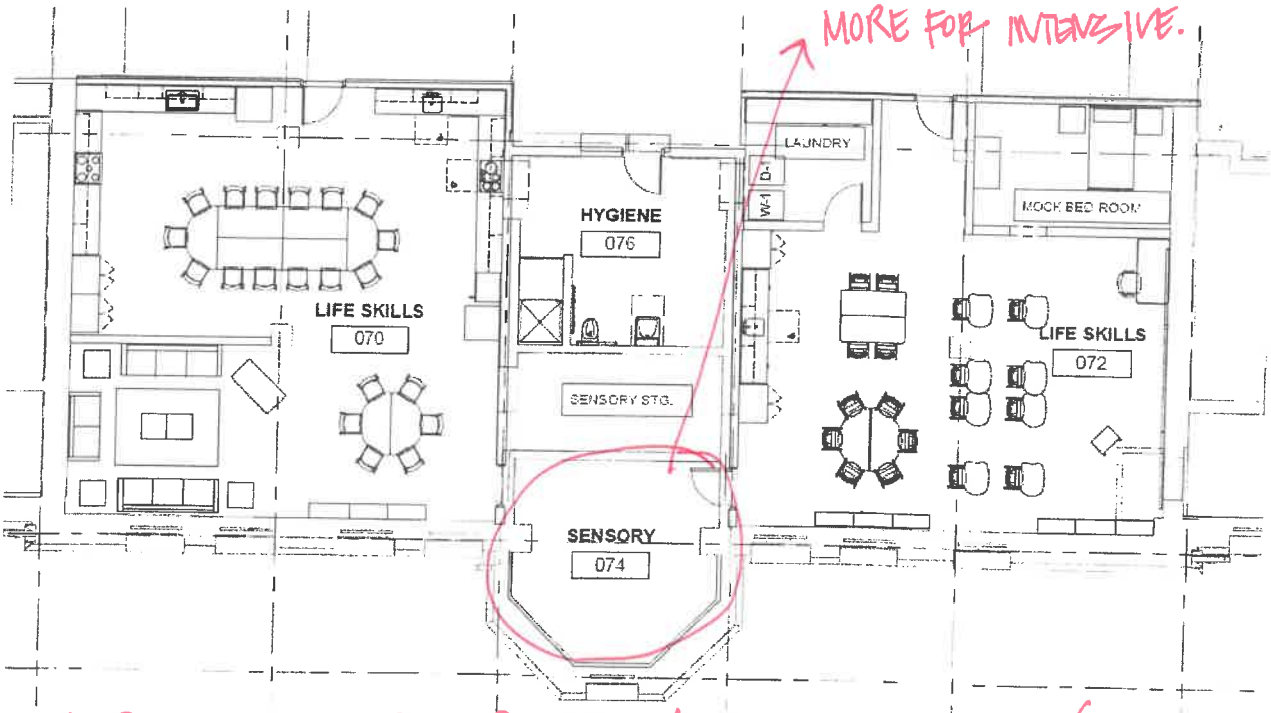
Users:	special education students and teachers
Adjacencies:	-
Orientation:	South
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor/rubber base (epoxy floor/base at toilets)
Walls:	multi-layer gypsum board, painted at new (cmu walls at toilets)
Ceiling:	high light reflectance ceiling tile (.90 LRV); MR gypsum at toilets
Door/Frame:	solid wood doors with acoustic gaskets & 3' w. glass sidelight with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	TBD
Furnishings:	TBD
Equipment:	TBD
Storage:	TBD



- SENSORY ROOM CONNECTED TO ~~ADULT~~ INTENSIVE. (ASK MINDY)
- 2 CLASSROOMS FOR INSTRUCTION WITH KITCH/LIVING OFF TO THE SIDE.

Lowell High School **November 2018**

SPECIAL EDUCATION - ADJUSTMENTS

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 1900sf
Quantity: 8
Occupants:

LOCATION/ORIENTATION CRITERIA

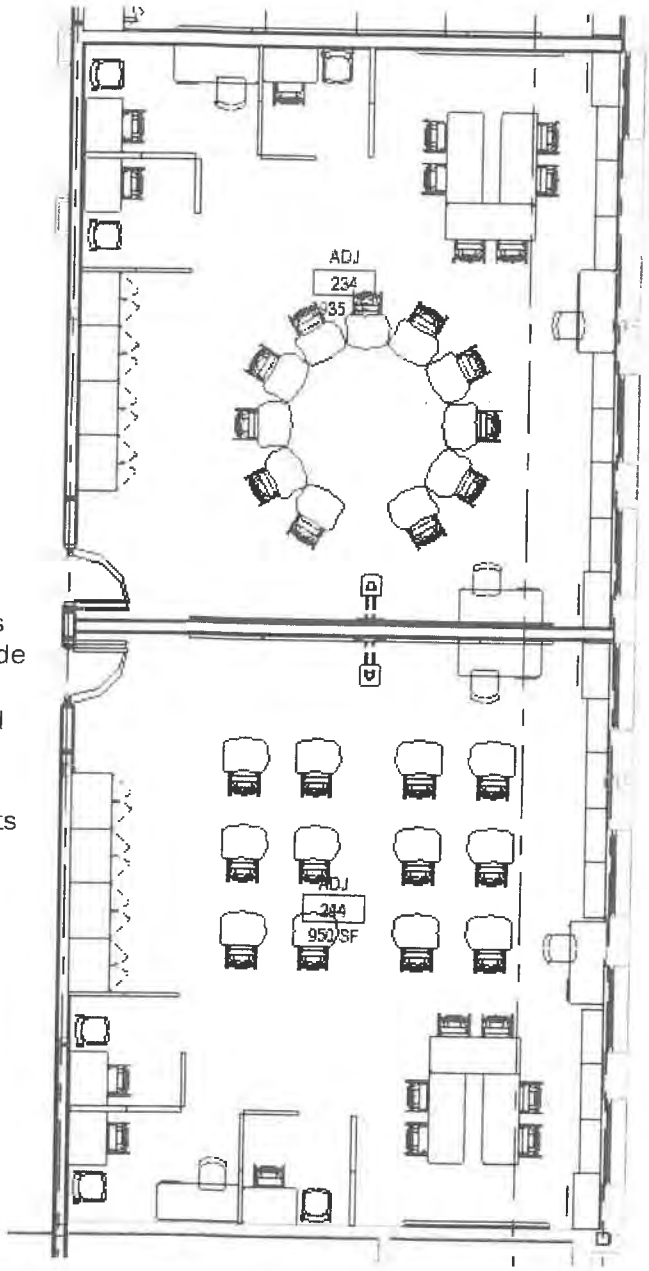
Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: toward the valley/mountains or north hill

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor? (or carpet) /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: TBD
Furnishings: TBD
Equipment: TBD
Storage: TBD



OK AS LAID ~~OUT~~ IN BUILDING.

Lowell High School **November 2018**

SPECIAL EDUCATION – FUNDAMENTALS CLASSROOM

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 1900sf
Quantity: 1
Occupants:

LOCATION/ORIENTATION CRITERIA

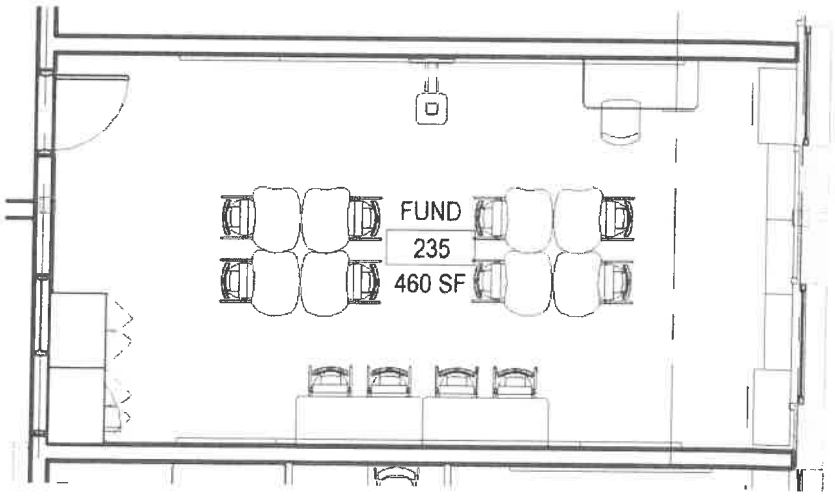
Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: toward the valley/mountains or north hill

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base (epoxy floor/base at toilets)
Walls: multi-layer gypsum board, painted at new (cmu walls at toilets)
Ceiling: high light reflectance ceiling tile (.90 LRV); MR gypsum at toilets
Door/Frame: solid wood doors with acoustic gaskets & 3' w. glass sidelight with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: TBD
Furnishings: TBD
Equipment: TBD
Storage: TBD



Lowell High School

November 2018

SPECIAL EDUCATION – INTENSIVE CLASSROOM

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence

Area: 950sf (inclu toilet)

Quantity: 2

Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists

Adjacencies: clustered with classroom/science clusters for each grade grouping

Orientation: north/south exposure for daylight control

Views: toward the valley/mountains or north hill

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base

Walls: glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new

Ceiling: high light reflectance ceiling tile (.90 LRV)

Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade

Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)

Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors

Power: convenience outlets as required

Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock

Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.

Acoustical: high performance ceiling (.8 NRC/.35 CAC)

Mechanical: Displacement Ventilation

Plumb/Fire: speaker/strobe alarm & sprinkler system

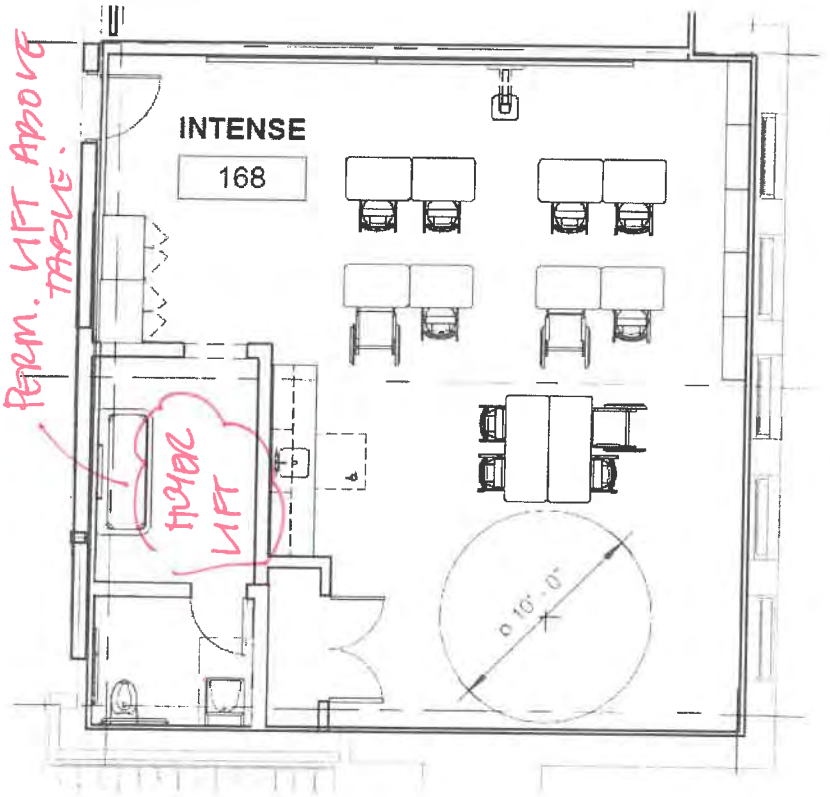
FIXTURES / FURNISHINGS

Casework: TBD

Furnishings: TBD

Equipment: TBD

Storage: TBD



- FULL HEIGHT ~ 10 @ each Accessible OUTSIDE EACH INTENSIVE.
- ADD SENSORY ROOM @ EACH.
- LIFTING AREA
- SENSORY 1-8 KIDS MAT + BEAN BAGS LIGHTS/MUSIC W/ SHELVING.

Lowell High School **November 2018**

SPECIAL EDUCATION – AUTISM CLASSROOM

FUNCTIONAL CRITERIA

Description:	specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area:	1000sf
Quantity:	8
Occupants:	

LOCATION/ORIENTATION CRITERIA

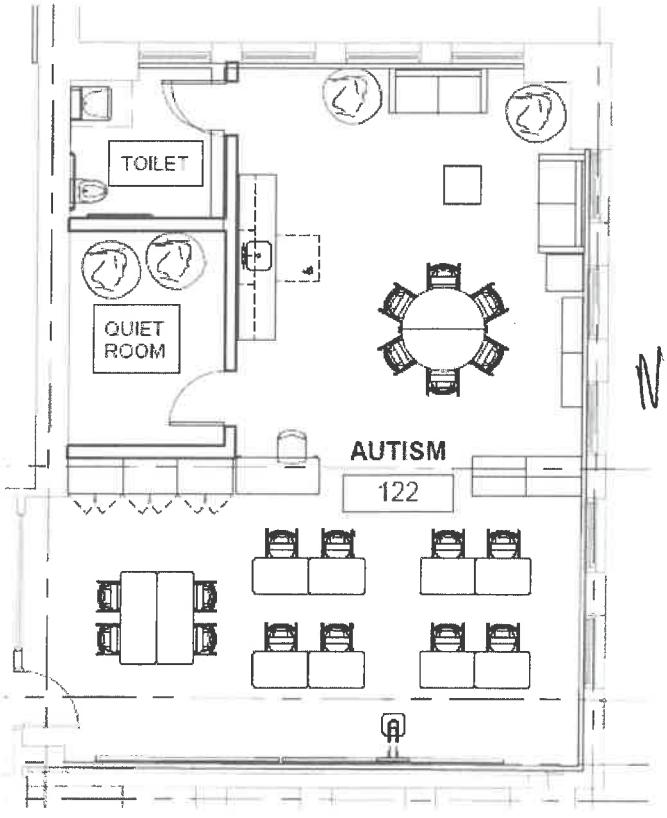
Users:	special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies:	clustered with classroom/science clusters for each grade grouping
Orientation:	north/south exposure for daylight control
Views:	toward the valley/mountains or north hill

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor/rubber base
Walls:	glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new
Ceiling:	high light reflectance ceiling tile (.90 LRV)
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	TBD
Furnishings:	TBD
Equipment:	TBD
Storage:	TBD



Space Refrig ?

Need refrigerator for special diets.

Lowell High School **November 2018**

SPECIAL EDUCATION – SUITE

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 2800sf
Quantity: 1
Occupants:

LOCATION/ORIENTATION CRITERIA

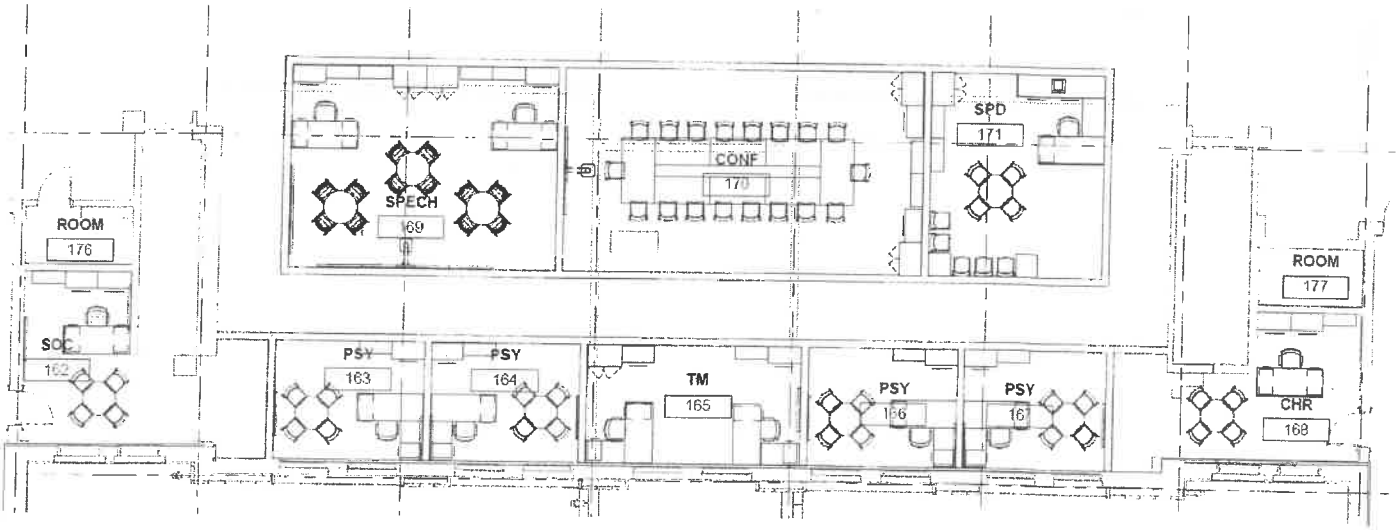
Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: toward the valley/mountains or north hill

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base
Walls: glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: TBD
Furnishings: TBD
Equipment: TBD
Storage: TBD



Lowell High School

November 2018

SCIENCE ROOM AND PREP- BIOTECH

FUNCTIONAL CRITERIA

Description:	teaching and learning lab
Area:	1440sf lab, 750 sf prep
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

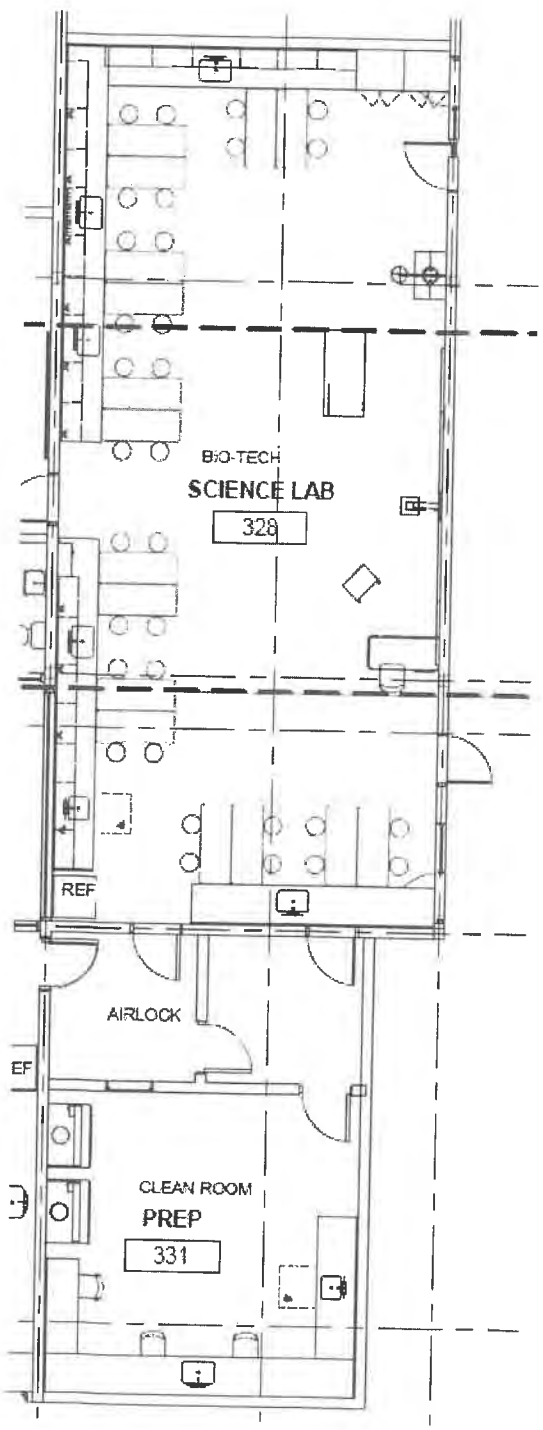
Users:	teachers and students
Adjacencies:	paired labs with shared prep between, central to CRs on each academic floor
Orientation:	-
Views:	windows into lightwells

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor/rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows:	-
Lighting:	LED pendant direct/indirect with daylight diming and occupancy sensors
Power:	convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com:	telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service?

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School

November 2018

SCIENCE ROOM AND PREP- MICROBIOLOGY

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 750 sf prep
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

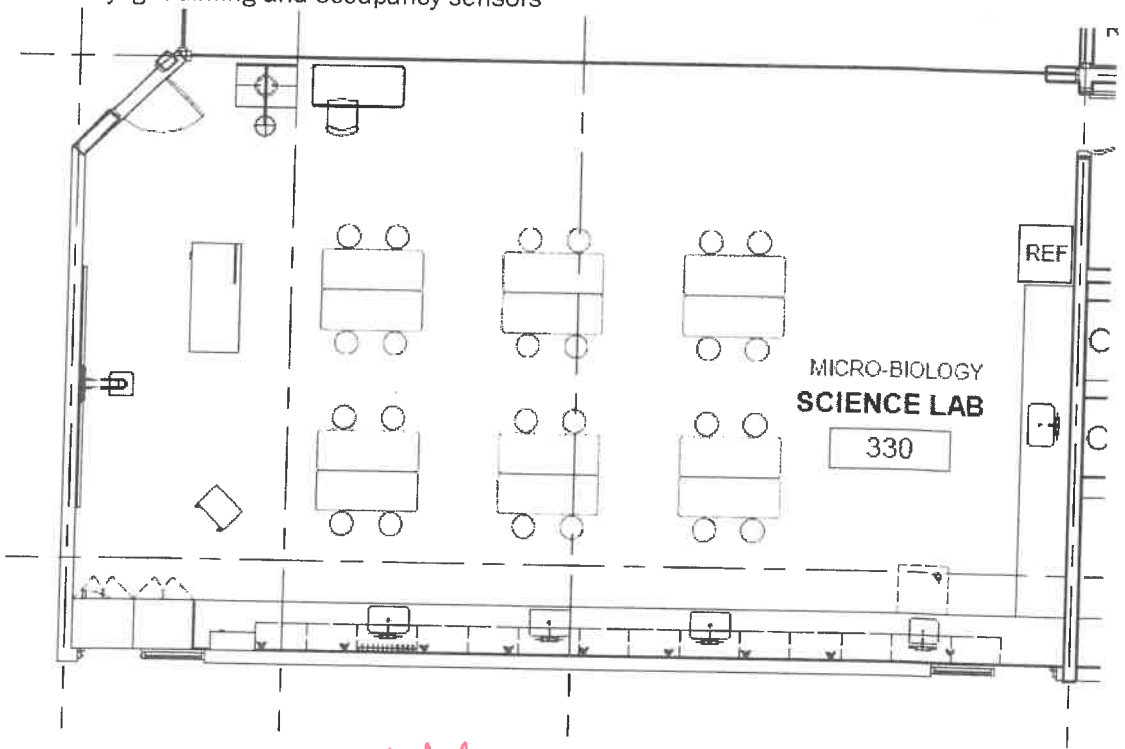
Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: -
Views: windows into lightwells

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: -
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service?

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -



LAYOUT LIKE ~~SOMETHING~~ TYPICAL SCIENCE ROOM.

Lowell High School

November 2018

SCIENCE ROOM AND PREP- HEALTH ASST (CNA)

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 750 sf prep
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

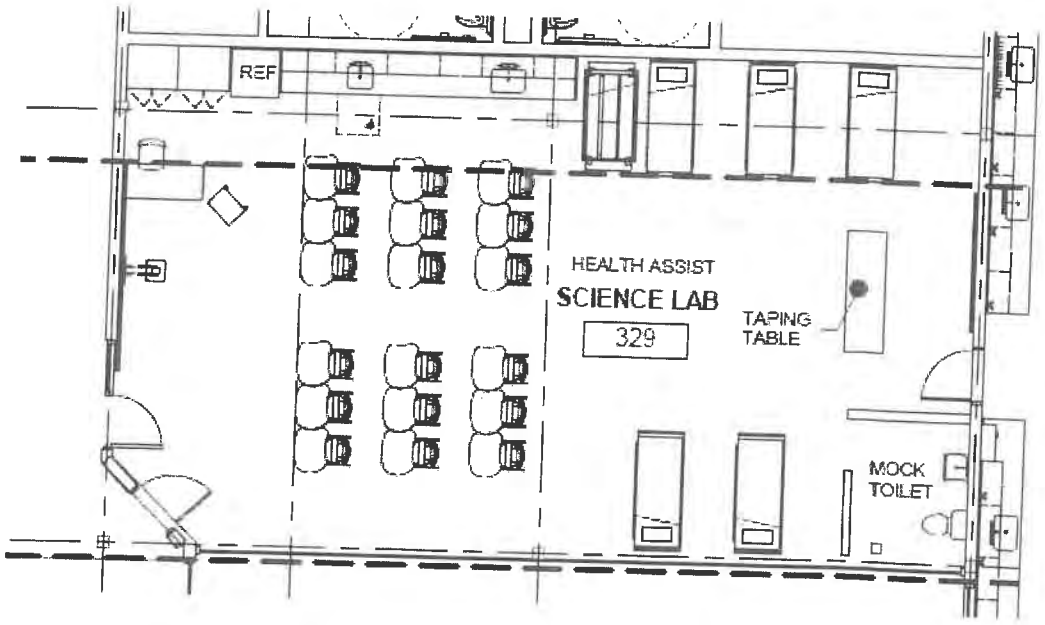
Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: -
Views: windows into lightwells

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: -
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service?

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -



REGULAR HEALTH CLASSROOMS – SHARE RESOURCES & WOULD LIKE TO BE CLUSTERED. (PREFERRED)

• IDEALLY (2) HEALTH IN FA.
• MOST HEALTH CLASSES ARE ~30 STUDENTS.

CURRENTLY PE TEACHERS ARE TEACHING HEALTH, NOT ALWAYS

Lowell High School **November 2018**

ART STUDIO

FUNCTIONAL CRITERIA

Description:	Art Studio
Area:	approx. 1,350 sqft,
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

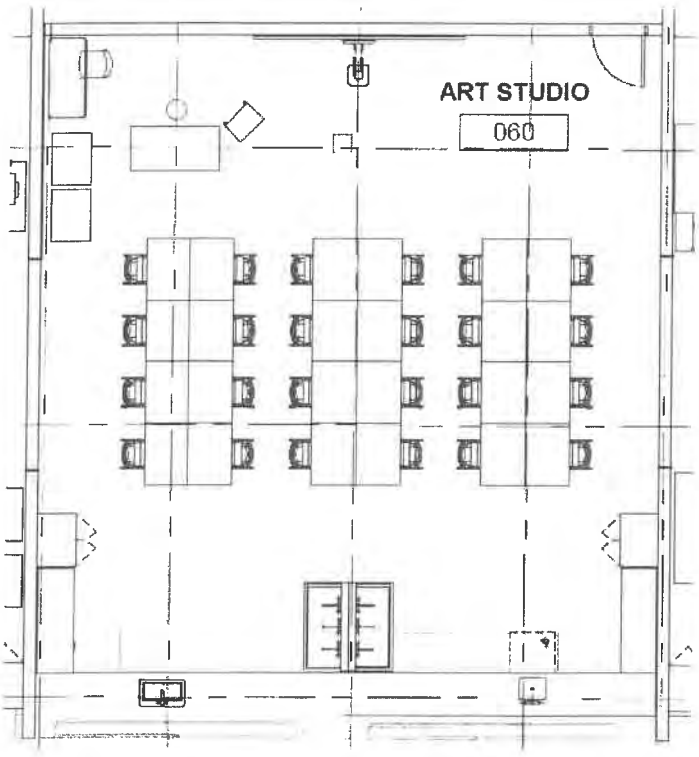
Users:	Students & Teachers/Staff
Adjacencies:	Fine Arts Suite
Orientation:	-
Views:	-

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	Glass between Rooms and out to Gallery. Skylights
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	perimeter counters with base cabinets, including 2 sinks (1 regular, 1 ADA), tall storage units
Furnishings:	teacher desk/file/chair, podium, student art tables/stools, demo table, white boards, tack boards
Equipment:	kiln, ware cart, drying racks, teacher computer,
Storage:	in-room cabinets as noted



Lowell High School

November 2018

2D ART

FUNCTIONAL CRITERIA

Description:	Art Studio
Area:	approx. 1,350 sqft
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

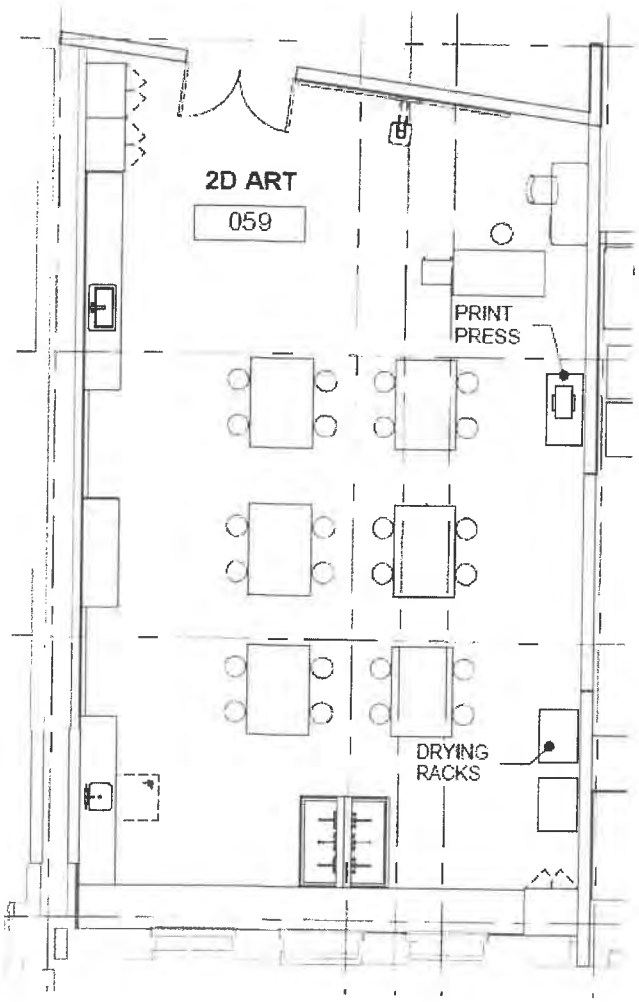
Users:	Students & Teachers/Staff
Adjacencies:	Fine Arts Suite
Orientation:	-
Views:	-

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor /rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door and 3' wide sidelight glass with solid roller shade
Windows:	Glass between Rooms and out to Gallery.
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	perimeter counters with base cabinets, including 2 sinks (1 regular, 1 ADA), tall storage units
Furnishings:	teacher desk/file/chair, podium, student art tables/stools, demo table, white boards, tack boards
Equipment:	kiln, ware cart, drying racks, teacher computer,
Storage:	in-room cabinets as noted



Lowell High School

November 2018

3D ART

FUNCTIONAL CRITERIA

Description:	Art Studio
Area:	approx.1,350 sqft
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

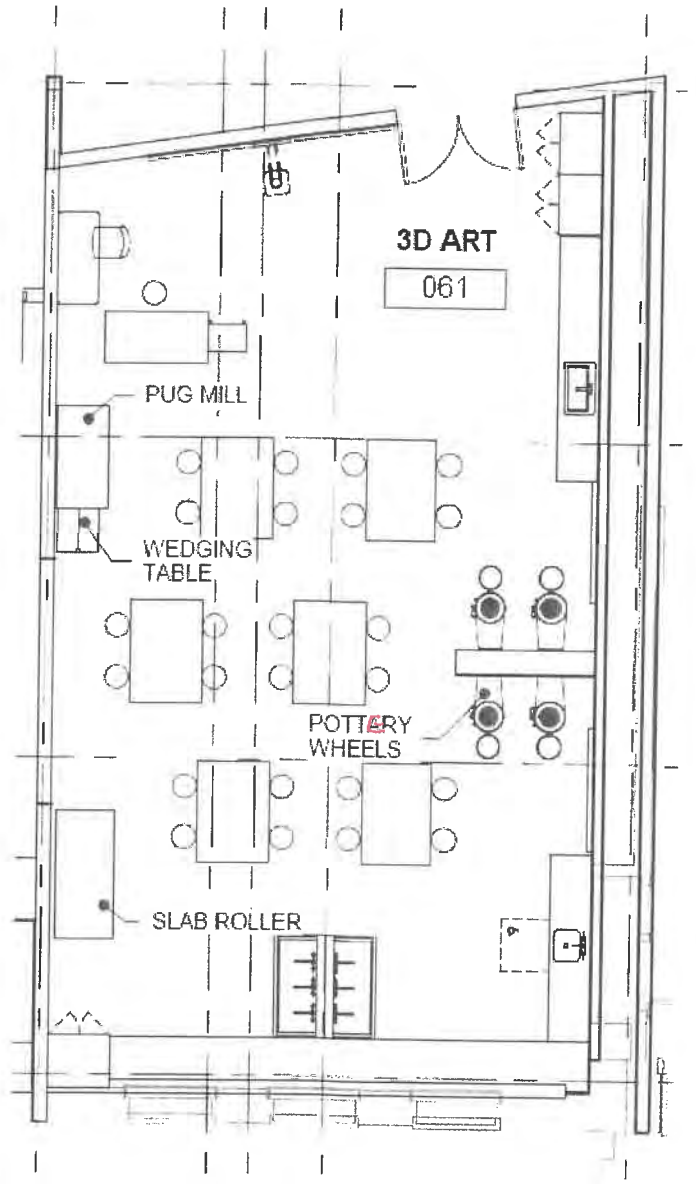
Users:	Students & Teachers/Staff
Adjacencies:	Fine Arts Suite
Orientation:	-
Views:	-

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor /rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door and 3' wide sidelight glass with solid roller shade
Windows:	Glass between Rooms and out to Gallery.
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



REMOTE KILN? NOT PREFERRED KILN IN 3D.

. IN ROOM STORAGE & BULK ACROSS HALL

Lowell High School

November 2018

ANIMATION

FUNCTIONAL CRITERIA

Description:	Animation Art Room
Area:	approx.. 1,350 sqft
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

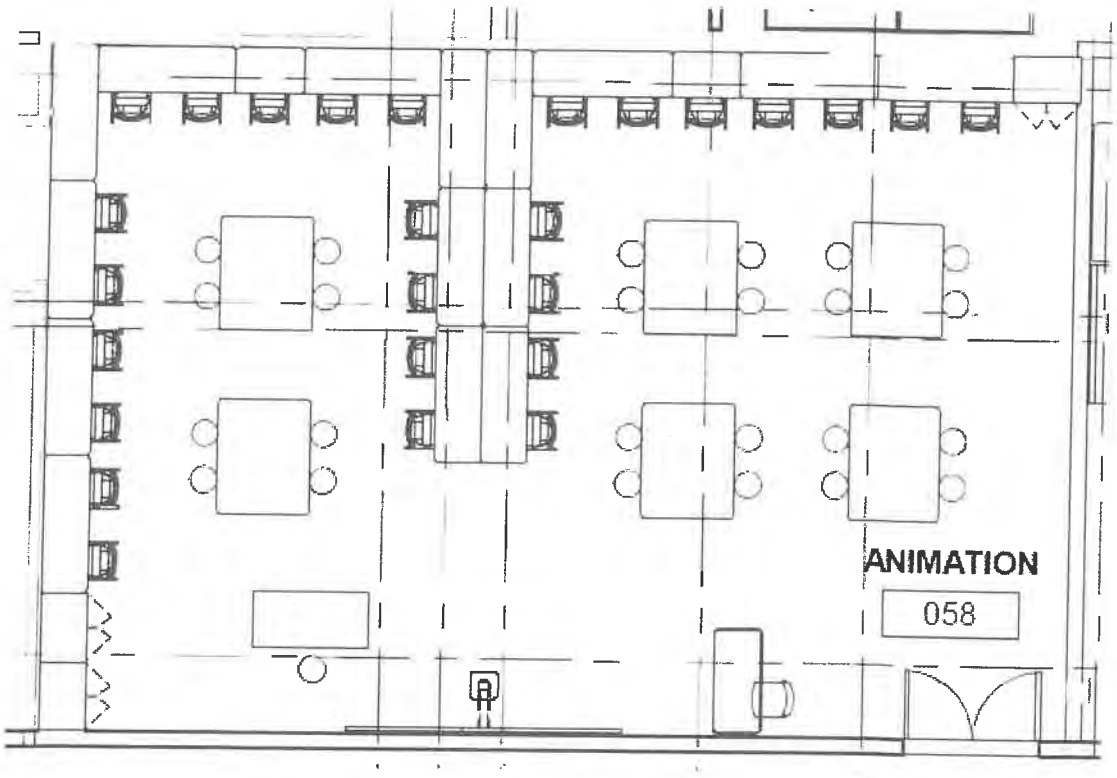
Users:	Students & Teachers/Staff
Adjacencies:	Storage, Kiln Room, Makerspace
Orientation:	South-facing (with sun control)
Views:	Outdoor Learning

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (5% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	TBD
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School

November 2018

GRAPHICS

FUNCTIONAL CRITERIA

Description:	Art Classroom, Storage & Kiln Room
Area:	1,350 sqft, Kiln 150 sqft, Storage 150sf
Quantity:	6 Classrooms
Occupants:	-

LOCATION/ORIENTATION CRITERIA

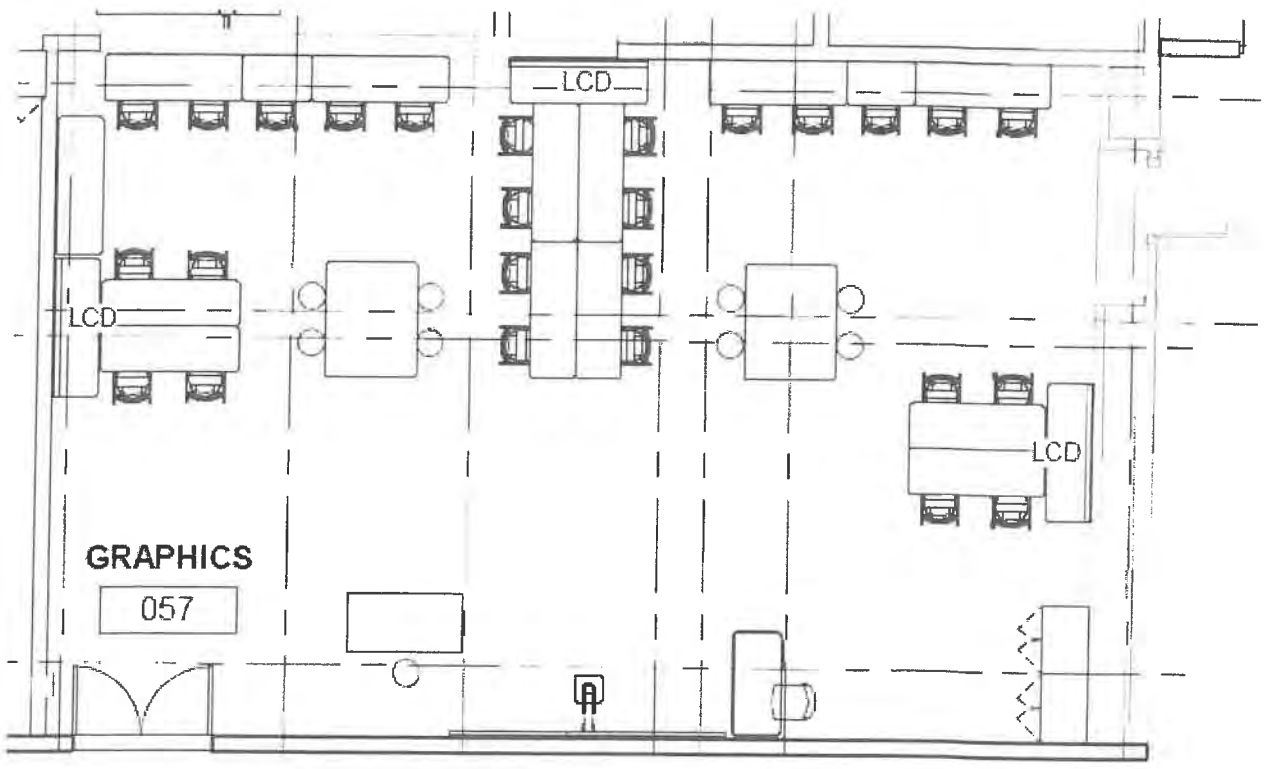
Users:	Students & Teachers/Staff
Adjacencies:	Storage, Kiln Room, Makerspace
Orientation:	South-facing (with sun control)
Views:	Outdoor Learning

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (5% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	TBD
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School

November 2018

ART STUDIO (TV PRODUCTION)

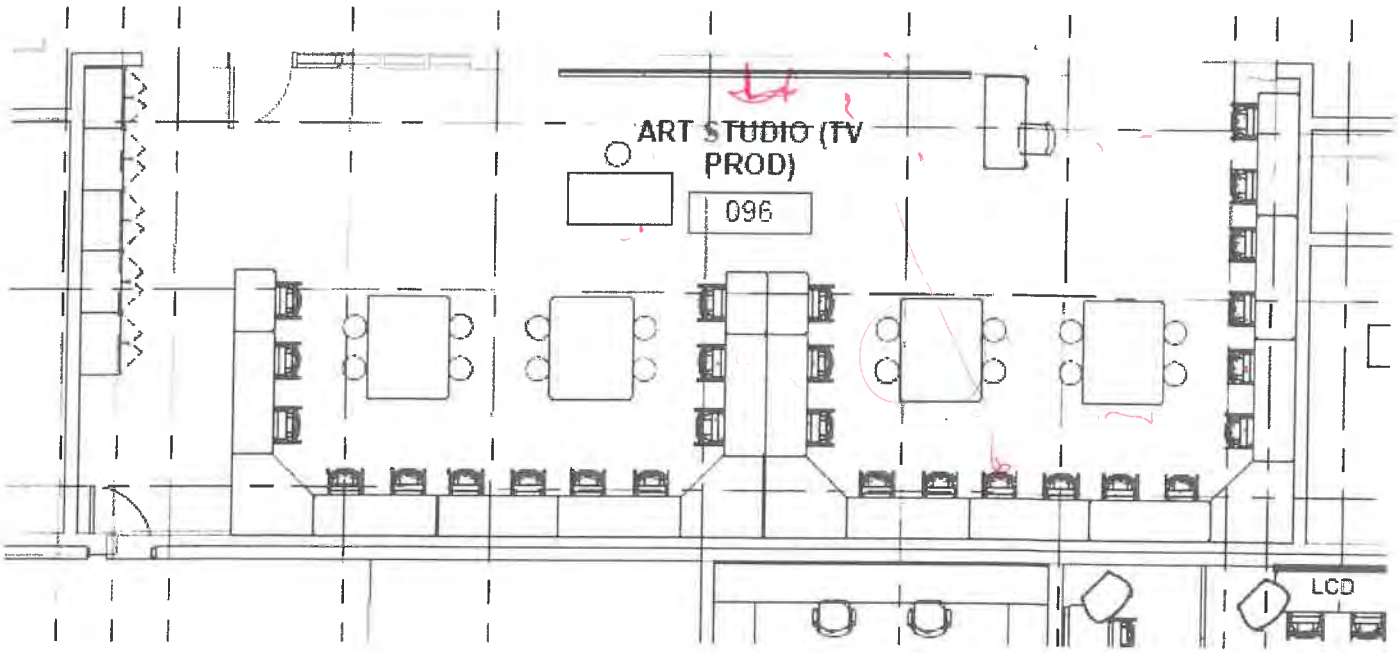
FUNCTIONAL CRITERIA
Description: TV Production
Area: approx. 1,350 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA
Users: Students & Teachers/Staff
Adjacencies: TV Studio/ Art Suite
Orientation: -
Views: -

TECHNICAL CRITERIA
Floor/Base: Linoleum Tile/Vinyl Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: -

Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

COSTUME SHOP

FUNCTIONAL CRITERIA

Description:	Art Classroom, Storage & Kiln Room
Area:	1,350 sqft
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

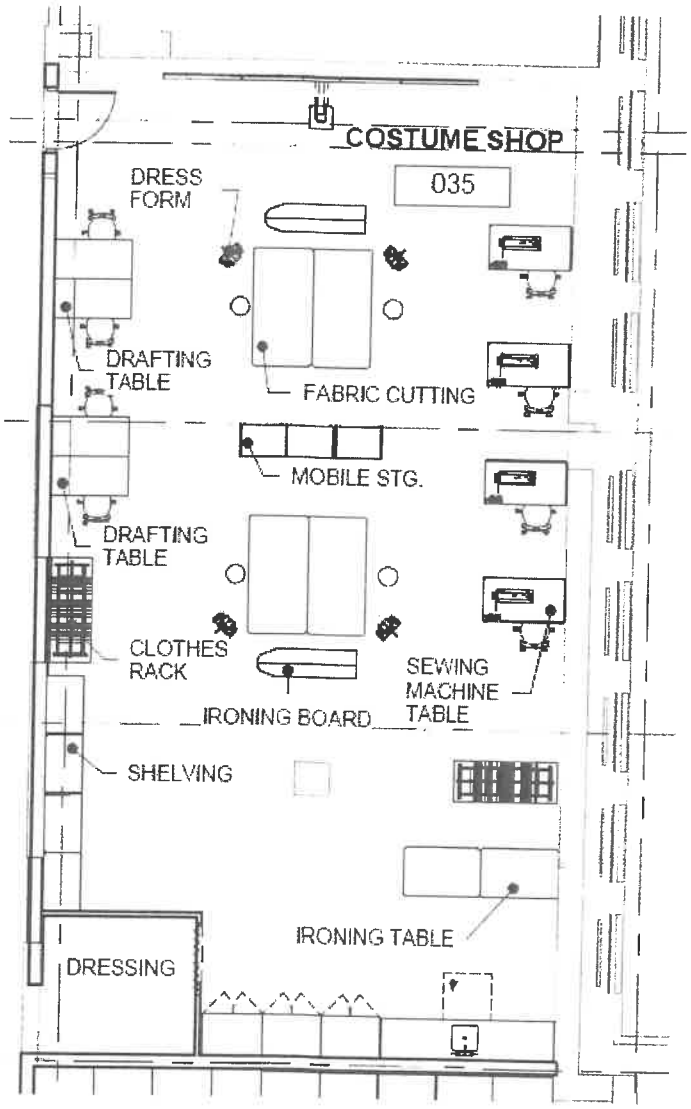
Users:	Students & Teachers/Staff
Adjacencies:	Fine Arts Suite
Orientation:	East
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor /rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School **November 2018**

BAND ROOM

FUNCTIONAL CRITERIA

Description:	instrumental and vocal instruction for band groups
Area:	approx. 2000sf
Quantity:	1
Occupants:	–

LOCATION/ORIENTATION CRITERIA

Users:	students, teachers and community groups students and teachers, including adaptive music
Adjacencies:	auditorium and other performing arts
Orientation:	East
Views:	Yes

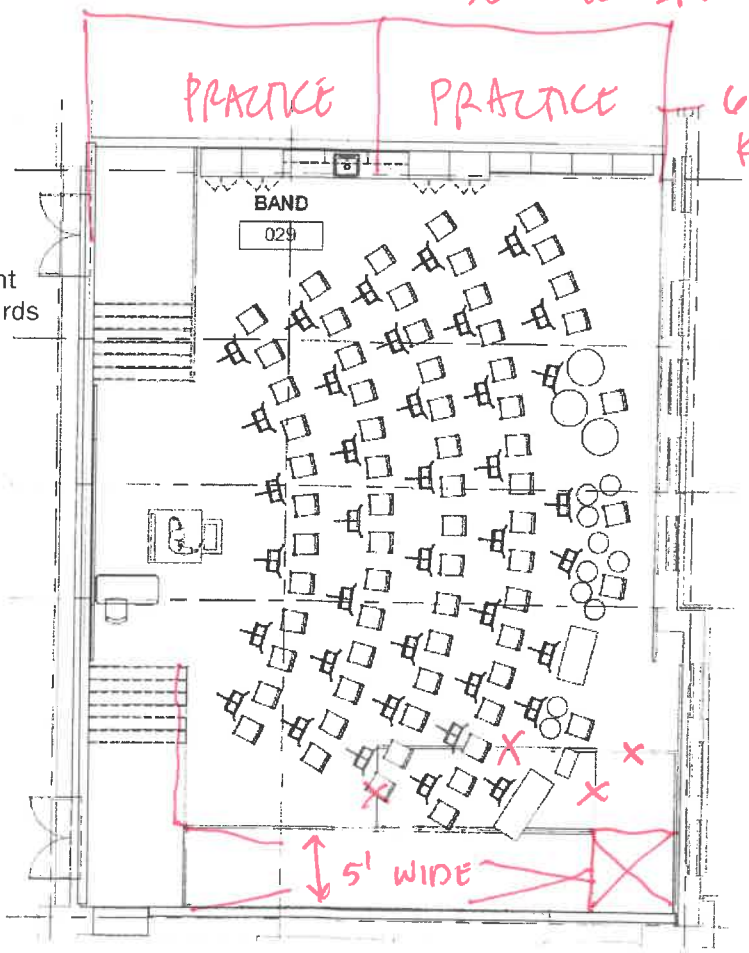
TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor /rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	instrument storage units
Furnishings:	conductor's chair/ stand, lateral files, student music chairs/stands, white boards, tack boards
Equipment:	music instruments, teacher computer, doc camera
Storage:	in-room cabinets as noted and separate instrument/auditorium storage room

UNIFORM STORAGE
~ 350 - 400 SF.



- GET RAMP OUT OF CLASSROOM LAYOUT.
- FLAT FLOOR
- MIRIMBAS MAKE TITE CORNER OF RAMP

Lowell High School **November 2018**

CHORUS ROOM

FUNCTIONAL CRITERIA

Description:	instrumental and vocal instruction for chorus groups
Area:	approx.. 1500sf
Quantity:	1
Occupants:	--

LOCATION/ORIENTATION CRITERIA

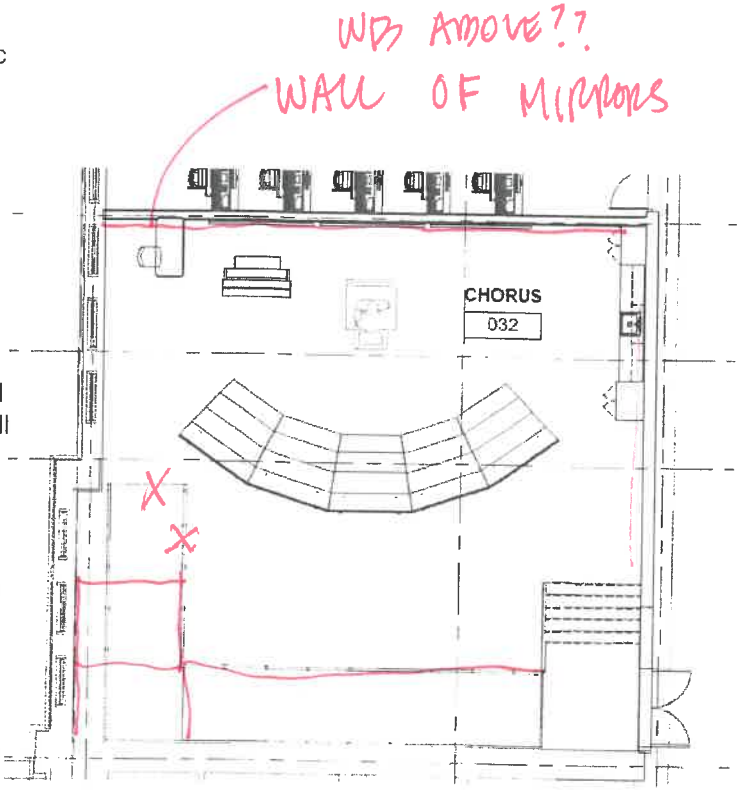
Users:	students, teachers and community groups students and teachers, including adaptive music
Adjacencies:	auditorium and other performing arts
Orientation:	West
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	~~carpet?~~ Linoleum/rubber base
Walls:	Painted drywall
Ceiling:	Painted Exposed and Acoustical Clouds
Door/Frame:	solid wood doors with acoustic gaskets
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security:	TBD
Acoustical:	Acoustic Ceiling Clouds and Acoustic Wall Panels
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	instrument storage units
Furnishings:	conductor's chair/ stand, lateral files, student music chairs/stands, white boards, tack boards
Equipment:	music instruments, teacher computer, doc camera
Storage:	in-room cabinets as noted and separate instrument/auditorium storage room



- MIRRORS ON WALLS
- BUILT UP WOOD FLOOR FOR RESILIENCE.
- ADD LATERAL FILES.

Lowell High School

November 2018

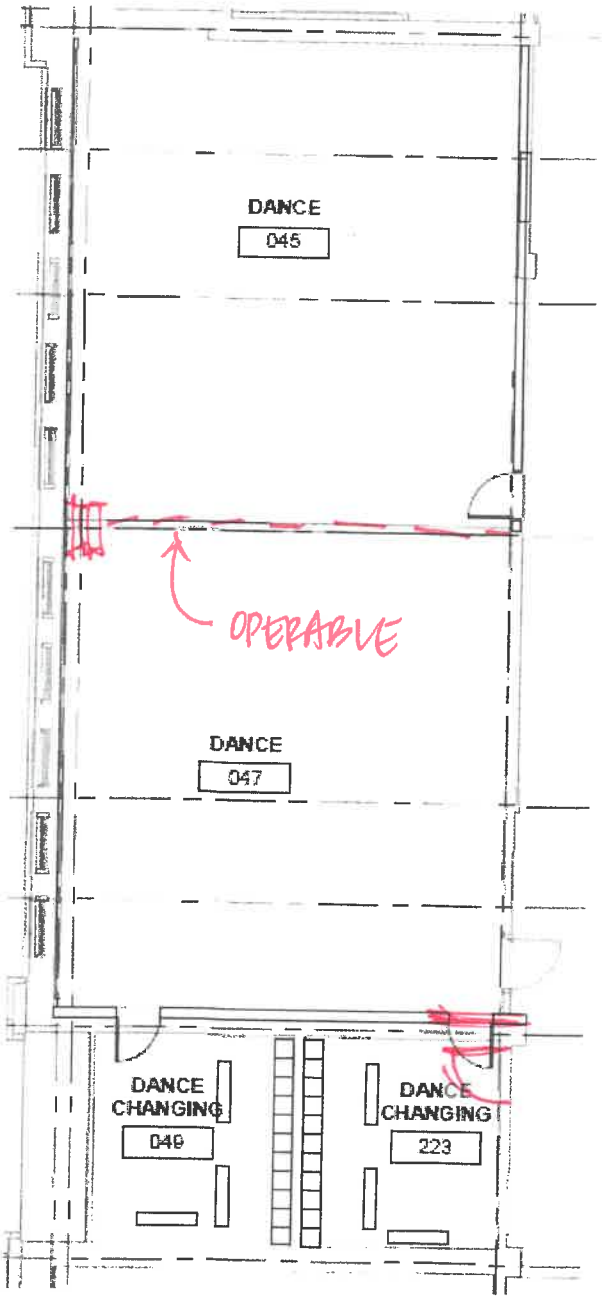
DANCE ROOM

FUNCTIONAL CRITERIA
Description: Dance Studio
Area: approx. 1200sf
Quantity: 2 (+ Stage)
Occupants: --

LOCATION/ORIENTATION CRITERIA
Users: students, teachers and community groups students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: west
Views: yes

TECHNICAL CRITERIA
Floor/Base: wood dance floor
Walls: Painted drywall/ mirrors
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors with acoustic gaskets
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security: TBD
Acoustical: Acoustic Ceiling Clouds and Acoustic Wall Panels
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



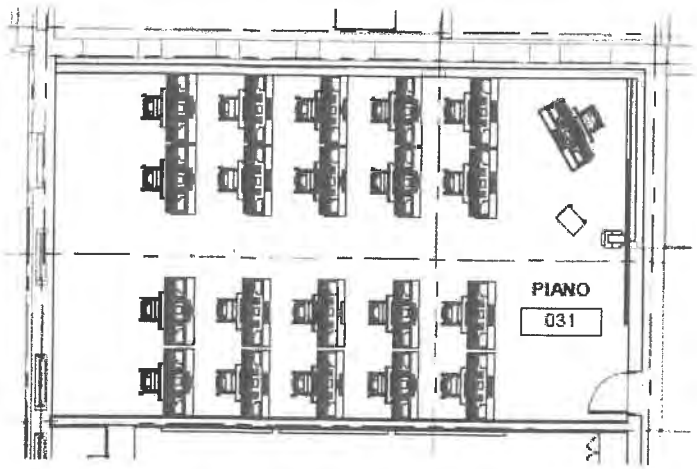
Lowell High School **November 2018**

PIANO/DIGITAL LAB

FUNCTIONAL CRITERIA
Description: instrumental instruction room
Area: 1000sf
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA
Users: students, teachers and community groups
students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: existing, north facing
Views: into new courtyard/amphitheater

TECHNICAL CRITERIA
Floor/Base: carpet?/rubber base
Walls: Painted drywall
Ceiling: Painted Exposed and Acoustical Clouds
Door/Frame: solid wood doors with acoustic gaskets
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security: TBD
Acoustical: Acoustic Ceiling Clouds and Acoustic Wall Panels
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system



FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -

Lowell High School

November 2018

GUITAR

FUNCTIONAL CRITERIA

Description:	instrumental instruction room
Area:	approx. 375sf
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

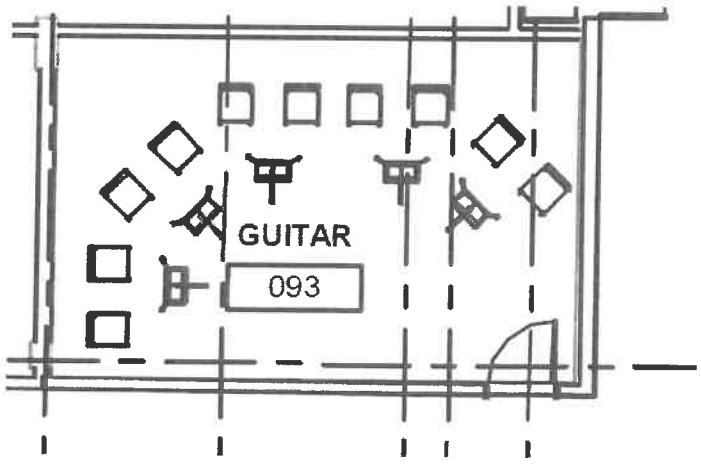
Users:	Students & Teachers
Adjacencies:	Music Rooms
Orientation:	-
Views:	-

TECHNICAL CRITERIA

Floor/Base:	Carpet?/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	-
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	Acoustic Ceiling Clouds and Acoustic Wall Panels
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



22 IN GUITAR.

Lowell High School **November 2018**

SCENE SHOP

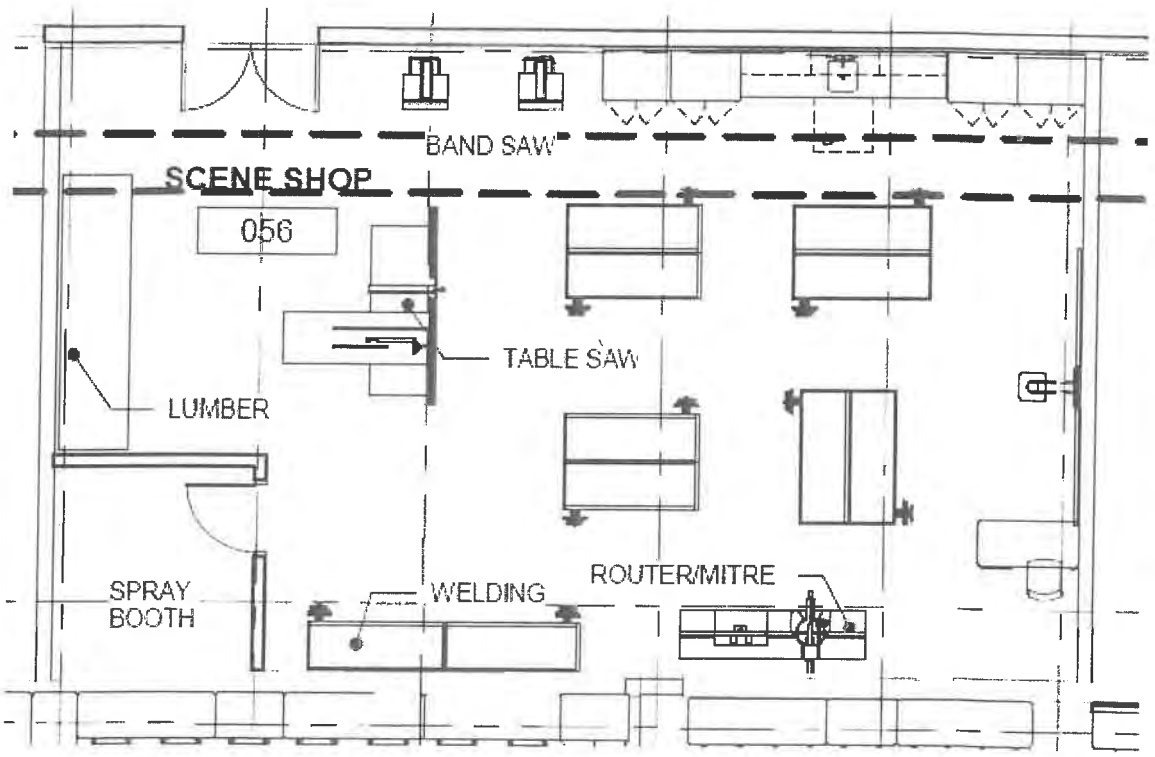
FUNCTIONAL CRITERIA
Description: Scene Shop
Area: approx. 1,440 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA
Users: Students & Teachers/Staff
Adjacencies: Auditorium, Art Asuite
Orientation: -
Views: -

TECHNICAL CRITERIA
Floor/Base: Linoleum Tile/Vinyl Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: -

Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

MEDIA CENTER

FUNCTIONAL CRITERIA

Description: Media Center
Area: approx. 21,900sf
Quantity: 2 (approx. 13,900sf + apprx 8,000sf)
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups
Adjacencies: Classrooms
Orientation: South
Views: Yes

TECHNICAL CRITERIA

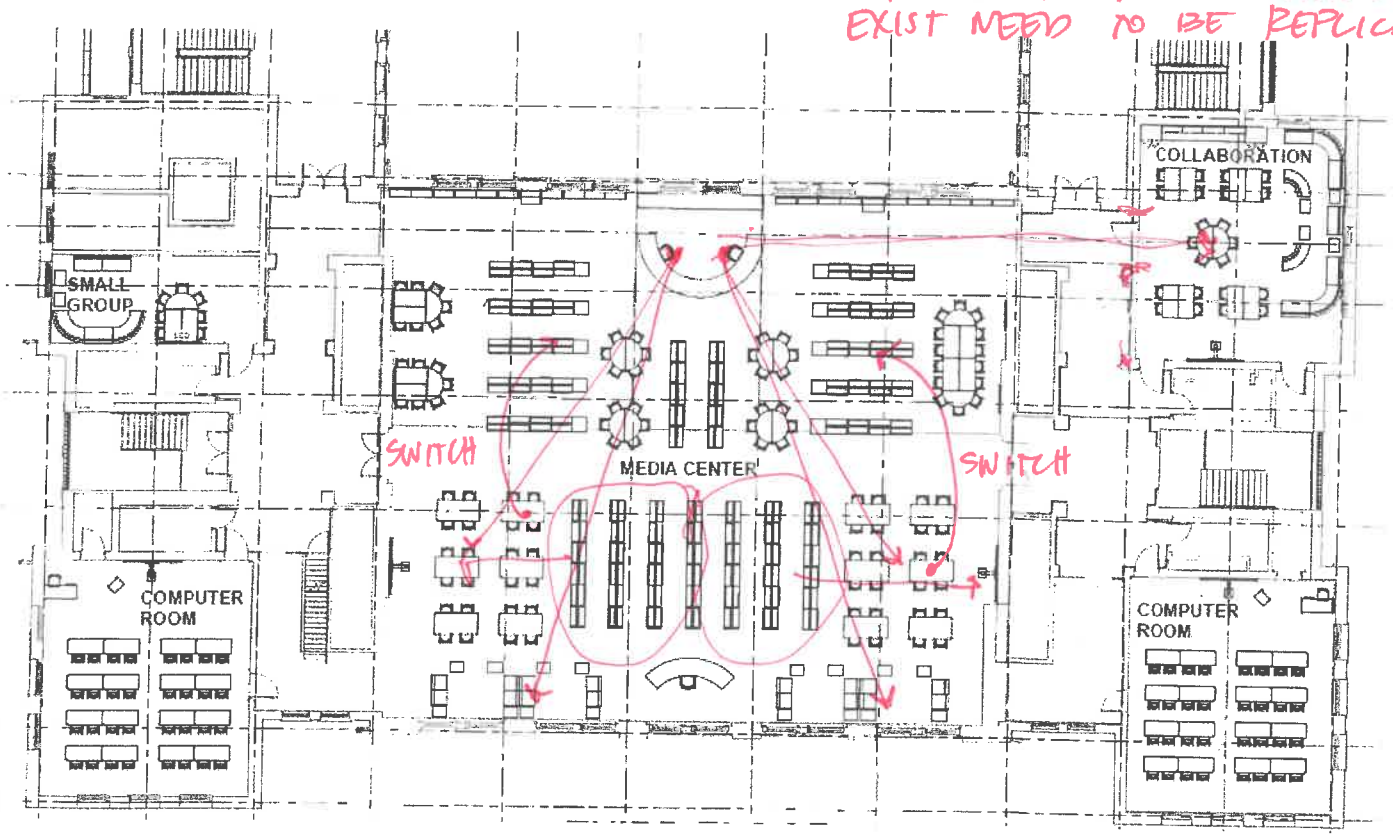
Floor/Base: Carpet? VB?
Walls: multi-layer gypsum board, painted
Ceiling: 80% acoustic, 20% gypsum soffits
Door/Frame: solid wood doors and sidelight glazing, entry doors to be interior storefront with aluminum doors
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: Convenience Outlets + CHARGING STATION
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -

ROUND MORE OPEN STACKS @ FICTION SECTION

• PERIMETER ROOMS THAT EXIST NEED TO BE REPLICATED.



• COMPUTERS IN MEDIA CENTER - 25 TOTAL

• USB/⏻ COMBO OR CHARGING STATIONS.

LHS ARCHIVE. MISSING. LOCKABLE

Lowell High School

November 2018

TV STUDIO

FUNCTIONAL CRITERIA
Description: TV Studio
Area: approx.. 4000sf
Quantity: 1
Occupants: -

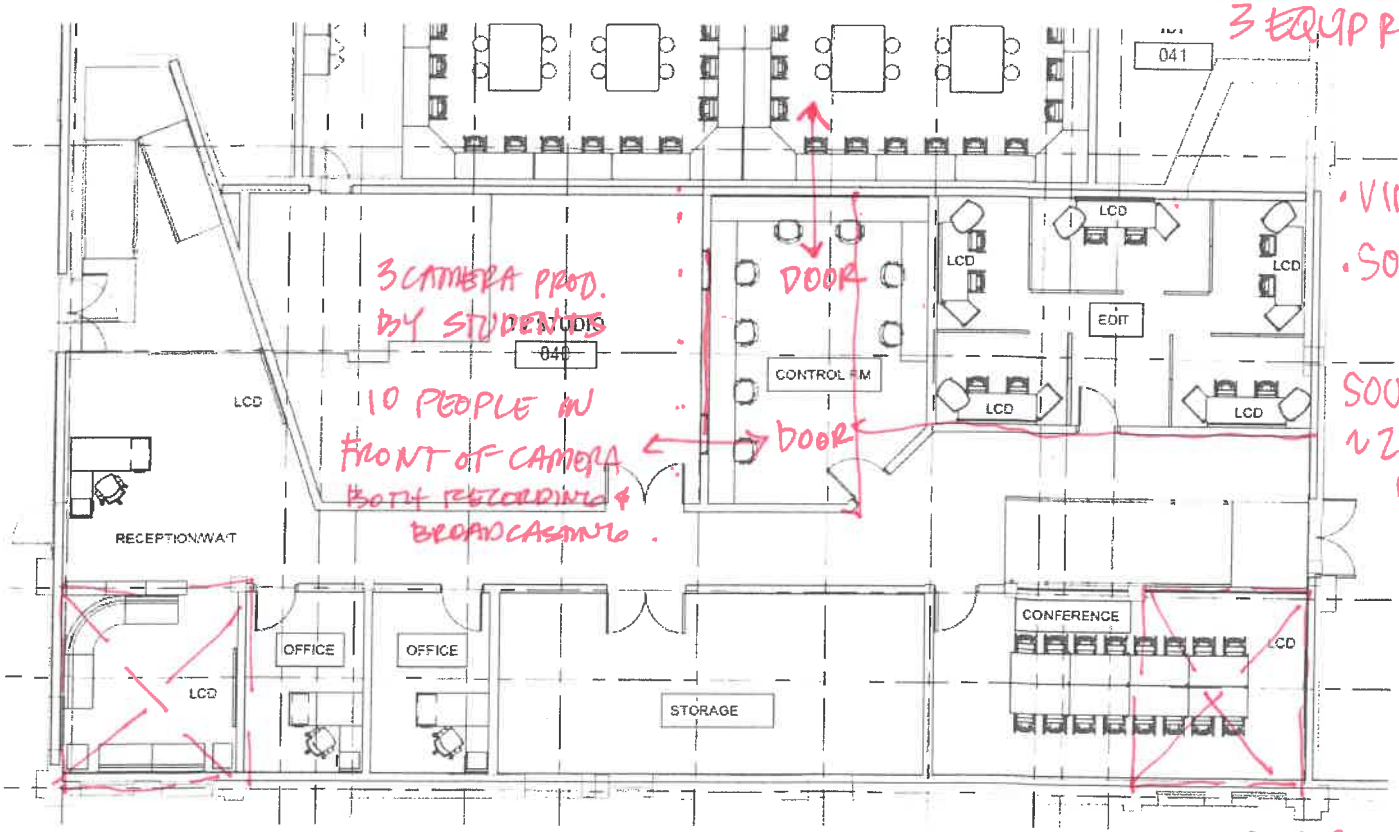
LOCATION/ORIENTATION CRITERIA
Users: Students & Teachers/Staff
Adjacencies: TV Production/ Art Suite
Orientation: -
Views: -

TECHNICAL CRITERIA
Floor/Base: Linoleum Tile/Vinyl Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: -

Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -

• 3 servers
EQUP ROOM & SERVER ROOM
7-8 RACKS
3 EQUP RACKS



• VIDEO EDI
• SOUND EDI
SOUND EDIT ~2 STUD. OR MORE?

• ACOUSTICALLY ISOLATE FROM BAND.

• NEED NEW FIBER LINE?
• FF&E to carry portable Cameras.

VIA CONTROL RM.
• CONNECT TO TV PRODUCTION CLASS

Lowell High School

November 2018

CULINARY KITCHEN & RESTAURANT

FUNCTIONAL CRITERIA

Description:	Culinary Kitchen & Classroom
Area:	4700sf
Quantity:	I Kitchen, 1 Restaurant, 2 Classrooms
Occupants:	-

LOCATION/ORIENTATION CRITERIA

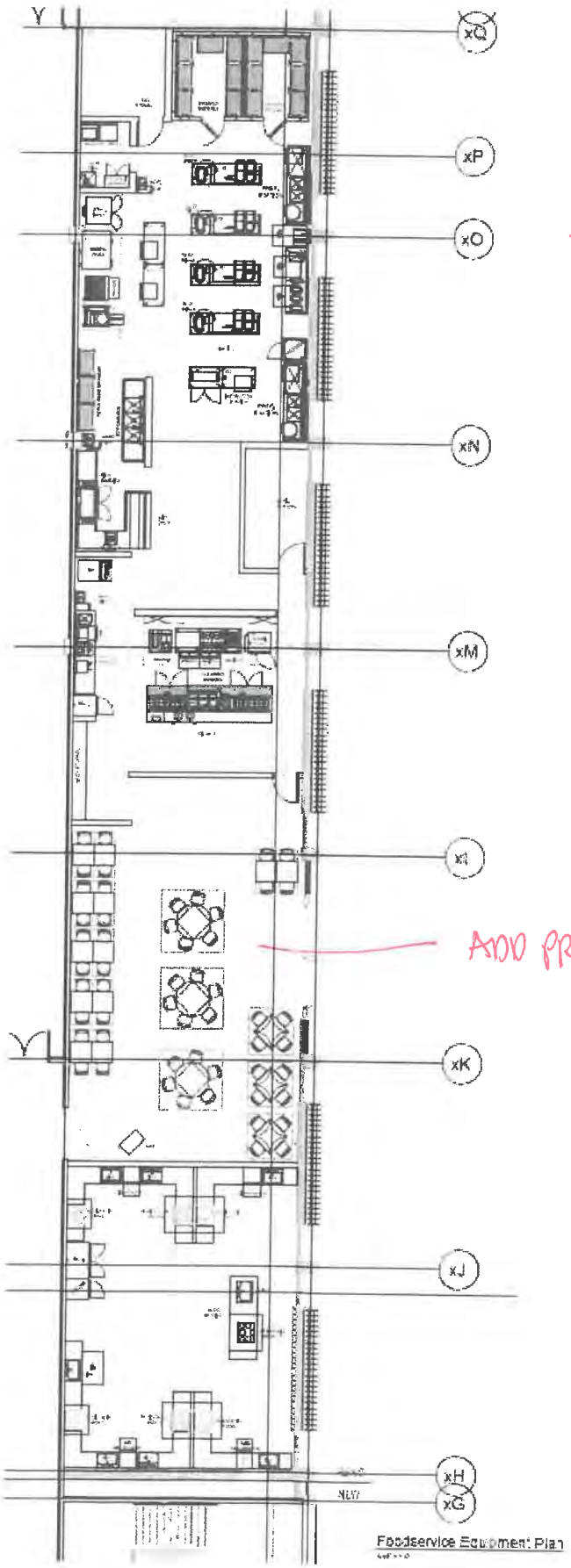
Users:	Students & Teachers/Staff, General Public
Adjacencies:	Lobby, Culinary Classrooms
Orientation:	East-facing
Views:	Canal

TECHNICAL CRITERIA

Floor/Base:	Epoxy? LVT?/Vinyl Base
Walls:	multi-layer gypsum board, painted with Porcelain tile wainscot
Ceiling:	high performance ceiling tile/ 10% GWB soffits
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)- Interior glazing at line.
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	(see list on next page)
Storage:	-



TOILET? LOCKERS IN COMPUTER

ADD PRESENTATION

CULINARY KITCHEN & RESTAURANT (cont.)

1 Walk-in cooler
1 Walk-in freezer
2 Remote refrigeration systems
18 Mobile shelving units
2 Utility carts
19 Dry storage shelving
1 Prep counter with sinks
1 Wall shelf
1 Accessible hand sink
1 Trash barrel (by Owner)
3 Mobile work tables
1 Exhaust ventilator
1 Ventilator control system
1 Deck oven (four decks)
1 Double convection oven
1 Four-burner range w/ oven
1 Forty-quart kettle with drain stand
1 Exhaust ventilator
2 Fire suppression systems
1 Utility distribution system
1 Griddle range with cabinet base
1 Two-burner/hot top range
1 Four-burner range with oven
1 Upright broiler w/ oven base
1 Fryer assembly with dump station,
1 Ventilator control system
1 Chef's counter assembly
2 Reach-in refrigerators
8 Mobile shelving
6 Storage shelving
6 Hand sinks
7 Waste bins (by Owner)
1 Accessible prep station with sink
1 Wall shelf with pot rack
4 Five-quart mixers
1 Sixty-quart mixer
1 Fill faucet
3 Mobile mixer stands
3 Twenty-quart mixers
1 Proofer cabinet
1 Dough divider
1 Scale with mobile stand
6 Maple top tables
12 Ingredient bins
17 Drop cords
5 Mobile pan racks
1 Mobile demonstration counter with mirror
1 Mobile work table
1 Clothes washer
1 Clothes dryer
1 Mop sink (by PC)
1 Mop rack/utility shelf
1 Detergent storage cabinet
1 Mobile slicer stand
1 Slicer
8 Work tables
8 Two burner range tops
1 Three-compartment sink
1 Wall shelf
1 Soiled ware landing table
1 Rack sorting shelf
1 Hose reel assembly
1 Ware washer
2 Exhaust ducts
1 Clean ware table
2 Bussing carts
1 Millwork counter
1 Reach-in refrigerator
1 Reach-in freezer
1 Combination display case
1 Work counter with sink
1 Wall shelf
1 Conveyor toaster
1 Coffee brewer

MAKERSPACE

FUNCTIONAL CRITERIA

Description: Makerspace
Area: approx.. 1440sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

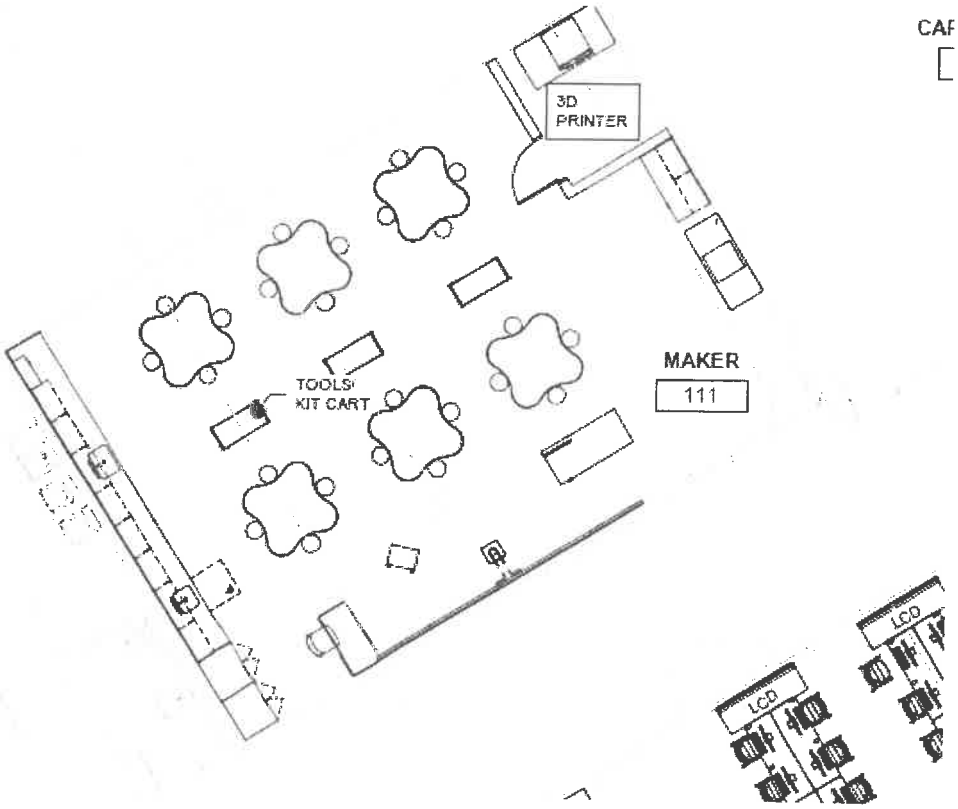
Users: Students & Teachers/Staff
Adjacencies: Freshman Academy, Robotics, Engineering
Orientation: North
Views: Front Entry Plaza

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Vinyl Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets, cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School **November 2018**

ROBOTICS

FUNCTIONAL CRITERIA

Description:	Robotics Lab
Area:	approx.. 1440sf
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

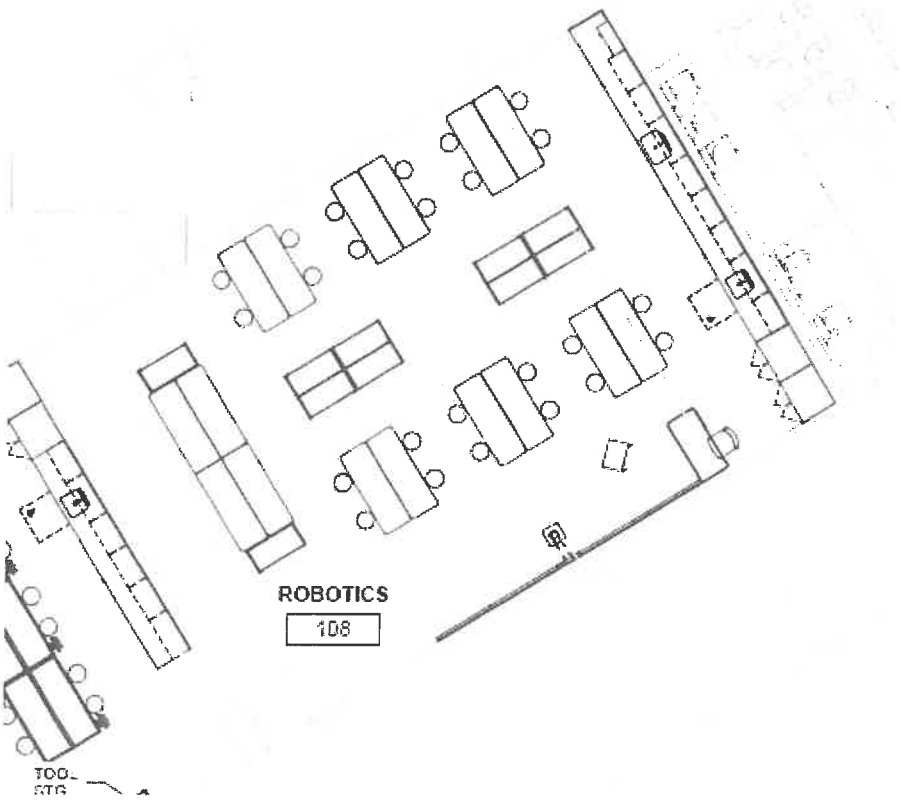
Users:	Students & Teachers/Staff
Adjacencies:	Freshman Academy, Makerspace, Engineering
Orientation:	North
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets, cord reels
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School **November 2018**

ENGINEERING

FUNCTIONAL CRITERIA

Description:	Engineering Lab
Area:	approx.. 1440sf
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

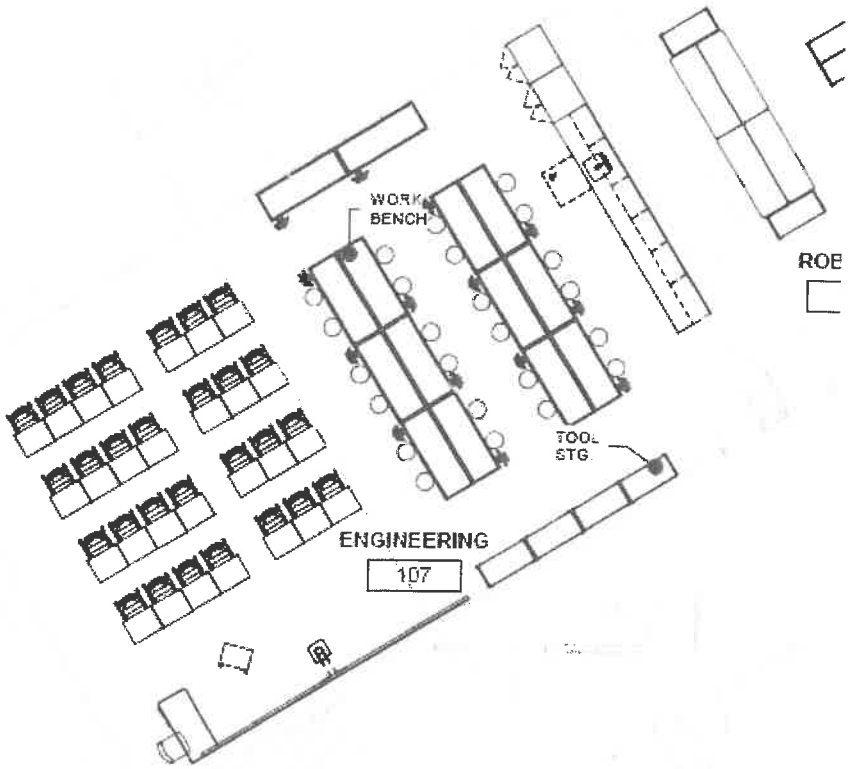
Users:	Students & Teachers/Staff
Adjacencies:	Freshman Academy, Makerspace, Robotics
Orientation:	North
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets, cord reels
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-



Lowell High School

November 2018

BUSINESS

FUNCTIONAL CRITERIA

Description:	Business Classroom
Area:	approx.. 1200sf
Quantity:	3 Classrooms
Occupants:	-

LOCATION/ORIENTATION CRITERIA

Users:	Students & Teachers/Staff
Adjacencies:	Business Classrooms, School Store
Orientation:	South Quad
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	Linoleum Tile/Vinyl Base
Walls:	multi-layer gypsum board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV);
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade
Windows:	thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting:	LED pendant direct/indirect with daylight dimming and occupancy sensors
Power:	convenience outlets as required
Data/Com:	telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	TBD
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-

Lowell High School

November 2018

BUSINESS/STORE

FUNCTIONAL CRITERIA

Description: Business Classroom
Area: approx.. 1200sf
Quantity: 3 Classrooms
Occupants: -

LOCATION/ORIENTATION CRITERIA

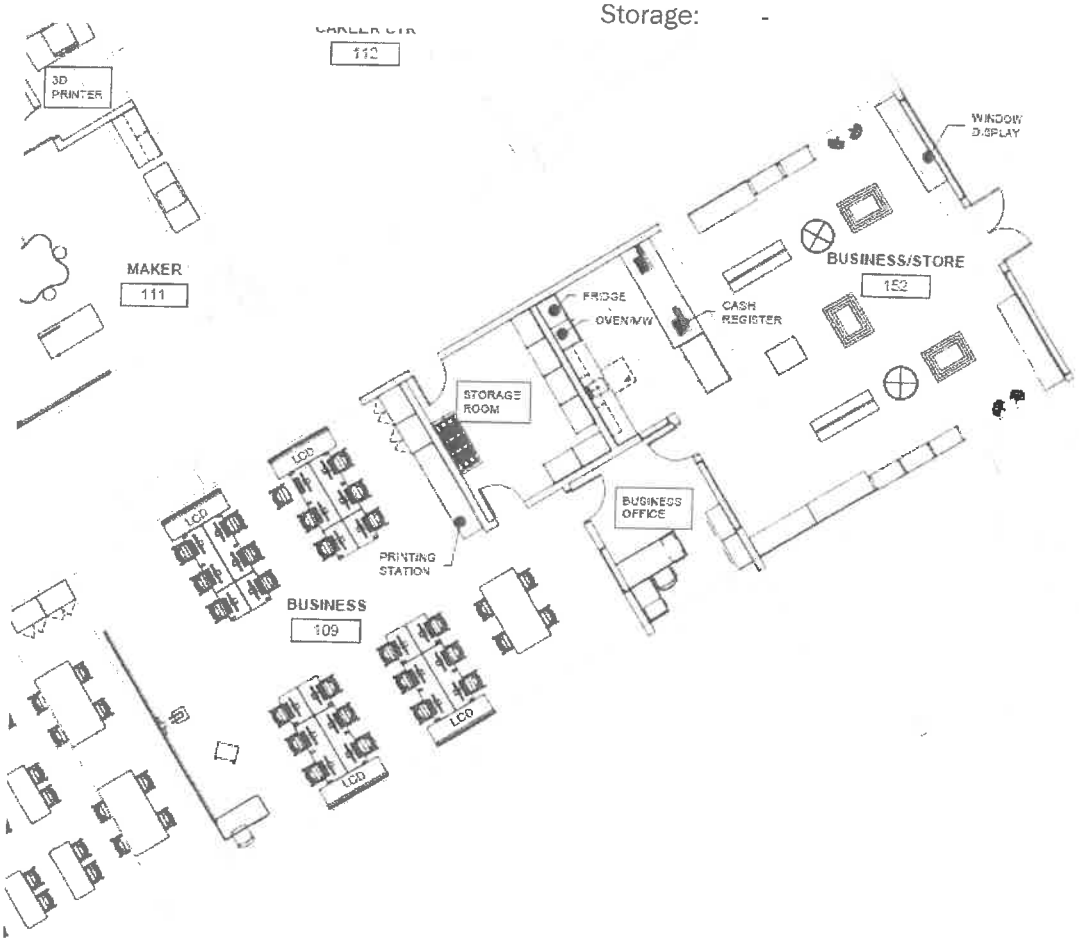
Users: Students & Teachers/Staff
Adjacencies: Business Classrooms, School Store
Orientation: South Quad
Views: Yes

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Vinyl Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

GYMNASIUM

- AUDIO - MUSIC + VOICE
- SCOREBOARD WIRELESS
- SCORERS TABLE OPPOSITE BLEACHERS

FUNCTIONAL CRITERIA

Description:	Gymnasium
Area:	approx.. 18,000SF
Quantity:	1- Operable Wall and Divider Curtains
Occupants:	--

LOCATION/ORIENTATION CRITERIA

Users:	Teachers/Staff/Students/Parents/Public
Adjacencies:	Public Entrance, Storage, Locker Rooms
Orientation:	North/South
Views:	Yes

TECHNICAL CRITERIA

Floor/Base:	Athletic Wood/Vented Base, Synthetic Athletic Floor
Walls:	CMU painted walls/Painted tectum
Ceiling:	Painted Exposed, Acoustical Deck
Doors:	solid wood doors
Windows:	Kalwall
Lighting:	LED Pendants
Power:	convenience outlets
Data/Com:	telephone, intercom, wireless access point, local sound system & wireless clock
Security:	TBD
Acoustical:	sound absorbing deck and wall treatment
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	-
Equipment:	-
Storage:	-

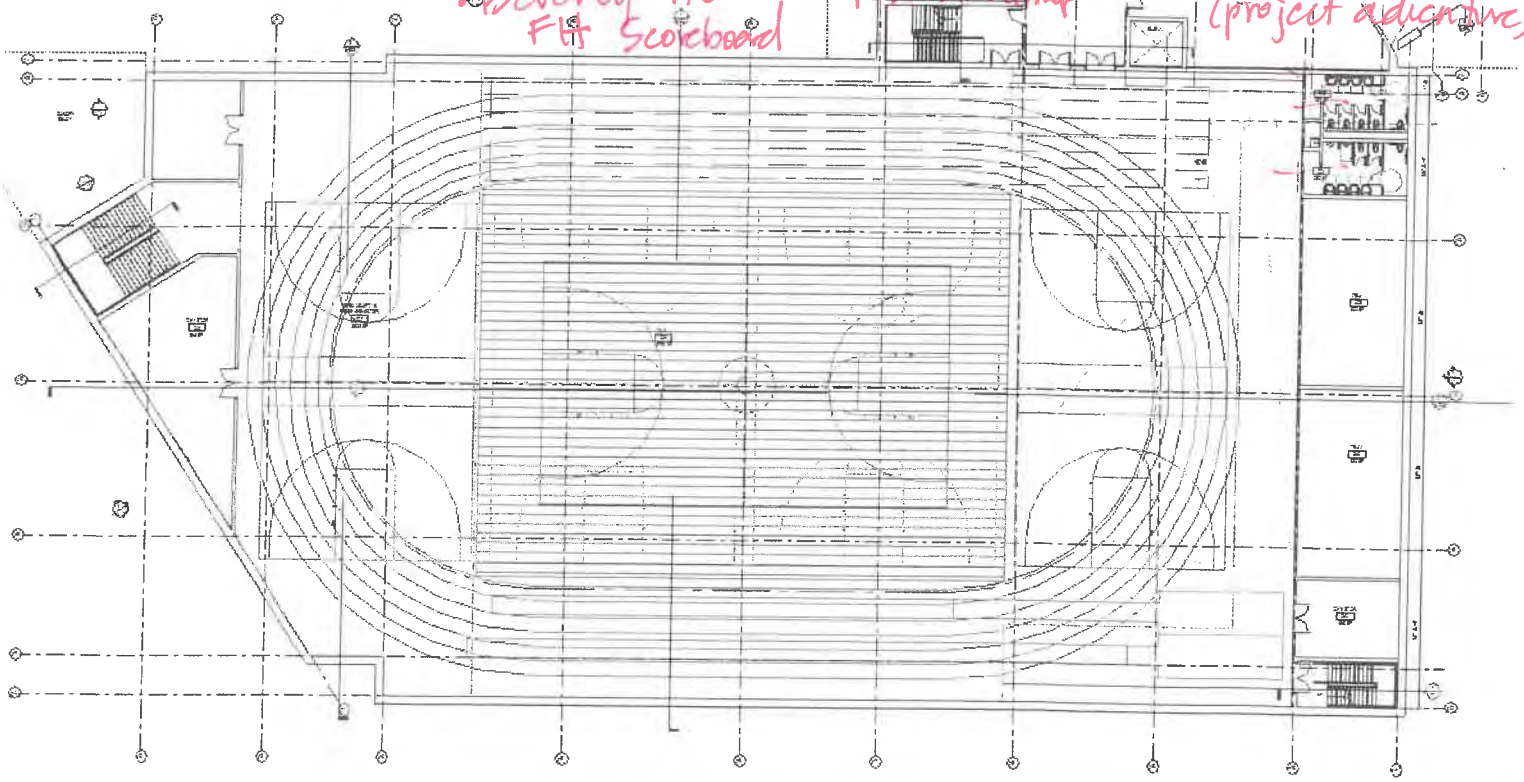
- hitters Cage
- Softball Cage
- Wrestling Mat
- Net for shot put?
- Lateral climbing (project adjacency)

- Ropes / Rings
- Carbon Fiber VB 4 cross + 1 long

3 scoreboard locations all score + shot clock

2 Ladders for Refs.

Beverly HS Fit Scoreboard



- ADD STORAGE ROOM - ACCESS FROM OUTSIDE.
- MANAGE EXITS.
- KEEP WORKING ON BLEACHERS.

Lowell High School

November 2018

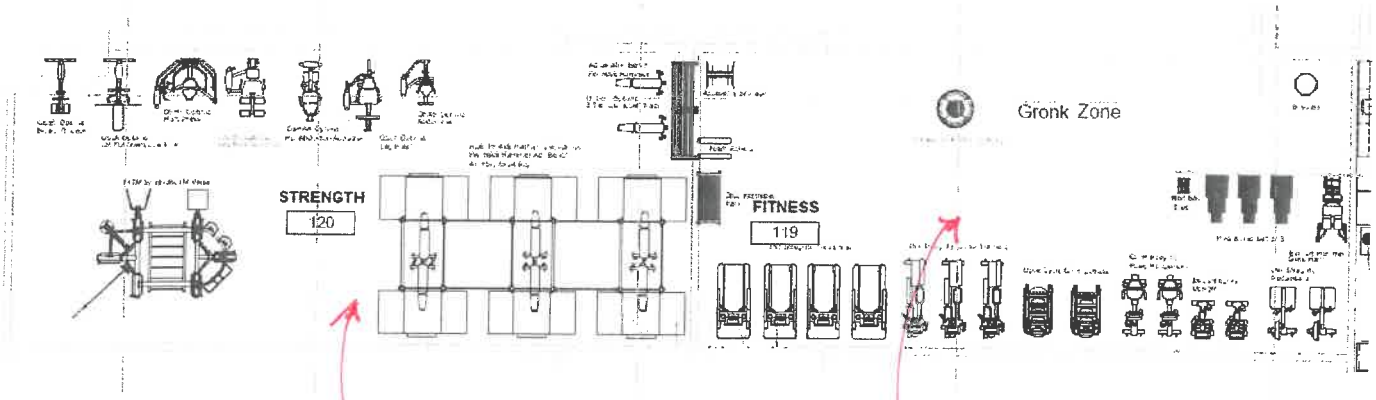
STRENGTH & FITNESS

FUNCTIONAL CRITERIA
Description: Gymnasium
Area: 3,000SF
Quantity: Divided into two- Strength & Fitness
Occupants: --

LOCATION/ORIENTATION CRITERIA
Users: Teachers/Staff/Students/Parents/Public
Adjacencies: Gymnasium, Lockers, Trainer
Orientation: North
Views: Yes

TECHNICAL CRITERIA
Floor/Base: Rubber Athletic Flooring
Walls: CMU painted walls
Ceiling: Painted Exposed
Doors: solid wood doors
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED Pendants
Power: convenience outlets
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

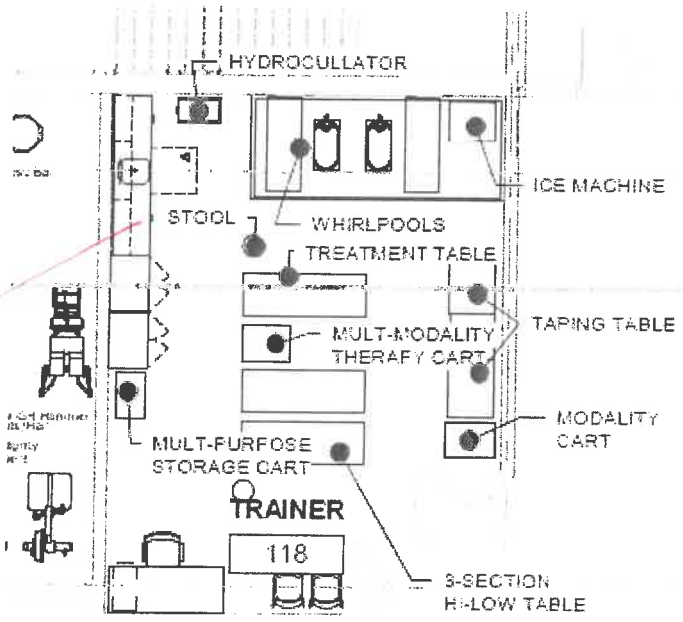
TRAINING ROOM

FUNCTIONAL CRITERIA
Description: Athletic Training Room
Area: approx. 600SF
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA
Users: Teachers/Staff/Students
Adjacencies: Gym, Strength/Fitness, Locker Rooms
Orientation: North
Views: Yes

TECHNICAL CRITERIA
Floor/Base: Rubber Athletic Flooring
Walls: CMU painted walls
Ceiling: Painted Exposed
Doors: solid wood doors
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED Pendants
Power: convenience outlets
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Lowell High School

November 2018

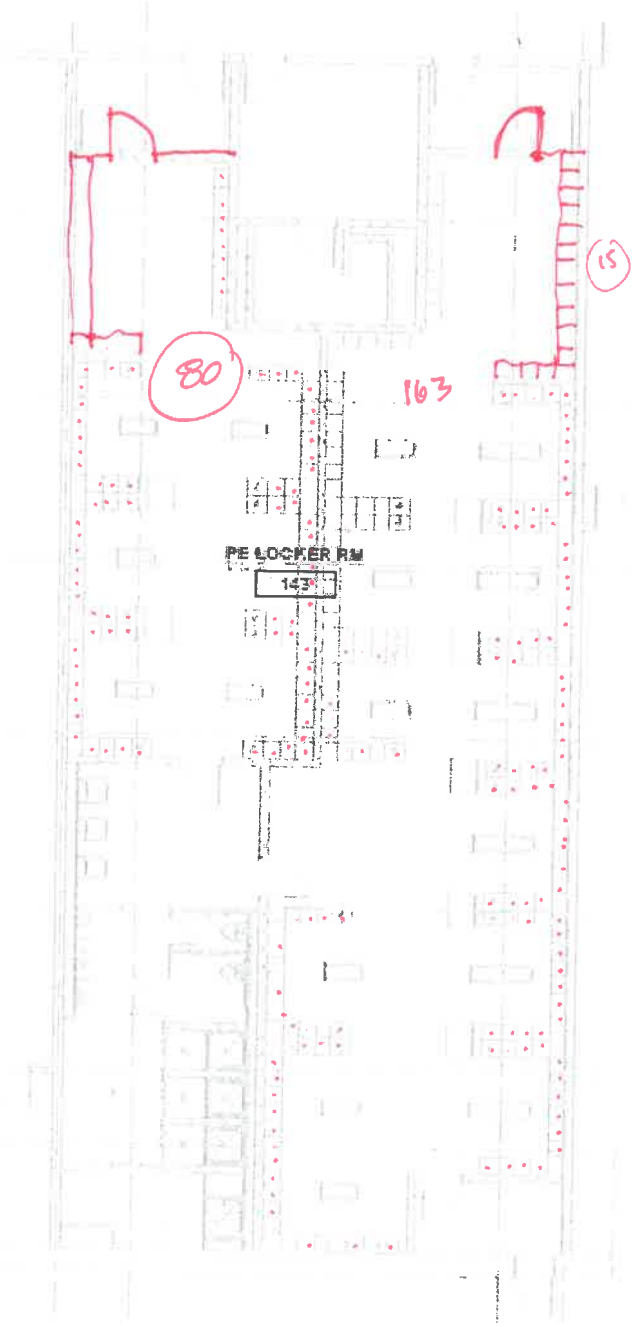
LOCKER ROOM

FUNCTIONAL CRITERIA
Description: PE & Athletic Locker Rooms
Area: approx. 3600sf
Quantity: 2
Occupants: -

LOCATION/ORIENTATION CRITERIA
Users: Students, teachers, coaches
Adjacencies: Gym, Strength/Fitness, Wrestling
Orientation: -
Views: No

TECHNICAL CRITERIA
Floor/Base: epoxy floors and base
Walls: CMU, painted
Ceiling: MR gypsum drywall
Door/Frame: solid wood doors
Windows: -
Lighting: LED inlay direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets as required
Data/Com: TBD
Security: TBD
Acoustical: -
Mechanical: Displacement Ventilation
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS
Casework: -
Furnishings: -
Equipment: -
Storage: -



Reference

9 classes @ 35 = 315

243

Lowell High School **November 2018**

MULTI-PURPOSE/WRESTLING

FUNCTIONAL CRITERIA

Description:	Gymnasium
Area:	approx. 6500sf (3000sf + 3500sf)
Quantity:	One multi-purpose 3000sf gym, one 3,500sf wrestling gym
Occupants:	--

LOCATION/ORIENTATION CRITERIA

Users:	Teachers/Staff/Students/Parents/Public
Adjacencies:	Gym, Strength/Fitness, Locker Rooms
Orientation:	-
Views:	-

TECHNICAL CRITERIA

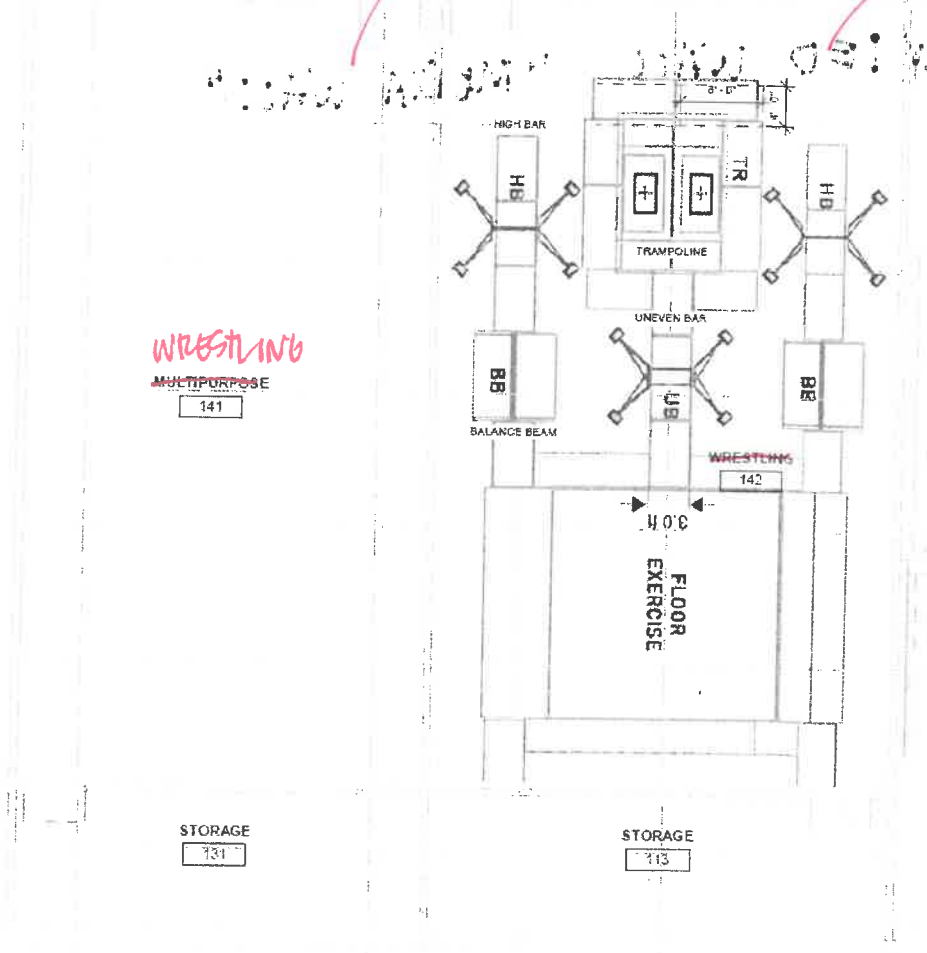
Floor/Base:	Rubber Athletic Flooring
Walls:	CMU; painted
Ceiling:	Painted Exposed
Door/Frame:	solid wood doors
Windows:	-

Lighting:	LED Pendants
Power:	convenience outlets
Data/Com:	telephone, intercom, wireless access point, local sound system & wireless clock
Security:	TBD
Acoustical:	sound absorbing deck and wall treatment
Mechanical:	Displacement Ventilation
Plumb/Fire:	speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework:	-
Furnishings:	
Equipment:	
Storage:	

AUDIO AUDIO



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PERKINS EASTMAN

MEETING RECORD

Perkins Eastman
Architects DPC

Date Prepared	12/26/2018	
Project Name	Lowell High School	
Project Number	67150	
Subject	Safety/Security	
Meeting Location	City Hall, Mayors Reception Room	
Meeting Date	12/10/2018	
Prepared By	Robert Bell	r.bell@perkinseastman.com
	T: Telephone Number	F: Fax Number
Participants	City of Lowell (Kara Keefe Mullin, Diane Tradd, Alex Mc, Christine Clancy, Sarah Brown) Lowell High School (Marianne Busteed, Roxane Howe, Rick Underwood) Lowell Police/Fire (David Peaslee – LPD/SRO) Owners Project Manager (MaryAnn Williams & Jim Dowd - Skanska) Design Team (Joe Drown & Robert Bell – Perkins Eastman, David Pereira – GGD) Safety/Security (Michael Dorn – Safe Havens International)	

AGENDA ITEMS		NOTES
3.1	Introductions	
3.2	Project Overview	• RB provided a verbal description of perimeter control and access control and new security set-up • Current plans are good for natural visibility, stairwells with doors on hold-opens, air-port style open bathrooms and layers of lockdown. • Systems types/equip and capabilities is constantly improving. We are not locking down exact choices now, just identifying scope and providing costs. • Nurse remains in a good, central location but needs a semi-private route for emergency/gurney access • Total of 8 security, with 1 second shift, 1 dedicated to lobby, 1 at FA and 6 mobile; may want to dedicate 1 at the Aud. lobby/entry (since FA won't be needed) and have a second badging area.
3.3	Perimeter	• Along Father Morrissette Blvd. consider raised planters which can double as a seat wall and provide protection from vehicular traffic. • The courtyard is secured by fencing and access gates which are closed during the school day. Michael Dorn, MD suggested to consider the feeling the fencing creates and presented examples of fencing options that are welcoming.

3.4	Access/Control	• Doors are open for student morning arrival then are locked. All entries after student arrival take place at the main entrance. There are currently 8 security staff. Sometimes parents arrive at the main entrance of the 1922 building and it would be good to have a video phone at other doors to direct people to the main entrance. A concerned raised was that after a person is buzzed in sometimes people hold the door for others behind them. The new design will have a security vestibule and adjacent security office for controlled access into the school. The vestibule and the security office will have ballistic resistant glass. • In the 1922 building there is concern that students let people in or that students may leave the building. Providing delayed access panic devices could help this issue but the school department thought that option would interfere with classes. A better option is to provide a door switch indicator will trip an alarm to the security office. The project is planning to utilize Vigilon security cameras analytics capability which allows the camera system to follow a person after an alarm is tripped. • Adding better signage and intercom/buzzer with visual at the secondary entry/exit points would help. Staff would have fob/card key access. • Controlling students skipping class is also a major issue that could be addressed better with analytics • Question about main entry access and if buzzer for both sets of doors in the vestibule; Answer, yes. • Question about the need to address the side doors and how to prevent students from letting others in; Answer to provide alarm/camera to alert security.
3.5	Interior Doors	• All interior doors in corridors and stairwells are planned to be on magnetic hold opens wired into the fire alarm and security system. During lockdown security doors and fire doors close but always allow emergency egress. • JD asked MD his recommendation for classroom door lock function. MD responded they recommend a maintenance lock function which requires key in from the corridor and always allows egress from the classroom side. They do not recommend thumb lock or key lock from the inside due to stress involved in a lockdown situation and to reduce risk of assault/abuse by anyone who could lock someone inside with them • SHI promotes windows on the doors and not blinds (which signals hiding if closed). SHI also points out out-of-sight markings on floors can be a concern. Fellow students will know, furniture/classroom layout will compromise and, that only works from corridor-side; not from exterior. • School's preference is doors opening into classroom; it keeps door/swings from impeding hallway, is in-line with their protocol for barricading, promotes ability to leave open for eyes/ears on corr. Doors could still be automatically locked from corridor-side when shut and opened with a key or fob. • The future may have advances in technology and lower costs that would allow fob/proximity access control. ➢ GGD to price proximity card access control to CR's?
3.6	Safe/Retreat Rooms	• "Safer Rooms" are recommended throughout the building within the distributed administration suites to provide staff a path of retreat from an escalating situation.

3.7	Communications	• MD suggested placement of the classroom phone away from the entry door so that in the event of an emergency teachers and students can be out of sight.
3.8	Visibility & Surveillance	• SHI promotes windows on the doors and not blinds (which signals hiding if closed). SHI also points out out-of-sight markings on floors can be a concern. Fellow students will know, furniture/classroom layout will compromise and, that only works from corridor-side; not from exterior. • Cameras with audio and visual analytics would allow communication to that point as well as having cameras follow the individual through the building. If a group comes through… you could track one, but all would be on camera(s). These systems also keep records ➢ Need GGD to include scope of door position switch tied to camera audio/visual analytics.
3.7	School Culture/Climate	• The behavioral side of safety/security is the most important. LHS already has a lot of work being done on the social emotional and behavioral side. • The ideal is to build layers of safety, where active camera systems help identify threats or behavior, where security staff are trained to see/diagnose and teachers/students communicate and those at risk or unusual behavior is read/relayed. • Parent/adult programs to recognize behavior would be good, but the ones that need it most probably wouldn't take advantage of these • What else can be done to avoid groups and individuals from compromising security (student education, teacher training, threat assessment and suicide prevention. There are twice as many fatalities from suicide than from an active shooter. • An important aspect for safety is building ownership, pride and connectivity – Prison-like facilities create prison-like behavior – Avoid institutional/static appearance – Bring art work, color and joyful • SHI – presented examples of use of color, murals and celebration of students while layering in security. Also spoke about the need for glass into spaces to provide safety from inappropriate behavior, sexual predators and bullying/abuse. • The colors and type of fencing, must not feel like containment, but more of an aesthetic feature. The media wall will be an important feature to help build community and culture within. Critical to a safe school. • MD identified that 92% of school homicides are fights related to gang activity which can be identified when trained through pre-attack patterns of behavior. • MD noted that school mental health support systems are critical components in the safety and security system. • MD discussed another area which is now receiving important attention is positive messaging. Consider introduce opportunities for murals or pictures of students that are regularly rotated. BB noted that the project is planning to provide a large media wall at the main entrance which can be incorporated into the messaging effort
3.8	Other Notes	• One switch, HVAC shut-off capability • MD noted that police are now carrying tourniquets and recommends placing them in alarmed AED cabinets.

PERKINS EASTMAN

SCHOOL WALK-THROUGH (MD, RH, JD & RB)		NOTES
W1	During Construction	• Phasing for emergency plans & communication systems will be needed
W2	Entry/Approach	• Reconfigure security for visual access of approach • Connect Security, SRO & Dare (allow retreat space) • 'mark' single door (each side of campus?) as daytime use
W3	Surveillance	• Security to have monitors and ability to watch/follow visitors • Smart cameras with analytics can track an individual through the building
W4	Fire Alarm Use as Threat	• Delayed alarm with manual override? • Maybe have camera/communication at pulls • SHI suggests contacting Littleton Colorado for smart fire alarms
W5	Heart/Identity	• Focus on welcoming elements upon entry; media wall is a great idea • Use of banners (flags in caf) to celebrate students and diversity • Own more graphic/mural & display areas throughout
W6	Restrooms	• Air-port style, without doors is spot-on • Murals, art or ownership is good
W7	Stairwells	• Consider mirrors (high) to improve supervision (similar at Library obstructions)
W8	Guardrails	• Clear are preferred for visibility, but extra height to inhibit sniper
W9	Panic Button & Video/Buzzer	• Own at main entry, each admin suite & custodial/receiving • Might be good at little theater too
W10	Ballistic Resistance	• Consider use at SRO/Security, maybe Admin Suites that are on main halls

Next Meeting: TBD

cc: Jim Dowd, Alicia Caritano, Dawn Guarriello

Attachments: None

Lowell High School

Student Educational Visioning Workshop Overview and Notes

On December 5, 2018, approximately 30 Lowell High School students participated in a four-hour Educational Visioning Workshop run by New Vista Design and Perkins Eastman. The workshop was a collaborative session designed to inform the LHS design process. Students were given a project overview and update and then led through a series of visioning activities aimed at capturing their best thinking about LHS's current and future educational goals and priorities, and connecting them to best practices and possibilities in innovative school facility design.

The following topics were explored during the workshop:

- **Project Overview** and parameters
- **Priority Goals** for the renovated and new facility
- **Strengths, Challenges, Opportunities, and Goals (SCOG Analysis)** associated with Lowell High School's current academic program as well as the vision for its new facility
- **21st Century Architectural Design Patterns** for innovative and future ready schools
- **Blue Sky Ideas** for the renovated/new facility
- **Key Spaces and Adjacencies** for the renovated/new facility

The following pages offer a summary of notes taken and information gathered during the workshop. If you would like to add comments or ideas to this evolving narrative please contact Dr. Roxanne Howe at rhowe@lowell.k12.ma.us .

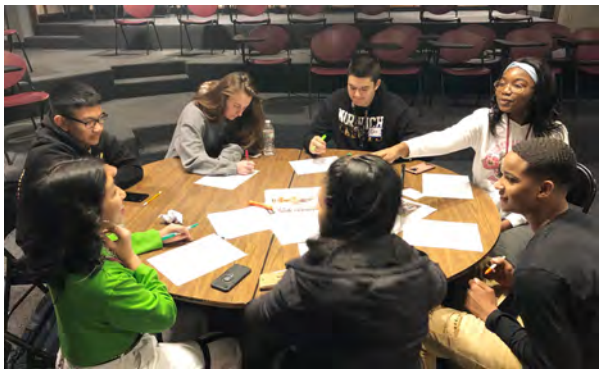
Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

Priority Goals

The following list of Priority Goals for the design of the renovated and new Lowell High School was recorded during the participant introduction section of the Student Educational Visioning Workshop, on December 5, 2018.



- Better security
- More and better Science Labs
- More space and furniture for Culinary
- Heating that works, and cooling
- No more gas leaks
- No more leaking ceilings
- Better and updated technology
- ID policy
- More security guards
- Fix rodent situation
- Wider hallways
- Bigger cafeteria
- Space for group work
- Computer areas within classrooms
- Metal and welding classroom
- Areas for critique
- A Makerspace
- A Chemistry Lab
- A Field House
- Better bathrooms
- Ceilings fixed
- Connect buildings
- No wasp nests
- More storage for art supplies and theater props
- Updated Auditorium and practice space
- Repair of basketball courts and running track
- More practice fields
- A convenience store, like CVS
- Blank walls for display and murals

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

SCOG Analysis

Students conducted a "SCOG Analysis" of what they see as the current strengths, challenges, opportunities and goals with regard to Lowell High School's academic programs and facilities. These are grouped by like-themes below, with the number next to each item indicating the number of times it was mentioned by individual students. Items mentioned only once do not have a number next to them.

STRENGTHS

- Opportunities for students to explore their future/career goals (18 mentions)
  - Vast topics for classes (5)
  - Variety of electives available to students
  - Good education
  - College tours, design workshop, etc.
  - College opportunities
  - Pathways
  - Lots of programs for each kind of student
  - Courses within engineering pathway
- Diversity of interests and culture (17 mentions)
- Broad range of clubs, activities, sports, pathways, etc. (17)
  - Great at including student chosen classes and clubs
  - Student involvement (2)
  - Afterschool curriculars (2)
- Helpful teachers, staff and security guards (10)
  - Staff passion
  - Educators
  - Communications between teachers and students for support
  - Support to students
- History and heritage (8)
  - Historical preservation
- Great at working with Special Ed (7)
  - Specialized programming
  - Special ed. programs
  - Student inclusion
- Size of school (7)
  - Lots of square footage to work with
  - Good hallway size in 1920's building
  - Multiple theaters
  - Large field house
- Athletics (6)
  - Sports program
- Downtown access to many stores and places (5)
  - Connection to small businesses
- Tunnels connecting building help so we don't need to walk outside (3)
- Wonderful resources such as library (3)
  - Tutoring areas in library
- Resources available to help students prepare for school (2)
- Trio/Gear Up (2)
- Some green areas
- Different styles of classroom set-up
- Lots of art displayed in hallways
- Community awareness
- Large community that everyone is a part of
- Inviting to outside influences that are beneficial
- Multiple lunch choices in main café
- ROTC drill

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

SCOG Analysis (continued)

CHALLENGES

- HVAC (16)
  - Heating/cooling (14)
  - Ventilation that affects comfort (2)
- Not enough space for students (12)
  - Hallway congestion (8)
  - Big classes and programs forced into small spaces
  - Congestion at the end of the tunnel and some staircases
  - Small spaces
  - Not enough space for all students
  - Small cafeteria
- Water and gas leaks (11)
  - Broken bubblers (3)
  - Pipes bursting and field house leaking
  - Tunnel leaks
  - Roof leak
  - Poor plumbing
- Sanitation and Maintenance (11)
  - Pest problem (rodent infestation) (6)
  - Dirtiness
  - Unsanitary conditions
  - Maintenance
  - Gym condition
  - Falling Ceilings
- Security (10)
  - Fights (4)
  - Not enough security guards
  - Too many entrances
  - Crime (stealing outdoor furniture/tech)
- Limited Resources (8)
  - Budgeting
  - No group meeting spaces (with white boards for writing down ideas)
  - Limited offerings and student help centers
  - Don't have AP art
  - Limited STEM resources
  - Not enough teachers for classes therefore class size is too big
  - Resources not available to all
  - Funding for all sports (not just football)
- Technology (4)
  - Embedding technology in classrooms
  - Not all classes get same amount of technology
  - Internet connection very weak
- Small locker space (6)
  - Location of lockers (2)
- Bathroom privacy (4)
  - Poor bathrooms
- Natural lighting (4)
  - Dark – not enough light (2)
- Inconvenience of freshman academy separated from other buildings (2)
- General advertising of clubs and activities available (2)
- Organization of classes (2)
- Located downtown – always busy (2)
  - Not private
  - Not enough outside space
- Transportation, like busses (2)
- Practical learning spaces
- Maintaining activities
- Integrating normal classes with special education
- Engaged students in classrooms
- Guidance counselors
- Better student relationships
- Announcing opportunities or volunteering to community
- Students skipping classes

- ID policy

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

SCOG Analysis (continued)

OPPORTUNITIES and GOALS

- Bigger, more flexible facilities (9)
  - Wider hallways (3)
  - Enough space for all clubs and activities (2)
  - Bigger cafeteria
  - More space in the bridge(s)
  - Expand ROTC – one small wing is not enough
- ID scanner to enter/exit building (8)
  - Find better way instead of having ID
  - Use something that isn't as easily lost as ID's
  - ID printer – bus passes intertwined with ID's
- More Courses and Opportunities (7)
  - AP fine arts (3)
  - More mentoring programs and college help (as a class, not just an elective)
  - More AP courses
  - Leadership programs should be valued
  - Metal welding
- Better Technology (7)
  - Don't block so many sites because some are necessary for class, end up slowing down class process (2)
  - Charging stations – in café (2)
  - Rentable technology
  - More internet access
  - Integrate more tech into school system
- Connections to Outdoors (6)
  - More connection to environment and nature
  - Incorporate nature
  - Green spaces
  - Outdoor picnic tables to eat outside to create more space to eat (other than café)
  - Better classroom proximity (related fields)

- Better HVAC (5)
  - Functioning necessities (heat, AC, restrooms, water fountains) (2)

- More light (4)
  - Lots of natural light (2)
  - Big windows with natural light
- New Labs (4)
  - New and updated lab rooms (2)
  - Media studio and labs
  - Inclusive maker space/lab
  - Chemical labs
  - Include certain designs for certain classes, especially the arts and sciences (labs, etc.)
- Sustainable Design (3)
  - Solar panels to decrease costs
- Machine to buy bus tickets (3)
  - LBTA ticket/pass machine
- Better bubblers (3)
- Better bathrooms (3)
  - Ventilation in bathroom
  - Air freshener in bathrooms
- Sound proof walls for band or block of anything noisy (2)

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

SCOG Analysis (continued)

OPPORTUNITIES and GOALS CONTINUED

- Better kitchens – quality over quantity (3)
  - Space for culinary programs
- Auditorium/easier way to bring in risers
- Display cases
- Make it cleaner
- Storage
- Increased security
- Bus just for Lowell High
- Passes for parking access
- Welcoming design (interior/exterior)
- More privacy
- Separation of academics and electives
- Better recruitment of athletes
- Freshman integration
- Student involvement
- Start looking/thinking about college sooner

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

Blue Sky Ideas

The following "Blue Sky" ideas for the design of the renovated and new Lowell High School were recorded during the Student Educational Visioning Workshop on December 5, 2018. Individual participants wrote about their own Blue-Sky Ideas and then shared them with the larger group. Ideas have been grouped together by like-themes.

Blue Sky Ideas, though sometime not feasible due to budget or design constraints, often hold the seeds of aspirational ideas and design approaches that can be implemented on some level within the design.

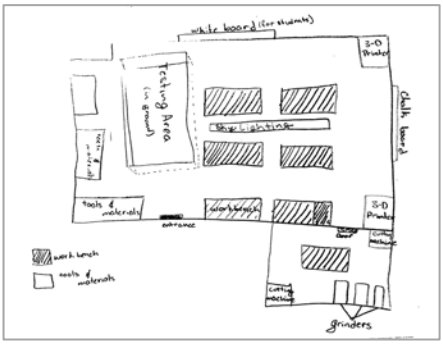


Diagram drawn by student.

Technology

- More internet connection (2)
- Charging station (2)
- Better quality cameras, audio boards, computers
- Bigger teleprompters
- Tech room
  - Can borrow a camera or GoPro
  - USB and ports
  - Multiple 3-D printers, free to use on certain days

Parking and Driving

- Drivers ed. program (2)
- Connect the parking with the building to make it easier to get to school and parking
- School owned parking garage
- Dedicated area for buses
- More buses to relieve congestion on buses

Ease of Use

- Larger practice area for the JROTC
- ATM machine
- Have an alternative to ID's – people forget to bring them
- Storage

Bathrooms

- Fancy bathrooms in the basement with more modern things
- Bathroom privacy

Design

- Open campus (to a degree) that allows a free period for students to ask about extra-curricular activities, etc.
  - All within reasonable rules, safe, but not overbearing

Aquarium

- Not a big one, but little one
- Walking through halls you see fish tanks
- An area where you can sit and enjoy looking at it

General critique room

- Students can put in their work, leave it there and come back with constructive criticism
- Essays, paper, art, music
- A way for students to get anonymous critiques
- Couches and a white board with magnets

School Store

- That sells more than some clothes and snacks – sell things like student made products
- Thrift store where students can sell or give away old books and use that money for new ones

Blue Sky Ideas Continued

Courtyard
- Open to all students

Fashion Design Room
- With sewing machines, storage room, layouts of basic clothing designs, mannequins, glass cases that show each individual's custom piece, and a runway/catwalk with spotlights

Student Lounge
- Study hall rooms where people can do homework
- Not rooms where people talk and gossip

A Movie Theater
- That kids can go to once in a while to release stress

Better sound Isolation
- In the band room, with much more space

Wide corridors

New Tunnels (Bridges)
- That have clear glass and doesn't leak
- Connect the FA as the current 2 buildings are connected. Possibly to be a dedicated science center

Lighting
- More windows that allow daylight into the classes
- More lights in hallways
- Lights with dimmers

Display and Exhibition
- Display of student work so that when people come to visit the school they can see all the achievements
- Murals of each graduating class
- Include public art on walls

Comfortable Classrooms
- Big classrooms
- Regroup the classes to make it easier for students to navigate
- Put academic classes together, foreign languages together, and fine arts together
- Comfortable and safe classrooms with comfortable chairs that are soft and laid back
- Board is as big as a movie theater screen and everything is nice and colorful
- Smart board next to regular white board
- Classroom thermostats
- Good ventilation that allows for air circulation to flow from room to outside

Access to Food
- Vending machines (2)
  - With frozen yogurt station
- Plaza of different food options in cafeteria
- Restaurant access to students
- Each level of the cafeteria could be a different food style (ex. 1st hot lunch, 2nd – sandwiches)
- Snack bar/café – can be run by students
- Huge snack room with lots of comfy couches, huge soda machines on both ends, and big, bright colors

Computer Lab
- Open computer lab with updated, renovated computers that can all print and work well
- Comfortable furniture and vibrant colors
- Place to go to complete a project or have time to get homework done
- Would mean students didn't have to 'fight' for a computer in the mornings
- More colored printers

Music Studio
- More music studio space – place to record and work on songs and be able to listen and play back what you're doing (2)
- Sound proof room with recording microphone
- Sound proof editing rooms
- Studio you could play with audio tune and add music
- Newest technology used by recording studios
- Scratch board

Blue Sky Ideas Continued

Relaxation and Meditation Spaces

- Area for meditation (2)
- Relaxing room where people can go for 5 minutes
  - Space to relax, study and take a nap

STEM and STEAM

- Large science lab for engineering pathway students with large lab benches that are strong enough to prevent scratches from exacto-blades
  - There would be enough room for large hands on projects and group work done daily
  - TVs would be available and laptops at all times with working internet connection
  - Storage closet that students could access instead of materials shoved on a small bench in the corner
  - Could be part maker space
- Workshop for building big projects like robots or things for architecture
  - All the tools and technology provided in a super advanced area
  - Really comfortable space to be in
- Virtual reality/augmented reality room
  - Would contain computers, open space, a machine that would let you enter a virtual reality. Lets those interested in programming test their abilities in creating a whole world or simulation

Athletics

- Indoor turf soccer field and combine it with a football field
  - This way teams can play indoor when it's cold or rainy outside and people won't get soaked
- Gym just for freshman
- Gymnasium with a track going around the top level, a weight room with natural light – glass windows
- Well-developed sports complex next to school to host all sporting with banners with our schools' accomplishments
  - Have different sports like football and any sport that can use the football field should be on the first floor
  - Weight room for gym class and sports or if students want to go use it after school
  - 3rd floor should have many basketball courts and next floor should just be for track and field
  - Regulation high school track and with field events in the middle and tennis courts can be at the very top
  - Open to the public and to make money off of it and host tournaments for different sports here
  - Each level should have concession stands and a level with baseball fields
- For LHS to actually consider the AFJROTC Drill Team to be a sport, because we're the only national champions

Media Center

- More media access from media studio and televisions in hallways that broadcast or advertise student news, clubs, etc. (1)
- Allow student run segments to showcase student work, voice different opinions or from staff
  - Create closer student-to-student and student-to-staff connections this way
- Be open to all different kinds of opinions as topics, go out and explore clubs and activities
- Green screen and room to film in
- Media center for TV production and filmmaking students (regain studio integration with classes)
- Natural lighting – news cameras and microphone
- Open space
- Projection area
- Editing computers and camera
- Performance area (1)
- More film major teachers (1)

Blue Sky Ideas Continued

Fine Arts Space

- Fine arts area taught by former film majors that teach courses in cinematography, directing, producing, and film work (1)
- Access to equipment to learn film processes and involve the community in work that can be shown to students/school (1)
- Larger area to perform fine arts with a large stage and acting lighting and backgrounds (1)

Programming

- More creative pathways
- More recognition of students going into the military at graduations no matter what branch
- Free period to efficiently use library and study spaces

Recreational Spaces

- Game Room with pool tables and arcades (2)
- A Recreational Room for after school clubs or in school activities
  - Used by clubs to provide activities in a more relaxed and casual setting for less 'robotic' feel
  - Colorful, cerebral wall paint/place for murals by students outlining milestone years (like 1980's wall artwork)
  - More cali-style, related furniture such as reclined chairs, bean chairs, etc.
  - Open after school for students to spend time during the cold winters
  - Speakers and screen for some form of visual entertainment such as school approved/student productions, PG movies, or simply natural scenes with music
- Petting Zoo
- Minecraft Room

Lowell High School

Student Educational Visioning Workshop Notes

December 5, 2018

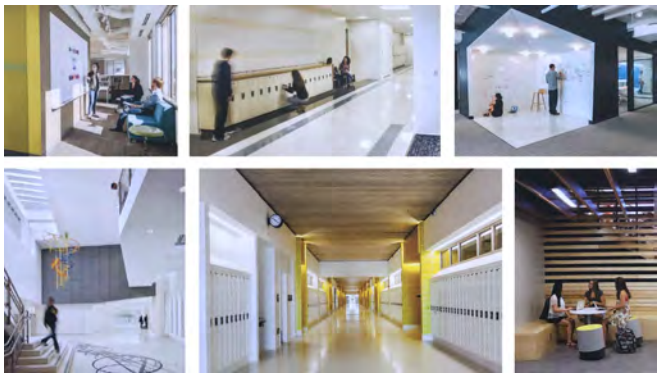
Space Planning Focus Groups

During the final 30 minutes of the December 5, 2018, Student Educational Visioning Workshop, students split into small focus groups to discuss particular design elements and spaces they would like to see within the renovated/new building. The following are the notes that each group put together.

LIGHT WELLS

- Green space
- Verdancy (does this need to be fake or can it be real?)
- Art
- Mediation space
- Terrariums
- Fountain
- Lights (on trees)
- Relaxation space(s)
- Aesthetic Visuals
- Biology experiments
- De-stress zone
- Loft
- Benches
- Environmental Club

CORRIDOR AND INFORMAL LEARNING



- Display and exhibition above lockers and wherever possible
- Murals
- Art on lockers
- Some informal seating areas with couches
- Natural light and electric lighting
- Gray and maroon floor tiles
- Glass above lockers into classrooms
- Gray lockers with maroon outlines
  - That fit backpacks
  - Lights in the lockers
- Maroon and Grey Tile
- Student feed wall
  - Ask questions and get them answered
- Whiteboard for student quotes
- LHS logos
- LHS Hall of Fame with athletic trophies and academic awards

Space Planning Focus Groups Continued

HEART OF SCHOOL

- Huge TV screen and Smartboard
- Colorful setting with natural light
- Small and large gathering area(s)
- Place for presentations and performances
- Big stairs to sit on
- Different size tables
- Study area

IDEAL CLASSROOMS

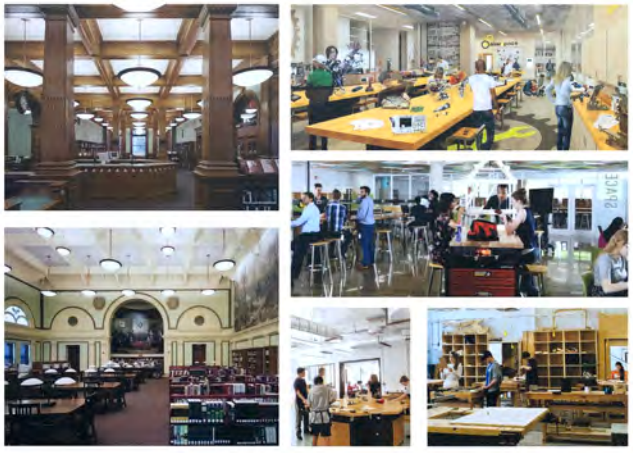
- No basement classrooms
- Lots of natural light
- Windows that can be opened
- Light floor tile to increase light
- Good wi-fi and technology access in every room
- Spacious rooms
- Lounge area with mini couches
- Comfortable, flexible desks and chairs
- Group tables instead of single desks
- Possible breaks during class
- Media board/ Smart Board for agenda and announcements, etc.
- Wireless charging stations
- Plenty of storage

OUTDOOR/QUAD SPACE

- Picnic tables (or others) for lunch
- Some space to sit outside and be protected from inclement weather
- Projection TV
- Intercoms outside
- Should be open to student during summer
- Some way to incorporate a stage for outdoor concerts and events
- Downtown activities can occur there (Winterfest, Folkfest, etc.)
- Turf instead of grass (less maintenance)
- Apple trees, gardens and flowers
- Trees that can survive winter (evergreens/pines)
- Stadium seating
- Sprinklers
- Trampoline

Space Planning Focus Groups Continued

MEDIA LAB



- Natural lighting
- Open spaces
- Projection area
- Editing and computers corner
- Performance area
- Good Internet connections
- Recording Studio with new equipment:
  - Cameras
  - Tripods
  - Microphones
  - Monopods
  - Control panel
  - Playback
  - Prompter
  - TV's
  - Headsets
- Editing rooms/booths
- Labs
- Interview spaces
- Live broadcast Control Room (updated)
- Studio include green screen
- New servers
- Internet access (music!)
- More teachers in studio (they were laid off)
- New computers
- HD quality cameras
- Soundproof rooms
- More pathways for Media
- Better way to advertise program
- Field trips to live shows
- Give students more access to projects outside of school
- New TVs so that students can access the Raider Report

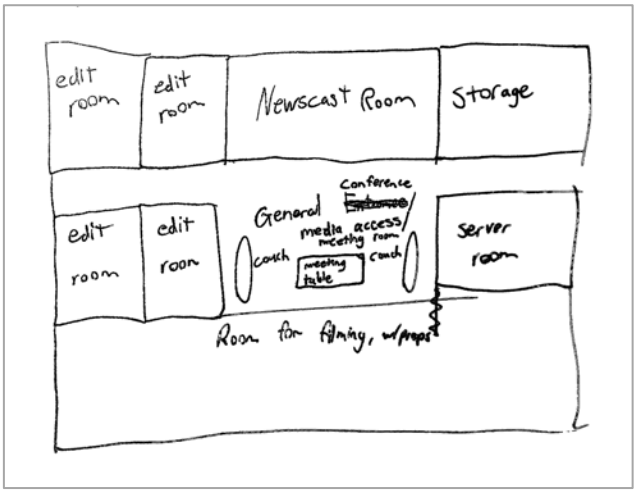


Diagram drawn by student.

PERKINS EASTMAN

LOWELL PLAN

LOWELL HS PROJECT

07 FEBRUARY 2019

LOWELL HIGH SCHOOL

SCHEMATIC DESIGN UPDATE- AGENDA

- PROCESS
- SITE DESIGN
- BUILDING DESIGN
- NEXT STEPS

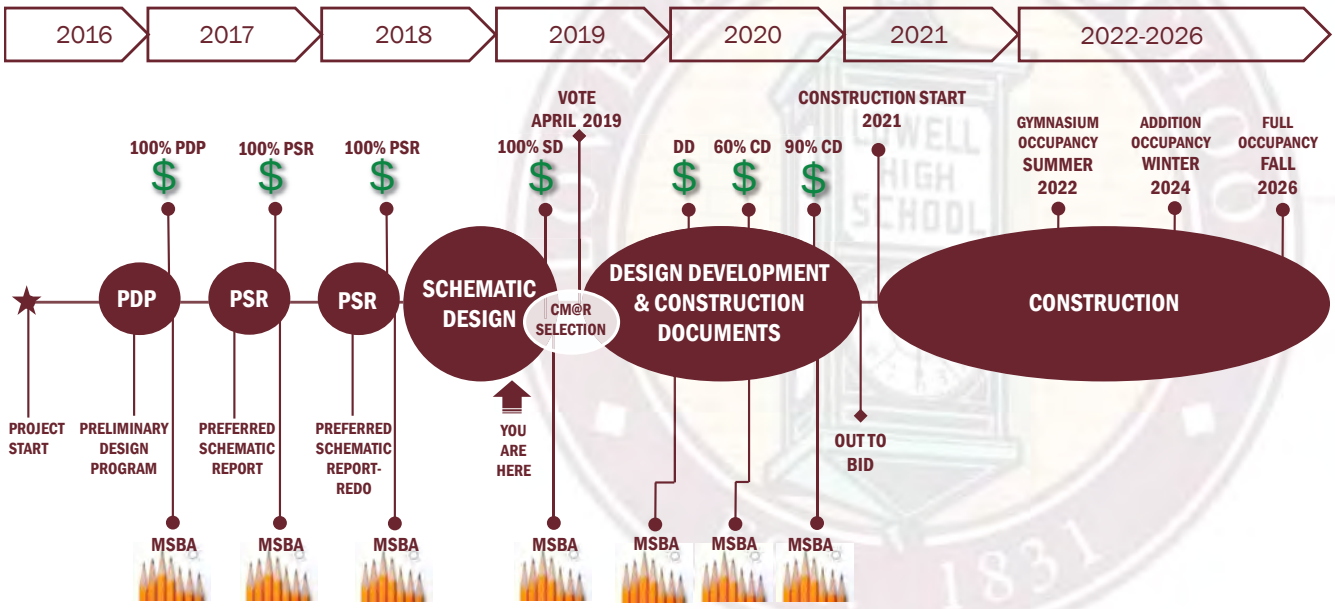
LOWELL HIGH SCHOOL

SCHEMATIC DESIGN RECAP

	AUGUST '18	SEPTEMBER '18	OCTOBER '18	NOVEMBER '18	DECEMBER '18	JANUARY '19
SBC MEETINGS	●	●	●	●		
ELT/WORKING GROUP MEETINGS	● ●	● ●	● ●			
FOCUS GROUP MEETINGS		● ●	● ●			
LOWELL HISTORIC/ NATIONAL PARKS		●	●	●		
ISD/FIRE/POLICE				●		
PLANNING & DEVELOPMENT				●		
EX. CONDITIONS (75 ARCAND)				●		● ●
STUDENT FORUM					●	
SECURITY MTG					●	

LOWELL HIGH SCHOOL

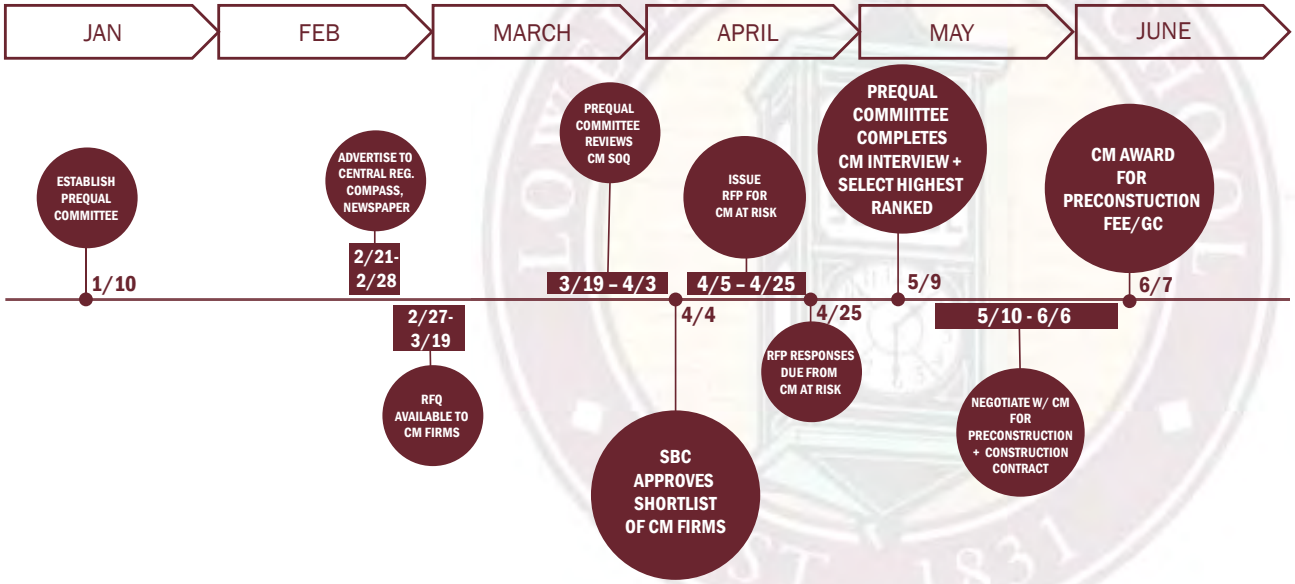
OVERALL SCHEDULE



LOWELL HIGH SCHOOL

CONSTRUCTION MANAGER AT RISK

2019



LOWELL HIGH SCHOOL

AERIAL VIEW OF EXISTING CAMPUS

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

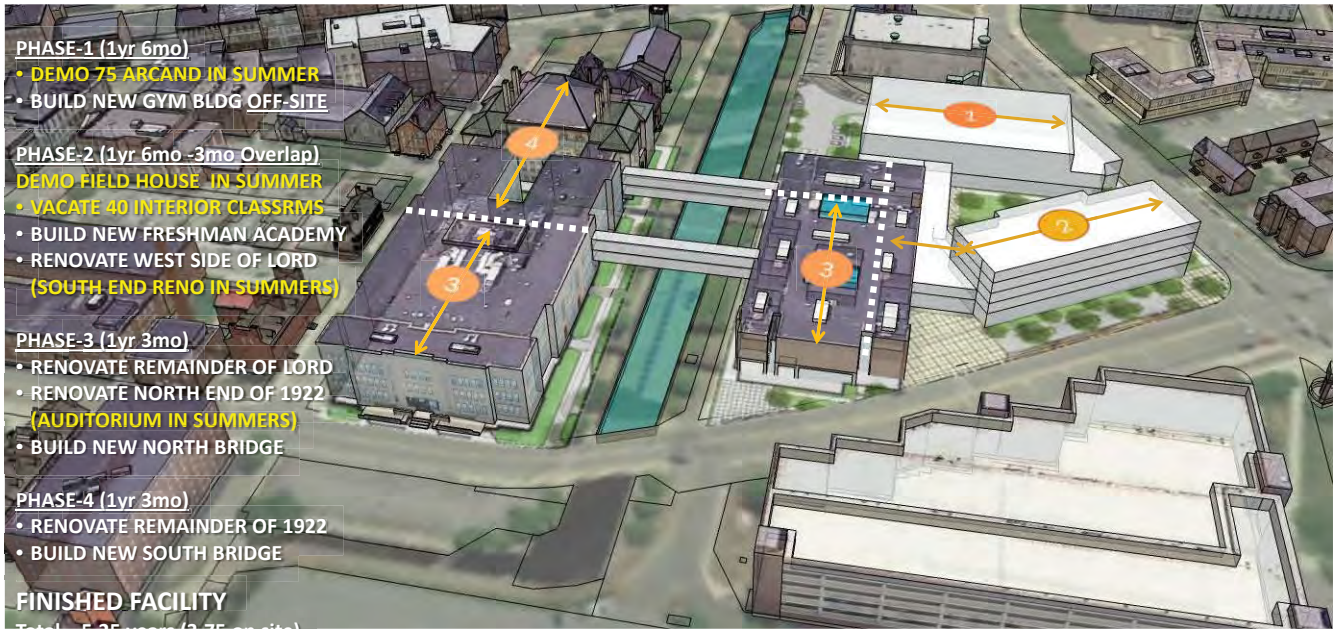
LOWELL HIGH SCHOOL

PROJECT GOALS

- CONNECTED FRESHMEN ACADEMY
- ZONED FOR COMMUNITY USE / LOCK-OFF
  - ACCESS TO MEDIA CENTER & FOOD SERVICE
  - DAYTIME PUBLIC ACCESS
- CREATE HUB/HEART TO THE SCHOOL
- ORGANIZE FOR INTERDISCIPLINARY COLLABORATION
- 9TH GRADE CORE ACADEMIC TEAMS

LOWELL HIGH SCHOOL

PROPOSED PHASING



LANDSCAPE OPPORTUNITIES

"THE LIGHT WELLS"

Tahari Courtyards,
Millburn NJ

Tahari Courtyards,
Millburn NJ

Site Specific Installation,
Velvet Da Vinci San Francisco

LANDSCAPE OPPORTUNITIES

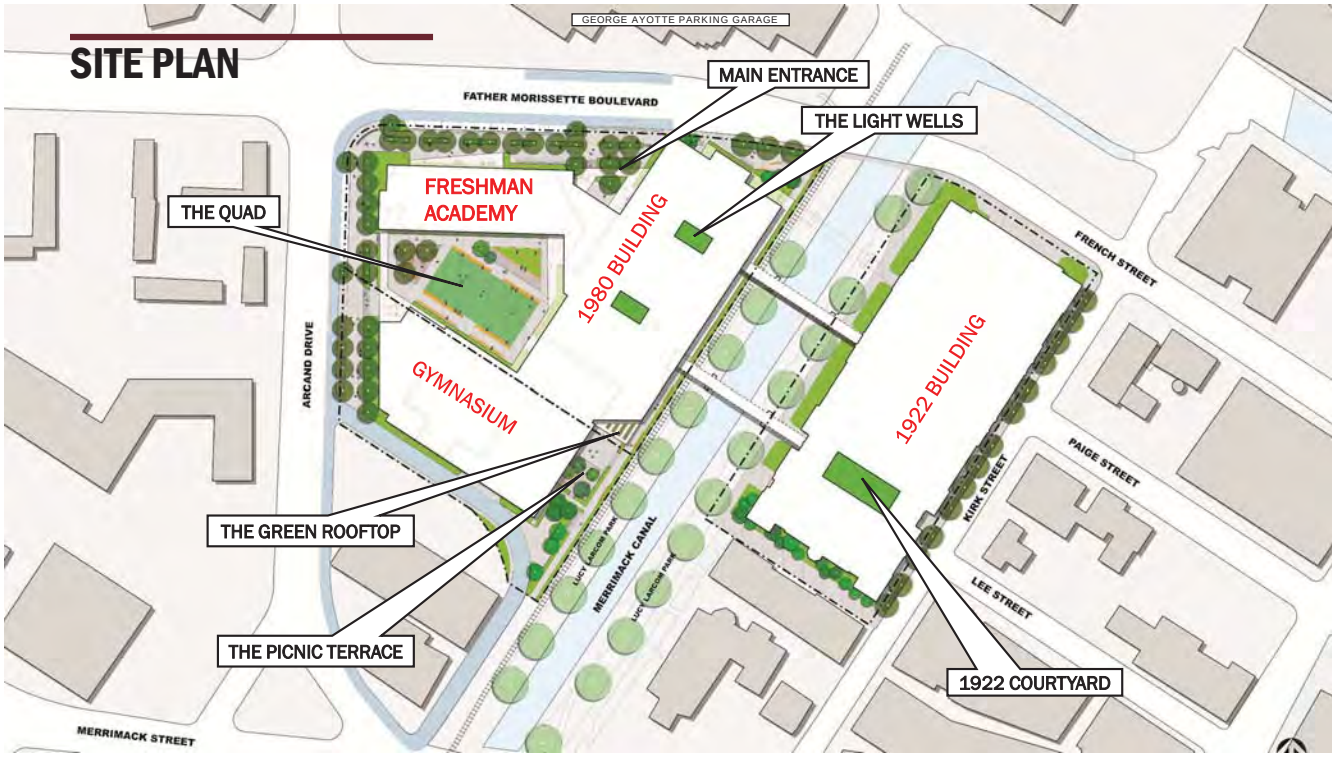
"THE ROOFTOP"

Adelaide High School Roof Terrace,
Adelaide, Australia

Alexandria Center for Life Sciences,
NYC, NY

Fenway Farms,
Boston, MA

SITE PLAN



LANDSCAPE OPPORTUNITIES

MAIN ENTRANCE

LANDSCAPE OPPORTUNITIES

"THE QUAD"

LOWELL HIGH SCHOOL

AERIAL VIEW OF PROPOSED CAMPUS

LOWELL HIGH SCHOOL

FRESHMAN ACADEMY VIEW FROM FATHER MORISSETTE BLVD & ARCAND DRIVE

LOWELL HIGH SCHOOL

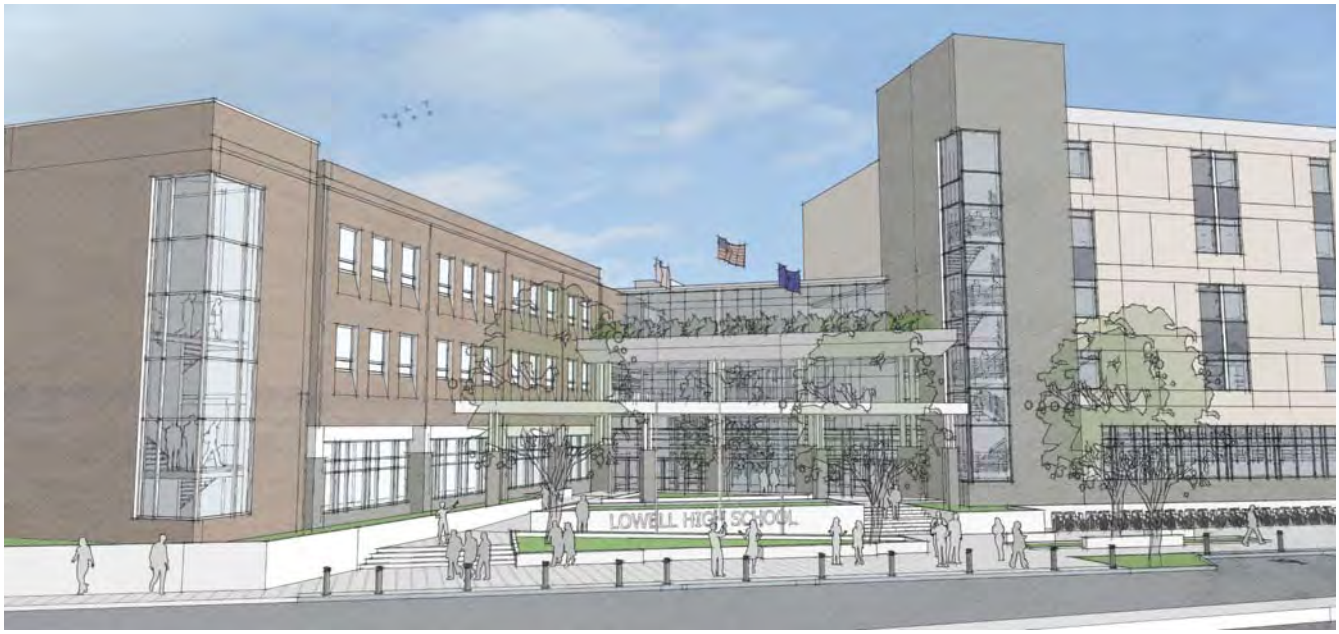
GYMNASIUM VIEW FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW OF GYMNASIUM FROM ARCAND DRIVE

LOWELL HIGH SCHOOL

VIEW TOWARD NEW FRONT ENTRY



LOWELL HIGH SCHOOL

BIRDSEYE VIEW FROM SOUTH

LOWELL HIGH SCHOOL

1922 BUILDING FROM FATHER MORISSETTE

LOWELL HIGH SCHOOL

1922 BUILDING FROM KIRK STREET

LOWELL HIGH SCHOOL

NEXT STEPS

- 2/7 SBC MEETING (VOTE)
- 2/12 CITY COUNCIL MEETING (VOTE)
- 2/20 SCHEMATIC DESIGN SUBMISSION TO MSBA
- 4/10 MSBA BOARD MEETING

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APPENDIX G – SUPPLEMENTAL MATERIALS

- Hazardous Materials Survey Plans (provided by Universal Environmental Consultants)
- Proposed Architectural Wall Type Floor Plans
- Proposed Architectural Program Plans
- Proposed Life Safety Floor Plans
- Proposed Furniture, Furnishings, and Equipment (FF&E) and Technology Equipment Budgets (provided by Point-Line-Space)

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BASEMENT

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

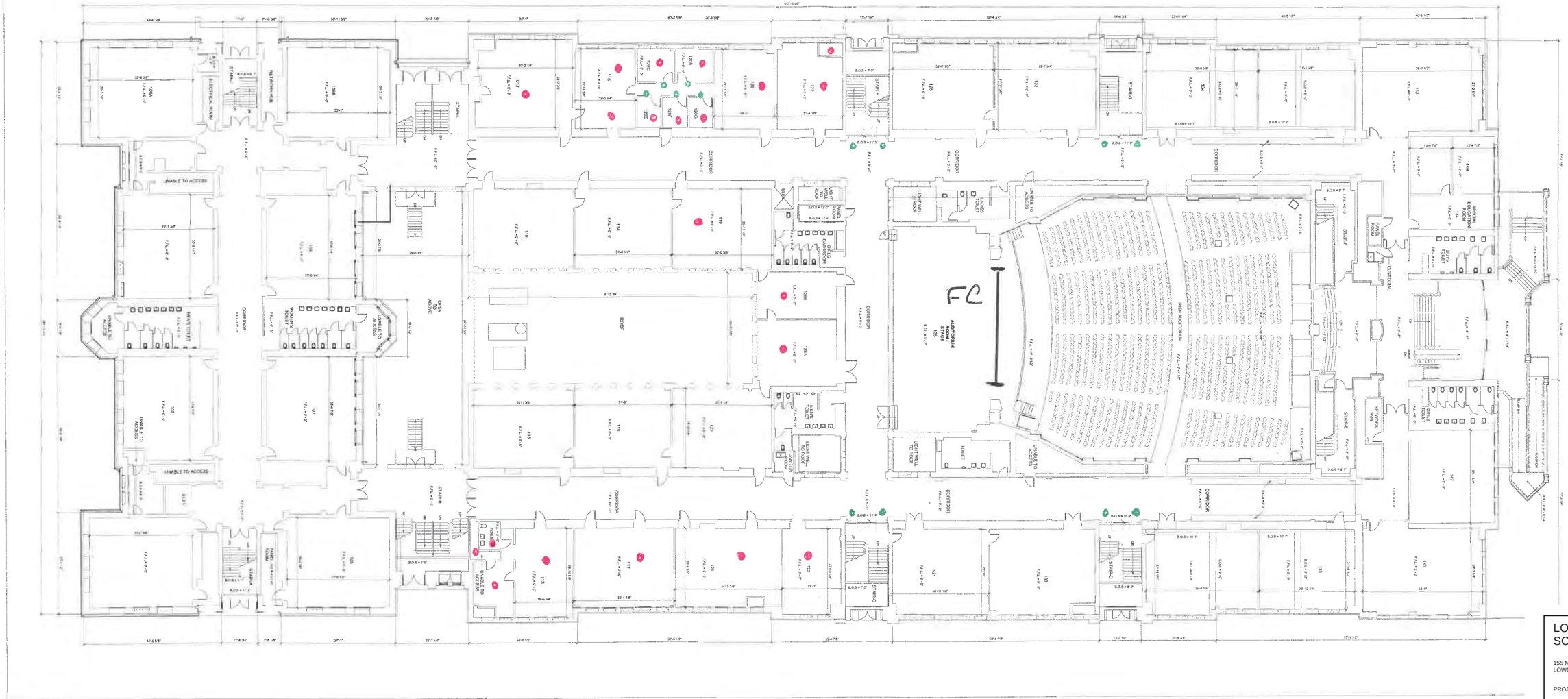
HAZMAT PLAN
EAST BLG
BASEMENT

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-01

SCHEMATIC DESIGN
2/20/2019

FLOOR 1



FC = Fire Curtain

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

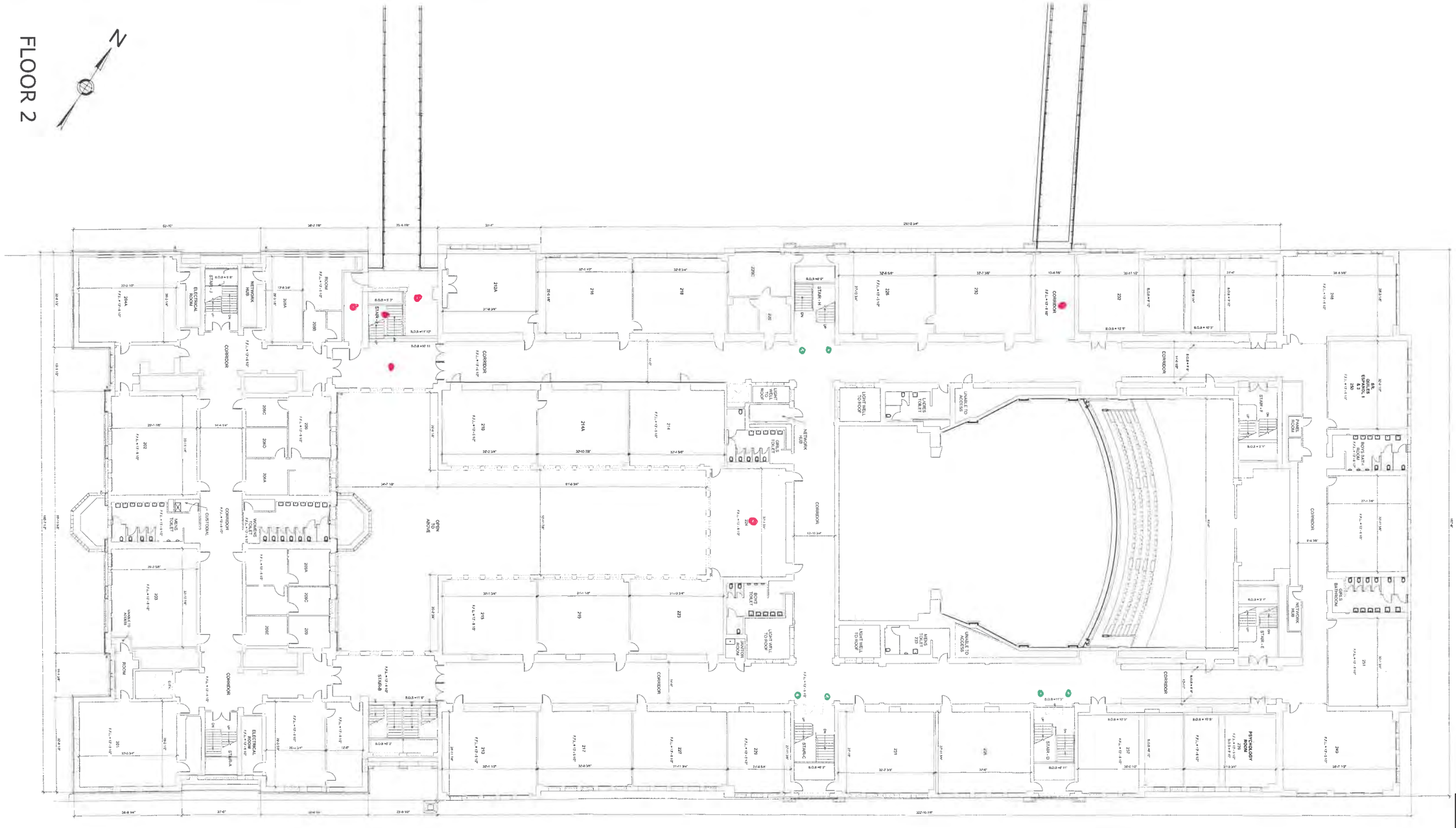
HAZMAT PLAN
EAST BLG
1ST FLOOR

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-02

SCHEMATIC DESIGN
2/20/2019

FLOOR 2



- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

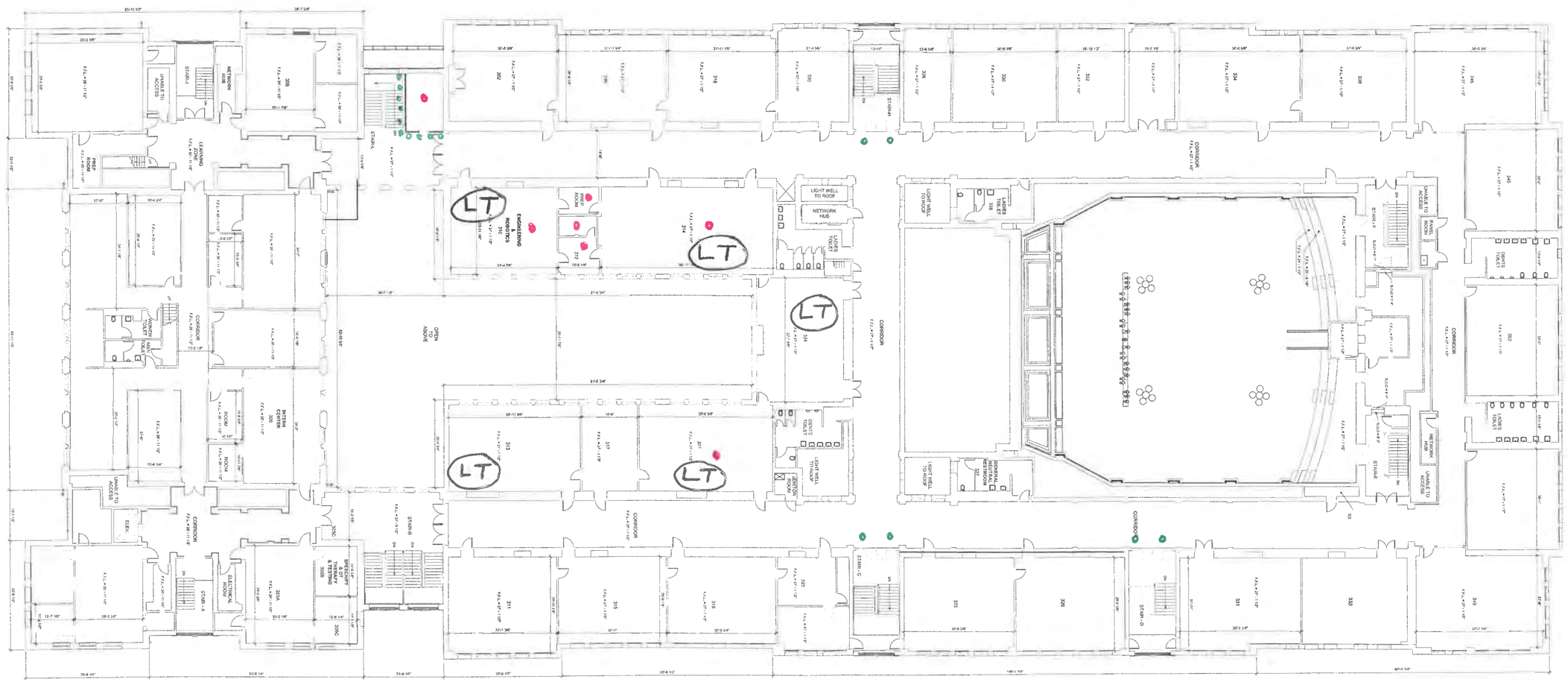
HAZMAT PLAN
EAST BLG
2ND FLOOR

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-03

SCHEMATIC DESIGN
2/20/2019

FLOOR 3



LT= Lab Tables

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
EAST BLG
3RD FLOOR

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-04

SCHEMATIC DESIGN
2/20/2019

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
EAST BLG
ATTIC

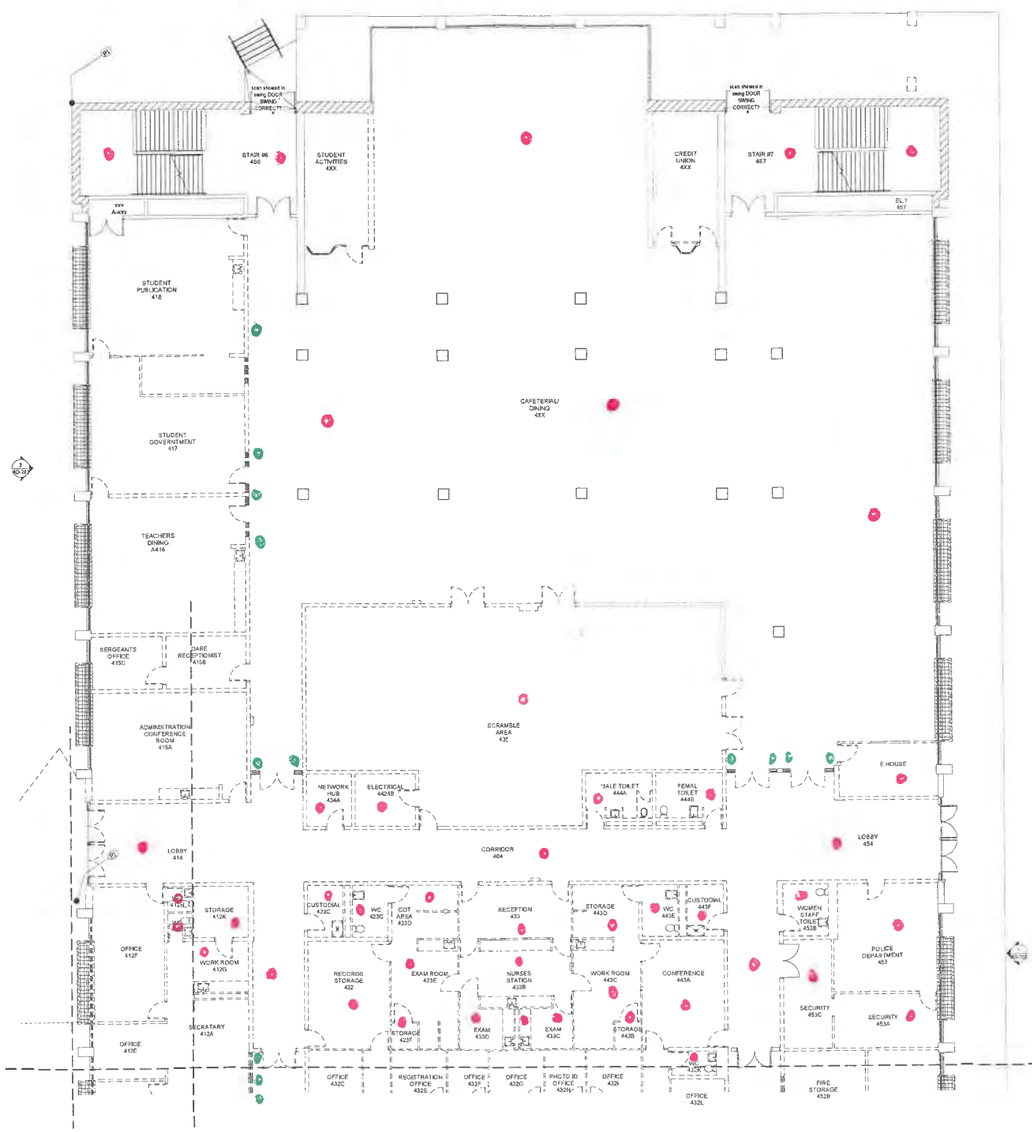
PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-05

SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED), TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 DEMO FIRST FLOOR - WEST BLDG - PART C
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
1ST FLOOR-C

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-06

SCHEMATIC DESIGN
2/20/2019

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DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED

1 **DEMO FIRST FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
1ST FLOOR-D

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-07

SCHEMATIC DESIGN
2/20/2019

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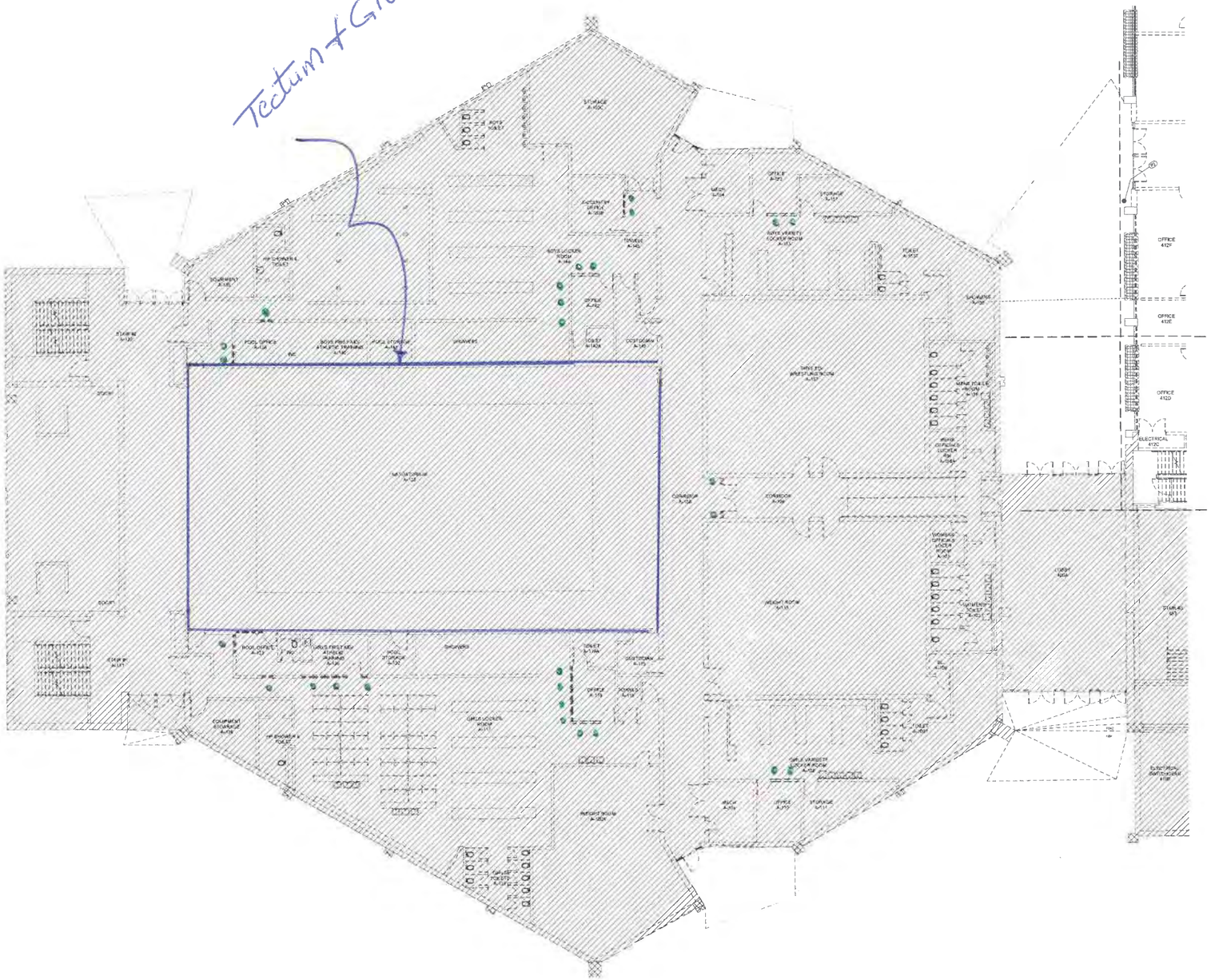
DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED

Tectum + Glue



1 **DEMO FIRST FLOOR - FIELD HOUSE**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
FIELD HOUSE
1ST FLOOR

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-08

SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED

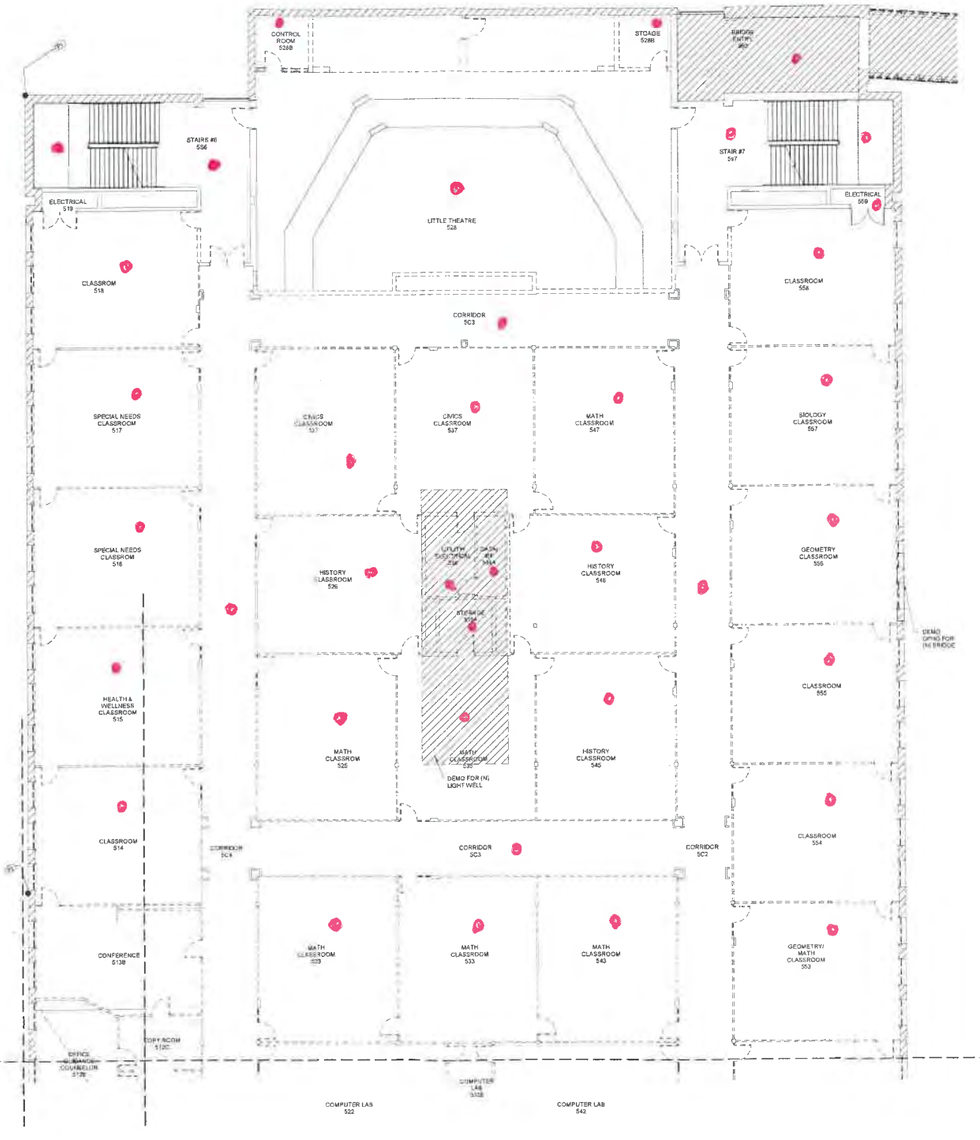
EXISTING DOOR AND FRAME TO BE REMOVED

EXISTING CONSTRUCTION TO REMAIN

AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED

EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED

DEMOLITION LEGEND
12" = 1'-0"



1 **DEMO SECOND FLOOR - WEST BLDG - PART C**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
2ND FLOOR-C

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-09

SCHEMATIC DESIGN
2/20/2019

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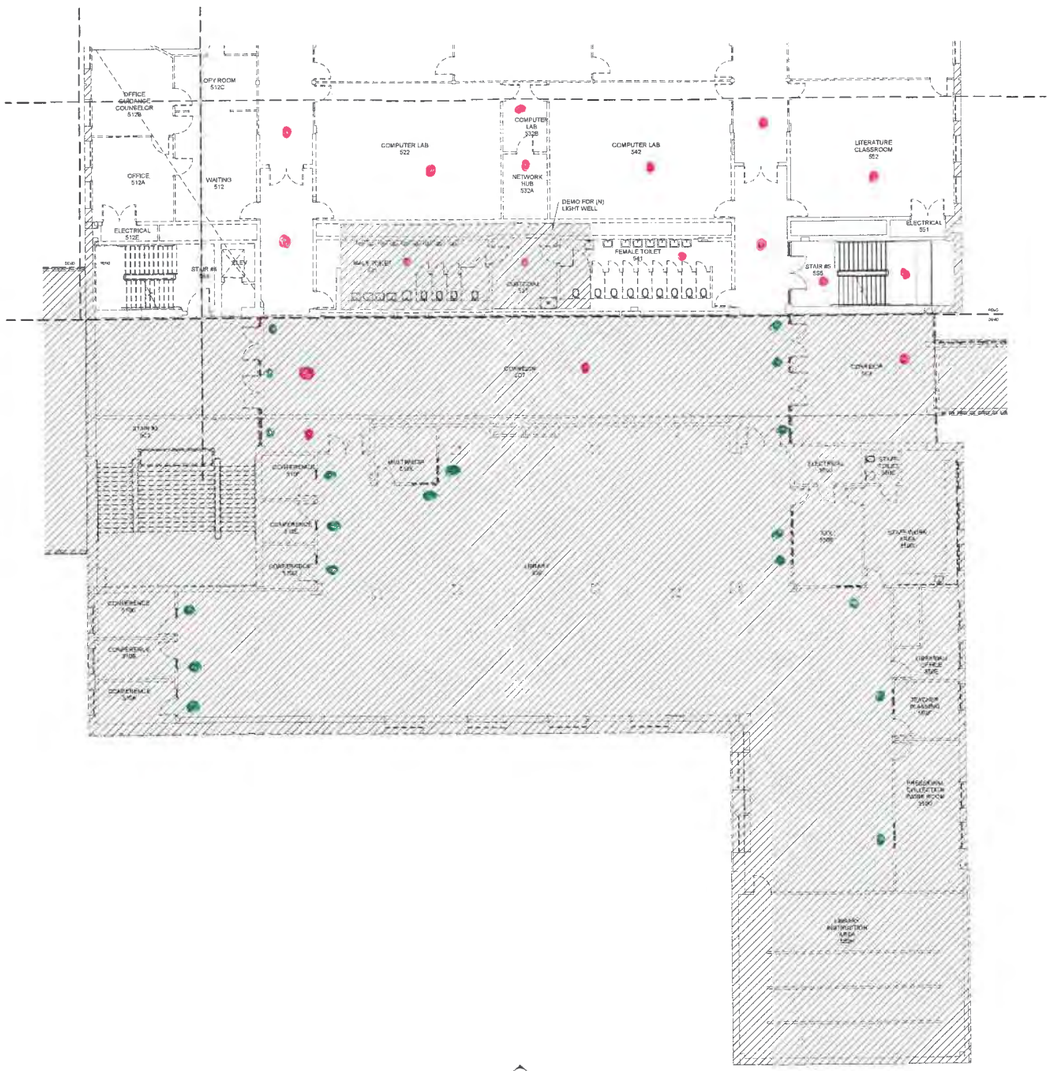
DEMOLITION LEGEND

	EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
	EXISTING DOOR AND FRAME TO BE REMOVED
	EXISTING CONSTRUCTION TO REMAIN
▨	AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
	EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 **DEMO SECOND FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

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● FLOORING MATERIALS

● BORRROWED LITE WINDOWS

✕ PIPE INSULTAITON

LOWELL HIGH
SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
2ND FLOOR-D

PROVIDED BY UNIVERSAL
ENVIROMENTAL
CONSULTANTS

HM-10

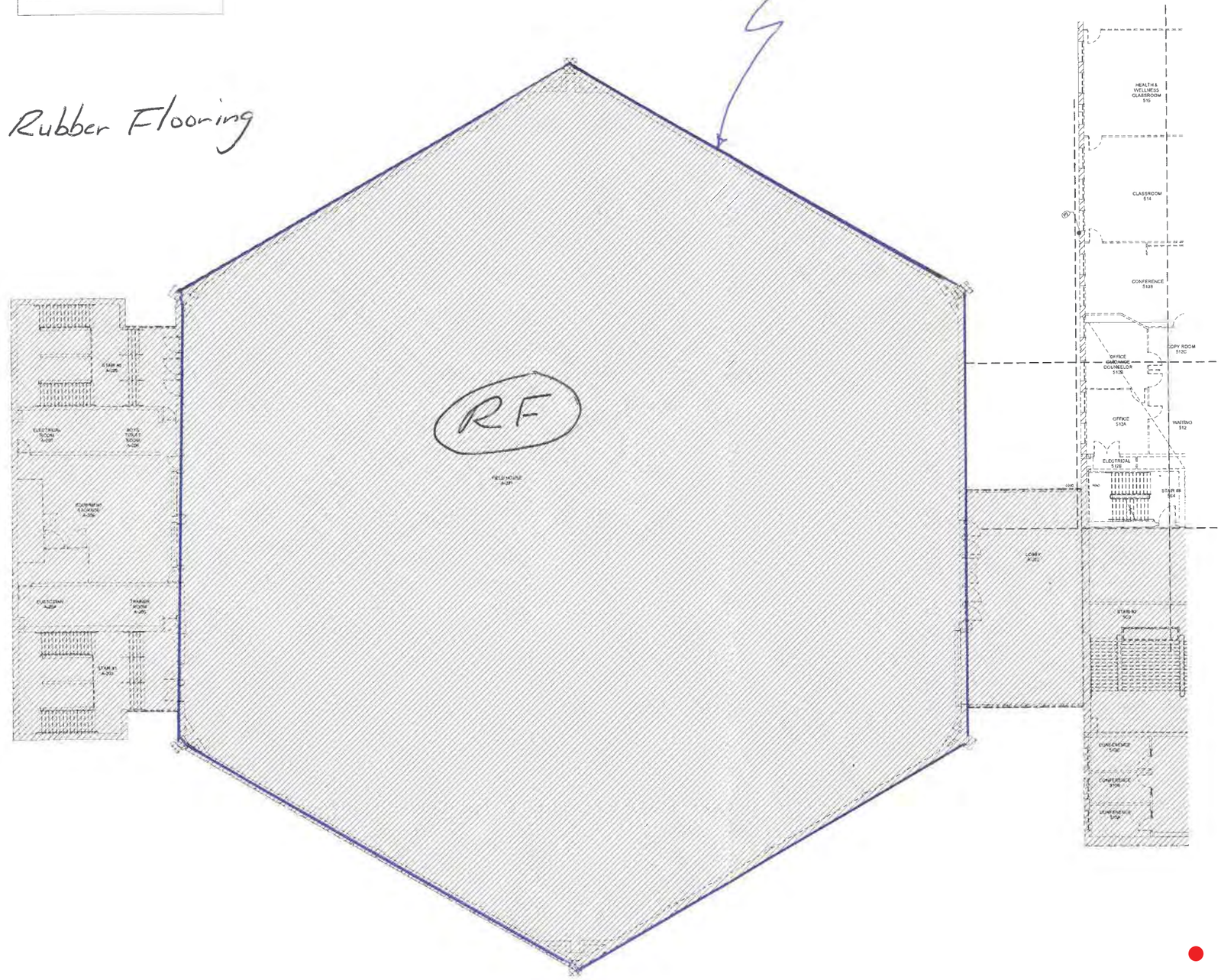
SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED

Tectum + Glue

RF = Rubber Flooring



1 **DEMO SECOND FLOOR - FIELD HOUSE**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

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LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
FIELD HOUSE
2ND FLOOR

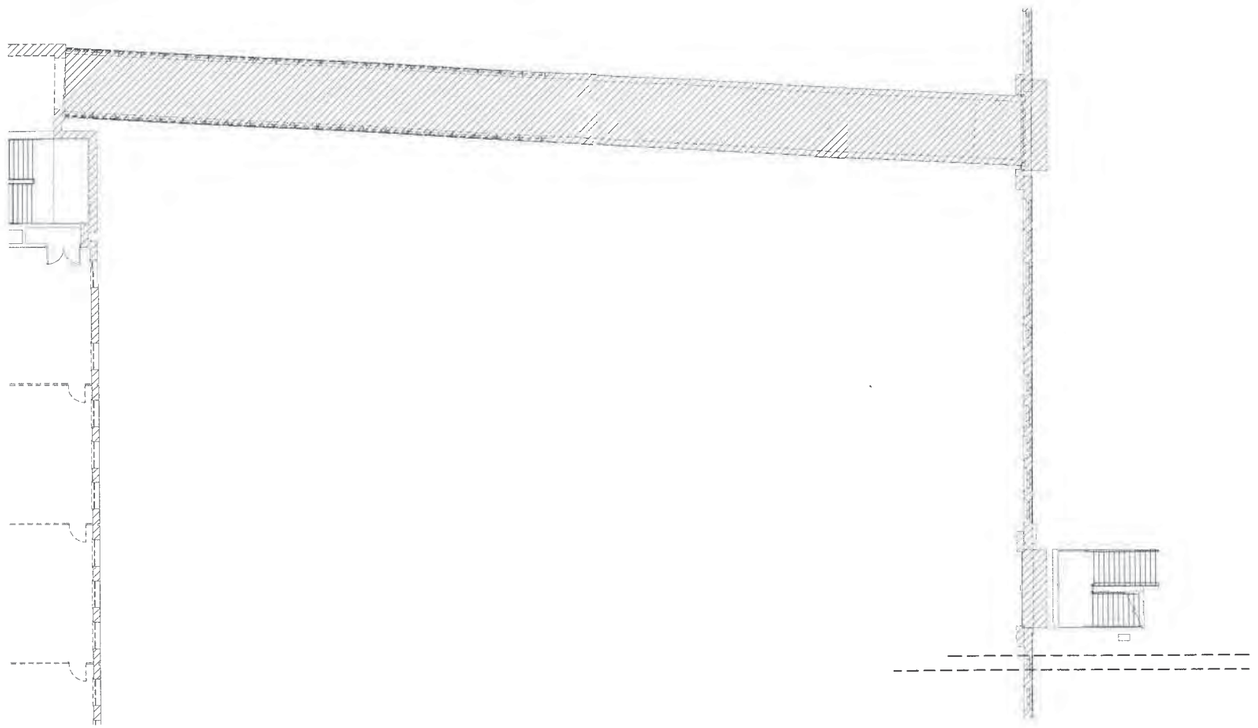
PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-11

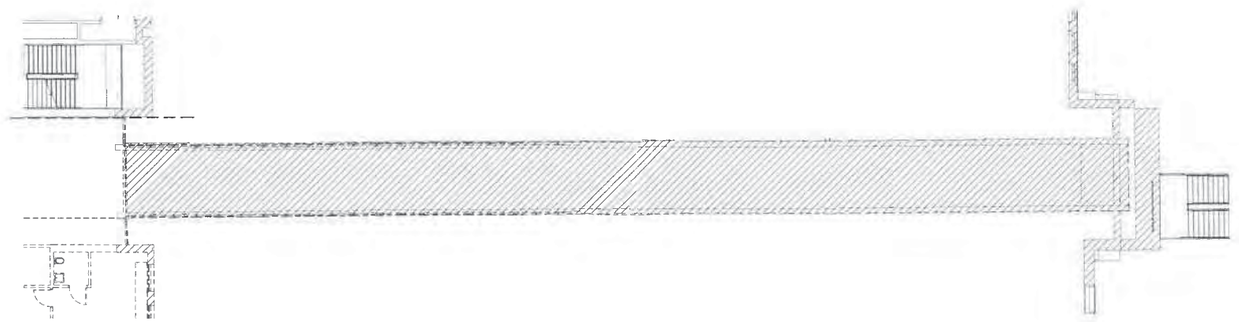
SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



2 **DEMO SECOND FLOOR - NORTH BRIDGE**
1/8" = 1'-0"



1 **DEMO SECOND FLOOR - SOUTH BRIDGE**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
BRIDGES
2ND FLOOR

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-12

SCHEMATIC DESIGN
2/20/2019

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DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED

1 **DEMO THIRD FLOOR - WEST BLDG - PART C**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

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LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
3RD FLOOR-C

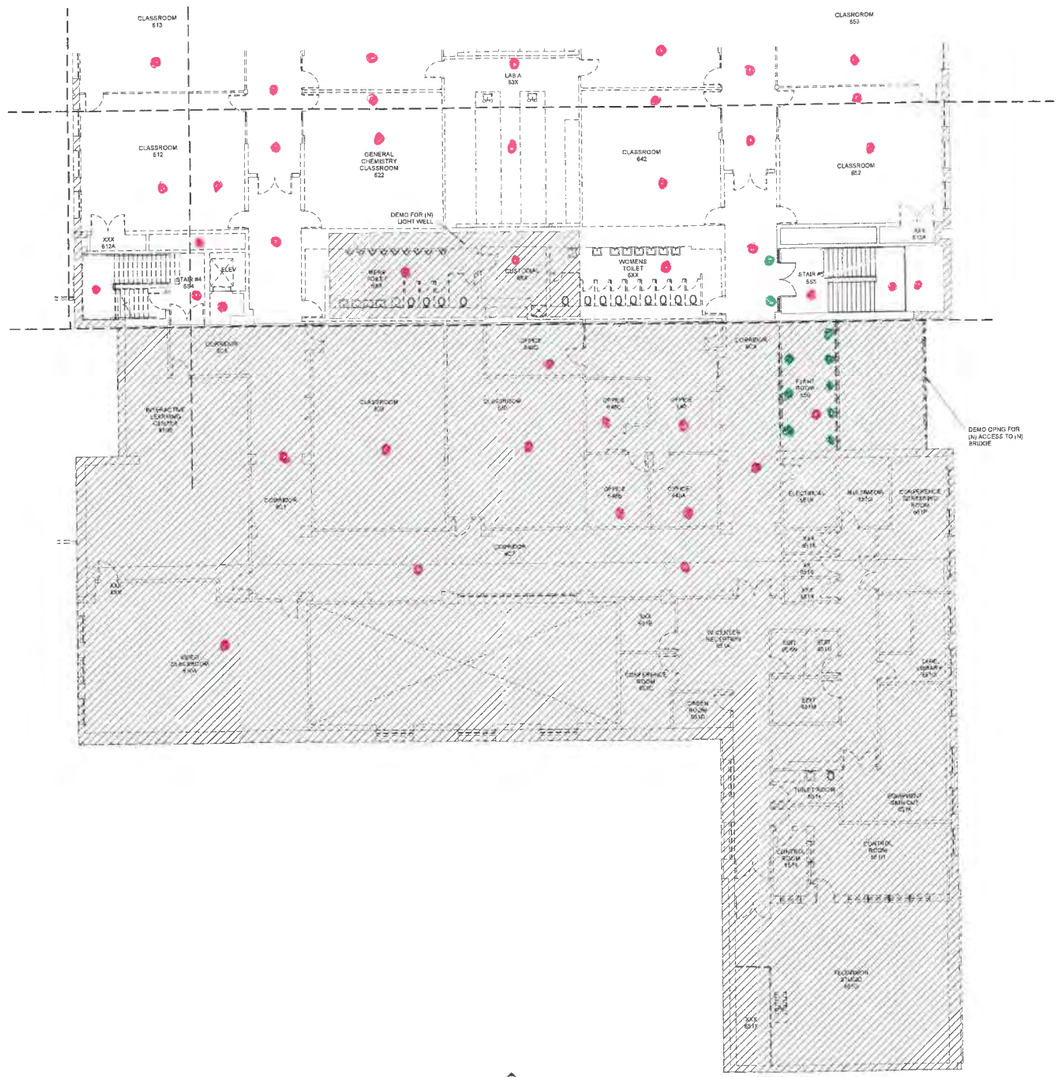
PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-13

SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 **DEMO THIRD FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
3RD FLOOR-D

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-14

SCHEMATIC DESIGN
2/20/2019

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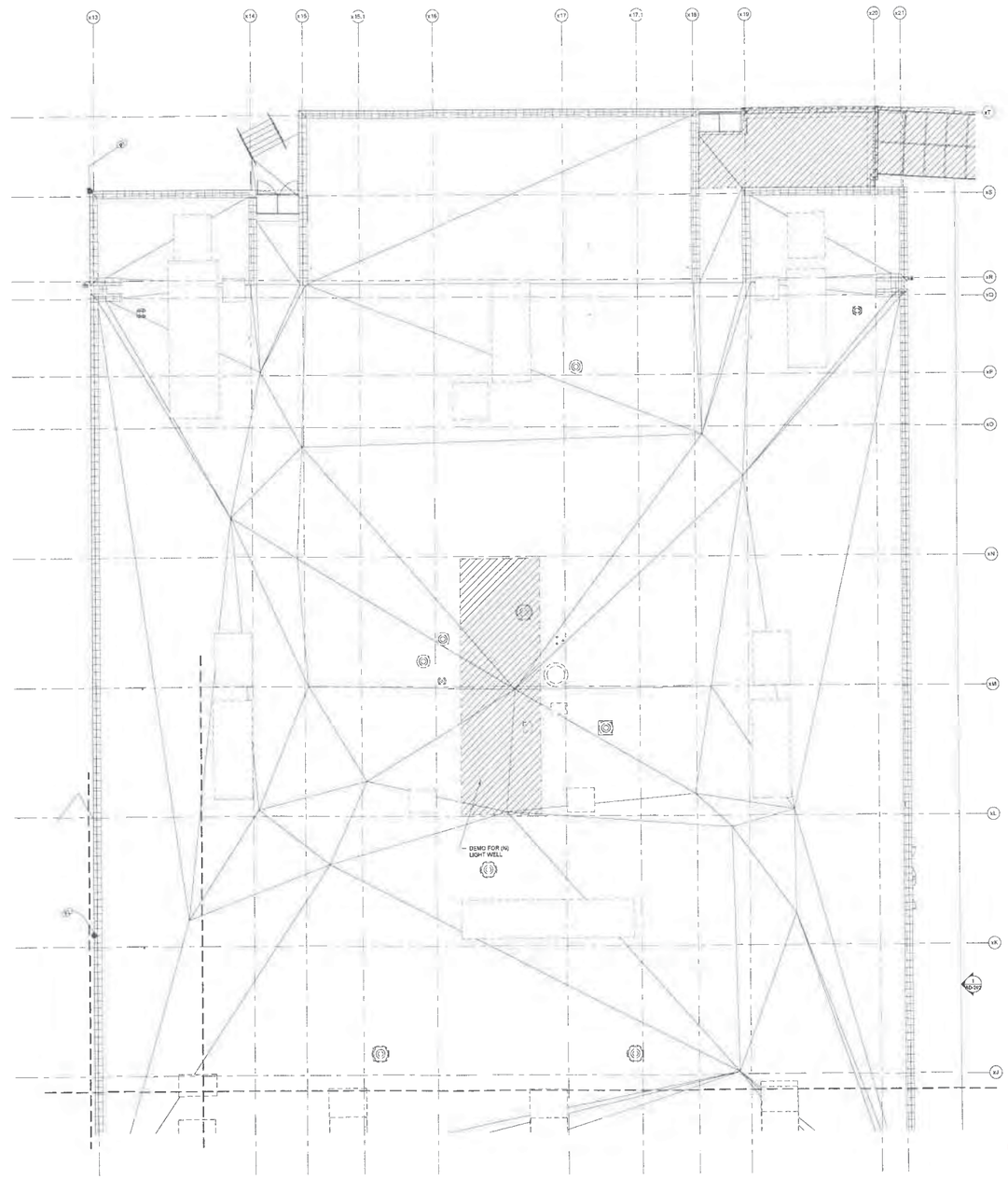
DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 **DEMO ROOF PLAN - WEST BLDG - PART C**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
ROOF-C

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-15

SCHEMATIC DESIGN
2/20/2019

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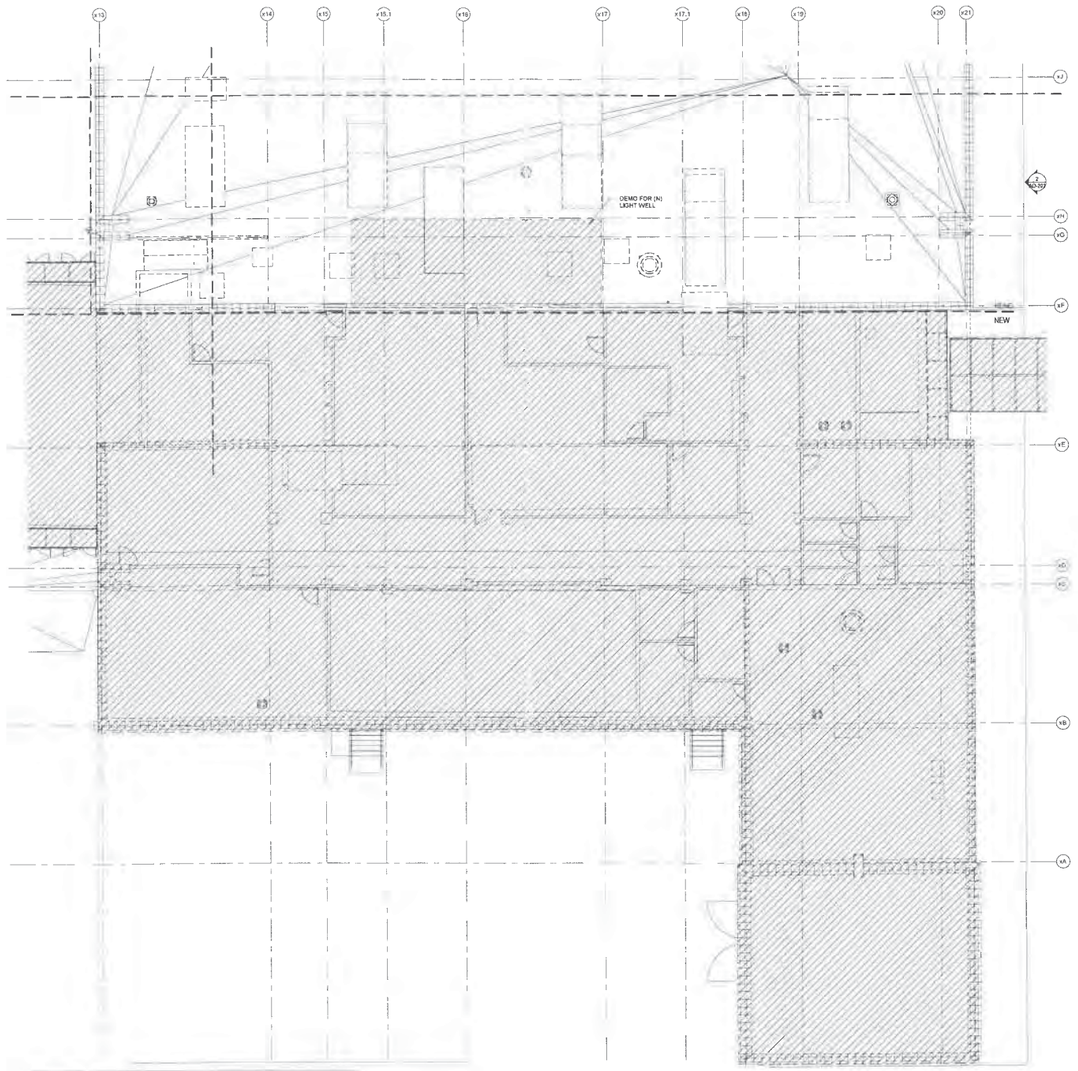
DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 **DEMO ROOF PLAN - WEST BLDG - PART D**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

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LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
WEST BLG
ROOF-D

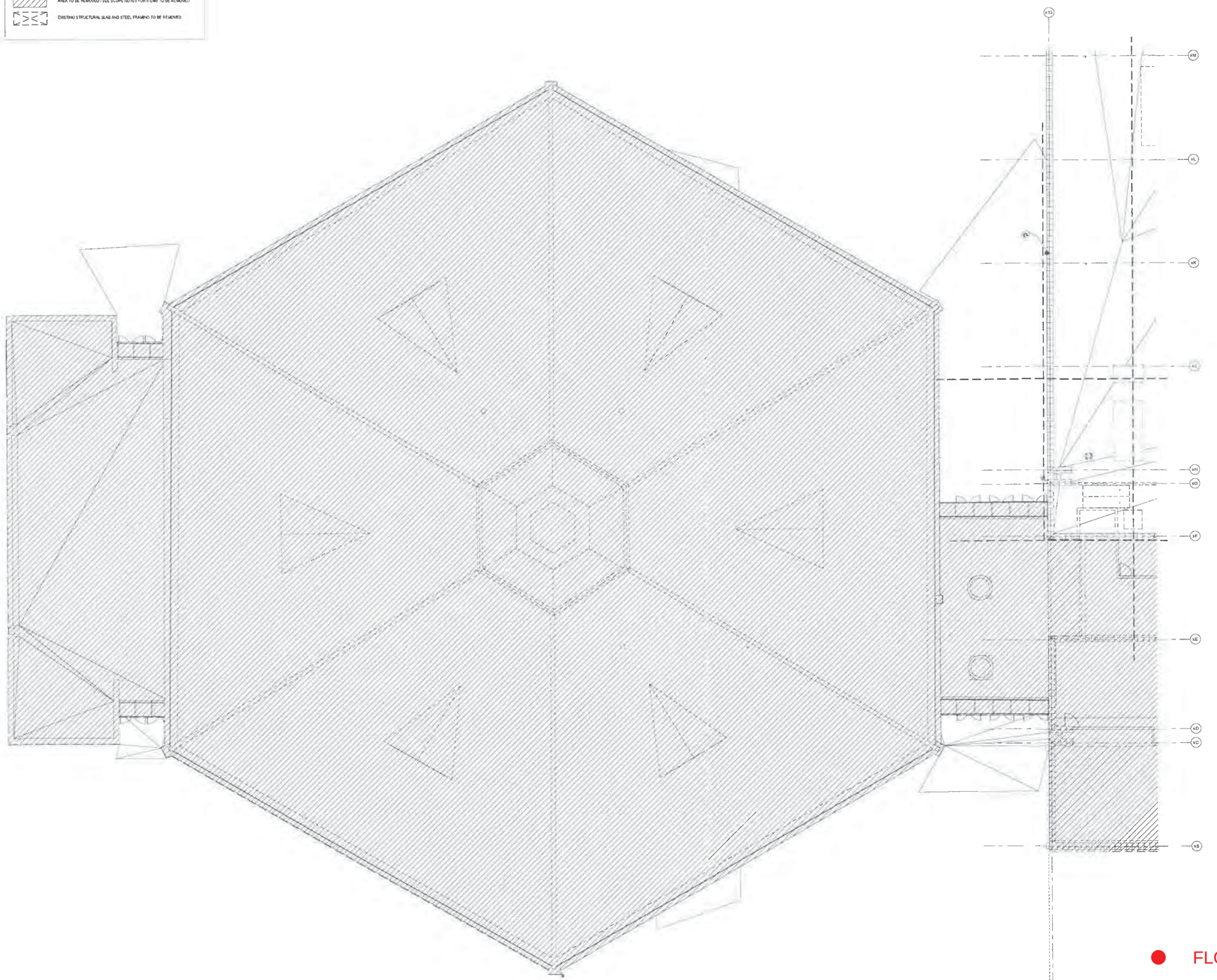
PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-16

SCHEMATIC DESIGN
2/20/2019

DEMOLITION LEGEND

- EXISTING PARTITIONS, EQUIPMENT, ETC. (SHOWN DASHED) TO BE REMOVED
- EXISTING DOOR AND FRAME TO BE REMOVED
- EXISTING CONSTRUCTION TO REMAIN
- AREA TO BE REMOVED - SEE SCOPE NOTES FOR ITEMS TO BE REMOVED
- EXISTING STRUCTURAL SLAB AND STEEL FRAMING TO BE REMOVED



1 **DEMO ROOF PLAN - FIELD HOUSE**
1/8" = 1'-0"

- FLOORING MATERIALS
- BORRROWED LITE WINDOWS
- PIPE INSULTAITON

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LOWELL HIGH SCHOOL

155 MERRIMACK STREET
LOWELL, MA 08152

PROJ. NO. 67150

HAZMAT PLAN
ROOF
FIELD HOUSE

PROVIDED BY UNIVERSAL ENVIROMENTAL CONSULTANTS

HM-17

SCHEMATIC DESIGN
2/20/2019

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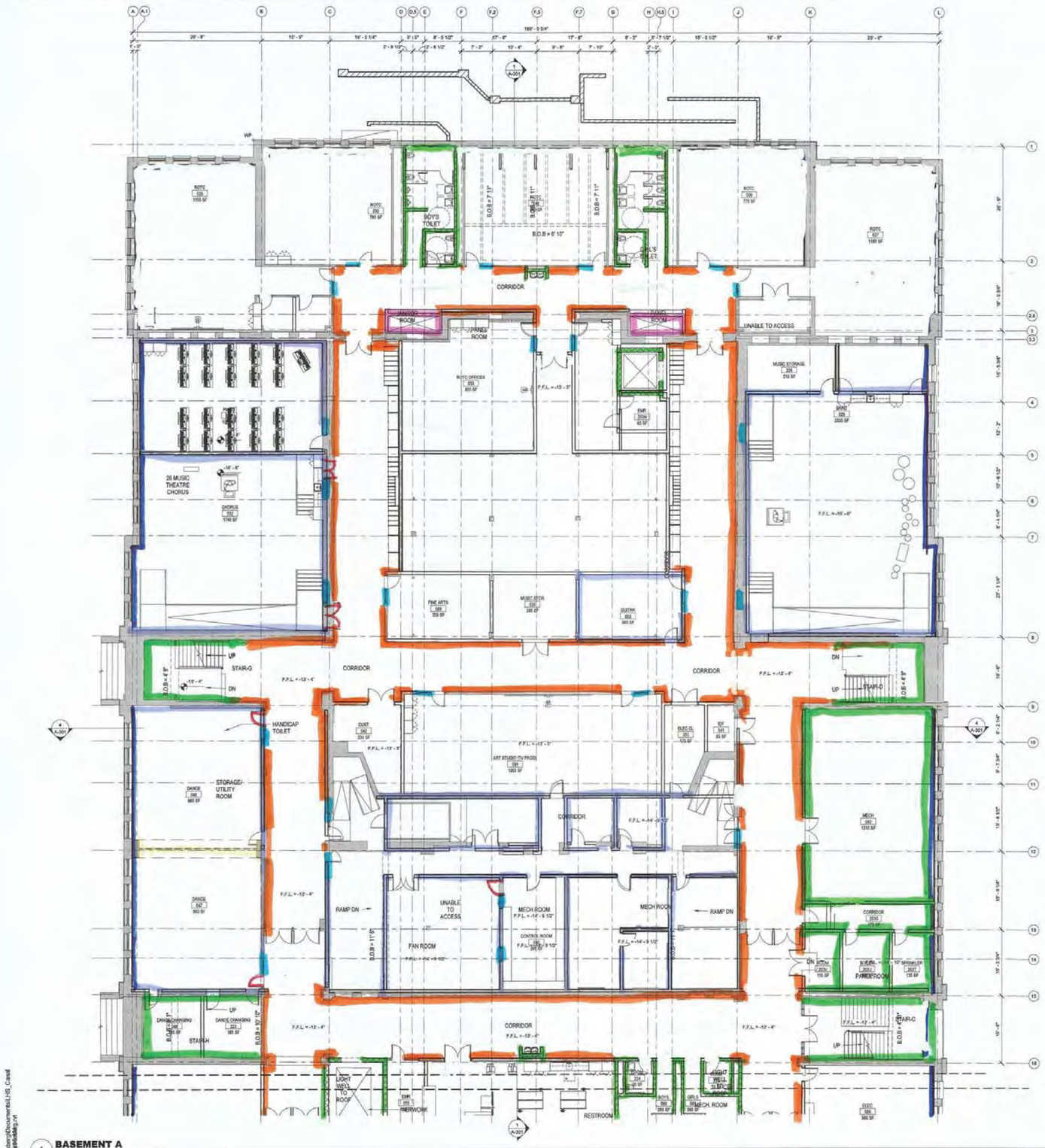

1 **BASEMENT A**
1/8" = 1'-0"

LEGEND (see A111C)

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 440 4560
F: +1 617 440 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Terrence Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2130 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope creultant Address

Code Consultant:
Rasings Consulting
142 Harlon Rd, Hudson, MA 01749

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
BASEMENT FLOOR PLAN - EAST BLDG - PART A

SCALE: 1/8" = 1'-0"

A-110A

SCHEMATIC DESIGN

Project Issue Date

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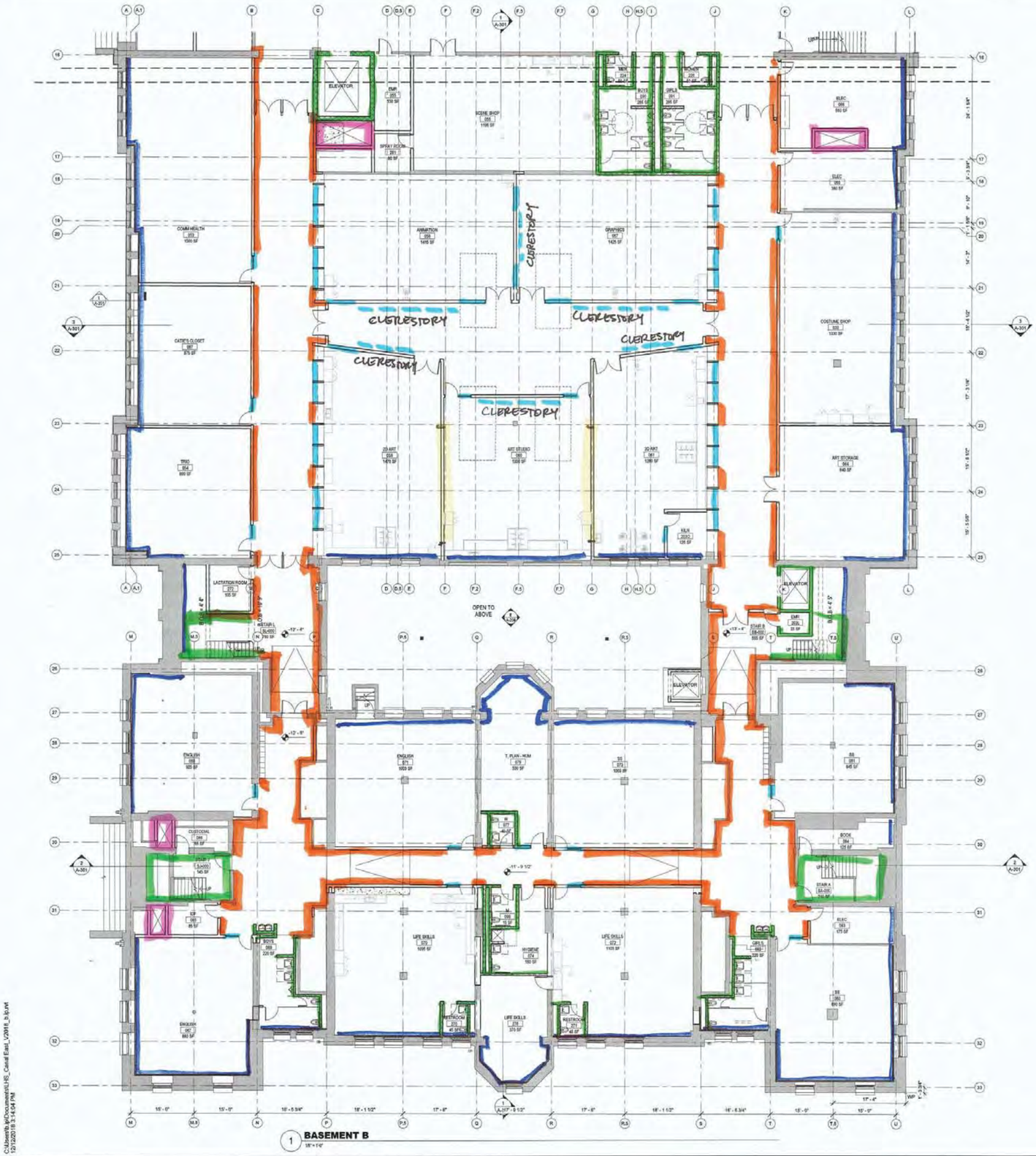


LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-005 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL ESCUTCHEONS.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL HANDRAIL & GUARDRAIL REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 448 4000
F: +1 617 448 4045

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Terrence Landscape Architects
100 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGurth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

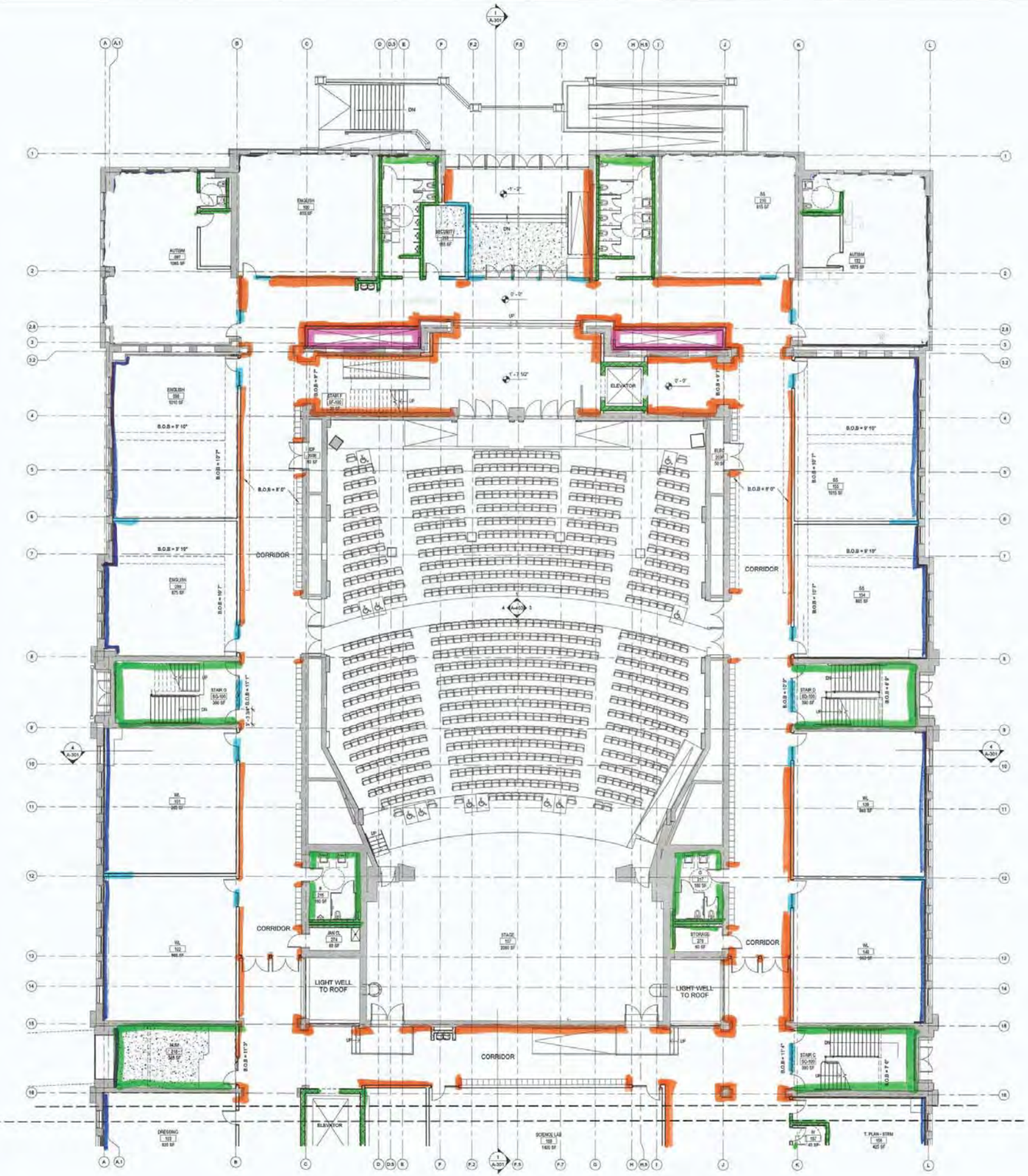
DRAWING TITLE:
BASEMENT FLOOR PLAN - EAST BLDG - PART B

SCALE: As indicated

A-100B

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **FIRST FLOOR A**
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-602 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW QUARTERLY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED TRISSES
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT ETR BY (E) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECHDWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U., SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McBeth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Harkin Rd. Holliston, MA 01746

Accoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - EAST BLDG - PART A

SCALE: As Indicated

A-101A

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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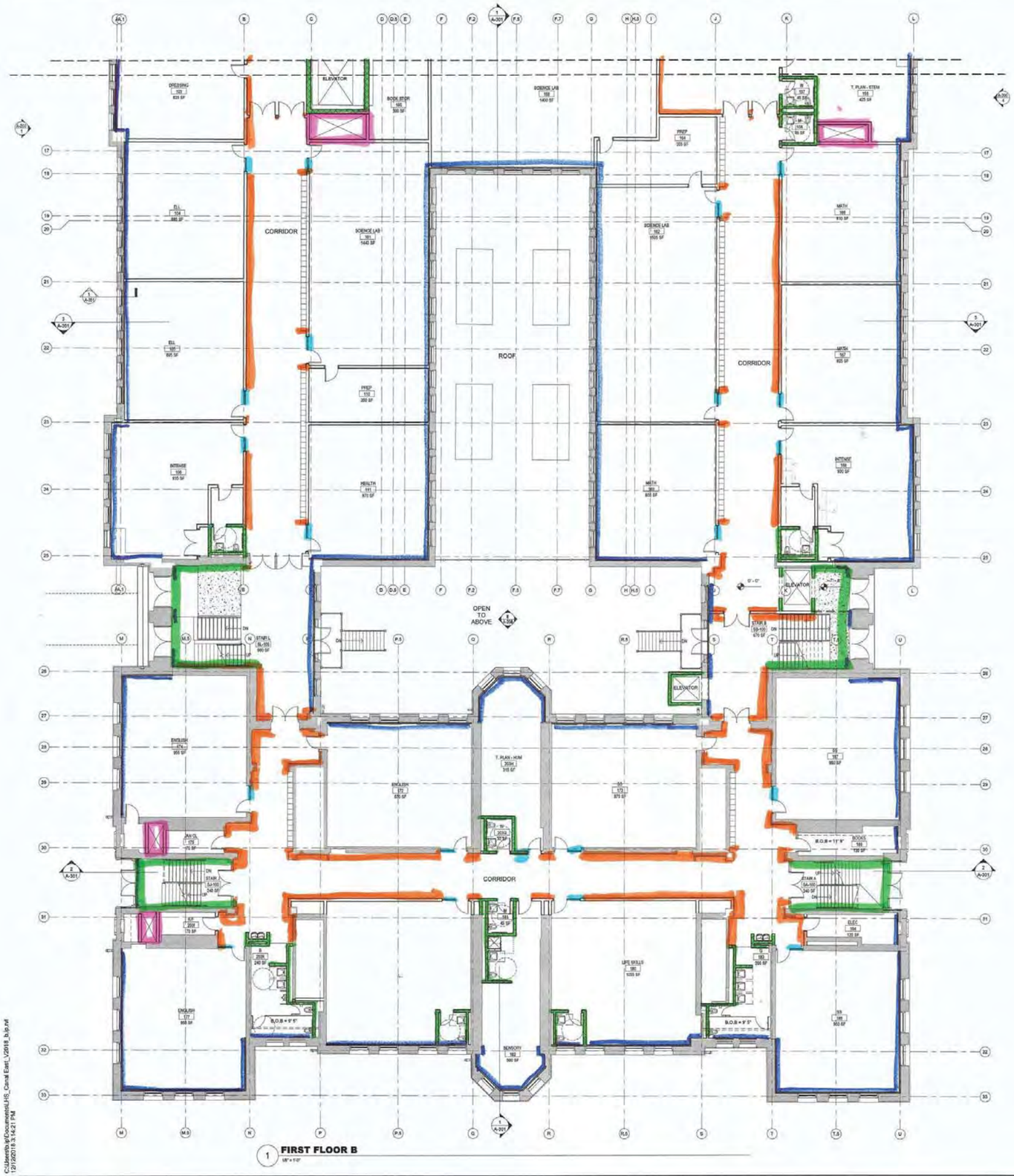

1 FIRST FLOOR B
1/8" = 1'-0"

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LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 FOLDING FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 FOLDING FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2190 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hawkings Consulting
142 Hardon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - EAST BLDG - PART B

SCALE: As indicated

A-101B

SCHEMATIC DESIGN - ESTIMATE

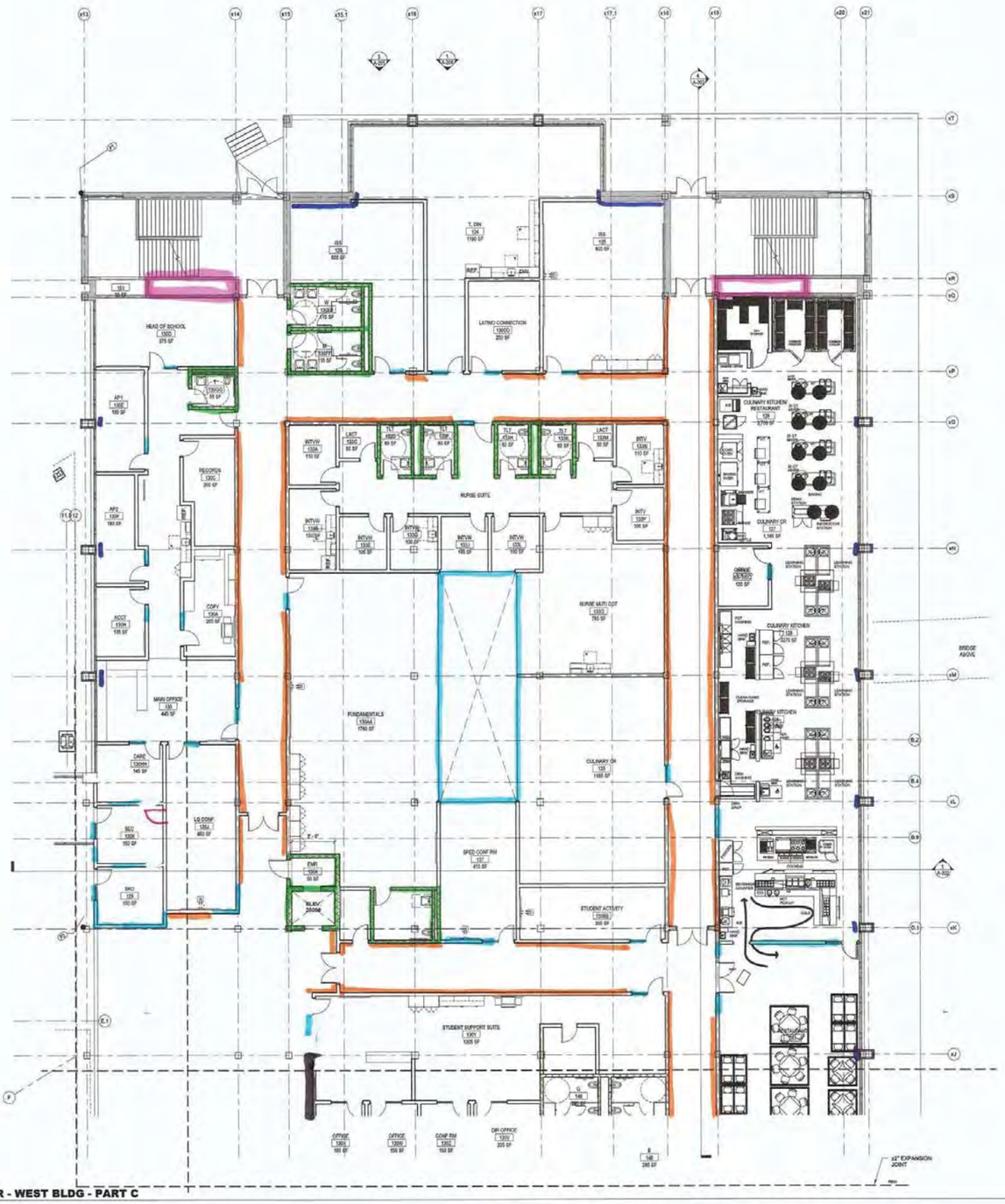
12/17/2018

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

GENERAL NOTES - FLOOR PLAN

1. SEE SHEET A-003 FOR PARTITION TYPES.
2. ALL PARTITIONS TYPE XXX, U.N.O.



1 FIRST FLOOR - WEST BLDG - PART C
1/8" = 1'-0"

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TYP. WALL TO BE:
* 6" MTL STUD W/ (2) LAY 5/8" GWB BOTH SIDES.

TYP WALL (AS NOTED ABOVE) WITH 2⅛" THICK POLISHED CMU WAINSCOTT TO 5'-4" HIGH. (CORRIDOR SIDE ONLY)

(2) 3 5/8" OFFSET STUDS W/ 1" AIRSPACE & (2) LA 5/8" GWB EITHER SIDE - FULL BATTS

OPERABLE WALL

3 5/8" STUDS W/ ~~FOAM~~ 2" SPRAY FOAM INSULATION (2) LAY 5/8" GWB @ INSIDE OF EXT WALLS (EXT.)

2HR SHAFTWALL

INTERIOR GLAZING

8" CMU - PAINTED (TO BE POLISHED CMU UP TO 5'-4" WHERE EXPOSED ON CORR. SIDE) GF

INTERIOR PARTITION TYPES
SD COST 12.17.18

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 5
Boston, MA 02108
T. +1 617 440 4500
F. +1 617 440 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
180 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2130 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

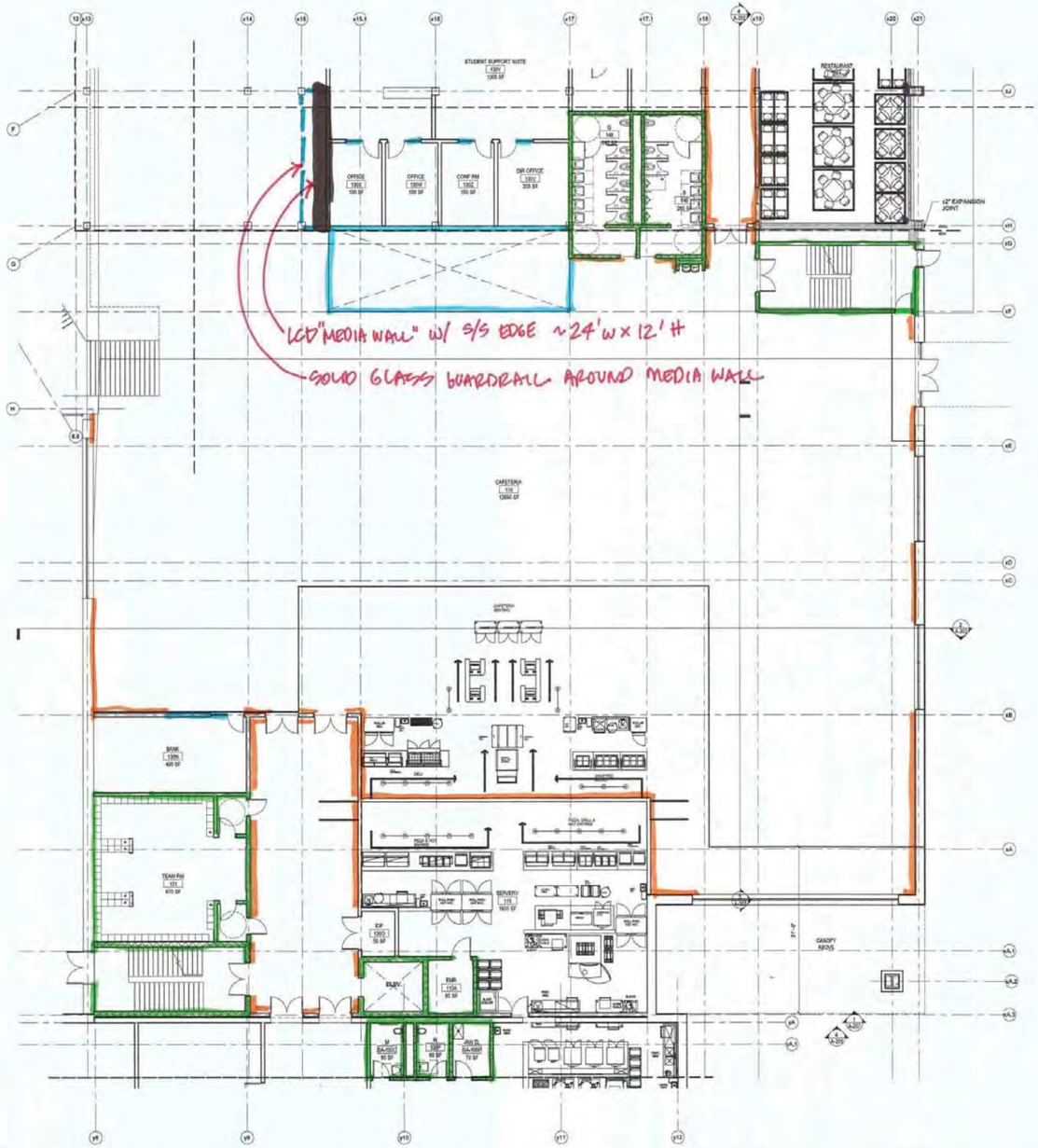
DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - WEST BLDG - PART C

SCALE: As Indicated

A-111C

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **FIRST FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02114
T. +1 617 449 4000
F. +1 617 449 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Trevene Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2100 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
163 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - WEST BLDG - PART D

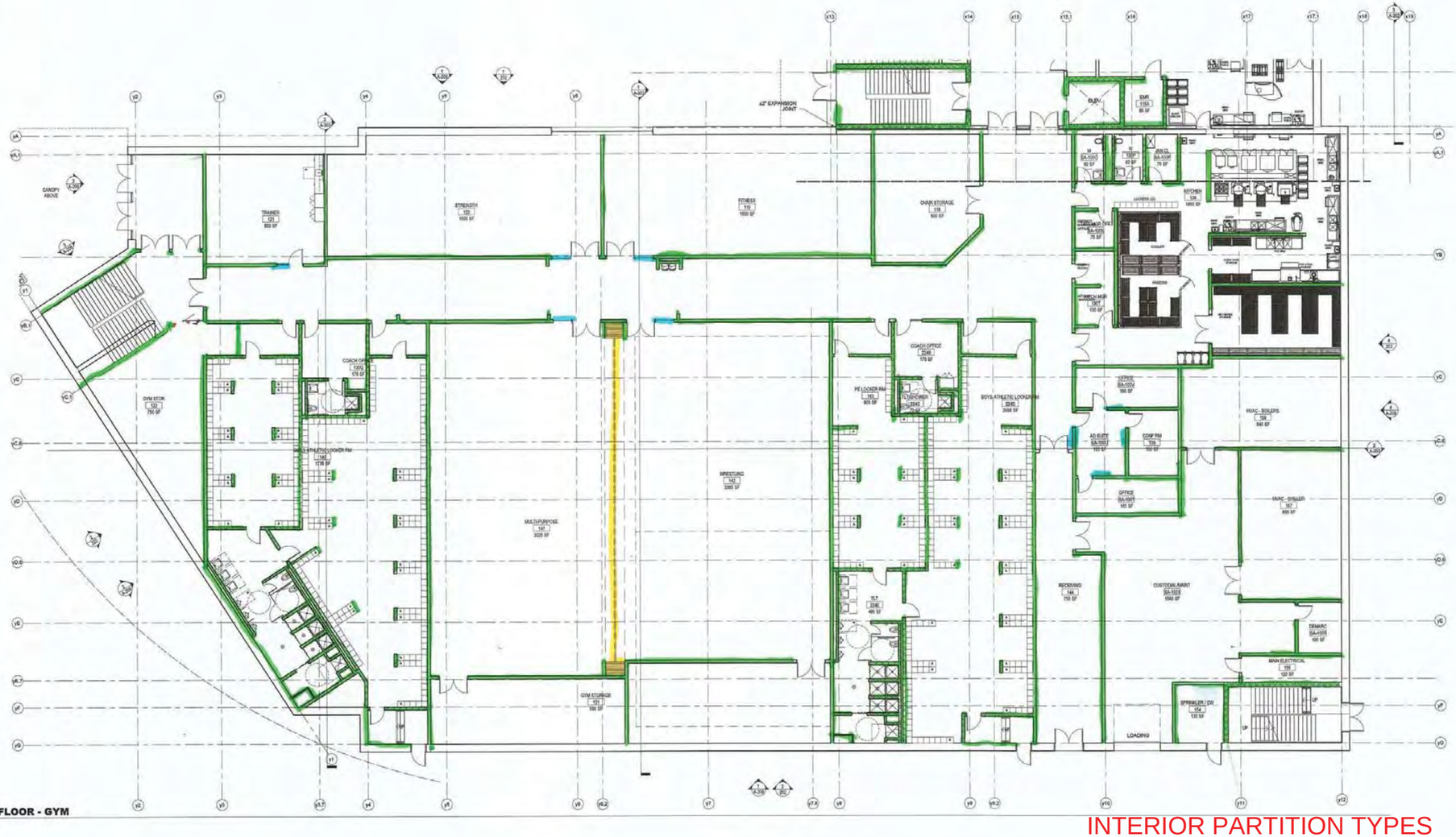
SCALE: 1/8" = 1'-0"

A-111D

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

NO.	DATE	ISSUE



1 **FIRST FLOOR - GYM**
1/8" = 1'-0"

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INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

SEAL

KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 5
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 443 4045

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2160 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park 6400 Woburn, MA 01801

Food Service:
Crédtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Harbor Rd, Hulliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - GYM

SCALE: 1/8" = 1'-0"

A-111E

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

1 **FIRST FLOOR - FRESHMAN ACADEMY/MAIN ENTRY**
1/8" = 1'-0"

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 5
Boston, MA 02108
T. +1 617 443 4000
F. +1 617 443 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Terrence Landscape Architects
155 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #450 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Hudson, MA 01748

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67160

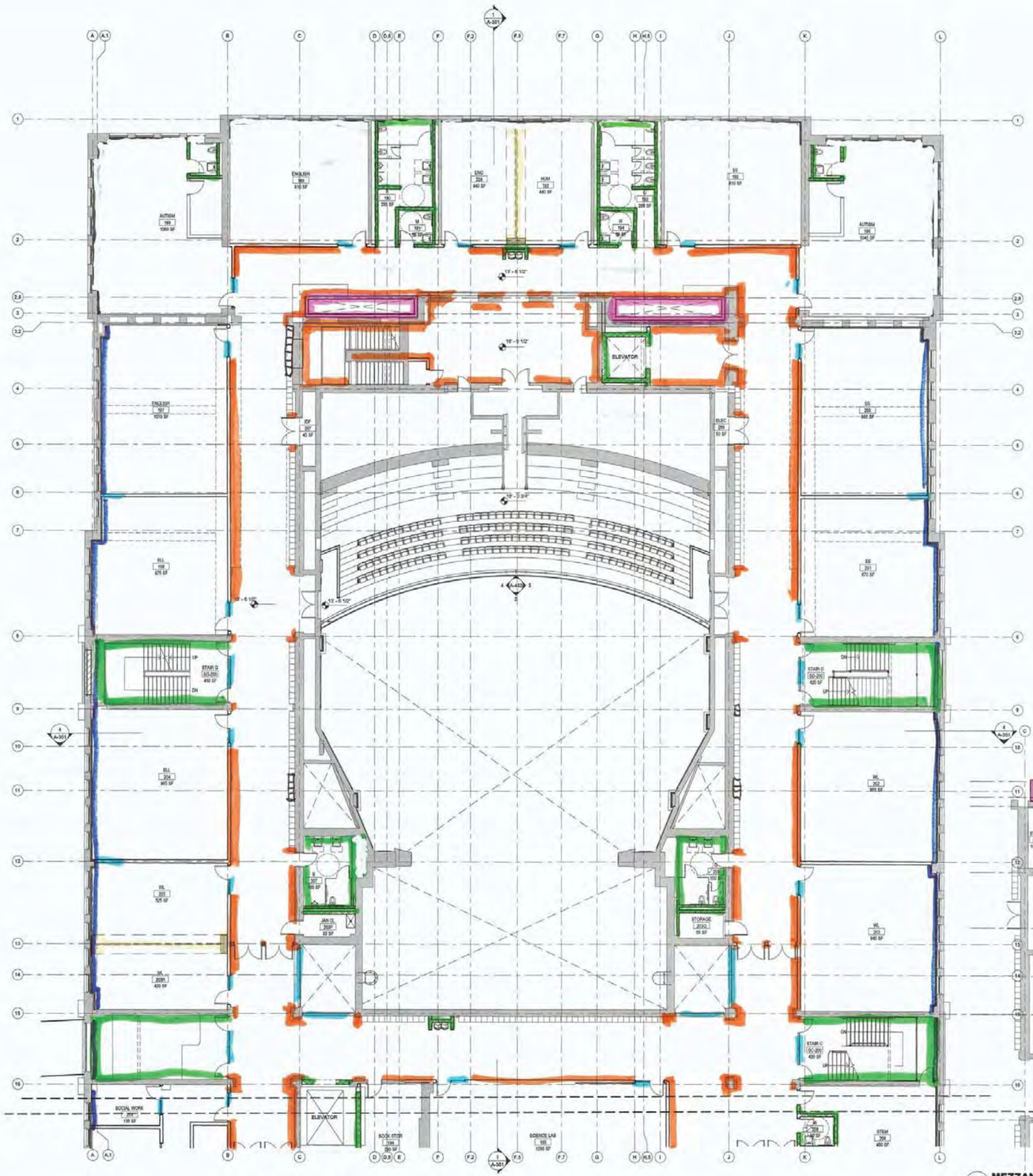
DRAWING TITLE:
FIRST FLOOR FLOOR PLAN - FRESHMAN ACADEMY

SCALE: 1/8" = 1'-0"

A-111F

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 SECOND FLOOR A
1/8" = 1'-0"

2 MEZZANINE FLOOR PLAN
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A402 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

M.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS.
M.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/ EPOXY INJECTION
M.3 REPLACEMENT ROOF ASSEMBLY
M.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
M.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
M.6 PROVIDE SEALANT @ RELIEVING ANGLE
M.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
M.8 EXPANSION JOINT @ FIRE WALL
M.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL ENGS
M.10 TELESCOPIC BLEACHERS
M.11 MECHANICAL UNIT, SEE MECH DWGS
M.12 RECESSED ENTRY MAT
M.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF. MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
M.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
M.15 ETR BRICK MASONRY

NO.	DATE	ISSUE

SSA

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Terrenia Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Hyannis, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - EAST BLDG - PART A

SCALE: As indicated

A-102A

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

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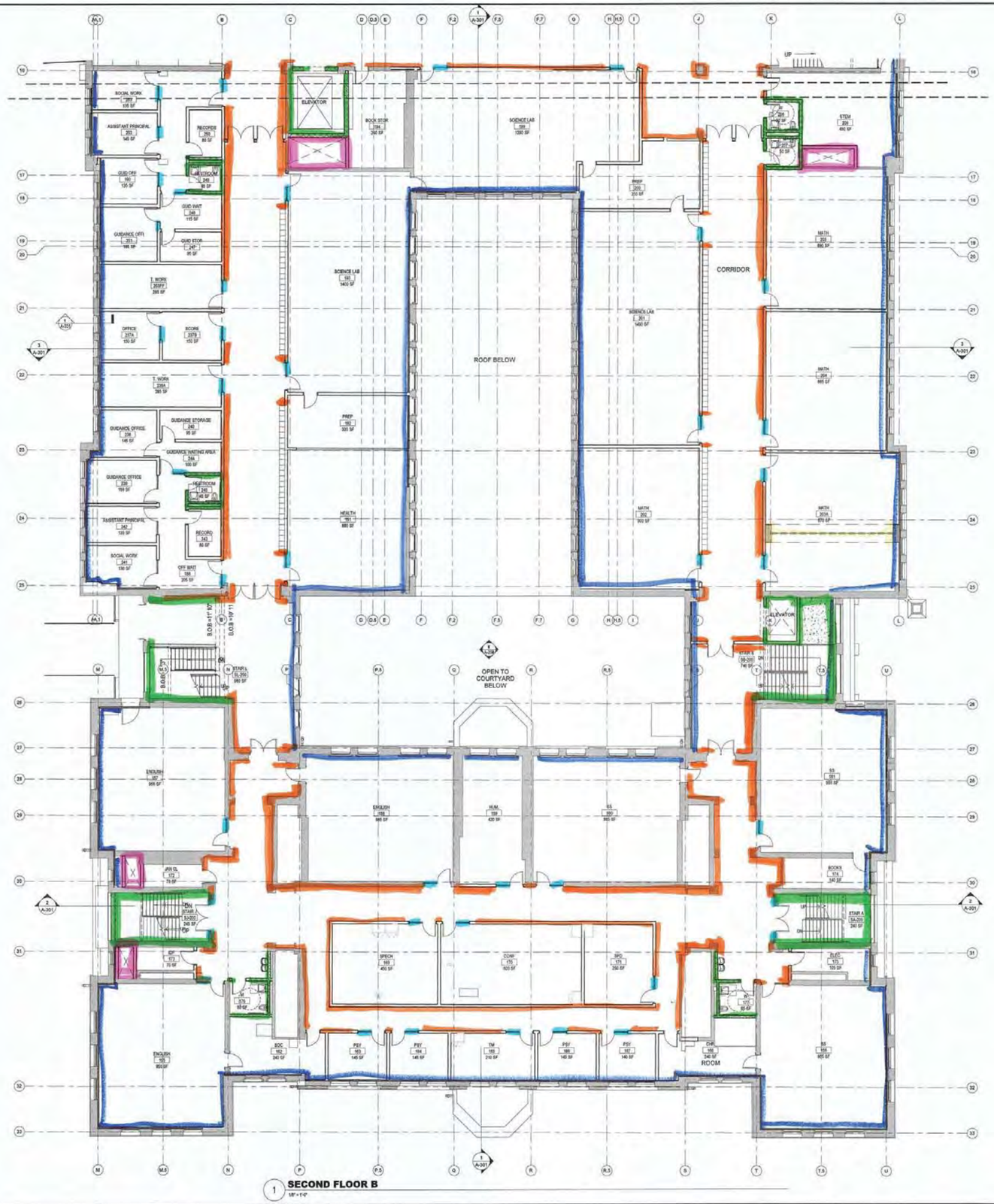


LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL W/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS, REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM.
W.6 PROVIDE SEALANT @ RELIEVED ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH.DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF. MTL PANEL ABOVE @ COLUMN & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE I/0 REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
180 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McNorth
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

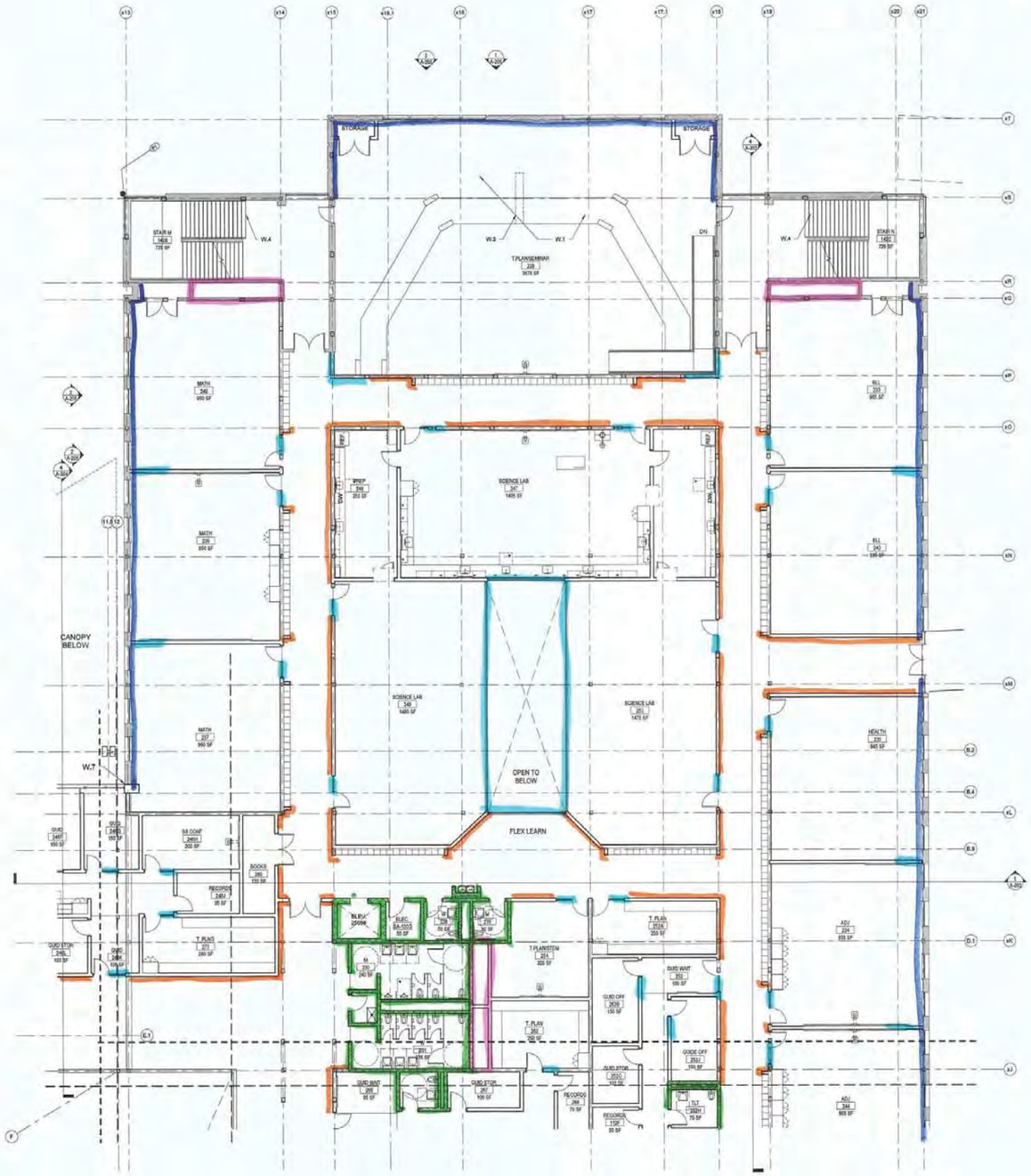
DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - EAST BLDG - PART B

SCALE: As indicated

A-102B

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **SECOND FLOOR - WEST BLDG - PART C**
1/8" = 1'-0"

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LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-802 FOR PARTITION TYPES, SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS, PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TRANSITIONS AND LANDINGS, PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS, REPLACE DAMAGED CONCRETE PAN, SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTW (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH.DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" APP. MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY, SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP @ ALL REPLACEMENT WINDOWS
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

REAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2100 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
101 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

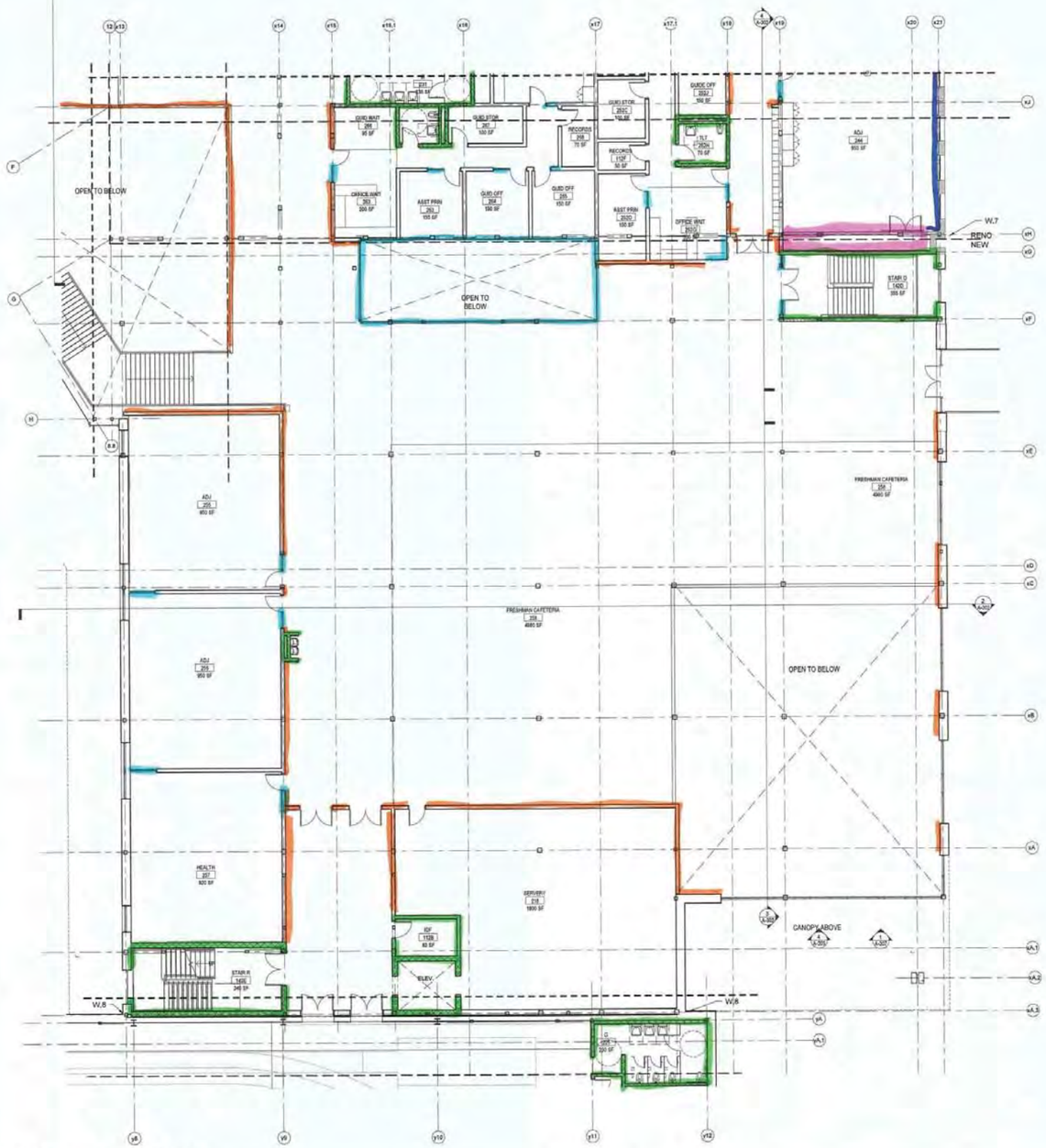
DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - WEST BLDG - PART C

SCALE: As Indicated

A-112C

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **SECOND FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

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LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

NO.	DATE	ISSUE

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A402 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDRELL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE MARKTIME FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 EXPANSION JOINT ETWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH.DWGS.
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY, SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH CHAIN DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

REAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4040

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Fuley Bohl Roberts & Associates, Inc.
3150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Harlem Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

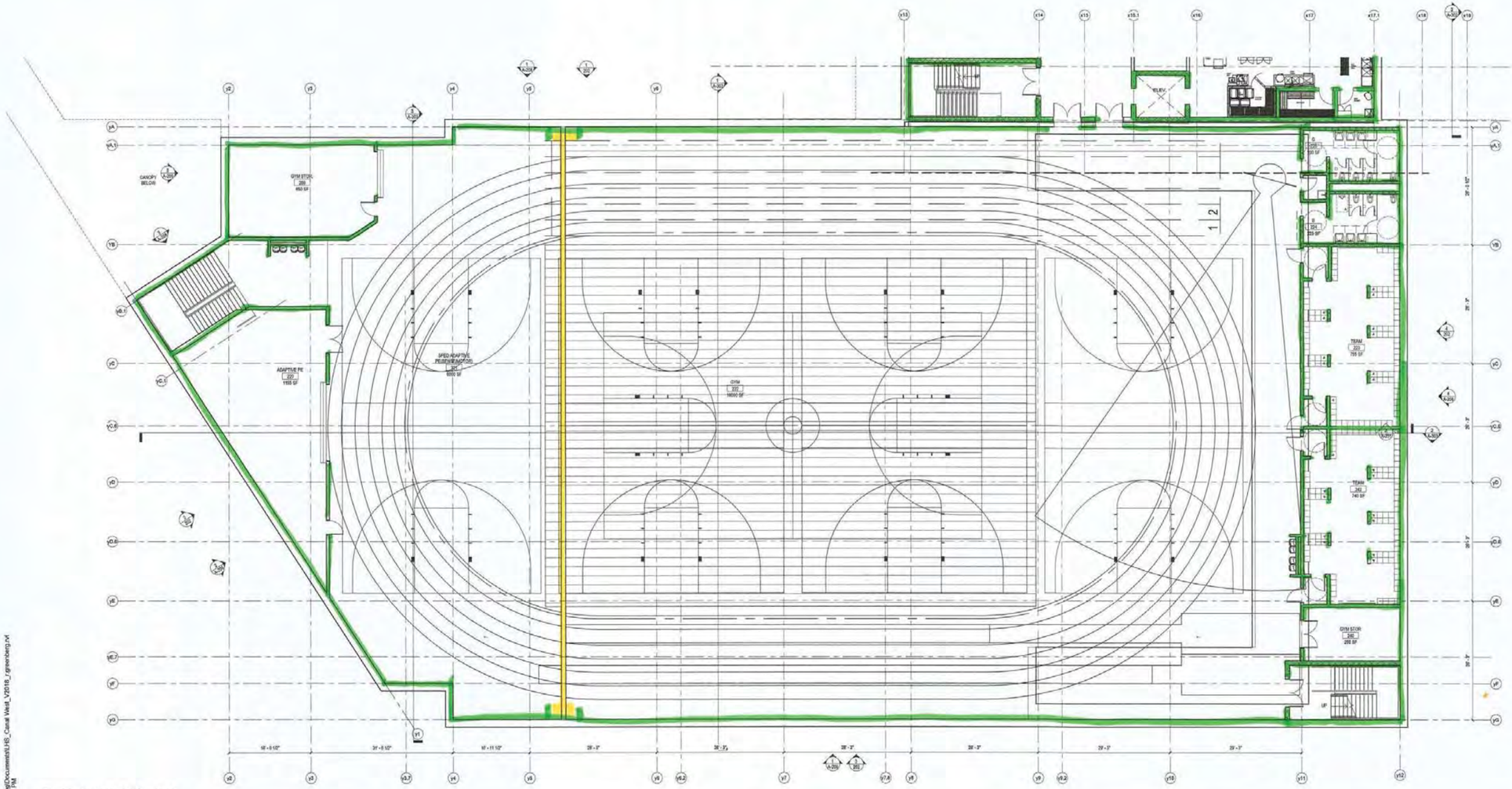
DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - WEST BLDG - PART D

SCALE: As Indicated

A-1| 2D

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **SECOND FLOOR - GYM**
1/8" = 1'-0"

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 482 0200
F. +1 617 482 4040

Owner:
City of Lowell
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
WAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crestmee McGrath
101 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - GYM

SCALE: 1/8" = 1'-0"

A-112E

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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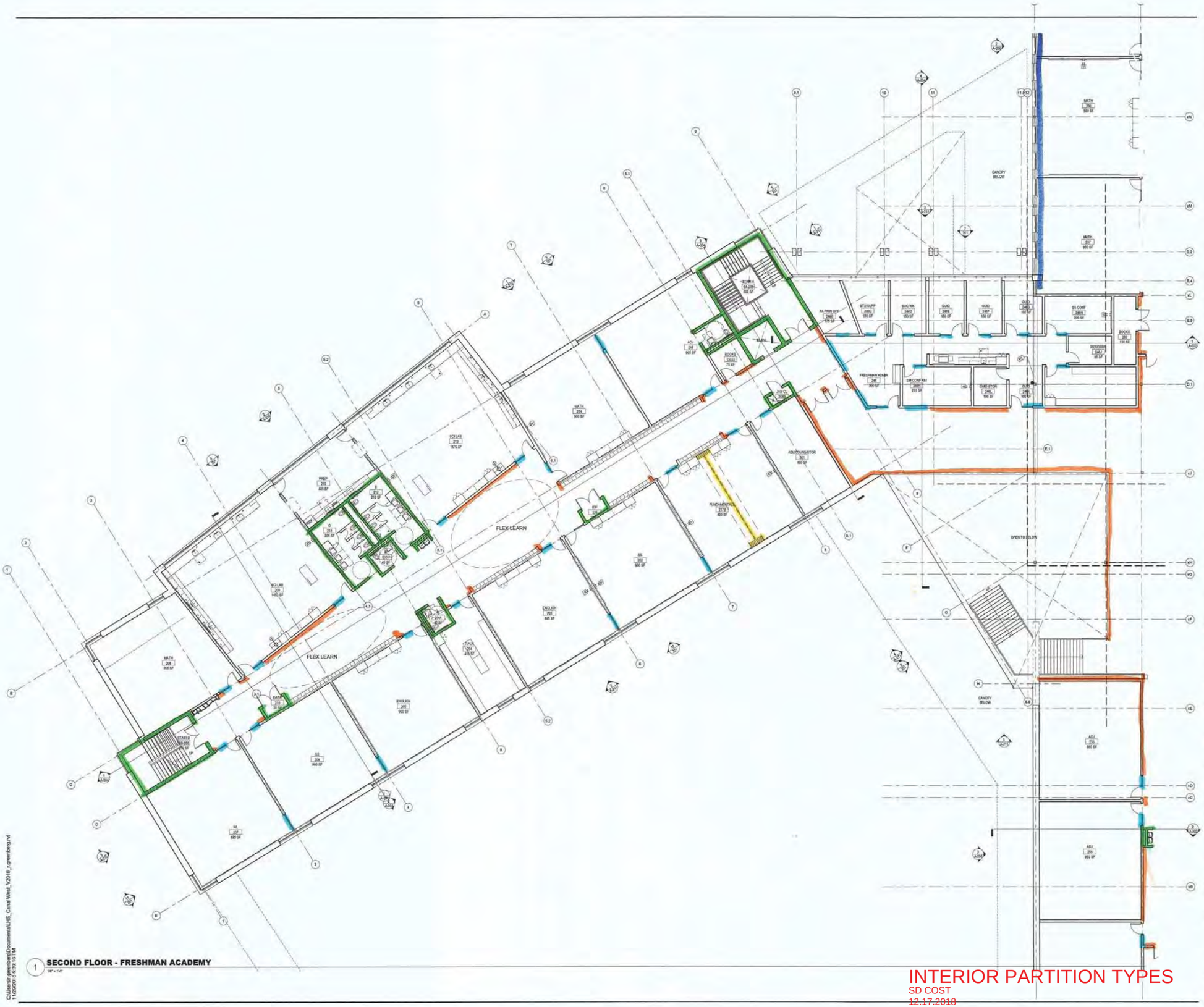

1 **SECOND FLOOR - FRESHMAN ACADEMY**
1/8" = 1'-0"

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NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS — EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T: +1 617 449 4000
F: +1 617 449 4049

Owner:

375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SECOND FLOOR FLOOR PLAN - FRESHMAN ACADEM

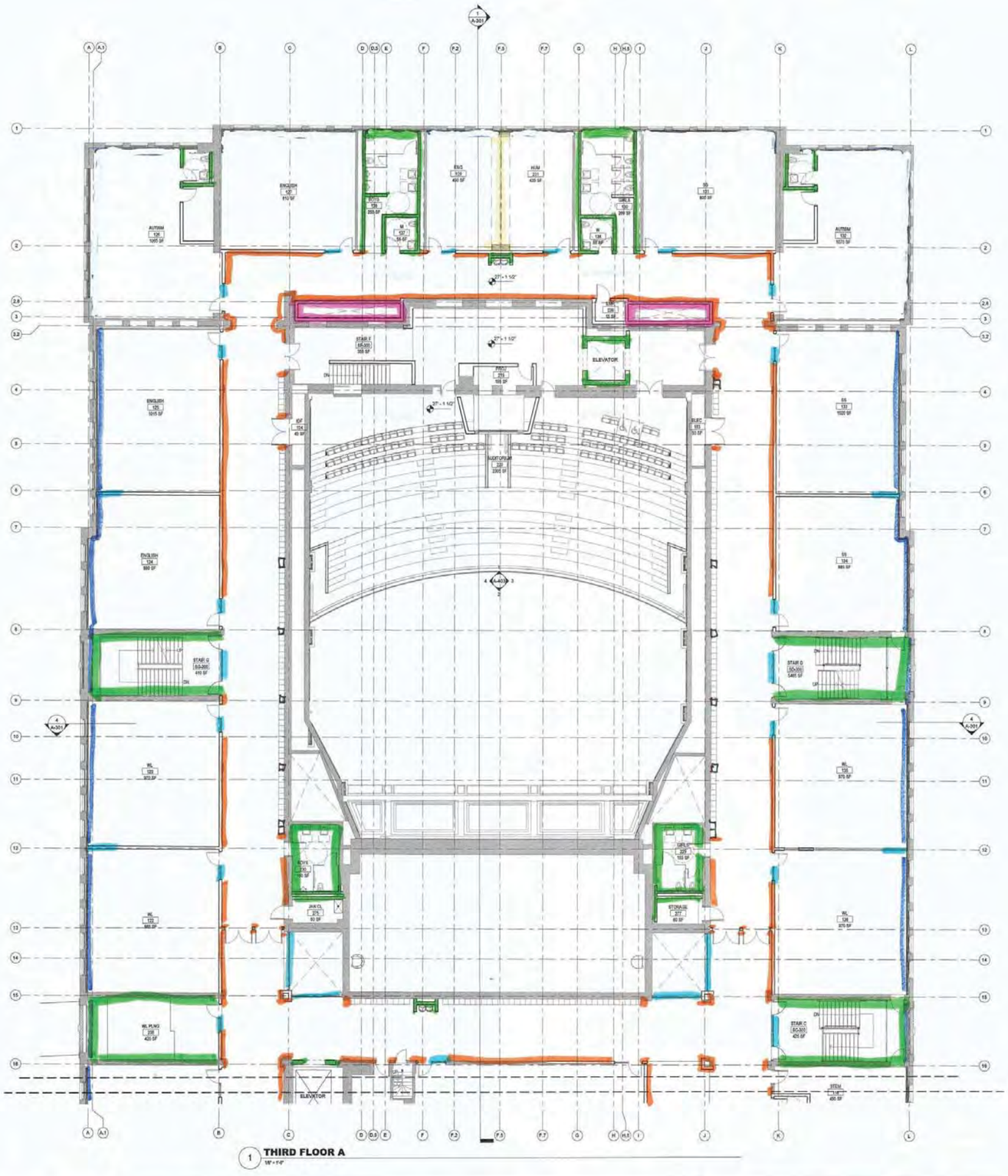
SCALE: 1/8" = 1'-0"

A-112F

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES
SD COST
~~12.17.2018~~
SEE A-111C FOR LEGEND



1 THIRD FLOOR A
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES, SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT (ETHR (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. T/ 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
160 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGarth
161 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

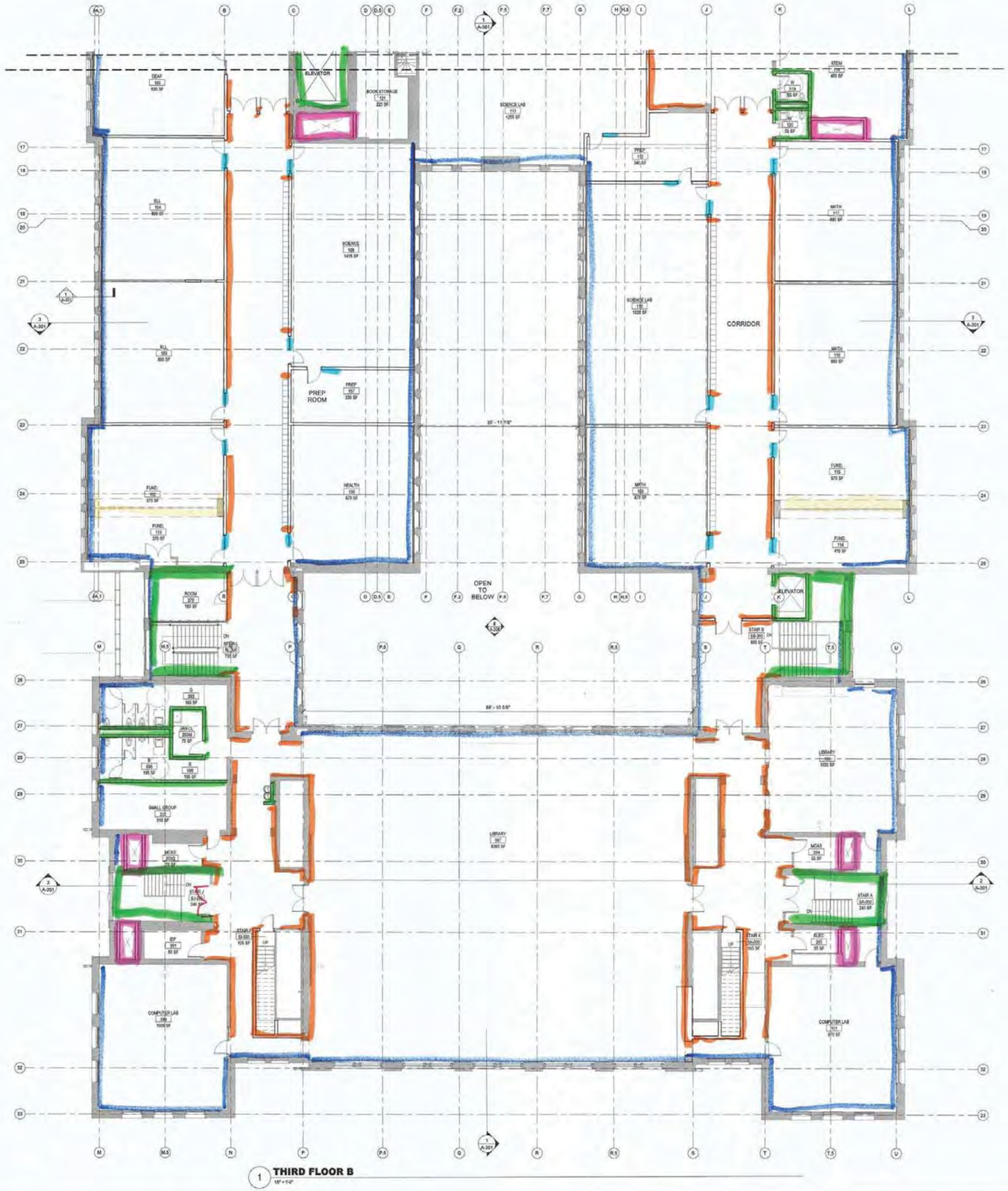
DRAWING TITLE:
THIRD FLOOR FLOOR PLAN - EAST BDLG - PART A

SCALE: As Indicated

A-103A

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - EAST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.

NOTES - EAST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED ROOFS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.9 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT.
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
370 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical & Plumbing:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Lighting Consultant:
Lighting Consultant Name
Lighting Consultant Address

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Planning / Zoning:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Hubbston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL - EAST CAMPUS

155 MERRIMACK STREET LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
THIRD FLOOR FLOOR PLAN - EAST BLDG - PART B

SCALE: As Indicated

A-103B

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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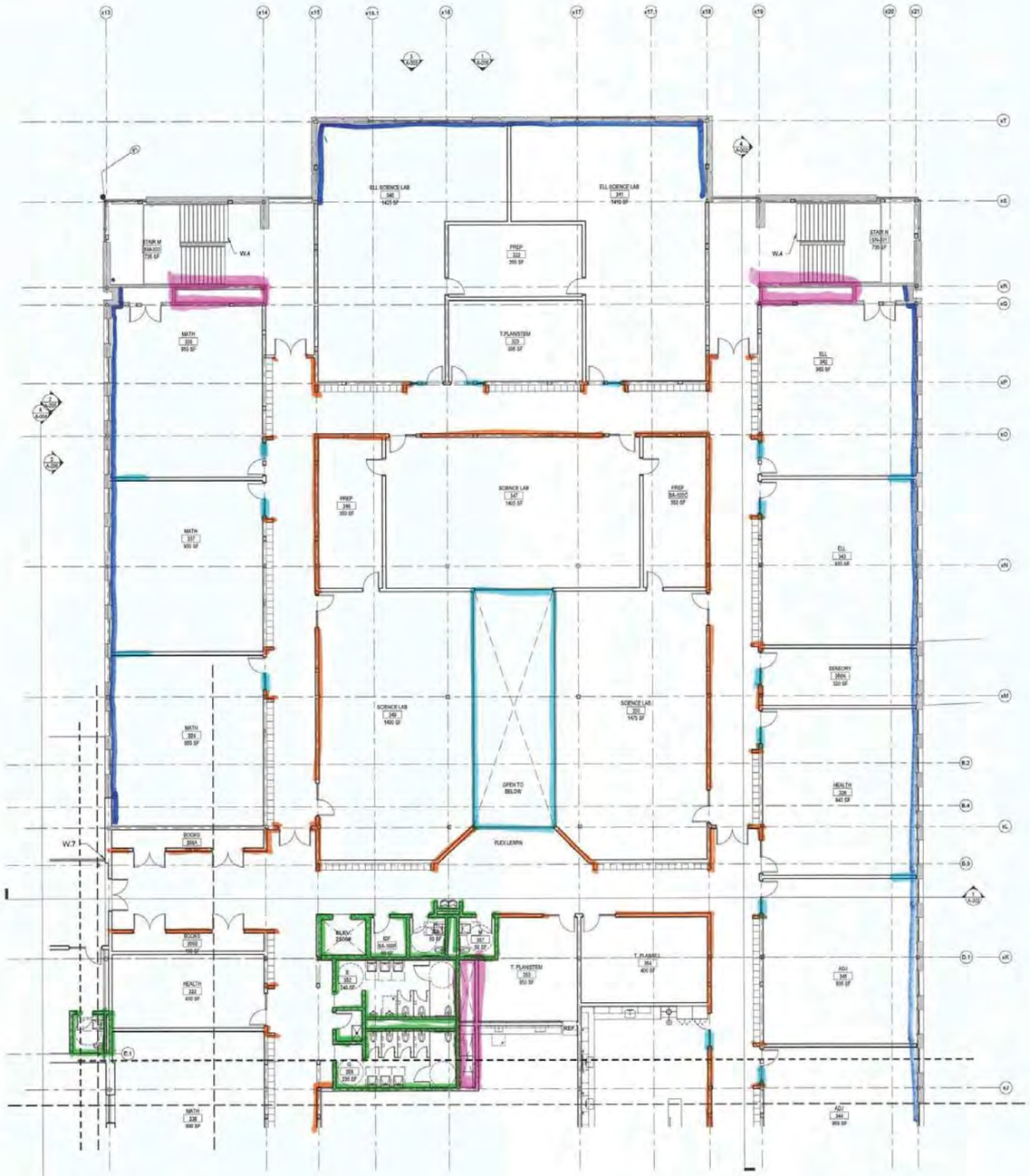


1 **THIRD FLOOR - WEST BLDG - PART C**
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
3. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-900 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ PIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 16'-0" AFF. MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY, SEE 2D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T: +1 617 443 4000
F: +1 617 443 4045

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverso Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope Insultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 07150

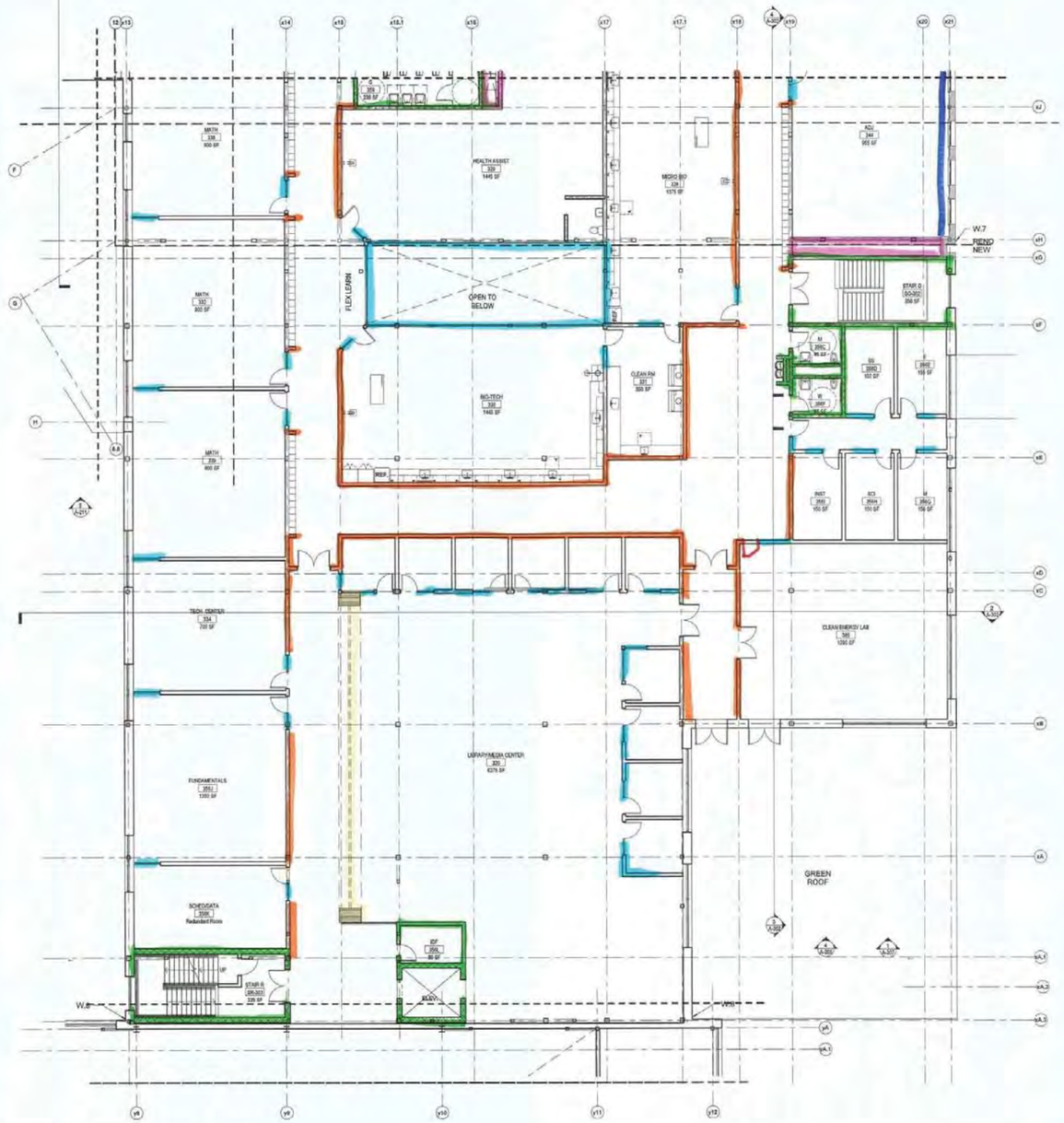
DRAWING TITLE:
THIRD FLOOR FLOOR PLAN - WEST BLDG - PART C

SCALE: As Indicated

A-113C

SCHEMATIC DESIGN - ESTIMATE

12/17/2018



1 **THIRD FLOOR - WEST BLDG - PART D**
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

NO.	DATE	ISSUE

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (EXTR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-602 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ FELDING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL SHOS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH.DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF. MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS
W.15 STR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4040

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2190 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Harlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
THIRD FLOOR FLOOR PLAN - WEST BLDG - PART D

SCALE: As indicated

A-113D

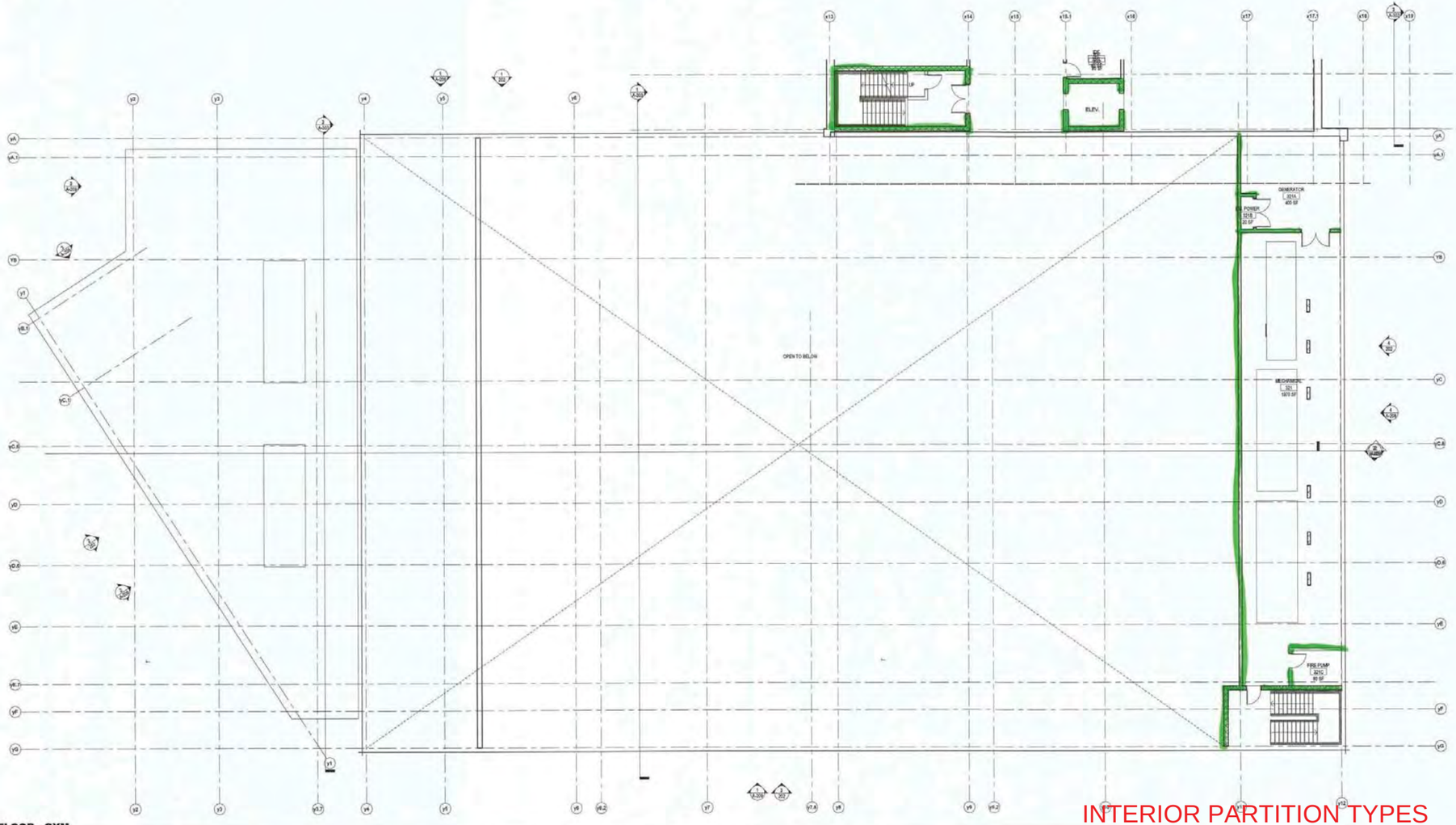
SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

NO. DATE ISSUE



1 THIRD FLOOR - GYM
1/8" = 1'-0"

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 5
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4045

Owner:
City of Lowell
50 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
100 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2100 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
THIRD FLOOR FLOOR PLAN - GYM

SCALE: 1/8" = 1'-0"

A-113E

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

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NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RECEIVING ANGLE
W.7 EXPANSION JOINT STRIP BY (E) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 FOUNDED FINISHED C.M.U. TO 59'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 50 REPRESENTATIONS FOR PATTERNS
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 50 REPRESENTATIONS FOR PATTERNS
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP. @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-402 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PUNCTUATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE ETR LOOSE BRICK.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 443 4000
F. +1 617 443 4046

Owner:
133 Merrimack Street, Lowell, MA 01852

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Harlon Rd. Hollston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE
THIRD FLOOR FLOOR PLAN - FRESHMAN ACADEMY

SCALE: As indicated

A-103F

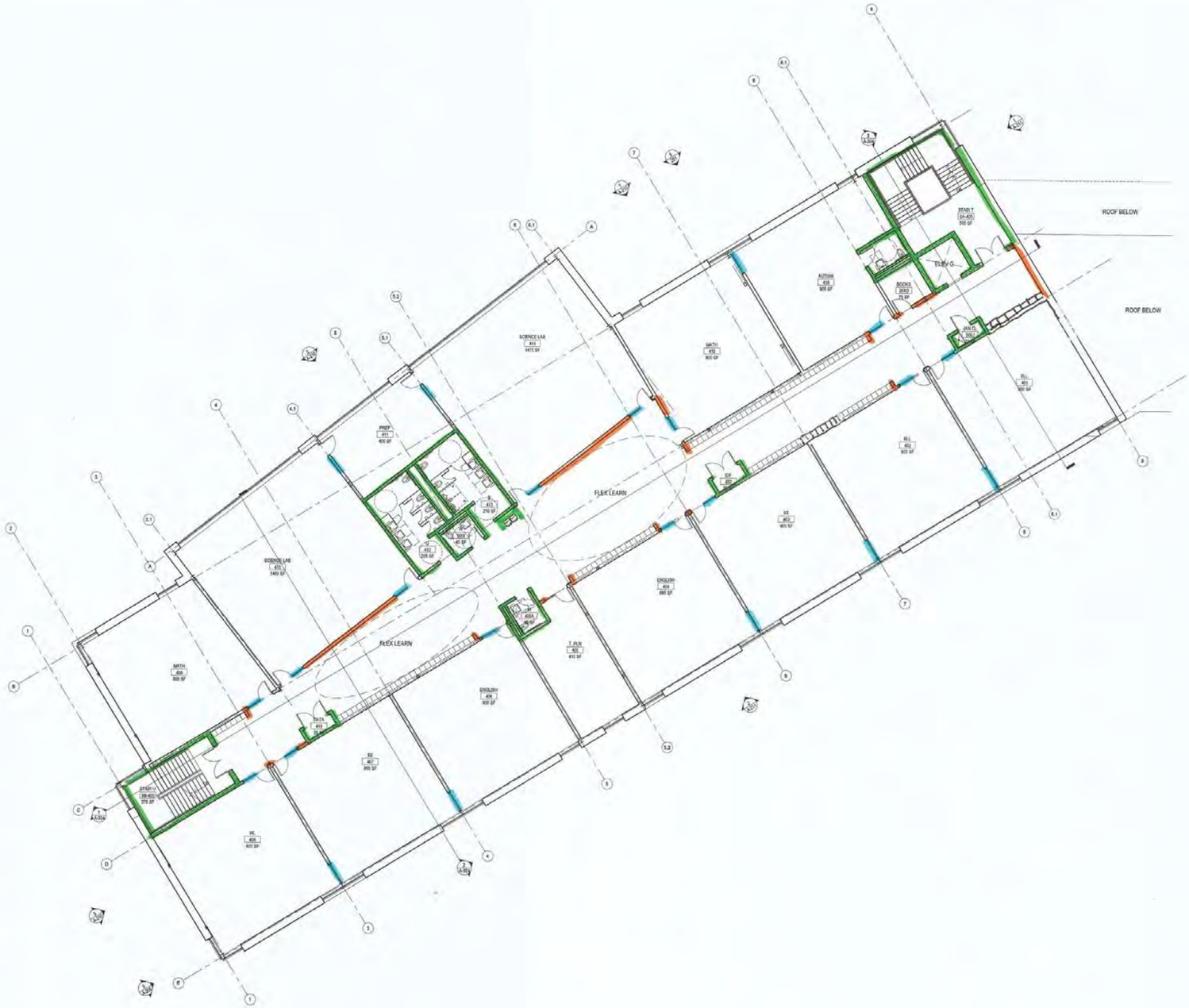
SCHEMATIC DESIGN - ESTIMATE

12/17/2018

1 **THIRD FLOOR - FRESHMAN ACADEMY**
1/8" = 1'-0"

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND



1 **FOURTH FLOOR - FRESHMAN ACADEMY**
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

NO.	DATE	ISSUE

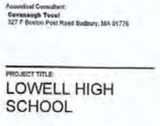
GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALITY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-002 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLORESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED RISERS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL W/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT BTWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB, SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT, SEE MECH.DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL. TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH DIVIDER/DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

BEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4040

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Wilbur Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Terrence Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Houlton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
V&V International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FOURTH FLOOR FLOOR PLAN - FRESHMAN ACADEMY

SCALE: As Indicated

A-104F

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES
SD COST
12.17.2018
SEE A-111C FOR LEGEND

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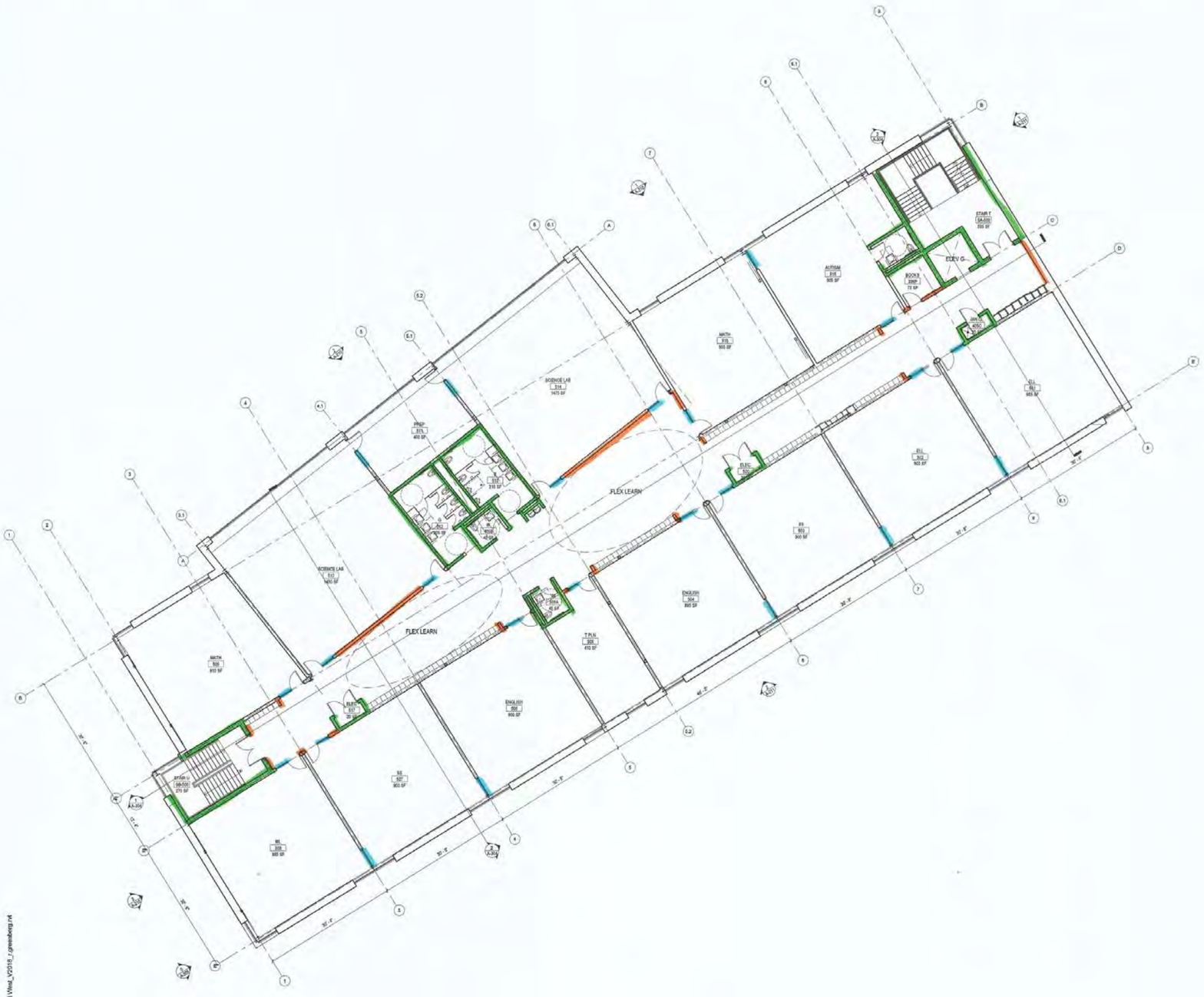

1 **FIFTH FLOOR - FRESHMAN ACADEMY**
1/8" = 1'-0"

LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- NEW DOOR AND DOOR FRAME
- NEW CONSTRUCTION
- INFILL CONCRETE SLAB

NO.	DATE	ISSUE

GENERAL NOTES - WEST CAMPUS

1. SEE ARCHITECTURAL NARRATIVE AND ROOM DATA SHEETS FOR ADDITIONAL INFO INCLUDING FOR SPECIALTY GLAZING.
2. ALL ITEMS IN THESE DRAWINGS ARE NEW (N) UNLESS NOTED AS EXISTING (E) OR EXISTING TO REMAIN (ETR).
3. SEE LIFE SAFETY PLANS FOR WALL RATINGS.
4. SEE SHEET A-602 FOR PARTITION TYPES. SEE SEPARATE FLOOR PLANS FOR LOCATION OF PARTITION TYPES.
5. PATCH (E) SLABS @ ABANDONED PENETRATIONS & TRENCHES FOR NEW SANITARY LINES.
6. REPLACE ALL EXTERIOR (E) SEALANT.
7. REPLACE (E) BROKEN BRICK.
8. REMOVE EFFLOURESCENCE.
9. REPOINT ETR MASONRY.
10. PROVIDE INSULATED METAL PANEL WHERE CURTAINWALL CROSSES PARTITIONS. PROVIDE SPANDREL PANELS WHERE CURTAINWALL CROSSES FLOOR SLABS.

NOTES - WEST CAMPUS

W.1 PROVIDE SPRINKLERS UNDER (E) WOOD FRAMED ROOFS
W.2 REPAIR (E) CRACK IN EXPOSED FOUNDATION WALL w/ EPOXY INJECTION
W.3 REPLACEMENT ROOF ASSEMBLY
W.4 PROVIDE RESILIENT FLOORING TREADS/RISERS AND LANDINGS. PROVIDE REPLACEMENT MTL RAILINGS & GUARDRAILS. REPLACE DAMAGED CONCRETE PAN. SEE NARRATIVE FOR ADDITIONAL INFO.
W.5 PROVIDE WOOD FRAMED INFILL OF TIERED PLATFORM
W.6 PROVIDE SEALANT @ RELIEVING ANGLE
W.7 EXPANSION JOINT ETWN (E) & (N) CONSTRUCTION
W.8 EXPANSION JOINT @ FIRE WALL
W.9 PATCH (E) CONCRETE SLAB. SEE STRUCTURAL DWGS
W.10 TELESCOPIC BLEACHERS
W.11 MECHANICAL UNIT. SEE MECH DWGS
W.12 RECESSED ENTRY MAT
W.13 POLISHED FINISHED C.M.U. TO 10'-0" AFF, MTL PANEL ABOVE @ COLUMNS & SOFFIT, TYP.
W.14 POLISHED FINISHED C.M.U. SEE 3D REPRESENTATIONS FOR PATTERNS.
W.15 ETR BRICK MASONRY
W.16 BRICK MASONRY, SEE 3D REPRESENTATIONS FOR PATTERNS.
W.17 REPLACEMENT PRECAST FACE BRICK LINTEL, TYP @ ALL REPLACEMENT WINDOWS.
W.18 ROLL-UP MESH GYM DIVIDER CURTAIN
W.19 MECHANICAL EQUIPMENT SCREEN

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 6
Boston, MA 02108
T. +1 617 440 4000
F. +1 617 440 4040

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Strett, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
375 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
375 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crestview McGrath
181 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope consultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd, Hollliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIFTH FLOOR FLOOR PLAN - FRESHMAN ACADEMY

SCALE: As indicated

A-105F

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

INTERIOR PARTITION TYPES

SD COST
12.17.2018
SEE A-111C FOR LEGEND

PROGRAM LEGEND

- ADMIN
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, TECHNOLOGY, BUSINESS
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- COMMON/PUBLIC SPACES
- CIRCULATION (INCLUDING STAIRS & RAMPS)

10' 20' 40'

1 **BASEMENT PROGRAM PLAN**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
BASEMENT PROGRAM PLAN

SCALE: As indicated

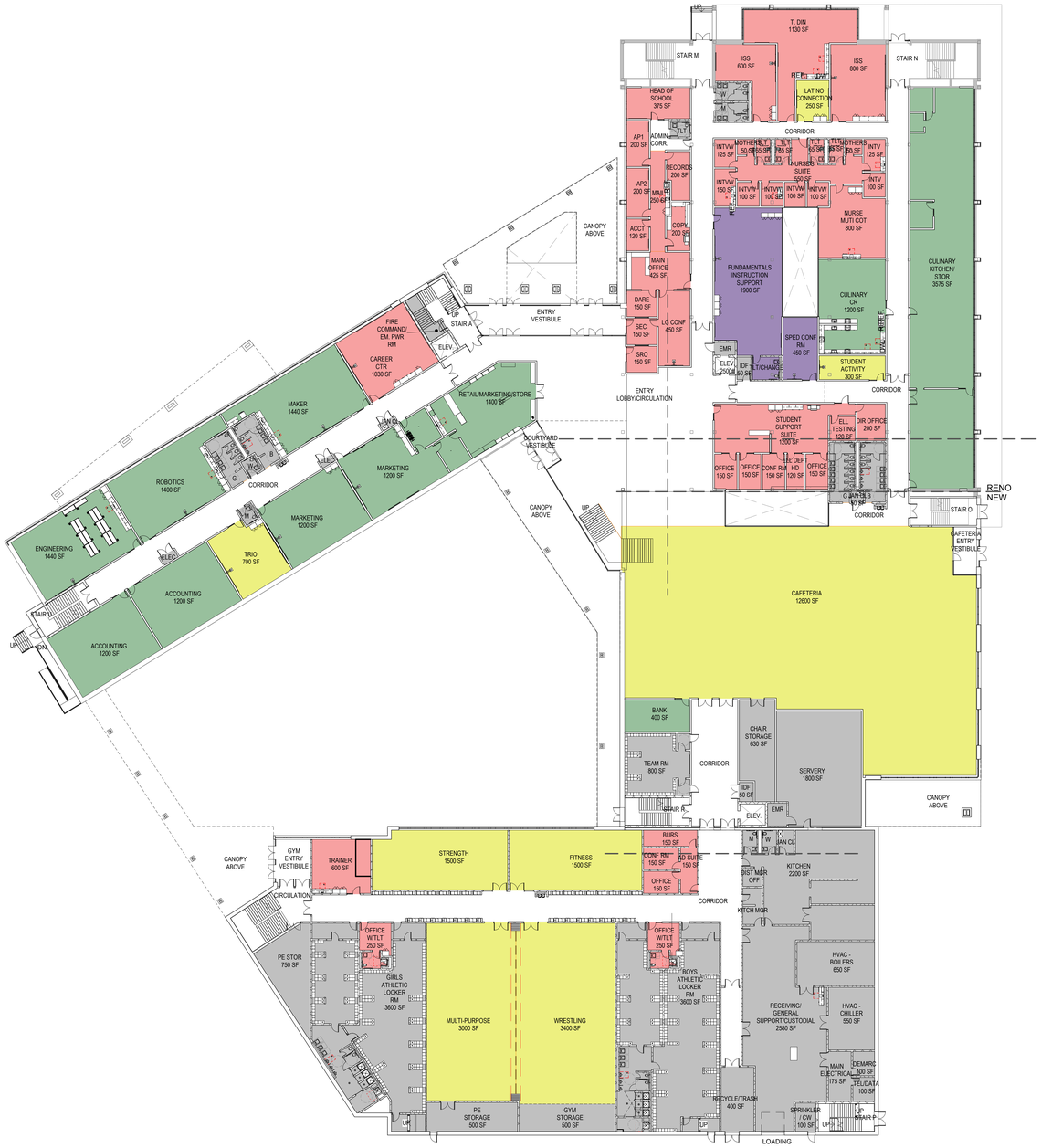
PROG-100

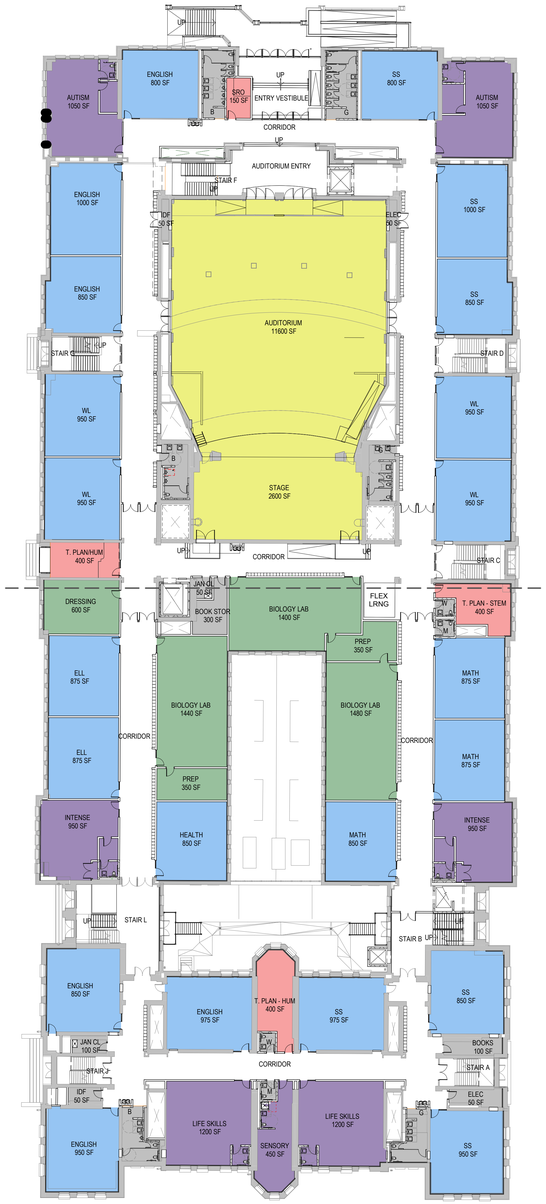
SCHEMATIC DESIGN SUBMISSION

02/20/2018

PROGRAM LEGEND

- ADMIN
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, TECHNOLOGY, BUSINESS
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- COMMON/PUBLIC SPACES
- CIRCULATION (INCLUDING STAIRS & RAMPS)





1 **FIRST FLOOR PROGRAM PLAN**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
FIRST FLOOR PROGRAM PLAN

SCALE: As indicated

PROG-101

SCHEMATIC DESIGN SUBMISSION

02/20/2018

PROGRAM LEGEND

- ADMIN
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, TECHNOLOGY, BUSINESS
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- COMMON/PUBLIC SPACES
- CIRCULATION (INCLUDING STAIRS & RAMPS)

1 **SECOND FLOOR PROGRAM PLAN**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:

155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollaston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
SECOND FLOOR PROGRAM PLAN

SCALE: As indicated

PROG-102

SCHEMATIC DESIGN SUBMISSION

02/20/2018

PROGRAM LEGEND

- ADMIN
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, TECHNOLOGY, BUSINESS
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- COMMON/PUBLIC SPACES
- CIRCULATION (INCLUDING STAIRS & RAMPS)

10' 20' 40'

1 **THIRD FLOOR PROGRAM PLAN**
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:

155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD,
LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
THIRD FLOOR PROGRAM PLAN

SCALE: As indicated

PROG-103

SCHEMATIC DESIGN SUBMISSION

02/20/2018

PROGRAM LEGEND

- ADMIN
- ART, MUSIC, TECHNOLOGY
- CLASSROOMS
- SPECIAL EDUCATION
- SCIENCE LAB, TECHNOLOGY, BUSINESS
- CUSTODIAL, MAINTENANCE, STORAGE, UTILITY
- COMMON/PUBLIC SPACES
- CIRCULATION (INCLUDING STAIRS & RAMPS)

2 **FIFTH FLOOR PROGRAM PLAN**

3/64" = 1'-0"

10' 20' 40'

1 **FOURTH FLOOR PROGRAM PLAN**

3/64" = 1'-0"

10' 20' 40'

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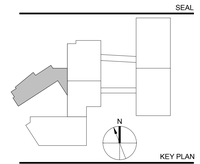
NO.	DATE	ISSUE

SEAL



KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:

155 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
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370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Security Consultant Name
Security Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollaston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:

LOWELL HIGH SCHOOL

50 FATHER MORISSETTE BOULEVARD, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:

FOURTH & FIFTH FLOOR PROGRAM PLANS

SCALE: As indicated

PROG-104

SCHEMATIC DESIGN SUBMISSION

02/20/2018

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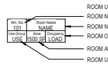
LIFE SAFETY SYMBOLS LEGEND



ROOM USE OCCUPANCY LOAD
ROOM NUMBER
ROOM NAME
ROOM OCCUPANCY
ROOM AREA-NET OR GROSS AS REQ'D PER CODE
ROOM USE GROUP

SMOKE PARTITION
SMOKE BARRIER
1 - HOUR FIRE BARRIER
1 1/2 HOUR FIRE BARRIER
2 - HOUR FIRE BARRIER
3 - HOUR FIRE BARRIER
2 - HOUR FIRE WALL
3 - HOUR FIRE WALL

FEC — FIRE EXTINGUISHER AND CABINET
FEW — FIRE EXTINGUISHER AND WALL MOUNTING BRACKET
STP — STAND PIPE

EXIT SIGN (SINGLE SIDED, DOUBLE SIDED, W/ DIRECTIONAL ARROW, WALL MOUNTED)

EGRESS COMPONENT CAPACITY
DOOR NUMBER
ACTUAL EGRESS OCCUPANCY OF DOOR
MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF EXIT

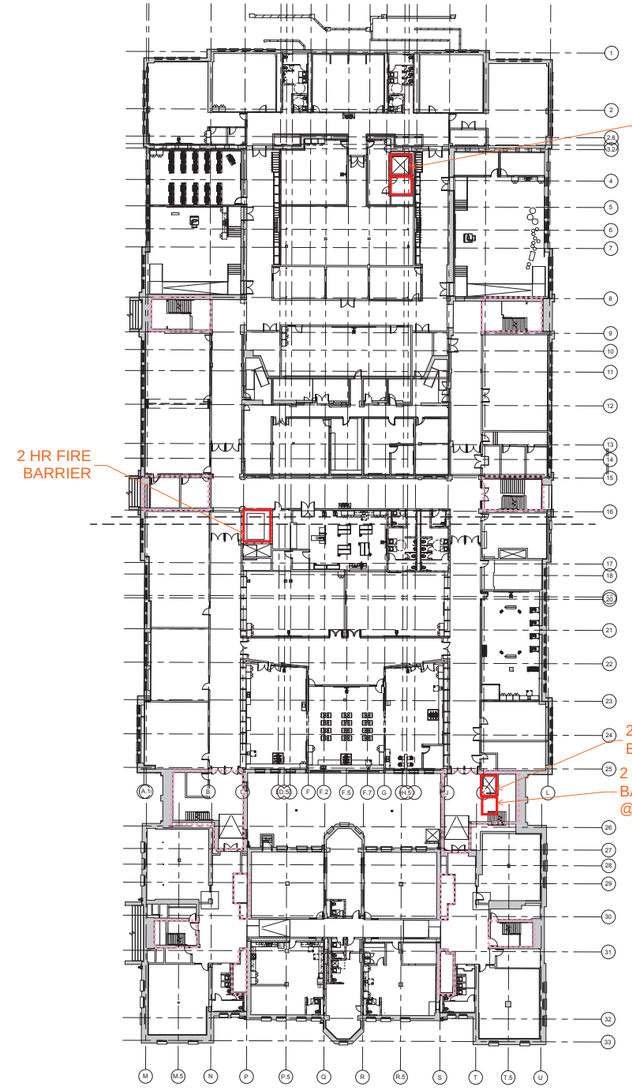
OCCUPANCY CALCULATION
CALCULATED OCCUPANCY
AREA IN SQUARE FEET
OCCUPANCY LOAD FACTOR

MAXIMUM TRAVEL DISTANCE
FROM FURTHEST POINT

DIRECTION OF TRAVEL
WITH ACCUMULATED OCCUPANCY LOAD

MAINTAIN EXISTING ENCLOSURE'S RATING

SEE CODE REPORT ON A-000 FOR ADDITIONAL INFORMATION



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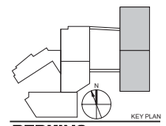


KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 9
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Buhl Roberts & Associates, Inc.
Washington Street Newton, MA 02462

hanical:
cia, Galuska, DeSousa, Inc.
Faunce Corner Road Dartmouth, MA 02747

trical:
wecia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
LIFE SAFETY OVERALL BASEMENT PLAN

SCALE: As indicated

G-100

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

1 **BASEMENT - EAST**
3/64" = 1'-0"

12/17/2018

LIFE SAFETY SYMBOLS LEGEND

ROOM USE OCCUPANCY LOAD
ROOM NUMBER
ROOM NAME
ROOM OCCUPANCY
ROOM AREA-NET OR GROSS AS REQ'D PER CODE
ROOM USE GROUP

SMOKE PARTITION
SMOKE BARRIER
1 - HOUR FIRE BARRIER
1 1/2 HOUR FIRE BARRIER
2 - HOUR FIRE BARRIER
3 - HOUR FIRE BARRIER
2 - HOUR FIRE WALL
3 - HOUR FIRE WALL

FEC — FIRE EXTINGUISHER AND CABINET
FEW — FIRE EXTINGUISHER AND WALL MOUNTING BRACKET
STP — STAND PIPE
EXIT SIGN (SINGLE SIDED, DOUBLE SIDED, W/ DIRECTIONAL ARROW, WALL MOUNTED)

EGRESS COMPONENT CAPACITY
DOOR NUMBER
ACTUAL EGRESS OCCUPANCY OF DOOR
MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF EXIT

OCCUPANCY CALCULATION
CALCULATED OCCUPANCY
AREA IN SQUARE FEET
OCCUPANCY LOAD FACTOR

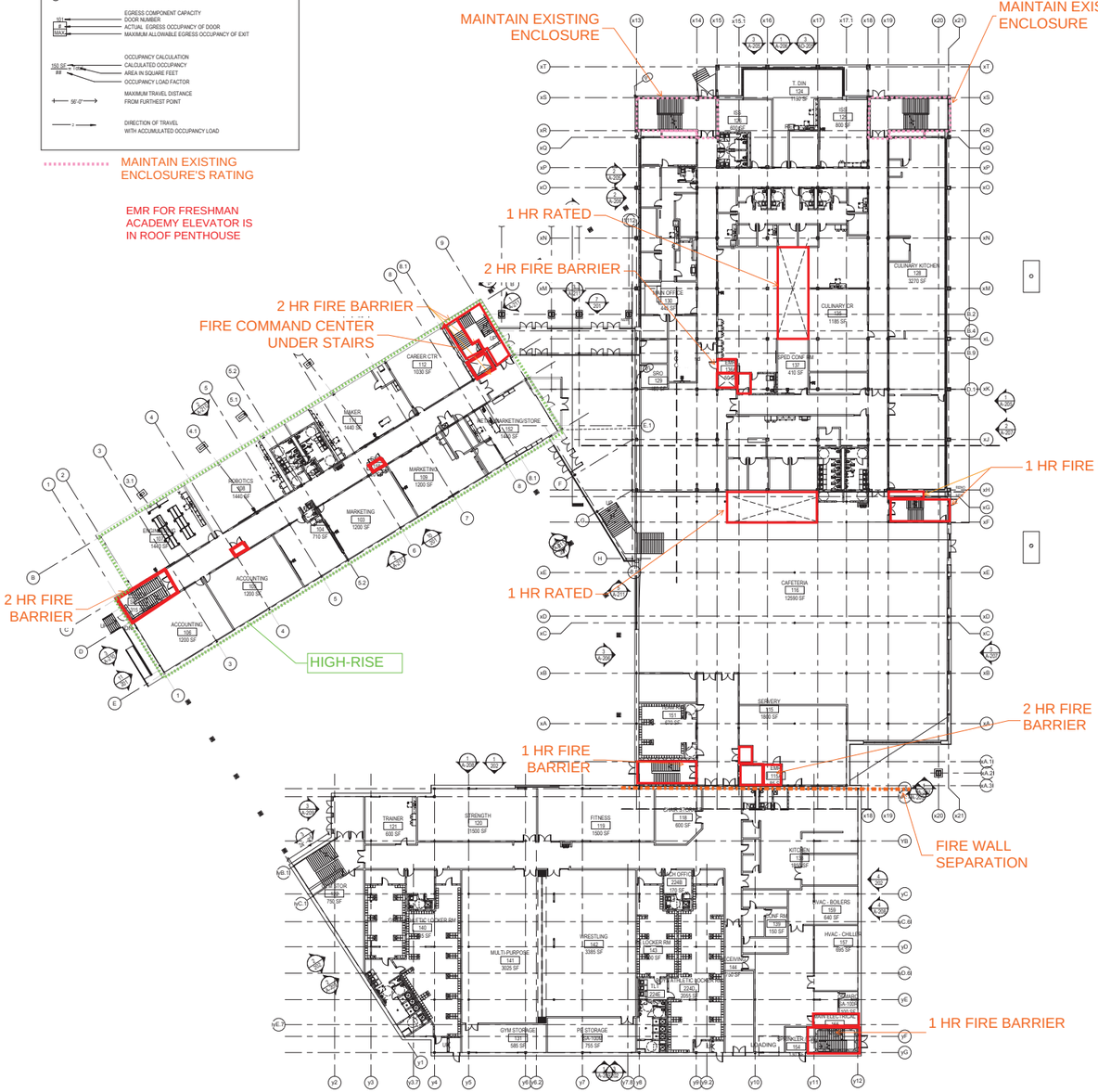
MAXIMUM TRAVEL DISTANCE FROM FURTHEST POINT

DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANCY LOAD

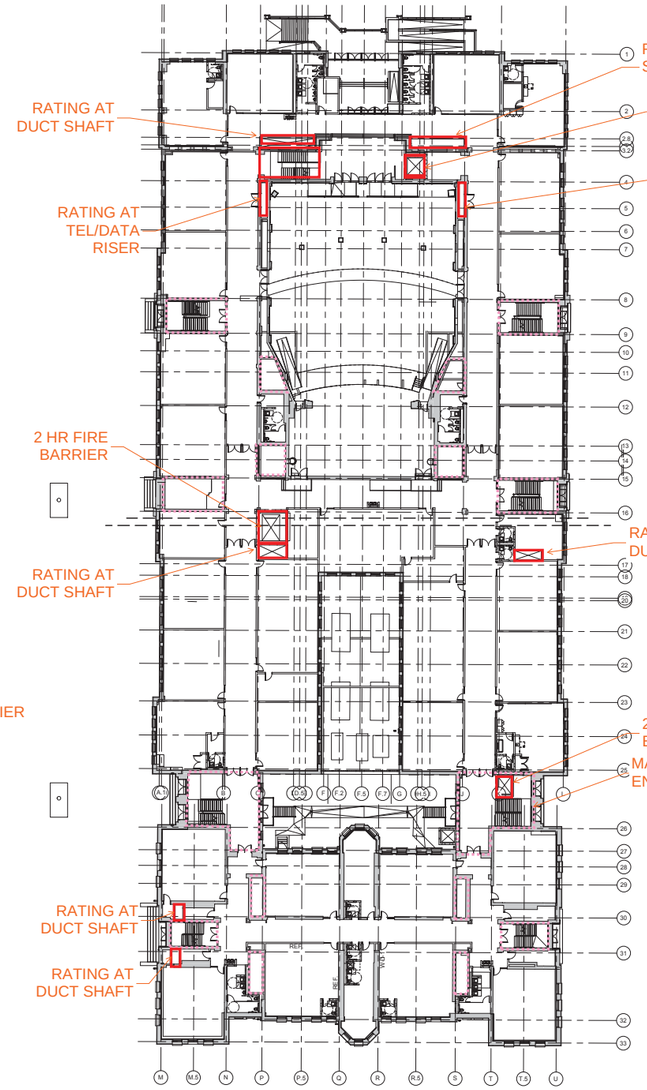
MAINTAIN EXISTING ENCLOSURE'S RATING

EMR FOR FRESHMAN ACADEMY ELEVATOR IS IN ROOF PENTHOUSE

SEE CODE REPORT ON A-000 FOR ADDITIONAL INFORMATION



1 **FIRST FLOOR - LIFE SAFETY**
3/64" = 1'-0"



NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 9
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

:k Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

ural:
y Buhl Roberts & Associates, Inc.
Washington Street Newton, MA 02462

sa, Inc.
Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
LIFE SAFETY OVERALL FIRST FLOOR PLAN

SCALE: As indicated

G-101

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

12/17/2018

LIFE SAFETY SYMBOLS LEGEND

ROOM USE OCCUPANCY LOAD
ROOM NUMBER
ROOM NAME
ROOM OCCUPANCY
ROOM AREA-NET OR GROSS AS REQ'D PER CODE
ROOM USE GROUP

SMOKE PARTITION
SMOKE BARRIER
1 - HOUR FIRE BARRIER
1 1/2 HOUR FIRE BARRIER
2 - HOUR FIRE BARRIER
3 - HOUR FIRE BARRIER
2 - HOUR FIRE WALL
3 - HOUR FIRE WALL

FEC — FIRE EXTINGUISHER AND CABINET
FEW — FIRE EXTINGUISHER AND WALL MOUNTING BRACKET
STP — STAND PIPE
EXIT SIGN (SINGLE SIDED, DOUBLE SIDED, W/ DIRECTIONAL ARROW, WALL MOUNTED)

EGRESS COMPONENT CAPACITY
DOOR NUMBER
ACTUAL EGRESS OCCUPANCY OF DOOR
MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF EXIT

OCCUPANCY CALCULATION
CALCULATED OCCUPANCY
AREA IN SQUARE FEET
OCCUPANCY LOAD FACTOR

MAXIMUM TRAVEL DISTANCE FROM FURTHEST POINT

DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANCY LOAD

MAINTAIN EXISTING ENCLOSURE'S RATING

SEE CODE REPORT ON A-000 FOR ADDITIONAL INFORMATION

MAINTAIN EXISTING ENCLOSURE
1 HR RATED
2 HR FIRE BARRIER
2 HR FIRE BARRIER
2 HR FIRE BARRIER @ ALL ELECTRICAL ROOMS
1 HR RATED
1 HR FIRE BARRIER
2 HR FIRE BARRIER
FIRE WALL SEPARATION
1 HR FIRE BARRIER
HIGH-RISE

MAINTAIN EXISTING ENCLOSURE
SMOKE RESITANT
SMOKE RESISTANT
1 HR FIRE BARRIER
SMOKE RESITANT
2 HR RATING AT DUCT SHAFT
2 HR RATING AT TEL/DATA RISER
2 HR RATING AT DUCT SHAFT, TYP.
2 HR RATING AT DUCT SHAFT
2 HR RATING AT TEL/DATA RISER, TYP.
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT

1 **SECOND FLOOR - LIFE SAFETY**
3/64" = 1'-0"

NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 9
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

teet, Lowell, MA 08152

ger:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

rice:
r McGrath
1 Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Hollliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
LIFE SAFETY OVERALL SECOND FLOOR PLAN

SCALE: As indicated

G-102

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

12/17/2018

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LIFE SAFETY SYMBOLS LEGEND

ROOM USE OCCUPANCY LOAD
ROOM NUMBER
ROOM NAME
ROOM OCCUPANCY
ROOM AREA-NET OR GROSS AS REQ'D PER CODE
ROOM USE GROUP

SMOKE PARTITION
SMOKE BARRIER
1 - HOUR FIRE BARRIER
1 1/2 HOUR FIRE BARRIER
2 - HOUR FIRE BARRIER
3 - HOUR FIRE BARRIER
2 - HOUR FIRE WALL
3 - HOUR FIRE WALL

FEC FIRE EXTINGUISHER AND CABINET
FEW FIRE EXTINGUISHER AND WALL MOUNTING BRACKET
STP STAND PIPE

EXIT SIGN (SINGLE SIDED, DOUBLE SIDED, W/ DIRECTIONAL ARROW, WALL MOUNTED)

EGRESS COMPONENT CAPACITY
DOOR NUMBER
ACTUAL EGRESS OCCUPANCY OF DOOR
MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF EXIT

OCCUPANCY CALCULATION
CALCULATED OCCUPANCY
AREA IN SQUARE FEET
OCCUPANCY LOAD FACTOR

MAXIMUM TRAVEL DISTANCE FROM FURTHEST POINT

DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANCY LOAD

MAINTAIN EXISTING ENCLOSURE'S RATING

SEE CODE REPORT ON A-000 FOR ADDITIONAL INFORMATION

MAINTAIN EXISTING ENCLOSURE
1 HR RATED
2 HR FIRE BARRIER
1 HR RATED
2 HR FIRE BARRIER
1 HR FIRE BARRIER
1 HR RATED
2 HR FIRE BARRIER
1 HR FIRE BARRIER
FIRE WALL SEPARATION
2 HR GENERATOR ROOM
1 HR FIRE BARRIER @ FIRE PUMP
1 HR FIRE BARRIER
HIGH-RISE

2 HR RATING AT DUCT SHAFT
2 HR RATING AT TEL/DATA RISER
2 HR RATING AT DUCT SHAFT
2 HR RATING AT TEL/DATA RISER
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT
2 HR RATING AT DUCT SHAFT

1 THIRD FLOOR - LIFE SAFETY
3/64" = 1'-0"

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NO. DATE ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 8
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

ack Street, Lowell, MA 08152

Construction Manager:
Construction Manager Name
Construction Manager Address

Civil / Site:
Nitsch Engineering
2 Center Plaza Suite 430 Boston, MA 02108

Landscape:
Traverse Landscape Architects
150 Chestnut Street, 4th Floor Providence, RI 02903

Structural:
Foley Buhl Roberts & Associates, Inc.
2150 Washington Street Newton, MA 02462

Mechanical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Electrical:
Garcia, Galuska, DeSousa, Inc.
370 Faunce Corner Road Dartmouth, MA 02747

Plumbing & Fire Protection:
VAV International
400 West Cummings Park #400 Woburn, MA 01801

d Service:
abree McGrath
1 West Main Street Georgetown, MA 01833

urity:
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Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanaugh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
LIFE SAFETY OVERALL THIRD FLOOR PLAN

SCALE: As indicated

G-103

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

12/17/2018

SEE CODE REPORT ON A-000 FOR ADDITIONAL INFORMATION

LIFE SAFETY SYMBOLS LEGEND

ROOM USE OCCUPANCY LOAD
ROOM NUMBER
ROOM NAME
ROOM OCCUPANCY
ROOM AREA-NET OR GROSS AS REQ'D PER CODE
ROOM USE GROUP

SMOKE PARTITION
SMOKE BARRIER
1 - HOUR FIRE BARRIER
1 1/2 HOUR FIRE BARRIER
2 - HOUR FIRE BARRIER
3 - HOUR FIRE BARRIER
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3 - HOUR FIRE WALL

FEC — FIRE EXTINGUISHER AND CABINET
FEW — FIRE EXTINGUISHER AND WALL MOUNTING BRACKET
STP — STAND PIPE
EXIT SIGN (SINGLE SIDED, DOUBLE SIDED, W/ DIRECTIONAL ARROW, WALL MOUNTED)

EGRESS COMPONENT CAPACITY
DOOR NUMBER
ACTUAL EGRESS OCCUPANCY OF DOOR
MAXIMUM ALLOWABLE EGRESS OCCUPANCY OF EXIT

OCCUPANCY CALCULATION
CALCULATED OCCUPANCY
AREA IN SQUARE FEET
OCCUPANCY LOAD FACTOR

MAXIMUM TRAVEL DISTANCE FROM FURTHEST POINT

DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANCY LOAD

MAINTAIN EXISTING ENCLOSURE'S RATING

2 HR FIRE BARRIER

HIGH-RISE

2 HR FIRE BARRIER @ ALL ELECTRICAL ROOMS

2 FIFTH FLOOR - LIFE SAFETY
3/64" = 1'-0"

1 FOURTH FLOOR - LIFE SAFETY
3/64" = 1'-0"

3 ATTIC - LIFE SAFETY
3/64" = 1'-0"

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NO.	DATE	ISSUE

SEAL

KEY PLAN

PERKINS EASTMAN
20 Ashburton Place, Floor 9
Boston, MA 02108
T. +1 617 449 4000
F. +1 617 449 4049

Owner:
375 Merrimack Street, Lowell, MA 08152

Construction Manager:
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Construction Manager Address

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400 West Cummings Park #400 Woburn, MA 01801

Food Service:
Crabtree McGrath
161 West Main Street Georgetown, MA 01833

Security:
Planning / Zoning Consultant Name
Planning / Zoning Consultant Address

Envelope Consultant:
Envelope Consultant Name
Envelope onsultant Address

Code Consultant:
Hastings Consulting
142 Hanlon Rd. Holliston, MA 01746

Acoustical Consultant:
Cavanagh Tocci
327 F Boston Post Road Sudbury, MA 01776

PROJECT TITLE:
LOWELL HIGH SCHOOL

155 MERRIMACK STREET, LOWELL, MA 08152

PROJECT No: 67150

DRAWING TITLE:
LIFE SAFETY OVERALL FOURTH & FIFTH FLOOR PLANS

SCALE: As indicated

G-104

SCHEMATIC DESIGN - ESTIMATE

12/17/2018

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FF&E/T - SCHEMATIC DESIGN ESTIMATE
LOWELL HIGH SCHOOL

ROOM TYPE	# OF RMS	F-EACH	FURNITURE TOTAL	E-EACH	EQUIPMENT TOTAL	TECH-EACH (inc. IWB/LCD; Teacher/Staff Computer)	TECH EQ TOTAL	TECH-LAB (24-28 Student desktop or laptops)	TOTAL	Comments
CORE ACADEMIC SPACES										
Classroom - Freshman (incl Health)	24	$13,000	$312,000	$1,000	$24,000	$7,500	$180,000		$516,000	
Classroom - Gr. 10-12 (incl. Health & ELL)	88	$13,000	$1,144,000	$1,000	$88,000	$7,500	$660,000		$1,892,000	
Teacher Planning - Freshman	4	$10,000	$40,000	$0	$0	$3,500	$14,000		$54,000	Tech - LCD's
Tchr Plng (Tch-Out, Lng, Ktch, Comp, Copy)	15	$6,000	$90,000	$0	$0	$3,500	$52,500		$142,500	
Dept Off.(Inst/Curr, Arts, Eng, Mth, Sci, SS)	6	$5,000	$30,000	$0	$0	$1,500	$9,000		$39,000	
Teacher Develop/Training (Little Thtr + Cntrl)	1	$35,000	$35,000	$0	$0	$7,500	$7,500		$42,500	
Small Group Seminar (20-30 seats)	6	$8,500	$51,000	$750	$4,500	$7,500	$45,000		$100,500	
Science Classroom / Lab - Freshman	8	$7,500	$60,000	$10,000	$80,000	$7,500	$60,000		$200,000	Epoxy Lab Tables - Casework
Science Classroom / Lab - Gr.10-12	20	$7,500	$150,000	$10,000	$200,000	$7,500	$150,000		$500,000	Lab Tables - Casework
Prep Room	15		$0	$0	$0	$0	$0		$0	Casework, EQ included in Science Clr
Central Chemical Storage Rm	1	$3,000	$3,000	$0	$0	$0	$0		$3,000	
Unassigned Green House/Growing Room	Incl. Above									
Clean Room (w/ Micro/Bio Tech Lab)	Incl. Above									Casework
SPECIAL EDUCATION										
LIFE SKILLS (69 stu's =78 prorated)										
Life Skills Labs (CRs + Kitch/Laundry/Mail)	4	$15,000	$60,000	$5,000	$20,000	$7,500	$30,000		$110,000	
Life Skills Hygene (Wash/Changing Room)	1	$3,750	$3,750	$2,500	$2,500	$0	$0		$6,250	
Life Skills Intensive CR +Tlt	2	$5,500	$11,000	$5,000	$10,000	$7,500	$15,000		$36,000	
Life Skills Sensory CR	1	$3,750	$3,750	$2,500	$2,500	$7,500	$7,500		$13,750	
Life Skills (CSA) Autism CR + Tlt	8	$7,500	$60,000	$5,000	$40,000	$7,500	$60,000		$160,000	
Life Skills Adaptive PE / SPED PE	2	$7,500	$15,000	$5,000	$10,000	$7,500	$15,000		$40,000	
ADJUSTMENTS (40 stu's =46 prorated)										
Adjustments CR	8	$18,000	$144,000	$5,000	$40,000	$7,500	$60,000		$244,000	
Adjust Social Worker	1	$3,500	$3,500	$0	$0	$1,500	$1,500		$5,000	
Counseling Room	1	$2,500	$2,500	$0	$0	$1,500	$1,500		$4,000	
Storage	1	$2,000	$2,000	$0	$0	$0	$0		$2,000	
FUNDAMNTL (190 stu's =214 prorated)										
Fundamentals - Freshman	2	$6,000	$12,000	$1,000	$2,000	$7,500	$15,000		$29,000	
Fundamentals - Gr.10-12	8	$6,000	$48,000	$1,000	$8,000	$7,500	$60,000		$116,000	
Fundamentals Instructional Support CR (for 24+)	1	$18,000	$18,000	$1,000	$1,000	$7,500	$7,500		$26,500	
OTHER SPECIAL NEEDS										
OT/PT (Part-time) - therapy in CRs	0	$0	$0	$0	$0	$0	$0		$0	
Deaf/Hearing Impared Suite	1	$8,500	$8,500	$5,000	$5,000	$1,500	$1,500		$15,000	
Speech/PT (Office for 3 + mtgs)	1	$6,500	$6,500	$0	$0	$1,500	$1,500		$8,000	
Psych + Evaluator/Testing	4	$5,500	$22,000	$0	$0	$1,500	$6,000		$28,000	
Social Worker	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
SPED Dept Chair	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
SPED Team Chair	2	$5,500	$11,000	$0	$0	$1,500	$3,000		$14,000	

ROOM TYPE	# OF RMS	F-EACH	FURNITURE TOTAL	E-EACH	EQUIPMENT TOTAL	TECH-EACH (inc. IWB/LCD; Teacher/Staff Computer)	TECH EQ TOTAL	TECH-LAB (24-28 Student desktop or laptops)	TOTAL	Comments
SPED Office/Waiting	1	$8,000	$8,000	$0	$0	$1,500	$1,500		$9,500	
Conference (1 for 12, 1 for 20)	2	$7,500	$15,000	$0	$0	$7,500	$15,000		$30,000	
ART & MUSIC										
Art CR (incl. Photo/Anim, Graph, TV Prod)	6	$17,000	$102,000	$5,000	$30,000	$7,500	$45,000	$135,000	$312,000	TECH-LAB for 3 of 6 Clr
Art Workroom w/ Storage & kiln	6	$2,000	$12,000	$2,000	$12,000	$0	$0		$24,000	
Band - 50 - 100 seats	1	$7,500	$7,500	$15,000	$15,000	$7,500	$7,500		$30,000	
Chorus - 50 - 100 seats (incl. Drama)	1	$10,000	$10,000	$0	$0	$7,500	$7,500		$17,500	
Music Practice (incl. Guitar)	5	$1,000	$5,000	$0	$0	$0	$0		$5,000	
Music Storage	2	$0	$0	$25,000	$50,000	$0	$0		$50,000	Casework - Instrument Storage
Piano/Digital Lab	1	$20,000	$20,000	$0	$0	$7,500	$7,500	$30,000	$57,500	TECH-LAB for 20
Music Admin - Conf/ Off	1	$3,000	$3,000	$0	$0	$0	$0		$3,000	
Dance (also uses stage)	2	$0	$0	$2,500	$5,000	$0	$0		$5,000	
VOCATIONS & TECHNOLOGY										
ROTC Classroom (385 stu = 434 prorated)	5	$13,000	$65,000	$1,000	$5,000	$7,500	$37,500	$45,000	$152,500	
Culinary Arts Classroom	2	$12,000	$24,000	$1,000	$2,000	$7,500	$15,000		$41,000	
Business (Accounting/Pers-Finance/Law)	2	$15,000	$30,000	$1,000	$2,000	$7,500	$15,000	$90,000	$137,000	
Business (Mktg/Sports Mktg) **CH.74**	incl. below									
Business (Retail Mktg - CR) **CH.74**	3	$15,000	$45,000	$3,000	$9,000	$7,500	$22,500	$135,000	$211,500	
Business (Retail Mktg - Store) **CH.74**	incl. above									
Tech Clrm. - (E.G. Drafting, Business)	inc. above									TECH-LAB for 6 of 12 Clr
ROTC MP/Gym w/ Stor (Drills/Band)	1	$5,000	$5,000	$5,000	$5,000	$7,500	$7,500		$17,500	
Culinary Arts Kitch + Restaurant (for 25-30)	1	$15,000	$15,000	$15,000	$15,000	$7,500	$7,500		$37,500	
Costume Shop w/ Sewing, Storage	1	$7,500	$7,500	$15,000	$15,000	$0	$0		$22,500	
Scene Shop	1	$7,500	$7,500	$15,000	$15,000	$0	$0		$22,500	
TV Studio (w/ cntrl, edit/scrn, off/wait, equip)	1	$10,000	$10,000	$50,000	$50,000	$0	$0		$60,000	
Robotics/CADD (w/ Engnr)	2	$15,000	$30,000	$5,000	$10,000	$7,500	$15,000		$55,000	
Clean Enegry Lab (w/ Engnr)	1	$15,000	$15,000	$5,000	$5,000	$7,500	$7,500		$27,500	
Maker Space (w/ Freshman Integr. Sci)	1	$15,000	$15,000	$30,000	$30,000	$7,500	$7,500		$52,500	
Business (Bank/Credit Union)	1	$0	$0	$0	$0	$0	$0		$0	
									$0	
ROTC Off/ Conf.	2	$5,000	$10,000	$0	$0	$7,500	$15,000		$25,000	
ROTC Storage (4sf/cadet, 400sf min)	3	$10,000	$30,000	$0	$0	$0	$0		$30,000	
Culinary Arts Storage	2	$0	$0	$0	$0	$0	$0		$0	
Scene Shop and Costume Stg. (incl. in rooms)	incl.									
Retail/Store Storage	1	$2,000	$2,000		$0	$0	$0		$2,000	
HEALTH & PHYSICAL EDUCATION										
Gymnasium (w/ 150-200m track, LJ, TJ)	6	$0	$0	$20,000	$120,000	$0	$0		$120,000	
PE Alternatives (Wrestling 42x84)	1	$0	$0	$20,000	$20,000	$0	$0		$20,000	
Fitness & Functional Strength	1	$0	$0	$100,000	$100,000	$0	$0		$100,000	
Multi Purpose (Gymnastics/Yoga/Cheering)	1	$0	$0	$75,000	$75,000	$0	$0		$75,000	
Gym Storeroom (incl. Gymnastics w/ MP)	1	$5,000	$5,000	$0	$0	$0	$0		$5,000	
Locker Rooms - Boys / Girls w/ Toilets	2	$0	$0	$0	$0	$0	$0		$0	
Varsity Lockers - Boys/ Girls w/ Toilets	3	$0	$0	$0	$0	$0	$0		$0	
Phys. Ed. Storage (incl. Equipment)	6	$2,000	$12,000	$0	$0	$0	$0		$12,000	
Athletic Director's Office (Lord 1st fl -South)	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
AD Secr, Bursor, Conf (Lord 1st fl - South)	3	$5,500	$16,500	$0	$0	$1,500	$4,500		$21,000	
Health Instructor's Office w/ Shower & Toilet	4	$2,500	$10,000	$0	$0	$1,500	$6,000		$16,000	

ROOM TYPE	# OF RMS	F-EACH	FURNITURE TOTAL	E-EACH	EQUIPMENT TOTAL	TECH-EACH (inc. IWB/LCD; Teacher/Staff Computer)	TECH EQ TOTAL	TECH-LAB (24-28 Student desktop or laptops)	TOTAL	Comments
Trainers Room	1	$2,500	$2,500	$35,000	$35,000	$1,500	$1,500		$39,000	
MEDIA CENTER										
Media Center / Reading Room	2	$125,000	$250,000	$10,000	$20,000	$15,000	$30,000	$90,000	$390,000	TECH-LAB - 50 to 60 Laptops
Computer Lab (Incl above)	incl. above									
Data Processing + Scheduler (Incl. above)	incl. above									
MCAS/Testing Stor (incl. instru. Specialist)	incl. above									
AUDITORIUM / DRAMA										
Auditorium	1	$0	$0	$0	$0	$0	$0		$0	
Stage	1	$0	$0	$5,000	$5,000	$0	$0		$5,000	
Auditorium Storage (incl Prop Storage)	4	$3,000	$12,000	$0	$0	$0	$0		$12,000	
Make-up / Dressing Rooms	2	$0	$0	$0	$0	$0	$0		$0	Casework
Controls / Lighting / Projection	1	$1,000	$1,000	$0	$0	$0	$0		$1,000	
DINING & FOOD SERVICE										
Cafeteria - Freshman	2	$40,000	$80,000	$0	$0	$15,000	$30,000		$110,000	
Cafeteria / Student Lounge / Break-out	2	$75,000	$150,000	$0	$0	$30,000	$60,000		$210,000	
Chair / Table Storage	1	$0	$0	$0	$0	$0	$0		$0	
Scramble Serving Area	1	$0	$0	$0	$0	$0	$0		$0	
Kitchen - Freshman	1	$0	$0	$0	$0	$0	$0		$0	
Kitchen	1	$0	$0	$25,000	$25,000	$0	$0		$25,000	Kitchen Smallwares
Staff Lunch Room	1	$20,000	$20,000	$0	$0	$3,500	$3,500		$23,500	Tech - LCD
MEDICAL										
Medical Suite Toilet	4	$0	$0	$0	$0	$0	$0		$0	
Nurses' Office / Waiting Room	1	$3,000	$3,000	$5,000	$5,000	$1,500	$1,500		$9,500	
Interview Room	8	$2,500	$20,000	$0	$0	$1,500	$12,000		$32,000	
Examination Room / Resting	10	$0	$0	$5,000	$50,000	$0	$0		$50,000	
Lactation Room	2	$1,000	$2,000	$0	$0	$0	$0		$2,000	
ADMINISTRATION & GUIDANCE										
General Office / Waiting Room / Toilet	1	$2,000	$2,000	$0	$0	$3,000	$3,000		$5,000	
Freshman Office/ Waiting Room/ Toilet	1	$2,000	$2,000	$0	$0	$3,000	$3,000		$5,000	
House Office/ Waiting Room/ Tlt (B, C, D, E)	4	$2,000	$8,000	$0	$0	$3,000	$12,000		$20,000	
Teacher's Mail and Time Room	1	$1,000	$1,000	$0	$0	$0	$0		$1,000	
Duplicating Room - C, D Houses	1	$1,000	$1,000	$0	$0	$5,000	$5,000		$6,000	
Records Room - Main, E House	1	$7,000	$7,000	$0	$0	$0	$0		$7,000	
Principal's Office w/ Conference Area	1	$10,000	$10,000	$0	$0	$7,500	$7,500		$17,500	
Principal's Office w/ Conf. Area - Freshman	1	$6,000	$6,000	$0	$0	$7,500	$7,500		$13,500	
Principal's Secretary/ waiting	1	$4,000	$4,000	$0	$0	$1,500	$1,500		$5,500	
Asst Principal's Office - AP1 (Discipl/Oper)	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
Asst Principal's Office - AP1 (Dir. Of Curric)	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
Assist Principal's Office (B, C, D, E)	4	$5,500	$22,000	$0	$0	$1,500	$6,000		$28,000	
Supervisory / Spare Office Accts Payable)	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
Conference Room (Administration)	1	$10,000	$10,000	$0	$0	$7,500	$7,500		$17,500	
Conference Room - Freshman	1	$3,000	$3,000	$0	$0	$7,500	$7,500		$10,500	
Conference Room - B House	1	$3,000	$3,000	$0	$0	$7,500	$7,500		$7,500	
									$0	
Guidance Office	10	$5,500	$55,000	$0	$0	$1,500	$15,000		$70,000	

ROOM TYPE	# OF RMS	F-EACH	FURNITURE TOTAL	E-EACH	EQUIPMENT TOTAL	TECH-EACH (inc. IWB/LCD; Teacher/Staff Computer)	TECH EQ TOTAL	TECH-LAB (24-28 Student desktop or laptops)	TOTAL	Comments
Guidance Office - Freshman	Incl. Above					$1,500	$1,500		$1,500	
Guidance Office - B, C, D, E House	Incl. Above					$1,500	$1,500		$1,500	
Social Worker Office - Freshman	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
Social Worker Office - B, C, D, E House	4	$5,500	$22,000	$0	$0	$1,500	$6,000		$28,000	
Guidance Waiting Room - C House	5	$1,500	$7,500	$0	$0	$0	$0		$7,500	
Guidance Waiting Room - Freshman	Incl. Above									
Guidance Store Room	4	$2,000	$8,000	$0	$0	$0	$0		$8,000	
Guidance Store Room - Freshman	1	$2,000	$2,000	$0	$0	$0	$0		$2,000	
Career Center	1	$25,000	$25,000	$0	$0	$15,000	$15,000		$40,000	
Records Room - Freshman	5	$5,000	$25,000	$0	$0	$0	$0		$25,000	
Kitchenette - Freshman	1	$0	$0	$0	$0	$0	$0		$0	
Student Support Offices - Freshman	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
Student Support Conf - Freshman	1	$5,000	$5,000	$0	$0	$7,500	$7,500		$12,500	
Student Support Suite (Incl. Safe Harbors)	1	$18,000	$18,000	$0	$0	$4,500	$4,500		$22,500	
Student Support Offices - Gr. 10 -12	3	$5,500	$16,500	$0	$0	$1,500	$4,500		$21,000	
Student Support Conf. Gr. 10 -12	1	$2,000	$2,000	$0	$0	$1,500	$1,500		$3,500	
Director of Student	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
ELL Dept. Head - Testing	2	$5,000	$10,000	$0	$0	$1,500	$3,000		$13,000	
Teachers' Work Room - Freshman	5	$5,000	$25,000	$1,000	$5,000	$3,500	$17,500		$47,500	Tech - LCD's
Trio - Gear Up/Talent/ Upward - Freshman	1	$20,000	$20,000	$1,000	$1,000	$8,000	$8,000		$29,000	
Trio - Upward	Incl. Above									
Trio - Suite (recept, wait, 2 offices, conf.)	Incl. Above									
CUSTODIAL & MAINTENANCE										
Custodian's Office + Lockers	2	$2,500	$5,000	$0	$0	$1,500	$3,000		$8,000	
Custodian's Workshop	1	$7,500	$7,500	$10,000	$10,000	$0	$0		$17,500	
Custodian's Storage	1	$5,000	$5,000	$0	$0	$0	$0		$5,000	
Recycling Room / Trash	1	$0	$0	$5,000	$5,000	$0	$0		$5,000	
Receiving and General Supply	1	$10,000	$10,000	$150,000	$150,000	$0	$0		$160,000	
Storeroom + Books	1	$12,000	$12,000	$0	$0	$0	$0		$12,000	
Network / Telecom Room	1	$3,500	$3,500	$0	$0	$0	$0		$3,500	
OTHER										
Lowell Comm Hlth Center	1									FFE/T - by others
Lowell Comm Hlth Center - Exam										
Lowell Comm Hlth Center - Office										
Lowell Comm Hlth Center - File and Storage										
Lowell Comm Hlth Center - Toilet										
Catie's Closet - Freshman	1									FFE/T - by others
Catie's Closet - Gr.10-12	Incl. Above									
									$0	
									$0	
In School Suspension - Freshman	1	$10,000	$10,000	$0	$0	$7,500	$7,500		$17,500	
In House Detention Gr.10-12	1	$10,000	$10,000	$0	$0	$7,500	$7,500		$17,500	
Score Mediation (Office, Entry, Stor)	2	$0	$0	$0	$0	$0	$0		$0	

ROOM TYPE	# OF RMS	F-EACH	FURNITURE TOTAL	E-EACH	EQUIPMENT TOTAL	TECH-EACH (inc. IWB/LCD; Teacher/Staff Computer)	TECH EQ TOTAL	TECH-LAB (24-28 Student desktop or laptops)	TOTAL	Comments
Interactive Learning Center + Storage	Typ. CRs									
Latino Connection	1	$4,000	$4,000	$0	$0	$1,500	$1,500		$5,500	
Student Activities (Lord 1st fl - North)	1	$5,000	$5,000	$0	$0	$0	$0		$5,000	
Substitute Teacher's Office	1	$5,500	$5,500	$0	$0	$1,500	$1,500		$7,000	
DARE Office & Security	2	$1,500	$3,000	$0	$0	$1,500	$3,000		$6,000	
SRO Office & Entry (Lord 1st fl - North)	2	$1,500	$3,000	$0	$0	$1,500	$3,000		$6,000	
TECH INFRASTRUCTURE HARDWARE										
Telephone (VOIP)							$200,000		$200,000	Does not include wiring/termination
WAP							$250,000		$250,000	Does not include wiring/termination
Data Switches (Core/IDF/UPS)							$400,000		$400,000	Does not include wiring/termination
Servers							$250,000		$250,000	
Student Tablet/Chromebook @ $300 each @ 2:1	3520							$528,000	$528,000	If 1:1, then add $528,000

SUBTOTALS			**$3,877,000**		**$1,438,500**		**$3,140,000**	**$1,053,000**	**$9,505,500**	
Contingency @ 15%			$581,550		$215,775		$471,000	$157,950		
SUBTOTALS W/CONTINGENCY			**$4,458,550**		**$1,654,275**		**$3,611,000**	**$1,210,950**		
				FF&E TOTAL	**$6,112,825**		**TECH TOTAL**	**$4,821,950**		
FF&E/T PROJECT TOTAL								**$10,934,775**		
MSBA Allowance	**3520**	**X**	**$2,400**					**$8,448,000**	**Per Student**	**$2,400**
Project Estimate per Student	**3520**		**(PROJECT TOTAL divided by 3520)**						**Per Student**	**$3,106**
									FF&E per Student	**$1,737**
									Technology per Student	**$1,370**

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APPENDIX H – ROOM DATA SHEETS

- Room Data Sheets

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TYPICAL CLASSROOM (GR. 9- NEW CONSTRUCTION)

FUNCTIONAL CRITERIA

Description: primary teaching and learning space
Area: 900sf Classrooms
Quantity: 24
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: Science, Flex Learning, Teacher Planning
Orientation: north/south exposure for daylight control
Views: Father Morissette/ Quad

TECHNICAL CRITERIA

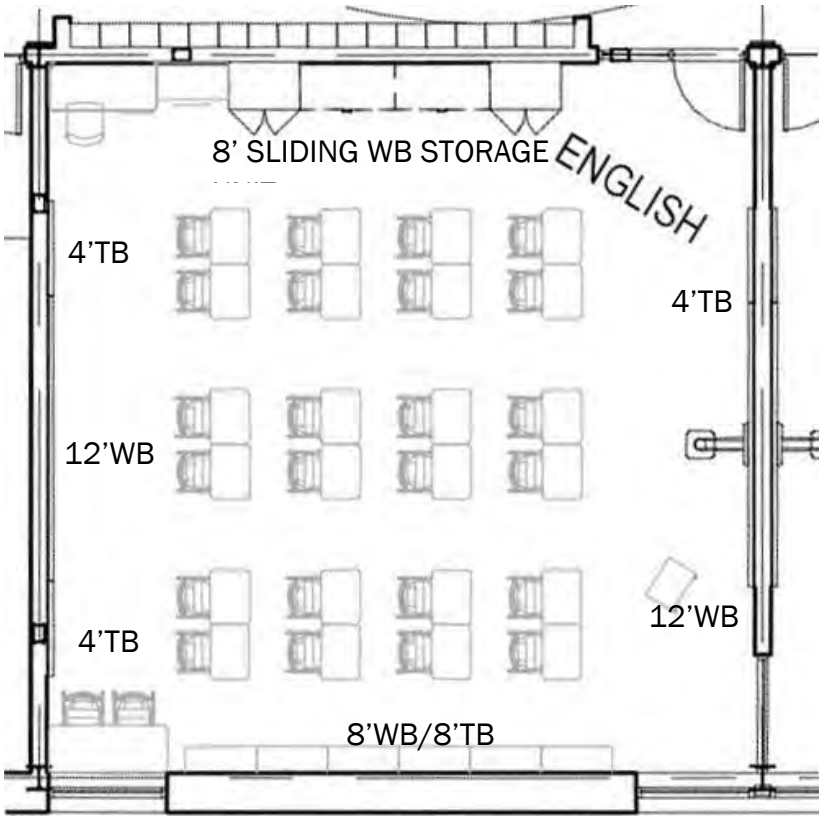
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 8'-8" up to 10'-8" at windows
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open) Interior Glazing between Classrooms as shown.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: upper/lower cabinets with sliding white board, tall storage units
Furnishings: classroom - teacher desks/files/chairs, student tables/chairs, podium, bookcases, 32LF white boards, 20LF tack boards
Equipment: teacher computer, document camera
Storage: in-room cabinets as note

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TYPICAL CLASSROOM (GR. 10-12- RENOVATION)

FUNCTIONAL CRITERIA

Description: primary teaching and learning space
Area: average 920sf renovated classrooms
Quantity: 88
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: Science, Flex Learning, Teacher Planning
Orientation: East/West- varies
Views: Canal/Kirk Street

TECHNICAL CRITERIA

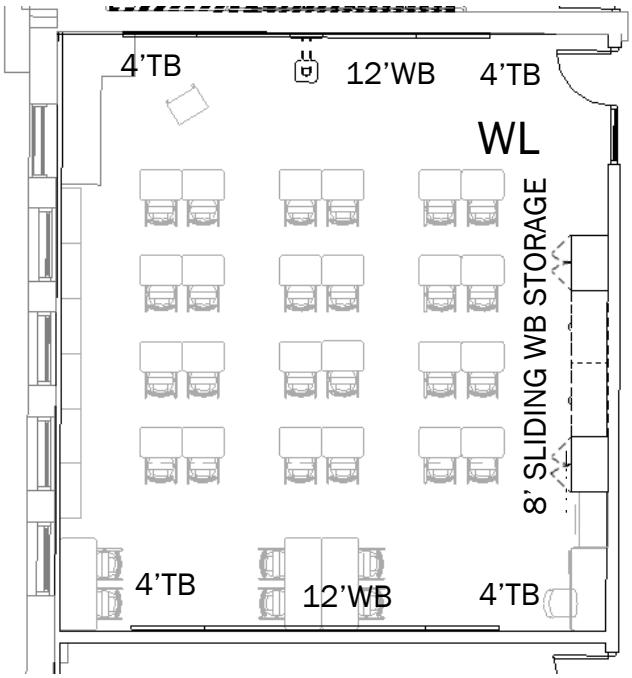
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 9'-6" up to 11'-6" at windows
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: West campus- thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open) Interior light shelves at all windows. Interior Glazing between Classrooms as shown on plans.
East Campus- single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open) Interior light shelves at all windows. Interior Glazing between Classrooms as shown on plans.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: classroom - telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD

FIXTURES / FURNISHINGS

Casework: upper/lower cabinets with sliding white board, tall storage units
Furnishings: classroom - teacher desks/files/chairs, student tables/chairs, podium, bookcases, 24LF white boards, 16LF tack boards
Equipment: teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TEACHER PLANNING

FUNCTIONAL CRITERIA

Description: teacher planning, meeting, copy and work space for staff
Area: 400sf
Quantity: 19 Total
Occupants: 10-12

LOCATION/ORIENTATION CRITERIA

Users: teachers, potentially students and parents
Adjacencies: central within each academic wing
Orientation: varies
Views: varies

TECHNICAL CRITERIA

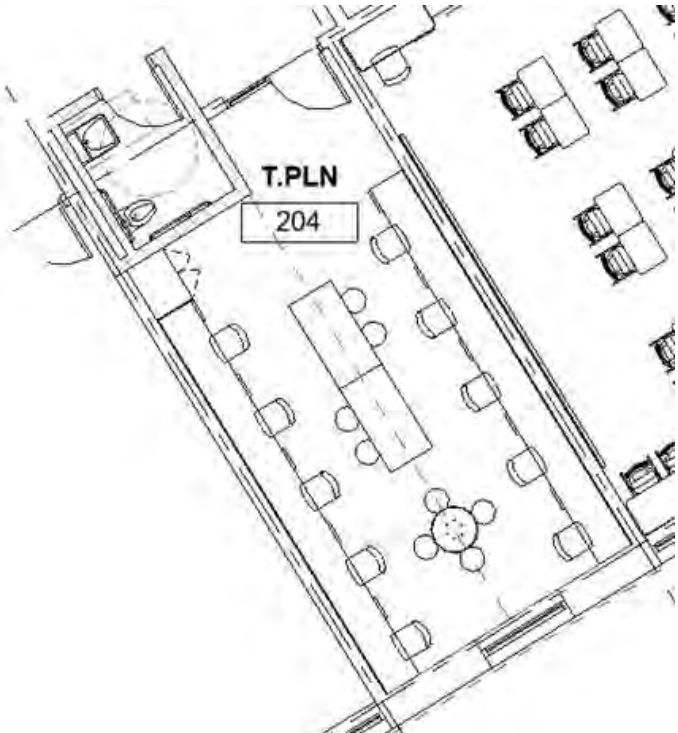
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); 9'-0" ACT- soffits as required at high window heads
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: West Campus: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open) Interior Glazing between Classrooms as shown on plans. Light shelves (interior) and Solar Shades (exterior) - horizontal at South Elevation
East Campus- single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open) Interior light shelves at all windows.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: Workstations with desk, shelving above, tall storage units
Furnishings: staff tables/chairs, round bistro table/chairs, white boards, tack boards, filing/locker counters
Equipment: desktop copier/printer
Storage: none

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TEACHER DEVELOPMENT/TRAINING

FUNCTIONAL CRITERIA

Description: large group, seminar, performance and meeting space
Area: 3650sf
Quantity: 1
Occupants: ±80

LOCATION/ORIENTATION CRITERIA

Users: teachers, students and community groups
Adjacencies: central within each academic wing
Orientation: North
Views: N/A

TECHNICAL CRITERIA

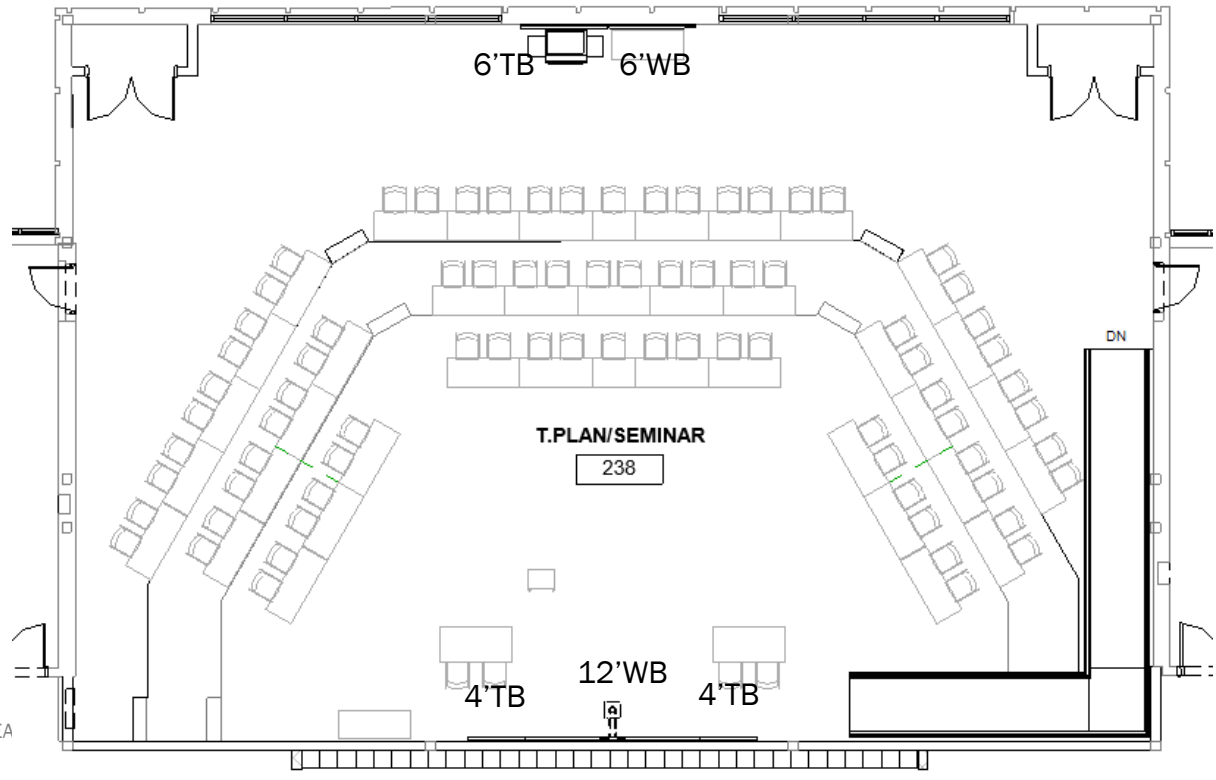
Floor/Base: synthetic Carpet tile/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); 10'-0" ACT
Door/Frame: solid wood doors and (2) 6'wide interior glazing units
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: wall telephone, intercom, wireless access point, data outlets, presentation outlet, data projector & wireless clock and local sound system.
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC) + 20% wall area in fabric wrapped panels
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: none
Furnishings: staff tables/chairs, podium, white boards, tack boards
Equipment: copier/printer
Storage: as shown in the room

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SCIENCE ROOM AND PREP- FRESHMAN

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 400 sf prep
Quantity: 8 labs, 4 prep rooms
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: north exposure for good daylight
Views: Father Morissette

TECHNICAL CRITERIA

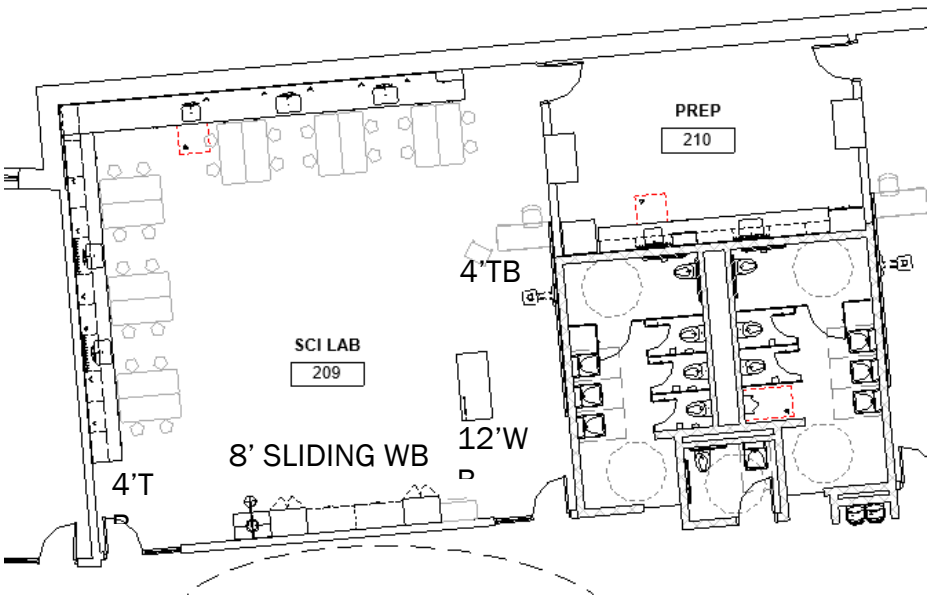
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 8'-8" up to 10'-8" at windows
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service

FIXTURES / FURNISHINGS

Casework: perimeter epoxy lab counters with upper/ lower cabinets, 8LF sliding white board cabinet, lab sinks, 1 ADA sink each room, safety goggle sterilizer, tall storage units, student mobile epoxy lab tables
Furnishings: teacher desk/file/chair, mobile demo table, student stools, podium, 12LF white boards, 8LF tack boards
Equipment: double sided pass-thru fume hood, full size refrigerator, dish washer, acid/flammable cabinets, teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SCIENCE ROOM AND PREP- GRADES 10-12

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 350 sf prep per lab
Quantity: 17 labs, 8 prep rooms+ 1 chem storage
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: south exposure for controllable daylight
Views: outside

TECHNICAL CRITERIA

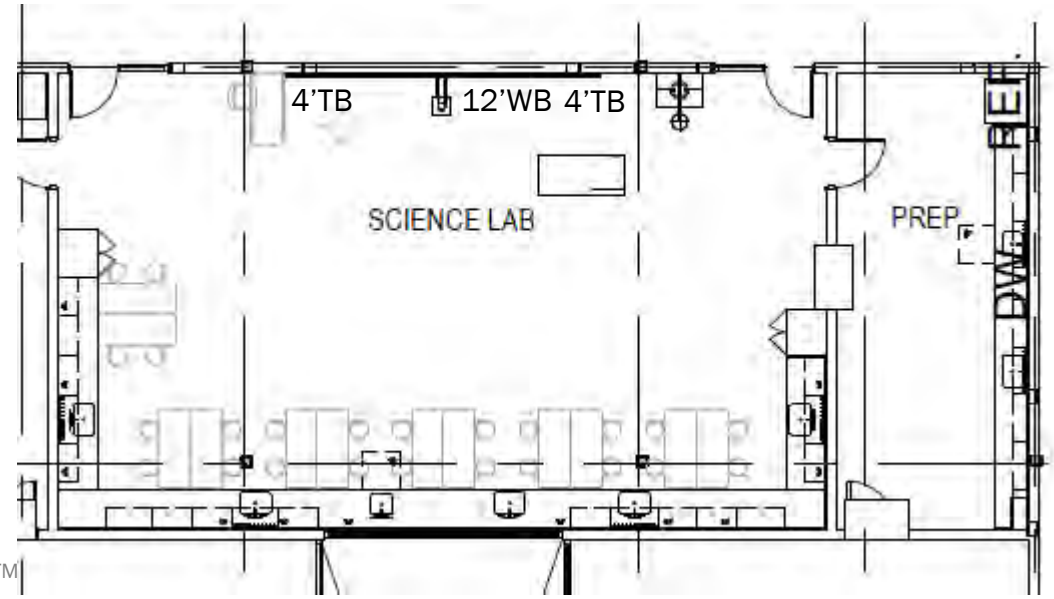
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); West campus: 10'-0"; East Campus: slopes from 9'-6" up to 11'-6" at windows
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: interior aluminum frame solar coated glass and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain) in both Classroom and Prep, fire extinguisher/blanket, eye wash at all faucets, gas service/outlets

FIXTURES / FURNISHINGS

Casework: perimeter epoxy lab counters with upper/ lower cabinets, 8 lab sinks, 1 ADA sink each room, safety goggle sterilizer, tall storage units, student mobile epoxy lab tables
Furnishings: teacher desk/file/chair, mobile demo table, student stools, podium, 12LF white boards, 8LF tack boards
Equipment: double sided pass-thru fume hood, full size refrigerator, dish washer, acid/flammable cabinets, teacher computer, and document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



CLEAN ENERGY LAB

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab
Quantity: 1
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: Rooftop Classroom/garden
Orientation: south exposure for controllable daylight
Views: Canal

TECHNICAL CRITERIA

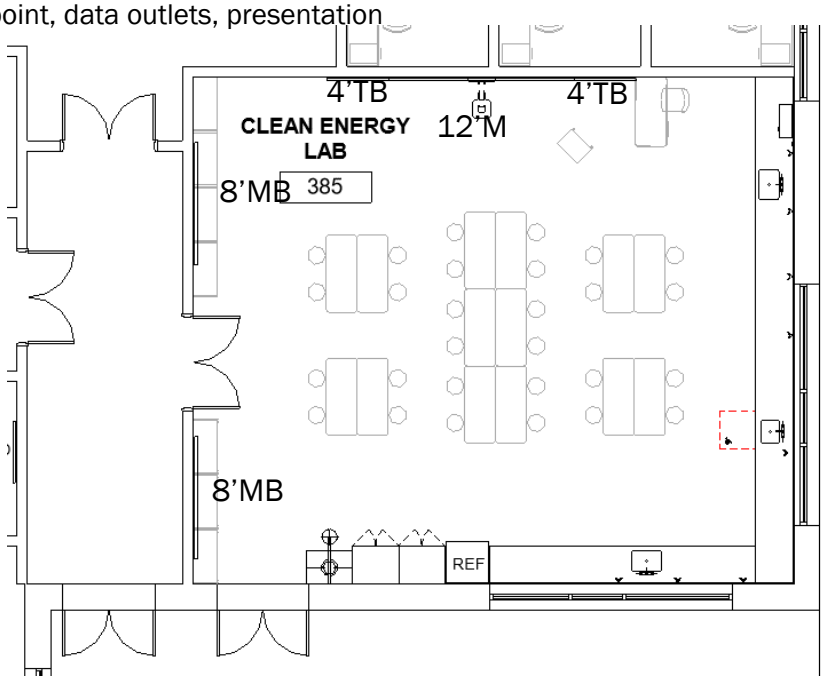
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 8'-8" up to 10'-8" at windows as required at high window heads
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into clean room
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open) Light shelves (interior) and Solar Shades (exterior) - horizontal at South Elevation
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service/outlets

FIXTURES / FURNISHINGS

Casework: perimeter epoxy lab counters with upper/ lower cabinets, lab sinks, 1 ADA sink each room, safety goggle sterilizer, tall storage units, student mobile epoxy lab tables
Furnishings: teacher desk/file/chair, mobile demo table, student stools, makerspace carts, podium, white boards, tack boards
Equipment: refrigerator, dish washer, acid/flammable cabinets, teacher computer, document camera, weather station, solar equipment
Storage: in-room cabinets as note

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



AUDITORIUM & STAGE

FUNCTIONAL CRITERIA

Description: Auditorium / performance space
Area: 11,600sf
Quantity: 1
Occupants: seating for 900

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups
Adjacencies: Scene Shop, Band & Chorus Rooms
Orientation: all directions (high volume), back wall of stage faces South
Views: None

TECHNICAL CRITERIA

Floor/Base: slab over-pour as shown on plans to meet accessibility slope; synthetic carpet finish. New Ramp access up to Stage in Auditorium and Corridor at back of Stage.
Walls: Existing plaster painted- demo as indicated on demo plans, wood panel trim/accents painted
Ceiling: Existing coffers with Trim/Crown to be painted. New opening for new Catwalk in Attic Space.
Door/Frame: Solid Wood Doors in Hollow Metal Frames
Windows: None
Lighting: Recessed LED, Tivoli type floor mounted aisle lighting. Decorative pendants.
Power: Convenience outlets
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock, sound system
Security: TBD
Acoustical: Ceiling hung acoustical clouds over stage thrust, fabric covered acoustical panels at high walls
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

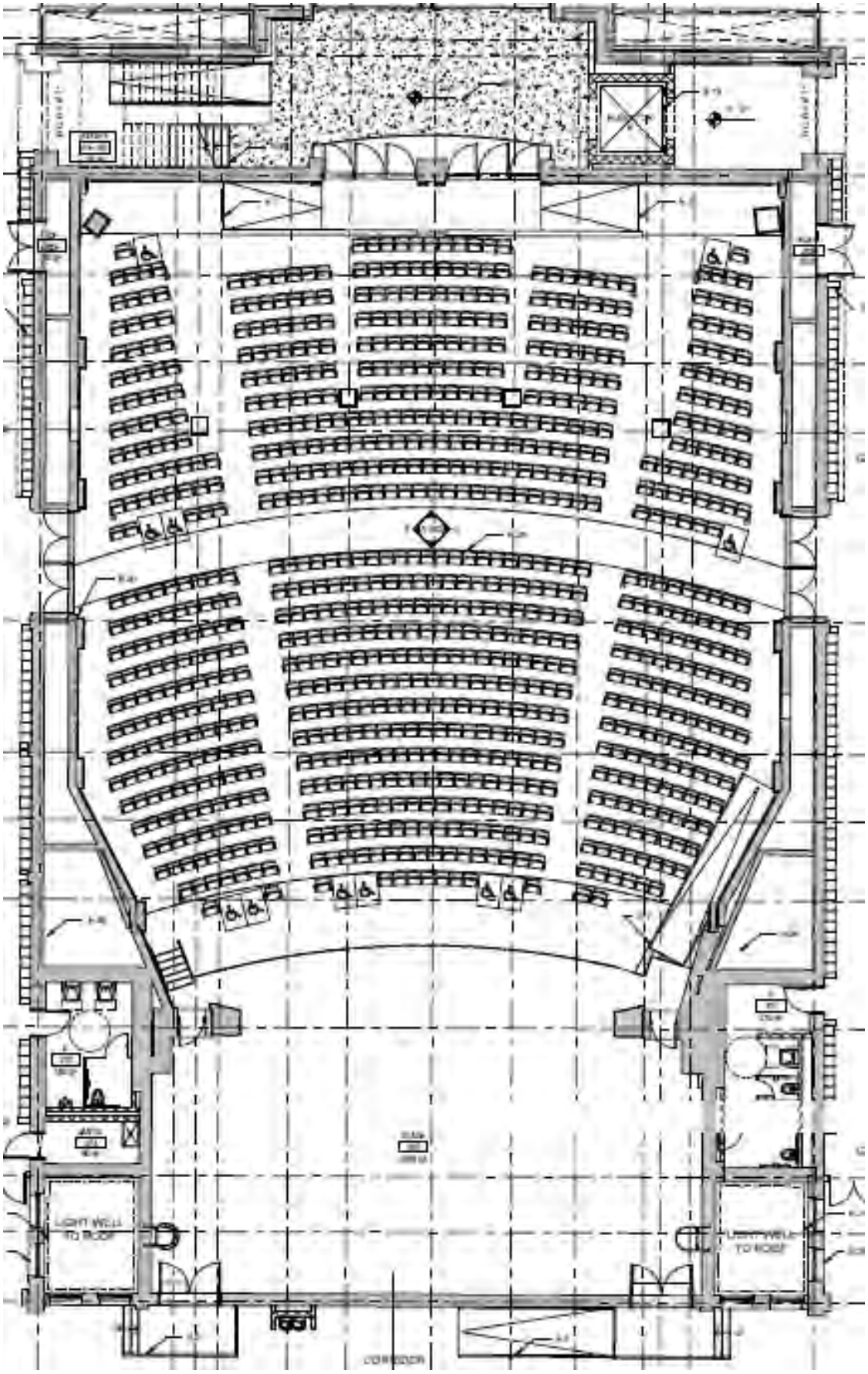
FIXTURES / FURNISHINGS

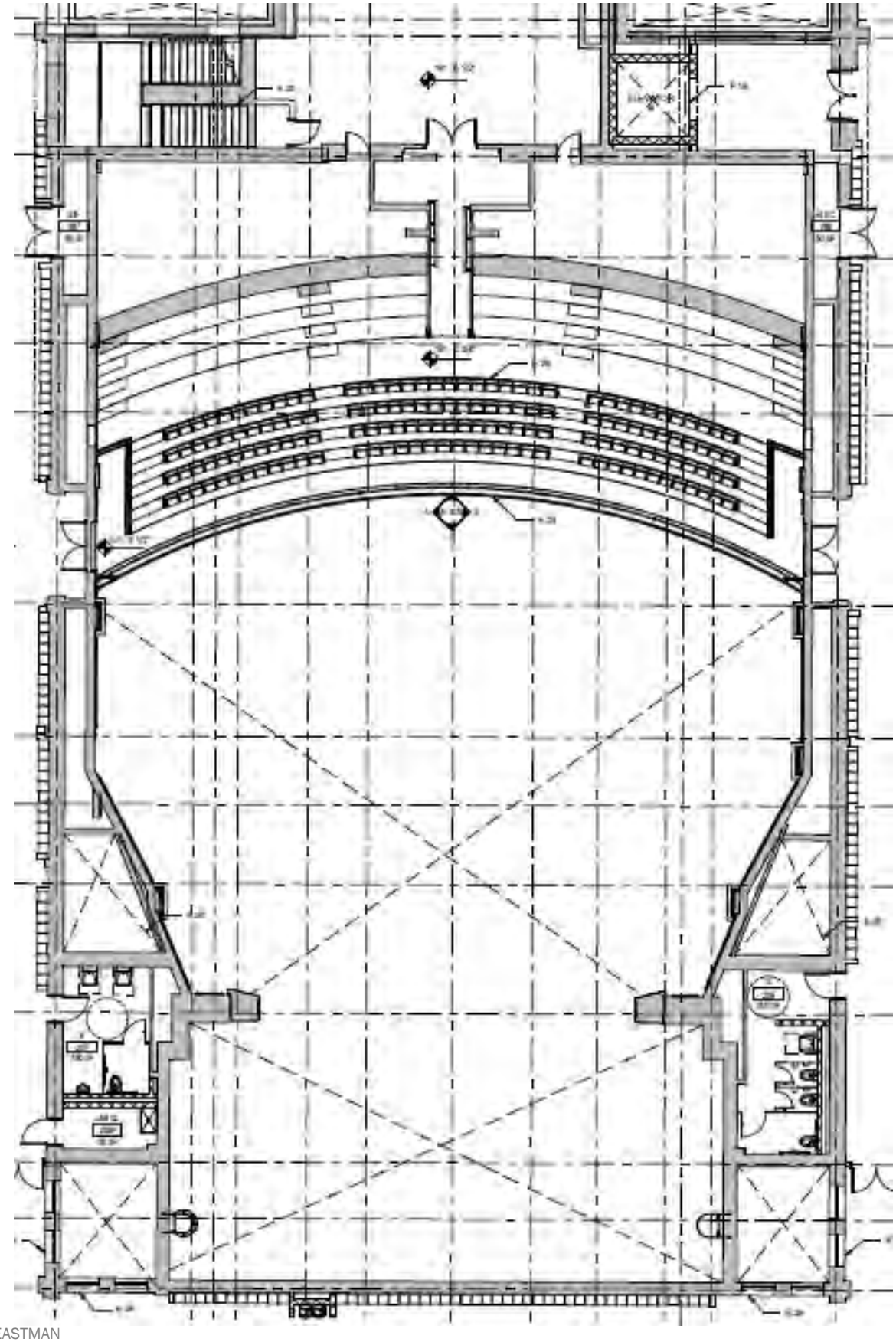
Casework: None
Furnishings: Fixed Auditorium Seating
Equipment: Stage Rigging
Storage: separate storage

OTHER INFORMATION:

Visibility: N/A

SEE PLANS ON FOLLOWING SHEETS


LIGHT WELL TO ROOF
LIGHT WELL TO ROOF
CORRIDOR



CAFETERIA- GRADE 9

FUNCTIONAL CRITERIA

Description: student dining & multi-purpose
Area: 4,400 sf, open to corridor
Quantity: 1
Occupants: seating for 294 students

LOCATION/ORIENTATION CRITERIA

Users: students, faculty and community groups
Adjacencies: kitchen, gymnasium
Orientation: west and southeast
Views: Canal and Quad

TECHNICAL CRITERIA

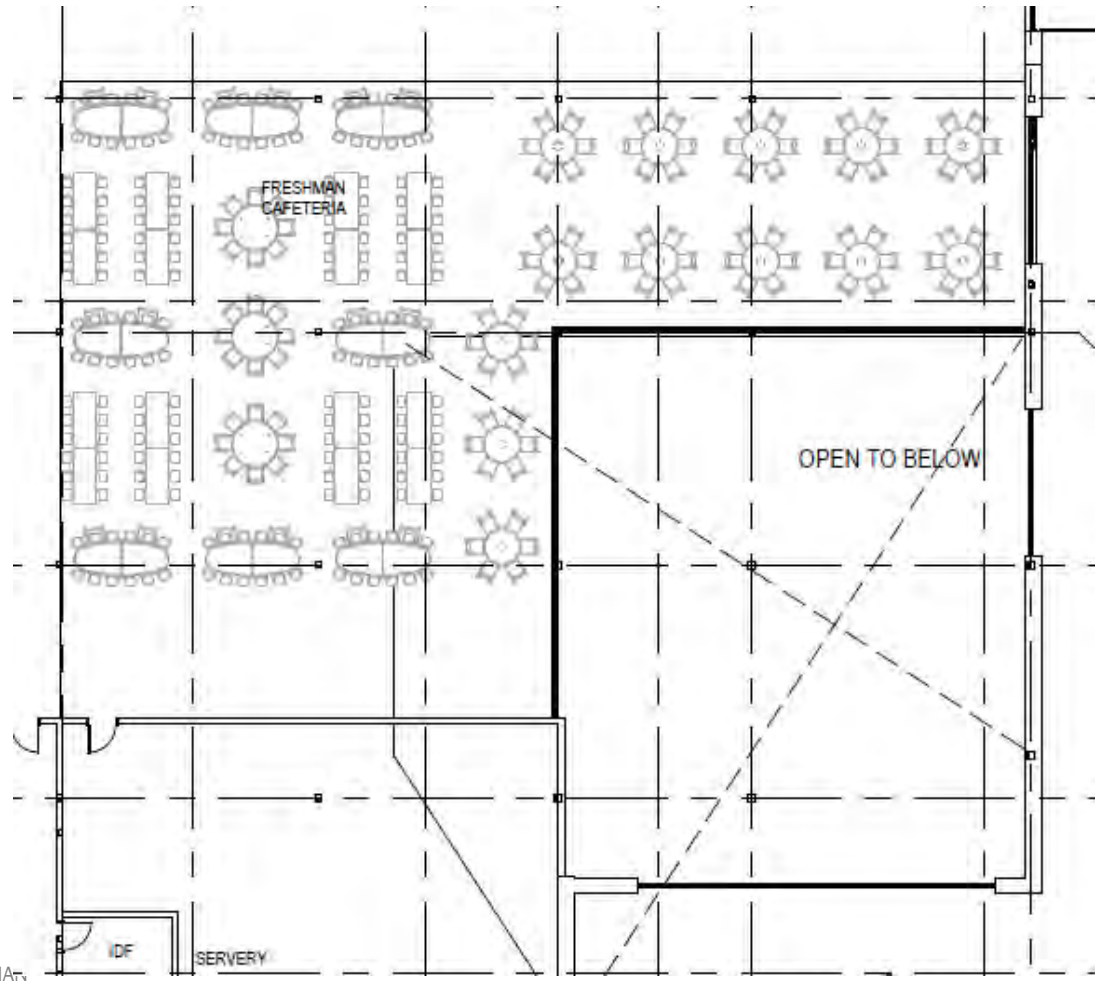
Floor/Base: linoleum tile/ RB
Walls: 5'-4"h 2 5/8" polished CMU wainscot with painted GWB above.
Ceiling: Metal & Beam Baffle Ceiling (painted exposed fireproofed structure above) + 20% GWB Soffits
Door/Frame: thermally broken aluminum curtainwall
Windows: thermally broken aluminum curtainwall
Lighting: LED pendants
Power: (extra) convenience outlets with USB charging on all walls
Data/Com: wireless access point, digital signage, local sound system, POS data & wireless clock
Security: cameras, motion detectors, door/window contacts, impact resistant glass treatment
Acoustical: acoustic wall panels
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: folding cafeteria tables w/attached stools, bistro tables/chairs
Equipment: Projection Screen
Storage: separate Storage Room

OTHER INFORMATION:

Visibility: N/A



CAFETERIA- GRADES 10-12

FUNCTIONAL CRITERIA

Description: student dining & multi-purpose
Area: 13,200 sf, open to corridor & lobby
Quantity: 1
Occupants: seating for 880 students

LOCATION/ORIENTATION CRITERIA

Users: students, faculty and community groups
Adjacencies: kitchen, gymnasium & outdoor plaza
Orientation: west (will receive low/direct light)
Views: Canal and Quad

TECHNICAL CRITERIA

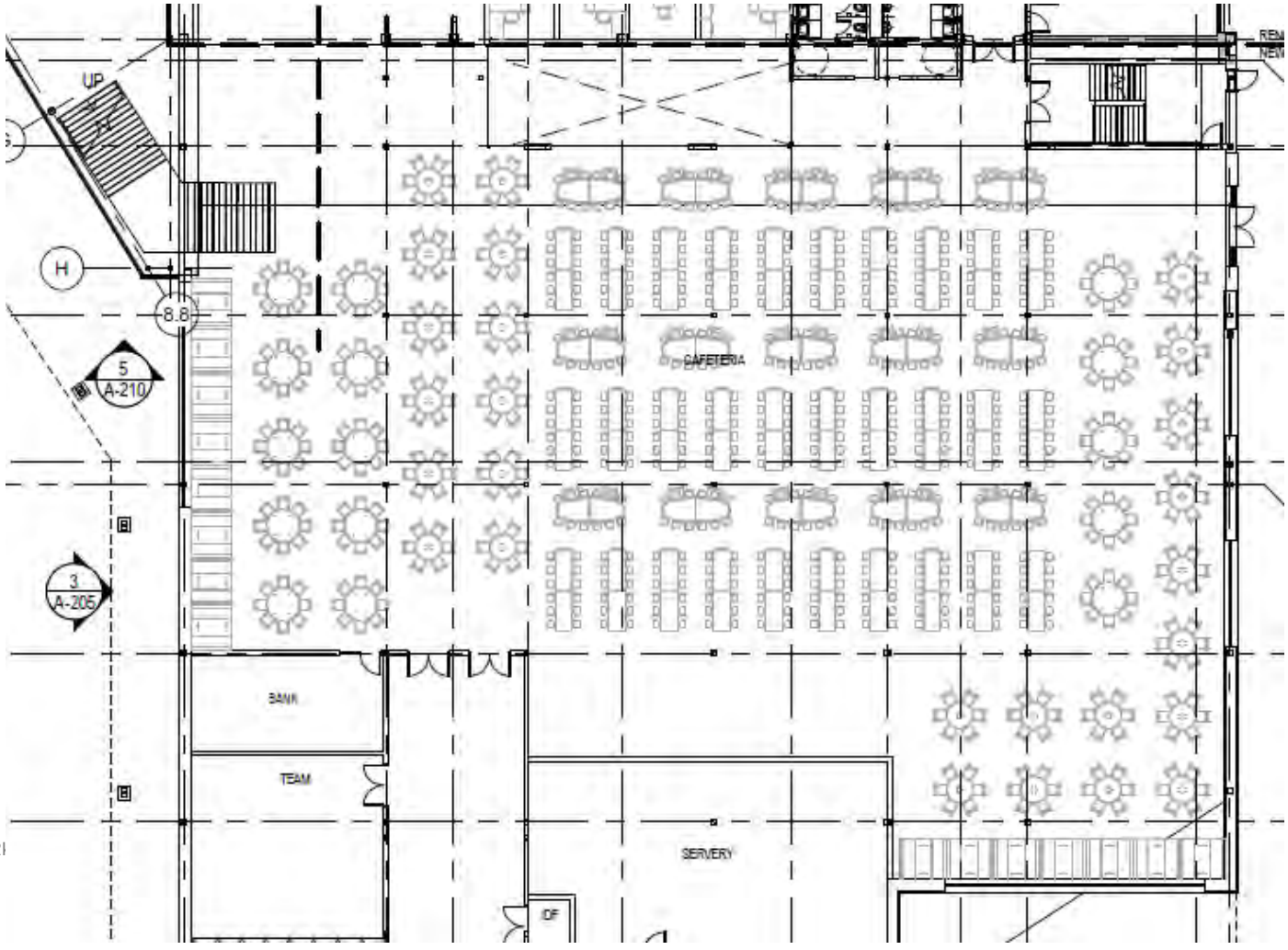
Floor/Base: linoleum tile
Walls: 5'-4"h 2 5/8" polished CMU wainscot with painted GWB above.
Ceiling: Metal & Beam Baffle Ceiling (painted exposed fireproofed structure above) + 20% GWB Soffits
Door/Frame: thermally broken aluminum curtainwall
Windows: thermally broken aluminum curtainwall
Lighting: LED pendants
Power: (extra) convenience outlets with USB charging on all walls
Data/Com: wireless access point, digital signage, local sound system, POS data & wireless clock
Security: cameras, motion detectors, door/window contacts, impact resistant glass treatment
Acoustical: acoustic wall panels
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: none
Furnishings: folding cafeteria tables w/attached stools, bistro tables/chairs, booth seating w/tables
Equipment:
Storage: separate storage

OTHER INFORMATION:

Visibility: N/A



KITCHEN & SERVERY- GRADES 10-12

FUNCTIONAL CRITERIA

Description: Kitchen & Servery
Area: 4,020 sqft (2,220sf Kit. + 1800sf serv.)
Quantity: 1
Occupants: varies

LOCATION/ORIENTATION CRITERIA

Users: Kitchen Staff, staff / Students at Serving
Adjacencies: Cafeteria, Receiving
Orientation: North/South
Views: None

TECHNICAL CRITERIA

Floor/Base: Epoxy Floor + Base
Walls: Gypsum Drywall with full height FRP panels
Ceiling: 2x4 lay in washable, mold and water resistant anti-microbial ceiling tile at 12'-0"
Door/Frame: Solid Wood Door with Hollow Metal Frames; large overhead rolling shutters (4) 10'x10'
Windows: -
Lighting: recessed strip LED with daylight dimming and occupancy sensors
Power: Convenience outlets and special receptacles to serve kitchen equipment
Data/Com: Telephone, intercom, wireless access point, data outlets & wireless clock
Security: None
Acoustical: None
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

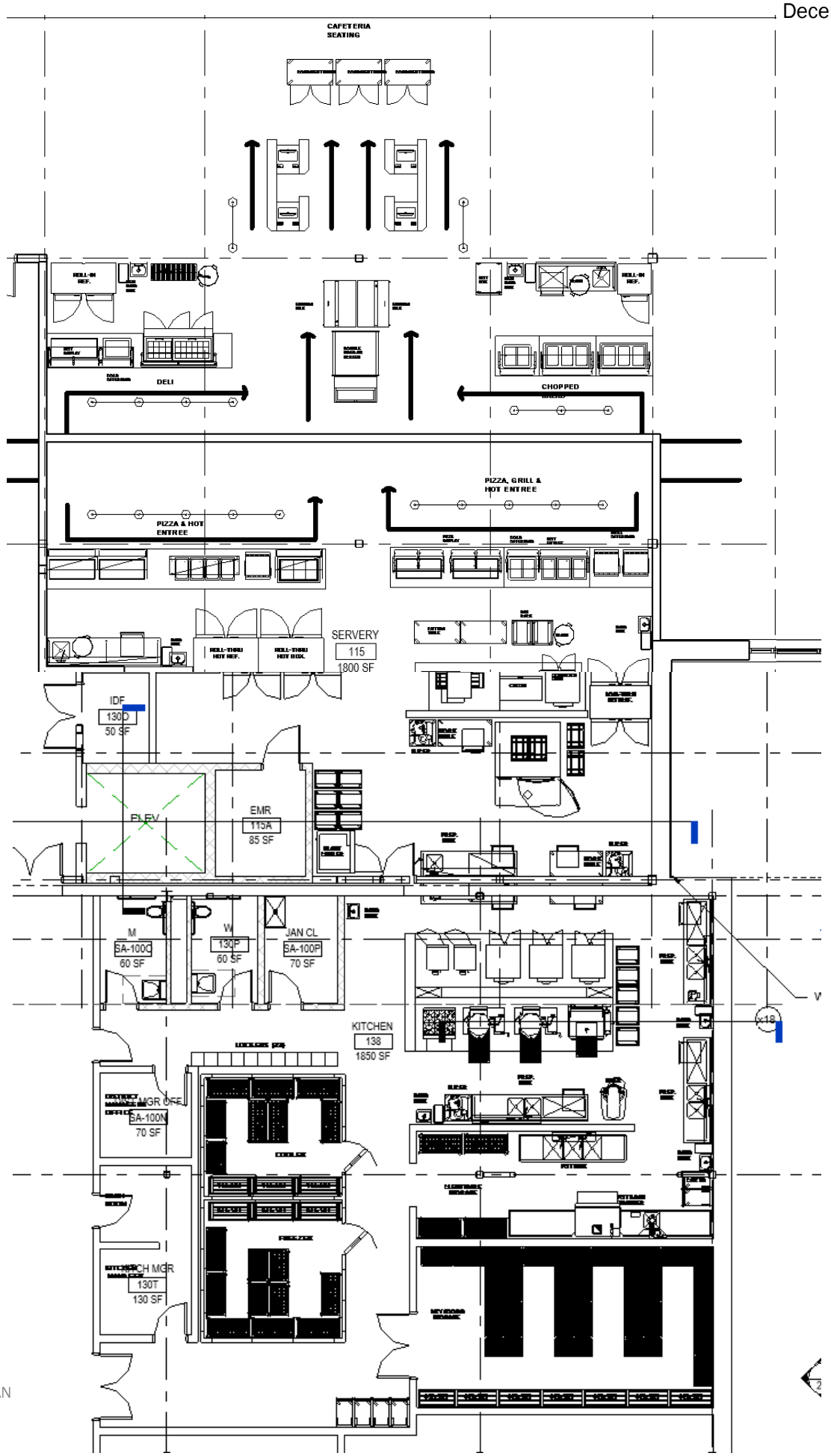
FIXTURES / FURNISHINGS

Casework: None
Furnishings: Office - Desk/ chair/ filing/ bookcase
Equipment: Kitchen equipment, shelving
Storage: in-room furnishing/equipment as noted

OTHER INFORMATION:

Visibility: N/A

SEE PLAN ON FOLLOWING SHEET


CAFETERIA SEATING
DELI
CHOPPED
PIZZA & HOT ENTREE
PIZZA, GRILL & HOT ENTREE
SERVERY
115
1800 SF
IDF
130D
50 SF
ELEV
EMR
115A
85 SF
M
SA-100C
60 SF
W
130P
60 SF
JAN CL
SA-100P
70 SF
KITCHEN
138
1850 SF
MGR OFF
SA-100N
70 SF
KITCH MGR
130T
130 SF

SERVERY- GRADE 9

FUNCTIONAL CRITERIA

Description: Kitchen & Servery
Area: 1,400 sqft
Quantity: 1
Occupants: Varies

LOCATION/ORIENTATION CRITERIA

Users: Kitchen Staff, staff / Students at Serving
Adjacencies: Cafeteria
Orientation: North/South
Views: None

TECHNICAL CRITERIA

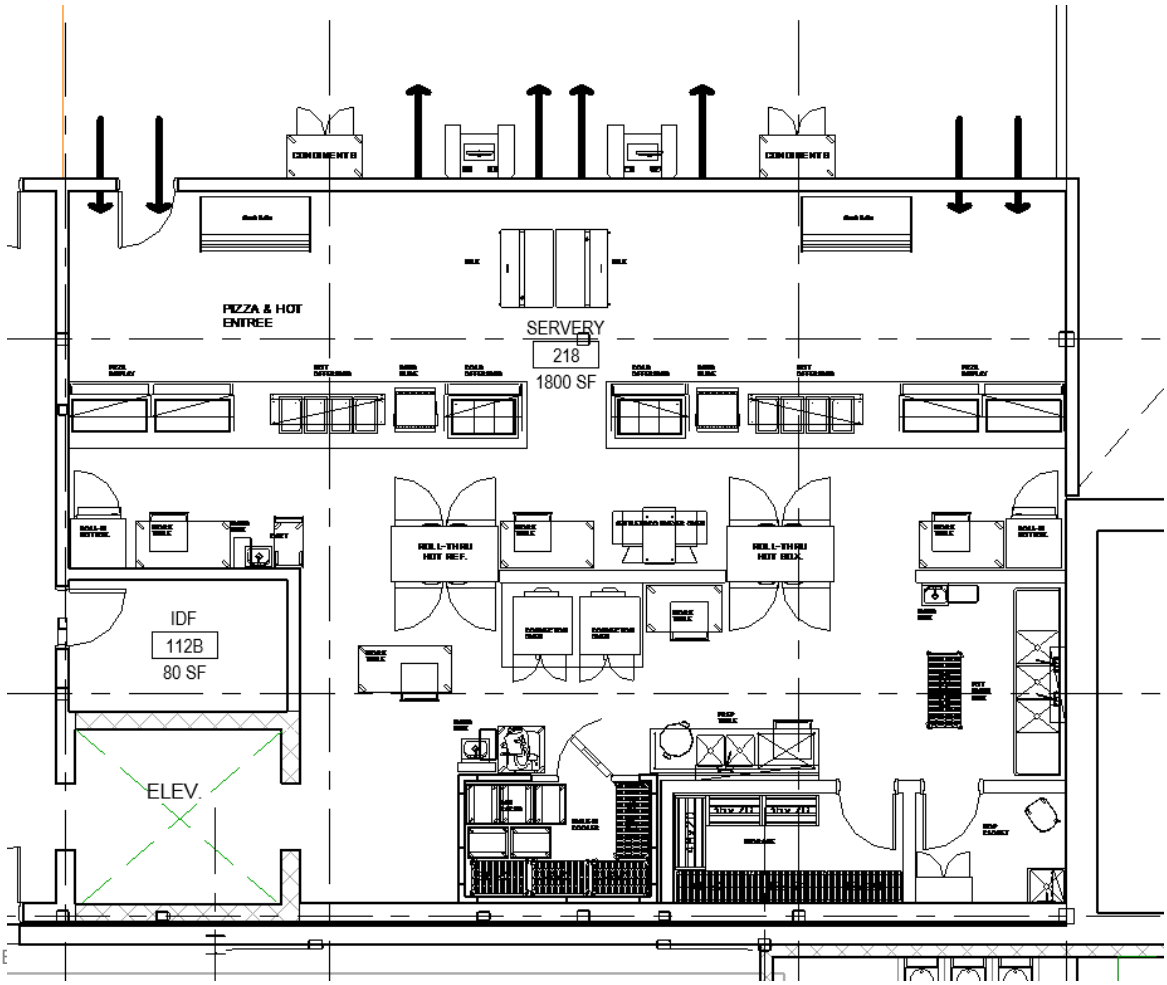
Floor/Base: Epoxy Floor + Base
Walls: Gypsum Drywall with full height FRP panels
Ceiling: 2x4 lay in washable, mold and water resistant anti-microbial ceiling tile at 8'-0"
Door/Frame: Solid Wood Door with Hollow Metal Frames; large overhead rolling shutters (4) 10'x10'
Windows: -
Lighting: recessed strip LED with daylight dimming and occupancy sensors
Power: Convenience outlets and special receptacles to serve kitchen equipment
Data/Com: Telephone, intercom, wireless access point, data outlets & wireless clock
Security: None
Acoustical: None
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: None
Furnishings: -
Equipment: Kitchen equipment, shelving
Storage: in-room furnishing/equipment as note

OTHER INFORMATION:

Visibility: N/A



CUSTODIAL STORAGE & OFFICE

FUNCTIONAL CRITERIA

Description: Custodial Areas
Area: 5,590sf
Quantity: 1
Occupants: 8

LOCATION/ORIENTATION CRITERIA

Users: Custodial and Facilities Staff
Adjacencies: Kitchen and Loading
Orientation: South
Views: N/A

TECHNICAL CRITERIA

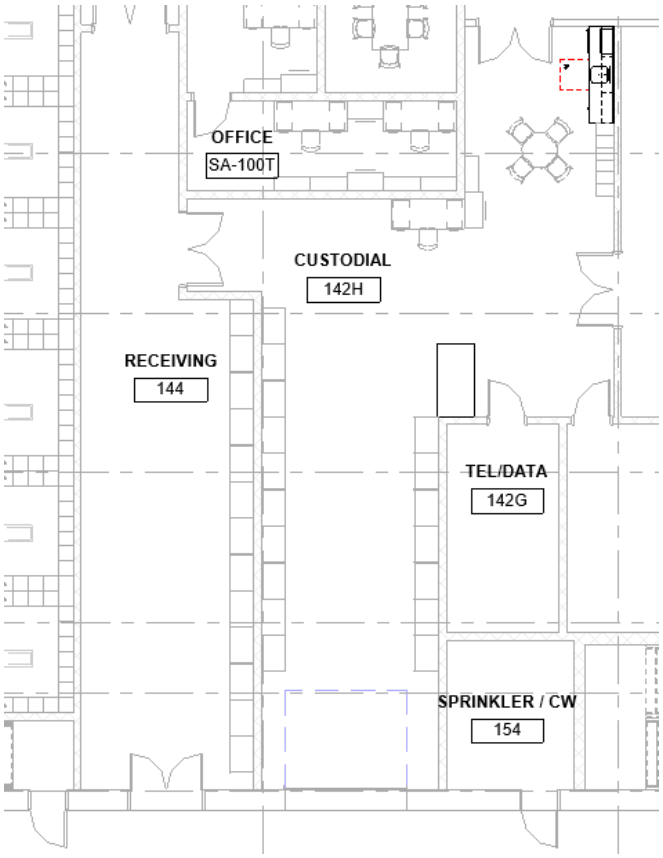
Floor/Base: Sealed Concrete/rubber base
Walls: Epoxy painted CMU
Ceiling: high light reflectance ceiling tile (.90 LRV);
flat at approximately 8'-0" at offices, exposed painted at other areas
Door/Frame: Hollow Metal doors with hollow metal frames- overhead garage door at loading
Windows: -
Lighting: Cage protected LED strip lights with occupancy sensors
Power: Convenience Outlets
Data/Com: Telephone, intercom, wireless access point, data outlets
Security: Motion Detection, AI phone at exterior door
Acoustical: None
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper & lower cabinets
Furnishings: Office - Desk/chair/filing, bookcase, work table, dining table, guest chairs, tack boards
Storage - Open shelving units
Equipment: Staff computer/printer, under counter fridge, microwave, maintenance equipment
Storage: in-room cabinets/shelving as noted

OTHER INFORMATION:

Visibility: N/A



ROTC OFFICE/CONFERENCE+ STORAGE

FUNCTIONAL CRITERIA

Description: Offices and Conference Room to support ROTC program
Area: approx. 3400sf (1600sf+1800sf)
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers and students/cadets
Adjacencies: ROTC Classrooms
Orientation: -
Views: -

TECHNICAL CRITERIA

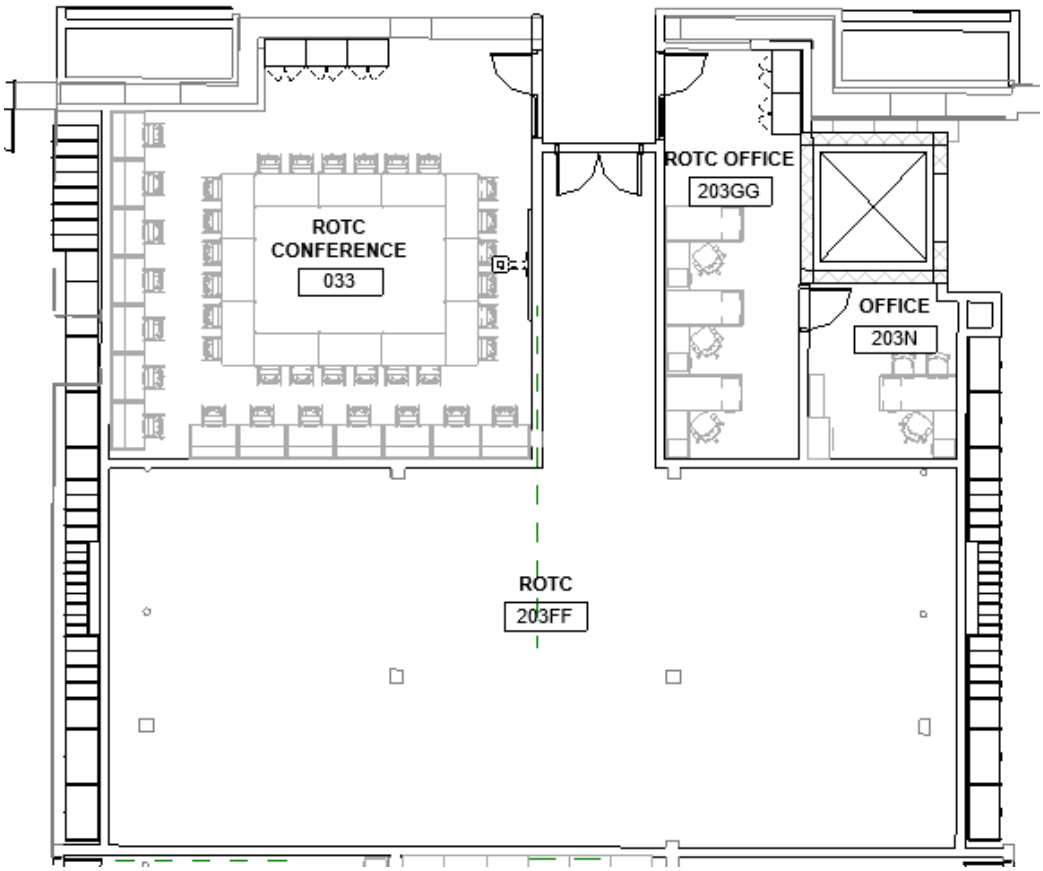
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer AR-GWB wall board
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass at Suite entry and Conf. entry (with solid roller shades)
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: TBD
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: classroom - teacher desks/files/chairs, conference tables/chairs, carrels, bookcases, white boards, tack boards, staff computers/printers
Equipment: cloth racks, marching equipment
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ROTC CLASSROOM

FUNCTIONAL CRITERIA

Description: primary teaching and learning space
Area: approx. 900sf
Quantity: 5 (incl. PT)
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers and students/cadets
Adjacencies: ROTC Offices, ROTC Conference, ROTC Storage
Orientation: North
Views: -

TECHNICAL CRITERIA

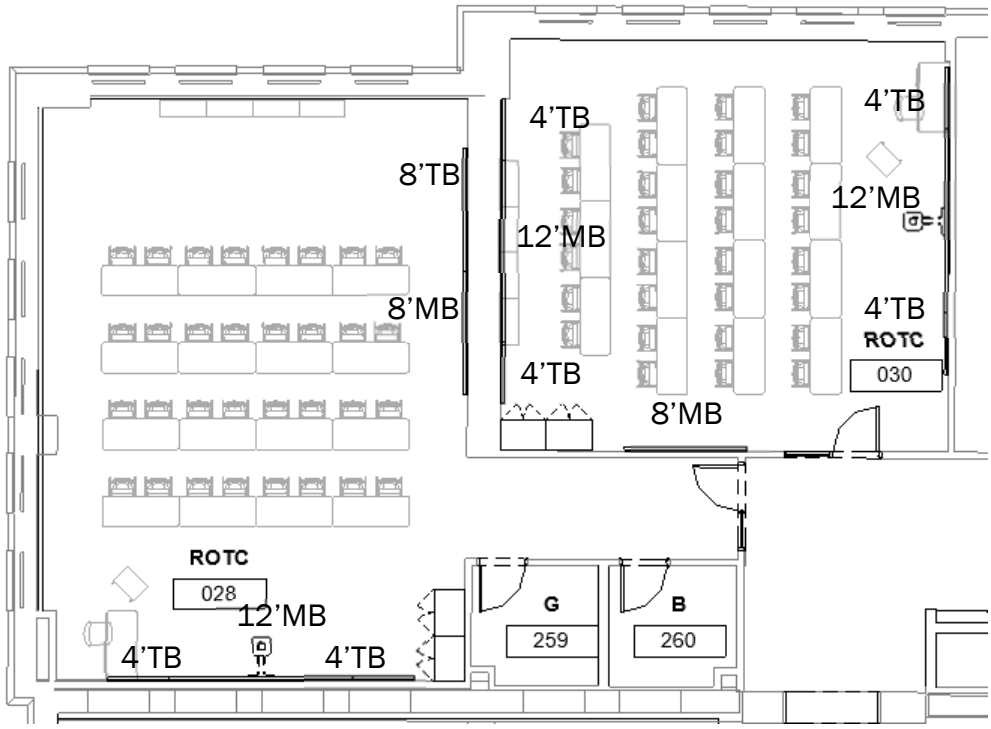
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer AR-GWB wall board
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight (with solid roller shade)
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: classroom - telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desks/files/chairs, student tables/chairs, podium, bookcases, white boards, tack boards, teacher computer, document camera
Equipment: TBD
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ROTC MP/GYM

FUNCTIONAL CRITERIA

Description: Drill Space
Area: approx. 2500sf
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: ROTC Teachers/Students
Adjacencies: Main Gym
Orientation: North/East/South
Views: -

TECHNICAL CRITERIA

Floor/Base: Synthetic Athletic Floor
Walls: CMU
Ceiling: Painted Exposed
Doors: -
Windows: Kalwall

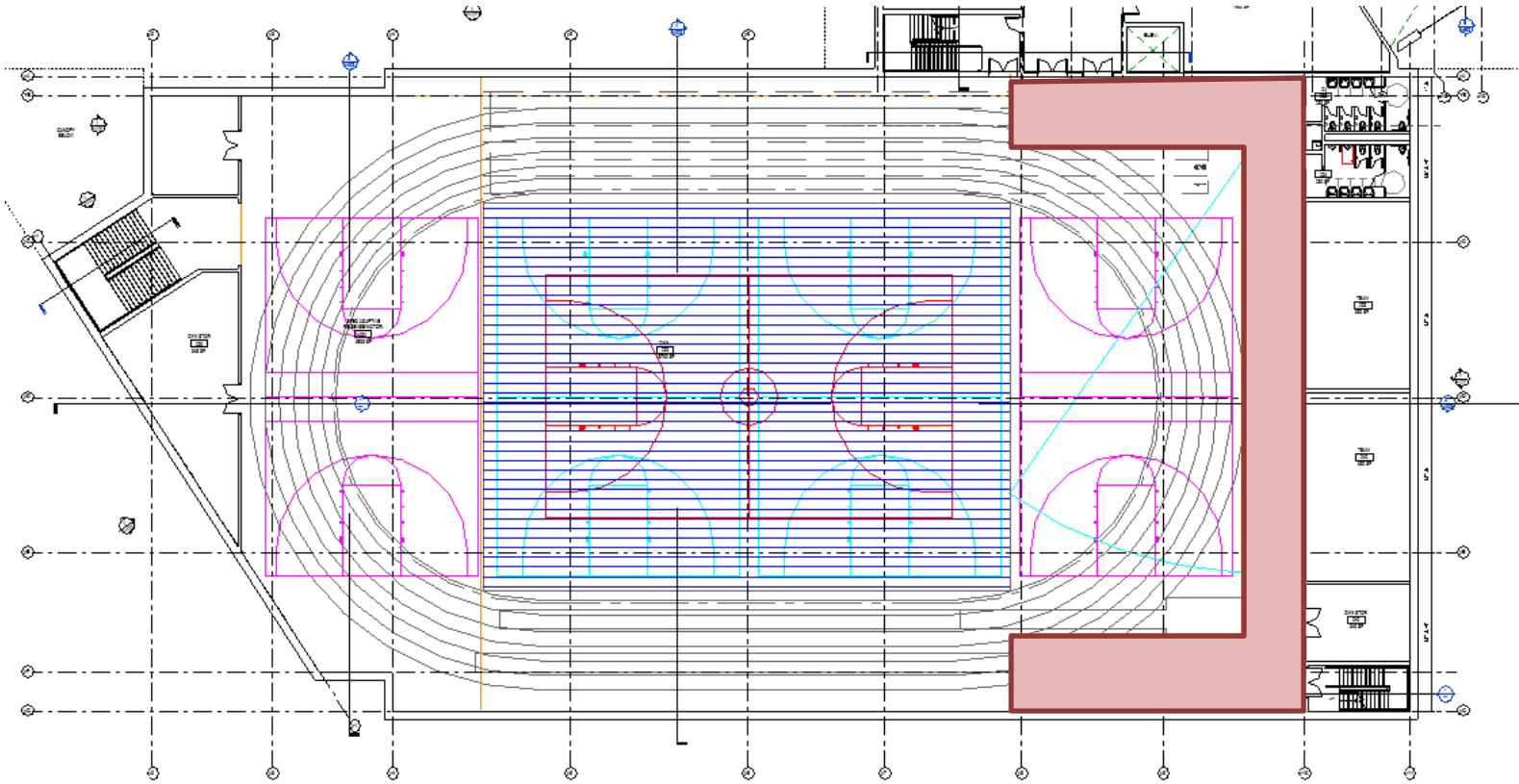
Lighting: LED Pendants
Power: convenience outlets
Data/Com: -
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: -
Storage: -

OTHER INFORMATION:

Visibility: N/A



MAIN OFFICE

FUNCTIONAL CRITERIA

Description: Main School Office
Area: approx. 3000sf
Quantity: 1 Suite: Office/Wait, Head of School, HD Secr, Accts Pay, Lg Conf, Records, Copy, Mail/Kitchen, AP1, AP2, Subs Tchr, Ell/Tst
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, potentially students
Adjacencies: Front Entry/Security
Orientation: North/West
Views: Entry Plaza

TECHNICAL CRITERIA

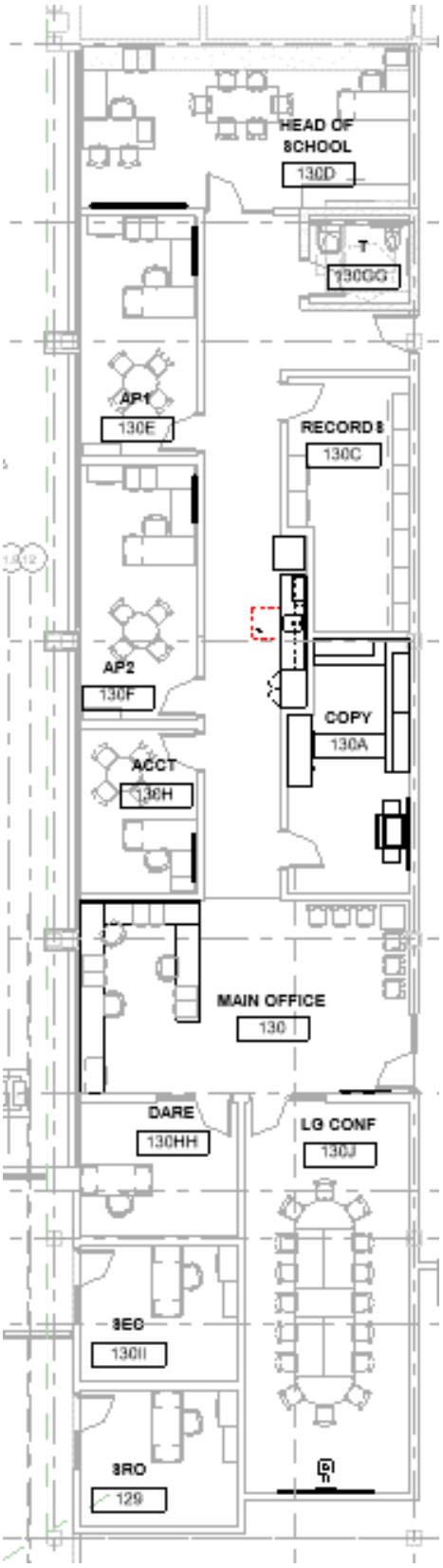
Floor/Base: linoleum tile floor /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper & lower cabinets, reception counter, mailboxes w/base cabinets, wardrobe
Furnishings: office desks/chairs, filings, bookcases, conf. tables/chairs, guest seating, side tables, white boards, tack boards
Equipment: under counter fridge, microwave, desktop printers, large copier(s), LCD
Storage: in room storage as listed

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



HOUSE OFFICES

FUNCTIONAL CRITERIA

Description: House Office
Area: approx. 1600sf
Quantity: 1 Suite;
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, students
Adjacencies: Front Entry/Security
Orientation: -
Views: Lightwell or canal

TECHNICAL CRITERIA

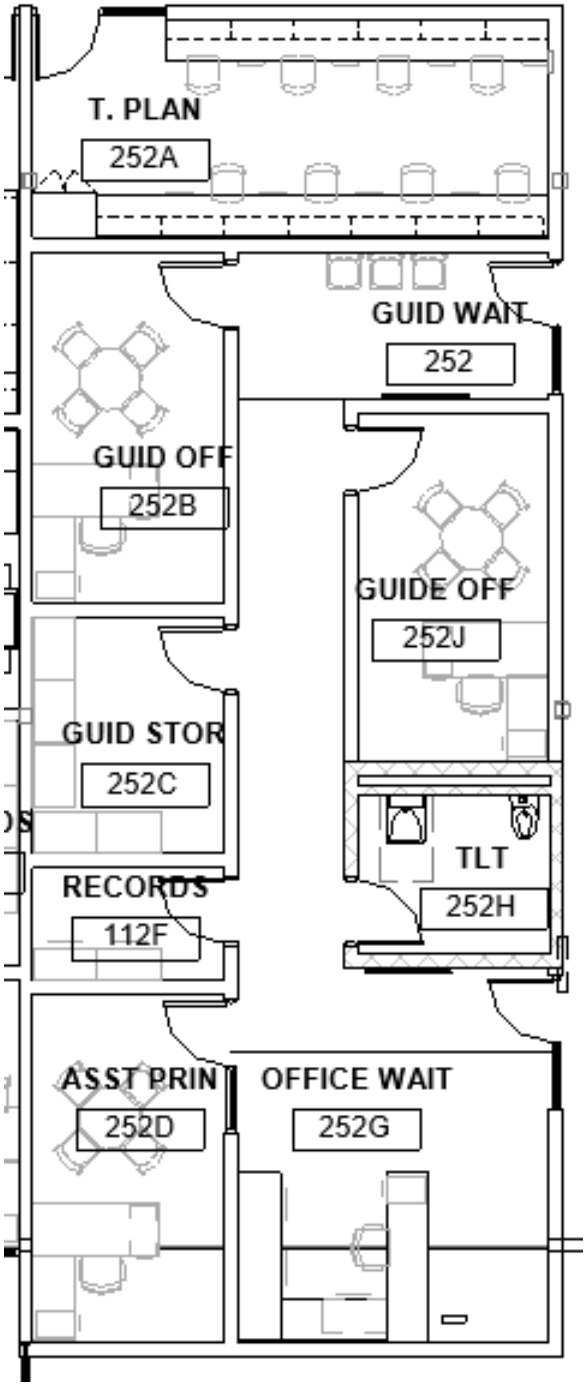
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: (West Side) thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
(East Side) single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: workstations with desk, shelving above, reception counter, tall storage units
Furnishings: office desks/chairs, filings, bookcases, conf. tables/chairs, guest seating, side tables, open metal shelving, white boards, tack boards
Equipment: desktop printers, copier, LCD
Storage: in room storage as listed

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn



FRESHMAN OFFICES

FUNCTIONAL CRITERIA

Description: Department Head Offices
Area: approx. 2000sf
Quantity: 1 Suite; Office/Wait, FA Prin, Sm Conf, Guid Wait, Guid, Soc Work, Guid Stor, Records, Mail/Kit, Stu Support, SS Conf, Tchr work.
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, students, staff
Adjacencies: Main Lobby
Orientation: North
Views: Entry Plaza

TECHNICAL CRITERIA

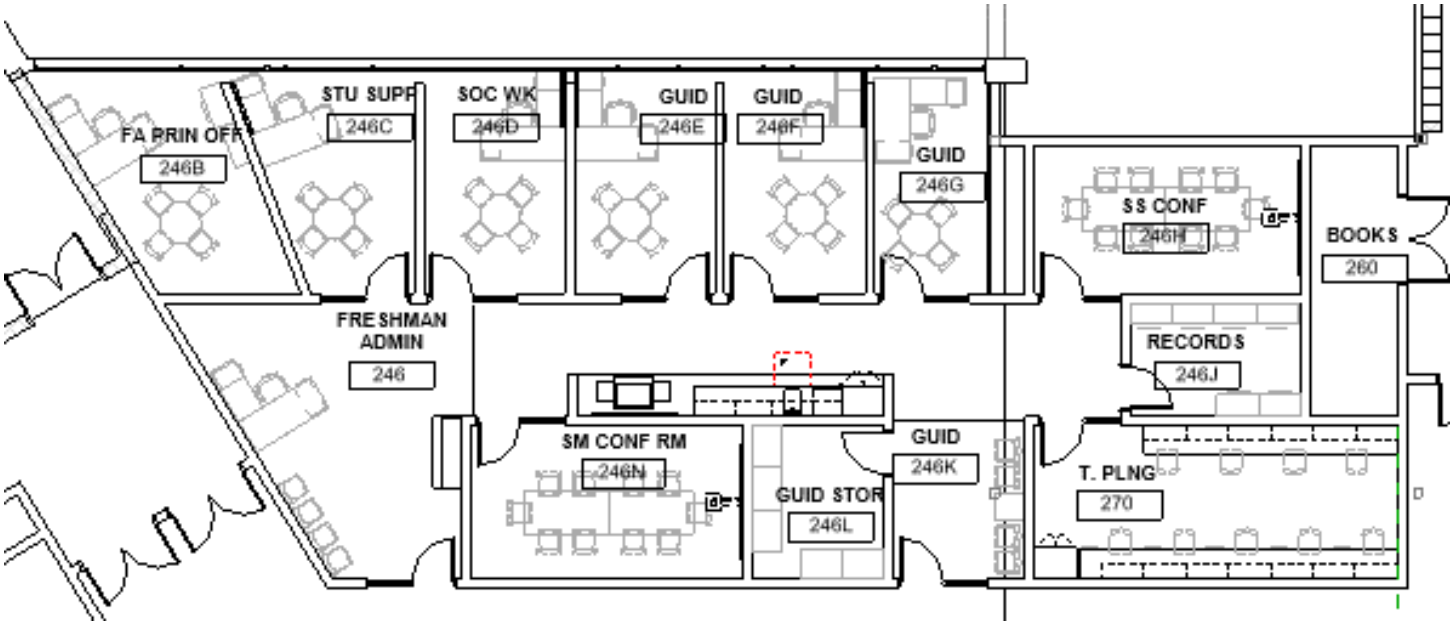
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper & lower cabinets, reception counter, mailboxes w/base cabinets, wardrobe
Furnishings: office desks/chairs, filings, bookcases, conf. tables/chairs, guest seating, side tables, white boards, tack boards
Equipment: under counter fridge, microwave, desktop printers, large copier, LCD
Storage: in room cabinets as listed

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



DEPT OFFICES

FUNCTIONAL CRITERIA

Description: Department Head Offices
Area: approx. 800sf
Quantity: 1 Suite; 6 Offices (Eng, SS, Math, Sci, WL/ELL, Instr)
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, potentially students
Adjacencies: central within academic wing
Orientation: -
Views: Quad

TECHNICAL CRITERIA

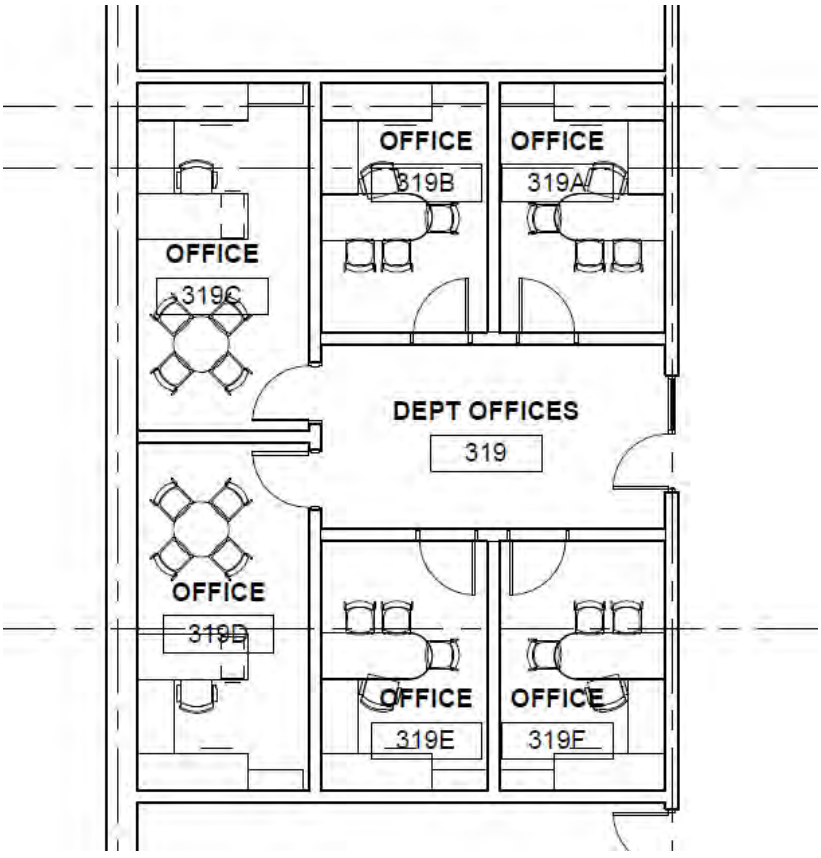
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: office desks/chairs, filings, bookcases, conf. tables/chairs, guest seating, side tables, white boards, tack boards
Equipment: desktop printers
Storage: -

OTHER INFORMATION:

Visibility: N/A



NURSE

FUNCTIONAL CRITERIA

Description: Nurses Suite
Area: Approx. 2,610sf (including toilets)
Quantity: 1 suite
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: Nurse, Staff, Teachers, Students
Adjacencies: Main Office
Orientation: North
Views: Lightwell

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/rubber base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 V);
Door/Frame: solid wood doors
Windows: Interior glazing into the adjacent lightwell and mesh roll down shade (3% open)
Lighting: recessed strip LED with daylight dimming and occupancy sensors
Power: Convenience Outlets
Data/Com: Telephone, intercom, wireless access point, data outlets & wireless clock, LCD in waiting area, dedicated fax machine
Security: Motion Detection
Acoustical: high performance acoustical ceiling
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: Upper/lower cabinets w/sink, tall storage
Furnishings: Office desk/chair/ filing, exam table, couches, rest cots, student table/chairs, bookcases, tack boards, divider curtains on tracks
Equipment: Refrigerator, microwave, medicine cabinet, medicine carts, teacher/staff computer, nurse equipment, printer, fax machine, LCD
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: N/A

STUDENT SUPPORT

FUNCTIONAL CRITERIA

Description: Student Support Office
Area: approx. 2000sf
Quantity: 1 Suite: Supp Suite, 3 Offices, Sm Conf, Dir of Students
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers, potentially students
Adjacencies: Lobby/Security/ Main Office
Orientation: -
Views: Lightwell

TECHNICAL CRITERIA

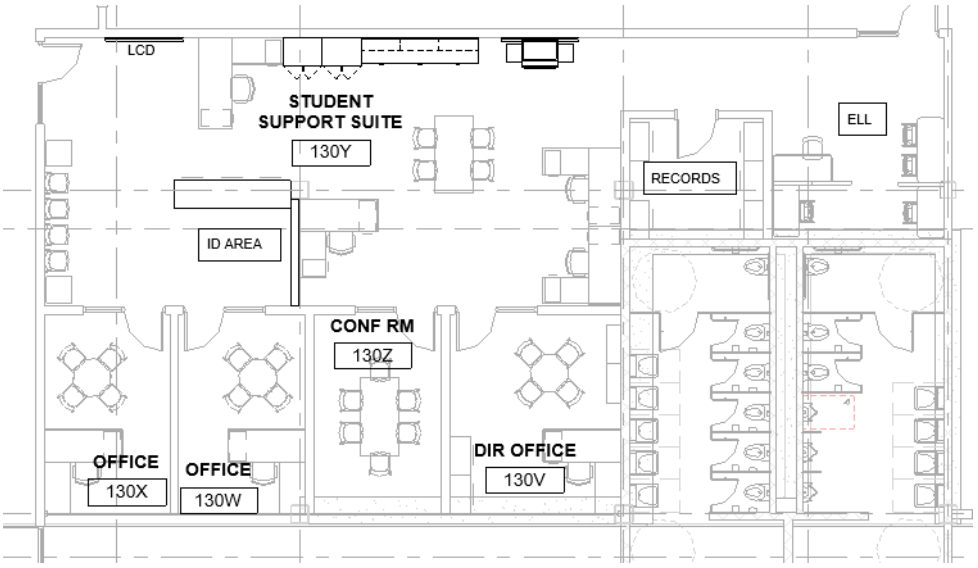
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: counter w/upper & lower cabinets, tall storage
Furnishings: office desks/chairs, conf. table/chairs, filing, bookcases, waiting chairs/tables, divider partitions, student tables/chairs, teacher desk/chair, white boards, tack boards
Equipment: staff computers, desktop printers, large copier, LCD
Storage: in room cabinets as noted

OTHER INFORMATION

Visibility: N/A



SPECIAL EDUCATION - LIFE SKILLS

FUNCTIONAL CRITERIA

Description: specialized instruction suite for students with severe needs to get hands-on guided learning toward domestic independence
Area: approx. 2900SF
Quantity: 2
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: special education students and teachers
Adjacencies: -
Orientation: South
Views: Yes

TECHNICAL CRITERIA

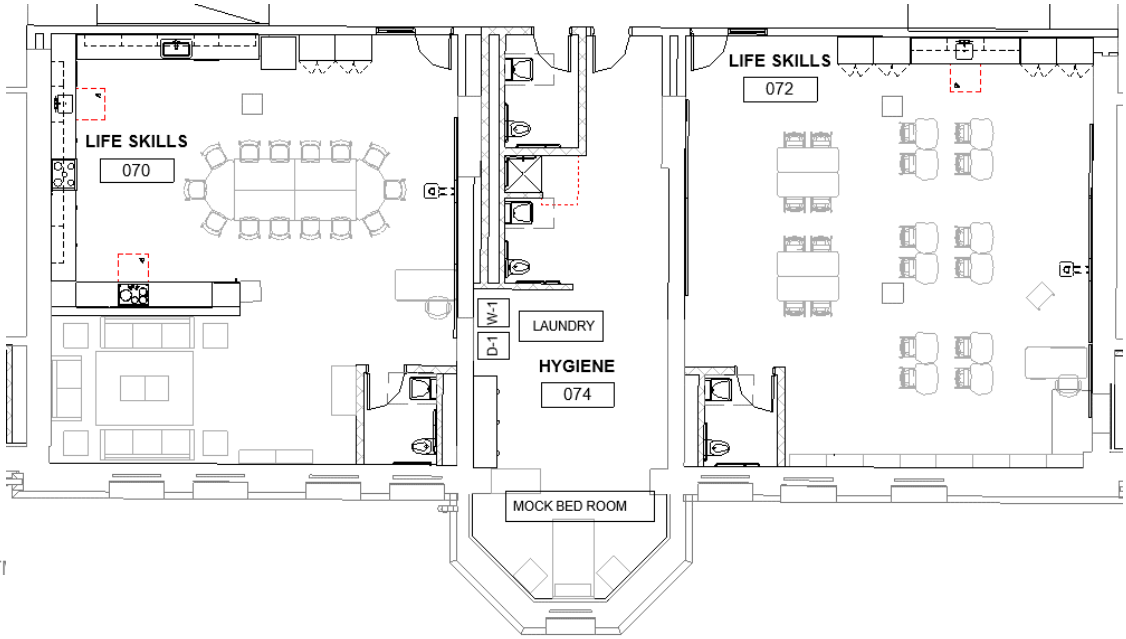
Floor/Base: linoleum tile floor/rubber base (epoxy floor/base at toilets)
Walls: multi-layer gypsum board, painted at new (cmu walls at toilets)
Ceiling: high light reflectance ceiling tile (.90 LRV); MR gypsum at toilets
Door/Frame: solid wood doors with acoustic gaskets & 3' w. glass sidelight with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, tall storage
Furnishings: teacher desk/chair, filing, bookcase, podium, student desks/tables/chairs, dining table/chairs, mock bed room set up, living room sofas, side tables, rugs, entertainment system, white boards, tack boards
Equipment: ironing board, conventional oven, cook-top, (2) exhaust hoods, (2) dish washers, ADA oven, refrigerator, microwave, washer, dryer, teacher computers, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SPECIAL EDUCATION - ADJUSTMENTS

FUNCTIONAL CRITERIA

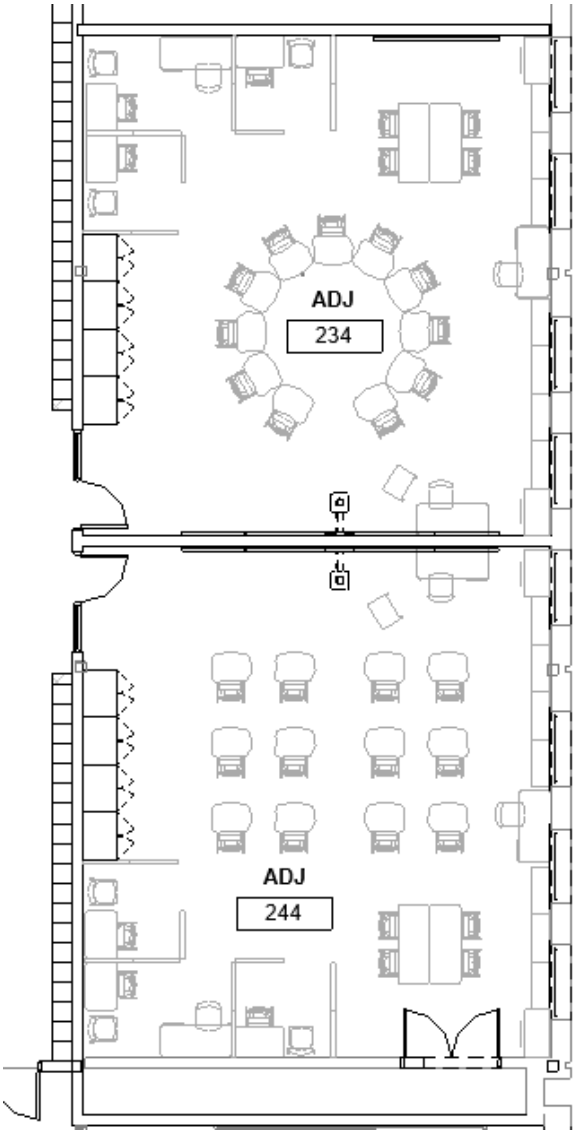
Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 1900sf
Quantity: 8
Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: outside

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: (West Side) thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
(East Side) single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system



FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desks/chairs, filing, bookcases, podium, student desks/tables/chairs, divider partitions, white boards, tack boards
Equipment: teacher computers, document camera
Storage: in room cabinets as noted

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

SPECIAL EDUCATION – FUNDAMENTALS CLASSROOM

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 1900sf
Quantity: 1
Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: outside

TECHNICAL CRITERIA

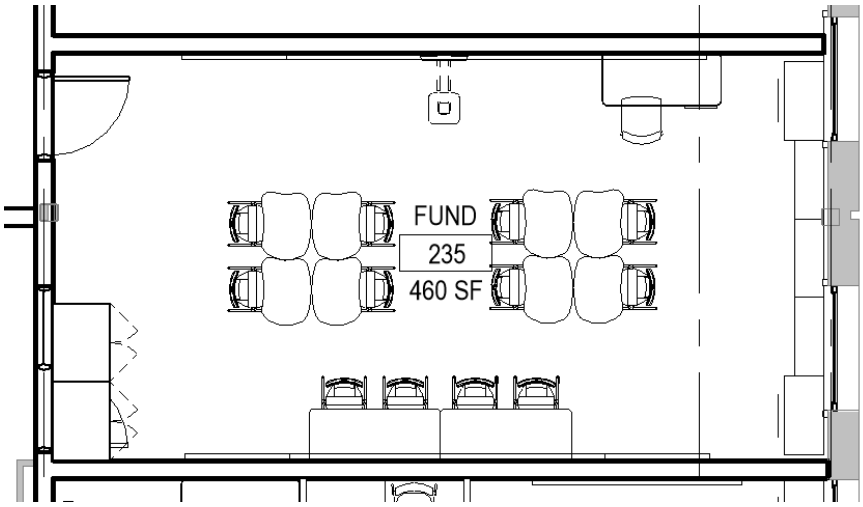
Floor/Base: linoleum tile floor/rubber base (epoxy floor/base at toilets)
Walls: multi-layer gypsum board, painted at new (cmu walls at toilets)
Ceiling: high light reflectance ceiling tile (.90 LRV); MR gypsum at toilets
Door/Frame: solid wood doors with acoustic gaskets & 3' w. glass sidelight with solid roller shade
Windows: (West Side) thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
(East Side) single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desk/chair, filing, bookcases, podium, student desks/tables/chairs, white boards, tack boards
Equipment: teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SPECIAL EDUCATION – INTENSIVE CLASSROOM

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 950sf (inclu toilet)
Quantity: 2
Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: outside

TECHNICAL CRITERIA

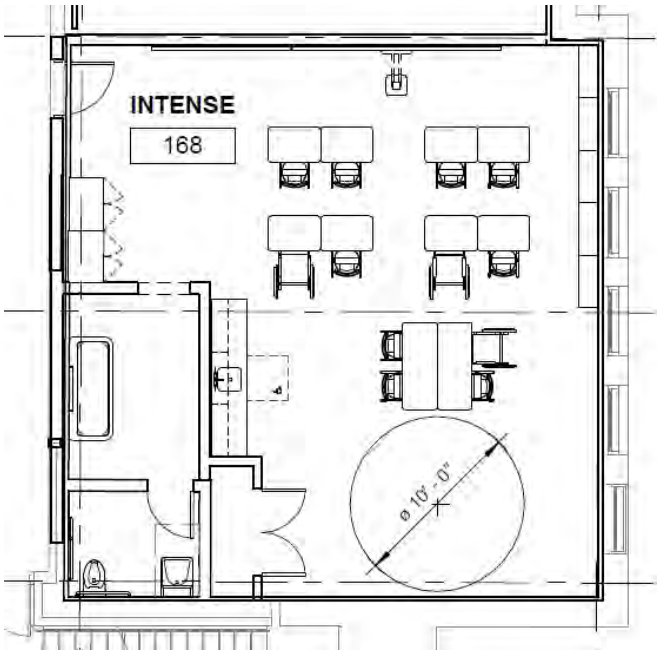
Floor/Base: linoleum tile floor/rubber base
Walls: glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, tall storage
Furnishings: teacher desk/chair, filing, bookcases, student tables/desks/chairs, white boards, tack boards
Equipment: changing table, sensory hanging equipment, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SPECIAL EDUCATION – AUTISM CLASSROOM

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 1000sf
Quantity: 8
Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: outside

TECHNICAL CRITERIA

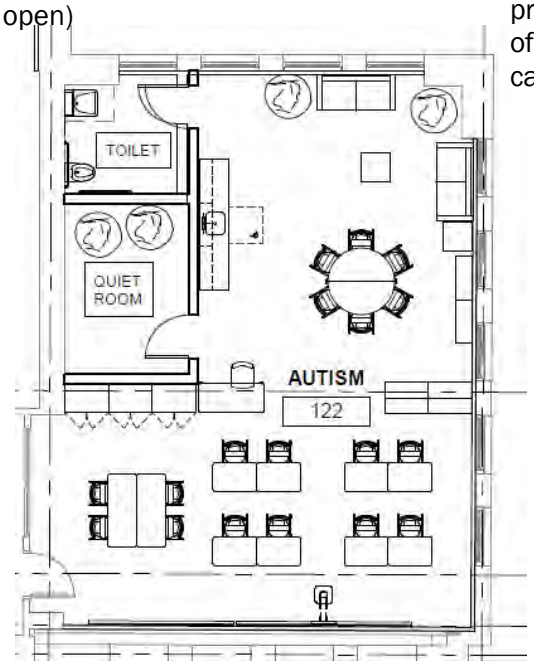
Floor/Base: linoleum tile floor/rubber base
Walls: glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: (West Side) thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
(East Side) single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, tall storage units
Furnishings: teacher desk/chair, filing, bookcases, student tables/desks/chairs, soft seating, bean bags, white boards, tack boards
Equipment: sensory equipment, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SPECIAL EDUCATION – SUITE

FUNCTIONAL CRITERIA

Description: specialized instruction space for students with individual educational plans to get small group instruction and support toward academic independence
Area: 2800sf
Quantity: 1
Occupants:

LOCATION/ORIENTATION CRITERIA

Users: special education students, 2 teachers (1 para) and Math, ELA & SS specialists
Adjacencies: clustered with classroom/science clusters for each grade grouping
Orientation: north/south exposure for daylight control
Views: outside

TECHNICAL CRITERIA

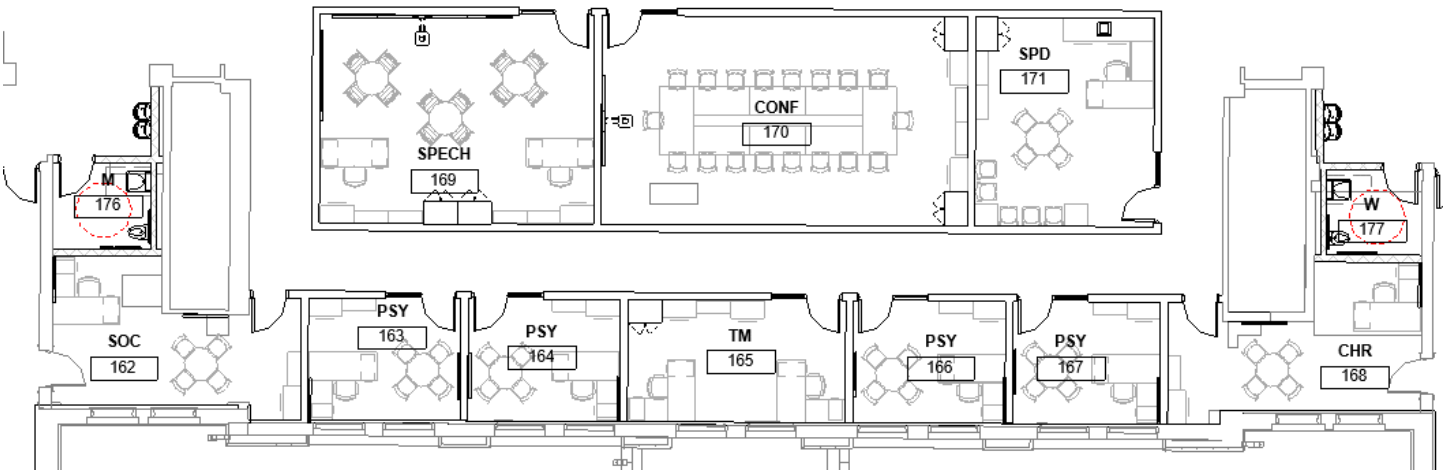
Floor/Base: linoleum tile floor/rubber base
Walls: glazed tile block at existing exterior walls; multi-layer gypsum board, painted at new
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: Office desks/chairs, filing/bookcases, meeting tables/chairs, waiting chairs, conference tables/chairs, testing carrells, teacher desks/chairs, white boards, tack boards
Equipment: staff & teacher computers, desktop printers, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ART STUDIO

FUNCTIONAL CRITERIA

Description: Art Studio
Area: approx. 1,350 sqft,
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Fine Arts Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

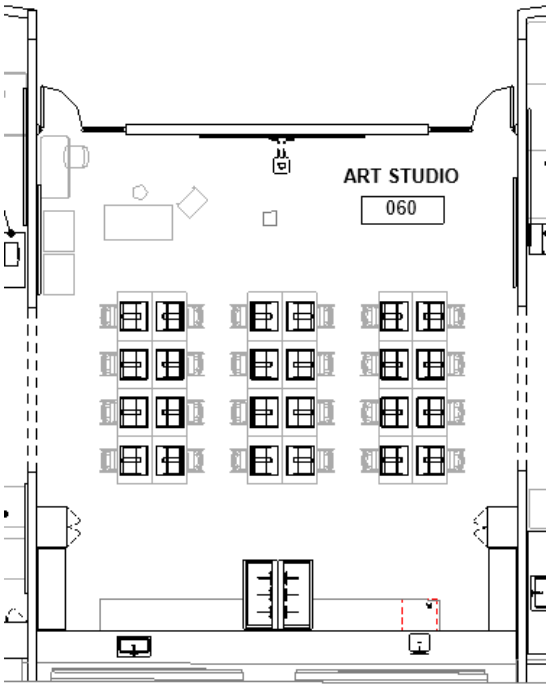
Floor/Base: poured epoxy + integral base
Walls: multi-layer gypsum board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: Glazing between Rooms and out to Gallery. Skylights
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required. overhead cord reels.
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling clouds (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

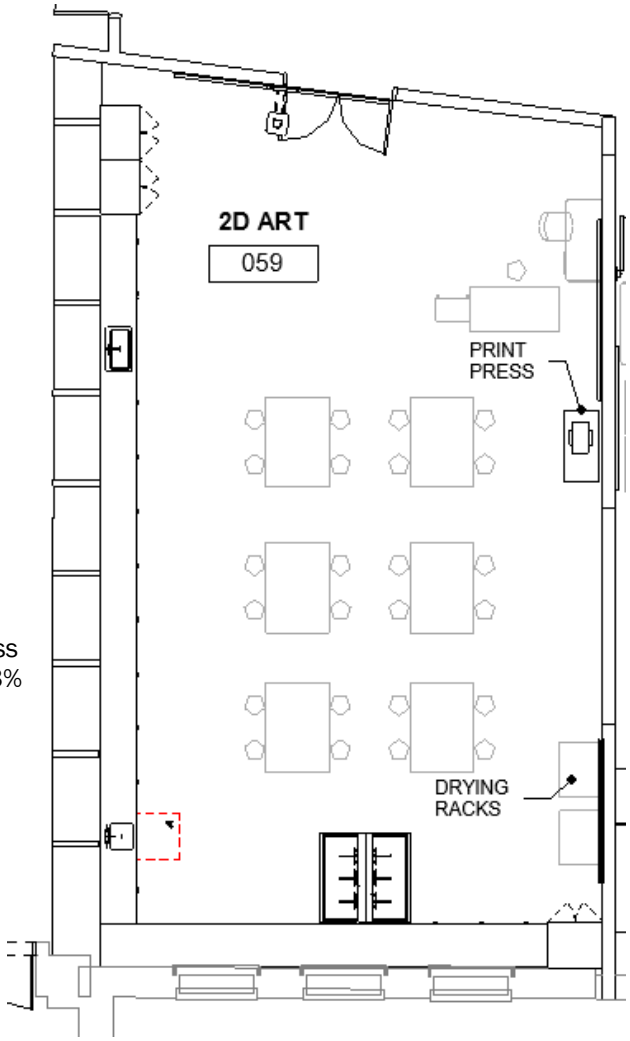
Casework: perimeter epoxy counters with base cabinets, including 4 sinks (1 regular, 1 ADA, 2 trough), tall storage units
Furnishings: teacher desk/file/chair, podium, student art tables/stools, demo table, white boards, tack boards
Equipment: flat files, drying racks, teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



2D ART



FUNCTIONAL CRITERIA

Description: Art Studio
Area: approx. 1,350 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Fine Arts Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

Floor/Base: poured epoxy + integral base
Walls: multi-layer gypsum wall board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open) Interior Glazing between Rooms and out to Gallery.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required. overhead cord reels.
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: perimeter counters with base cabinets, including 2 sinks (1 regular, 1 ADA), tall storage units
Furnishings: teacher desk/file/chair, podium, student art tables/stools, demo table, white boards, tack boards
Equipment: kiln, ware cart, drying racks, teacher computer,
Storage: in-room cabinets as noted

FIXTURES / FURNISHINGS

Casework: perimeter epoxy counters with base cabinets, including 4 sinks (1 regular, 1 ADA, 2 trough), tall storage units
Furnishings: teacher desk/file/chair, podium, student art tables/stools, demo table, flat files, white boards, tack boards
Equipment: drying racks, print press, cutting boards, teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

3D ART

FUNCTIONAL CRITERIA

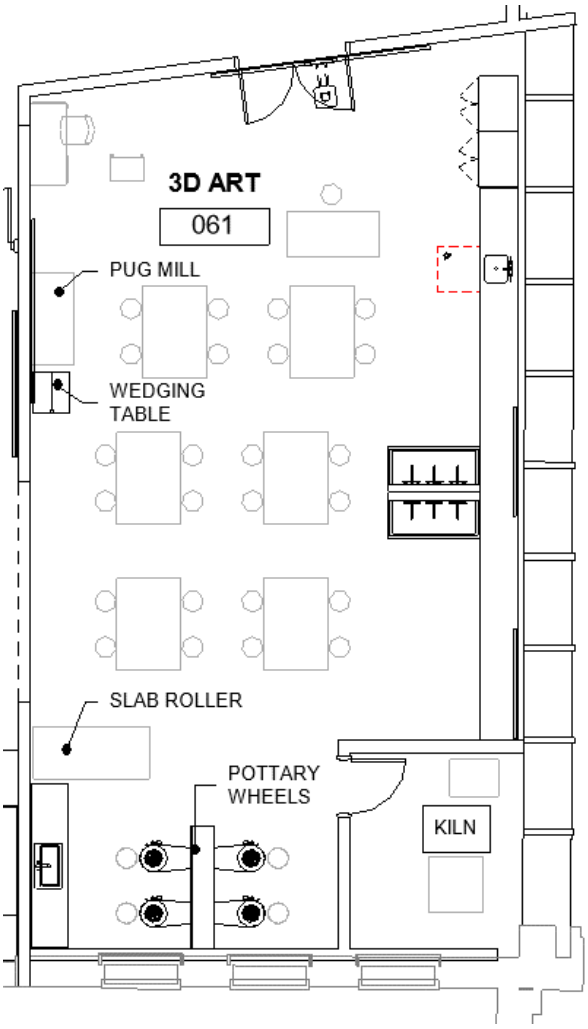
Description: Art Studio
Area: approx.1,350 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Fine Arts Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

Floor/Base: poured epoxy + integral base
Walls: multi-layer gypsum wall board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open) Interior Glazing between Rooms and out to Gallery.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required. overhead cord reels
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system



FIXTURES / FURNISHINGS

Casework: perimeter epoxy counters with base cabinets, including 4 sinks (1 regular, 1 ADA, 2 trough), tall storage units
Furnishings: teacher desk/file/chair, podium, student art tables/stools, metal open shelving, flat files, demo table, white boards, tack boards
Equipment: pottery wheels, kiln, ware cart, pug mill, wedging table, slab roller, drying racks, teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

ANIMATION

FUNCTIONAL CRITERIA

Description: Animation Art Room
Area: approx. 1,350 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Storage, Kiln Room, Makerspace
Orientation: South-facing (with sun control)
Views: Outdoor Learning

TECHNICAL CRITERIA

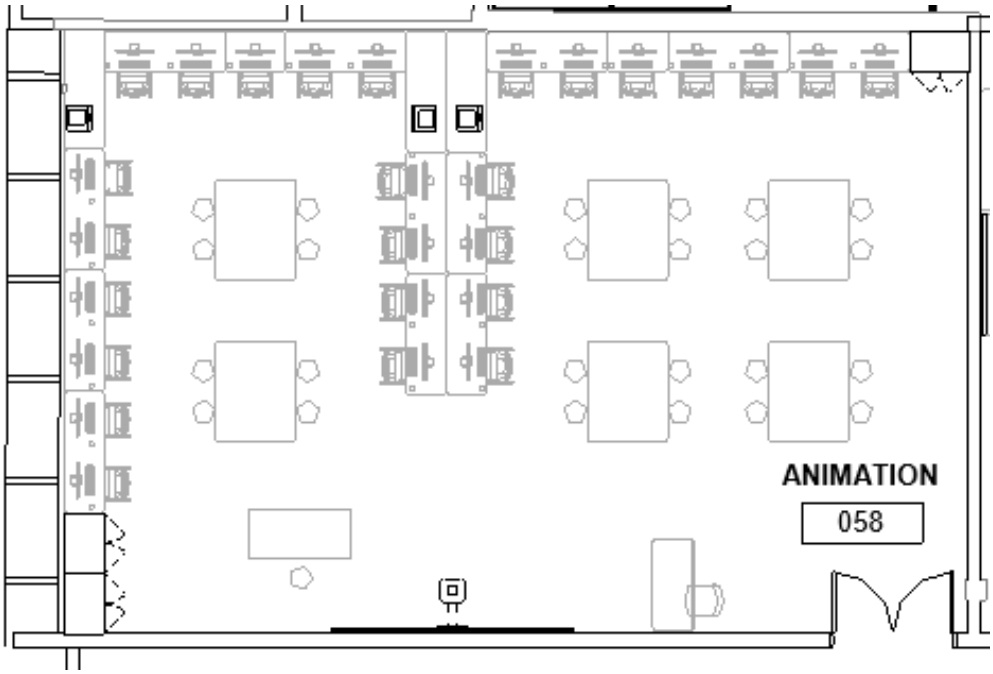
Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: Interior glazing as indicated on plans
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required. overhead cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desk/chair, filing, bookcases, demo table, student work tables/stools, computer tables/chairs, white boards, tack boards
Equipment: teacher computer, student computers, document camera, printers
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



GRAPHICS

FUNCTIONAL CRITERIA

Description: Art Classroom, Storage & Kiln Room
Area: 1,350 sqft, Kiln 150 sqft, Storage 150sf
Quantity: 6 Classrooms
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Storage, Kiln Room, Makerspace
Orientation: South-facing (with sun control)
Views: Outdoor Learning

TECHNICAL CRITERIA

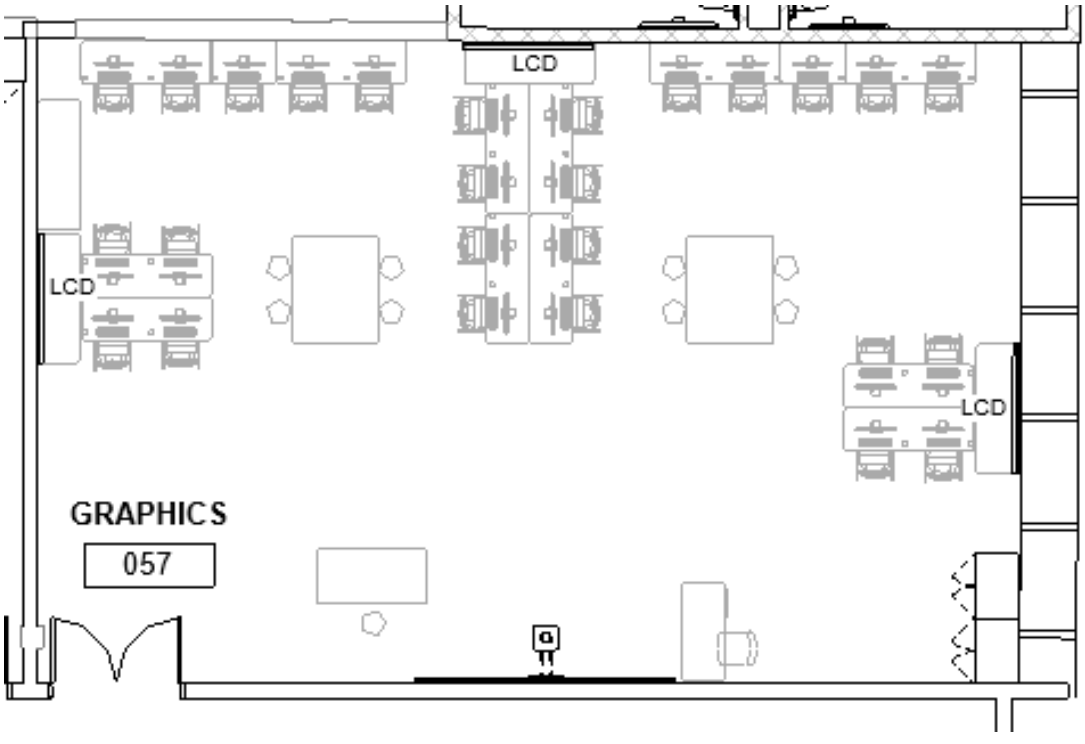
Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: Interior glazing as indicated on plans
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required, overhead cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desk/chair, filing, bookcases, demo table, student work tables/stools, computer tables/chairs, white boards, tack boards
Equipment: teacher computer, student computers, document camera, printers, LCDs
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ART STUDIO (TV PRODUCTION)

FUNCTIONAL CRITERIA

Description: TV Production
Area: approx. 1,350 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: TV Studio/ Art Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

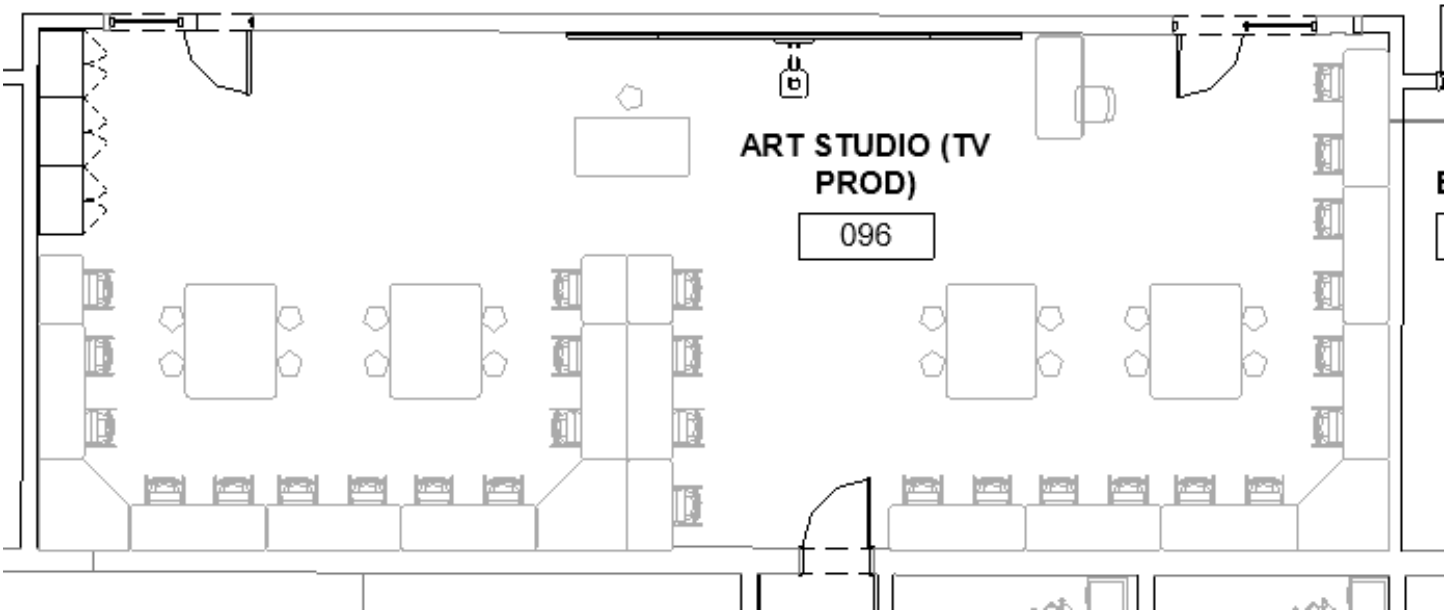
Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: exposed painted exposed ceilings with 50% ACT Clouds + overhead Unistrut/pipe grid
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: Interior glazing as indicated on plans
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desk/chair, filing, bookcases, demo table, student work tables/stools, computer tables/chairs, white boards, tack boards
Equipment: teacher computer, student computers, document camera, printers
Storage: in-room cabinets as noted

OTHER INFORMATION:

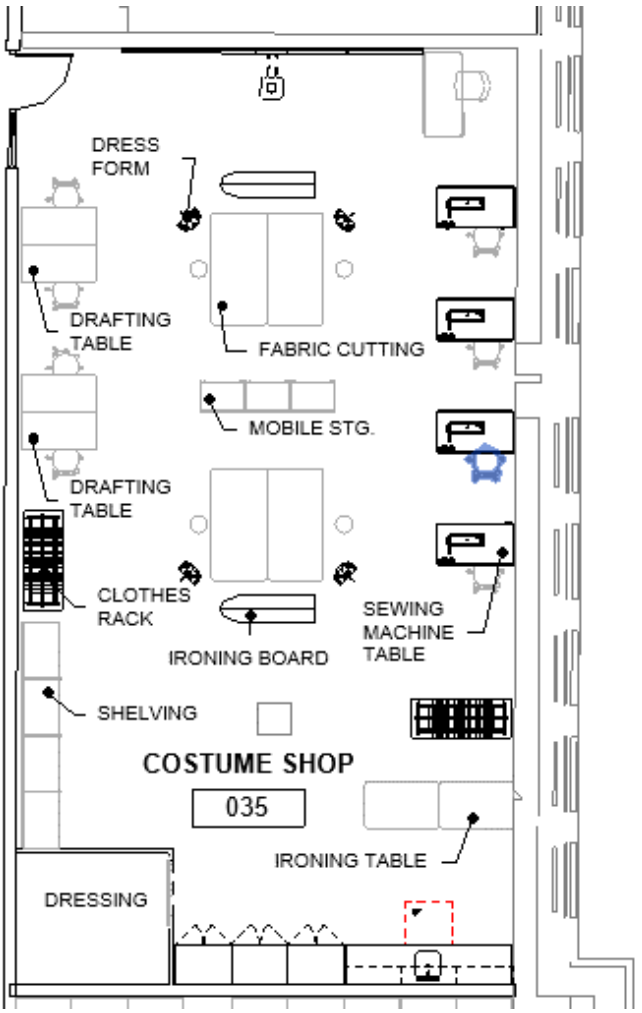
Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



COSTUME SHOP

FUNCTIONAL CRITERIA

Description: Art Classroom, Storage & Kiln Room
Area: 1,350 sqft
Quantity: 1
Occupants: -



LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Fine Arts Suite
Orientation: East
Views: Yes

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

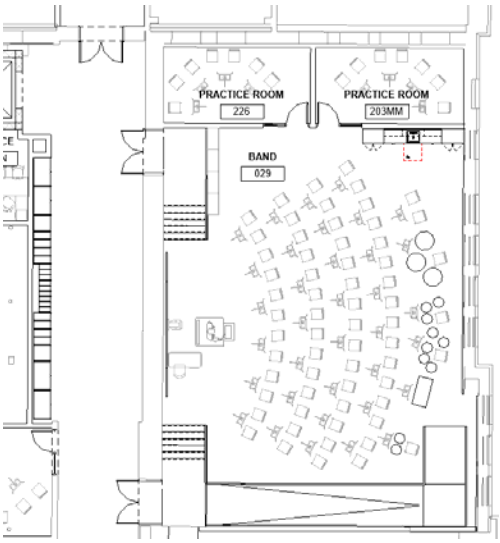
FIXTURES / FURNISHINGS

Casework: sink counter w/ upper & lower cabinets, tall storage units
Furnishings: teacher desk/chair, filing, bookcases, fabric cutting tables/stools, drafting tables/sewing tables/chairs, ironing table, mobile storage, open metal shelving, clothing racks, curtains white boards, tack boards
Equipment: sewing machines, ironing boards, dress forms, fashion equipment, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

BAND ROOM



FUNCTIONAL CRITERIA

Description: instrumental and vocal instruction for band groups
Area: approx. 2000sf
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups, students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: East
Views: Yes

TECHNICAL CRITERIA

Floor/Base: New LGMF floor w/ new subfloor as indicated on plans. Synthetic carpet tiles /rubber base- new stair and ramp as shown; rubber treads/risers and linoleum landings.
Walls: multi-layer gypsum wall board, painted + 25% wall area fabric wrapped acoustical panels
Ceiling: Sloping Acoustical Ceiling- 50% high light reflectance ceiling tile (.90 LRV); 50% 2x2 Lay-in “wedge” acoustical tiles
Door/Frame: solid wood doors with acoustic gaskets and 3’ wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and motorized mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required, power to motorized shades
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC) + Lay-in “wedge” acoustical tiles. Sound Absorbing Fabric wrapped wall panels.
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: 90 LFT of band instrument storage units with individual grill doors, sink counter w/upper & lower cabinets, tall storage
Furnishings: conductor's chair/ stand, lateral files, student music chairs/stands, white boards, tack boards
Equipment: music instruments, teacher computer, doc camera
Storage: in-room cabinets as noted, instrument storage in adjacent corridor and at chorus side corridor

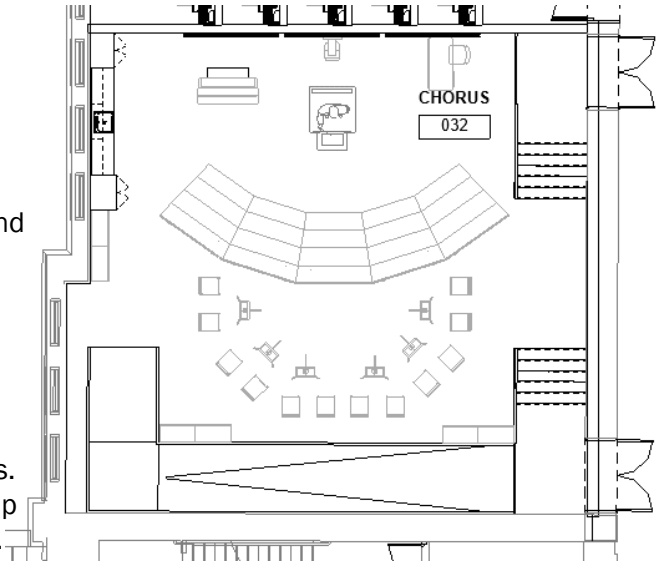
OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District’s standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated “out of sight” areas within each room if the shade cannot be drawn.

CHORUS ROOM

FUNCTIONAL CRITERIA

Description: instrumental and vocal instruction for chorus groups
Area: approx. 1500sf
Quantity: 1
Occupants: --



LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: West
Views: Yes

TECHNICAL CRITERIA

Floor/Base: New LGMF floor w/ new subfloor as indicated on plans. Synthetic carpet tiles /rubber base- new stair and ramp as shown; rubber treads/risers and linoleum landings.
Walls: multi-layer gypsum wall board, painted + fabric wrapped acoustical panels
Ceiling: Sloping Acoustical Ceiling- 50% high light reflectance ceiling tile (.90 LRV); 50% 2x2 Lay-in “wedge” acoustical tiles
Door/Frame: solid wood doors with acoustic gaskets and 3’ wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and motorized mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required, power to motorized shades
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC) + Lay-in “wedge” acoustical tiles. Sound Absorbing Fabric wrapped wall panels.
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

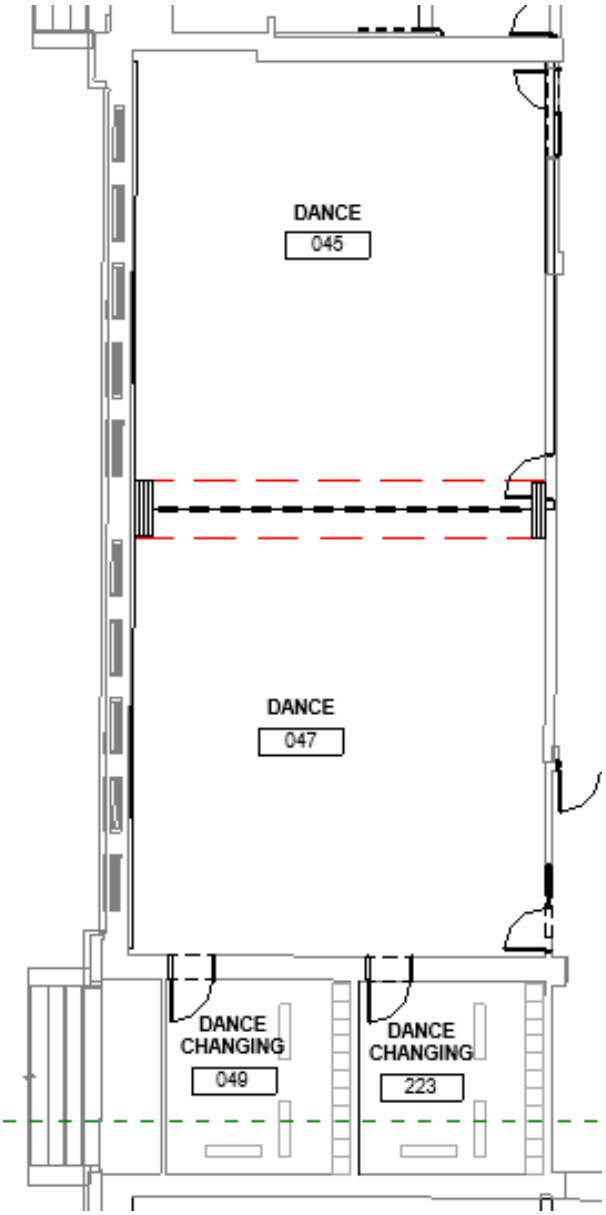
FIXTURES / FURNISHINGS

Casework: sink counter w/upper & lower cabinets, tall storage
Furnishings: conductor's chair/ stand, lateral files, student music chairs/stands, white boards, tack boards
Equipment: music instruments, choral risers, piano, teacher computer, doc camera
Storage: in-room cabinets as noted

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District’s standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated “out of sight” areas within each room if the shade cannot be drawn.

DANCE ROOM



FUNCTIONAL CRITERIA

Description: Dance Studio
Area: approx. 1200sf
Quantity: 2 (+ Stage)
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: west
Views: yes

TECHNICAL CRITERIA

Floor/Base: built up resilient dance floor
Walls: multi-layer gypsum wall board, painted- mirrors w/ ballet barre all walls except operable partition. Diver wall to be powered operable wall with full height tempered mirrors, both sides.
Ceiling: sloped high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security: TBD
Acoustical: Acoustic Ceiling Clouds and Acoustic Wall Panels
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

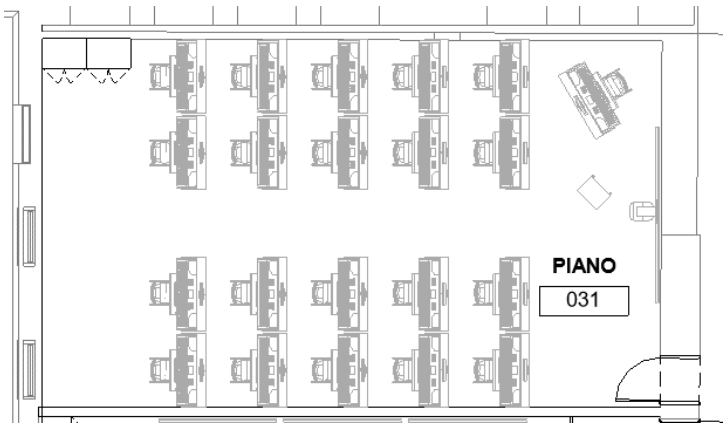
Casework: -
Furnishings: mirrors, fixed ballet barres on walls without mirrors, portable ballet barres, rosin box, paper towel holder
Equipment: upright piano and bench, water cooler with bottle filler, lockers and benches

Storage: as listed part of changing rooms

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

PIANO/DIGITAL LAB



FUNCTIONAL CRITERIA

Description: instrumental instruction room
Area: 1000sf
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups students and teachers, including adaptive music
Adjacencies: auditorium and other performing arts
Orientation: existing, north facing
Views: into new courtyard/amphitheater

TECHNICAL CRITERIA

Floor/Base: New LGMF floor w/ new subfloor as indicated on plans. Synthetic carpet tiles /rubber base
Walls: multi-layer gypsum wall board, painted + fabric wrapped acoustical panels
Ceiling: Sloping Acoustical Ceiling- 50% high light reflectance ceiling tile (.90 LRV); 50% 2x2 Lay-in “wedge” acoustical tiles
Door/Frame: solid wood doors with acoustic gaskets and 3’ wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement, local sound system & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC) + Lay-in “wedge” acoustical tiles. Sound Absorbing Fabric wrapped wall panels.
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage
Furnishings: teacher chair, student chairs, podium, white boards, tack boards
Equipment: computers (21), MIDI Keyboards (21), audio controllers (21), central audio controller (1)
Storage: in room cabinets as note

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District’s standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated “out of sight” areas within each room if the shade cannot be drawn.

GUITAR

FUNCTIONAL CRITERIA

Description: instrumental instruction room
Area: approx. 375sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers
Adjacencies: Music Rooms
Orientation: -
Views: -

TECHNICAL CRITERIA

Floor/Base: Synthetic carpet tiles /rubber base
Walls: multi-layer gypsum wall board, painted + fabric wrapped acoustical panels
Ceiling: Sloping Acoustical Ceiling- 50% high light reflectance ceiling tile (.90 LRV); 50% 2x2 Lay-in "wedge" acoustical tiles
Door/Frame: solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade

Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required

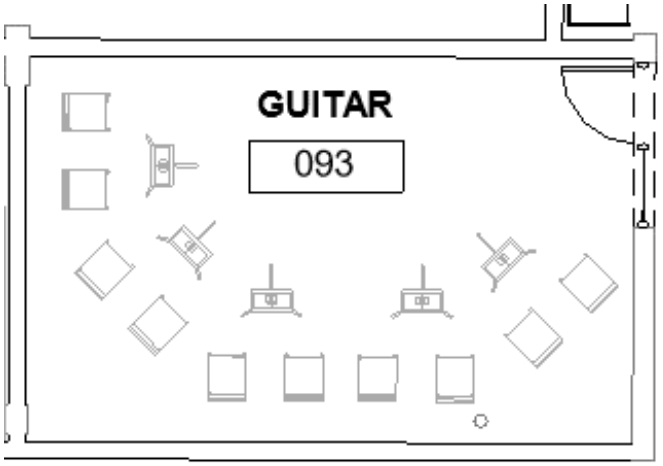
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC) + Lay-in "wedge" acoustical tiles. Sound Absorbing Fabric wrapped wall panels.
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: guitar storage units, student music chairs, stands, tack boards
Equipment: guitars
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TV STUDIO

FUNCTIONAL CRITERIA

Description: TV Studio
Area: approx. 4000sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: TV Production/ Art Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV)+overhead Unistrut frame
Door/Frame: solid wood doors with acoustic gaskets and 3' wide sidelight glass (as shown) with solid roller shade

Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD

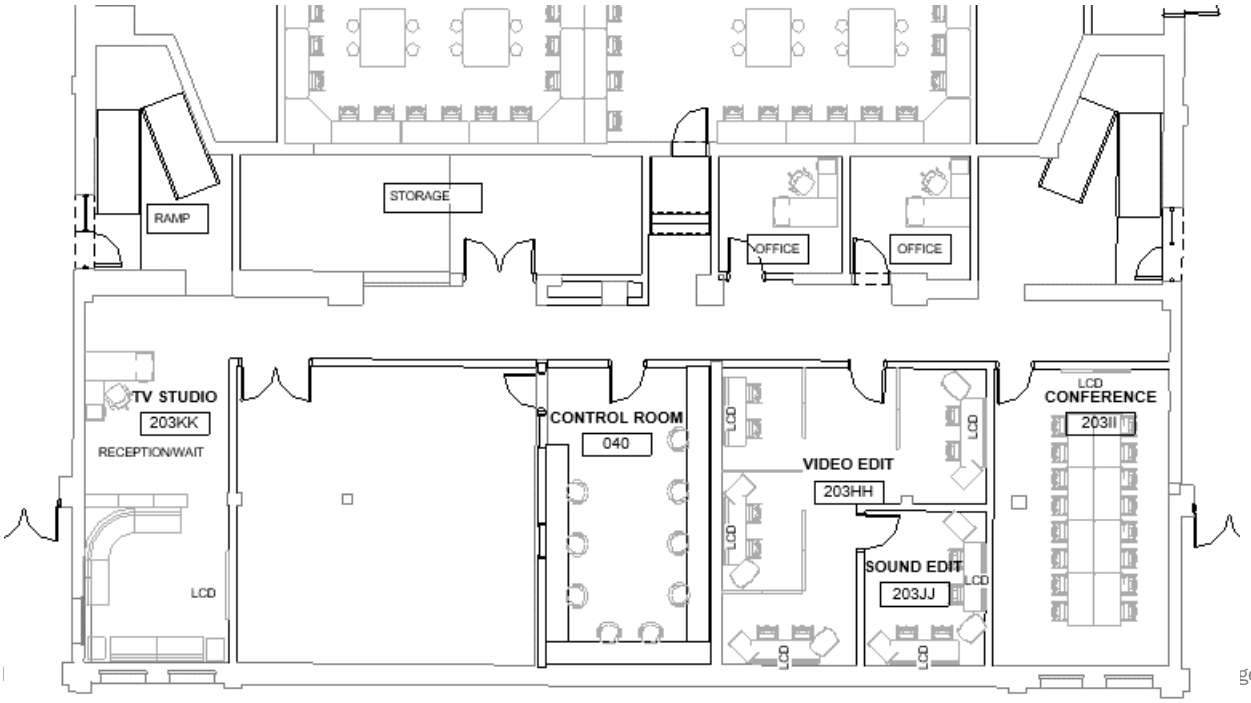
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, work counters
Furnishings: reception desk/chair, filing, bookcase, waiting chairs, soft seating, side tables, office desk/chairs/filing/bookcase, open metal shelving, conference tables/ chairs, sound/video editing workstations/chairs, divider partitions, control room chairs, marker boards, tack boards
Equipment: digital cameras, digital flashes, film cameras, microphones, headphones, light meters, lighting/studio equipment, audio equipment, Blu-ray and DVD players, TV monitors, LCDs
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SCENE SHOP

FUNCTIONAL CRITERIA

Description: Scene Shop
Area: approx. 1,440 sqft
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Auditorium, Art Suite
Orientation: -
Views: -

TECHNICAL CRITERIA

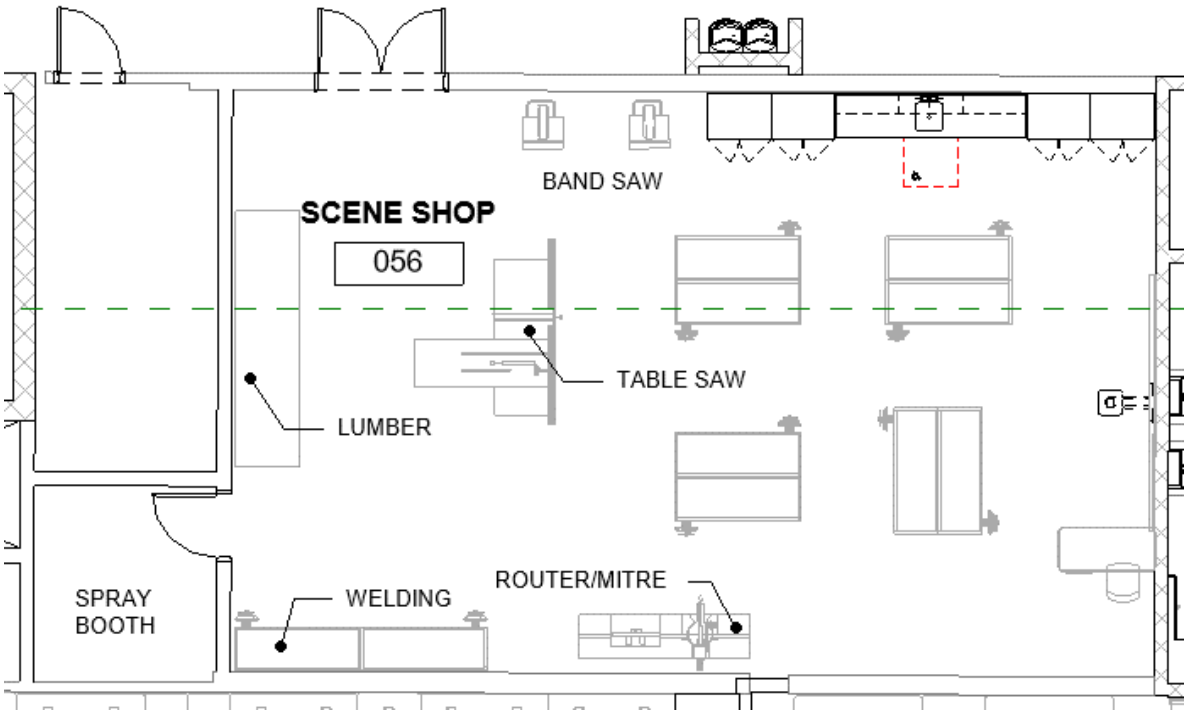
Floor/Base: poured epoxy flooring with integral base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, epoxy sink counter w/upper and lower cabinets
Furnishings: white board, tack boards
Equipment: band saw, chop saw w/ radial arm saw, table Saw, CNC router, metal saw, scroll saw, router table, hampers, welding tools, flat bed cart, lumber storage, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



CULINARY KITCHEN & RESTAURANT

FUNCTIONAL CRITERIA

Description: Culinary Kitchen & Classroom
Area: 4700sf
Quantity: I Kitchen, 1 Restaurant, 2 Classrooms
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff, General Public
Adjacencies: Lobby, Culinary Classrooms
Orientation: East-facing
Views: Canal

TECHNICAL CRITERIA

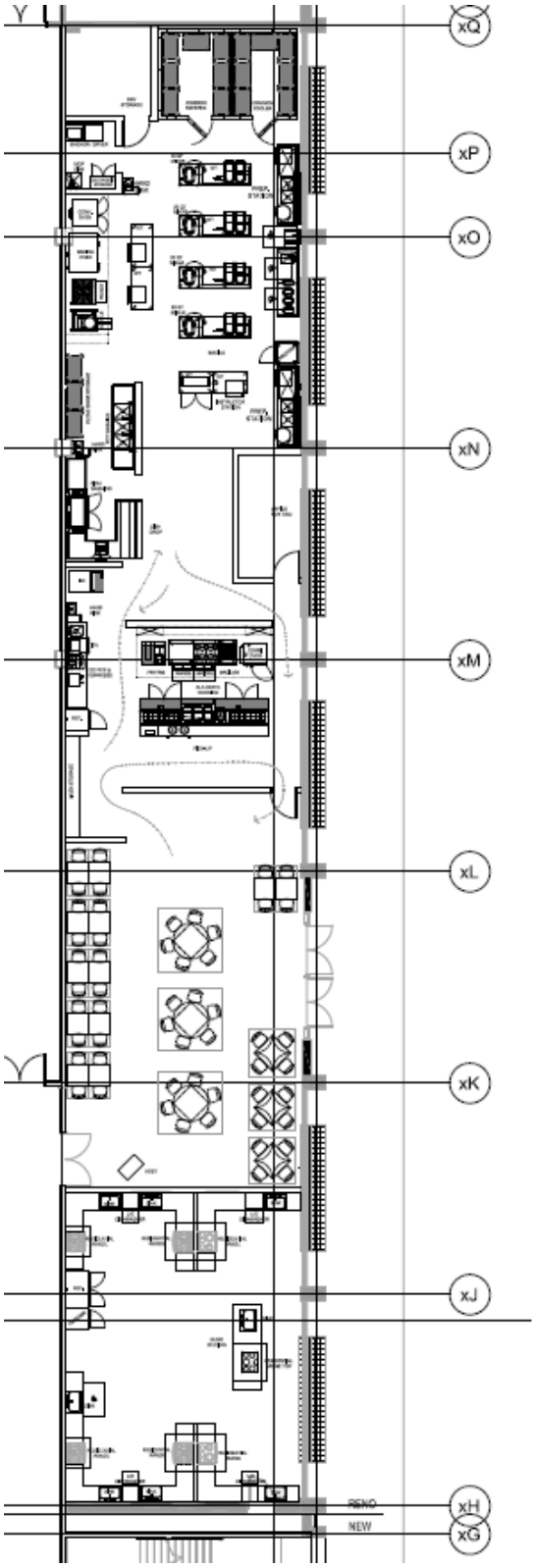
Floor/Base: Epoxy at Kitchen LVT/Rubber Base
Walls: multi-layer gypsum board, painted with Porcelain tile wainscot
Ceiling: high performance ceiling tile/ 10% GWB soffits
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)- Interior glazing at line.
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: dining table/chairs, bistro tables/stools
Equipment: (see list on next page)
Storage: -

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



CULINARY KITCHEN & RESTAURANT (CONT.)

1	Walk-in cooler
1	Walk-in freezer
2	Remote refrigeration systems
18	Mobile shelving units
2	Utility carts
19	Dry storage shelving
1	Prep counter with sinks
1	Wall shelf
1	Accessible hand sink
1	Trash barrel (by Owner)
3	Mobile work tables
1	Exhaust ventilator
1	Ventilator control system
1	Deck oven (four decks)
1	Double convection oven
1	Four-burner range w/ oven
1	Forty-quart kettle with drain stand
1	Exhaust ventilator
2	Fire suppression systems
1	Utility distribution system
1	Griddle range with cabinet base
1	Two-burner/hot top range
1	Four-burner range with oven
1	Upright broiler w/ oven base
1	Fryer assembly with dump station,
1	Ventilator control system
1	Chef's counter assembly
2	Reach-in refrigerators
8	Mobile shelving
6	Storage shelving
6	Hand sinks
7	Waste bins (by Owner)
1	Accessible prep station with sink
1	Wall shelf with pot rack
4	Five-quart mixers
1	Sixty-quart mixer
1	Fill faucet
3	Mobile mixer stands
3	Twenty-quart mixers
1	Proofer cabinet
1	Dough divider
1	Scale with mobile stand
6	Maple top tables
12	Ingredient bins
17	Drop cords
5	Mobile pan racks
1	Mobile demonstration counter with mirror
1	Mobile work table
1	Clothes washer
1	Clothes dryer
1	Mop sink (by PC)
1	Mop rack/utility shelf
1	Detergent storage cabinet
1	Mobile slicer stand
1	Slicer
8	Work tables
8	Two burner range tops
1	Three-compartment sink
1	Wall shelf
1	Soiled ware landing table
1	Rack sorting shelf
1	Hose reel assembly
1	Ware washer
2	Exhaust ducts
1	Clean ware table
2	Bussing carts
1	Millwork counter
1	Reach-in refrigerator
1	Reach-in freezer
1	Combination display case
1	Work counter with sink
1	Wall shelf
1	Conveyor toaster
1	Coffee brewer

MAKERSPACE

FUNCTIONAL CRITERIA

Description: Makerspace
Area: approx. 1440sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Freshman Academy, Robotics, Engineering
Orientation: North
Views: Front Entry Plaza

TECHNICAL CRITERIA

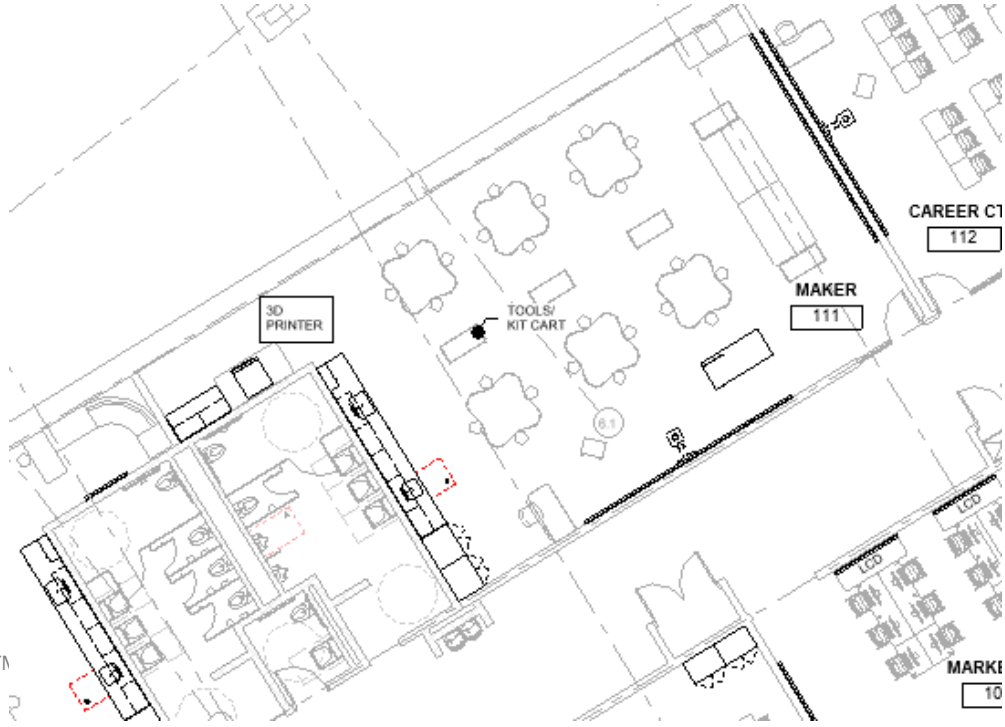
Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets, cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, safety goggle cabinet, tall storage units
Furnishings: teacher desk/chair, filing, bookcases, podium, demo table, student work tables/ stools, mobile storage units, white boards, tack boards
Equipment: 3D printers, copier, tables top shop tools, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ROBOTICS

FUNCTIONAL CRITERIA

Description: Robotics Lab
Area: approx. 1440sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Freshman Academy, Makerspace, Engineering
Orientation: North
Views: Yes

TECHNICAL CRITERIA

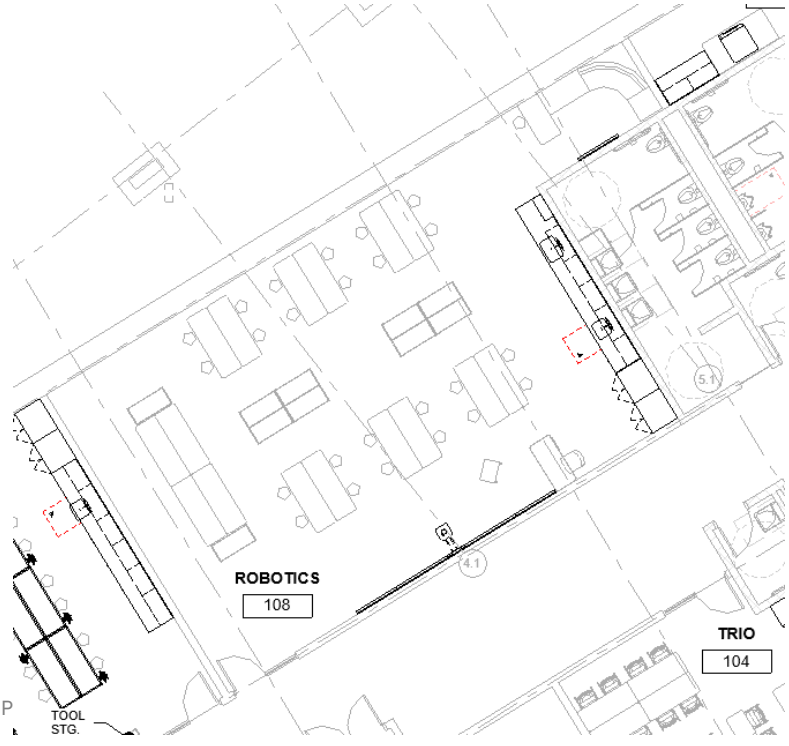
Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets, cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, safety goggle cabinet, tall storage units
Furnishings: teacher desk/chair, filing, bookcases, podium, demo table, student work tables/ stools, mobile storage units, soft seating, white boards, tack boards
Equipment: robotics kits and tools, teacher computer, document camera, LCD
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



ENGINEERING

FUNCTIONAL CRITERIA

Description: Engineering Lab
Area: approx. 1440sf
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Freshman Academy, Makerspace, Robotics
Orientation: North
Views: Yes

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door with acoustic gaskets and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets, cord reels
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: Speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper and lower cabinets, safety goggle cabinet, tall storage units
Furnishings: teacher desk/chair, filing, bookcases, podium, demo table, student work benches w/vices & stools, student desk/chairs, mobile storage units, white boards, tack boards
Equipment: tabletop shop tools, teacher computer, document camera
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

BUSINESS

FUNCTIONAL CRITERIA

Description: Business Classroom
Area: approx. 1200sf
Quantity: 3 Classrooms
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Business Classrooms, School Store
Orientation: South Quad
Views: Yes

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desk/chair, filing, bookcases, podium, student tables/chairs, student work tables, white boards, tack boards
Equipment: teacher computer, document camera, printers
Storage: in room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

BUSINESS/STORE

FUNCTIONAL CRITERIA

Description: Business Classroom
Area: approx. 1200sf
Quantity: 3 Classrooms
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students & Teachers/Staff
Adjacencies: Business Classrooms, School Store
Orientation: South Quad
Views: Yes

TECHNICAL CRITERIA

Floor/Base: Linoleum Tile/Rubber Base
Walls: multi-layer gypsum board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, counter w/lower cabinets; Store: sink counter w/upper and lower cabinets
Furnishings: Classroom: teacher desk/chair, filing, bookcases, podium, student computer tables/chairs, student work table, white boards, tack boards; Storage: open shelving, clothing racks; Office: desk/chair, filing, bookcase, guest chairs, marker board, tack board; Store: display clothing racks, retail shelving and racks, transection counter, window display units, marker board
Equipment: Refrigerator, oven, microwave, cash registers, scanners, teacher computer, document camera, desktop printers, LCDs
Storage: in room cabinets/storage as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

GYMNASIUM

FUNCTIONAL CRITERIA

Description: Gymnasium
Area: approx. 18,000SF
Quantity: 1- Operable Wall and Divider Curtains
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: Teachers/Staff/Students/Parents/Public
Adjacencies: Public Entrance, Storage, Locker Rooms
Orientation: North/South
Views: Yes

TECHNICAL CRITERIA

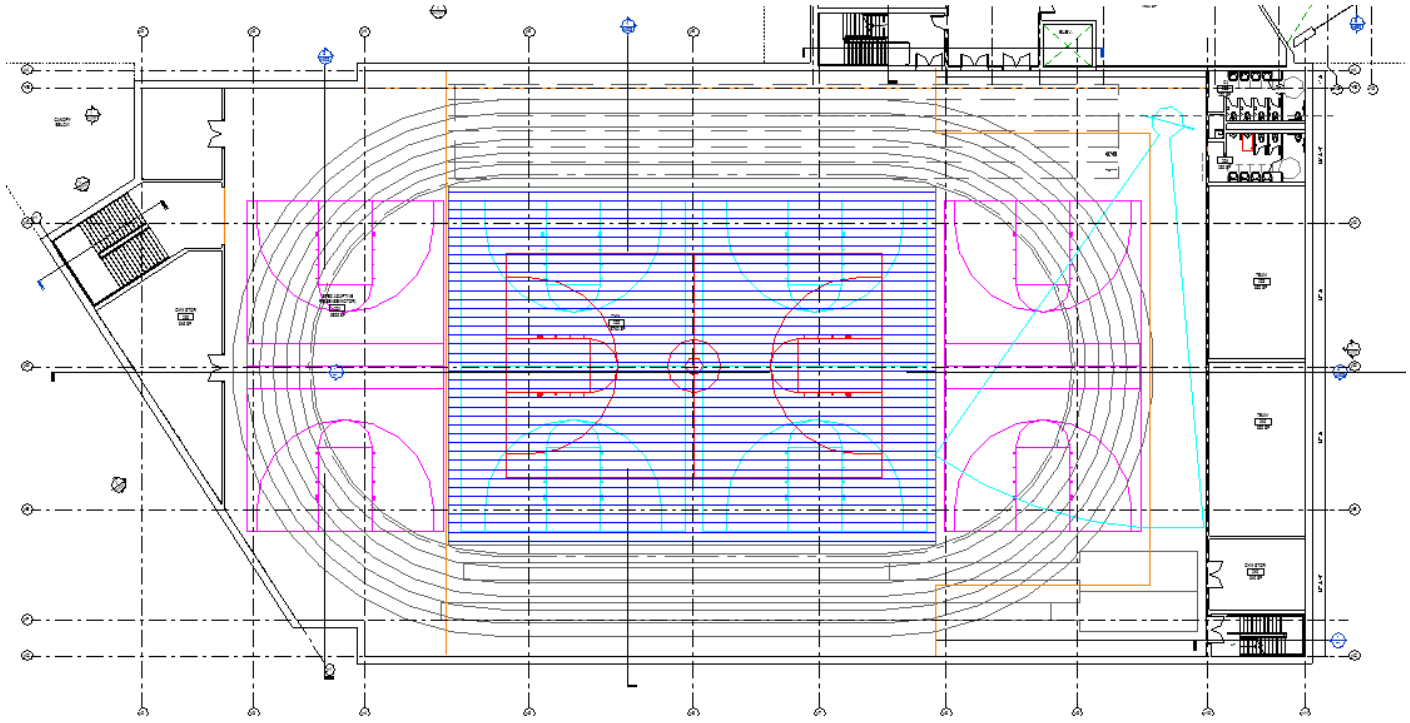
Floor/Base: Athletic Wood/Vented Base, Synthetic Athletic Floor
Walls: CMU painted walls/Painted tectum
Ceiling: Painted Exposed, Acoustical Deck
Doors: solid wood doors
Windows: Kalwall with vision glass at North Elevation.
Lighting: LED Pendants
Power: convenience outlets, (1) center digital 4-sided scoreboard + (4) sets wall mounted scoreboards
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation/Radiant Panels + (8) ceiling mounted de-stratification fans
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: (8) Fabric gym divider curtains + (1) hard panel divider curtain +(10) Acrylic Backboards retractable-adjustable height + (2) adjustable chin up bar+ (2) sets of ceiling mounted climbing ropes + (5) sets of carbon fiber insets volleyball sleeves
Equipment: Fixed (5) 18LF x 7 tiers high, and Moveable- (9) 20LF x 7 tiers high
Storage: separate storage rooms

OTHER INFORMATION:

Visibility: N/A



STRENGTH & FITNESS

FUNCTIONAL CRITERIA

Description: Gymnasium
Area: 3,000SF
Quantity: Divided into two- Strength & Fitness
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: Teachers/Staff/Students/Parents/Public
Adjacencies: Gymnasium, Lockers, Trainer
Orientation: North
Views: Yes

TECHNICAL CRITERIA

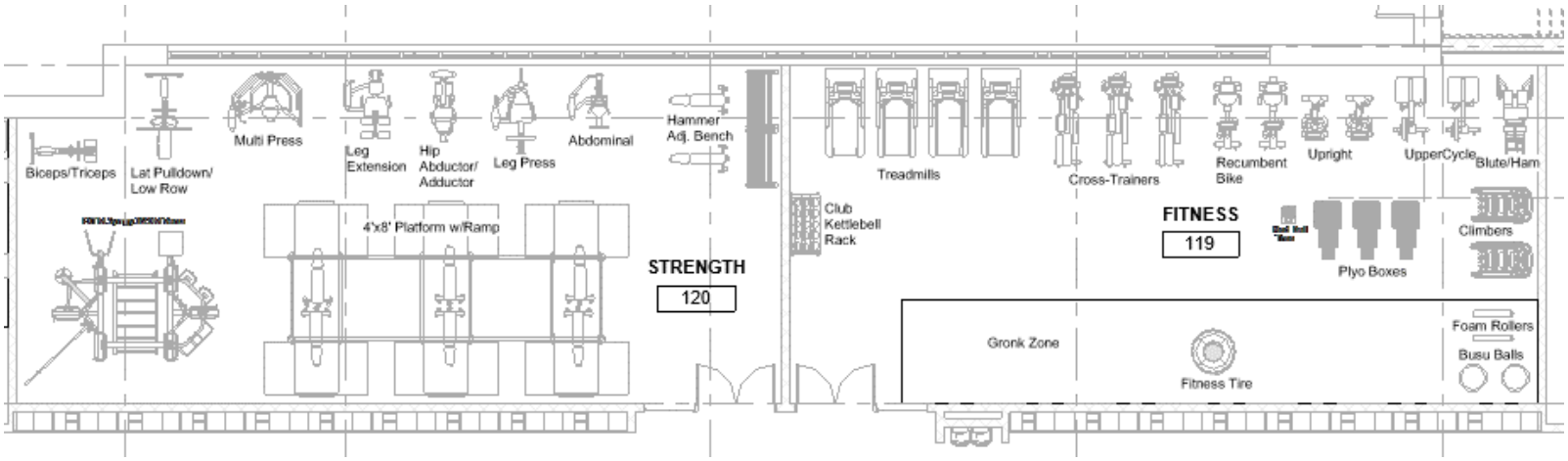
Floor/Base: Rubber Athletic Flooring
Walls: CMU painted walls
Ceiling: Painted Exposed
Doors: solid wood doors
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED Pendants
Power: convenience outlets
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: stationary bikes, treadmills, stair masters, kettle bells and racks, ball rack, conditioning equipment, cardio equipment, weight lifting equipment and benches, yoga mats
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TRAINING ROOM

FUNCTIONAL CRITERIA

Description: Athletic Training Room
Area: approx. 600SF
Quantity: 1
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: Teachers/Staff/Students
Adjacencies: Gym, Strength/Fitness, Locker Rooms
Orientation: North
Views: Yes

TECHNICAL CRITERIA

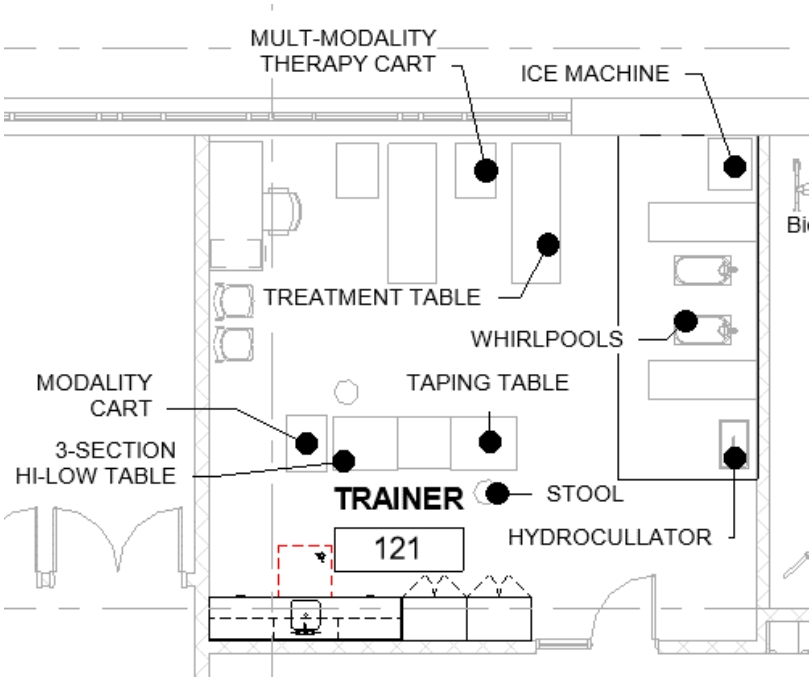
Floor/Base: Rubber Athletic Flooring
Walls: CMU painted walls
Ceiling: Painted Exposed
Doors: solid wood doors
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (10% open)
Lighting: LED Pendants
Power: convenience outlets
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, sink counter w/upper and lower cabinets
Furnishings: teacher desk/chair, filing, bookcase, treatment tables, student chairs/stools, multipurpose storage cart, taping tables, modality cart, marker board
Equipment: whirlpools, hydrocollator, ice machine, teacher computer
Storage: in room cabinets as listed

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



LOCKER ROOMS/TEAM ROOMS

FUNCTIONAL CRITERIA

Description: PE & Athletic Locker Rooms
Area: approx. 3600sf
Quantity: 2
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: Students, teachers, coaches
Adjacencies: Gym, Strength/Fitness, Wrestling
Orientation: -
Views: No

TECHNICAL CRITERIA

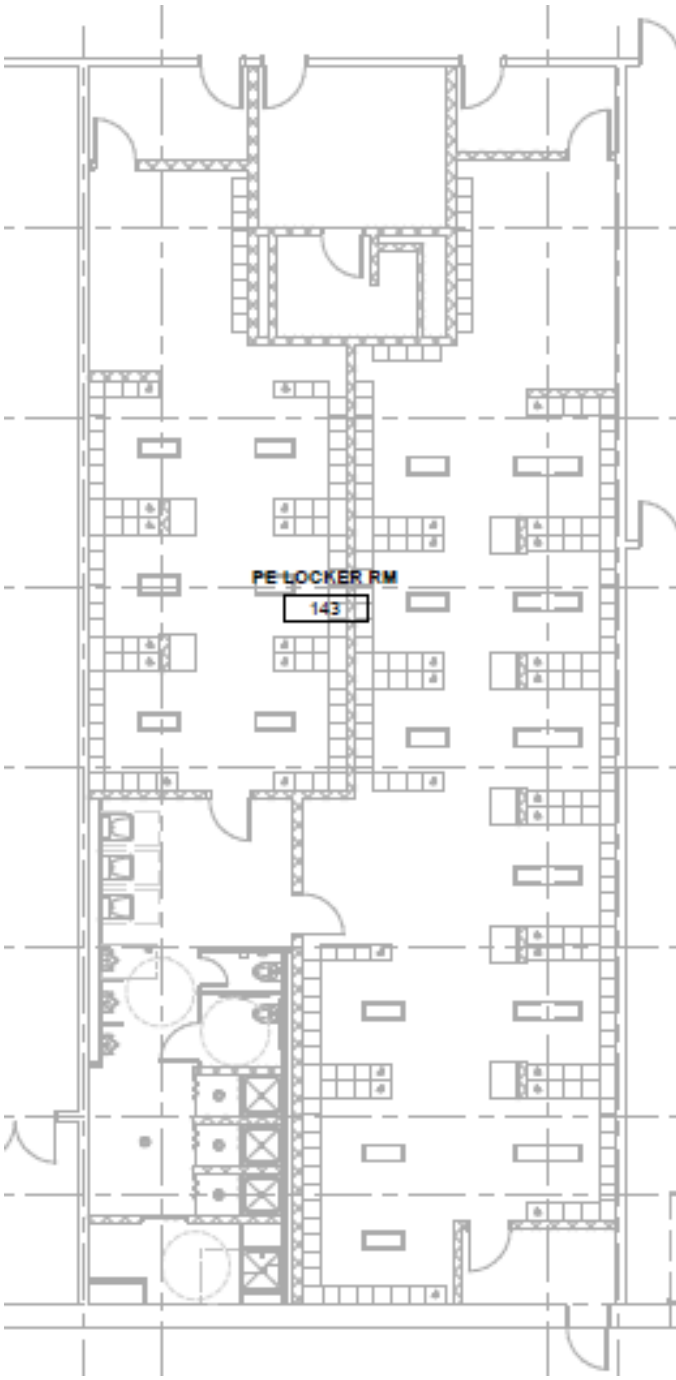
Floor/Base: epoxy floors and base
Walls: CMU, painted
Ceiling: Moisture resistant Tectum Ceilings
Door/Frame: solid wood doors
Windows: -
Lighting: LED inlay direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets as required
Data/Com: TBD
Security: TBD
Acoustical: -
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: lockers and benches
Storage: -

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



MULTI-PURPOSE/WRESTLING

FUNCTIONAL CRITERIA

Description: Gymnasium
Area: approx. 6500sf (3000sf + 3500sf)
Quantity: One multi-purpose 3000sf gym, one 3,500sf wrestling gym
Occupants: --

LOCATION/ORIENTATION CRITERIA

Users: Teachers/Staff/Students/Parents/Public
Adjacencies: Gym, Strength/Fitness, Locker Rooms
Orientation: -
Views: -

TECHNICAL CRITERIA

Floor/Base: Rubber Athletic Flooring
Walls: CMU; painted
Ceiling: Painted Exposed
Door/Frame: solid wood doors
Windows: -

Lighting: LED Pendants
Power: convenience outlets
Data/Com: telephone, intercom, wireless access point, local sound system & wireless clock

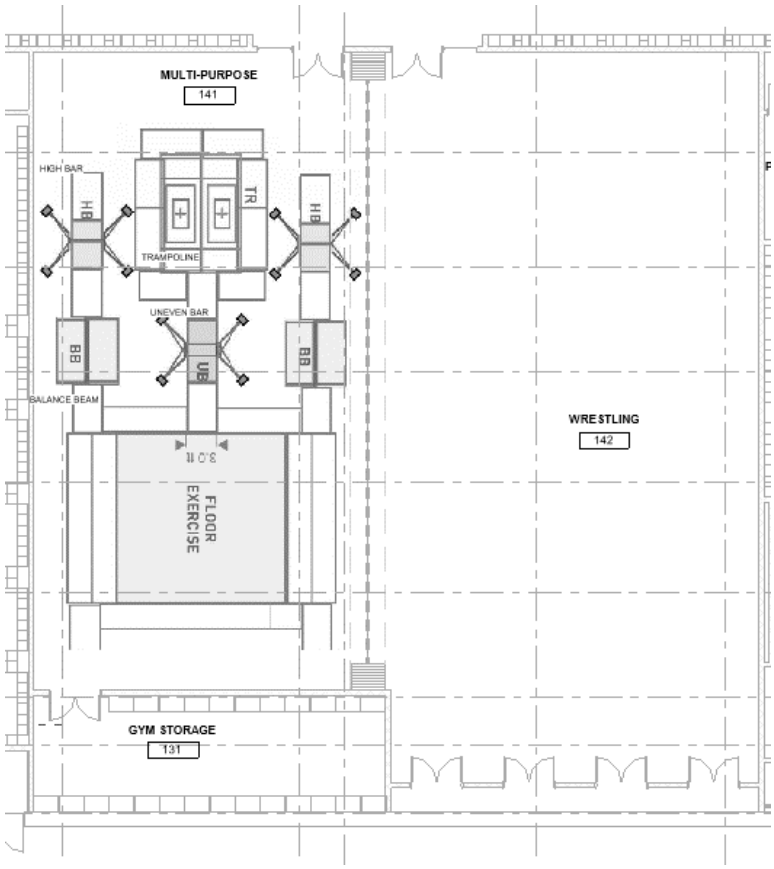
Security: TBD
Acoustical: sound absorbing deck and wall treatment
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: -
Equipment: high bars, trampoline, uneven bars, floor exercise mats, balance beams, open metal shelving units
Storage: in room shelving as listed

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



MEDIA CENTER

FUNCTIONAL CRITERIA

Description: Media Center
Area: approx. 21,900sf
Quantity: 2 (approx. 13,900sf + approx. 8,000sf)
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: students, teachers and community groups
Adjacencies: Classrooms
Orientation: South
Views: Yes

TECHNICAL CRITERIA

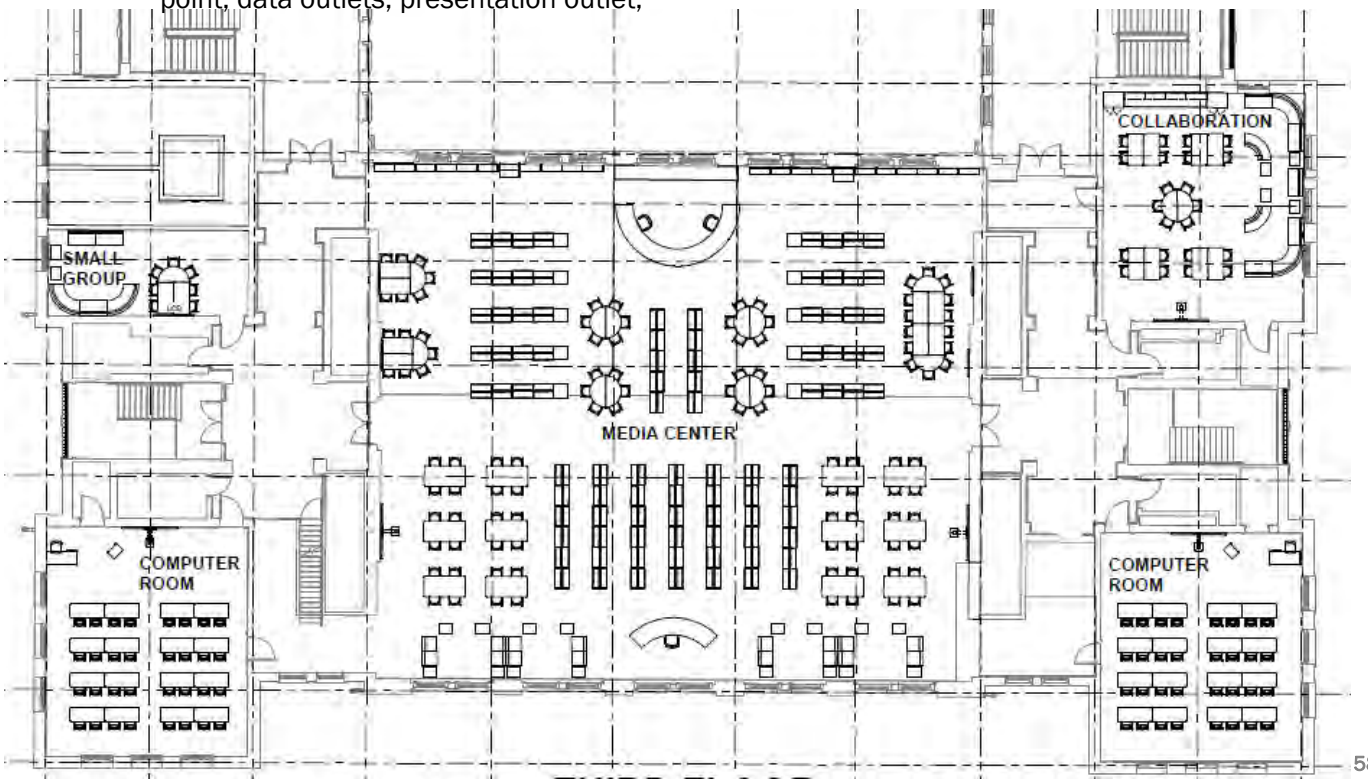
Floor/Base: Carpet/ rubber base
Walls: multi-layer gypsum board, painted
Ceiling: 80% acoustic, 20% gypsum soffits
Door/Frame: solid wood doors and sidelight glazing, entry doors to be interior storefront with aluminum doors
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and motorized mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: Convenience Outlets
Data/Com: Telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, counter w/upper and lower cabinets
Furnishings: circulation desk/chairs, single and double sided book shelving units, student computer and reading tables, chairs, soft seating, side tables, white boards, tack boards
Equipment: staff computers, printers, copiers
Storage: In room cabinets as listed.

OTHER INFORMATION:

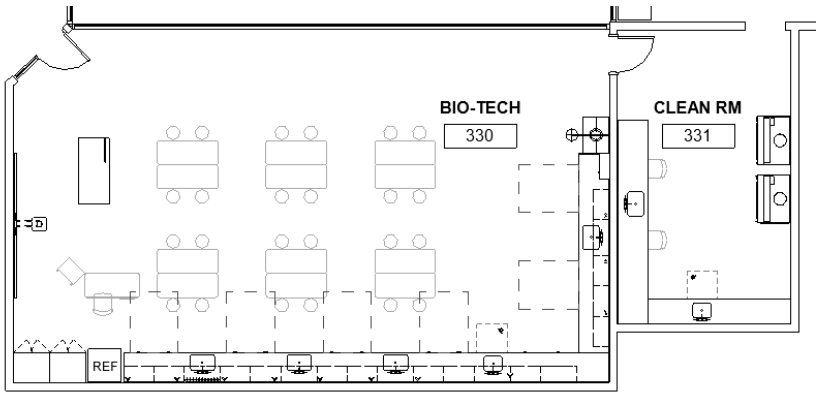
Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SCIENCE ROOM AND PREP- BIOTECH

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 350 sf Clean Room
Quantity: 1
Occupants: -



LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: -
Views: into lightwells

TECHNICAL CRITERIA

Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: interior curtainwall into adjacent Lightwells
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service

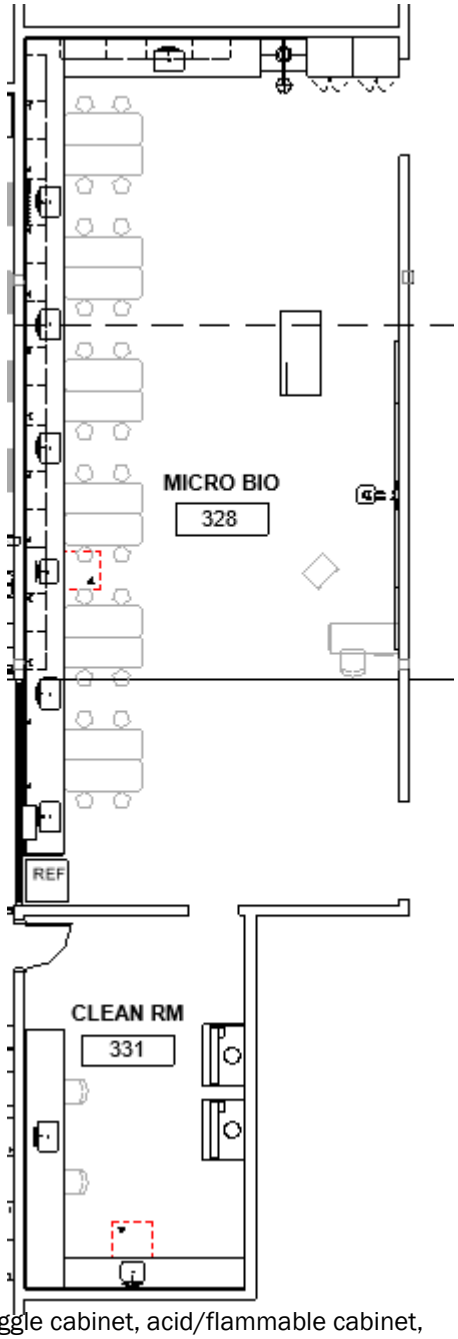
FIXTURES / FURNISHINGS

Casework: tall storage units, epoxy sink counters w/upper and lower cabinets, safety goggle cabinet, acid/flammable cabinet, fume hood
Furnishings: teacher desk/chairs, demo table/stool, podium, filing/bookcase, student epoxy top lab tables/stools, white boards, tack boards
Equipment: microscopes, clean room equipment, refrigerator, dish washer, teacher computer, document camera
Storage: In room cabinets as listed

OTHER INFORMATION

Visibility: Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

SCIENCE ROOM AND PREP- MICROBIOLOGY



FUNCTIONAL CRITERIA

Description:	teaching and learning lab
Area:	1440sf lab, 750 sf prep
Quantity:	1
Occupants:	-

LOCATION/ORIENTATION CRITERIA

Users:	teachers and students
Adjacencies:	paired labs with shared prep between, central to CRs on each academic floor
Orientation:	-
Views:	into lightwells

TECHNICAL CRITERIA

Floor/Base:	linoleum tile floor/rubber base
Walls:	multi-layer gypsum wall board, painted
Ceiling:	high light reflectance ceiling tile (.90 LRV)
Door/Frame:	solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows:	interior curtainwall into adjacent Lightwells
Lighting:	LED pendant direct/indirect with daylight diming and occupancy sensors
Power:	convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com:	telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security:	room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical:	high performance ceiling (.8 NRC/.35 CAC)
Mechanical:	Displacement Ventilation/Radiant Panels
Plumb/Fire:	speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service

FIXTURES / FURNISHINGS

Casework:	tall storage units, epoxy sink counters w/upper and lower cabinets, goggle cabinet, acid/flammable cabinet, fume hood
Furnishings:	teacher desk/chairs, demo table/stool, podium, filing/bookcase, student epoxy top lab tables/stools, white boards, tack boards
Equipment:	microscopes, clean room equipment, refrigerator, dish washer, teacher computer, document camera
Storage:	In room cabinets as listed

OTHER INFORMATION

Visibility:	Sidelights at doorway entrance are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.

SCIENCE ROOM AND PREP- HEALTH ASST (CNA)

FUNCTIONAL CRITERIA

Description: teaching and learning lab
Area: 1440sf lab, 750 sf prep
Quantity: 1
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: paired labs with shared prep between, central to CRs on each academic floor
Orientation: -
Views: windows into lightwells

TECHNICAL CRITERIA

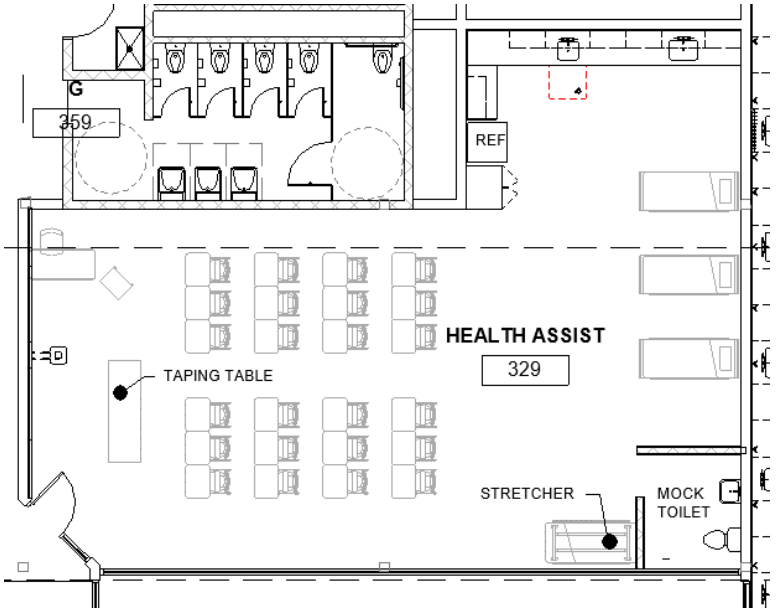
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV)
Door/Frame: solid wood doors and 3' wide sidelight glass with solid roller shade & separate vision panel into prep room
Windows: -
Lighting: LED pendant direct/indirect with daylight diming and occupancy sensors
Power: convenience outlets located above counters, cabinet face & overhead (reels)
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: room hardware with interior thumb latch and barricade set along with school-wide access, detection & monitoring systems.
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system, pull chain eye wash/shower (no drain), fire extinguisher/blanket, eye wash at all faucets, gas service

FIXTURES / FURNISHINGS

Casework: tall storage units, epoxy sink counters w/upper and lower cabinets, safety goggle cabinet
Furnishings: teacher desk/chairs, filing/bookcase, podium student desks/chairs, taping table, hospital beds, white boards, tack boards
Equipment: refrigerator, stretcher, health and EMS training equipment, teacher computer, document camera
Storage: In room cabinets as listed

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



IN-SCHOOL SUSPENSION/DETENTION (ISS)

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 600sf (Fresh) + 800sf (Gr 10-12)
Quantity: 2
Occupants: 28

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: -
Orientation: north exposure for daylight control
Views: Father Morissette

TECHNICAL CRITERIA

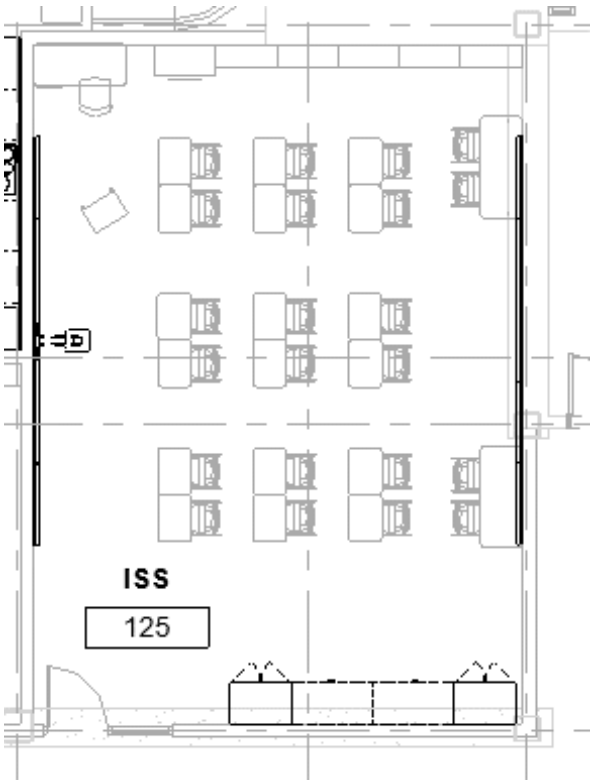
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 8'-8" up to 10'-8" at windows
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone at desk, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: 8'LF upper/lower cabinets with sliding white board, tall storage units
Furnishings: teacher desk/chairs, filing, bookcases, student tables/desks/chairs, podium, white boards, tack boards
Equipment: teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



STUDENT ACTIVITIES

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 300sf
Quantity: 1
Occupants: ± 14

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: -
Orientation: north exposure for daylight control
Views: Father Morissette

TECHNICAL CRITERIA

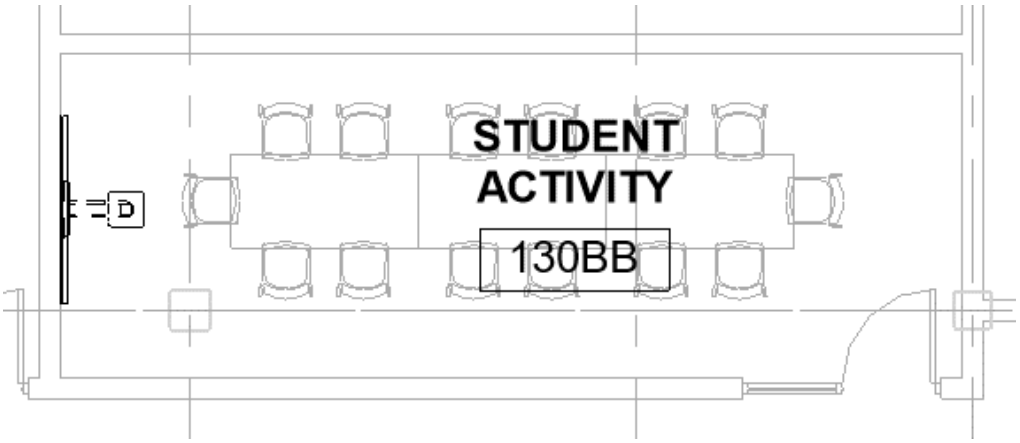
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); at 12'-0"AFF
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: meeting tables/chairs, white boards, tack boards
Equipment: -
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TEACHER DINING

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 1,130sf
Quantity: 1
Occupants: ± 35

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: -
Orientation: north exposure for daylight control
Views: Father Morissette

TECHNICAL CRITERIA

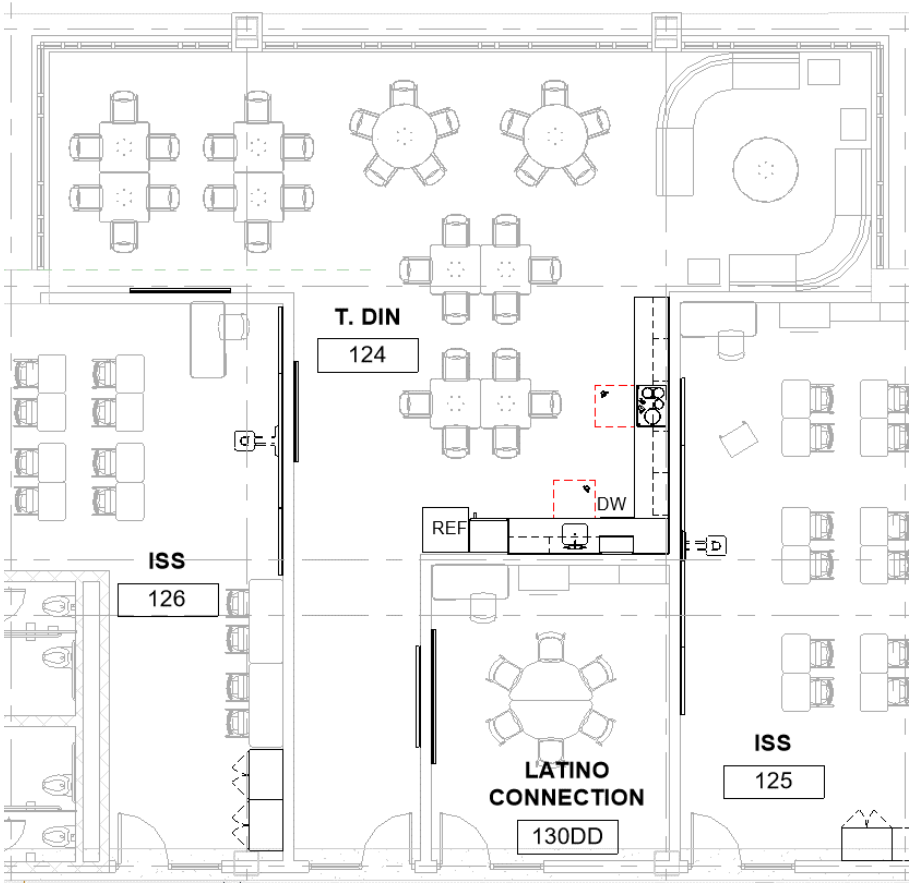
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); at 12'-0"AFF
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: sink counter w/upper & lower cabinets
Furnishings: dining tables/chairs, soft seating, white boards, tack boards
Equipment: refrigerator, cooktop, dish washer, microwave, ADA oven
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



TRIO

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 1500sf (~700sf+800sf)
Quantity: 1
Occupants: varies

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: -
Orientation: south
Views: Quad

TECHNICAL CRITERIA

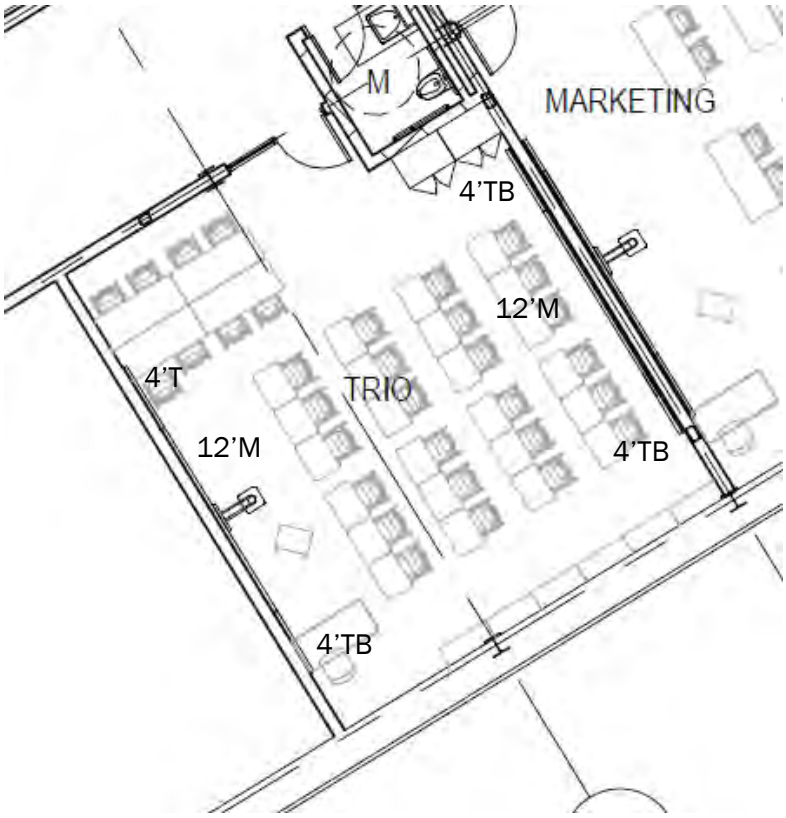
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); slopes from 8'-8" up to 10'-8" at windows
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets, presentation outlet, data projector, sound reinforcement & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desks/files/chairs, student tables/desks/chairs, podium, bookcases, white boards, tack boards
Equipment: teacher computer, document camera
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



CATIE'S CLOSET

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 700sf
Quantity: 1
Occupants: varies

LOCATION/ORIENTATION CRITERIA

Users: staff, students and parents
Adjacencies: -
Orientation: west
Views: Canal

TECHNICAL CRITERIA

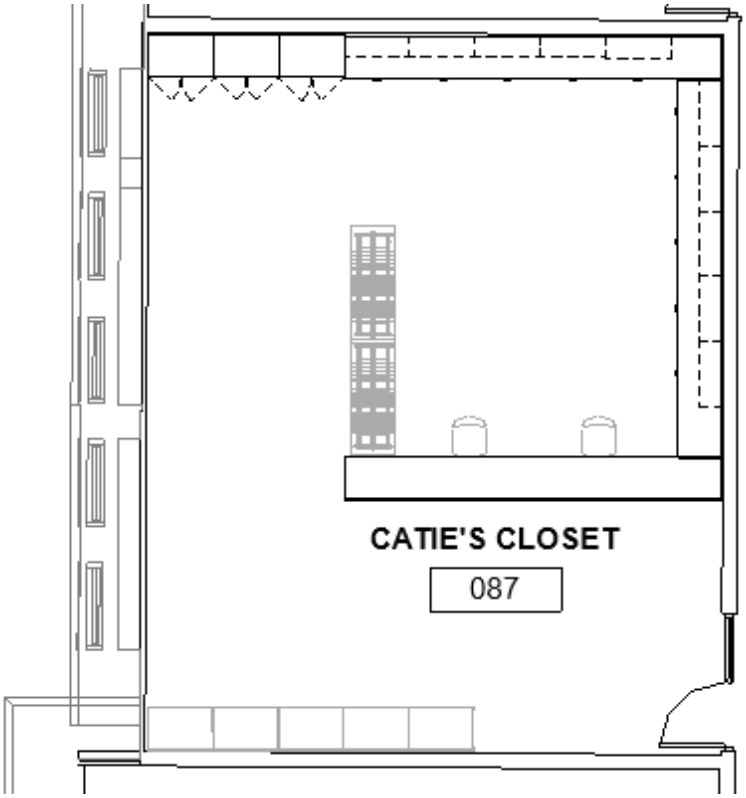
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); 9'-0" ACT, GWB soffit at window heads
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: single-hung aluminum clad wood windows, solar coated glass with operable panes/screens and mesh roll down shades (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units, counters w/upper & lower cabinets
Furnishings: shelving, racks, chairs
Equipment: -
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



LATINO CONNECTION

FUNCTIONAL CRITERIA

Description: teaching and learning space
Area: 250sf
Quantity: 1
Occupants: varies

LOCATION/ORIENTATION CRITERIA

Users: teachers and students
Adjacencies: -
Orientation: -
Views: -

TECHNICAL CRITERIA

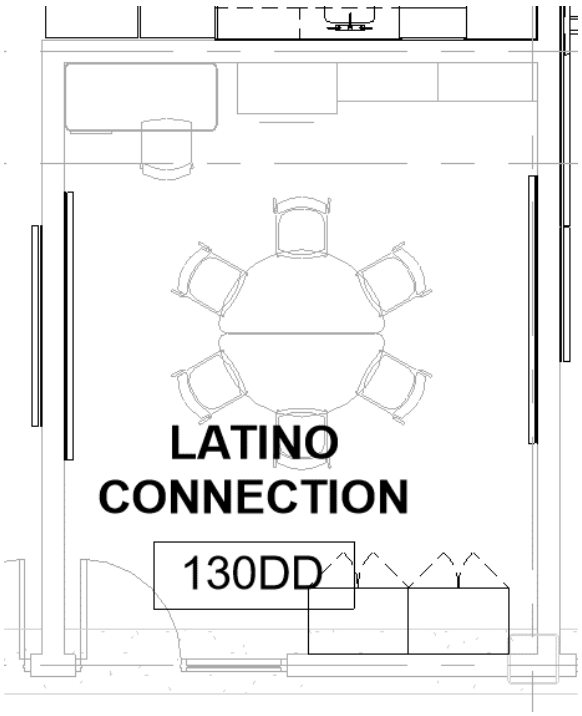
Floor/Base: linoleum tile floor/ rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV); 9'-0"
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: -
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: tall storage units
Furnishings: teacher desks/files/chairs, student tables/chairs, podium, bookcases, white boards, tack boards
Equipment: teacher computer
Storage: in-room cabinets as noted

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



SRO/SECURITY/DARE

FUNCTIONAL CRITERIA

Description: Office
Area: 450sf (150sf each)
Quantity: 3 total spaces
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: SRO/Security Officers
Adjacencies: central within academic wing
Orientation: -
Views: Quad

TECHNICAL CRITERIA

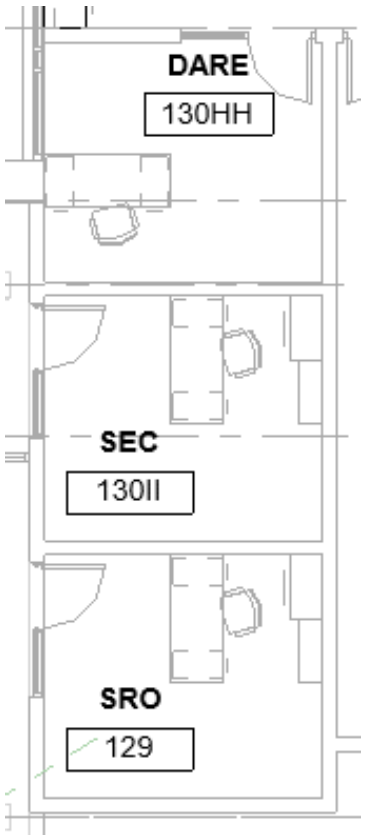
Floor/Base: linoleum tile floor/rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: office desk/chair, files, bookcase
Equipment: -
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



LOWELL COMMUNITY HEALTH

FUNCTIONAL CRITERIA

Description: Community Health Center
Area: 1500sf
Quantity: 1 Suite
Occupants: -

LOCATION/ORIENTATION CRITERIA

Users: staff and patients
Adjacencies: an exterior entry
Orientation: -
Views: Quad

TECHNICAL CRITERIA

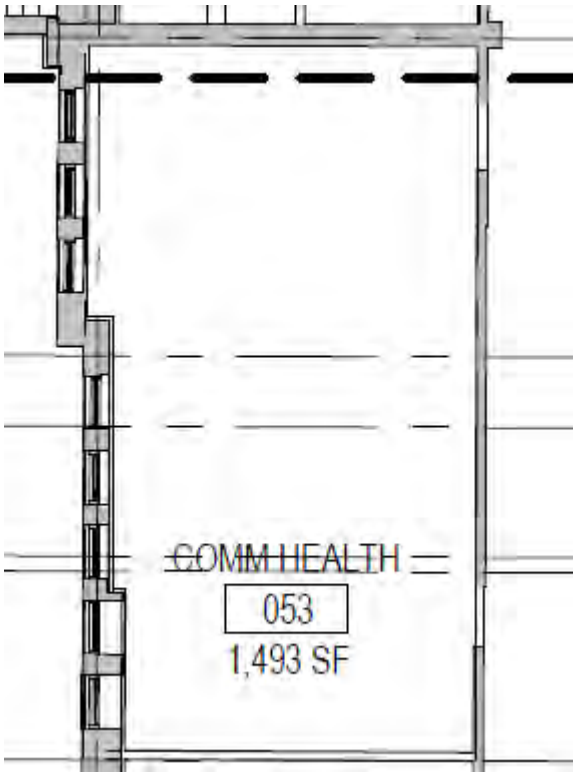
Floor/Base: linoleum tile floor /rubber base
Walls: multi-layer gypsum wall board, painted
Ceiling: high light reflectance ceiling tile (.90 LRV);
Door/Frame: solid wood door and 3' wide sidelight glass with solid roller shade
Windows: thermally broken aluminum frames, solar coated glass with operable panes/screens and mesh roll down shade (3% open)
Lighting: LED pendant direct/indirect with daylight dimming and occupancy sensors
Power: convenience outlets as required
Data/Com: telephone, intercom, wireless access point, data outlets & wireless clock
Security: TBD
Acoustical: high performance ceiling (.8 NRC/.35 CAC)
Mechanical: Displacement Ventilation/Radiant Panels
Plumb/Fire: speaker/strobe alarm & sprinkler system

FIXTURES / FURNISHINGS

Casework: -
Furnishings: TBD
Equipment: -
Storage: -

OTHER INFORMATION:

Visibility: Sidelights at doorway entrances are compatible with the District's standards related to visibility from the Corridor. All sidelights will have full height solid roller shades that can be drawn for security or privacy. There will also be designated "out of sight" areas within each room if the shade cannot be drawn.



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APPENDIX I – ESTIMATING

- Designer's Estimates (provided by PM&C)
- OPM's Estimate (provided by SKANSKA)
- Value Engineering Summary

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Schematic Design Estimate

Lowell High School

Lowell, MA

PM&C LLC
20 Downer Avenue, Suite 5
Hingham, MA 02043
(T) 781-740-8007
(F) 781-740-1012

Prepared for:

Perkins Eastman

January 28, 2019
Reconciled

Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate

INTRODUCTION

This cost estimate was produced from drawings and narratives, dated December 17th, 2018 prepared by Perkins Eastman and their design team and includes Addenda #1 - #4 received January 2nd-15th, 2019.

This estimate includes all direct construction costs, construction managers overhead and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under 149a of the Massachusetts General Laws to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate. Our pricing is based on competitive bidding for all trades and assumes at least four responsive bids for all subcontractor work.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- All professional fees and insurance
- Building Permit costs
- Land acquisition, feasibility, and financing costs
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items (e.g. draperies, furniture and equipment)
- Rock excavation; special foundations (unless indicated by design engineers)
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- No work included at Boiler Building - turned over to School
- No work included at Freshman Academy- turned over to School

Notes per Summary sheets

[1] Costs from UEC report (excludes design and monitoring services)

[2] Based on C. 149a CMr

PM&C

Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

MAIN CONSTRUCTION COST SUMMARY

			Gross Floor Area	$/sf	Estimated Construction Cost
1922 BUILDING RENOVATION			297,133	$229.68	$68,246,611
1980 BUILDING RENOVATION			91,129	$287.71	$26,218,409
1980 BUILDING ADDITION			65,564	$348.67	$22,860,315
NEW GYMNASIUM			70,984	$326.31	$23,162,734
NEW FRESHMAN ACADEMY			93,970	$293.88	$27,616,245
NEW BRIDGES (2 QTY)			3,997	$897.44	$3,587,082
SITEWORK					$7,003,247
SUB-TOTAL BUILDINGS AND SITEWORK			622,777	$286.93	$178,694,643
HAZARDOUS MATERIALS ABATEMENT					
1922 Building					$1,003,200
1980 Building					$2,163,910
75 Arcand Drive					$465,000
DEMOLISH EXISTING BUILDINGS					
Field House			68,434	$8.00	$547,472
West Building (Partial Demo)			47,914	$8.00	$383,312
Bridges			4,556	$8.00	$36,448
Premium for bridge demolition			1 ls	$100,000.00	$100,000
75 Arcand Drive			15,000	$8.00	$120,000
SUB-TOTAL DEMOLITION AND ABATEMENT					$4,819,342
SUB-TOTAL BUILDING, SITEWORK, DEMOLITION & ABATEMENT			**622,777**	**$294.67**	**$183,513,985**
DESIGN AND PRICING CONTINGENCY	10%				$18,351,399
ESCALATION - July 1, 2021 Start	8.50%				$15,598,689
SUB-TOTAL					$217,464,073
GENERAL CONDITIONS [2]		60	MTHS	$250,000	$15,000,000
GENERAL REQUIREMENTS [2]	4%				$8,698,563
BONDS	0.75%				$1,630,981
INSURANCE	1.10%				$2,392,105
PERMIT					NIC
SUB-TOTAL					$245,185,722
OVERHEAD AND FEE	2.50%				$6,129,643
GMP CONTINGENCY	3%				$7,355,572
PHASING/ENABLING - 5 YRS (4YRS ON SCHOOL SITE)	6% @ Reno & Site work, 3% @ New				$11,773,919
TEMPORARY GYMNASIUM					NR
TEMPORARY CLASSROOMS					NR
TOTAL OF ALL CONSTRUCTION			622,777	$434.26	**$270,444,856**

PM&C

Lowell High School
Lowell, MA
Schematic Design Estimate

28-Jan-19

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM										
GSF			*297,133*	*91,129*	*65,564*	*70,984*	*93,970*	*4,556*		*623,336*	*$286.67*
BUILDING			1922 RENO	1980 RENO	1980 ADDITIONS	GYM WING	FRESHMAN ADDITION	BRIDGE	SITEWORK	TOTAL	COST/GSF
A10	**FOUNDATIONS**										
	A1010	Standard Foundations	$114,545	$232,325	$678,454	$952,447	$587,074	$51,951		**$2,616,796**	**$4.20**
	A1020	Special Foundations	$120,000	$70,000	$1,041,150	$971,150	$650,300	$215,600		**$3,068,200**	**$4.92**
	A1030	Lowest Floor Construction	$593,487	$312,094	$729,305	$958,064	$543,815			**$3,136,765**	**$5.03**
A20	**BASEMENT EXCAVATION**										
	A2010	Basement Excavation									
	A2030	Basement Walls									
B10	**SUPERSTRUCTURE**										
	B1010	Upper Floor Construction	$2,711,462	$1,124,916	$2,503,293	$3,467,078	$4,228,793	$1,126,086		**$15,161,628**	**$24.32**
	B1020	Roof Construction	$380,225	$189,641	$493,993	$361,994	$158,022	$18,224		**$1,602,099**	**$2.57**
B20	**EXTERIOR CLOSURE**										
	B2010	Exterior Walls	$3,087,871	$952,478	$1,594,560	$1,624,565	$2,491,515	$302,760		**$10,053,749**	**$16.13**
	B2020	Windows/Curtainwall	$4,180,152	$1,127,189	$1,324,306	$1,236,839	$2,227,350	$1,166,818		**$11,262,654**	**$18.07**
	B2030	Exterior Doors	$223,580	$27,480	$138,120	$45,684	$4,408			**$439,272**	**$0.70**
B30	**ROOFING**										
	B3010	Roof Coverings	$978,559	$698,954	$918,660	$949,015	$513,894	$143,508		**$4,202,590**	**$6.74**
	B3020	Roof Openings	$174,000	$154,800	$154,800					**$483,600**	**$0.78**
C10	**INTERIOR CONSTRUCTION**										
	C1010	Partitions	$4,855,363	$2,325,930	$1,795,097	$1,585,442	$2,018,140			**$12,579,972**	**$20.18**
	C1020	Interior Doors	$1,343,170	$476,755	$410,700	$263,270	$413,550	$17,000		**$2,924,445**	**$4.69**
	C1030	Specialties/Millwork	$2,933,999	$708,813	$703,446	$604,414	$864,566	$147,778		**$5,963,016**	**$9.57**
C20	**STAIRCASES**										
	C2010	Stair Construction	$709,900	$42,000	$212,000	$91,000	$268,000			**$1,322,900**	**$2.12**
	C2020	Stair Finishes	$83,060	$20,000	$22,840	$9,180	$15,380			**$150,460**	**$0.24**
C30	**INTERIOR FINISHES**										
	C3010	Wall Finishes	$2,476,795	$611,214	$437,272	$294,473	$480,241	$22,780		**$4,322,775**	**$6.93**
	C3020	Floor Finishes	$1,904,520	$855,712	$447,780	$1,072,896	$577,460	$25,200		**$4,883,568**	**$7.83**
	C3030	Ceiling Finishes	$2,481,560	$618,396	$1,533,563	$605,104	$678,501	$127,050		**$6,044,174**	**$9.70**
D10	**CONVEYING SYSTEMS**										
	D1010	Elevator	$810,000	$135,000	$135,000		$225,000			**$1,305,000**	**$2.09**
D20	**PLUMBING**										
	D20	Plumbing	$4,587,519	$1,505,642	$943,734	$816,180	$1,539,070			**$9,392,145**	**$15.07**
D30	**HVAC**										
	D30	HVAC	$15,004,025	$6,889,649	$2,705,056	$3,210,252	$4,002,894	$105,927		**$31,917,803**	**$51.20**
D40	**FIRE PROTECTION**										
	D40	Fire Protection	$1,596,382	$462,863	$311,429	$397,510	$466,358	$20,502		**$3,255,044**	**$5.22**
D50	**ELECTRICAL**										
	D5010	Electrical Systems	$10,330,054	$3,296,771	$1,907,151	$2,519,527	$3,065,986	$95,898		**$21,215,387**	**$34.04**
E10	**EQUIPMENT**										
	E10	Equipment	$1,481,800	$800,930	$1,305,020	$1,048,650	$267,200			**$4,903,600**	**$7.87**
E20	**FURNISHINGS**										
	E2010	Fixed Furnishings	$2,221,801	$1,361,715	$413,586	$78,000	$1,328,728			**$5,403,830**	**$8.67**
	E2020	Movable Furnishings									
F10	**SPECIAL CONSTRUCTION**										
	F10	Special Construction									
F20	**SELECTIVE BUILDING DEMOLITION**										
	F2010	Building Elements Demo	$2,862,782	$1,217,142						**$4,079,924**	**$6.55**
G	**SITEWORK**										
	G1010	Site Preparation & Demolition							$1,533,100	**$7,003,247**	**$11.24**
	G1020	Site Improvements							$3,726,267		
	G1030	Civil Utilities							$601,120		
	G1040	Electrical Utilities							$1,142,760		
TOTAL DIRECT COST (Trade Costs)			$68,246,611	$26,218,409	$22,860,315	$23,162,734	$27,616,245	$3,587,082	$7,003,247	**$178,694,643**	**$286.67**
			$229.68	$287.71	$348.67	$326.31	$293.88	$787.33	$11.24	$286.67	

PM&C

Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 297,133

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
1922 BUILDING RENOVATION						
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$114,545			
	A1020	Special Foundations	$120,000			
	A1030	Lowest Floor Construction	$593,487	**$828,032**	$2.79	1.2%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$2,711,462			
	B1020	Roof Construction	$380,225	**$3,091,687**	$10.41	4.5%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$3,087,871			
	B2020	Windows/Curtainwall	$4,180,152			
	B2030	Exterior Doors	$223,580	**$7,491,603**	$25.21	11.0%
B30	**ROOFING**					
	B3010	Roof Coverings	$978,559			
	B3020	Roof Openings	$174,000	**$1,152,559**	$3.88	1.7%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$4,855,363			
	C1020	Interior Doors	$1,343,170			
	C1030	Specialties/Millwork	$2,933,999	**$9,132,532**	$30.74	13.4%
C20	**STAIRCASES**					
	C2010	Stair Construction	$709,900			
	C2020	Stair Finishes	$83,060	**$792,960**	$2.67	1.2%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$2,476,795			
	C3020	Floor Finishes	$1,904,520			
	C3030	Ceiling Finishes	$2,481,560	**$6,862,875**	$23.10	10.1%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$810,000	**$810,000**	$2.73	1.2%
D20	**PLUMBING**					
	D20	Plumbing	$4,587,519	**$4,587,519**	$15.44	6.7%
D30	**HVAC**					
	D30	HVAC	$15,004,025	**$15,004,025**	$50.50	22.0%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$1,596,382	**$1,596,382**	$5.37	2.3%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$10,330,054	**$10,330,054**	$34.77	15.1%
E10	**EQUIPMENT**					
	E10	Equipment	$1,481,800	**$1,481,800**	$4.99	2.2%

PM&C

Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 297,133

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
1922 BUILDING RENOVATION						
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$2,221,801			
	E2020	Movable Furnishings	NIC	**$2,221,801**	$7.48	3.3%
F10	**SPECIAL CONSTRUCTION**					
	F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**					
	F2010	Building Elements Demolition	$2,862,782			
	F2020	Hazardous Components Abatement	$0	**$2,862,782**	$9.63	4.2%
TOTAL DIRECT COST (Trade Costs)				***$68,246,611***	*$229.68*	*100.0%*

PM&C

Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate **GFA** 297,133

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	GROSS FLOOR AREA CALCULATION						
	Basement				80,569		
	First Floor				77,266		
	Second Floor				66,452		
	Mezzanine				3,768		
	Third Floor				65,213		
	Fourth Floor				3,865		
	TOTAL GROSS FLOOR AREA (GFA)				**297,133**	***sf***	
A10	***FOUNDATIONS***						
A1010	**STANDARD FOUNDATIONS**						
033000	*CONCRETE*						
	Allowance for miscellaneous foundation work at renovated spaces	**1**	ls	30,000.00	30,000		
	Elevator pits - premium for work in existing building	**4**	ea				
	12" walls	**36**	cy	1,000.00	36,000		
	24" Mat slab	**400**	sf	35.00	14,000		
312000	*EARTHWORK*						
	Elevator pit						
	Excavation & remove by hand	**267**	cy	90.00	24,030		
	Backfill with existing material	**178**	cy	20.00	3,560		
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**107**	tns	65.00	6,955		
	SUBTOTAL					114,545	
A1020	**SPECIAL FOUNDATIONS**						
	Allowance for underpinning at existing foundations for new elevator pits	**4**	loc	30,000.00	120,000		
	SUBTOTAL					120,000	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	Slab on grade infill at plumbing trenches	**3,500**	sf	20.00	70,000		
	Slab on grade infill at other areas	**2,500**	sf	20.00	50,000		
	Haunched slab on grade w/ 2#5 under CMU walls	**1,220**	sf	25.00	30,500		
	Miscellaneous cutting and patching for new MEP installations	**80,569**	sf	1.25	100,711		
	Allowance for topping slab at basement level	**80,569**	sf	4.00	322,276		
	Equipment pads for new MEP equipment	**1**	ls	20,000.00	20,000		
	SUBTOTAL					593,487	
	TOTAL - FOUNDATIONS						**$828,032**
B10	***SUPERSTRUCTURE***						
B1010	**FLOOR CONSTRUCTION**						
	Allowance to anchor/brace tops of all non structural interior masonry partitions	**2,570**	loc	180.00	462,600		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		1922 BUILDING RENOVATION						
50		Seismic clips to ETR CMU	**1,803**	ea	200.00	360,600		
51		Basement						
52		Raised floor in Chorus, Piano, Band & Practice rooms; LGMF w/ 2 layers fire rated plywood subfloor	**4,720**	sf	15.00	70,800		
53		Ramp & Stair at TV Studio; LGMF w/ 2 layers fire rated plywood subfloor	**285**	sf	15.00	4,275		
54		LGMF stair, landing and ramp in Band	**450**	sf	20.00	9,000		
55		LGMF stair, landing and ramp in Chorus	**420**	sf	20.00	8,400		
56		LGMF stair & landing	**50**	sf	20.00	1,000		
57		LGMF ramp in Corridor	**240**	sf	20.00	4,800		
58		1st Floor						
59		Raised floor and steps at Auditorium entrance; LGMF w/ 2 layers fire rated plywood subfloor	**650**	sf	15.00	9,750		
60		LGMF stair & landing at Main entry	**120**	sf	20.00	2,400		
61		LGMF ramps in Auditorium	**255**	sf	20.00	5,100		
62		LGMF Stage stair	**1**	ls	1,500.00	1,500		
63		LGMF stair, landing and ramp in Auditorium	**295**	sf	20.00	5,900		
64		Insulation under framing (inaccessible)	**5,370**	sf	12.00	64,440		
65		Existing Structure						
66		New wall-mounted ladder w/ cage and catwalk platform below ceiling at Stage	**140**	sf	80.00	11,200		
67		Diamond plate catwalk flooring in Attic	**600**	sf	80.00	48,000		
68		Metal security mesh rails & doors at catwalk in Attic; assume 10' high	**330**	lf	400.00	132,000		
69		New elevator support beams	**18**	stps	5,000.00	90,000		
70		New stair support beams anchored to existing walls	**17**	flts	8,000.00	136,000		
71		New lintels as necessary at light well; level 1-3	**108**	lf	220.00	23,760		
72		Install new built-up floor at Main entry including reinforcing of existing structure to accommodate new configuration	**650**	sf	50.00	32,500		
73		New steel beam framing at infilled light well, stair opes etc., anchored to existing masonry walls	**1,286**	sf	30.00	38,580		
74		Infill existing slab openings at corridor walls, elevator opes etc.; slab to be 3.5" NWC on 2" deck, anchored to existing concrete encased steel beams						
75		1st floor	**2,503**	sf	50.00	125,150		
76		2nd floor	**2,892**	sf	50.00	144,600		
77		3rd floor	**2,967**	sf	50.00	148,350		
78		Attic						
79		Infill existing elevator opening - infill w/ plywood over engineered lumber to match existing construction. New timber beams to be anchored back to existing bearing walls	**300**	sf	25.00	7,500		
80		New transfer beam and steel columns at removed bearing wall at level 1-level 3; 1892 building	**237**	lf	350.00	82,950		
81		Install new structure around new shaft openings	**300**	lf	50.00	15,000		
82		Allowance at bathrooms in 1892 Building - reinforce structure for new CMU walls and/or install supplemental structure as required	**1,500**	sf	15.00	22,500		
83		Structural steel support system above Stage for catwalk & rigging & lighting rack in Auditorium - allow	**2,060**	sf	25.00	51,500		
84		Structural framing at new catwalk	**600**	sf	30.00	18,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	Allowance to reinforce Attic spaces for new MEP equipment ($/sf allowance per Engineer)	**3,865**	sf	5.00	19,325		
	Openings in existing structure for new MEP systems	**216,564**	sf	0.50	108,282		
	Allowance for spray fireproofing at new slab structure and existing steel columns				NR		
	Miscellaneous metals throughout building	**297,133**	gsf	1.50	445,700		
	SUBTOTAL					2,711,462	
B1020	**ROOF CONSTRUCTION**						
	Steel framing at new roofs	**1,235**	sf	30.00	37,050		
	New 1 1/2" deck at new stairwell & elevator over-run roofs	**1,235**	sf	5.00	6,175		
	Allowance for bracing at parapets	**200**	lf	200.00	40,000		
	Steel dunnage/ reinforcing at new packaged Mechanical equipment - allow	**26**	tns	4,500.00	117,000		
	Allowance for stair, grating & rails at rooftop packaged mechanical room	**1,600**	sf	50.00	80,000		
	Roof screen framing				NR		
	Dunnage at new AHU's & Chiller	**1**	ls	100,000.00	100,000		
	SUBTOTAL					380,225	
	TOTAL - SUPERSTRUCTURE						**$3,091,687**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**	*105,000*	*sf*	TOTAL AREA			
	Exterior Wall Area - Solid	*76,786*	sf				
042000	*MASONRY*						
	Repair and repoint exterior walls- brick; 10%	**7,679**	sf	38.00	291,802		
	Repair/ reset cornice units at building perimeter; allow 20%	**370**	lf	250.00	92,500		
	Infill masonry at opes at basement light well - match existing	**72**	sf	85.00	6,120		
	Modify masonry to accept new pedestrian bridges	**100**	lf	250.00	25,000		
	Clean/restore exterior masonry surfaces at North elevation of 1997 Addition	**8,400**	sf	8.00	67,200		
	Clean exterior masonry surfaces- remaining elevations	**68,386**	sf	5.00	341,930		
	8" CMU backup at stair, elevator & light wells	**2,400**	sf	26.00	62,400		
	Lifts/Staging to exterior wall	**105,000**	sf	4.00	420,000		
055000	*MISC. METALS*						
	Lintels at new opes including brick work as necessary	**70**	lf	150.00	10,500		
	Replace lintels at significantly deteriorated locations w/ new hot dipped galvanized angles; allow 10% per structural report (approx 75 loc)	**322**	lf	250.00	80,500		
	Clean and coat ETR lintels (approx 670 locations)	**2,898**	lf	50.00	144,900		
	Building Signage; 24" high Letters "LOWELL HIGH SCHOOL" & "LHS AUDITORIUM"	**1**	ls	15,000.00	15,000		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
126		Air barrier to interior face of existing exterior wall	**52,430**	sf	7.00	367,010		
127		Air barrier/flashing at openings	**19,376**	lf	6.25	121,100		
128		Miscellaneous sealants to closure	**105,000**	sf	0.50	52,500		
129								
130	*072100*	*THERMAL INSULATION*						
131		6" Rockwall insulation	**2,400**	sf	4.00	9,600		
132		Spray foam insulation around entire perimeter of exterior walls of Attic	**15,955**	sf	5.00	79,775		
133		2" Spray foam insulation to interior face of existing exterior wall	**52,430**	sf	3.00	157,290		
134								
135	*076400*	*CLADDING*						
136		Metal panel at stairwell, light well & elevator over-run	**2,400**	sf	60.00	144,000		
137		Metal panel replacement at East/West entrances	**325**	sf	100.00	32,500		
138		Roof screen				NR		
139								
140	*092900*	*GYPSUM BOARD ASSEMBLIES*						
141		3 5/8" Metal stud backup to interior face of existing exterior wall	**52,430**	sf	5.00	262,150		
142		2 layers Drywall lining to interior face of stud backup at existing exterior wall	**52,430**	sf	5.80	304,094		
143		SUBTOTAL					3,087,871	
144								
145	**B2020**	**WINDOWS/CURTAINWALL**						
146		**Exterior Wall Area - Glazed**	*28,214*	sf				
147								
148	*061000*	*ROUGH CARPENTRY*						
149		Wood blocking at openings	**19,376**	lf	8.00	155,008		
150								
151	*070001*	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
152		Backer rod & double sealant	**19,376**	lf	9.00	174,384		
153								
154	*080001*	*METAL WINDOWS*						
155		***All Exterior glazing is double glazed***						
156		Replace existing historical windows w/ Pella Monumental windows or similar; single hung aluminum clad wood windows w/ metal insect screens	**12,278**	sf	125.00	1,534,750		
157		Replace existing historical windows w/ Pella Monumental windows or similar; single hung aluminum clad wood windows w/ mullions and metal insect screens	**10,394**	sf	135.00	1,403,190		
158		Premium for security screens at street level	**2,853**	sf	25.00	71,325		
159		Replace existing historical windows w/ Pella Monumental windows or similar; aluminum clad wood windows w/ mullions - curved top	**2,971**	sf	170.00	505,070		
160		Storefront, EFCO 403 T, custom color	**1,320**	sf	95.00	125,400		
161		Curtainwall, Kawneer 5600 or equal, custom color at bridge connections	**840**	sf	125.00	105,000		
162		Glazing in hollow metal frame at roof light well	**216**	sf	250.00	54,000		
163		Fritting at toilet room windows	**480**	sf	5.00	2,400		
164		Premium for ballistic grade glazing; assume school guard	**470**	sf	40.00	18,800		
165		Sunshades				NR		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
089000	*LOUVERS*						
	Louver replacement	**411**	sf	75.00	30,825		
	SUBTOTAL					4,180,152	
B2030	**EXTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door at main entry, ballistic glazing	**4**	pr	13,500.00	54,000		
	Glazed entrance doors including frame and hardware; double door at side entrances, ballistic glazing	**11**	pr	13,500.00	148,500		
	Glazed entrance doors including frame and hardware at side entries; double door at Courtyard egress	**2**	pr	8,500.00	17,000		
	Backer rod & double sealant	**340**	lf	9.00	3,060		
	Wood blocking at openings	**340**	lf	3.00	1,020		
	SUBTOTAL					223,580	
	TOTAL - EXTERIOR CLOSURE						**$7,491,603**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	1894 Building roof - ***separate City project***	**17,000**	sf		ETR		
	Roof membrane demo (remainder carried w/ abatement)	**4,766**	sf	2.00	9,532		
	E32 at Courtyard; New membrane on existing cover board & insulation; infill insulation to match existing tapered profile	**3,400**	sf	13.00	44,200		
	E50; Membrane roofing including air barrier, tapered rigid insulation and cover board at new stairwell, light well l& elevator over-run	**1,235**	sf	22.00	27,170		
	E50; Membrane roofing including air barrier, tapered rigid insulation and cover board at connector to 1894	**1,715**	sf	22.00	37,730		
	E53; Membrane roofing including cover board	**57,316**	sf	11.00	630,476		
	Tapered insulation at existing roof	**8,560**	sf	5.00	42,800		
	Roof edge coping/ detail at new stairwell, light wells & elevator over-runs	**250**	lf	45.00	11,250		
	Walkway pads	**2,620**	sf	8.00	20,960		
	Miscellaneous roof flashings	**63,666**	sf	1.00	63,666		
	Roof blocking repair/replacement	**3,450**	lf	12.00	41,400		
	Roof accessories; ladders, hatches etc.	**1**	ls	20,000.00	20,000		
	Metal galvanized security pipe rail guard at roof perimeter	**235**	lf	125.00	29,375		
	SUBTOTAL					978,559	
B3020	**ROOF OPENINGS**						
	Stage smoke vents	**2**	ea	9,000.00	18,000		
	Structural skylights in Courtyard (4 qty)	**600**	sf	150.00	90,000		
	Fall Protection	**4**	ea	7,500.00	30,000		
	E56; Steel framed, glazed infill roof monitor at light wells	**288**	sf	125.00	36,000		
	SUBTOTAL					174,000	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	TOTAL - ROOFING						**$1,152,559**
	C10 INTERIOR CONSTRUCTION						
C1010	**PARTITIONS**						
	ETR Masonry Partitions						
	Seismic clips at exterior masonry partitions			included w/ exterior closure			
	Patch/ repair existing to remain CMU partitions disturbed by new work (including new duct openings etc.)	**133,640**	sf	2.00	267,280		
	CMU Partitions						
	4" CMU partitions	**15,472**	sf	20.00	309,440		
	8" CMU partitions	**25,495**	sf	22.00	560,890		
	8" CMU partition at elevator shaft	**8,417**	sf	25.00	210,425		
	Premium for Polished GF CMU to 5'-4" in corridors	**1,546**	sf	4.00	6,184		
	Masonry infill at door opes	**1,897**	sf	40.00	75,880		
	Seismic clips to CMU (new & existing)	**1,391**	ea	140.00	194,740		
	Miscellaneous metals to CMU	**49,384**	sf	1.50	74,076		
	GWB Partitions						
	Typical interior partition; 6" Metal stud w/ 2 layers 5/8" gwb both sides	**102,264**	sf	15.50	1,585,092		
	STC Partition; Double 3 5/8" offset studs w/ 1" airspace, 2 layers 5/8" gwb each side, batt insulation in each stud	**10,712**	sf	19.50	208,884		
	2hr Shaftwall	**12,894**	sf	18.00	232,092		
	Allowance for column covers	**8,320**	sf	12.00	99,840		
	Rough blocking to partitions	**9,533**	lf	4.00	38,132		
	Sealants & caulking at partitions	**297,133**	gsf	1.00	297,133		
	Glazed Partitions						
	Interior glazing between classrooms; assume 7' high	**347**	sf	85.00	29,495		
	TV Studio Control room window	**28**	sf	120.00	3,360		
	Projection room window; tilted fire treated wood frame w/ framed tempered glazing on sliding track	**32**	sf	125.00	4,000		
	Firelite glazing in hollow metal frame at light well, level 1-3, 2hr	**864**	sf	250.00	216,000		
	Clerestory glazing in Art rooms - basement; assume 36" high	**115**	lf	240.00	27,600		
	Fire rates glazed partition at stair C, D & G, 2hr rating	**864**	sf	250.00	216,000		
	Aluminum storefront at main entry	**114**	sf	90.00	10,260		
	Premium for ballistic glazing at entries, assume school guard	**114**	sf	40.00	4,560		
	Aluminum storefront at security, ballistic, including premium for sliding transaction window	**160**	sf	130.00	20,800		
	Operable Partitions						
	Support framing for operable walls	**210**	lf	130.00	27,300		
	Manual, operable partitions	**150**	lf	600.00	90,000		
	Manual, operable partitions w/ acoustical fabric finish in Art rooms	**30**	lf	680.00	20,400		
	Power operated operable partitions in Dance; full height tempered mirrors both sides	**30**	lf	850.00	25,500		
	SUBTOTAL					4,855,363	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
C1020	**INTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door, ballistic	**3**	pr	13,500.00	40,500		
	Single leaf door, frame & hardware	**321**	ea	1,900.00	609,900		
	Double leaf door, frame & hardware; Corridor/ Stairs	**62**	pr	3,900.00	241,800		
	Double leaf door, frame & hardware; Classrooms, Auditorium	**30**	pr	3,800.00	114,000		
	Double leaf door, frame & hardware; Electrical & Janitor closets etc.	**13**	pr	3,600.00	46,800		
	3'-0" wide sidelight at classroom/office entries	**142**	ea	1,260.00	178,920		
	Premium for specialty hardware, fire rated doors, vision lites, sound control doors/ gasketting etc.	**1**	ls	101,250.00	101,250		
	Access doors	**1**	ls	10,000.00	10,000		
	SUBTOTAL					1,343,170	
C1030	**SPECIALTIES / MILLWORK**						
	Allowance for floor prep/ leveling/ wood sub-floor repairs	**153,911**	sf	3.00	461,733		
	Backer panels in electrical closets	**1**	ls	2,000.00	2,000		
	Marker boards						
	Typical Classrooms	**6,144**	sf	22.00	135,168		
	Adjustments, Fundamentals, Intense etc.	**2,760**	sf	22.00	60,720		
	Art rooms/ Graphics	**1,560**	sf	22.00	34,320		
	Science labs, Health	**528**	sf	22.00	11,616		
	ROTC	**544**	sf	22.00	11,968		
	Corridors/ Office Suites - allow	**4**	flrs	10,000.00	40,000		
	Tack boards						
	Typical Classrooms	**6,144**	sf	20.00	122,880		
	Adjustments, Fundamentals, Intense etc.	**1,840**	sf	22.00	40,480		
	Art rooms/ Graphics	**1,560**	sf	22.00	34,320		
	Science labs, Health	**352**	sf	20.00	7,040		
	ROTC	**320**	sf	22.00	7,040		
	Corridors/ Office Suites - allow	**4**	flrs	3,000.00	12,000		
	Gang bathroom accessories	**12**	rms	3,150.00	37,800		
	Double bathroom accessories	**10**	rms	2,500.00	25,000		
	Single bathroom accessories	**34**	rms	1,500.00	51,000		
	Shower accessories	**2**	ea	500.00	1,000		
	Janitors closet accessories	**8**	rms	300.00	2,400		
	Frameless Mirrors in Dance Studios	**600**	sf	35.00	21,000		
	HDPE Toilet Partitions - hcap	**22**	ea	1,800.00	39,600		
	HDPE Toilet Partitions - typical	**36**	ea	1,650.00	59,400		
	HDPE Toilet Partitions - urinal screens	**12**	ea	650.00	7,800		
	2-tier metal student lockers 18" x 15" x 48" h	**2,053**	opes	190.00	390,070		
	Code compliant signage	**297,133**	gsf	0.35	103,997		
	Room signage	**426**	ea	100.00	42,600		
	Interior brushed aluminum stand-off lettering, 8" high	**7**	loc	5,000.00	35,000		
	Allowance for removal & reinstallation of existing wood panels w/ plaques	**18**	loc	300.00	5,400		
	Window sills - white oak	**3,220**	lf	35.00	112,700		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
291		7' x 18" Lighted Display cases (per spec)	**96**	lf	540.00	51,840		
292		Display cases specialty millwork at Art rooms; 60" high Thru-wall display cabinets w/ one-side laminate glass, butt-jointed, other side full vision millwork doors, adjustable shelving & recessed lighting	**90**	lf	1,000.00	90,000		
293		Circulation desk in Media center/Library	**15**	lf	800.00	12,000		
294		Custom millwork at proscenium for auditorium	**1**	ls	50,000.00	50,000		
295		Ballet bar in Dance	**100**	lf	150.00	15,000		
296		Rails at LGMF stairs & ramps	**325**	lf	300.00	97,500		
297		Rails at Main entry stairs & ramp	**40**	lf	300.00	12,000		
298		Rails at Auditorium ramps & Stage stair	**110**	lf	300.00	33,000		
299		Balcony rail at Auditorium	**90**	lf	300.00	27,000		
300		Fire Extinguisher cabinets	**93**	ea	380.00	35,340		
301		Allowance for miscellaneous specialties; wall protection etc.	**297,133**	gsf	0.50	148,567		
302		Rough blocking throughout	**297,133**	gsf	0.50	148,567		
303		Miscellaneous sealants throughout building	**297,133**	gsf	1.00	297,133		
304		SUBTOTAL					2,933,999	
305								
306		***TOTAL - INTERIOR CONSTRUCTION***						**$9,132,532**
307								
308								
309	***C20***	***STAIRCASES***						
310								
311	**C2010**	**STAIR CONSTRUCTION**						
312		Exterior metal pan stair in Exterior Courtyard	**2**	flt	15,000.00	30,000		
313		ETR Egress stairs - install bent steel infill at riser to meet MAAB nosing regulations, install new railings & guardrails	**13**	flt	9,000.00	117,000		
314		Metal pan stair; egress stair	**17**	flt	30,000.00	510,000		
315		Concrete fill to stairs	**17**	flt	2,000.00	34,000		
316		New guardrail at Stair L open to below	**22**	lf	350.00	7,700		
317		Security grill enclosure for stair runs above third floor landing	**28**	lf	400.00	11,200		
318		SUBTOTAL					709,900	
319								
320	**C2020**	**STAIR FINISHES**						
321		**New Stairs**						
322		High performance coating to stairs including all railings etc.	**17**	flt		NR		
323		Concrete sealer at stairs - landings	**2,550**	sf	2.00	5,100		
324		Norament treads at stairs - treads & risers	**864**	lft	15.00	12,960		
325		**Existing to remain stairs**						
326		Existing stair finishes; rubber treads/risers/landing and painting	**13**	flt	5,000.00	65,000		
327		SUBTOTAL					83,060	
328								
329		***TOTAL - STAIRCASES***						**$792,960**
330								
331								
332	***C30***	***INTERIOR FINISHES***						
333								
334	**C3010**	**WALL FINISHES**						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
335		Paint CMU walls	**94,145**	sf	1.30	122,389		
336		Paint to GWB walls	**299,596**	sf	0.90	269,636		
337		Prep & paint ETR interior walls	**267,280**	sf	1.50	400,920		
338		2" Fabric acoustical treatments (per spec)						
339		Chorus	**600**	sf	30.00	18,000		
340		Piano	**500**	sf	30.00	15,000		
341		Band	**800**	sf	30.00	24,000		
342		Guitar	**220**	sf	30.00	6,600		
343		Art Studio/TV Production	**900**	sf	30.00	27,000		
344		Control room	**200**	sf	30.00	6,000		
345		Sound Edit	**200**	sf	30.00	6,000		
346		Video Edit	**220**	sf	30.00	6,600		
347		Auditorium	**1,000**	sf	30.00	30,000		
348		Acoustic diffusers in Auditorium; Kinetics High tones or similar	**800**	sf	50.00	40,000		
349		2 5/8" Polished CMU wainscot corridor side, 5'-4" high	**30,765**	sf	30.00	922,950		
350		Painted hardwood cap at CMU/GWB transition in corridors	**5,800**	lf	20.00	116,000		
351		Allowance to protect/preserve historic detailing	**297,133**	gsf	1.00	297,133		
352		Film applied Logos/Letters - allowance	**1**	ls	20,000.00	20,000		
353		Miscellaneous touch-up painting	**297,133**	gsf	0.50	148,567		
354		SUBTOTAL					2,476,795	
355								
356	**C3020**	**FLOOR FINISHES**	*267,420*	*sf*				
357		Repair, protect & clean existing to remain Terrazzo in corridors level 1-3 (Col 3-25)	**32,940**	sf	10.00	329,400		
358		2mm Linoleum tile flooring	**185,635**	sf	6.00	1,113,810		
359		Stage flooring - Refinish and stain existing hardwood flooring	**2,060**	sf	5.00	10,300		
360		Built-up resilient dance floor in Dance rooms	**1,925**	sf	18.00	34,650		
361		Carpet tile at Music spaces & Library	**14,265**	sf	5.00	71,325		
362		Carpet in Auditorium aisles	**5,600**	sf	5.00	28,000		
363		Anti-slip rubber floor at ramps	**840**	sf	12.00	10,080		
364		Poured epoxy at 2D, 3D, and Art Studio, Scene shop & BOH spaces	**9,400**	sf	12.00	112,800		
365		Poured epoxy at bathrooms	**8,000**	sf	12.00	96,000		
366		Concrete sealer at Auditorium seating	**6,755**	sf	2.00	13,510		
367		Integral epoxy base	**3,110**	lf	10.00	31,100		
368		Rubber base	**21,418**	lf	2.50	53,545		
369		SUBTOTAL					1,904,520	
370								
371	**C3030**	**CEILING FINISHES**	*267,420*	sf				
372		Sound isolation ceiling in music rooms; Type K - 2 layers 5/8" gwb on drywall grid w/ resilient hangers & 6" batt insulation - Music rooms, Mechanical, Dance, Scene shop & TV Studio area	**12,620**	sf	22.00	277,640		
373		2' x 4' ACT 1	**216,828**	sf	5.50	1,192,554		
374		ACT-4; USG Geometrix lay-in wedge acoustic tiles in music rooms - 50% area	**2,950**	sf	14.00	41,300		
375		ACT clouds at Stage	**2,062**	sf	22.00	45,364		
376		ACT clouds at exposed ceilings in Art Studio, 2D Art, 3D Art, Animation, Graphics & TV Production	**4,058**	sf	30.00	121,740		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
377		Sloping GWB ceiling in ROTC	**865**	sf	16.00	13,840		
378		GWB ceiling in Library	**8,365**	sf	14.00	117,110		
379		GWB ceiling in bathrooms	**8,000**	sf	14.00	112,000		
380		Allowance for Unistrut pipe grid in Art Studio, 2D Art, 3D Art, Animation, Graphics & TV Production	**4,500**	sf	25.00	112,500		
381		Paint exposed ceilings in Art Studio, 2D Art, 3D Art, Animation, Graphics & TV Production	**8,115**	sf	2.00	16,230		
382		Repair/ paint existing coffers w/ trim/crown molding in Auditorium & at Balcony	**12,170**	sf	15.00	182,550		
383		Paint exposed ceiling in BOH spaces	**8,065**	sf	1.50	12,098		
384		Paint GWB ceilings	**17,230**	sf	0.80	13,784		
385		Allowance for GWB soffits throughout	**297,133**	gsf	0.75	222,850		
386		SUBTOTAL					2,481,560	
387								
388		***TOTAL - INTERIOR FINISHES***						**6,862,875**
389								
390								
391	***D10***	***CONVEYING SYSTEMS***						
392								
393		5-stop elevator; double sided, 3000# w/ Piano access	**1**	ea	260,000.00	260,000		
394		4-stop elevator; 4000#	**1**	ea	200,000.00	200,000		
395		6-stop elevator; double sided, 2500#	**1**	ea	270,000.00	270,000		
396		LU/LA in Courtyard; Front to back, 2 stop, 4000lbs - basement to 1st floor	**1**	ea	80,000.00	80,000		
397		SUBTOTAL					810,000	
398								
399		***TOTAL - CONVEYING SYSTEMS***						**$810,000**
400								
401								
402	***D20***	***PLUMBING***						
403								
404	**D20**	**PLUMBING, GENERALLY**						
405		*1922 Building contains science rooms, classrooms, auditorium & art studios. Hot water via gas fired heaters*						
406		Gas fired hot water heater 650 MBH with 2 260 gallon storage tank, circ pump, expansion tank & air separator	**1**	ls	45,000.00	45,000		
407		Acid waste neutralizer tank	**1**	ea	30,000.00	30,000		
408		Plumbing equipment	**297,133**	sf	1.60	475,413		
409		Water closet	**94**	ea	1,400.00	131,600		
410		Lavatory	**79**	ea	1,000.00	79,000		
411		Urinal	**17**	ea	1,600.00	27,200		
412		Miscellaneous plumbing fixtures; science room sinks, drinking fountains etc.	**297,133**	sf	1.75	519,983		
413		Domestic water pipe with fittings & hangers	**297,133**	sf	2.75	817,116		
414		Domestic water pipe insulation	**297,133**	sf	1.55	460,556		
415		Sanitary waste pipe with fittings & hangers	**297,133**	sf	2.50	742,833		
416		Non-potable water pipe with fittings & hangers	**297,133**	sf	0.25	74,283		
417		Acid waste pipe with fittings & hangers	**297,133**	sf	1.25	371,416		
418		Storm water pipe with fittings & hangers	**297,133**	sf	1.00	297,133		
419		Gas pipe with fittings & hangers	**297,133**	sf	0.75	222,850		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	Demolition/phasing	**1**	ls	100,000.00	100,000		
	Miscellaneous	**297,133**	sf	0.65	193,136		
	SUBTOTAL					4,587,519	
	TOTAL - PLUMBING						**$4,587,519**
D30	***HVAC***						
D30	**HVAC, GENERALLY**						
	1922 Building HVAC system contains HW boilers, water cooled chillers & cooling tower, RTU's with ERW, VAV systems, partial 4 pipe chilled beam system in selective areas & displacement diffuser system						
	HVAC Equipment						
	Gas fired HW boiler 6000 MBH	**3**	ea	180,000.00	540,000		
	Hot water pumps with VFD	**2**	ea	20,000.00	40,000		
	Water cooled chiller 220 ton	**2**	ea	440,000.00	880,000		
	Cooling tower with filtration 440 ton	**1**	ea	154,000.00	154,000		
	Chilled water pump with VFD	**2**	ea	25,000.00	50,000		
	Condenser water pump with VFD	**2**	ea	30,000.00	60,000		
	Radiant snow melting system for courtyard	**1**	ls	125,000.00	125,000		
	Heating and cooling devices throughout including active chilled beams to admin area, CUH's, fintube, etc.	**297,133**	sf	2.50	742,833		
	Add for HVAC upgrades to facilitate double glazed windows in lieu of triple glazed	**1**	ls	550,000.00	550,000		
	Air Distribution Equipment						
	AHU with HW, CHW coil & ERW classrooms	**104,000**	cfm	15.00	1,560,000		
	AHU with HW, CHW coil & ERW Aud & stage	**26,000**	cfm	15.00	390,000		
	AHU with HW, CHW coil & ERW add & media	**7,500**	cfm	15.00	112,500		
	Miscellaneous air distribution equipment	**297,133**	sf	2.50	742,833		
	Hot water piping with fittings & hangers	**297,133**	sf	4.00	1,188,532		
	Chilled water piping with fittings & hangers	**297,133**	sf	2.50	742,833		
	Condenser water piping with fittings & hangers	**297,133**	sf	0.50	148,567		
	Pipe insulation	**297,133**	sf	2.50	742,833		
	Sheet metal & accessories	**297,133**	sf	10.50	3,119,897		
	Stainless steel ductwork	**10,000**	lbs	24.00	240,000		
	Automatic temperature controls DDC	**297,133**	sf	6.00	1,782,798		
	System testing & balancing	**297,133**	sf	1.00	297,133		
	Demolition	**1**	ls	200,000	200,000		
	Miscellaneous	**297,133**	sf	2.00	594,266		
	SUBTOTAL					15,004,025	
	TOTAL - HVAC						**15,004,025**
D40	***FIRE PROTECTION***						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system	**297,133**	sf	4.75	1,411,382		
	Dry system in attic	**500**	ea	250.00	125,000		
	Demolition	**1**	ls	60,000.00	60,000		
	SUBTOTAL					1,596,382	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	TOTAL - FIRE PROTECTION						**$1,596,382**
D50	***ELECTRICAL***						
D5010	**SERVICE & DISTRIBUTION**						
	Gear & Distribution						
	Normal						
	5000A 480/277V main switchboard	**1**	ea	150,000.00	150,000		
	Associated panelboards and feeders	**297,133**	sf	2.00	594,266		
	Emergency						
	400A ATS	**1**	ea	8,200.00	8,200		
	200A ATS	**1**	ea	6,100.00	6,100		
	Associated panelboards and feeders	**297,133**	sf	1.50	445,700		
	45KW UPS	**1**	ea	30,000.00	30,000		
	Provisions for PV system (Rough-in only)	**1**	ls	10,000.00	10,000		
	Grounding	**1**	ls	50,000.00	50,000		
	Equipment Wiring						
	Equipment wiring feed and connections	**297,133**	sf	2.00	594,266		
	Chiller unit feed and connection	**2**	ea	10,500.00	21,000		
	Cooling tower feed and connection	**1**	ea	6,500.00	6,500		
	AHU feed and connection	**9**	ea	4,500.00	40,500		
	Pump feed and connection	**12**	ea	1,500.00	18,000		
	Boiler feed and connection	**3**	ea	1,500.00	4,500		
	VFD's feed and connection only	**12**	ea	950.00	11,400		
	Kitchen equipment feed and connections				See 1980 Bldg.		
	Aluminum buses to switchboards and panelboards in lieu of copper - credit	**1**	ls	(65,000.00)	(65,000)		
	SUBTOTAL					1,925,432	
D5020	**LIGHTING & POWER**						
	Lighting fixture with installation labor:						
	LC6	**27**	ea	450.00	12,150		
	LC8	**51**	ea	600.00	30,600		
	LP4	**1**	ea	320.00	320		
	LP8	**838**	ea	640.00	536,320		
	LR24	**108**	ea	200.00	21,600		
	LR4	**5**	ea	300.00	1,500		
	LR8	**212**	ea	600.00	127,200		
	LS8	**15**	ea	500.00	7,500		
	LS8B	**60**	ea	500.00	30,000		
	P48	**29**	ea	650.00	18,850		
	PC1	**109**	ea	450.00	49,050		
	RC1	**47**	ea	300.00	14,100		
	RSH	**2**	ea	325.00	650		
	SL4	**12**	ea	650.00	7,800		
	TH1	**84**	ea	200.00	16,800		
	Credit for corridor fixtures - target price ($450,	**500**	ea	(150.00)	(75,000)		
	Lighting fixtures not yet detailed, allow	**297,133**	sf	3.00	891,399		
	Emergency/egress lighting	**297,133**	sf	0.50	148,567		
	Lighting to exterior	**1**	ls	20,000.00	20,000		
	Lighting controls						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922	**BUILDING RENOVATION**						
520		Automated lighting controls system	**297,133**	sf	1.25	371,416		
521		Single pole LV switch	**194**	ea	65.00	12,610		
522		Occupancy sensor	**288**	ea	220.00	63,360		
523		Photo sensor	**127**	ea	220.00	27,940		
524		Branch devices						
525		Duplex receptacle	**700**	ea	20.00	14,000		
526		Double duplex receptacle	**450**	ea	40.00	18,000		
527		GFI duplex receptacle	**22**	ea	35.00	770		
528		GFI double duplex receptacle	**40**	ea	70.00	2,800		
529		Special purpose receptacle	**24**	ea	65.00	1,560		
530		Connection to hand dryer		ea	100.00			
531		Cord reel	**48**	ea	600.00	28,800		
532		Emergency power off button	**16**	ea	300.00	4,800		
533		Branch devices not yet detailed	**297,133**	sf	0.35	103,997		
534		Lighting and branch circuitry						
535		Branch circuitry	**297,133**	sf	6.00	1,782,798		
536		SUBTOTAL					4,292,257	
537								
538	**D5030**	**COMMUNICATION & SECURITY SYSTEMS**						
539		Fire Alarm						
540		Make connections at new control panel	**1**	ls	1,500.00	1,500		
541		Manual pull station	**30**	ea	100.00	3,000		
542		Smoke detector	**10**	ea	130.00	1,300		
543		Audio visual device	**138**	ea	135.00	18,630		
544		Visual device	**18**	ea	115.00	2,070		
545		Magnetic door holder	**122**	ea	172.00	20,984		
546		Fire alarm circuitry	**297,133**	sf	0.75	222,850		
547		Testing and programming	**1**	ls	4,500.00	4,500		
548		Fire alarm not yet detailed (Including Mass. Notification)	**297,133**	sf	1.50	445,700		
549		BDA/DAS system	**1**	ls	175,000.00	175,000		
550		Telephone/Data/CATV						
551		IDF closets	**1**	ls	30,000.00	30,000		
552		Devices and cabling:						
553		1 port	**128**	ea	18.00	2,304		
554		2 port	**304**	ea	36.00	10,944		
555		3 port	**18**	ea	54.00	972		
556		TVE	**132**	ea	54.00	7,128		
557		WAP	**150**	ea	350.00	52,500		
558		Backbone cabling (allow)	**300**	lf	20.00	6,000		
559		Rough-in:						
560		IDF	**6**	ea	2,000.00	12,000		
561		Cable tray	**110**	lf	50.00	5,500		
562		4" sleeve	**24**	ea	250.00	6,000		
563		Backboard	**6**	ea	500.00	3,000		
564		Closet grounding	**6**	ea	500.00	3,000		
565		Device box with conduit stub	**732**	ea	84.00	61,488		
566		Telecom scope not yet detailed	**297,133**	sf	2.50	742,833		
567		Clock/PA System						
568		Head end	**1**	ls	45,000.00	45,000		
569		Devices and cabling						
570		Clock	**22**	ea	120.00	2,640		
571		Speaker	**172**	ea	150.00	25,800		
572		Cabling	**12,000**	lf	2.00	24,000		
573		Devices and cabling not yet detailed	**297,133**	sf	0.40	118,853		
574		Rough-in	**297,133**	sf	0.30	89,140		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	Sound systems						
	Cafeteria sound system				See 1980 Bldg.		
	Two Way Communications System						
	Elevator lobby two way communication system	**1**	ls	15,000.00	15,000		
	Auditorium						
	Stage lighting and dimming system	**1**	ls	225,000.00	225,000		
	Rough-in with installation & 120V power	**1**	ls	50,000.00	50,000		
	Auditorium sound system with installation	**1**	ls	265,000.00	See Equip		
	Rough-in with 120V power	**1**	ls	50,000.00	50,000		
	TV Studio						
	TV Studio theatrical lighting	**1**	ls	75,000.00	75,000		
	Rough-in with installation & 120V power	**1**	ls	20,000.00	20,000		
	AV General Building						
	AV equipment provided by others				See Equip		
	Rough-in and power	**297,133**	sf	0.25	74,283		
	Security System						
	Head end	**1**	ls	25,000.00	25,000		
	Devices and cabling						
	CCTV site cameras - allow	**1**	ls	25,000.00	25,000		
	CCTV camera	**125**	ea	850.00	106,250		
	CCTV camera WP	**1**	ea	950.00	950		
	Card reader	**13**	ea	350.00	4,550		
	Additional card readers	**47**	ea	2,000.00	94,000		
	Door contact	**9**	ea	120.00	1,080		
	Door junction box	**5**	ea	65.00	325		
	Electric hinge connection	**5**	ea	65.00	325		
	Electric lock	**5**	ea	120.00	600		
	Motion detector	**4**	ea	150.00	600		
	Power transfer device	**5**	ea	150.00	750		
	Request to exit	**5**	ea	150.00	750		
	Cabling	**17,000**	lf	2.00	34,000		
	Devices and cabling not yet detailed	**297,133**	sf	1.00	297,133		
	Rough-in	**297,133**	sf	1.00	297,133		
	SUBTOTAL					3,542,365	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Lightning protection	**1**	ls	125,000.00	125,000		
	Seismic	**1**	ls	10,000.00	10,000		
	Testing	**1**	ls	5,000.00	5,000		
	Miscellaneous						
	Demolition/phasing	**1**	ls	150,000.00	150,000		
	Temp power & lights	**1**	ls	150,000.00	150,000		
	Permits and fees	**1**	ls	130,000.00	130,000		
	SUBTOTAL					570,000	
	TOTAL - ELECTRICAL						**$10,330,054**
E10	***EQUIPMENT***						
E10	**EQUIPMENT, GENERALLY**						
	Double sided Fume Hood	**9**	ea	14,000.00	126,000		
	Pegboard	**36**	ea	500.00	18,000		
	Goggle cabinet	**9**	ea	200.00	1,800		
	Acid/ Flammable cabinet	**9**	ea	2,000.00	18,000		
	Kiln	**1**	ea	5,000.00	5,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1922 BUILDING RENOVATION							
	Irish Auditorium & TV Studio Theatrical stage curtains & rigging (per quote)	**1**	ls	315,000.00	315,000		
	AV equipment, allow (per quote)						
	Irish Auditorium	**1**	ls	265,000.00	265,000		
	Choral Classroom	**1**	ls	15,000.00	15,000		
	Band Classroom	**1**	ls	15,000.00	15,000		
	Dance Studio 1 & 2	**1**	ls	15,000.00	15,000		
	Television Studio	**1**	ls	275,000.00	275,000		
	Auditorium seating; Irwin Quote	**1**	ls	378,000.00	378,000		
	Allowance for residential equipment in Life skills classrooms including Washer/Dryers	**1**	ls	25,000.00	25,000		
	Allowance to protect and repair existing exterior historic clock	**1**	ea	10,000.00	10,000		
	SUBTOTAL					1,481,800	
	TOTAL - EQUIPMENT						**$1,481,800**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
	Rolling mesh shades at exterior windows in non circulation spaces	**25,643**	sf	7.00	179,501		
	Recessed entry mats - allow	**200**	sf	55.00	11,000		
	Casework						
	Light shelves at windows				NA		
	ROTC	**1**	ea				
	Tall storage cabinet	**15**	ea	1,600.00	24,000		
	Trio	**1**	ea				
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Art Studio, 2D & 3D Art						
	Base cabinets with epoxy resin countertop	**139**	lf	750.00	104,250		
	Tall storage cabinet	**6**	ea	1,600.00	9,600		
	Animation	**1**	ea				
	Tall storage cabinet	**3**	ea	1,600.00	4,800		
	Graphics	**1**	ea				
	Tall storage cabinet	**3**	ea	1,600.00	4,800		
	Art Studio (TV Production)	**1**	ea				
	Tall storage cabinet	**3**	ea	1,600.00	4,800		
	Costume Shop						
	Base cabinets with solid surface countertop	**8**	lf	425.00	3,400		
	Upper cabinets	**8**	lf	225.00	1,800		
	Tall storage cabinet	**3**	ea	1,600.00	4,800		
	Band						
	Base cabinets with solid surface countertop	**8**	lf	425.00	3,400		
	Upper cabinets	**8**	lf	225.00	1,800		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Band Instrument storage	**90**	lf	1,100.00	99,000		
	Chorus						
	Base cabinets with solid surface countertop	**8**	lf	225.00	1,800		
	Upper cabinets	**8**	lf	225.00	1,800		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Band						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
679		Tall storage cabinet	**2**	ea	1,600.00	3,200		
680		Teacher Planning	**3**	ea				
681		Work counter - solid surface	**120**	lf	225.00	27,000		
682		Shelving above	**120**	lf	150.00	18,000		
683		Tall storage cabinet	**3**	ea	1,600.00	4,800		
684		Computer Lab	**2**	ea				
685		Tall storage cabinet	**4**	ea	1,600.00	6,400		
684		TV Studio						
685		Control room counter	**55**	lf	225.00	12,375		
686		Scene Shop						
687		Base cabinets with solid surface countertop	**8**	lf	425.00	3,400		
688		Upper cabinets	**8**	lf	225.00	1,800		
689		Tall storage cabinet	**4**	ea	1,600.00	6,400		
690		Caties Closet						
691		Base cabinets with solid surface countertop	**31**	lf	425.00	13,175		
692		Upper cabinets	**28**	lf	225.00	6,300		
693		Tall storage cabinet	**3**	ea	1,600.00	4,800		
694		Work counter - solid surface	**16**	lf	225.00	3,600		
695		Library						
696		Base cabinets with solid surface countertop	**10**	lf	225.00	2,250		
697		Upper cabinets	**10**	lf				
698		Tall storage cabinet	**2**	ea	1,600.00	3,200		
695		Special Education Suite	**1**	ea				
696		Tall storage cabinet	**3**	ea	1,600.00	4,800		
697		Fundamentals	**2**	ea				
698		Tall storage cabinet	**8**	ea	1,600.00	12,800		
699		Speech	**1**	ea				
700		Tall storage cabinet	**2**	ea	1,600.00	3,200		
699		Health	**3**	ea				
700		Base cabinets with solid surface countertop and WB storage above	**24**	lf	675.00	16,200		
701		Tall storage cabinet	**6**	ea	1,600.00	9,600		
702		Deaf	**1**	ea				
703		Tall storage cabinet	**2**	ea	1,600.00	3,200		
702		Sensory	**1**	ea				
703		Base cabinets with solid surface countertop and WB storage above	**8**	lf	500.00	4,000		
704		Tall storage cabinet	**2**	ea	1,600.00	3,200		
705		Life Skills	**4**	ea				
706		Base cabinets with epoxy resin countertop and WB storage above	**20**	lf	750.00	15,000		
707		Base cabinets with solid surface countertop	**106**	lf	425.00	45,050		
708		Upper cabinets	**68**	lf	225.00	15,300		
709		Tall storage cabinet	**12**	ea	1,600.00	19,200		
710		Intense	**2**	ea				
711		Base cabinets with solid surface countertop	**16**	lf	425.00	6,800		
712		Upper cabinets	**16**	lf	225.00	3,600		
713		Tall storage cabinet	**4**	ea	1,600.00	6,400		
714		Autism Classrooms	**6**	ea				
715		Base cabinets with solid surface countertop	**60**	lf	425.00	25,500		
716		Upper cabinets	**60**	lf	225.00	13,500		
717		Tall storage cabinet	**18**	ea	1,600.00	28,800		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
718		Typical Classrooms	**64**	ea				
719		Base cabinets with solid surface countertop and WB storage above	**512**	lf	675.00	345,600		
720		Tall storage cabinet	**128**	ea	1,600.00	204,800		
721		Science Lab Classrooms	**9**	ea				
722		Base cabinets with epoxy resin countertop along window	**387**	lf	500.00	193,500		
723		Base cabinets with epoxy resin countertop and WB storage above	**72**	lf	750.00	54,000		
724		Base cabinets with epoxy resin countertop & wall cabinet/shelving	**252**	lf	725.00	182,700		
725		Tall storage cabinet	**18**	ea	1,600.00	28,800		
726		Student tables; mobile epoxy top tables, 12 per room	**108**	ea	2,800.00	302,400		
727		Science Prep rooms	**6**	ea				
728		Base cabinets with epoxy resin countertop & wall cabinet/shelving	**120**	lf	725.00	87,000		
729		SUBTOTAL					2,221,801	
730								
731	**E2020**	**MOVABLE FURNISHINGS**						
732		All movable furnishings to be provided and installed by owner						
733		SUBTOTAL					NIC	
734								
735		***TOTAL - FURNISHINGS***						**$2,221,801**
736								
737								
738	***F10***	***SPECIAL CONSTRUCTION***						
739								
740	**F10**	**SPECIAL CONSTRUCTION**						
741		No items in this section						
742		SUBTOTAL					-	
743								
744		***TOTAL - SPECIAL CONSTRUCTION***						
745								
746								
747	***F20***	***SELECTIVE BUILDING DEMOLITION***						
748								
749	**F2010**	**BUILDING ELEMENTS DEMOLITION**						
750		**Structural Demolition**						
751		First floor						
752		Sawcut slab on grade	**3,345**	lf	8.00	26,760		
753		Selective demo and removal of existing structural slab on grade	**6,000**	sf	8.00	48,000		
754		Demo concrete pads	**280**	sf	10.00	2,800		
755		1st floor						
756		Demo upper floor structure for new stairs, elevator shaft & MEP shafts	**1,200**	sf	15.00	18,000		
757		2nd floor						
758		Demo upper floor structure for new stairs, elevator shaft & MEP shafts	**1,000**	sf	15.00	15,000		
759		3rd floor						
760		Demo upper floor structure for new stairs, elevator shaft & MEP shafts	**1,500**	sf	15.00	22,500		
761		Attic						
762		Demo upper floor structure at stage & Auditorium	**1,730**	sf	15.00	25,950		
763		1892 Attic mezzanine demolition	**3,500**	sf	30.00	105,000		

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Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate **GFA** 297,133

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1922 BUILDING RENOVATION							
764		Roof						
765		Demo roof structure for new MEP penetrations; approx 5'x3'	**11**	ea	750.00	8,250		
766		**Exterior Closure & Roof Demolition**						
767		Demo translucent fiberglass skylights in Courtyard (4#)	**600**	sf	10.00	6,000		
768		Entry steps, ramps and associated walls			included w/ sitework			
769		Demo Courtyard entry stair	**2**	ea	2,000.00	4,000		
770		Demo metal panels at entry doors	**325**	sf	6.00	1,950		
771		Exterior door demo	**30**	ea	included w/ abatement			
772		D2& D3 Remove exterior windows & storefront	**25,643**	sf	6.00	153,858		
773		Exterior wall masonry demolition for new bridge connection	**400**	sf	30.00	12,000		
774		Roof membrane demo	**58,900**	sf	included w/ abatement			
187		Shoring at demolished masonry bearing walls from 1st to 3rd floor in 1892 Building (3 floors; 13' high)	**210**	lf	125.00	26,250		
188		**Interior Demolition**						
189		Demo wood tiered platforms	**5,550**	sf	6.00	33,300		
190		Door demolition	**487**	ea	100.00	48,700		
191		Drywall partition demolition	**97,071**	sf	2.50	242,678		
192		Masonry partition demolition	**11,479**	sf	5.00	57,395		
193		Demolish existing corridor walls & masonry encasement at columns	**39,650**	sf	6.00	237,900		
193		Demo plaster ceiling and coffers at stage for new catwalk	**1,200**	sf	15.00	18,000		
194		Ceiling demolition (portion carried w/ abatement)	**272,162**	sf	2.00	544,324		
195		Floor demolition (portion carried w/ abatement)	**230,362**	sf	1.50	345,543		
196		Demo stair flights	**12**	flts	3,000.00	36,000		
197		Demo stair rails & finishes	**13**	flts	1,500.00	19,500		
198		Demolish existing interior face of exterior wall; plaster	**52,430**	sf	2.00	104,860		
199		Allowance for miscellaneous demolition throughout; plumbing fixtures, lockers, casework, specialties, window shades, display cases, toilet accessories etc.	**297,133**	gsf	0.50	148,567		
200		Remove cut & capped MEP equipment and fixtures	**297,133**	gsf	1.50	445,700		
201		Temporary enclosures/protection	**297,133**	gsf	0.35	103,997		
202		SUBTOTAL					2,862,782	
203								
204	**F2020**	**HAZARDOUS COMPONENTS ABATEMENT**						
205		See summary						
206		SUBTOTAL						
207								
		TOTAL - SELECTIVE BUILDING DEMOLITION						**$2,862,782**

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Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate GFA 91,129

CONSTRUCTION COST SUMMARY

1980 BUILDING RENOVATION

	BUILDING SYSTEM		SUB-TOTAL	TOTAL	$/SF	%
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$232,325			
	A1020	Special Foundations	$70,000			
	A1030	Lowest Floor Construction	$312,094	**$614,419**	$6.74	2.3%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$1,124,916			
	B1020	Roof Construction	$189,641	**$1,314,557**	$14.43	5.0%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$952,478			
	B2020	Windows/Curtainwall	$1,127,189			
	B2030	Exterior Doors	$27,480	**$2,107,147**	$23.12	8.0%
B30	**ROOFING**					
	B3010	Roof Coverings	$698,954			
	B3020	Roof Openings	$154,800	**$853,754**	$9.37	3.3%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$2,325,930			
	C1020	Interior Doors	$476,755			
	C1030	Specialties/Millwork	$708,813	**$3,511,498**	$38.53	13.4%
C20	**STAIRCASES**					
	C2010	Stair Construction	$42,000			
	C2020	Stair Finishes	$20,000	**$62,000**	$0.68	0.2%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$611,214			
	C3020	Floor Finishes	$855,712			
	C3030	Ceiling Finishes	$618,396	**$2,085,322**	$22.88	8.0%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$135,000	**$135,000**	$1.48	0.5%
D20	**PLUMBING**					
	D20	Plumbing	$1,505,642	**$1,505,642**	$16.52	5.7%
D30	**HVAC**					
	D30	HVAC	$6,889,649	**$6,889,649**	$75.60	26.3%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$462,863	**$462,863**	$5.08	1.8%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$3,296,771	**$3,296,771**	$36.18	12.6%
E10	**EQUIPMENT**					
	E10	Equipment	$800,930	**$800,930**	$8.79	3.1%

Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate GFA 91,129

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
1980 BUILDING RENOVATION						
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$1,361,715			
	E2020	Movable Furnishings	NIC	**$1,361,715**	$14.94	5.2%
F10	**SPECIAL CONSTRUCTION**					
	F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**					
	F2010	Building Elements Demolition	$1,217,142			
	F2020	Hazardous Components Abatement	$0	**$1,217,142**	$13.36	4.6%
TOTAL DIRECT COST (Trade Costs)				***$26,218,409***	*$287.71*	*100.0%*

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Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate **GFA** 91,129

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	GROSS FLOOR AREA CALCULATION						
	First Floor				30,547		
	Second Floor				30,268		
	Third Floor				30,314		
	TOTAL GROSS FLOOR AREA (GFA)				**91,129** ***sf***		
A10	***FOUNDATIONS***						
A1010	**STANDARD FOUNDATIONS**						
033000	*CONCRETE*						
	Miscellaneous repairs/ resurfacing of cracks at exposed concrete foundation walls	**1**	ls	25,000.00	25,000		
	Grade Beam at new braced frames; 24"x2'-6"						
	Formwork	**2,750**	sf	20.00	55,000		
	Re-bar, 75#/LF	**41,250**	lbs.	1.32	54,450		
	Concrete material	**107**	cy	135.00	14,445		
	Placing concrete	**107**	cy	60.00	6,420		
	Slab haunching at new interior CMU walls	**60**	cy	500.00	30,000		
	Elevator pit;						
	12" walls	**9**	cy	1,000.00	9,000		
	18" Mat slab	**100**	sf	30.00	3,000		
312000	*EARTHWORK*						
	Elevator pit						
	Excavation & remove by hand	**67**	cy	90.00	6,030		
	Backfill with existing material	**45**	cy	20.00	900		
	Grade Beams						
	Excavation & remove by hand	**244**	cy	90.00	21,960		
	Backfill with existing material	**137**	cy	20.00	2,740		
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**52**	tns	65.00	3,380		
	SUBTOTAL					232,325	
A1020	**SPECIAL FOUNDATIONS**						
	Allowance for new drilled mini-piles at new elevator	**1**	ls	50,000.00	50,000		
	Temporary protection of existing adjacent foundations at new elevator pit	**1**	ea	20,000.00	20,000		
	SUBTOTAL					70,000	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	Structural slab on grade infill, 8" thick, 6psf rebar	**7,500**	sf	30.00	225,000		
	Premium for slab depression at Culinary kitchen	**300**	lf	20.00	6,000		
	Miscellaneous cutting and patching for new MEP installations	**30,547**	sf	2.00	61,094		
	Equipment pads for new MEP equipment	**1**	ls	20,000.00	20,000		
	SUBTOTAL					312,094	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	TOTAL - FOUNDATIONS						**$614,419**
B10	***SUPERSTRUCTURE***						
B1010	**FLOOR CONSTRUCTION**						
	Seismic clips to ETR CMU	**424**	ea	200.00	84,800		
	New bracing and reinforcing of any existing beams & columns - allowance per Engineer	**110**	tns	5,000.00	550,000		
	Openings in existing structure for new MEP systems - allowance	**91,129**	gsf	2.00	182,258		
	Allowance for modifications/infills at existing upper floor slabs at bridge connection and new ramp in Little Theater	**1**	ls	20,000.00	20,000		
	1hr Fire proofing to columns and beams (at Type IIA Construction)	**60,582**	sf	2.00	121,164		
	Allowance for intumescent paint at diagonals of braced frames at new CW locations	**1**	ls	30,000.00	30,000		
	Miscellaneous metals throughout building	**91,129**	gsf	1.50	136,694		
	SUBTOTAL					1,124,916	
B1020	**ROOF CONSTRUCTION**						
	Roof framing and decking at light monitor, elevator over-run & roof infills	**1,000**	sf	50.00	50,000		
	Support framing to roof screen - allow per Engineer	**4**	tns	4,500.00	18,000		
	Dunnage framing - allowance	**1**	ls	30,000.00	30,000		
	1hr Fire proofing to deck, columns and beams (at Type IIA Construction)	**30,547**	sf	3.00	91,641		
	SUBTOTAL					189,641	
	TOTAL - SUPERSTRUCTURE						**$1,314,557**
B20	***EXTERIOR CLOSURE***						
		1,110	*sf*	Overhang			
B2010	**EXTERIOR WALLS**	*25,500*	*sf*	TOTAL AREA			
	Exterior Wall Area - Solid	*16,715*	sf				
042000	*MASONRY*						
	New brick veneer at demolished walls, match existing	**500**	sf	85.00	42,500		
	Polished Finished CMU base & to 10' at columns	**2,090**	sf	28.00	58,520		
	Miscellaneous repairs & cleaning of existing closure - minimal	**16,715**	sf	10.00	167,150		
	Lifts/Staging to exterior wall	**25,500**	sf	4.00	102,000		
055000	*MISC. METALS*						
	Lintels at new opes including brick work as necessary (11 loc)	**150**	lf	150.00	22,500		
	Replace precast face brick lintel & metal lintel at replacement windows including removal of existing; 5' wide	**63**	loc	1,500.00	94,500		
	Allowance to repair relieving angle system			NR per Structural Narrative			

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING RENOVATION							
86		Building Signage; 24" high Letters "LOWELL HIGH SCHOOL"	**1**	ls	10,000.00	10,000		
87								
88	*070001*	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
89		Air barrier	**4,620**	sf	7.00	32,340		
90		Air barrier/flashing at openings	**3,612**	lf	6.25	22,575		
91		Miscellaneous sealants to closure	**25,500**	sf	0.50	12,750		
92								
93	*072100*	*THERMAL INSULATION*						
94		2" Spray foam insulation to interior face of existing exterior wall	**12,785**	sf	4.00	51,140		
95		6" Rockwall insulation at new infills	**4,620**	sf	4.00	18,480		
96								
97	*076400*	*CLADDING*						
98		Roof screen; 10 feet high	**60**	lf	600.00	36,000		
99		Metal panel at CW heads, columns & soffits	**2,030**	sf	60.00	121,800		
100								
101	*092900*	*GYPSUM BOARD ASSEMBLIES*						
102		3 5/8" Metal stud backup to interior face of existing exterior wall	**12,785**	sf	5.00	63,925		
103		Gypsum Sheathing	**2,590**	sf	2.75	7,123		
104		2 layers Drywall lining to interior face of stud backup at new infills	**2,590**	sf	5.80	15,022		
105		2 layers Drywall lining to interior face of stud backup at existing exterior wall	**12,785**	sf	5.80	74,153		
106		SUBTOTAL					952,478	
107								
108	**B2020**	**WINDOWS/CURTAINWALL**						
109		**Exterior Wall Area - Glazed**	*8,785*	sf				
110		***All Exterior glazing is double glazed***						
111								
112	*061000*	*ROUGH CARPENTRY*						
113		Wood blocking at openings	**3,612**	lf	8.00	28,896		
114								
115	*070001*	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
116		Backer rod & double sealant	**3,612**	lf	9.00	32,508		
117								
118	*080001*	*METAL WINDOWS*						
119		Aluminum windows; 3-coat fluoropolymer finish, awning/fixed types, metal insect screens w/ full wicket - non-historic	**2,840**	sf	100.00	284,000		
120		Curtainwall, Kawneer 5600 or equal, custom color	**5,945**	sf	125.00	743,125		
121		Premium for ballistic grade glazing; assume school guard	**42**	sf	40.00	1,680		
122		Sunshades; horizontal at West elevation	**134**	lf	220.00	29,480		
123								
124	*089000*	*LOUVERS*						
125		Louvers - allow	**100**	sf	75.00	7,500		
126		SUBTOTAL					1,127,189	
127								
128	**B2030**	**EXTERIOR DOORS**						
129		Glazed entrance doors including frame and hardware; double door, ballistic glazing	**2**	pr	13,500.00	27,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	Backer rod & double sealant	**40**	lf	9.00	360		
	Wood blocking at openings	**40**	lf	3.00	120		
	SUBTOTAL					27,480	
	TOTAL - EXTERIOR CLOSURE						**$2,107,147**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Roof membrane demo; complete including insulation etc.	**30,268**	sf	included w/ abatement			
	Fully adhered TPO membrane roofing	**30,268**	sf	17.00	514,556		
	Replace all edge flashings - existing precast coping to remain	**920**	lf	25.00	23,000		
	Roof edge coping/ detail at new light well & elevator over-run	**170**	lf	45.00	7,650		
	Walkway pads; allowance	**1**	ls	25,000.00	25,000		
	Miscellaneous roof flashings	**30,268**	sf	1.00	30,268		
	Roof blocking	**6,540**	lf	12.00	78,480		
	Roof accessories; ladders, hatches etc.	**1**	ls	20,000.00	20,000		
	SUBTOTAL					698,954	
B3020	**ROOF OPENINGS**						
	Roof monitor glazing; triple glazed	**1,032**	sf	150.00	154,800		
	SUBTOTAL					154,800	
	TOTAL - ROOFING						**$853,754**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
	CMU Partitions						
	4" CMU partitions	**4,871**	sf	20.00	97,420		
	8" CMU partitions	**12,279**	sf	22.00	270,138		
	Premium for Polished GF CMU to 5'-4" in corridors	**1,375**	sf	4.00	5,500		
	8" CMU partition at elevator shaft	**2,186**	sf	25.00	54,650		
	Seismic clips to CMU (new & existing)	**310**	ea	140.00	43,400		
	Miscellaneous metals to CMU	**20,711**	sf	1.50	31,067		
	GWB Partitions						
	Typical interior partition; 6" Metal stud w/ 2 layers 5/8" gwb both sides	**78,802**	sf	15.50	1,221,431		
	2hr Shaft wall	**5,619**	sf	18.00	101,142		
	Allowance for column covers	**5,359**	sf	12.00	64,308		
	Rough blocking to partitions	**5,650**	lf	4.00	22,600		
	Sealants & caulking at partitions	**91,129**	gsf	1.00	91,129		
	Glazed Partitions						
	Glazed walls/borrowed lights	**554**	sf	85.00	47,090		
	Interior windows at Dare/SEC/SRO	**48**	sf	85.00	4,080		
	Interior glazing between classrooms; assume 7' high	**315**	sf	85.00	26,775		
	Full height glazing at open to above light well - level 1-3, 1hr	**2,440**	sf	85.00	207,400		
	Solid glass guardrail around Media wall - level 1	**35**	lf	600.00	21,000		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING RENOVATION							
179		30" high glass at top of knee wall at stair open to below level 2	**48**	lf	350.00	16,800		
180		**Operable Partitions**						
181		No items in this section						
182		SUBTOTAL					2,325,930	
183								
184	**C1020**	**INTERIOR DOORS**						
185		Glazed entrance doors including frame and hardware; double door - light well access	**2**	pr	8,500.00	17,000		
186		Single leaf door, frame & hardware	**130**	ea	2,000.00	260,000		
187		Double leaf door, frame & hardware; Corridor/ Stairs/ Restaurant	**13**	pr	3,900.00	50,700		
188		Double leaf door, frame & hardware; Electrical & Janitor, Book closets	**11**	pr	3,600.00	39,600		
189		3'-0" wide sidelight at classroom/office entries	**69**	ea	1,260.00	86,940		
190		Premium for specialty hardware, fire rated doors, vision lites etc.	**1**	ls	17,515.00	17,515		
191		Access doors	**1**	ls	5,000.00	5,000		
192		SUBTOTAL					476,755	
193								
194	**C1030**	**SPECIALTIES / MILLWORK**						
195		Backer panels in electrical closets	**1**	ls	2,000.00	2,000		
196		Marker boards						
197		Typical Classrooms	**1,440**	sf	22.00	31,680		
198		Adjustments, Fundamentals, ISS etc.	**1,080**	sf	22.00	23,760		
199		Science labs, Health	**480**	sf	22.00	10,560		
200		Seminar	**72**	sf	22.00	1,584		
201		Corridors/ Office Suites - allow	**3**	flrs	10,000.00	30,000		
202		Tack boards						
203		Typical Classrooms (Math)	**960**	sf	20.00	19,200		
204		Adjustments, Fundamentals, ISS etc.	**720**	sf	20.00	14,400		
205		Science labs, Health	**160**	sf	20.00	3,200		
206		Seminar	**56**	sf	20.00	1,120		
207		Corridors/ Office Suites - allow	**3**	flrs	3,000.00	9,000		
208		Gang bathroom accessories	**6**	rms	3,150.00	18,900		
209		Double bathroom accessories	**2**	rms	2,500.00	5,000		
210		Single bathroom accessories	**13**	rms	1,500.00	19,500		
211		Janitors closet accessories	**3**	rms	300.00	900		
212		HDPE Toilet Partitions - hcap	**8**	ea	1,800.00	14,400		
213		HDPE Toilet Partitions - typical	**21**	ea	1,600.00	33,600		
214		HDPE Toilet Partitions - urinal screens	**4**	ea	650.00	2,600		
215		2-tier metal student lockers 18" x 15" x 48" h	**646**	opes	190.00	122,740		
216		Code compliant signage	**91,129**	gsf	0.35	31,895		
217		Room signage	**154**	ea	100.00	15,400		
218		Interior brushed aluminum stand-off lettering, 8" high	**4**	loc	5,000.00	20,000		
219		Stainless steel cable trellis in light well; 45' high	**675**	sf	45.00	30,375		
220		Window sills - plam	**400**	lf	35.00	14,000		
221		7' x 18" Lighted Display cases (per spec)	**16**	lf	540.00	8,640		
222		Reception desk in Student Center	**10**	lf	800.00	8,000		
223		Reception desk in Main office	**8**	lf	800.00	6,400		
224		Rails at Little theater ramp	**86**	lf	200.00	17,200		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	Fire Extinguisher cabinets	**30**	ea	350.00	10,500		
	Allowance for miscellaneous specialties; wall protection etc.	**91,129**	gsf	0.50	45,565		
	Rough blocking throughout	**91,129**	gsf	0.50	45,565		
	Miscellaneous sealants throughout building	**91,129**	gsf	1.00	91,129		
	SUBTOTAL					708,813	
	TOTAL - INTERIOR CONSTRUCTION						**$3,511,498**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
	Allowance to patch existing concrete treads	**4**	flt	1,500.00	6,000		
	ETR Egress stairs - install bent steel infill at riser to meet MAAB nosing regulations, install new railings & guardrails	**4**	flt	9,000.00	36,000		
	SUBTOTAL					42,000	
C2020	**STAIR FINISHES**						
	New stair finishes; rubber treads/risers/landing and painting	**4**	flt	5,000.00	20,000		
	SUBTOTAL					20,000	
	TOTAL - STAIRCASES						**$62,000**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
	Paint CMU walls	**36,486**	sf	1.30	47,432		
	Paint to GWB walls	**183,957**	sf	1.00	183,957		
	2 5/8" Polished CMU wainscot corridor side, 5'-4" high	**8,262**	sf	30.00	247,860		
	Painted hardwood cap at CMU/GWB transition in corridors	**1,550**	lf	20.00	31,000		
	Porcelain tile wainscot in Culinary kitchen	**1,600**	sf	25.00	40,000		
	Stainless steel frame/edge at 1st floor Media wall	**72**	lf	75.00	5,400		
	Film applied Logos/Letters - allowance	**1**	ls	10,000.00	10,000		
	Miscellaneous touch-up painting	**91,129**	gsf	0.50	45,565		
	SUBTOTAL					611,214	
C3020	**FLOOR FINISHES**	*83,839*	*sf*				
	Allowance for floor prep/ leveling/ wood sub-floor repairs	**83,839**	sf	3.00	251,517		
	2mm Linoleum tile flooring in Corridors, Classrooms & Teaching spaces	**73,714**	sf	6.00	442,284		
	2mm Linoleum tile flooring in Main Lobby w/ waterjet cut design	**2,600**	sf	7.50	19,500		
	Anti-slip rubber floor at ramp	**200**	sf	12.00	2,400		
	Poured epoxy at Server, bathrooms & BOH spaces	**7,525**	sf	12.00	90,300		
	Integral epoxy base	**1,537**	lf	10.00	15,370		
	Rubber base	**11,447**	lf	3.00	34,341		
	Moisture mitigation				NR		
	SUBTOTAL					855,712	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
C3030	**CEILING FINISHES**						
	2' x 4' ACT 1	**74,649**	sf	5.50	410,570		
	2' x 4' ACT 2 Health zone	**4,460**	sf	7.00	31,220		
	1' x 6' ACT 3	**1,700**	sf	8.00	13,600		
	GWB ceilings	**2,430**	sf	14.00	34,020		
	Metal beam & baffle; Hunter Douglas "Travola" or similar	**480**	sf	45.00	21,600		
	GWB soffits in Lobby (20%)	**120**	sf	25.00	3,000		
	GWB soffits in Culinary Kitchen (10%)	**365**	sf	25.00	9,125		
	Paint GWB ceilings & soffits	**2,915**	sf	0.80	2,332		
	Paint exposed ceiling above metal beam & baffle in Lobby	**600**	sf	3.00	1,800		
	Allowance for GWB soffits throughout	**91,129**	gsf	1.00	91,129		
	SUBTOTAL					618,396	
	TOTAL - INTERIOR FINISHES						**$2,085,322**
D10	***CONVEYING SYSTEMS***						
	Elevator; 2500lbs, 3 stop	**1**	ea	135,000.00	135,000		
	SUBTOTAL					135,000	
	TOTAL - CONVEYING SYSTEMS						**$135,000**
D20	***PLUMBING***						
D20	**PLUMBING, GENERALLY**						
	1980 Building contains science rooms, classrooms, culinary kitchen & restaurant. Hot water by gas fired heaters						
	Acid waste neutralizer tank	**1**	ea	30,000.00	30,000		
	Gas fired hot water heater 850 MBH with 2 260 gallon storage tank, circ pump, expansion tank & air separator	**1**	ls	55,000.00	55,000		
	Plumbing equipment	**91,129**	sf	1.25	113,911		
	Water closet	**43**	ea	1,400.00	60,200		
	Lavatory	**39**	ea	1,000.00	39,000		
	Urinal	**7**	ea	1,600.00	11,200		
	Miscellaneous plumbing fixtures; science room sinks, drinking fountains etc.	**91,129**	sf	1.55	141,250		
	Domestic water pipe with fittings & hangers	**91,129**	sf	2.75	250,605		
	Domestic water pipe insulation	**91,129**	sf	1.55	141,250		
	Sanitary waste pipe with fittings & hangers	**91,129**	sf	2.50	227,823		
	Non-potable water pipe with fittings & hangers	**91,129**	sf	0.25	22,782		
	Acid waste pipe with fittings & hangers	**91,129**	sf	1.25	113,911		
	Storm water pipe with fittings & hangers	**91,129**	sf	1.00	91,129		
	Gas pipe with fittings & hangers	**91,129**	sf	0.75	68,347		
	Culinary rough-in	**1**	ls	30,000.00	30,000		
	Demolition/phasing	**1**	ls	50,000.00	50,000		
	Miscellaneous	**91,129**	sf	0.65	59,234		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	SUBTOTAL					1,505,642	
	TOTAL - PLUMBING						**$1,505,642**
D30	***HVAC***						
D30	**HVAC, GENERALLY**						
	1980 Building contains science rooms, classrooms, culinary kitchen & restaurant						
	1980 Building HVAC system contains HW boilers, water cooled chillers & cooling tower, RTU's with ERW, VAV systems, partial 4 pipe chilled beam system in selective areas & displacement diffuser system						
	Gas fired HW boiler 5600 MBH	**3**	ea	168,000.00	504,000		
	Hot water pumps with VFD	**2**	ea	25,000.00	50,000		
	Water cooled chiller 275 ton	**2**	ea	550,000.00	1,100,000		
	Cooling tower with filtration 550 ton	**1**	ea	192,500.00	192,500		
	Chilled water pump with VFD	**2**	ea	30,000.00	60,000		
	Condenser water pump with VFD	**2**	ea	35,000.00	70,000		
	Heating and cooling devices throughout including active chilled beams to admin, TV studio, media center. CUH's, fintube...	**91,129**	sf	3.00	273,387		
	Add for HVAC upgrades to facilitate double glazed windows in lieu of triple glazed	**1**	ls	150,000.00	150,000		
	AHU with HW, CHW coil & ERW classrooms	**39,500**	cfm	15.00	592,500		
	AHU with HW, CHW coil & ERW kitchen & support	**6,000**	cfm	15.00	90,000		
	AHU with HW, CHW coil & ERW cafeteria	**17,000**	cfm	15.00	255,000		
	AHU with HW, CHW coil & ERW freshman cafeteria	**12,000**	cfm	15.00	180,000		
	AHU with HW, CHW coil & ERW culinary arts & rest	**6,500**	cfm	15.00	97,500		
	AHU with HW, CHW coil & ERW admin, student act & media	**12,000**	cfm	15.00	180,000		
	Make up air unit culinary	**1**	ls	32,000.00	32,000		
	Miscellaneous air distribution equipment	**91,129**	sf	2.50	227,823		
	Hot water piping with fittings & hangers	**91,129**	sf	4.00	364,516		
	Chilled water piping with fittings & hangers	**91,129**	sf	2.50	227,823		
	Condenser water piping with fittings & hangers	**91,129**	sf	0.50	45,565		
	Pipe insulation	**91,129**	sf	2.50	227,823		
	Sheet metal & accessories	**91,129**	sf	10.50	956,855		
	Stainless steel ductwork	**5,740**	lbs	24.00	137,760		
	Automatic temperature controls DDC	**91,129**	sf	6.00	546,774		
	System testing & balancing	**91,129**	sf	1.00	91,129		
	Demolition	**1**	ls	100,000.00	100,000		
	Miscellaneous	**91,129**	sf	1.50	136,694		
	SUBTOTAL					6,889,649	
	TOTAL - HVAC						**$6,889,649**
D40	***FIRE PROTECTION***						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system	**91,129**	gsf	4.75	432,863		
	Demolition	**1**	ls	30,000.00	30,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	SUBTOTAL					462,863	
	TOTAL - FIRE PROTECTION						**$462,863**
D50	***ELECTRICAL***						
D5010	**SERVICE & DISTRIBUTION**						
	Gear & Distribution						
	Normal						
	Associated panelboards and feeders	**91,129**	sf	2.00	182,258		
	Emergency						
	Associated ATS's, panelboards and feeders	**91,129**	sf	1.50	136,694		
	Provisions for PV system (Rough-in only)	**1**	ls	5,000.00	5,000		
	Grounding	**1**	ls	15,000.00	15,000		
	Equipment Wiring						
	Equipment wiring feed and connections	**91,129**	sf	2.00	182,258		
	Cooling tower feed and connection	**2**	ea	6,500.00	13,000		
	AHU feed and connection	**8**	ea	4,500.00	36,000		
	MAU feed and connection	**1**	ea	3,520.00	3,520		
	Culinary kitchen equipment feed and connections	**1**	ls	5,000.00	5,000		
	Aluminum buses to switchboards and panelboards in lieu of copper - credit	**1**	ls	(20,000.00)	(20,000)		
	SUBTOTAL					558,730	
D5020	**LIGHTING & POWER**						
	Lighting fixture with installation labor:						
	Emergency battery unit	**1**	ea	150.00	150		
	Library fixture	**19**	ea	650.00	12,350		
	LC4	**12**	ea	300.00	3,600		
	LC6	**12**	ea	450.00	5,400		
	LC8	**48**	ea	600.00	28,800		
	LP8	**330**	ea	640.00	211,200		
	LR24	**90**	ea	200.00	18,000		
	LR8	**90**	ea	600.00	54,000		
	LS8B	**22**	ea	500.00	11,000		
	SL3	**7**	ea	600.00	4,200		
	Credit for corridor fixtures - target price ($450, installed)	**200**	ea	(150.00)	(30,000)		
	Lighting fixtures not yet detailed, allow	**91,129**	sf	2.00	182,258		
	Emergency/egress lighting	**91,129**	sf	0.50	45,565		
	Lighting to exterior	**1**	ls	8,500.00	8,500		
	Lighting controls						
	Automated lighting controls system	**91,129**	sf	1.25	113,911		
	Single pole LV switch	**98**	ea	65.00	6,370		
	Occupancy sensor	**144**	ea	220.00	31,680		
	Photo sensor	**39**	ea	220.00	8,580		
	Branch devices						
	Duplex receptacle	**370**	ea	20.00	7,400		
	Double duplex receptacle	**205**	ea	40.00	8,200		
	GFI duplex receptacle	**12**	ea	35.00	420		
	GFI double duplex receptacle	**60**	ea	70.00	4,200		
	Special purpose receptacle	**16**	ea	65.00	1,040		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING RENOVATION							
414		Connection to hand dryer	**12**	ea	100.00	1,200		
415		Cord reel	**15**	ea	600.00	9,000		
416		Emergency power off button	**25**	ea	300.00	7,500		
417		Branch devices not yet detailed	**91,129**	sf	0.25	22,782		
418		Lighting and branch circuitry						
419		Branch circuitry	**91,129**	sf	6.00	546,774		
420		SUBTOTAL					1,324,080	
421								
422	**D5030**	**COMMUNICATION & SECURITY SYSTEMS**						
423		Fire Alarm						
424		Make connections at new control panel	**1**	ls	3,500.00	3,500		
425		Manual pull station	**11**	ea	100.00	1,100		
426		Smoke detector	**10**	ea	130.00	1,300		
427		Audio visual device	**46**	ea	135.00	6,210		
428		Visual device	**57**	ea	115.00	6,555		
429		Magnetic door holder	**50**	ea	172.00	8,600		
430		Fire alarm circuitry	**91,129**	sf	0.75	68,347		
431		Fire alarm not yet detailed (Including Mass. Notification)	**91,129**	sf	1.50	136,694		
432		Testing and programming	**1**	ls	4,500.00	4,500		
433		BDA/DAS system	**1**	ls	85,000.00	85,000		
434		Telephone/Data/CATV						
435		IDF closets	**1**	ls	10,000.00	10,000		
436		Devices and cabling:						
437		1 port	**29**	ea	18.00	522		
438		2 port	**150**	ea	36.00	5,400		
439		3 port	**45**	ea	54.00	2,430		
440		TVE	**39**	ea	54.00	2,106		
441		WAP	**45**	ea	350.00	15,750		
442		Backbone cabling (allow)	**300**	lf	15.00	4,500		
443		Rough-in:						
444		IDF	**14**	ea	2,000.00	28,000		
445		Cable tray	**100**	lf	50.00	5,000		
446		4" sleeve	**16**	ea	250.00	4,000		
447		Backboard	**4**	ea	500.00	2,000		
448		Closet grounding	**4**	ea	500.00	2,000		
449		Device box with conduit stub	**308**	ea	84.00	25,872		
450		Telecom scope not yet detailed	**91,129**	sf	2.00	182,258		
451		Clock/PA System						
452		Head end	**1**	ls	20,000.00	20,000		
453		Devices and cabling						
454		Clock	**72**	ea	120.00	8,640		
455		Speaker	**62**	ea	150.00	9,300		
456		Cabling	**8,100**	lf	2.00	16,200		
457		Devices and cabling not yet detailed	**91,129**	sf	0.20	18,226		
458		Rough-in	**91,129**	sf	0.20	18,226		
459		Two Way Communications System						
460		Elevator lobby two way communication system	**1**	ls	15,000.00	15,000		
461		AV						
462		Cafeteria AV system	**1**	ls	45,000.00	See Equip		
463		Rough-in	**1**	ls	10,000.00	10,000		
464		AV equipment provided by others				See Equip		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING RENOVATION							
	Rough-in and power	**91,129**	sf	0.25	22,782		
	Security System						
	Head end	**1**	ls	25,000.00	25,000		
	Devices and cabling						
	CCTV site cameras - allow	**1**	ls	10,000.00	10,000		
	CCTV camera	**56**	ea	850.00	47,600		
	Card reader	**2**	ea	350.00	700		
	Additional card readers	**28**	ea	2,000.00	56,000		
	Door contact	**2**	ea	120.00	240		
	Door junction box	**2**	ea	65.00	130		
	Electric hinge connection	**2**	ea	65.00	130		
	Electric lock	**2**	ea	120.00	240		
	Intercom master station	**4**	ea	2,500.00	10,000		
	Panic button	**4**	ea	120.00	480		
	Power transfer device	**2**	ea	150.00	300		
	Request to exit	**2**	ea	150.00	300		
	Cabling	**7,500**	lf	2.00	15,000		
	Devices and cabling not yet detailed	**91,129**	sf	1.50	136,694		
	Rough-in	**91,129**	sf	1.00	91,129		
	SUBTOTAL					1,143,961	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Lightning protection	**1**	ls	60,000.00	60,000		
	Seismic	**1**	ls	10,000.00	10,000		
	Testing	**1**	ls	5,000.00	5,000		
	Miscellaneous						
	Demolition/phasing	**1**	ls	75,000.00	75,000		
	Temp power & lights	**1**	ls	80,000.00	80,000		
	Permits and fees	**1**	ls	40,000.00	40,000		
	SUBTOTAL					270,000	
	TOTAL - ELECTRICAL						**$3,296,771**
E10	***EQUIPMENT***						
E10	**EQUIPMENT, GENERALLY**						
	Double sided Fume Hood	**8**	ea	14,000.00	112,000		
	Pegboard	**32**	ea	500.00	16,000		
	Goggle cabinet	**8**	ea	200.00	1,600		
	Acid/ Flammable cabinet	**8**	ea	2,000.00	16,000		
	AV equipment, allow (per quote)						
	Little Theater	**1**	ls	65,000.00	65,000		
	Residential appliances in Teacher Dining & Main office kitchenette	**1**	ls	7,500.00	7,500		
	Allowance for residential equipment in Culinary classroom	**1**	ls	20,000.00	20,000		
	Culinary arts equipment (Crabtree Mc Grath Associates, Inc dated 12/13/18)	**1**	ls	562,830.00	562,830		
	SUBTOTAL					800,930	
	TOTAL - EQUIPMENT						**$800,930**

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING RENOVATION							
514	***E20***	***FURNISHINGS***						
515								
516	**E2010**	**FIXED FURNISHINGS**						
517		Rolling mesh shades at exterior windows in non circulation spaces	**6,735**	sf	7.00	47,145		
518		Recessed entry mats	**150**	sf	55.00	8,250		
519		**Casework**						
520		Light shelves at windows - allowance	**350**	lf	90.00	31,500		
521		Teacher Dining	**1**	ea				
522		Base cabinets with solid surface countertop	**23**	lf	425.00	9,775		
523		Wall cabinet	**20**	lf	225.00	4,500		
524		ISS	**2**	ea				
525		Base cabinets with solid surface countertop and WB storage above	**16**	lf	675.00	10,800		
526		Tall storage cabinet	**4**	ea	1,600.00	6,400		
527		Latino Connection	**1**	ea				
528		Tall storage cabinet	**2**	ea	1,600.00	3,200		
529		Copy room	**1**	ea				
530		Base cabinets with solid surface countertop	**23**	lf	425.00	9,775		
531		Wall cabinet	**17**	lf	225.00	3,825		
532		Main Office Kitchenette	**1**	ea				
533		Base cabinets with solid surface countertop	**8**	lf	425.00	3,400		
534		Wall cabinet	**8**	lf	225.00	1,800		
535		Tall storage cabinet	**1**	ea	1,600.00	1,600		
536		Base cabinet w/ mailboxes above	**16**	lf	750.00	12,000		
537		Base cabinets with solid surface countertop and wall cabinet above	**8**	lf	650.00	5,200		
538		Nurse Suite						
539		Base cabinets with solid surface countertop	**28**	lf	425.00	11,900		
540		Wall cabinet	**28**	lf	225.00	6,300		
541		Tall storage cabinet	**2**	ea	1,600.00	3,200		
542		Fundamentals	**1**	ea				
543		Base cabinets with solid surface countertop and WB storage above	**8**	lf	675.00	5,400		
544		Tall storage cabinet	**4**	ea	1,600.00	6,400		
545		Student Support Suite	**1**	ea				
546		Base cabinets with solid surface countertop and WB storage above	**8**	lf	675.00	5,400		
547		Wall cabinet	**43**	lf	225.00	9,675		
548		Culinary Classroom	**1**	ea				
549		Base cabinets with solid surface countertop	**80**	lf	425.00	34,000		
550		Adjustments Classrooms	**2**	ea				
551		Tall storage cabinet	**8**	ea	1,600.00	12,800		
552		Teacher Planning	**7**	ea				
553		Work counter - solid surface	**256**	lf	220.00	56,320		
554		Shelving above	**238**	lf	150.00	35,700		
555		Tall storage cabinet	**7**	ea	1,600.00	11,200		
556		Health	**2**	ea				
557		Base cabinets with solid surface countertop and WB storage above	**16**	lf	675.00	10,800		
558		Tall storage cabinet	**4**	ea	1,600.00	6,400		
559		Typical Classrooms	**12**	ea				

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		1980 BUILDING RENOVATION						
560		Base cabinets with solid surface countertop and WB storage above	**96**	lf	675.00	64,800		
561		Tall storage cabinet	**24**	ea	1,600.00	38,400		
562		Science Classrooms	**6**	ea				
563		Base cabinets with epoxy resin countertop	**426**	lf	500.00	213,000		
564		Wall cabinet/ shelving	**324**	lf	250.00	81,000		
565		Tall storage cabinet	**12**	ea	1,600.00	19,200		
566		Student tables; mobile epoxy top tables	**72**	ea	2,800.00	201,600		
567		Science Prep rooms	**4**	ea				
568		Base cabinets with epoxy resin countertop & wall cabinet/shelving	**100**	lf	750.00	75,000		
569		ELL Science Classrooms	**2**	ea				
570		Base cabinets with epoxy resin countertop along window	**68**	lf	500.00	34,000		
571		Base cabinets with epoxy resin countertop	**80**	lf	500.00	40,000		
572		Wall cabinet/ shelving	**76**	lf	225.00	17,100		
573		Base cabinets with solid surface countertop and WB storage above	**16**	lf	675.00	10,800		
574		Tall storage cabinet	**4**	ea	1,600.00	6,400		
575		Student tables; mobile epoxy top tables	**24**	ea	2,800.00	67,200		
576		Science Prep room	**1**	ea				
577		Base cabinets with epoxy resin countertop & wall cabinet/shelving	**26**	lf	725.00	18,850		
578		Health Assist	**1**	ea				
579		Base cabinets with epoxy resin countertop	**23**	lf	500.00	11,500		
580		Wall cabinet/ shelving	**19**	lf	225.00	4,275		
581		Micro-Biology	**1**	ea				
582		Base cabinets with epoxy resin countertop & wall cabinet/shelving	**65**	lf	725.00	47,125		
583		Tall storage cabinet	**2**	ea	1,600.00	3,200		
584		Student tables; mobile epoxy top tables	**12**	ea	2,800.00	33,600		
585		SUBTOTAL					1,361,715	
586								
587	**E2020**	**MOVABLE FURNISHINGS**						
588		All movable furnishings to be provided and installed by owner						
589		SUBTOTAL					NIC	
590								
591		***TOTAL - FURNISHINGS***						**$1,361,715**
592								
593								
594	***F10***	***SPECIAL CONSTRUCTION***						
595								
596	**F10**	**SPECIAL CONSTRUCTION**						
597		No items in this section						
598		SUBTOTAL					-	
599								
600		***TOTAL - SPECIAL CONSTRUCTION***						
601								
602								
603	***F20***	***SELECTIVE BUILDING DEMOLITION***						
604								
605	**F2010**	**BUILDING ELEMENTS DEMOLITION**						
606		**Structural Demolition**						
607		First floor						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		1980 BUILDING RENOVATION						
608		Sawcut 8" slab on grade	**2,150**	lf	8.00	17,200		
609		Selective demo and removal of existing structural slab on grade	**7,500**	sf	8.00	60,000		
610		Demo shear walls for new braced frame installation	**7,000**	sf	12.00	84,000		
611		2nd floor						
612		Demo upper floor structure for new light well/ open to above, elevator shaft & MEP shafts	**1,500**	sf	15.00	22,500		
613		Demo shear walls for new braced frame installation	**6,350**	sf	12.00	76,200		
614		3rd floor						
615		Demo upper floor structure for new light well/ open to above, elevator shaft & MEP shafts	**1,000**	sf	15.00	15,000		
616		Demo shear walls for new braced frame installation	**3,650**	sf	12.00	43,800		
617		Roof						
618		Demo roof structure for new MEP penetrations; approx 5'x4'	**11**	ea	750.00	8,250		
619		Demo roof structure for new light well & elevator over-run	**800**	sf	20.00	16,000		
620		**Exterior Closure & Roof Demolition**						
621		Demo structure in its entirety at NE corner for new bridge	**24,500**	cf	1.00	24,500		
622		Demo & remove cmu planters (10 qty)	**150**	lf	125.00	18,750		
623		Demo entry stair	**1**	ea	2,000.00	2,000		
624		D17 Remove precast brick lintel for access (approx 5' per loc)	**66**	loc	included w/ masonry			
625		D15 Demo cementitious panels at wall & soffit	**2,115**	sf	included w/ abatement			
626		D2& D3 Remove exterior windows & storefront	**6,605**	sf	included w/ abatement			
627		D23, D24 & D27; Selective exterior wall demolition at connection to new addition; brick & CMU block	**2,116**	sf	10.00	21,160		
628		Roof membrane demo	**30,547**	sf	included w/ abatement			
629		Temporary enclosures/protection	**91,129**	sf	0.50	45,565		
630		Shoring at demolished shear walls; 3 floors	**1,130**	lf	80.00	90,400		
631		**Interior Demolition**						
632		Door demolition	**250**	ea	100.00	25,000		
633		Partition demolition	**92,300**	sf	3.00	276,900		
634		Ceiling demolition (portion carried w/ abatement)	**76,339**	sf	2.00	152,678		
635		Floor demolition	**83,839**	sf	included w/ abatement			
636		Demo tiered floor/seating in Little Theater	**682**	sf	5.00	3,410		
637		Demo stair rails & finishes	**4**	flts	1,500	6,000		
638		Demolish existing interior face of exterior wall; plaster	**12,785**	sf	2.00	25,570		
638		Allowance for miscellaneous demolition throughout; plumbing fixtures, lockers, casework, specialties, window shades, display cases, toilet accessories etc.	**91,129**	gsf	0.50	45,565		
639		Remove cut & capped MEP equipment and fixtures	**91,129**	gsf	1.50	136,694		
640		SUBTOTAL					1,217,142	
641								
642	**F2020**	**HAZARDOUS COMPONENTS ABATEMENT**						
643		See summary						
644		SUBTOTAL						
645								
646		***TOTAL - SELECTIVE BUILDING DEMOLITION***						**$1,217,142**

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Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate GFA 65,564

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
1980 BUILDING ADDITION						
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$678,454			
	A1020	Special Foundations	$1,041,150			
	A1030	Lowest Floor Construction	$729,305	**$2,448,909**	$37.35	10.7%
A20	**BASEMENT EXCAVATION**					
	A2010	Basement Excavation	$0			
	A2030	Basement Walls	$0	**$0**	$0.00	0.0%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$2,503,293			
	B1020	Roof Construction	$493,993	**$2,997,286**	$45.72	13.1%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$1,594,560			
	B2020	Windows/Curtainwall	$1,324,306			
	B2030	Exterior Doors	$138,120	**$3,056,986**	$46.63	13.4%
B30	**ROOFING**					
	B3010	Roof Coverings	$918,660			
	B3020	Roof Openings	$154,800	**$1,073,460**	$16.37	4.7%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$1,795,097			
	C1020	Interior Doors	$410,700			
	C1030	Specialties/Millwork	$703,446	**$2,909,243**	$44.37	12.7%
C20	**STAIRCASES**					
	C2010	Stair Construction	$212,000			
	C2020	Stair Finishes	$22,840	**$234,840**	$3.58	1.0%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$437,272			
	C3020	Floor Finishes	$447,780			
	C3030	Ceiling Finishes	$1,533,563	**$2,418,615**	$36.89	10.6%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$135,000	**$135,000**	$2.06	0.6%
D20	**PLUMBING**					
	D20	Plumbing	$943,734	**$943,734**	$14.39	4.1%
D30	**HVAC**					
	D30	HVAC	$2,705,056	**$2,705,056**	$41.26	11.8%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$311,429	**$311,429**	$4.75	1.4%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$1,907,151	**$1,907,151**	$29.09	8.3%

Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate GFA 65,564

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
1980 BUILDING ADDITION						
E10	**EQUIPMENT**					
	E10	Equipment	$1,305,020	**$1,305,020**	$19.90	5.7%
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$413,586			
	E2020	Movable Furnishings	NIC	**$413,586**	$6.31	1.8%
F10	**SPECIAL CONSTRUCTION**					
	F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**					
	F2010	Building Elements Demolition	$0			
	F2020	Hazardous Components Abatement	$0	**$0**	$0.00	0.0%
TOTAL DIRECT COST (Trade Costs)				***$22,860,315***	*$348.67*	*100.0%*

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 65,564

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST

1980 BUILDING ADDITION

GROSS FLOOR AREA CALCULATION

First Floor	25,595
Second Floor	19,173
Third Floor	20,796

TOTAL GROSS FLOOR AREA (GFA) **65,564** ***sf***

A10 FOUNDATIONS

A1010 STANDARD FOUNDATIONS

033000 CONCRETE

Grade Beams	*152*	*CY*	*$1,169*	
Pile Caps	*421*	*CY*	*$702*	
Slab thickening/ tie-beams	*254*	*CY*	*$300*	
Pilasters	*66*	*CY*	*$750*	
Total Foundation Concrete	*893*	*CY*		

Perimeter Grade Beams; 18"x4'-6"				
Formwork	**2,880**	sf	20.00	57,600
Re-bar, 90#/LF	**42,300**	lbs.	1.32	55,836
Concrete material	**123**	cy	135.00	16,605
Placing concrete	**123**	cy	60.00	7,380
Form shelf	**470**	lf	10.00	4,700
Grade Beam at braced frames; 24"x2'-6"				
Formwork	**750**	sf	20.00	15,000
Re-bar, 75#/LF	**11,250**	lbs.	1.32	14,850
Concrete material	**29**	cy	135.00	3,915
Placing concrete	**29**	cy	60.00	1,740
Pile caps (3 pile)	**26**	ea		
Formwork	**2,704**	sf	22.00	59,488
Re-bar	**12,750**	lbs.	1.32	16,830
Concrete material	**170**	cy	135.00	22,950
Placing concrete	**170**	cy	60.00	10,200
Pile caps (2 pile)	**32**	ea		
Formwork	**3,072**	sf	22.00	67,584
Re-bar	**13,425**	lbs.	1.32	17,721
Concrete material	**179**	cy	135.00	24,165
Placing concrete	**179**	cy	60.00	10,740
Slab thickening at individual piles	**36**	ea		
Formwork	**2,160**	sf	22.00	47,520
Re-bar	**3,240**	lbs.	1.32	4,277
Concrete material	**72**	cy	135.00	9,720
Placing concrete	**72**	cy	60.00	4,320
Slab thickening to tie typical pile caps				
Slab thickening	**254**	cy	300.00	76,200
Pilaster at perimeter columns; 24" x24"				
Pilasters, 24"x24", complete	**66**	cy	750.00	49,500
Elevator pit;				
12" walls	**9**	cy	750.00	6,750
18" slab	**100**	sf	25.00	2,500

070001 WATERPROOFING, DAMPPROOFING AND CAULKING

Troweled-on bituminous mastic at perimeter grade beam	**2,115**	sf	3.00	NR
Waterproofing at elevator pit wall and slab	**340**	sf	10.00	3,400

072100 THERMAL INSULATION

2" Insulation to grade beams	**2,115**	sf	3.00	6,345

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
312000	*EARTHWORK*						
	Elevator pit						
	Excavation	**67**	cy	15.00	1,005		
	Remove off site	**67**	cy	16.00	1,072		
	Backfill with existing material	**45**	cy	12.00	540		
	Grade Beams						
	Excavation	**266**	cy	15.00	3,990		
	Remove off site	**152**	cy	16.00	2,432		
	Backfill with existing material	**114**	cy	12.00	1,368		
	Pile caps						
	Excavation	**1,181**	cy	15.00	17,715		
	Remove off site	**421**	cy	16.00	6,736		
	Backfill with existing material	**760**	cy	12.00	9,120		
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**256**	tns	65.00	16,640		
	Miscellaneous						
	Dewatering				NR		
	SUBTOTAL					678,454	
A1020	**SPECIAL FOUNDATIONS**	Average pile length 45' long per FBR Report dated 3.28.18 (page 3) Boring GZ1 & Existing bldg depths					
	Mobilization	**1**	ls	50,000.00	50,000		
	Load test	**1**	ls	70,000.00	70,000		
	95 Ton, Conical point piles	**6,390**	vlf	115.00	734,850		
	95 Ton, Conical point pile at intermediate slab supports	**1,620**	vlf	115.00	186,300		
	SUBTOTAL					1,041,150	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	Fill to make up levels Elev. 36' (current Elev 32')						
	Structural fill to make up levels at new slab on grade	**2,057**	cy	38.00	78,166		
	Structural; Slab on grade, 10" thick						
	Rough grading of building pad	**25,595**	sf	1.00	25,595		
	Gravel fill, assume 12"	**948**	cy	40.00	37,920		
	4" Rigid insulation	**25,595**	sf	4.00	102,380		
	Vapor barrier	**25,595**	sf	1.00	25,595		
	Compact existing sub-grade	**25,595**	sf	0.50	12,798		
	Formwork	**620**	sf	12.00	7,440		
	Rebar; 7 lbs/sf	**179,165**	lbs	1.32	236,498		
	Concrete - 10" thick	**826**	cy	125.00	103,250		
	Placing concrete	**826**	cy	45.00	37,170		
	Finishing and curing concrete	**25,595**	sf	1.50	38,393		
	Premium for slab depression at entry grilles	**300**	lf	15.00	4,500		
	Barrier I	**826**	cy	60.00	NR		
	Control joints - saw cut	**25,595**	sf	0.10	2,560		
	Perimeter drain	**320**	lf	22.00	7,040		
	Miscellaneous						
	Equipment pads	**1**	ls	10,000.00	10,000		
	SUBTOTAL					729,305	
	TOTAL - FOUNDATIONS						**$2,448,909**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 65,564

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
	No items in this section						
	SUBTOTAL						
A2020	**BASEMENT WALLS**						
	No items in this section						
	SUBTOTAL						
	TOTAL - BASEMENT CONSTRUCTION						**$0**
B10	***SUPERSTRUCTURE***						
		12.05	lbs/sf				
B1010	**FLOOR CONSTRUCTION**	395	tns				
	Floor Structure - Steel:						
	Steel beams, columns & braced frames	**395**	tns	3,750.00	1,481,250		
	Additional steel at Cafeteria for long spans	**80**	tns	3,750.00	300,000		
	Premium for HSS	**99**	tns	300.00	29,700		
	Shear studs	**9,992**	ea	2.50	24,980		
	Floor Structure						
	2" 18 Ga. Metal galvanized floor deck	**39,969**	sf	3.75	149,884		
	WWF reinforcement	**45,964**	sf	1.10	50,560		
	Concrete Fill to metal deck; Normal Weight, 5-1/2"	**712**	cy	137.50	97,900		
	Place and finish concrete	**39,969**	sf	3.00	119,907		
	Rebar to decks at openings/edges	**11,991**	lbs	1.32	15,828		
	Barrier I				NR		
	Miscellaneous						
	Allowance for expansion/ seismic joints	**1**	ls	50,000.00	50,000		
	1hr Fire proofing to columns and beams (at Type IIA Construction)	**39,969**	sf	2.00	79,938		
	Intumescent paint				NR		
	Fire stopping floors	**1**	ls	5,000.00	5,000		
	Miscellaneous metals throughout building	**65,564**	gsf	1.50	98,346		
	SUBTOTAL					2,503,293	
B1020	**ROOF CONSTRUCTION**						
	Roof Structure	Included w/ floor framing tonnage					
	Main Entry canopy framing	**1,600**	sf	35.00	56,000		
	Canopy at Main entry green roof	**880**	sf	35.00	30,800		
	North canopy framing	**1,080**	sf	35.00	37,800		
	South canopy framing	**2,700**	sf	35.00	94,500		
	Roof Structure						
	Metal roof decking; 1 1/2"	**25,595**	sf	4.00	102,380		
	Metal roof decking; 2"	**2,830**	sf	3.75	10,613		
	5" Normal weight concrete fill at Green roofs (F1)	**2,000**	sf	7.50	15,000		
	5" Normal weight concrete fill at mechanical equipment (F1)	**6,330**	sf	7.50	47,475		
	5 1/2" Normal weight concrete fill at Green roof deck (F2)	**2,830**	sf	8.00	22,640		
	Miscellaneous						
	Support framing to roof screen (300')				included in Tonnage		
	1hr Fire proofing to deck, columns and beams (at Type IIA Construction)	**25,595**	sf	3.00	76,785		
	SUBTOTAL					493,993	
	TOTAL - SUPERSTRUCTURE						**$2,997,286**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**	*22,210*	sf	TOTAL AREA			
	Exterior Wall Area - Solid	*12,513*	sf				
042000	*MASONRY*						
	Polished Finished CMU base	**1,184**	sf	28.00	33,152		
	Brick veneer	**11,329**	sf	39.00	441,831		
	Brick veneer at canopy columns	**2,906**	sf	40.00	116,240		
	8" CMU backup at stairs/elevator	**3,440**	sf	22.00	75,680		
	Staging to exterior wall	**22,210**	sf	4.00	Included		
055000	*MISC. METALS*						
	Seismic clips to CMU	**10**	ea	140.00	1,400		
	Miscellaneous metals to CMU	**3,440**	sf	1.50	5,160		
	Allowance for loose lintels, relieving angles etc.	**22,210**	sf	1.50	33,315		
	Building Signage			included w/ Renovation			
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Air barrier	**12,513**	sf	7.00	87,591		
	Air barrier/flashing at windows	**4,373**	lf	6.25	27,331		
	Miscellaneous sealants to closure	**12,513**	sf	1.00	12,513		
072100	*THERMAL INSULATION*						
	6" Rockwall insulation	**12,513**	sf	4.00	50,052		
076400	*CLADDING*						
	Canopies - linear metal soffit	**6,260**	sf	60.00	375,600		
	Roof screen	**300**	lf	600.00	180,000		
092900	*GYPSUM BOARD ASSEMBLIES*						
	8" metal stud backup	**9,073**	sf	11.00	99,803		
	Gypsum Sheathing	**9,073**	sf	2.75	24,951		
	Drywall lining to interior face of stud backup	**9,073**	sf	3.30	29,941		
	SUBTOTAL					1,594,560	
B2020	**WINDOWS**						
	Exterior Wall Area - Glazed	*9,697*	sf				
	All Exterior glazing is double glazed						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**4,373**	lf	8.00	34,984		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**4,373**	lf	9.00	39,357		
080001	*METAL WINDOWS*						
	Curtainwall, Kawneer 5600 or equal, custom color at West building Addition	**4,453**	sf	125.00	556,625		
	Curtainwall, Kawneer 5600 or equal, custom color at Main entry lobby	**5,244**	sf	125.00	655,500		
	Premium for ballistic grade glazing; assume school guard	**236**	sf	40.00	9,440		
	Sunshades; horizontal at West elevation & South elevation	**95**	lf	220.00	20,900		
089000	*LOUVERS*						
	Louvers - allow	**100**	sf	75.00	7,500		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING ADDITION						
	SUBTOTAL					1,324,306	
B2030	**EXTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door, ballistic glazing	**6**	pr	13,500.00	81,000		
	Glazed entrance doors including frame and hardware; double door	**6**	pr	8,500.00	51,000		
	HM doors, frames and hardware- double	**1**	pr	3,000.00	3,000		
	Backer rod & double sealant	**260**	lf	9.00	2,340		
	Wood blocking at openings	**260**	lf	3.00	780		
	SUBTOTAL					138,120	
	TOTAL - EXTERIOR CLOSURE						**$3,056,986**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Low slope, Fully adhered TPO membrane roofing, complete	**25,595**	sf	18.00	460,710		
	Concrete/ Wood tile pavers or Green roof tray system on membrane roof - premium	**6,330**	sf	25.00	158,250		
	Coping system	**750**	lf	45.00	33,750		
	Flashings at roof to wall connection	**250**	lf	25.00	6,250		
	Walkway pads; allowance	**1**	ls	10,000.00	10,000		
	Miscellaneous roof flashings	**31,925**	sf	1.00	31,925		
	Roof blocking	**6,000**	lf	12.00	72,000		
	Roof accessories; ladders, hatches etc.	**1**	ls	20,000.00	20,000		
	Canopies - membrane roof	**6,260**	sf	15.00	93,900		
	Canopy - fascia & flashings	**425**	lf	75.00	31,875		
	SUBTOTAL					918,660	
B3020	**ROOF OPENINGS**						
	Roof monitor glazing; triple glazed	**1,032**	sf	150.00	154,800		
	SUBTOTAL					154,800	
	TOTAL - ROOFING						**$1,073,460**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
	CMU Partitions						
	4" CMU partitions	**1,206**	sf	20.00	24,120		
	8" CMU partitions	**9,194**	sf	22.00	202,268		
	8" CMU partition at elevator shaft	**2,405**	sf	25.00	60,125		
	Premium for Polished GF CMU to 5'-4" in corridors	**906**	sf	4.00	3,624		
	Seismic clips to CMU	**213**	ea	140.00	29,820		
	Miscellaneous metals to CMU	**12,805**	sf	1.50	19,208		
	GWB Partitions						
	Typical interior partition; 6" Metal stud w/ 2 layers 5/8" gwb both sides	**29,194**	sf	15.50	452,507		
	Allowance for column covers	**6,079**	sf	12.00	72,948		
	Rough blocking to partitions	**2,072**	lf	4.00	8,288		
	Sealants & caulking at partitions	**65,564**	gsf	1.00	65,564		
	Glazed Partitions						
	Glazed walls/borrowed lights	**1,426**	sf	85.00	121,210		
	Interior glazing between classrooms; assume 7' high	**189**	sf	85.00	16,065		
	Interior storefront at Main entry Lobby entrances & Retail entry; assume 10' high	**1,500**	sf	85.00	127,500		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		1980 BUILDING ADDITION						
275		Premium for ballistic grade storefront at entries, assume school guard	**546**	sf	40.00	21,840		
276		Full height glazing at open to above light well - level 1-3, 1hr	**3,680**	sf	95.00	349,600		
277		Glazed rail at open to below areas - level 2	**90**	lf	600.00	54,000		
278		30" high glass at top of kneewall at stair open to below level 2	**85**	lf	350.00	29,750		
279		**Operable Partitions**						
280		Support framing for operable walls	**82**	lf	130.00	10,660		
281		Nana wall at Library/Media center	**62**	lf	1,800.00	111,600		
282		Manual, operable partition in Fundamentals	**20**	lf	720.00	14,400		
283		SUBTOTAL					1,795,097	
284								
285	**C1020**	**INTERIOR DOORS**						
286		Glazed entrance doors including frame and hardware; double door, ballistic grade	**8**	pr	13,500.00	108,000		
287		Glazed entrance doors including frame and hardware; double door - light well access	**2**	pr	8,500.00	17,000		
288		Single leaf door, frame & hardware	**53**	ea	2,000.00	106,000		
289		Double leaf door, frame & hardware; Corridor/ Stairs	**16**	pr	3,900.00	62,400		
290		Double leaf door, frame & hardware; Electrical & Janitor closets	**1**	pr	3,600.00	3,600		
291		3'-0" wide sidelight at classroom/office entries	**25**	ea	1,260.00	31,500		
292		Premium for specialty hardware, fire rated doors, vision lites etc.	**1**	ls	17,200.00	17,200		
293		Overhead security grilles at Servery; 10'x10'	**8**	ea	7,500.00	60,000		
294		Access doors	**1**	ls	5,000.00	5,000		
295		SUBTOTAL					410,700	
296								
297	**C1030**	**SPECIALTIES / MILLWORK**						
298		Backer panels in electrical closets	**1**	ls	2,000.00	2,000		
299		Marker boards						
300		Typical Classrooms (Math)	**6,048**	sf	22.00	133,056		
301		Adjustments, Fundamentals, Health etc.	**840**	sf	22.00	18,480		
302		Scheduling/Data, Conference room	**32**	sf	22.00	704		
303		Bio-tech & Clean Energy labs	**128**	sf	22.00	2,816		
304		Corridors/Flex spaces/ Media center - allow	**3**	flrs	10,000.00	30,000		
305		Tack boards						
306		Typical Classrooms (Math)	**160**	sf	20.00	3,200		
307		Adjustments, Fundamentals, Health etc.	**560**	sf	22.00	12,320		
308		Scheduling/Data, Conference room	**32**	sf	20.00	640		
309		Bio-tech & Clean Energy labs	**64**	sf	20.00	1,280		
310		Corridors/Flex spaces/ Media center - allow	**3**	flrs	3,000.00	9,000		
311		Single bathroom accessories	**3**	rms	1,500.00	4,500		
312		2-tier metal student lockers 18" x 15" x 48" h	**456**	opes	190.00	86,640		
313		Team room, heavy duty metal lockers	**71**	ea	400.00	28,400		
314		Code compliant signage	**65,564**	gsf	0.35	22,947		
315		Room signage	**70**	ea	100.00	7,000		
316		Dedication Plaque. 18"x24"	**1**	ea	2,000.00	2,000		
317		Interior brushed aluminum stand-off lettering, 8" high	**5**	loc	5,000.00	25,000		
318		Aircraft cable wire suspended for banners in Main Lobby	**12**	ea	300.00	3,600		
319		Aircraft cable wire suspended for banners in Cafeteria	**75**	ea	300.00	22,500		
320		Stainless steel cable trellis in light well; 45' high	**675**	sf	45.00	30,375		
321		Window sills - plam	**300**	lf	35.00	10,500		
322		7' x 18" Lighted Display cases (per spec)	**64**	lf	540.00	34,560		
323		Circulation desk in Media center	**15**	lf	800.00	12,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
	Custom millwork double sided built-in booths in Cafeteria	**4**	ea	10,000.00	40,000		
	Built-in corridor benches (per spec)	**50**	lf	400.00	20,000		
	Fire Extinguisher cabinets	**22**	ea	400.00	8,800		
	Allowance for miscellaneous specialties; wall protection etc.	**65,564**	gsf	0.50	32,782		
	Rough blocking throughout	**65,564**	gsf	0.50	32,782		
	Miscellaneous sealants throughout building	**65,564**	gsf	1.00	65,564		
	SUBTOTAL					703,446	
	TOTAL - INTERIOR CONSTRUCTION						**$2,909,243**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
	10' wide Feature stair in Main lobby including stainless steel handrails w/ ss guardrail and glass inserts	**1**	flt	75,000.00	75,000		
	Metal pan stair; egress stair	**5**	flt	25,000.00	125,000		
	Concrete fill to stairs	**6**	flt	2,000.00	12,000		
	SUBTOTAL					212,000	
C2020	**STAIR FINISHES**						
	High performance coating to stairs including all railings etc.	**6**	flt		NR		
	Concrete sealer at stairs - landings	**500**	sf	2.00	1,000		
	Norament treads at stairs - treads & risers	**456**	lft	15.00	6,840		
	Allowance for finishes at feature stair	**1**	ls	15,000.00	15,000		
	SUBTOTAL					22,840	
	TOTAL - STAIRCASES						**$234,840**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
	Paint CMU walls	**32,508**	sf	1.30	42,260		
	Paint to GWB walls	**73,540**	sf	1.00	73,540		
	Acoustical treatments (per spec)						
	Cafeteria; 2" acoustic panel	**1,200**	sf	30.00	36,000		
	FRP in Servery	**3,200**	sf	14.00	44,800		
	2 5/8" Polished CMU wainscot corridor side, 5'-4" high	**5,863**	sf	30.00	175,890		
	Painted hardwood cap at CMU/GWB transition in corridors	**1,100**	lf	20.00	22,000		
	Film applied Logos/Letters - allowance	**1**	ls	10,000.00	10,000		
	Miscellaneous touch-up painting	**65,564**	gsf	0.50	32,782		
	SUBTOTAL					437,272	
C3020	**FLOOR FINISHES**						
	2mm Linoleum tile flooring in Corridors, Classrooms & Teaching spaces	**21,100**	sf	6.00	126,600		
	2mm Linoleum tile flooring in Main Lobby & Cafeteria w/ waterjet cut design	**29,300**	sf	7.00	205,100		
	Carpet in Media Center	**718**	sy	45.00	32,310		
	Poured epoxy at Servery, bathrooms & BOH spaces	**4,860**	sf	12.00	58,320		
	Integral epoxy base	**790**	lf	10.00	7,900		
	Rubber base	**5,850**	lf	3.00	17,550		
	Moisture mitigation	**56,862**	sf	3.00	NR		
	SUBTOTAL					447,780	

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
C3030	**CEILING FINISHES**						
	Sound isolation ceiling in Media center	**6,275**	sf	22.00	138,050		
	2' x 4' ACT 1	**27,232**	sf	5.50	149,776		
	2' x 4' ACT 2 Health zone	**3,445**	sf	7.00	24,115		
	1' x 6' ACT 3	**12,650**	sf	8.00	101,200		
	Acoustical clouds in Media center (30%)	**1,883**	sf	30.00	56,490		
	GWB ceilings	**395**	sf	14.00	5,530		
	Metal beam & baffle; Hunter Douglas "Travola" or similar in Lobby & Cafeteria	**18,000**	sf	45.00	810,000		
	GWB soffits in Lobby & Cafeteria (20%)	**3,900**	sf	25.00	97,500		
	GWB soffits in Media Center (10%)	**628**	sf	25.00	15,700		
	Paint GWB ceilings & soffits	**4,923**	sf	0.80	3,938		
	Paint exposed ceiling above metal beam & baffle in Lobby & Cafeteria	**21,900**	sf	3.00	65,700		
	Allowance for GWB soffits throughout	**65,564**	gsf	1.00	65,564		
	SUBTOTAL					1,533,563	
	TOTAL - INTERIOR FINISHES						**$2,418,615**
D10	***CONVEYING SYSTEMS***						
D1010	**ELEVATOR**						
	Elevator; 3000lbs, 3 stop	**1**	ea	135,000.00	135,000		
	SUBTOTAL					135,000	
	TOTAL - CONVEYING SYSTEMS						**$135,000**
D20	***PLUMBING***						
D20	**PLUMBING, GENERALLY** *Entry, Kitchen & Library space*						
	Plumbing equipment	**65,564**	sf	1.75	114,737		
	Water closet	**4**	ea	1,400.00	5,600		
	Lavatory	**4**	ea	1,000.00	4,000		
	Miscellaneous plumbing fixtures; science room sinks, drinking fountains etc.	**65,564**	sf	1.93	126,539		
	Domestic water pipe with fittings & hangers	**65,564**	sf	2.50	163,910		
	Domestic water pipe insulation	**65,564**	sf	1.50	98,346		
	Sanitary waste pipe with fittings & hangers	**65,564**	sf	2.00	131,128		
	Acid waste pipe with fittings & hangers	**65,564**	sf	1.25	81,955		
	Storm water pipe with fittings & hangers	**65,564**	sf	1.00	65,564		
	Gas pipe with fittings & hangers	**65,564**	sf	0.75	49,173		
	Kitchen rough-in	**1**	ls	70,000.00	70,000		
	Miscellaneous	**65,564**	sf	0.50	32,782		
	SUBTOTAL					943,734	
	TOTAL - PLUMBING						**$943,734**
D30	***HVAC***						
D30	**HVAC, GENERALLY** *Entry, Kitchen & Library space*						
	HVAC equipment	**65,564**	ea	2.00	131,128		
	Make up air unit kitchen	**1**	ls	40,000.00	40,000		
	Air distribution equipment	**65,564**	sf	8.00	524,512		
	Hot water piping with fittings & hangers	**65,564**	sf	3.55	232,752		
	Chilled water piping with fittings & hangers	**65,564**	sf	1.50	98,346		
	Pipe insulation	**65,564**	sf	2.50	163,910		
	Sheet metal & accessories	**65,564**	sf	12.00	786,768		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
	Stainless steel ductwork	**3,000**	lbs	24.00	72,000		
	Automatic temperature controls DDC	**65,564**	sf	7.50	491,730		
	System testing & balancing	**65,564**	sf	1.00	65,564		
	Miscellaneous	**65,564**	sf	1.50	98,346		
	SUBTOTAL					2,705,056	
	TOTAL - HVAC						**$2,705,056**
D40	***FIRE PROTECTION***						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system	**65,564**	gsf	4.75	311,429		
	SUBTOTAL					311,429	
	TOTAL - FIRE PROTECTION						**$311,429**
D50	***ELECTRICAL***						
D50	**ELECTRICAL, GENERALLY**						
	Gear & Distribution						
	Normal						
	Associated panelboards and feeders	**65,564**	sf	2.00	131,128		
	Emergency						
	Associated ATS's, panelboards and feeders	**65,564**	sf	1.00	65,564		
	Equipment Wiring						
	Kitchen equipment feed and connections	**1**	ls	25,000.00	25,000		
	Equipment wiring feed and connections	**65,564**	sf	2.00	131,128		
	Aluminum buses to switchboards and panelboards in lieu of copper - credit	**1**	ls	(10,000.00)	(10,000)		
	SUBTOTAL					342,820	
D5020	**LIGHTING & POWER**						
	Lighting fixture with installation labor:						
	LP8	**18**	ea	640.00	11,520		
	LR24	**12**	ea	200.00	2,400		
	LR8	**7**	ea	600.00	4,200		
	LS8B	**4**	ea	500.00	2,000		
	SL3	**2**	ea	600.00	1,200		
	SL5	**50**	ea	300.00	15,000		
	Credit for corridor fixtures - target price ($450, installed)	**80**	ea	(150.00)	(12,000)		
	Lighting fixtures not yet detailed, allow	**65,564**	sf	4.00	262,256		
	Emergency/egress lighting	**65,564**	sf	0.50	32,782		
	Lighting to exterior	**1**	ls	750.00	750		
	Lighting controls						
	Automated lighting controls system	**65,564**	sf	1.25	81,955		
	Single pole LV switch	**9**	ea	65.00	585		
	Occupancy sensor	**11**	ea	220.00	2,420		
	Photo sensor	**3**	ea	220.00	660		
	Branch devices						
	Duplex receptacle	**46**	ea	20.00	920		
	Double duplex receptacle	**26**	ea	40.00	1,040		
	Branch devices not yet detailed	**65,564**	sf	0.25	16,391		
	Lighting and branch circuitry						
	Branch circuitry	**65,564**	sf	6.00	393,384		
	SUBTOTAL					817,463	
D5030	**COMMUNICATION & SECURITY SYSTEMS**						
	Fire Alarm						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	1980 BUILDING ADDITION						
	Control panel	**1**	ls	15,000.00	15,000		
	Annunciator	**1**	ea	1,500.00	1,500		
	Beacon	**2**	ea	225.00	450		
	Knox box	**2**	ea	600.00	1,200		
	Master box	**1**	ea	2,500.00	2,500		
	Manual pull station	**2**	ea	100.00	200		
	Smoke detector	**3**	ea	130.00	390		
	Audio visual device	**5**	ea	135.00	675		
	Visual device	**7**	ea	115.00	805		
	Fire alarm circuitry	**65,564**	sf	0.75	49,173		
	Fire alarm not yet detailed (Including Mass. Notification)	**65,564**	sf	1.40	91,790		
	BDA/DAS system	**1**	ls	40,000.00	40,000		
	Telephone/Data/CATV						
	Make connection at IDF closet	**1**	ls	1,500.00	1,500		
	Devices and cabling:						
	1 port	**5**	ea	18.00	90		
	2 port	**15**	ea	36.00	540		
	3 port	**6**	ea	54.00	324		
	TVE	**5**	ea	54.00	270		
	WAP	**6**	ea	350.00	2,100		
	Rough-in:						
	Device box with conduit stub	**37**	ea	84.00	3,108		
	Telecom scope not yet detailed	**65,564**	sf	2.75	180,301		
	Clock/PA System						
	Make connections at existing Head end	**1**	ls	2,000.00	2,000		
	Devices and cabling						
	Clock	**11**	ea	120.00	1,320		
	Speaker	**7**	ea	150.00	1,050		
	Cabling	**1,200**	lf	2.00	2,400		
	Devices and cabling not yet detailed	**65,564**	sf	0.40	26,226		
	Rough-in	**65,564**	sf	0.20	13,113		
	AV						
	AV equipment provided by others				See Equip		
	Rough-in only	**65,564**	sf	0.20	13,113		
	Security System						
	Head end	**1**	ls	3,000.00	3,000		
	Devices and cabling						
	CCTV site cameras - allow	**1**	ls	15,000.00	15,000		
	CCTV camera	**4**	ea	850.00	3,400		
	CCTV camera WP	**3**	ea	950.00	2,850		
	Card reader	**5**	ea	350.00	1,750		
	Additional card readers	**25**	ea	2,000.00	50,000		
	Door contact	**8**	ea	120.00	960		
	Door junction box	**4**	ea	65.00	260		
	Electric hinge connection	**8**	ea	65.00	520		
	Electric lock	**4**	ea	120.00	480		
	Intercom station	**1**	ea	1,500.00	1,500		
	Motion detector	**2**	ea	150.00	300		
	Power transfer device	**4**	ea	150.00	600		
	Request to exit	**8**	ea	150.00	1,200		
	Cabling	**5,000**	lf	2.00	10,000		
	Devices and cabling not yet detailed	**65,564**	sf	1.50	98,346		
	Rough-in	**65,564**	sf	1.00	65,564		
	SUBTOTAL					706,868	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Lightning protection	**1**	ls	5,000.00	5,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
	Miscellaneous						
	Temp power & lights	**1**	ls	10,000.00	10,000		
	Permits and fees	**1**	ls	25,000.00	25,000		
	SUBTOTAL					40,000	
	TOTAL - ELECTRICAL						**$1,907,151**
E10	***EQUIPMENT***						
E10	**EQUIPMENT, GENERALLY**						
	Fume Hoods in Bio-tech	**2**	ea	14,000.00	28,000		
	Pegboard	**2**	ea	500.00	1,000		
	Goggle cabinet	**2**	ea	200.00	400		
	Acid/ Flammable cabinet	**2**	ea	2,000.00	4,000		
	AV equipment, allow (per quote)						
	Cafeteria	**1**	ls	45,000.00	45,000		
	Residential Appliances	**1**	ls	10,000.00	10,000		
	Kitchen equipment (Crabtree Mc Grath Associates, Inc dated 12/13/18)	**1**	ls	888,330.00	888,330		
	Second Floor Servery equipment (Crabtree Mc Grath Associates, Inc dated 12/13/18)	**1**	ls	328,290.00	328,290		
	SUBTOTAL					1,305,020	
	TOTAL - EQUIPMENT						**$1,305,020**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
	Rolling mesh shades at exterior windows in non circulation spaces	**4,673**	sf	7.00	32,711		
	Premium for motorized shades at Cafeteria & Media center	**2,805**	sf	25.00	70,125		
	Recessed entry mats	**1,250**	sf	55.00	68,750		
	Casework						
	Light shelves at windows - allowance	**80**	lf	90.00	7,200		
	Adjustments Classrooms	**2**	ea				
	Tall storage cabinet	**8**	ea	1,600.00	12,800		
	Health	**1**	ea				
	Base cabinets with solid surface countertop and WB storage above	**8**	lf	675.00	5,400		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Freshman Admin						
	Base cabinet, solid surface counter & wall cabinet	**22**	lf	650.00	14,300		
	Fundamentals	**2**	ea				
	Tall storage cabinet	**8**	ea	1,600.00	12,800		
	Typical Classrooms	**2**	ea				
	Base cabinets with solid surface countertop and WB storage above	**16**	lf	675.00	10,800		
	Tall storage cabinet	**4**	ea	1,600.00	6,400		
	Tech Center - allow	**1**	ea				
	Tall storage cabinet	**4**	ea	1,600.00	6,400		
	Bio-tech & Clean Energy lab	**2**	ea				
	Base cabinets with epoxy resin countertop along window	**50**	lf	500.00	25,000		
	Base cabinets with epoxy resin countertop & wall cabinet/shelving	**60**	lf	725.00	43,500		
	Tall storage cabinet	**4**	ea	1,600.00	6,400		
	Student tables; mobile epoxy top tables	**26**	ea	2,800.00	72,800		
	Clean room	**1**	ea				

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Schematic Design Estimate

GFA 65,564

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
1980 BUILDING ADDITION							
	Base cabinets with epoxy resin countertop	**30**	lf	500.00	15,000		
	Media center/ Library						
	Bookcase allowance at media center				F,F+E		
	Circulation desk				w/ Millwork/Specialties		
	SUBTOTAL					413,586	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner						
	SUBTOTAL					NIC	
	TOTAL - FURNISHINGS						**$413,586**
F10	***SPECIAL CONSTRUCTION***						
F10	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - SPECIAL CONSTRUCTION						**$0**
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	See main summary for demolition of existing buildings				See Summary		
	SUBTOTAL					0	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	See main summary for HazMat allowance				See Summary		
	SUBTOTAL					$0	
	TOTAL - SELECTIVE BUILDING DEMOLITION						**$0**

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Schematic Design Estimate GFA 70,984

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW GYMNASIUM						
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$952,447			
	A1020	Special Foundations	$971,150			
	A1030	Lowest Floor Construction	$958,064	**$2,881,661**	$40.60	12.4%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$3,467,078			
	B1020	Roof Construction	$361,994	**$3,829,072**	$53.94	16.5%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$1,624,565			
	B2020	Windows/Curtainwall	$1,236,839			
	B2030	Exterior Doors	$45,684	**$2,907,088**	$40.95	12.6%
B30	**ROOFING**					
	B3010	Roof Coverings	$949,015			
	B3020	Roof Openings	$0	**$949,015**	$13.37	4.1%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$1,585,442			
	C1020	Interior Doors	$263,270			
	C1030	Specialties/Millwork	$604,414	**$2,453,126**	$34.56	10.6%
C20	**STAIRCASES**					
	C2010	Stair Construction	$91,000			
	C2020	Stair Finishes	$9,180	**$100,180**	$1.41	0.4%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$294,473			
	C3020	Floor Finishes	$1,072,896			
	C3030	Ceiling Finishes	$605,104	**$1,972,473**	$27.79	8.5%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$0	**$0**	$0.00	0.0%
D20	**PLUMBING**					
	D20	Plumbing	$816,180	**$816,180**	$11.50	3.5%
D30	**HVAC**					
	D30	HVAC	$3,210,252	**$3,210,252**	$45.23	13.9%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$397,510	**$397,510**	$5.60	1.7%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$2,519,527	**$2,519,527**	$35.49	10.9%
E10	**EQUIPMENT**					
	E10	Equipment	$1,048,650	**$1,048,650**	$14.77	4.5%
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$78,000			
	E2020	Movable Furnishings	NIC	**$78,000**	$1.10	0.3%

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Schematic Design Estimate GFA 70,984

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM	*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW GYMNASIUM					
F10	**SPECIAL CONSTRUCTION**				
F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**				
F2010	Building Elements Demolition	$0			
F2020	Hazardous Components Abatement	$0	**$0**	$0.00	0.0%
TOTAL DIRECT COST (Trade Costs)			***$23,162,734***	*$326.31*	*100.0%*

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GFA 70,984

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	GROSS FLOOR AREA CALCULATION						
	First Floor			34,307			
	Second Floor			33,804			
	Mezzanine			2,873			
	TOTAL GROSS FLOOR AREA (GFA)				**70,984** ***sf***		
	A10 FOUNDATIONS						
	A1010 STANDARD FOUNDATIONS						
033000	*CONCRETE*						
	Grade Beams	*268*	*CY*	*$1,336*			
	Pile Caps	*470*	*CY*	*$680*			
	Slab thickening/ tie-beams	*368*	*CY*	*$300*			
	Pilasters	*75*	*CY*	*$750*			
	Total Foundation Concrete	*1,181*	*CY*				
	Perimeter Grade Beams; 18"x4'-6"						
	Formwork	**7,200**	sf	20.00	144,000		
	Re-bar, 90#/LF	**72,000**	lbs.	1.32	95,040		
	Concrete material	**210**	cy	135.00	28,350		
	Placing concrete	**210**	cy	60.00	12,600		
	Form shelf	**700**	lf	10.00	7,000		
	Grade Beam at braced frames; 24"x2'-6"						
	Formwork	**1,500**	sf	20.00	30,000		
	Re-bar, 75#/LF	**22,500**	lbs.	1.32	29,700		
	Concrete material	**58**	cy	135.00	7,830		
	Placing concrete	**58**	cy	60.00	3,480		
	Pile caps (2 pile)	**71**	ea				
	Formwork	**6,816**	sf	22.00	149,952		
	Re-bar	**19,880**	lbs.	1.32	26,242		
	Concrete material	**398**	cy	135.00	53,730		
	Placing concrete	**398**	cy	60.00	23,880		
	Slab thickening at individual piles	**36**	ea				
	Formwork	**2,160**	sf	22.00	47,520		
	Re-bar	**3,240**	lbs.	1.32	4,277		
	Concrete material	**72**	cy	135.00	9,720		
	Placing concrete	**72**	cy	60.00	4,320		
	Slab thickening to tie typical pile caps						
	Slab thickening	**368**	cy	300.00	110,400		
	Pilaster at perimeter columns; 24" x24"						
	Pilasters, 24"x24" w/ 50plf rebar	**75**	cy	750.00	56,250		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Troweled-on bituminous mastic at perimeter grade beam	**3,150**	sf	3.00	NR		
072100	*THERMAL INSULATION*						
	2" Insulation to grade beams	**3,150**	sf	3.00	9,450		
312000	*EARTHWORK*						
	Grade Beams						
	Excavation	**469**	cy	15.00	7,035		
	Remove off site	**469**	cy	16.00	7,504		
	Backfill with existing material	**201**	cy	12.00	2,412		
	Pile caps						
	Excavation	**1,467**	cy	15.00	22,005		
	Remove off site	**1,467**	cy	16.00	23,472		
	Backfill with existing material	**629**	cy	12.00	7,548		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**442**	tns	65.00	28,730		
	Miscellaneous						
	Dewatering				NR		
	SUBTOTAL					952,447	
A1020	**SPECIAL FOUNDATIONS**	Average pile length 45' long per Geotech pg6; Borings B201-B207					
	Mobilization	**1**	ls	50,000.00	50,000		
	Load test	**1**	ls	30,000.00	Included Elsewhere		
	95 Ton, Conical point piles	**6,390**	vlf	115.00	734,850		
	95 Ton, Conical point pile at intermediate slab supports	**1,620**	vlf	115.00	186,300		
	SUBTOTAL					971,150	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	Fill to make up levels Elev. 36' (current Elev 33')						
	Structural fill to make up levels at new slab on grade	**1,487**	cy	38.00	56,506		
	Structural; Slab on grade, 10" thick						
	Rough grading of building pad	**34,307**	sf	1.00	34,307		
	Gravel fill, assume 12"	**1,271**	cy	40.00	50,840		
	4" Rigid insulation	**34,307**	sf	4.00	137,228		
	Vapor barrier	**34,307**	sf	1.00	34,307		
	Compact existing sub-grade	**34,307**	sf	0.50	17,154		
	Formwork	**800**	sf	12.00	9,600		
	Rebar; 7.5 lbs/sf	**257,303**	lbs	1.32	339,640		
	Concrete - 10" thick	**1,107**	cy	125.00	138,375		
	Placing concrete	**1,107**	cy	45.00	49,815		
	Finishing and curing concrete	**34,307**	sf	1.50	51,461		
	Barrier I	**1,107**	cy	Included w/ floor finishes			
	Control joints - saw cut	**34,307**	sf	0.10	3,431		
	Perimeter drain	**700**	lf	22.00	15,400		
	Miscellaneous						
	Equipment pads	**1**	ls	20,000.00	20,000		
	SUBTOTAL					958,064	
	TOTAL - FOUNDATIONS						**$2,881,661**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						
	No items in this section						
	SUBTOTAL					0	
A2020	**BASEMENT WALLS**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - BASEMENT CONSTRUCTION						**$0**
B10	***SUPERSTRUCTURE***						
		21	lbs/sf				
B1010	**FLOOR CONSTRUCTION**	740	tns				
	Floor Structure - Steel:						
	Steel beams and columns	**490**	tns	3,750.00	1,837,500		

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	Bar joists	**250**	tns	4,100.00	1,025,000		
	Premium for HSS	**123**	tns	300.00	36,900		
	Shear studs	**9,169**	ea	2.50	22,923		
	Floor Structure						
	2" 18 Ga. Metal galvanized floor deck	**36,677**	sf	3.75	137,539		
	WWF reinforcement	**42,179**	sf	1.10	46,397		
	Concrete Fill to metal deck; Normal Weight, 5-1/2"	**653**	cy	137.50	89,788		
	Place and finish concrete	**36,677**	sf	3.00	110,031		
	Rebar to decks at openings/edges	**11,003**	lbs	1.32	14,524		
	Barrier I	**653**	cy	60.00	NR		
	Miscellaneous						
	Allowance for expansion/ seismic joints	**1**	ls	30,000.00	30,000		
	2hr Fire proofing to columns and beams (at Type IIB Construction)				NR		
	Intumescent paint				NR		
	Fire stopping floors	**1**	ls	10,000.00	10,000		
	Miscellaneous metals throughout building	**70,984**	gsf	1.50	106,476		
	SUBTOTAL					3,467,078	
B1020	**ROOF CONSTRUCTION**						
	Roof Structure	Included w/ floor framing tonnage					
	Decking						
	Metal roof decking; 1 1/2"	**6,434**	sf	4.00	25,736		
	Metal roof decking; 2"	**2,873**	sf	3.75	10,774		
	3" Acoustic deck at Gymnasium	**25,000**	sf	9.00	225,000		
	5 1/2" Normal weight concrete fill at roof deck (F2)	**2,873**	sf	8.00	22,984		
	5" Normal weight concrete fill at mechanical equipment (F1)	**1,000**	sf	7.50	7,500		
	Miscellaneous			0.00			
	Support framing to roof screen				NR		
	Canopy framing	**2,000**	sf	35.00	70,000		
	Spray-applied fireproofing to beams and deck				NR		
	SUBTOTAL					361,994	
	TOTAL - SUPERSTRUCTURE						**$3,829,072**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**	*33,400*	sf	TOTAL AREA			
	Exterior Wall Area	*17,805*	sf				
042000	*MASONRY*						
	Polished Finished CMU to 10' (W14)	**5,618**	sf	28.00	157,304		
	Brick veneer above 10', jumbo	**12,187**	sf	34.00	414,358		
	4" Polished CMU backup to 10' in Gymnasium, full height at Teams rooms/BOH	**14,305**	sf	28.00	400,540		
	Staging to exterior wall	**33,400**	sf		Included		
055000	*MISC. METALS*						
	Seismic clips to CMU	**175**	ea	140.00	24,500		
	Miscellaneous metals to CMU	**14,305**	sf	1.50	21,458		
	Allowance for loose lintels, relieving angles etc.	**33,400**	sf	1.50	50,100		
	Building Signage; 24" high Letters "LHS ARENA"	**1**	ls	7,500.00	7,500		
	Building Signage; Metal School Logo	**1**	ea	10,000.00	10,000		
	Banners	**20**	ea	3,000.00	60,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Air barrier	**17,805**	sf	7.00	124,635		
	Air barrier/flashing at openings	**2,572**	lf	6.25	16,075		
	Miscellaneous sealants to closure	**33,400**	sf	1.00	33,400		
072100	*THERMAL INSULATION*						
	6" Rockwall insulation	**17,805**	sf	4.00	71,220		
076400	*CLADDING*						
	Roof screen				NR		
	Canopy - linear metal soffit	**2,000**	sf	60.00	120,000		
	Metal roof overhang	**651**	sf	60.00	39,060		
092900	*GYPSUM BOARD ASSEMBLIES*						
	3 5/8" metal stud backup above 10' in Gym	**3,500**	sf	6.00	21,000		
	Plywood, FR	**17,805**	sf	3.00	53,415		
	SUBTOTAL					1,624,565	
B2020	**WINDOWS**						
	Exterior Wall Area - Openings	*15,595*	sf				
	All Exterior glazing is double glazed						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**2,572**	lf	8.00	20,576		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**2,572**	lf	9.00	23,148		
080001	*METAL WINDOWS*						
	Kalwall Translucent Panels (W21)	**11,370**	sf	65.00	739,050		
	Kalwall Clear Panels (W22)	**275**	sf	65.00	17,875		
	Curtainwall, Kawneer 5600 or equal, custom color	**2,650**	sf	125.00	331,250		
	Premium for ballistic grade glazing; assume school guard	**186**	sf	40.00	7,440		
	Sunshades				NR		
089000	*LOUVERS*						
	Louvers	**1,300**	sf	75.00	97,500		
	SUBTOTAL					1,236,839	
B2030	**EXTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door, ballistic glazing	**2**	pr	13,500.00	27,000		
	HM doors, frames and hardware- single	**3**	ea	2,000.00	6,000		
	HM doors, frames and hardware- double	**2**	pr	3,000.00	6,000		
	Overhead door	**1**	ea	4,800.00	4,800		
	Backer rod & double sealant	**157**	lf	9.00	1,413		
	Wood blocking at openings	**157**	lf	3.00	471		
	SUBTOTAL					45,684	
	TOTAL - EXTERIOR CLOSURE						**$2,907,088**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Ribbed membrane roofing, complete	**29,295**	sf	22.00	644,490		
	Low slope, Fully adhered TPO membrane roofing, complete	**5,200**	sf	18.00	93,600		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	Metal coping/fascia	**915**	lf	45.00	41,175		
	Walkway pads; allowance	**1**	ls	5,000.00	5,000		
	Miscellaneous roof flashings	**34,495**	sf	1.00	34,495		
	Roof blocking	**5,490**	lf	12.00	65,880		
	Roof accessories; ladders, hatches etc.	**1**	ls	10,000.00	10,000		
	Allowance for gutters & downspouts	**250**	lf	30.00	7,500		
	Canopy - membrane roof	**2,000**	sf	15.00	30,000		
	Canopy - fascia & flashings	**225**	lf	75.00	16,875		
	SUBTOTAL					949,015	
B3020	**ROOF OPENINGS**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - ROOFING						**$949,015**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
	CMU Partitions						
	3hr Firewall between 1980 Building & Gymnasium wing	**4,950**	sf	35.00	173,250		
	8" CMU partitions	**50,148**	sf	22.00	1,103,256		
	Premium for Polished GF CMU to 5'-4" in corridors	**2,665**	sf	4.00	10,660		
	Seismic clips to CMU	**813**	ea	140.00	113,820		
	Miscellaneous metals to CMU	**50,148**	sf	1.50	75,222		
	GWB Partitions						
	No items in this section						
	Glazed Partitions						
	Glazed walls/borrowed lights - allowance	**450**	sf	85.00	38,250		
	Sealants & caulking at partitions	**70,984**	gsf	1.00	70,984		
	SUBTOTAL					1,585,442	
C1020	**INTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door, ballistic glazing	**2**	pr	13,500.00	27,000		
	Single leaf door, frame & hardware	**40**	ea	2,000.00	80,000		
	Double leaf door, frame & hardware	**33**	pr	3,800.00	125,400		
	Premium for specialty hardware, fire rated doors, vision lites etc.	**1**	ls	10,270.00	10,270		
	Coiling door at Gym storage	**1**	ea	4,800.00	4,800		
	Coiling door at Adaptive PE	**1**		10,800.00	10,800		
	Access doors	**1**	ls	5,000.00	5,000		
	SUBTOTAL					263,270	
C1030	**SPECIALTIES / MILLWORK**						
	Backer panels in electrical closets	**1**	ls	2,000.00	2,000		
	Gang bathroom accessories	**4**	rms	3,150.00	12,600		
	Single bathroom accessories	**4**	rms	1,500.00	6,000		
	Shower accessories	**10**	ea	500.00	5,000		
	Shower ADA seat	**4**	ea	750.00	3,000		
	Janitors closet accessories	**2**	rms	300.00	600		
	HDPE Toilet Partitions - hcap	**4**	ea	1,600.00	6,400		
	HDPE Toilet Partitions - typical	**7**	ea	1,200.00	8,400		
	HDPE Toilet Partitions - urinal screens	**8**	ea	500.00	4,000		
	Gym First floor Corridor, heavy duty metal lockers; 18"x18"30", 2 tier	**64**	opes	200.00	12,800		
	Gym First floor Corridor, heavy duty metal lockers; 18"x18"60", single tier	**32**	ea	400.00	12,800		
	Football lockers;24"x218"60", single tier	**32**	ea	600.00	19,200		

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Lowell, MA

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	Athletic lockers at gym team & locker rooms - 2-tier	**1,258**	ea	190.00	239,020		
	Kitchen lockers	**22**	opes	200.00	4,400		
	Code compliant signage	**70,984**	gsf	0.35	24,844		
	Room signage	**73**	ea	100.00	7,300		
	Dedication Plaque. 18"x24"	**1**	ea	2,000.00	2,000		
	Interior brushed aluminum stand-off lettering, 8" high	**2**	loc	5,000.00	10,000		
	Banners - allowance for mounting for existing & future	**1**	ls	15,000.00	15,000		
	Unframed mirrors in Exercise rooms - allow	**1,200**	sf	30.00	36,000		
	7' x 18" Lighted Display cases (per spec)	**48**	lf	540.00	25,920		
	Allowance for millwork - built-in locker room benches, corridor benches etc.	**1**	ls	50,000.00	50,000		
	Fire Extinguisher cabinets	**24**	ea	350.00	8,400		
	Allowance for miscellaneous specialties; wall protection, MB/TB etc.	**70,984**	gsf	0.50	35,492		
	Rough blocking throughout	**70,984**	gsf	0.25	17,746		
	Miscellaneous sealants throughout building	**70,984**	gsf	0.50	35,492		
	SUBTOTAL					604,414	
	TOTAL - INTERIOR CONSTRUCTION						**$2,453,126**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
	Metal pan stair; egress stair	**2**	flt	25,000.00	50,000		
	Metal pan stair; egress stair, open	**1**	flt	35,000.00	35,000		
	Concrete fill to stairs	**3**	flt	2,000.00	6,000		
	SUBTOTAL					91,000	
C2020	**STAIR FINISHES**						
	High performance coating to stairs including all railings etc.	**3**	flt		NR		
	Concrete sealer at stairs - landings	**300**	sf	2.00	600		
	Norament treads at stairs - treads & risers	**572**	lft	15.00	8,580		
	SUBTOTAL					9,180	
	TOTAL - STAIRCASES						**$100,180**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
	Paint CMU walls	**114,601**	sf	1.30	148,981		
	FRP in Kitchen	**2,000**	sf	14.00	28,000		
	Tectum panel above 10' in Gymnasium (at 3 5/8" backup stud)	**4,000**	sf	18.00	72,000		
	Film applied Logos/Letters - allowance	**1**	ls	10,000.00	10,000		
	Miscellaneous touch-up painting	**70,984**	gsf	0.50	35,492		
	SUBTOTAL				0	294,473	
C3020	**FLOOR FINISHES**						
	2mm Linoleum tile flooring	**7,696**	sf	6.00	46,176		
	Sealed concrete	**400**	sf	2.00	800		
	Poured epoxy w/ schluter edges	**18,000**	sf	12.00	216,000		
	Carpet	**56**	sy	45.00	2,520		
	Wood athletic floor in Gymnasium	**8,800**	sf	19.00	167,200		
	Athletic flooring in Exercise rooms & Running track	**30,000**	sf	20.00	600,000		
	Integral epoxy base	**3,000**	lf	10.00	30,000		
	Resilient bases	**3,400**	lf	3.00	10,200		

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Schematic Design Estimate GFA 70,984

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW GYMNASIUM							
336		Moisture mitigation	**38,200**	sf	3.00	NR		
337		SUBTOTAL					1,072,896	
338								
339	**C3030**	**CEILING FINISHES**						
340		Sound isolation ceiling below Gymnasium at Wrestling & Multipurpose areas; Type K - 2 layers 5/8" gwb on drywall grid w/ resilient hangers & 6" batt insulation	**6,700**	sf	22.00	147,400		
341		2' x 4' ACT 1	**21,000**	sf	5.50	115,500		
342		2' x 4' ACT 2 Health zone	**3,560**	sf	7.00	24,920		
343		GWB ceilings, MR	**10,500**	sf	14.00	147,000		
344		Paint exposed ceilings	**30,300**	sf	3.00	90,900		
345		Paint GWB ceilings	**10,500**	sf	0.80	8,400		
346		Allowance for GWB soffits throughout	**70,984**	gsf	1.00	70,984		
347		SUBTOTAL					605,104	
348								
349		***TOTAL - INTERIOR FINISHES***						**$1,972,473**
350								
351								
352	***D10***	***CONVEYING SYSTEMS***						
353								
354	**D1010**	**ELEVATOR**						
355		No items in this section						
356		SUBTOTAL					0	
357								
358		***TOTAL - CONVEYING SYSTEMS***						**$0**
359								
360								
361	***D20***	***PLUMBING***						
362								
363	**D20**	**PLUMBING, GENERALLY**						
364		*Gym wing contains gym, locker rm, training rms's & fitness rm's*						
365		Plumbing equipment	**70,984**	sf	1.50	106,476		
366		Water closet	**15**	ea	1,400.00	21,000		
367		Lavatory	**16**	ea	1,000.00	16,000		
368		Urinal	**7**	ea	1,600.00	11,200		
369		Shower with valve & drain	**10**	ea	1,200.00	12,000		
370		Miscellaneous plumbing fixtures; drinking fountains etc.	**70,984**	sf	1.15	81,632		
371		Domestic water pipe with fittings & hangers	**70,984**	sf	2.50	177,460		
372		Domestic water pipe insulation	**70,984**	sf	1.50	106,476		
373		Sanitary waste pipe with fittings & hangers	**70,984**	sf	2.50	177,460		
374		Storm water pipe with fittings & hangers	**70,984**	sf	1.00	70,984		
375		Miscellaneous	**70,984**	sf	0.50	35,492		
376		SUBTOTAL					816,180	
377								
378		***TOTAL - PLUMBING***						**$816,180**
379								
380								
381	***D30***	***HVAC***						
382								
383	**D30**	**HVAC, GENERALLY**						
384		*Gym building contains gym, locker rm, training rms's & fitness rm's*						
385		AHU with HW, CHW coil & ERW gym	**30,000**	cfm	15.00	450,000		
386		AHU with HW, CHW coil & ERW ROTC, multi & fit	**29,000**	cfm	15.00	435,000		
387		AHU#14	**6,000**	cfm	15.00	90,000		
388		Miscellaneous air distribution equipment	**70,984**	sf	1.00	70,984		
389		Hot water piping with fittings & hangers	**70,984**	sf	3.50	248,444		
390		Chilled water piping with fittings & hangers	**70,984**	sf	1.00	70,984		
391		Pipe insulation	**70,984**	sf	2.50	177,460		
392		Sheet metal & accessories	**65,000**	lbs	11.00	715,000		

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
	Aluminum ductwork in locker rooms - premium	**1**	ls	300,000.00	300,000		
	Automatic temperature controls DDC	**70,984**	sf	5.00	354,920		
	Facility Fuel Oil System	**1**	ls	120,000.00	120,000		
	System testing & balancing	**70,984**	sf	1.00	70,984		
	Miscellaneous	**70,984**	sf	1.50	106,476		
	SUBTOTAL					3,210,252	
	TOTAL - HVAC						**$3,210,252**
D40	***FIRE PROTECTION***						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system including fire pump assembly	**70,984**	sf	5.60	397,510		
	SUBTOTAL					397,510	
	TOTAL - FIRE PROTECTION						**$397,510**
D50	***ELECTRICAL***						
D50	**ELECTRICAL, GENERALLY**						
	Gear & Distribution						
	Normal						
	3000A 480/277V main switchboard	**1**	ea	110,000	110,000		
	2500A 480/277V main switchboard	**1**	ea	100,000	100,000		
	Associated panelboards and feeders	**70,984**	sf	2.50	177,460		
	Emergency						
	250KW diesel generator with sound atten. cover	**1**	ls	95,000.00	95,000		
	400A ATS	**1**	ea	8,200.00	8,200		
	200A ATS	**1**	ea	6,100.00	6,100		
	Associated panelboards and feeders	**70,984**	sf	1.50	106,476		
	45KW UPS	**1**	ea	30,000.00	30,000		
	Provisions for PV system (Rough-in only)	**1**	ls	5,000.00	5,000		
	Equipment Wiring						
	Equipment wiring feed and connections	**70,984**	sf	2.00	141,968		
	AHU feed and connection	**5**	ea	4,500.00	22,500		
	MAU feed and connection	**1**	ea	3,520.00	3,520		
	Aluminum buses to switchboards and panelboards in lieu of copper - credit	**1**	ls	(25,000.00)	(25,000)		
	SUBTOTAL					781,224	
D5020	**LIGHTING & POWER**						
	Lighting fixture with installation labor:						
	LC4	**3**	ea	300.00	900		
	LC6	**8**	ea	450.00	3,600		
	LC8	**8**	ea	600.00	4,800		
	LP8	**4**	ea	640.00	2,560		
	LPG	**138**	ea	600.00	82,800		
	LR24	**14**	ea	200.00	2,800		
	LR4	**14**	ea	300.00	4,200		
	LR8	**11**	ea	600.00	6,600		
	LS8	**27**	ea	500.00	13,500		
	LS8B	**6**	ea	500.00	3,000		
	LV4	**3**	ea	250.00	750		
	LV8	**20**	ea	500.00	10,000		
	RSH	**9**	ea	325.00	2,925		
	SL3	**3**	ea	600.00	1,800		
	SL4	**4**	ea	600.00	2,400		
	SL5	**12**	ea	300.00	3,600		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW GYMNASIUM						
452		Credit for corridor fixtures - target price ($450, installed)	**34**	ea	(150.00)	(5,100)		
453		Lighting fixtures not yet detailed, allow	**70,984**	sf	1.25	88,730		
454		Emergency/egress lighting	**70,984**	sf	0.25	17,746		
455		Lighting to exterior	**1**	ls	3,500.00	3,500		
456		Lighting controls						
457		Automated lighting controls system	**70,984**	sf	1.25	88,730		
458		Single pole LV switch	**12**	ea	65.00	780		
459		Occupancy sensor	**15**	ea	220.00	3,300		
460		Branch devices						
461		Duplex receptacle	**53**	ea	20.00	1,060		
462		Double duplex receptacle	**27**	ea	40.00	1,080		
463		GFI duplex receptacle	**13**	ea	35.00	455		
464		Special purpose receptacle	**16**	ea	65.00	1,040		
465		Connection to hand dryer	**2**	ea	100.00	200		
466		Emergency power off button	**1**	ea	300.00	300		
467		Branch devices not yet detailed	**70,984**	sf	0.35	24,844		
468		Lighting and branch circuitry						
469		Branch circuitry	**70,984**	sf	6.00	425,904		
470		SUBTOTAL					798,804	
471								
472	**D5030**	**COMMUNICATION & SECURITY SYSTEMS**						
473		Fire Alarm						
474		Control panel	**1**	ls	15,000.00	15,000		
475		Annunciator	**1**	ea	1,500.00	1,500		
476		Beacon	**2**	ea	225.00	450		
477		Knox box	**2**	ea	600.00	1,200		
478		Master box	**1**	ea	2,500.00	2,500		
479		Manual pull station	**3**	ea	100.00	300		
480		Smoke detector	**10**	ea	130.00	1,300		
481		Audio visual device	**10**	ea	135.00	1,350		
482		Visual device	**9**	ea	115.00	1,035		
483		Magnetic door holder	**4**	ea	172.00	688		
484		Fire alarm circuitry	**70,984**	sf	0.75	53,238		
485		Fire alarm not yet detailed (Including Mass. Notification)	**70,984**	sf	1.40	99,378		
486		BDA/DAS system	**1**	ls	35,000.00	35,000		
487		Telephone/Data/CATV						
488		MDF closet	**1**	ls	7,500.00	7,500		
489		Devices and cabling:						
490		1 port	**1**	ea	18.00	18		
491		2 port	**5**	ea	36.00	180		
492		3 port	**6**	ea	54.00	324		
493		WAP	**1**	ea	350.00	350		
494		Backbone cabling (allow)	**300**	lf	15.00	4,500		
495		Rough-in:						
496		MDF	**1**	ea	7,500.00	7,500		
497		Cable tray	**50**	lf	50.00	2,500		
498		4" sleeve	**4**	ea	250.00	1,000		
499		Backboard	**1**	ea	500.00	500		
500		Closet grounding	**1**	ea	500.00	500		
501		Device box with conduit stub	**13**	ea	84.00	1,092		
502		Telecom scope not yet detailed	**70,984**	sf	2.50	177,460		
503		Two Way Communications System						
504		Elevator lobby two way communication system	**1**	ls	15,000.00	15,000		
505		Clock/PA System						
506		Make connections at head end	**1**	ls	3,500.00	3,500		
507		Devices and cabling						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW GYMNASIUM						
508		Clock	**6**	ea	150.00	900		
509		Speaker	**6**	ea	150.00	900		
510		Cabling	**1,000**	lf	2.00	2,000		
511		Devices and cabling not yet detailed	**70,984**	sf	0.40	28,394		
512		Rough-in	**70,984**	sf	0.20	14,197		
513		Scoreboard						
514		Scoreboard shot clocks and circuitry	**4**	ea	13,500.00	w/ Equipment		
515		4-Sided center scoreboard	**1**	ea	100,000.00	w/ Equipment		
516		Gym equipment feed and connections	**1**	ls	20,000.00	20,000		
517		AV						
518		Gymnasium AV system	**1**	ls	75,000.00	See Equip		
519		Rough-in with 120V power	**1**	ls	50,000.00	50,000		
520		Wrestling AV system	**1**	ls	20,000.00	See Equip		
521		Strength AV system	**1**	ls	20,000.00	See Equip		
522		Fitness AV system	**1**	ls	20,000.00	See Equip		
523		Rough-in with 120V power	**3**	ea	7,500.00	22,500		
524		AV equipment provided by others				See Equip		
525		Rough-in only	**70,984**	sf	0.10	7,098		
526		Security System						
527		Make connections at head end	**1**	ls	3,500.00	3,500		
528		Devices and cabling						
529		CCTV site cameras - allow	**1**	ls	20,000.00	20,000		
530		CCTV camera	**9**	ea	850.00	7,650		
531		CCTV camera WP	**1**	ea	950.00	950		
532		Card reader	**1**	ea	350.00	350		
533		Additional card readers	**4**	ea	2,000.00	8,000		
534		Door contact	**4**	ea	120.00	480		
535		Door junction box	**1**	ea	65.00	65		
536		Electric hinge connection	**2**	ea	65.00	130		
537		Electric lock	**1**	ea	120.00	120		
538		Power transfer device	**1**	ea	150.00	150		
539		Request to exit	**2**	ea	150.00	300		
540		Cabling	**2,500**	lf	2.00	5,000		
541		Devices and cabling not yet detailed	**70,984**	sf	2.00	141,968		
542		Rough-in	**70,984**	sf	1.00	70,984		
543		SUBTOTAL					840,499	
544								
545	**D5040**	**OTHER ELECTRICAL SYSTEMS**						
546		Lightning protection	**1**	ls	27,000.00	27,000		
547		Miscellaneous						
548		Temp power & lights	**1**	ls	40,000.00	40,000		
549		Permits and fees	**1**	ls	32,000.00	32,000		
550		SUBTOTAL					99,000	
551								
552		***TOTAL - ELECTRICAL***						**$2,519,527**
553								
554								
555	***E10***	***EQUIPMENT***						
556								
557	**E10**	**EQUIPMENT, GENERALLY**						
558		Kitchen Equipment			Included w/ 1980 Addition Kitchen			
559		Residential appliances in Trainer room	**1**	ls	5,000.00	5,000		
560		Loading Dock equipment	**1**	ls	10,000.00	10,000		
561		Gym wall pads	**250**	lf	96.00	24,000		
562		Gymnasium hard panel dividing curtain; electrically operated in Multipurpose room	**1,350**	sf	25.00	33,750		
563		Gymnasium hard panel dividing curtain btwn SPED & Gym; electrically operated in Gymnasium	**3,250**	sf	24.00	78,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW GYMNASIUM						
	Gymnasium fabric dividing curtain; electrically operated in Gymnasium at Track oval	**5,000**	sf	16.00	80,000		
	Gymnasium fabric dividing curtain; electrically operated in Gymnasium	**10,000**	sf	16.00	160,000		
	Adjustable chin up bar	**8**	loc	300.00	2,400		
	Ceiling mounted climbing ropes	**1**	ls	5,000.00	5,000		
	Volley ball standards	**5**	loc	1,500.00	7,500		
	Full pit for long jump & triple jump - allow	**1**	ls	20,000.00	20,000		
	Drop down batting cage - allow	**1**	ls	15,000.00	15,000		
	Shot put cage - allow	**1**	ls	10,000.00	10,000		
	Center Digital 4-sided Scoreboard	**1**	ea	100,000.00	100,000		
	Scoreboard and shot clock	**4**	ea	13,500.00	54,000		
	Basketball backstops; retractable	**10**	ea	10,000.00	100,000		
	Total bleacher capacity is 1200 seats						
	Fixed Telescoping bleachers	**630**	lf	90.00	56,700		
	Moveable Telescoping bleachers	**1,260**	lf	105.00	132,300		
	AV equipment, allow (per quote)						
	Gymnasium	**1**	ls	75,000.00	75,000		
	Wrestling	**1**	ls	20,000.00	20,000		
	Fitness	**1**	ls	20,000.00	20,000		
	Multi-purpose	**1**	ls	20,000.00	20,000		
	Strength	**1**	ls	20,000.00	20,000		
	SUBTOTAL					1,048,650	
	TOTAL - EQUIPMENT						**$1,048,650**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
	Window treatments - allowance	**1**	ls	50,000.00	50,000		
	Recessed entry mats - allow	**250**	sf	55.00	13,750		
	Casework						
	Trainer						
	Base cabinet, counter & wall cabinet	**9**	lf	650.00	5,850		
	3' wide Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Custodial						
	Base cabinet, counter & wall cabinet	**8**	lf	650.00	5,200		
	SUBTOTAL					78,000	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner						
	SUBTOTAL					NIC	
	TOTAL - FURNISHINGS						**$78,000**
F10	***SPECIAL CONSTRUCTION***						
F10	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - SPECIAL CONSTRUCTION						**$0**
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	See main summary for demolition of existing buildings				See Summary		
	SUBTOTAL					$0	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW GYMNASIUM							
625	See main summary for HazMat allowance				See Summary		
626	SUBTOTAL					$0	
627							
628	***TOTAL - SELECTIVE BUILDING DEMOLITION***						**$0**

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CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW FRESHMAN ACADEMY						
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$587,074			
	A1020	Special Foundations	$650,300			
	A1030	Lowest Floor Construction	$543,815	**$1,781,189**	$18.95	6.4%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$4,228,793			
	B1020	Roof Construction	$158,022	**$4,386,815**	$46.68	15.9%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$2,491,515			
	B2020	Windows/Curtainwall	$2,227,350			
	B2030	Exterior Doors	$4,408	**$4,723,273**	$50.26	17.1%
B30	**ROOFING**					
	B3010	Roof Coverings	$513,894			
	B3020	Roof Openings	$0	**$513,894**	$5.47	1.9%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$2,018,140			
	C1020	Interior Doors	$413,550			
	C1030	Specialties/Millwork	$864,566	**$3,296,256**	$35.08	11.9%
C20	**STAIRCASES**					
	C2010	Stair Construction	$268,000			
	C2020	Stair Finishes	$15,380	**$283,380**	$3.02	1.0%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$480,241			
	C3020	Floor Finishes	$577,460			
	C3030	Ceiling Finishes	$678,501	**$1,736,202**	$18.48	6.3%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$225,000	**$225,000**	$2.39	0.8%
D20	**PLUMBING**					
	D20	Plumbing	$1,539,070	**$1,539,070**	$16.38	5.6%
D30	**HVAC**					
	D30	HVAC	$4,002,894	**$4,002,894**	$42.60	14.5%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$466,358	**$466,358**	$4.96	1.7%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$3,065,986	**$3,065,986**	$32.63	11.1%
E10	**EQUIPMENT**					
	E10	Equipment	$267,200	**$267,200**	$2.84	1.0%
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$1,328,728			
	E2020	Movable Furnishings	NIC	**$1,328,728**	$14.14	4.8%

PMC - Project Management Cost

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CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM	*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW FRESHMAN ACADEMY					
F10	**SPECIAL CONSTRUCTION**				
F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**				
F2010	Building Elements Demolition	$0			
F2020	Hazardous Components Abatement	$0	**$0**	$0.00	0.0%
TOTAL DIRECT COST (Trade Costs)			***$27,616,245***	*$293.88*	*100.0%*

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Lowell High School 28-Jan-19
Lowell, MA

Schematic Design Estimate GFA 93,970

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST

NEW FRESHMAN ACADEMY

GROSS FLOOR AREA CALCULATION

First Floor	17,936
Second Floor	19,146
Third floor	19,146
Fourth floor	19,146
Fifth floor	18,596

TOTAL GROSS FLOOR AREA (GFA) **93,970** ***sf***

A10 FOUNDATIONS

A1010 STANDARD FOUNDATIONS

Grade Beams	*186*	*CY*	*$1,339*	
Pile Caps	*271*	*CY*	*$675*	
Slab thickening/ tie-beams	*193*	*CY*	*$300*	
Pilasters	*40*	*CY*	*$750*	
Total Foundation Concrete	*690*	*CY*		
Perimeter Grade Beams; 18"x4'-6"				
Formwork	**5,040**	sf	20.00	100,800
Re-bar, 90#/LF	**50,400**	lbs.	1.32	66,528
Concrete material	**147**	cy	135.00	19,845
Placing concrete	**147**	cy	60.00	8,820
Form shelf	**560**	lf	10.00	5,600
Grade Beam at braced frames; 24"x2'-6"				
Formwork	**1,000**	sf	20.00	20,000
Re-bar, 75#/LF	**15,000**	lbs.	1.32	19,800
Concrete material	**39**	cy	135.00	5,265
Placing concrete	**39**	cy	60.00	2,340
Pile caps (3 pile)	**23**	ea		
Formwork	**2,392**	sf	22.00	52,624
Re-bar	**8,740**	lbs.	1.32	11,537
Concrete material	**150**	cy	135.00	20,250
Placing concrete	**150**	cy	60.00	9,000
Pile caps (2 pile)	**17**	ea		
Formwork	**1,632**	sf	22.00	35,904
Re-bar	**8,550**	lbs.	1.32	11,286
Concrete material	**95**	cy	135.00	12,825
Placing concrete	**95**	cy	60.00	5,700
Slab thickening at individual piles	**13**	ea		
Formwork	**780**	sf	22.00	17,160
Re-bar	**1,170**	lbs.	1.32	1,544
Concrete material	**26**	cy	135.00	3,510
Placing concrete	**26**	cy	60.00	1,560
Slab thickening to tie typical pile caps				
Slab thickening	**193**	cy	300.00	57,900
Pilaster at perimeter columns; 24" x24"				
Pilasters, 24"x24", complete	**40**	cy	750.00	30,000
Elevator pit;				
12" walls	**9**	cy	750.00	6,750
18" Mat slab	**100**	sf	25.00	2,500
070001 WATERPROOFING, DAMPPROOFING AND CAULKING				
Troweled-on bituminous mastic at perimeter grade beam	**2,520**	sf	3.00	NR
Waterproofing at elevator pit wall and slab	**340**	sf	10.00	3,400
072100 THERMAL INSULATION				
2" Insulation to grade beams	**2,520**	sf	3.00	7,560

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW FRESHMAN ACADEMY							
312000	*EARTHWORK*						
	Elevator pit						
	Excavation	**67**	cy	15.00	1,005		
	Remove off site	**67**	cy	16.00	1,072		
	Backfill with existing material	**45**	cy	12.00	540		
	Grade Beams						
	Excavation	**326**	cy	15.00	4,890		
	Remove off site	**186**	cy	16.00	2,976		
	Backfill with existing material	**140**	cy	12.00	1,680		
	Pile caps						
	Excavation	**812**	cy	15.00	12,180		
	Remove off site	**271**	cy	16.00	4,336		
	Backfill with existing material	**541**	cy	12.00	6,492		
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**183**	tns	65.00	11,895		
	Miscellaneous						
	Dewatering				NR		
	SUBTOTAL					587,074	
A1020	**SPECIAL FOUNDATIONS**	Average pile length 45' per Geo-tech Report dated 3.28.18 (page 13) Borings B101-B105					
	Mobilization	**1**	ls	50,000.00	50,000		
	Load test	**1**	ls	30,000.00	Included elsewhere		
	95 Ton, Conical point pile	**4,635**	vlf	115.00	533,025		
	95 Ton, Conical point pile at intermediate slab supports	**585**	vlf	115.00	67,275		
	SUBTOTAL					650,300	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	Fill to make up levels Elev. 36' (current Elev 33')						
	Structural fill at demolished Fieldhouse basement	**1,296**	cy	38.00	49,248		
	Structural fill to make up levels at new slab on grade	777	cy	38.00	29,526		
	Structural; Slab on grade, 10" thick						
	Rough grading of building pad	**17,936**	sf	1.00	17,936		
	Gravel fill, assume 12"	**664**	cy	40.00	26,560		
	4" Rigid insulation	**17,936**	sf	4.00	71,744		
	Vapor barrier	**17,936**	sf	1.00	17,936		
	Compact existing sub-grade	**17,936**	sf	0.50	8,968		
	Formwork	**560**	sf	12.00	6,720		
	Rebar; 7 lbs/sf	**125,552**	lbs	1.32	165,729		
	Concrete - 10" thick	**579**	cy	125.00	72,375		
	Placing concrete	**579**	cy	45.00	26,055		
	Finishing and curing concrete	**17,936**	sf	1.50	26,904		
	Barrier I	**579**	cy	60.00	NR		
	Control joints - saw cut	**17,936**	sf	0.10	1,794		
	Perimeter drain	**560**	lf	22.00	12,320		
	Miscellaneous						
	Equipment pads	**1**	ls	10,000.00	10,000		
	SUBTOTAL					543,815	
	TOTAL - FOUNDATIONS						**$1,781,189**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW FRESHMAN ACADEMY							
	No items in this section						
	SUBTOTAL					0	
A2020	**BASEMENT WALLS**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - BASEMENT CONSTRUCTION						**$0**
B10	***SUPERSTRUCTURE***						
		16.71	lbs/sf				
B1010	**FLOOR CONSTRUCTION**	785	tns				
	Floor Structure - Steel:						
	Steel beams, columns & braced frames	**785**	tns	3,750.00	2,943,750		
	Premium for HSS	**196**	tns	300.00	58,800		
	Shear studs	**19,009**	ea	2.50	47,523		
	Floor Structure						
	2" 18 Ga. Metal galvanized floor deck	**76,034**	sf	3.75	285,128		
	WWF reinforcement	**87,439**	sf	1.10	96,183		
	Concrete Fill to metal deck; Normal Weight, 5-1/2"	**1,354**	cy	137.50	186,175		
	Place and finish concrete	**76,034**	sf	3.00	228,102		
	Rebar to decks at openings/edges	**22,810**	lbs	1.32	30,109		
	Barrier I	**1,354**	cy	60.00	NR		
	Miscellaneous						
	Allowance for expansion/ seismic joints	**1**	ls	50,000.00	50,000		
	1hr Fire proofing to columns and beams (at Type IIA Construction)	**76,034**	sf	2.00	152,068		
	Intumescent paint	**1**	ls		Not anticipated		
	Fire stopping floors	**1**	ls	10,000.00	10,000		
	Miscellaneous metals throughout building	**93,970**	gsf	1.50	140,955		
	SUBTOTAL					4,228,793	
B1020	**ROOF CONSTRUCTION**						
	Roof Structure	Included w/ floor framing tonnage					
	Canopy framing				Included w/ Gym		
	Decking						
	Metal roof decking; 1 1/2"	**19,146**	sf	4.00	76,584		
	5" Normal weight concrete fill at mechanical equipment (F1)	**3,200**	sf	7.50	24,000		
	Miscellaneous						
	Support framing to roof screen (365')				included in Tonnage		
	Canopy framing				included w/ Gymnasium		
	1hr Fire proofing to deck, columns and beams (at Type IIA Construction)	**19,146**	sf	3.00	57,438		
	SUBTOTAL					158,022	
	TOTAL - SUPERSTRUCTURE						**$4,386,815**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**	*45,500*	sf	TOTAL AREA			
	Exterior Wall Area - Solid	*29,900*	sf				
042000	*MASONRY*						
	Polished Finished CMU base	**2,240**	sf	28.00	62,720		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW FRESHMAN ACADEMY							
	Brick veneer, jumbo	**27,660**	sf	34.00	940,440		
	Brick veneer at overhang columns	**1,044**	sf	35.00	36,540		
	8" CMU backup at stairwells	**4,337**	sf	22.00	95,414		
	Staging to exterior wall	**45,500**	sf		Included		
055000	*MISC. METALS*						
	Seismic clips to CMU	**75**	ea	140.00	10,500		
	Miscellaneous metals to CMU	**4,337**	sf	1.50	6,506		
	Allowance for loose lintels, relieving angles etc.	**45,500**	sf	1.50	68,250		
	Building Signage; 24" high Letters "LHS FRESHMAN ACADEMY"	**1**	ls	10,000.00	10,000		
	Building Signage; Metal School Logo	**1**	ea	10,000.00	10,000		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Air barrier	**29,900**	sf	7.00	209,300		
	Air barrier/flashing at openings	**3,800**	lf	6.25	23,750		
	Miscellaneous sealants to closure	**45,500**	sf	1.00	45,500		
072100	*THERMAL INSULATION*						
	6" Rockwall insulation	**29,900**	sf	4.00	119,600		
076400	*CLADDING*						
	Roof screen	**365**	lf	600.00	219,000		
	Overhang at 3rd floor & roof level - linear metal soffit	**2,070**	sf	60.00	124,200		
092900	*GYPSUM BOARD ASSEMBLIES*						
	8" metal stud backup	**29,900**	sf	11.00	328,900		
	Gypsum Sheathing	**29,900**	sf	2.75	82,225		
	Drywall lining to interior face of stud backup	**29,900**	sf	3.30	98,670		
	SUBTOTAL					2,491,515	
B2020	**WINDOWS**						
	Exterior Wall Area - Glazed	*15,600*	sf				
	All Exterior glazing is double glazed						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**3,800**	lf	8.00	30,400		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**3,800**	lf	9.00	34,200		
080001	*METAL WINDOWS*						
	Curtainwall, Kawneer 5600 or equal, custom color	**15,600**	sf	125.00	1,950,000		
	Premium for spandrel panel	**3,130**	sf	15.00	46,950		
	Sunshades; horizontal at South	**530**	lf	220.00	116,600		
	Sunshades; vertical at West	**190**	lf	180.00	34,200		
089000	*LOUVERS*						
	Louvers - allow	**200**	sf	75.00	15,000		
	SUBTOTAL					2,227,350	
B2030	**EXTERIOR DOORS**						
	HM doors, frames and hardware- single	**2**	ea	2,000.00	4,000		
	Backer rod & double sealant	**34**	lf	9.00	306		
	Wood blocking at openings	**34**	lf	3.00	102		
	SUBTOTAL					4,408	
	TOTAL - EXTERIOR CLOSURE						**$4,723,273**

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW FRESHMAN ACADEMY							
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Low slope, Fully adhered TPO membrane roofing, complete	**19,776**	sf	18.00	355,968		
	Metal coping/fascia	**700**	lf	45.00	31,500		
	Walkway pads; allowance	**1**	ls	25,000.00	25,000		
	Miscellaneous roof flashings	**19,776**	sf	1.00	19,776		
	Roof blocking	**4,200**	lf	12.00	50,400		
	Roof accessories; ladders, hatches etc.	**1**	ls	20,000.00	20,000		
	Overhang - fascia & flashings	**150**	lf	75.00	11,250		
	SUBTOTAL					513,894	
B3020	**ROOF OPENINGS**						
	Skylights, allow				NR		
	SUBTOTAL					0	
	TOTAL - ROOFING						**$513,894**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
	CMU Partitions						
	4" CMU partitions	**5,872**	sf	20.00	117,440		
	8" CMU partitions	**23,697**	sf	22.00	521,334		
	8" CMU partition at elevator shaft	**3,138**	sf	25.00	78,450		
	Premium for Polished GF CMU to 5'-4" in corridors	**2,399**	sf	4.00	9,596		
	Seismic clips to CMU	**588**	ea	140.00	82,320		
	Miscellaneous metals to CMU	**32,707**	sf	1.50	49,061		
	GWB Partitions						
	Typical interior partition; 6" Metal stud w/ 2 layers 5/8" gwb both sides	**48,124**	sf	15.50	745,922		
	Allowance for column covers	**5,706**	sf	12.00	68,472		
	Rough blocking to partitions	**3,700**	lf	4.00	14,800		
	Sealants & caulking at partitions	**93,970**	gsf	1.00	93,970		
	Glazed Partitions						
	Glazed walls/borrowed lights - allowance at Career/ Retail & Marketing spaces	**93,970**	gsf	1.00	93,970		
	Interior glazing between classrooms; assume 7' high	**725**	sf	85.00	61,625		
	Interior storefront at Stair A	**108**	sf	85.00	9,180		
	Solid glass guardrail around Media wall - level 1	**35**	lf	600.00	21,000		
	Operable Partitions						
	Support framing for operable walls	**60**	lf	130.00	7,800		
	Manual, operable partition in Fundamentals	**60**	lf	720.00	43,200		
	SUBTOTAL					2,018,140	
C1020	**INTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door	**1**	pr	8,500.00	8,500		
	Single leaf door, frame & hardware	**105**	ea	2,000.00	210,000		
	Double leaf door, frame & hardware; Corridor/ Stairs	**14**	pr	3,900.00	54,600		
	Double leaf door, frame & hardware; Electrical & Janitor closets	**11**	pr	3,600.00	39,600		
	3'-0" wide sidelight at classroom/TP entry	**64**	ea	1,260.00	80,640		
	Premium for specialty hardware, fire rated doors, vision lites etc.	**1**	ls	15,210.00	15,210		
	Access doors	**1**	ls	5,000.00	5,000		
	SUBTOTAL					413,550	
C1030	**SPECIALTIES / MILLWORK**						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW FRESHMAN ACADEMY						
	Backer panels in electrical closets	**1**	ls	2,000.00	2,000		
	Marker boards						
	Typical Classrooms	**3,960**	sf	22.00	87,120		
	Engineering, Robotics, Autism, Fundamentals etc.	**1,320**	sf	22.00	29,040		
	Teacher Planning	**64**	sf	22.00	1,408		
	Science classrooms	**384**	sf	22.00	8,448		
	Corridors/Flex spaces - allow	**4**	flrs	10,000.00	40,000		
	Tack boards						
	Typical Classrooms	**2,640**	sf	20.00	52,800		
	Engineering, Robotics, Autism, Fundamentals etc.	**880**	sf	20.00	17,600		
	Teacher Planning	**64**	sf	20.00	1,280		
	Science classrooms	**256**	sf	20.00	5,120		
	Corridors/Flex spaces - allow	**4**	flrs	3,000.00	12,000		
	Gang bathroom accessories	**10**	rms	3,150.00	31,500		
	Single bathroom accessories	**14**	rms	1,500.00	21,000		
	Janitors closet accessories	**5**	rms	300.00	1,500		
	HDPE Toilet Partitions - hcap	**10**	ea	1,800.00	18,000		
	HDPE Toilet Partitions - typical	**22**	ea	1,600.00	35,200		
	HDPE Toilet Partitions - urinal screens	**8**	ea	650.00	5,200		
	2-tier metal student lockers 18" x 15" x 48" h	**646**	opes	190.00	122,740		
	Code compliant signage	**93,970**	gsf	0.35	32,890		
	Room signage	**130**	ea	100.00	13,000		
	Dedication Plaque. 18"x24"	**1**	ea	2,000.00	2,000		
	Interior brushed aluminum stand-off lettering, 8" high	**4**	loc	5,000.00	20,000		
	Window sills - plam	**1,300**	lf	35.00	45,500		
	7' x 18" Lighted Display cases (per spec)	**72**	lf	540.00	38,880		
	Built-in corridor benches (per spec)	**50**	lf	400.00	20,000		
	Fire Extinguisher cabinets	**31**	ea	400.00	12,400		
	Allowance for miscellaneous specialties; wall protection etc.	**93,970**	gsf	0.50	46,985		
	Rough blocking throughout	**93,970**	gsf	0.50	46,985		
	Miscellaneous sealants throughout building	**93,970**	gsf	1.00	93,970		
	SUBTOTAL					864,566	
	TOTAL - INTERIOR CONSTRUCTION						**$3,296,256**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
	Metal pan stair; egress stair	**4**	flt	25,000.00	100,000		
	Metal pan stair; egress stair, square	**5**	flt	30,000.00	150,000		
	Concrete fill to stairs	**9**	flt	2,000.00	18,000		
	SUBTOTAL					268,000	
C2020	**STAIR FINISHES**						
	High performance coating to stairs including all railings etc.	**9**	flt		NR		
	Concrete sealer at stairs - landings	**1,870**	sf	2.00	3,740		
	Norament treads at stairs - treads & risers	**776**	lft	15.00	11,640		
	SUBTOTAL					15,380	
	TOTAL - STAIRCASES						**$283,380**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
	Paint CMU walls	**66,140**	sf	1.30	85,982		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW FRESHMAN ACADEMY							
	Paint to GWB walls	**131,854**	sf	1.00	131,854		
	2 5/8" Polished CMU wainscot corridor side, 5'-4" high	**3,864**	sf	30.00	115,920		
	Painted hardwood cap at CMU/GWB transition in corridors	**725**	lf	20.00	14,500		
	Film applied Logos/Letters - allowance	**1**	ls	10,000.00	10,000		
	Allowance for miscellaneous wall finishes not yet depicted; vinyl wall coverings, acoustic panels, wood paneling etc.	**1**	ls	75,000.00	75,000		
	Miscellaneous touch-up painting	**93,970**	gsf	0.50	46,985		
	SUBTOTAL					480,241	
C3020	**FLOOR FINISHES**						
	2mm Linoleum tile flooring	**81,700**	sf	6.00	490,200		
	Poured epoxy at bathrooms & BOH spaces	**3,575**	sf	12.00	42,900		
	Integral epoxy base	**1,400**	lf	10.00	14,000		
	Rubber base	**10,120**	lf	3.00	30,360		
	Moisture mitigation	**81,700**	sf	3.00	NR		
	SUBTOTAL					577,460	
C3030	**CEILING FINISHES**						
	2' x 4' ACT 1	**80,419**	sf	5.50	442,305		
	Premium for sloped ACT in classrooms; 8'-8" to 10'-8"	**42,300**	sf	1.00	42,300		
	GWB ceilings, MR	**3,075**	sf	14.00	43,050		
	GWB soffits in corridors (15%)	**2,051**	sf	25.00	51,275		
	Paint GWB ceilings	**5,126**	sf	0.80	4,101		
	Paint exposed ceilings	**500**	sf	3.00	1,500		
	Allowance for GWB soffits throughout	**93,970**	gsf	1.00	93,970		
	SUBTOTAL					678,501	
	TOTAL - INTERIOR FINISHES						**$1,736,202**
D10	***CONVEYING SYSTEMS***						
D1010	**ELEVATOR**						
	Elevator; 2500lbs, 5 stop	**1**	ea	225,000.00	225,000		
	SUBTOTAL					225,000	
	TOTAL - CONVEYING SYSTEMS						**$225,000**
D20	***PLUMBING***						
D20	**PLUMBING, GENERALLY**						
	Freshman building contains science rooms & classrooms						
	Acid waste neutralizer tank	**1**	ea	30,000.00	30,000		
	Plumbing equipment	**93,970**	sf	1.75	164,448		
	Water closet	**46**	ea	1,400.00	64,400		
	Lavatory	**44**	ea	1,000.00	44,000		
	Urinal	**8**	ea	1,600.00	12,800		
	Miscellaneous plumbing fixtures; science room sinks, drinking fountains etc.	**93,970**	sf	2.00	187,940		
	Domestic water pipe with fittings & hangers	**93,970**	sf	2.75	258,418		
	Domestic water pipe insulation	**93,970**	sf	1.55	145,654		
	Sanitary waste pipe with fittings & hangers	**93,970**	sf	2.50	234,925		
	Tempered water pipe with fittings & hangers	**93,970**	sf	0.25	23,493		
	Acid waste pipe with fittings & hangers	**93,970**	sf	1.25	117,463		
	Storm water pipe with fittings & hangers	**93,970**	sf	1.00	93,970		
	Gas pipe with fittings & hangers	**93,970**	sf	0.75	70,478		
	Demolition/phasing	**1**	ls	30,000.00	30,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW FRESHMAN ACADEMY						
	Miscellaneous	**93,970**	sf	0.65	61,081		
	SUBTOTAL					1,539,070	
	TOTAL - PLUMBING						**$1,539,070**
	D30 HVAC						
D30	**HVAC, GENERALLY**						
	Freshman building contains science rooms & classrooms						
	Green house heating & ventilation	**1**	ls	10,000.00	10,000		
	AHU with HW, CHW coil & ERW classrooms	**54,000**	cfm	15.00	810,000		
	Add for HVAC upgrades to facilitate double glazed windows in lieu of triple glazed	**1**	ls	300,000.00	300,000		
	Miscellaneous air distribution equipment	**93,970**	sf	2.50	234,925		
	Hot water piping with fittings & hangers	**93,970**	sf	3.50	328,895		
	Chilled water piping with fittings & hangers	**93,970**	sf	2.00	187,940		
	Condenser water piping with fittings & hangers	**93,970**	sf	0.50	46,985		
	Pipe insulation	**93,970**	sf	2.50	234,925		
	Sheet metal & accessories	**93,970**	sf	10.50	986,685		
	Stainless steel ductwork	**12,000**	lbs	not required w/ ductless fume hood			
	Automatic temperature controls DDC	**93,970**	sf	6.30	592,011		
	System testing & balancing	**93,970**	sf	1.00	93,970		
	Demolition	**1**	ls	45,000.00	45,000		
	Miscellaneous	**93,970**	sf	1.40	131,558		
	SUBTOTAL					4,002,894	
	TOTAL - HVAC						**$4,002,894**
	D40 FIRE PROTECTION						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system	**93,970**	sf	4.75	446,358		
	Demolition/phasing	**1**	ls	20,000.00	20,000		
	SUBTOTAL					466,358	
	TOTAL - FIRE PROTECTION						**$466,358**
	D50 ELECTRICAL						
D50	**ELECTRICAL, GENERALLY**						
	Gear & Distribution						
	Normal						
	Associated panelboards and feeders	**93,970**	sf	2.50	234,925		
	Emergency						
	Associated ATS's, panelboards and feeders	**93,970**	sf	1.00	93,970		
	Equipment Wiring						
	Equipment wiring feed and connections	**93,970**	sf	1.75	164,448		
	AHU feed and connection	**3**	ea	4,500.00	13,500		
	Aluminum buses to switchboards and panelboards in lieu of copper - credit	**1**	ls	(10,000.00)	(10,000)		
	SUBTOTAL					496,843	
D5020	**LIGHTING & POWER**						
	Lighting fixture with installation labor:						
	LC4	**8**	ea	300.00	2,400		
	LC6	**8**	ea	450.00	3,600		
	LC8	**28**	ea	600.00	16,800		
	LP8	**246**	ea	640.00	157,440		
	LR8	**30**	ea	600.00	18,000		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW FRESHMAN ACADEMY						
456		LS8B	**16**	ea	500.00	8,000		
457		SL3	**3**	ea	600.00	1,800		
458		SL4	**1**	ea	600.00	600		
459		Credit for corridor fixtures - target price ($450, installed)	**128**	ea	(150.00)	(19,200)		
460		Lighting fixtures not yet detailed, allow	**93,970**	sf	3.75	352,388		
461		Emergency/egress lighting	**93,970**	sf	0.50	46,985		
462		Lighting to exterior	**1**	ls	5,000.00	5,000		
463		Lighting controls						
464		Automated lighting controls system	**93,970**	sf	1.25	117,463		
465		Single pole LV switch	**55**	ea	65.00	3,575		
466		Occupancy sensor	**79**	ea	220.00	17,380		
467		Photo sensor	**55**	ea	220.00	12,100		
468		Branch devices						
469		Duplex receptacle	**265**	ea	20.00	5,300		
470		Double duplex receptacle	**205**	ea	40.00	8,200		
471		GFI duplex receptacle	**8**	ea	35.00	280		
472		Connection to hand dryer	**8**	ea	100.00	800		
473		Branch devices not yet detailed	**93,970**	sf	0.45	42,287		
474		Lighting and branch circuitry						
475		Branch circuitry	**93,970**	sf	6.00	563,820		
476		SUBTOTAL					1,365,018	
477								
478	**D5030**	**COMMUNICATION & SECURITY SYSTEMS**						
479		Fire Alarm						
480		Make connections at new control panel	**1**	ls	3,500.00	3,500		
481		Manual pull station	**9**	ea	100.00	900		
482		Smoke detector	**10**	ea	130.00	1,300		
483		Audio visual device	**55**	ea	135.00	7,425		
484		Visual device	**8**	ea	115.00	920		
485		Magnetic door holder	**16**	ea	172.00	2,752		
486		Fire alarm circuitry	**93,970**	sf	0.75	70,478		
487		Fire alarm not yet detailed (Including Mass. Notification)	**93,970**	sf	1.75	164,448		
488		BDA/DAS system	**1**	ls	45,000.00	45,000		
489		Telephone/Data/CATV						
490		IDF closet	**1**	ls	4,500.00	4,500		
491		Devices and cabling:						
492		1 port	**51**	ea	18.00	918		
493		2 port	**153**	ea	36.00	5,508		
494		TVE	**51**	ea	54.00	2,754		
495		WAP	**58**	ea	350.00	20,300		
496		Rough-in:						
497		IDF	**3**	ea	2,000.00	6,000		
498		Cable tray	**50**	lf	50.00	2,500		
499		Backboard	**3**	ea	500.00	1,500		
500		Closet grounding	**3**	ea	500.00	1,500		
501		Device box with conduit stub	**313**	ea	84.00	26,292		
502		Telecom scope not yet detailed	**93,970**	sf	2.20	206,734		
503		Two Way Communications System						
504		Elevator lobby two way communication system	**1**	ls	15,000.00	15,000		
505		Clock/PA System						
506		Make connections at existing Head end	**1**	ls	3,500.00	3,500		
507		Devices and cabling						
508		Clock	**51**	ea	120.00	6,120		
509		Speaker	**77**	ea	150.00	11,550		
510		Cabling	**8,000**	lf	2.00	16,000		
511		Devices and cabling not yet detailed	**93,970**	sf	0.20	18,794		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW FRESHMAN ACADEMY						
	Rough-in	**93,970**	sf	0.20	18,794		
	AV						
	AV equipment provided by others				See Equip		
	Rough-in only	**93,970**	sf	0.25	23,493		
	Security System (Rough-in only)						
	Head end	**1**	ls	5,000.00	5,000		
	Devices and cabling						
	CCTV site cameras - allow	**1**	ls	15,000.00	15,000		
	CCTV camera	**27**	ea	850.00	22,950		
	Card reader	**5**	ea	350.00	1,750		
	Additional card readers	**15**	ea	2,000.00	30,000		
	Door contact	**6**	ea	120.00	720		
	Door junction box	**5**	ea	65.00	325		
	Electric hinge connection	**5**	ea	65.00	325		
	Electric lock	**5**	ea	120.00	600		
	Motion detector	**7**	ea	150.00	1,050		
	Power transfer device	**5**	ea	150.00	750		
	Request to exit	**5**	ea	150.00	750		
	Cabling	**7,000**	lf	2.00	14,000		
	Devices and cabling not yet detailed	**93,970**	sf	1.50	140,955		
	Rough-in	**93,970**	sf	1.00	93,970		
	SUBTOTAL					1,016,625	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Lightning protection	**1**	ls	40,000.00	40,000		
	Miscellaneous						
	Demolition/phasing	**1**	ls	60,000.00	60,000		
	Temp power & lights	**1**	ls	50,000.00	50,000		
	Permits and fees	**1**	ls	37,500.00	37,500		
	SUBTOTAL					187,500	
	TOTAL - ELECTRICAL						**$3,065,986**
E10	***EQUIPMENT***						
E10	**EQUIPMENT, GENERALLY**						
	Double sided Fume Hood (Ductless)	**8**	ea	24,000.00	192,000		
	Pegboard	**24**	ea	500.00	12,000		
	Goggle cabinet	**11**	ea	200.00	2,200		
	Acid/ Flammable cabinet	**8**	ea	2,000.00	16,000		
	Residential Appliances	**1**	ls	10,000.00	10,000		
	AV equipment, allow (per quote)						
	Outdoor Quad	**1**	ls	35,000.00	35,000		
	SUBTOTAL					267,200	
	TOTAL - EQUIPMENT						**$267,200**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
	Rolling mesh shades at exterior windows in non circulation spaces	**10,654**	sf	7.00	74,578		
	Casework						
	Light shelves at South facing windows	**530**	lf	90.00	47,700		
	Engineering	**1**	ea				
	Base cabinets with solid surface countertop	**16**	lf	425.00	6,800		
	Upper cabinets	**16**	lf	225.00	3,600		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Robotics	**1**	ea				

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW FRESHMAN ACADEMY						
	Base cabinets with solid surface countertop	**24**	lf	425.00	10,200		
	Upper cabinets	**24**	lf	225.00	5,400		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Maker	**1**	ea				
	Base cabinets with solid surface countertop	**30**	lf	425.00	12,750		
	Upper cabinets	**30**	lf	225.00	6,750		
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Work bench & Tool storage cabinets				assume FF+E		
	Retail	**1**	ea				
	Base cabinets with solid surface countertop	**10**	lf	425.00	4,250		
	Upper cabinets	**10**	lf	225.00	2,250		
	Cashier counter	**15**	lf	750.00	11,250		
	Store shelving				assume FF+E		
	Marketing	**1**	ea				
	Base cabinets with solid surface countertop	**18**	lf	425.00	7,650		
	Upper cabinets	**18**	lf	225.00	4,050		
	Tall storage cabinet	**4**	ea	1,600.00	6,400		
	Trio	**1**	ea				
	Tall storage cabinet	**2**	ea	1,600.00	3,200		
	Teacher Planning	**4**	ea				
	Work counter - solid surface	**180**	lf	225.00	40,500		
	Shelving above	**180**	lf	150.00	27,000		
	Tall storage cabinet	**4**	ea	1,600.00	6,400		
	Adjustments Classrooms	**2**	ea				
	Tall storage cabinet	**8**	ea	1,600.00	12,800		
	Fundamentals	**2**	ea				
	Tall storage cabinet	**8**	ea	1,600.00	12,800		
	Autism Classrooms	**2**	ea				
	Base cabinets with solid surface countertop	**20**	lf	425.00	8,500		
	Upper cabinets	**20**	lf	225.00	4,500		
	Tall storage cabinet	**6**	ea	1,600.00	9,600		
	Typical Classrooms	**33**	ea				
	Base cabinets with solid surface countertop and WB storage above	**264**	lf	675.00	178,200		
	Tall storage cabinet	**66**	ea	1,600.00	105,600		
	Science Classrooms	**8**	ea				
	Base cabinets with epoxy resin countertop along window	**264**	lf	500.00	132,000		
	Base cabinets with epoxy resin countertop and WB storage above	**64**	lf	750.00	48,000		
	Base cabinets with epoxy resin countertop & wall cabinet/shelving	**240**	lf	725.00	174,000		
	Tall storage cabinet	**16**	ea	1,600.00	25,600		
	Student tables; mobile epoxy top tables, 12 per room	**96**	ea	2,800.00	268,800		
	Science Prep rooms	**4**	ea				
	Base cabinets with epoxy resin countertop & wall cabinet/shelving	**80**	lf	725.00	58,000		
	SUBTOTAL					1,328,728	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner						
	SUBTOTAL					NIC	
	TOTAL - FURNISHINGS						**$1,328,728**
F10	***SPECIAL CONSTRUCTION***						
F10	**SPECIAL CONSTRUCTION**						
	No items in this section						

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 93,970

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW FRESHMAN ACADEMY						
	SUBTOTAL					0	
	TOTAL - SPECIAL CONSTRUCTION						**$0**
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	See main summary for demolition of existing buildings				See Summary		
	SUBTOTAL					0	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	See main summary for HazMat allowance				See Summary		
	SUBTOTAL					$0	
	TOTAL - SELECTIVE BUILDING DEMOLITION						**$0**

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Lowell High School 20-Apr-18
Lowell, MA

PSR Pricing Options GFA 4,556

CONSTRUCTION COST SUMMARY

NEW BRIDGES (2 QTY)

	BUILDING SYSTEM		SUB-TOTAL	TOTAL	$/SF	%
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$51,951			
	A1020	Special Foundations	$215,600			
	A1030	Lowest Floor Construction	$0	**$267,551**	$58.72	7.5%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$1,126,086			
	B1020	Roof Construction	$18,224	**$1,144,310**	$251.17	31.9%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$302,760			
	B2020	Windows/Curtainwall	$1,166,818			
	B2030	Exterior Doors	$0	**$1,469,578**	$322.56	41.0%
B30	**ROOFING**					
	B3010	Roof Coverings	$143,508			
	B3020	Roof Openings	$0	**$143,508**	$31.50	4.0%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$0			
	C1020	Interior Doors	$17,000			
	C1030	Specialties/Millwork	$147,778	**$164,778**	$36.17	4.6%
C20	**STAIRCASES**					
	C2010	Stair Construction	$0			
	C2020	Stair Finishes	$0	**$0**	$0.00	0.0%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$22,780			
	C3020	Floor Finishes	$25,200			
	C3030	Ceiling Finishes	$127,050	**$175,030**	$38.42	4.9%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$0	**$0**	$0.00	0.0%
D20	**PLUMBING**					
	D20	Plumbing	$0	**$0**	$0.00	0.0%
D30	**HVAC**					
	D30	HVAC	$105,927	**$105,927**	$23.25	3.0%
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$20,502	**$20,502**	$4.50	0.6%
D50	**ELECTRICAL**					
	D5010	Electrical Systems	$95,898	**$95,898**	$21.05	2.7%
E10	**EQUIPMENT**					
	E10	Equipment	$0	**$0**	$0.00	0.0%

Lowell High School 20-Apr-18
Lowell, MA

PSR Pricing Options GFA 4,556

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM			*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW BRIDGES (2 QTY)						
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$0			
	E2020	Movable Furnishings	NIC	**$0**	$0.00	0.0%
F10	**SPECIAL CONSTRUCTION**					
	F10	Special Construction	$0	**$0**	$0.00	0.0%
F20	**SELECTIVE BUILDING DEMOLITION**					
	F2010	Building Elements Demolition	$0			
	F2020	Hazardous Components Abatement	$0	**$0**	$0.00	0.0%
TOTAL DIRECT COST (Trade Costs)				**$3,587,082**	$787.33	100.0%

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 4,556

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW BRIDGES (2 QTY)							
	GROSS FLOOR AREA CALCULATION						
	Second Floor			4,556			
	TOTAL GROSS FLOOR AREA (GFA)				**4,556** ***sf***		
A10	***FOUNDATIONS***						
A1010	**STANDARD FOUNDATIONS**						
033000	*CONCRETE*						
	8'x16'x3' Concrete mat slab	**4**	ea				
	Formwork	**576**	sf	22.00	12,672		
	Re-bar	**16,000**	lbs.	1.32	21,120		
	Concrete material	**60**	cy	135.00	8,100		
	Placing concrete	**60**	cy	60.00	3,600		
312000	*EARTHWORK*						
	Mat slab						
	Excavation	**105**	cy	15.00	1,575		
	Remove off site	**79**	cy	16.00	1,264		
	Backfill with imported material	**26**	cy	30.00	780		
	Gravel base at mat slabs	**19**	cy	40.00	760		
	Soil disposal premiums						
	Premium for disposal of contaminated soil; assume 25% of volume	**32**	tns	65.00	2,080		
	SUBTOTAL					51,951	
A1020	**SPECIAL FOUNDATIONS**	Average pile length 45' long per Geotech pg13 (Borings B106-B109)					
	Mobilization	**1**	ls	50,000.00	50,000		
	Load test	**1**	ls	30,000.00	Included		
	(8) 95 Ton, Conical point piles	**1,440**	lf	115.00	165,600		
	SUBTOTAL					215,600	
A1030	**LOWEST FLOOR CONSTRUCTION**						
	No Work in this section						
	SUBTOTAL					0	
	TOTAL - FOUNDATIONS						**$267,551**
A20	***BASEMENT CONSTRUCTION***						
A2010	**BASEMENT EXCAVATION**						
	No Work in this section						
	SUBTOTAL					0	
A2020	**BASEMENT WALLS**						
	No Work in this section						
	SUBTOTAL					0	
	TOTAL - BASEMENT CONSTRUCTION						**$0**
B10	***SUPERSTRUCTURE***						
		53	lbs/sf				
B1010	**FLOOR CONSTRUCTION**	120	tns				
	Concrete support columns at bridges, exposed, sealed (4 qty) - allow	**4**	ea	18,000.00	72,000		

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 4,556

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW BRIDGES (2 QTY)							
	Floor Structure - Steel:						
	Steel beams and columns	**120**	tns	7,500.00	900,000		
	Shear studs	**1,139**	ea	2.50	2,848		
	Floor Structure						
	2" 18 Ga. Metal galvanized floor deck	**4,556**	sf	3.75	17,085		
	WWF reinforcement	**5,239**	sf	1.10	5,763		
	Concrete Fill to metal deck; Normal Weight, 5-1/2"	**81**	cy	137.50	11,138		
	Place and finish concrete	**4,556**	sf	3.00	13,668		
	Rebar to decks at openings/edges	**1,367**	lbs	1.32	1,804		
	Barrier I	**81**	cy	60.00	NR		
	Miscellaneous						
	Allowance for expansion/ seismic joints	**1**	ls	50,000.00	50,000		
	Framing at new opes/ bridge connections	**4**	loc	6,000.00	24,000		
	Fire proofing to columns and beams				NR		
	Intumescent paint	**1**	ls	25,000.00	NR		
	Fire stopping floors	**1**	ls	5,000.00	5,000		
	Miscellaneous metals throughout building	**4,556**	sf	5.00	22,780		
	SUBTOTAL					1,126,086	
B1020	**ROOF CONSTRUCTION**						
	Roof Structure	Included w/ floor framing tonnage					
	Decking						
	Metal roof decking; 1 1/2"	**4,556**	sf	4.00	18,224		
	Fire proofing to columns, beams & decking				NR		
	SUBTOTAL					18,224	
	TOTAL - SUPERSTRUCTURE						**$1,144,310**
B20	***EXTERIOR CLOSURE***						
B2010	**EXTERIOR WALLS**	*9,800*	sf	TOTAL AREA			
	Exterior Wall Area - Solid		sf				
042000	*MASONRY*						
	No items in this section						
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Miscellaneous sealants to closure	**9,800**	sf	3.00	29,400		
072100	*THERMAL INSULATION*						
076400	*CLADDING*						
	Linear metal soffit	**4,556**	sf	60.00	273,360		
092900	*GYPSUM BOARD ASSEMBLIES*						
	SUBTOTAL					302,760	
B2020	**WINDOWS**						
	Exterior Wall Area - Glazed	*9,100*	sf				
	All Exterior glazing is double glazed						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**1,504**	lf	8.00	12,032		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW BRIDGES (2 QTY)							
	Backer rod & double sealant	**1,504**	lf	9.00	13,536		
080001	*METAL WINDOWS*						
	Curtainwall, Kawneer 5600 or equal, custom color	**9,100**	sf	125.00	1,137,500		
089000	*LOUVERS*						
	Louvers	**50**	sf	75.00	3,750		
	SUBTOTAL					1,166,818	
B2030	**EXTERIOR DOORS**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - EXTERIOR CLOSURE						**$1,469,578**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**						
	Low slope, Fully adhered TPO membrane roofing, complete	**4,556**	sf	18.00	82,008		
	Coping system	**700**	lf	45.00	31,500		
	Soffit			included with closure cladding			
	Allowance for roof drainage	**1**	ls	30,000	30,000		
	SUBTOTAL					143,508	
B3020	**ROOF OPENINGS**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - ROOFING						**$143,508**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
	Reconfiguration of spaces at connection to existing buildings in included w/ the specific buildings						
	SUBTOTAL					0	
C1020	**INTERIOR DOORS**						
	Glazed entrance doors including frame and hardware; double door	**2**	pr	8,500.00	17,000		
	SUBTOTAL					17,000	
C1030	**SPECIALTIES / MILLWORK**						
	Signage	**4,556**	sf	0.40	1,822		
	Fire extinguisher cabinets	**4**	ea	350.00	1,400		
	Interior railings along perimeter glazing	**700**	lf	200.00	140,000		
	Miscellaneous sealants throughout building	**4,556**	sf	1.00	4,556		
	SUBTOTAL					147,778	
	TOTAL - INTERIOR CONSTRUCTION						**$164,778**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
	No items in this section				0		
	SUBTOTAL					0	
C2020	**STAIR FINISHES**						

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Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 4,556

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW BRIDGES (2 QTY)							
	No items in this section						
	SUBTOTAL					0	
	TOTAL - STAIRCASES						**$0**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
	Wall finishes - Film applied logos etc.	**4,556**	gsf	5.00	22,780		
	SUBTOTAL					22,780	
C3020	**FLOOR FINISHES**						
	2mm Linoleum floor	**3,850**	sf	6.00	23,100		
	Rubber base	**700**	lf	3.00	2,100		
	Moisture mitigation	**3,850**	sf	3.00	NR		
	SUBTOTAL					25,200	
C3030	**CEILING FINISHES**						
	Metal plank ACT	**3,850**	sf	30.00	115,500		
	Paint exposed ceiling above metal plank ceiling	**3,850**	sf	3.00	11,550		
	SUBTOTAL					127,050	
	TOTAL - INTERIOR FINISHES						**$175,030**
D10	***CONVEYING SYSTEMS***						
D1010	**ELEVATOR**						
	No items in this section						
	SUBTOTAL						
	TOTAL - CONVEYING SYSTEMS						**$0**
D20	***PLUMBING***						
D20	**PLUMBING, GENERALLY**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - PLUMBING						**$0**
D30	***HVAC***						
D30	**HVAC, GENERALLY**						
	New bridge connectors with radiant heat						
	Radiant ceiling panel & fintube	**4,556**	sf	2.00	9,112		
	Hot water piping with fittings & hangers	**4,556**	sf	3.50	15,946		
	Pipe insulation	**4,556**	sf	2.25	10,251		
	Sheet metal & accessories	**4,556**	sf	10.00	45,560		
	Automatic temperature controls DDC	**4,556**	sf	3.00	13,668		
	System testing & balancing	**4,556**	sf	1.00	4,556		
	Miscellaneous	**4,556**	sf	1.50	6,834		
	SUBTOTAL					105,927	
	TOTAL - HVAC						**$105,927**
D40	***FIRE PROTECTION***						
D40	**FIRE PROTECTION, GENERALLY**						
	Fire protection system	**4,556**	sf	4.50	20,502		
	SUBTOTAL					20,502	
	TOTAL - FIRE PROTECTION						**$20,502**

PM&C

Lowell High School
Lowell, MA

28-Jan-19

Schematic Design Estimate

GFA 4,556

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW BRIDGES (2 QTY)						
	D50 ELECTRICAL						
D50	**ELECTRICAL, GENERALLY**						
	Equipment Wiring						
	Equipment wiring feed and connections	**4,556**	sf	1.50	6,834		
	Lighting and power						
	Connector lighting and receptacles	**4,556**	sf	12.00	54,672		
	Fire Alarm						
	Connector devices and cabling	**4,556**	sf	3.00	13,668		
	Security System						
	Make connections at head end	**1**	ls	2,500.00	2,500		
	Devices and cabling	**4,556**	sf	2.00	9,112		
	Rough-in	**4,556**	sf	1.00	4,556		
	Miscellaneous						
	Miscellaneous	**4,556**	sf	1.00	4,556		
	SUBTOTAL					95,898	
	TOTAL - ELECTRICAL						**$95,898**
	E10 EQUIPMENT						
E10	**EQUIPMENT, GENERALLY**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - EQUIPMENT						**$0**
	E20 FURNISHINGS						
E2010	**FIXED FURNISHINGS**						
	No items in this section						
	SUBTOTAL					0	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner						
	SUBTOTAL					NIC	
	TOTAL - FURNISHINGS						**$0**
	F10 SPECIAL CONSTRUCTION						
F10	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					0	
	TOTAL - SPECIAL CONSTRUCTION						**$0**
	F20 SELECTIVE BUILDING DEMOLITION						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	Included w/ Building 1922 & 1980 demolition						
	SUBTOTAL					0	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	See main summary for HazMat allowance				See Summary		
	SUBTOTAL					$0	
	TOTAL - SELECTIVE BUILDING DEMOLITION						**$0**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	G SITEWORK						
G10	**SITE PREPARATION & DEMOLITION**						
	Allowance for temporary work including provisions for trolley service	**1**	ls	50,000.00	50,000		
	Site construction fence/barricades	**4,060**	lf	14.00	56,840		
	Site construction fence gates	**3**	ea	2,500.00	7,500		
	Construction entrances	**2,000**	sf	25.00	50,000		
	General site prep & clearing at existing landscaped areas	**70,000**	sf	0.75	52,500		
	Paving demolition - concrete sidewalk, cobblestone paving, courtyard paving, bituminous walks & roadways & associated curbs	**106,000**	sf	2.00	212,000		
	Demo existing fence	**250**	lf	8.00	2,000		
	Demo and remove existing sewer and water lines including associated manholes, catch basins etc.	**1,957**	lf	30.00	58,710		
	Demo and remove existing telecom/electrical lines	**742**	lf	25.00	18,550		
	Demo and remove existing gas line	**242**	lf	25.00	6,050		
	Remove existing tree & stump	**41**	ea	750.00	30,750		
	Demo and remove existing 1922 building entrance						
	walls & associated rails	**200**	lf	100.00	20,000		
	ramp, slab, stairs and associated foundations	**1,350**	sf	20.00	27,000		
	Miscellaneous demolition; demo site furnishings etc.	**1**	ls	25,000.00	25,000		
	Prune & protect existing trees	**28**	ea	500.00	14,000		
	Allowance to protect ETR utilities & utility tunnel	**1**	ls	20,000.00	20,000		
	Site Earthwork						
	Strip topsoil and remove				N/A		
	Silt fence/erosion control, wash bays, stock piles	**4,500**	lf	12.00	54,000		
	Bio-retention protection	**14,000**	sf	5.00	70,000		
	Inlet protection	**41**	ea	200.00	8,200		
	Silt fence maintenance and monitoring	**1**	ls	25,000.00	25,000		
	Dust control/ street sweeping/ wheel washes allowance	**1**	ls	100,000.00	100,000		
	Allowance for obstructions	**1**	ls	included w/ pile unit price			
	Hazardous Waste Remediation						
	Allowance for soil remediation	**1**	ls	625,000.00	625,000		
	Dispose/treat contaminated soils				Included w/ foundations		
	SUBTOTAL					1,533,100	
G20	**SITE IMPROVEMENTS**						
	Asphalt Paving at new Service area & Bus parking;	*9,875*	sf				
	gravel base; 12" thick	**366**	cy	40.00	14,640		
	heavy duty asphalt; 4" thick	**1,097**	sy	30.00	32,910		
	Allowance for asphalt repairs at connection to existing	**1**	ls	20,000.00	20,000		
	Granite curbs along City street	**1,835**	lf	75.00	137,625		
	Granite curb in parking lot	**995**	lf	50.00	49,750		
	Parking space lines (12 spaces), crosswalk hatchings, other road markings	**1**	ls	10,000.00	10,000		
	HC curb cuts; allow	**10**	loc	350.00	3,500		
	Signage	**1**	ls	30,000.00	30,000		
	Broom swept concrete paving	***61,441***	*sf*				
	gravel base; 8" thick	**1,518**	cy	45.00	68,310		
	Broom finish concrete; 5" thick	**61,441**	sf	10.00	614,410		
	Premium for ramps	**500**	sf	5.00	2,500		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		SITEWORK						
49		Premium for granite strip paving in concrete paving, 6" wide	**2,165**	lf	50.00	108,250		
50		Compacted bonded aggregate paving	***2,799***	*sf*				
51		gravel base; 8" thick	**69**	cy	45.00	3,105		
52		Aggregate paving	**2,799**	sf	12.00	33,588		
53		Unit pavers	***9,693***	*sf*				
54		stone base; 12" thick	**359**	cy	45.00	16,155		
55		Unit paver	**9,693**	sf	20.00	193,860		
56		Granite pavers	***999***	*sf*				
57		stone base; 8" thick	**25**	cy	45.00	1,125		
58		Granite paver	**999**	sf	75.00	74,925		
59		Plank pavers along Promenade	***6,273***	*sf*				
60		stone base; 8" thick	**155**	cy	45.00	6,975		
61		Plank paver	**6,273**	sf	26.00	163,098		
62		2' Stone apron	**335**	lf	10.00	3,350		
63		Allowance for concrete pads	**1**	ls	25,000.00	25,000		
64		Artificial turf at Quad	**8,182**	sf	11.00	90,002		
65		1980 Building Light wells	***1,000***	*sf*				
66		gravel base; 8" thick	**25**	cy	45.00	1,125		
67		Broom finish concrete; 5" thick	**1,000**	sf	10.00	10,000		
68		2' Raised planters	**440**	lf	150.00	66,000		
69		Site Improvements						
70		Retaining wall at Main entry	**250**	lf	505.00	126,250		
71		Retaining wall at bike racks	**175**	lf	505.00	88,375		
72		Entry sign wall	**33**	lf	350.00	11,550		
73		Concrete seatwall w/ lighting along Arc and Drive	**320**	lf	450.00	144,000		
74		Retaining wall at Picnic terrace	**105**	lf	560.00	58,800		
75		Quad						
76		Concrete planter wall	**134**	lf	225.00	30,150		
77		2-sided Precast concrete bench w/ wood slat toppers and lighting at Quad; 4' wide	**105**	lf	500.00	52,500		
78		Concrete steps	**350**	lf	190.00	66,500		
79		1922 Building Entry						
80		CIP wall faced with stone base and brick masonry to match existing	**214**	lf				
81		Concrete footing and wall	**32**	cy	500.00	16,000		
82		Concrete wall	**55**	cy	750.00	41,250		
83		Stone base	**300**	sf	80.00	24,000		
84		Brick veneer to match existing	**1,392**	sf	50.00	69,600		
85		Column cap	**6**	ea	1,000.00	6,000		
86		Wall cap	**200**	lf	75.00	15,000		
87		Concrete steps	**130**	lf	190.00	24,700		
88		Concrete ramp & landing	**1,120**	sf	20.00	22,400		
89		Other site improvements not yet defined - at 1922 Building side entrances etc.	**1**	ls	50,000.00	50,000		
90		Site Furnishings						
91		Flagpole; 35'	**3**	ea	7,500.00	22,500		
92		Flagpole; 25'	**1**	ea	6,500.00	6,500		
93		Ornamental bollard w/ lighting	**10**	ea	1,500.00	w/ electrical		
94		Ornamental bollard	**35**	ea	1,200.00	42,000		
95		Ornamental litter+ recycle receptacle	**18**	ea	750.00	13,500		
96		Unit paver tree pit	**16**	ea	1,500.00	24,000		
97		Ornamental wood bench	**288**	lf	350.00	100,800		
98		Ornamental bike rack; 5 bike capacity	**16**	ea	1,500.00	24,000		
99		Picnic bench in Quad	**5**	ea	1,900.00	9,500		
100		Café tables at Picnic terrace	**11**	ea	2,000.00	22,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	Fixed bar stool w/ back	**11**	ea	500.00	5,500		
	Built-in bar height top table w/ wood top	**48**	lf	800.00	38,400		
	6' Ornamental fence & gate at Picnic terrace	**150**	lf	250.00	37,500		
	Transformer bollards	**8**	ea	750.00	6,000		
	Fence at Transformer	**88**	lf	90.00	7,920		
	Double gates at Courtyard	**1**	ea	2,000.00	2,000		
	Wood/ Aluminum planters at 3rd floor Roof garden - allow	**1**	ls	10,000.00	10,000		
	1922 Building Courtyard						
	Café tables	**4**	ea	2,000.00	8,000		
	Ornamental wood bench	**32**	lf	250.00	8,000		
	Ornamental railing w/ lighting; (lighting carried in electrical)						
	1922 Building entry	**200**	lf	320.00	64,000		
	Main entry steps	**30**	lf	320.00	9,600		
	Freshman Academy & Quad steps	**75**	lf	320.00	24,000		
	Quad Ramp	**158**	lf	320.00	50,560		
	Freshman Academy steps & ramp	**105**	lf	320.00	33,600		
	Ornamental metal screen and gates along Arcand drive	**500**	lf	280.00	140,000		
	SUBTOTAL					3,337,158	
	Landscaping						
	Topsoil at landscaped areas	**640**	cy	40.00	25,600		
	Planting soil & mulch	**1,233**	cy	50.00	61,650		
	Sedum mix	**1,926**	sf	0.50	963		
	Street trees	**32**	ea	1,500.00	48,000		
	Specimen/Ornamental trees	**29**	ea	1,000.00	29,000		
	Groundcover/Perennial mix	**15,802**	sf	3.00	47,406		
	Bio-retention/ Raingarden mix	**16,500**	sf	7.00	115,500		
	Vegetable mix	**330**	sf	3.00	990		
	Allowance for drip irrigation at Green roof	**1**	ls	10,000.00	10,000		
	Irrigation to landscaped areas - allow	**1**	ls	50,000.00	50,000		
	SUBTOTAL					389,109	
G30	**CIVIL MECHANICAL UTILITIES**						
	Water supply; pricing includes E&B and bedding						
	New DI piping; 6" Domestic water	**375**	lf	100.00	37,500		
	New DI piping; 8" Fire	**90**	lf	130.00	11,700		
	Connect to existing	**2**	loc	10,000.00	20,000		
	FD connection	**1**	ea	2,000.00	2,000		
	Gate valves	**6**	ea	750.00	4,500		
	Fire hydrant	**1**	ea	5,000.00	5,000		
	Sanitary; pricing includes E&B and bedding						
	Manholes	**2**	ea	4,000.00	8,000		
	Grease traps; (1) 1,500 gal & (1) 6000 gal	**1**	ea	25,000.00	25,000		
	Acid waste neutralizer tank	**3**	ea	w/ East, West & FA building			
	Oil separator	**1**	ea	7,500.00	7,500		
	8" PVC	**160**	lf	65.00	10,400		
	6" PVC	**45**	lf	56.00	2,520		
	Connect to existing	**1**	ea	5,000.00	5,000		
	Storm water; pricing includes E&B and bedding						
	12" CPP	**1,010**	lf	70.00	70,700		
	Manhole	**9**	loc	4,500.00	40,500		
	Catch basins	**3**	loc	3,800.00	11,400		
	WQS	**1**	ea	15,000.00	15,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	OCS	**1**	ea	8,000.00	8,000		
	Connect to existing	**2**	loc	3,000.00	6,000		
	Subsurface Infiltration system	**10,180**	sf	30.00	305,400		
	Gas service						
	E&B trench for new gas pipe - install by National Grid	**200**	lf	25.00	5,000		
	SUBTOTAL					601,120	
G40	**ELECTRICAL UTILITIES**						
	Power						
	Utility co. back charges, allow				By Owner		
	Connect to existing riser pole	**1**	ea	1,500.00	1,500		
	Connect to existing manhole pole	**2**	ea	2,500.00	5,000		
	Power manhole	**2**	ea	4,500.00	9,000		
	Primary duct bank AA to East building, 2-4" conduit, empty	**560**	lf	60.00	33,600		
	Primary duct bank AA to West building, 2-4" conduit, empty	**430**	lf	60.00	25,800		
	Primary cabling by utility co.				By Utility co.		
	New pad mount transformer	**1**	ls		By Utility co.		
	Transformer pad	**1**	ea	2,500.00	2,500		
	Secondary service duct bank CC to East building 11-4" conduits, A feeder	**360**	lf	1,180.00	424,800		
	Secondary service duct bank BB to West building 14-4" conduits, A feeder	**60**	lf	1,180.00	70,800		
	Communications						
	Communications service entrance	**560**	lf	90.00	50,400		
	Site Lighting						
	Service access area lighting	**1**	ls	50,000.00	50,000		
	Pedestrian lighting	**1**	ls	50,000.00	50,000		
	Courtyard lighting	**1**	ls	30,000.00	30,000		
	Site lighting fixtures:						
	SL1	**26**	ea	3,200.00	83,200		
	SL2	**10**	ea	3,800.00	38,000		
	SL3	**20**	ea	600.00	w/ building		
	SL4	**12**	ea	600.00	w/ building		
	SL5	**62**	ea	300.00	w/ building		
	SL6 bollard	**6**	ea	2,000.00	12,000		
	SF1 bollard	**4**	ea	2,000.00	8,000		
	HR - light for handrail	**568**	lf	120.00	68,160		
	Site lighting circuitry, allow	**10,000**	lf	15.00	150,000		
	Site Security						
	CCTV surveillance at site, allow	**1**	ls	75,000.00	w/ specific buildings		
	Blue phones, allow	**3**	loc	10,000.00	30,000		
	SUBTOTAL					1,142,760	
	TOTAL - SITE DEVELOPMENT						***$7,003,247***

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City of Lowell
Lowell High School
Schematic Design Estimate—Reconciled

Lowell, MA
February 8, 2019

SKANSKA

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Executive Summary

Lowell High School
Schematic Design Estimate
Lowell, MA
February 8, 2019

Executive Summary

This Schematic Design Estimate is based upon the documents prepared by Perkins-Eastman and their consultants, dated December 17, 2018, supplemented by Addendum 1-5 and RFI responses as well as scope discussions during reconciliation meetings.

From this data and our current understanding of the schedule and logistics issues involved with the project, we hereby have estimated a total cost of $268,931,807.

Escalation has been included in the pricing based on the anticipated start date. We recommend including a 10% design contingency which is included in our pricing. Cost of phasing has been included at 6% for renovation areas and 3% for new.

The costs for design and FF&E are all assumed to be included in separate Owner's budget.

SKANSKA

City of Lowell **2/8/2019**
Lowell High School
Lowell MA
Reconciled Schematic Design Estimate

Direct Cost Summary

	Description	East Building	West Building	New Gym	Freshman Academy	Bridges	Site	Total	
									622,777
A10	Foundation	$722,710	$1,427,425	$992,500	$835,950	$274,200		$4,252,785	$6.83
A20	Basements	$0	$0	$0	$0	$0		$0	$0.00
B10	Superstructure	$4,257,508	$4,177,604	$4,402,599	$4,737,303	$1,033,340		$18,608,354	$29.88
B20	Exterior Closure	$8,156,725	$4,662,654	$2,943,352	$5,566,072	$1,797,225		$23,126,028	$37.13
B30	Roofing	$1,180,660	$1,636,680	$994,363	$499,093	$124,660		$4,435,456	$7.12
C10	Interior Construction	$11,450,143	$4,318,994	$2,285,706	$3,290,622	$20,000		$21,365,465	$34.31
C20	Stairs	$997,100	$477,100	$237,700	$335,100			$2,047,000	$3.29
C30	Interior Finishes	$5,613,009	$4,563,991	$2,387,297	$1,903,496	$296,140		$14,763,933	$23.71
D10	Conveying	$911,666	$351,667	$0	$271,667			$1,535,000	$2.46
D20	Plumbing	$3,641,280	$2,867,529	$1,033,439	$2,209,248			$9,751,496	$15.66
D30	H.V.A.C.	$13,727,637	$7,711,635	$5,840,344	$4,488,734	$111,142		$31,879,492	$51.19
D40	Fire Protection	$1,711,644	$806,881	$389,517	$529,505	$22,780		$3,460,327	$5.56
D50	Electrical/AV	$9,649,820	$4,994,662	$2,866,223	$3,270,867	$136,740		$20,918,312	$33.59
E10	Equipment	$1,493,700	$2,105,000	$1,037,250	$190,000			$4,825,950	$7.75
E20	Furnishings	$2,473,051	$1,773,866	$13,925	$1,467,134			$5,727,976	$9.20
F10	Special Construction	$0	$0		$0	$0		$0	$0.00
	Phasing Costs			See Below					
Z10	GR's with Trades								
	Total Building Cost	**$65,986,653**	**$41,875,688**	**$25,424,215**	**$29,594,791**	**$3,816,227**	**$0**	**$166,697,574**	**$267.67**
G10	Site Prep	$0	$0	$0	$0	$0	$1,365,000	$1,365,000	$2.19
G20	SitSite Improvements	$0	$0	$0	$0	$0	$3,631,770	$3,631,770	$5.83
G30	Site Mechanical Utilities	$0	$0	$0	$0	$0	$558,350	$558,350	$0.90
G40	Site Electrical Utilities	$0	$0	$0	$0	$0	$1,042,245	$1,042,245	$1.67
	Total Site Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$6,597,365**	**$6,597,365**	**$10.59**
F20	Demolition	$3,720,800	$3,697,360	$1,316,400		$81,835	$0	$8,816,395	$14.16
F20	Hazardous Materials								
	Total Demo Cost	**$3,720,800**	**$3,697,360**	**$1,316,400**	**$0**	**$81,835**	**$0**	**$8,816,395**	**$14.16**
	Sub Total Construction Costs	**$69,707,453**	**$45,573,048**	**$26,740,615**	**$29,594,791**	**$3,898,062**	**$6,597,365**	**$182,111,334**	**$292.42**
10.00%	Design & Pricing Contingency	$6,970,745	$4,557,305	$2,674,062	$2,959,479	$389,806	$659,737	$18,211,133	$29.24
8.50%	Escalation	$5,925,134	$3,873,709	$2,272,952	$2,515,557	$331,335	$560,776	$15,479,463	$24.86
	Subtotal	$82,603,332	$54,004,062	$31,687,629	$35,069,827	$4,619,203	$7,817,878	$215,801,931	$346.52
Variable	General Conditions	$3,600,000	$3,600,000	$3,600,000	$3,600,000	$200,000	$400,000	$15,000,000	$24.09
4.00%	General Requirements	$3,304,133	$2,160,162	$1,267,505	$1,402,793	$184,768	$312,715	$8,632,077	$13.86
0.75%	Bonds	$619,525	$405,030	$237,657	$263,024	$34,644	$58,634	$1,618,514	$2.60
1.10%	Insurance	$908,637	$594,045	$348,564	$385,768	$50,811	$85,997	$2,373,821	$3.81
0.00%	Permit	NIC	NIC	NIC	NIC	NIC	NIC	NIC	
		$91,035,627	$60,763,299	$37,141,355	$40,721,412	$5,089,427	$8,675,223	$243,426,344	$390.87
2.50%	Overhead And Fee	$2,275,891	$1,519,082	$928,534	$1,018,035	$127,236	$216,881	$6,085,659	$9.77
3.00%	GMP Contingency	$2,731,069	$1,822,899	$1,114,241	$1,221,642	$152,683	$260,257	$7,302,790	$11.73
Variable	Phasing (6% reno and site / 3% new)	$5,462,138	$3,645,798	$1,114,241	$1,221,642	$152,683	$520,513	$12,117,015	$19.46
	Temp Gym	$0	$0	$0	$0	$0	$0	$0	$0.00
	Temp Classrooms	$0	$0	$0	$0	$0	$0	$0	$0.00
	Temp Bridge Connection	$0	$0	$0	$0	$0	$0	$0	$0.00
	Temp Café Fit-out	$0	$0	$0	$0	$0	$0	$0	$0.00
	Total Construction Budget	**$101,504,724**	**$67,751,079**	**$40,298,370**	**$44,182,732**	**$5,522,028**	**$9,672,874**	**$268,931,807**	**$431.83**

SKANSKA

Lowell High School
Lowell High School
Lowell, MA
2/8/2019 5:00:00 PM

Estimate Type: Schematic Design Estimate
Project No.: 01
Revision: 00
Building Area: 622,777 sf

Skanska USA Building Inc
101 Seaport Boulevard, Suite 200
Boston, MA 02210

Estimate Detail

Lowell High School - Schematic Reconciled

	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	A10 - FOUNDATIONS				
	A1010 - Standard Foundations				
1	Elevator Pit Slab	648.00	sf	20.00	12,960
2	Elevator Pit Walls	184.00	lf	225.00	41,400
3	Underpin Existing Foundations for Elevator Pit	2.00	ea	20,000.00	40,000
4	New Grade Beam (2'W x 2'6"D)	97.00	cy	550.00	53,350
5	New Slab Trenches & Grade Beams - Allowance	1.00	ls	100,000.00	100,000
6	Drilled Mini Piles @ Elevator Pit	1.00	ea	50,000.00	50,000
7	Repair Exposed Foundations by Epoxy Injection - Allowance	1.00	ls	100,000.00	100,000
8	BAsement Topping Slab - Allowance	1.00	ea	325,000.00	325,000
	A1010 - Standard Foundations				722,710
	A10 - FOUNDATIONS				722,710
	B10 - SUPERSTRUCTURE				
	B1010 - Floor Construction				
9	New Ramp Construction	1,555.00	sf	40.00	62,200
10	Self-Leveler Topping @ Basement	69,122.00	sf	4.00	276,488
11	Replace Existing Slab	1,980.00	sf	10.00	19,800
12	Slab Infill w/ Deck & Support Beams	8,908.00	sf	50.00	445,400
13	New Built-Up Floor	1,452.00	sf	15.00	21,780
14	Replace 8" Slab on Grade @ Grade Beams	1,932.00	sf	25.00	48,300
15	Replace 8" Slab on Grade	5,110.00	sf	12.00	61,320
16	MEP Housekeeping Pads	2,000.00	sf	25.00	50,000
17	Anchor Existing Walls to Floors	2,915.00	ea	225.00	655,875
18	New Slab Openings (Saw Cut & Supported) - Allowance	1.00	ls	75,000.00	75,000
19	3-1/2" Slab Infill @ Metal Deck - Allowance	1.00	ls	50,000.00	50,000
20	2-1/2" Slab Infill on Metal Deck & Beams - Allowance	1.00	ls	50,000.00	50,000
21	Basement/First Floor Slab Infills	4,103.00	sf	15.00	61,545
22	Misc. Metals	297,133.00	sf	1.50	445,700
	B1010 - Floor Construction				2,323,408
	B1020 - Roof Construction				
23	Operable Partition Support	231.00	lf	250.00	57,750

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	B10 - SUPERSTRUCTURE				
	B1020 - Roof Construction				
24	New Door & Window Lintels	321.00	lf	300.00	96,300
25	Structure for New Vertical Ductwork in Shafts & Tele/Data	915.00	sf	100.00	91,500
26	Elevator Support Beams for New Elevators	529.00	lf	150.00	79,350
27	Reinforce Existing Structure for New CMU Walls	4,752.00	sf	50.00	237,600
28	New Steel Column above Existing Column	4.00	ea	10,000.00	40,000
29	CMU Wall Bracing	2,198.00	lf	50.00	109,900
30	New Duct Opening Lintels - Allowance	6.00	ea	750.00	4,500
31	Stair Support Beams	252.00	lf	150.00	37,800
32	New Wide Flange Transfer Beam	136.00	lf	500.00	68,000
33	Replace Underhung Steel @ Precast Lintels	4.00	ea	2,500.00	10,000
34	AHU/Chiller Steel Dunnage	3,390.00	sf	60.00	203,400
35	New Structure above Stage to support Catwalk	2,075.00	sf	150.00	311,250
36	Steel Angles for Stage Lighting Rack	81.00	lf	250.00	20,250
37	New Catwalk - Allowance	1,044.00	sf	200.00	208,800
38	New Structure & Roof Deck	103.00	sf	100.00	10,300
39	Lightwell Roof Structure	717.00	sf	50.00	35,850
40	Elevator Pop-Up Roof Structure	187.00	sf	150.00	28,050
41	New Roof Openings - Allowance	1.00	ls	25,000.00	25,000
42	Infill Existing Roof Openings - Allowance	1.00	ls	25,000.00	25,000
43	Brace Existing Un-Reinforced Masonry Parapet	214.00	lf	250.00	53,500
44	Mechanical Room Support Dunnage	1,625.00	sf	60.00	97,500
45	Stair D & G Grille Enclosures	2.00	ea	7,500.00	15,000
46	Theater Rigging Miscellaneous Metals - Allowance	1.00	ls	50,000.00	50,000
	B1020 - Roof Construction				1,916,600
	C1030 - Building Specialties				
47	Solid Glass Guardrail @ Media Wall	35.00	lf	500.00	17,500
	C1030 - Building Specialties				17,500
	B10 - SUPERSTRUCTURE				4,257,508
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
48	Replace Exist Lintel - 10% Openings	78.00	loc	550.00	42,900
49	8" CMU Ext Wall (E.41) - Courtyard	506.00	ea	48.00	24,288
50	Wash & Minor Repoint - Exist Brick to Remain	77,500.00	sf	8.75	678,125
51	Scaffold & Material Hoist	77,500.00	sf	5.45	422,375
52	Tei-in Exterior Wall to Floors	2,915.00	loc	450.00	1,311,750

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
53	Galv Steel Stair & Landing w/ Railings - Courtyard	2.00	ea	20,625.00	41,250
54	Building Signage, 24" H Letters "LOWELL HIGH SCHOOL" & "LHS AUDITORIUM"	29.00	ltrs	520.00	15,080
55	Galv Steel Stair & Landing w/ Railings - Courtyard	2.00	ea	20,625.00	41,250
56	Protect & Preservr Exist Clock (E.69)	1.00	ea	25,000.00	25,000
57	Modifiy Exist Masonry for Bridge Work	190.00	sf	55.00	10,450
58	Repoint Exist Brick Surrounding Replacement Windows	3,120.00	sf	12.00	37,440
59	Perimeter Flashing & Sealants - 10% Openings	1,880.00	lf	16.00	30,080
60	Clean & Coat ETR Lintels	2,900.00	lf	50.00	145,000
61	Flashing & Sealants - Exist Windows	17,496.00	lf	16.00	279,936
	B2010 - Exterior Walls				3,104,924
	B2020 - Exterior Windows				
62	Alum Sorefront w/ Triple Pane Insul Glass	1,202.00	sf	130.00	156,260
63	Alum Sorefront w/ Triple Pane Insul Glass Ballistic Rated	1,365.00	sf	190.00	259,350
64	2'-8" x 2'-4" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 15.	4.00	ea	1,180.00	4,720
65	2'-8" x 4'-4" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 39 & 50.	4.00	ea	2,190.00	8,760
66	2'-8" x 8'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 30.	6.00	ea	2,160.00	12,960
67	4'-2" x 8'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 21, 27, 33 & 34, 70 & 73.	111.00	ea	6,885.00	764,235
68	4'-2" x 8'-4" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 28, 32, 35, 36, 44, 61, 69 & 71.	158.00	ea	6,610.00	1,044,380
69	4'-0" x 6'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 37, 12 & 13.	37.00	ea	5,080.00	187,960
70	4'-0" x 8'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 20, 29, 31, 52, 53 & 54.	190.00	ea	6,100.00	1,159,000
71	4'-0" x 5'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 14, 24, 46, 55, 56 & 60.	26.00	ea	4,320.00	112,320
72	4'-0" x 2'-6" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 17 & 19.	10.00	ea	1,905.00	19,050

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Estimate Detail		Lowell High School - Schematic Reconciled		
	Description	Qty	Unit Cost	Amount
	--- - Base			
	A - Renovate Kouloheras (East)			
	B20 - EXTERIOR CLOSURE			
	B2020 - Exterior Windows			
73	4'-4" x 8'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 41, 45 & 51.	24.00 ea	7,175.00	172,200
74	5'-0" x 5'-0" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 3, 2 & 1.	6.00 ea	4,765.00	28,590
75	4'-8" x 8'-4" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 48 & 49.	12.00 ea	7,430.00	89,160
76	5'-0" x 8'-6" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 37, 38 & 40.	18.00 ea	8,255.00	148,590
77	4'-0" x 5'-6" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 1, 2, 4, 5 & 42.	50.00 ea	4,195.00	209,750
78	4'-0" x 4'-6" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 3.	5.00 ea	3,430.00	17,150
79	4'-6" x 4'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 8, 9, 10, 11 & 58.	28.00 ea	4,000.00	112,000
80	4'-0" x 7'-4" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 22 & 47.	5.00 ea	7,570.00	37,850
81	4'-2" x 8'-10" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 43.	8.00 ea	7,145.00	57,160
82	4'-2" x 5'-8" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 57.	4.00 ea	4,495.00	17,980
83	4'-2" x 12'-6" Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin Tag 79.	20.00 ea	9,910.00	198,200
84	14'-0" x 2'-0" Alum Window w/ Triple Pane Insul Glass, 3-Coat Pt Fin Tag 23	2.00 ea	5,335.00	10,670
85	4'-0" x 5'-6" Alum Window w/ Triple Pane Insul Glass, Louver in Top, 3-Coat Pt Fin Tag 25	1.00 ea	2,950.00	2,950
86	Round Window w/ Triple Pane Insul Glass Tag 16 & 79.	14.00 ea	2,535.00	35,490
87	Crescent Window w/ Triple Pane Insul Glass Tag 79	20.00 ea	3,450.00	69,000

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
A - Renovate Kouloheras (East)				
B20 - EXTERIOR CLOSURE				
B2020 - Exterior Windows				
88 Louver (Under Crescent)	4.00	ea	3,940.00	15,760
Tag 79				
89 2,-0" x 0'-8" Vent	2.00	ea	2,160.00	4,320
90 Steel Frame w/ Triple Pane Insul Glass	218.00	sf	250.00	54,500
91 Applied Frit at Toilet Rooms - Premium	480.00	sf	5.00	2,400
92 Credit for Dual Pane Insulated Glass in lieu Triple Pane	1.00	ea	(425,000.00)	(425,000)
93 Alum Curtain Wall w/ Triple Pane Insul Glass	910.00	sf	160.00	145,600
B2020 - Exterior Windows				4,733,315
B2030 - Exterior Doors				
94 6'-0" x 7'-0"Pr Alum & Glass Doors w/ Hardware	2.00	pr	13,596.70	27,193
95 6'-0" x 7'-0"Pr Alum & Glass Doors w/ Hardware & Ballistic Glass	9.00	pr	22,114.80	199,033
96 7'-0" x 7'-0"Pr Alum & Glass Doors w/ Hardware & Ballistic Glass	4.00	pr	23,064.80	92,259
B2030 - Exterior Doors				318,486
B20 - EXTERIOR CLOSURE				8,156,725
B30 - ROOFING				
B3010 - Roof Coverings				
97 EPDM Roof Pads (E.57)	2,568.00	sf	6.00	15,408
98 New EPDM Roof Membrane, Repair Exist Insulation (E.32) - 1st Fl B	2,936.00	sf	16.80	49,325
99 Perimeter Closure & Flashing (E.32) - 1st Fl B	495.00	lf	20.00	9,900
100 New EPDM Roof Membrane w/ Coverboard	58,220.00	sf	12.50	727,750
101 Perimeter Closure & Base Flashing	2,315.00	lf	28.00	64,820
102 New Tapered Insulation & AVB (E.52)	4,510.00	sf	11.20	50,512
103 New EPDM Roof Membrane, Repair Exist Insulation (E.32) - 1st Fl B	365.00	sf	22.00	8,030
104 Perimeter Closure & Flashing (E.32) - 1st Fl B	102.00	lf	20.00	2,040
105 Galv Mtl Security Pipe Rail Guard (E.51)	236.00	lf	350.00	82,600
106 New Galv Steel Stair w/ Railing (E.59)	2.00	ea	1,850.00	3,700
107 Galv Guardrail w/ Fence	37.00	lf	275.00	10,175
B3010 - Roof Coverings				1,024,260
B3020 - Roof Openings				
108 Stage Smoke Hatch	2.00	ea	9,000.00	18,000
109 Roof Accessories - Allowance	1.00	ea	20,000.00	20,000
110 Skylights w/ FR Structural Glass & Fall Protection	4.00	ea	29,600.00	118,400
B3020 - Roof Openings				156,400
B30 - ROOFING				1,180,660

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail		Lowell High School - Schematic Reconciled		
	Description	Qty	Unit Cost	Amount
	--- - Base			
	A - Renovate Kouloheras (East)			
	C10 - INTERIOR CONSTRUCTION			
	C1010 - Partitions			
111	8" CMU 11'11"H	13,380.00 sf	20.00	267,600
112	8" CMU 12'10"H	1,960.00 sf	20.00	39,200
113	8" CMU 13'4"H	12,684.00 sf	20.00	253,680
114	8" CMU 13'6"H	19,687.00 sf	20.00	393,740
115	8" CMU 18'H	11,611.00 sf	25.00	290,275
116	2-5/8" thick Polished CMU Wainscott to 5'4"H, w/ Hardwood Cap - Corridor Side Only	39,413.00 sf	35.00	1,379,455
117	4"H CMU Base @ Lockers	974.00 lf	20.00	19,480
118	Interior Glazing Partition 10'	4,380.00 sf	100.00	438,000
119	Change Interior Glazing Partition to Standard	438.00 sf	(65.00)	(28,470)
120	Clerestory Glass @ Art Rooms	2,490.00 sf	150.00	373,500
121	Double Glass Door & Hardware	28.00 ea	5,000.00	140,000
122	(2) 3-5/8" Offset Studs w/ 1" Airspace & (1) layer 5/8" GWB - Full Batt, STC 60, 13'4"H	4,302.00 sf	25.00	107,550
123	(2) 3-5/8" Offset Studs w/ 1" Airspace & (2) layers 5/8" GWB - Full Batt, STC 60, 13'4"H	8,422.00 sf	30.00	252,660
124	2hr Shaftwall 11'11"	2,532.00 sf	18.00	45,576
125	2hr Shaftwall 13'4"	2,130.00 sf	18.00	38,340
126	2hr Shaftwall 13'6"	6,955.00 sf	18.00	125,190
127	2hr Shaftwall 18'	1,533.00 sf	18.00	27,594
128	3-5/8"Studs w/2" Spray Foam Insulation & (2) layers 5/8" GWB - Inside Ext. Wall 11'11"	16,647.00 sf	22.00	366,234
129	3-5/8"Studs w/2" Spray Foam Insulation & (2) layers 5/8" GWB - Inside Ext. Wall 13'4"	15,499.00 sf	22.00	340,978
130	3-5/8"Studs w/2" Spray Foam Insulation & (2) layers 5/8" GWB - Inside Ext. Wall 13'6"	37,040.00 sf	22.00	814,880
131	3-5/8"Studs w/2" Spray Foam Insulation & (2) layers 5/8" GWB - Inside Ext. Wall 18'	536.00 sf	22.00	11,792
132	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 11'11"	8,342.00 sf	20.00	166,840
133	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 13'4"	13,210.00 sf	20.00	264,200
134	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 13'6"	24,744.00 sf	20.00	494,880
135	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 18'	19,266.00 sf	24.00	462,384
136	Allowance - Finish Existing Drywall Above CMU Wainscott 6'7"	10,937.00 sf	10.00	109,370
137	Allowance - Finish Existing Drywall Above CMU Wainscott 8'	13,740.00 sf	10.00	137,400
138	Allowance - Finish Existing Drywall Above CMU Wainscott 8'2"	26,316.00 sf	10.00	263,160
139	Allowance - Finish Existing Drywall Above CMU Wainscott 12'8"	9,969.00 sf	10.00	99,690
140	Spray Foam Insulation @ Perimeter of Ext. Wall @ Attic 12'10"	19,764.00 sf	10.00	197,640
141	Installation of D/F/H	459.00 ea	650.00	298,350

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Koulohera s (East)				
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
142	Installation of Toilet Accessories	710.00	ea	65.00	46,150
143	Operable Partition 11'11"H - w/ Acoustical Fabric Finish - 3 ea	1,060.00	sf	60.00	63,600
144	Operable Partition 13'4"H - w/ Mirror - 1 ea	393.00	sf	85.00	33,405
145	Operable Partition 13'4"H - w/ Acoustical Fabric Finish - 2 ea	739.00	sf	60.00	44,340
146	Operable Partition 13'6"H - w/ Acoustical Fabric Finish - 2 ea	776.00	sf	60.00	46,560
	C1010 - Partitions				8,425,223
	C1020 - Interior Doors				
147	Single Door & Frame	176.00	ea	550.00	96,800
148	Single Door w/ Side Light & Frame	202.00	ea	700.00	141,400
149	Double Door & Frame	76.00	ea	850.00	64,600
150	Double Door w/ Side Light & Frame	3.00	ea	1,000.00	3,000
151	Hardware Allowance	459.00	ea	750.00	344,250
	C1020 - Interior Doors				650,050
	C1030 - Building Specialties				
152	Millwork Blocking	3,496.00	lf	6.00	20,976
153	Misc. Rough Carpentry/Blocking	388,262.00	sf	0.50	194,131
154	New Lightgauge Ramp	578.00	sf	50.00	28,900
155	Plywood & Engineered Lumber Infill	349.00	sf	25.00	8,725
156	Replace Twisted Timber Column	1.00	ea	5,000.00	5,000
157	New LGMF Raised Floor w/ 2 Layers of Plywood	5,364.00	sf	30.00	160,920
158	Plywood & Engineered Lumber Infill - Allowance	1.00	ls	50,000.00	50,000
159	New Fire-Treated Plywood Underlayment @ Classrooms	74,711.00	sf	6.50	485,622
160	Built-In Bench @ Corridor	50.00	lf	500.00	25,000
161	Display/Trophy Case 84"H x 18"D	124.00	lf	750.00	93,000
162	Sliding White Boards - 8'L	65.00	ea	4,500.00	292,500
163	White Boards	2,464.00	sf	20.00	49,280
164	Tackboards	1,588.00	sf	15.00	23,820
165	Standard Toilet Partition	42.00	ea	1,200.00	50,400
166	ADA Toilet Partition	26.00	ea	1,800.00	46,800
167	Urinal Screen	14.00	ea	350.00	4,900
168	Interior Room Signage & Code Directional Signage - Allowance	388,262.00	sf	0.75	291,197
169	Stainless Steel Plaques	4.00	ea	3,500.00	14,000
170	8" Brushed Aluminum Stand-Off Letters	230.00	ea	175.00	40,250
171	Exterior Banner Stanchions	10.00	ea	2,500.00	25,000

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	C10 - INTERIOR CONSTRUCTION				
	C1030 - Building Specialties				
172	Removal & Reinstallation of Existing Wood Panels w/ Plaques	14.00	ea	1,000.00	14,000
173	Backlit Post 24"H Letters	29.00	ea	500.00	14,500
174	Backlit School Logo	1.00	ea	2,500.00	2,500
175	Lockers	779.00	ea	450.00	350,550
176	Toilet Accessories for Single Use Toilet Room	30.00	rms	1,095.00	32,850
177	Toilet Accessories for Gang Toilet Room	22.00	rms	2,275.00	50,050
	C1030 - Building Specialties				2,374,870
	C10 - INTERIOR CONSTRUCTION				11,450,143
	C20 - STAIRS				
	C2010 - Stair Construction				
178	Ramp Handrails	717.00	lf	300.00	215,100
179	New 6-Riser Stair	4.00	ea	7,500.00	30,000
180	Metal Pan Stairs, Renovation - Stair A	70.00	rs	650.00	45,500
181	Metal Pan Stairs, Renovation - Stair C	70.00	rs	650.00	45,500
182	Metal Pan Stairs, Renovation - Stair D	70.00	rs	650.00	45,500
183	Metal Pan Stairs, Renovation - Stair G	23.00	rs	650.00	14,950
184	Metal Pan Stairs, Renovation - Stair J	70.00	rs	650.00	45,500
185	Metal Pan Stairs, New - Stair B	70.00	rs	1,200.00	84,000
186	Metal Pan Stairs, New - Stair D	20.00	rs	1,200.00	24,000
187	Metal Pan Stairs, New - Stair F	67.00	rs	1,200.00	80,400
188	Metal Pan Stairs, New - Stair G	47.00	rs	1,200.00	56,400
189	Metal Pan Stairs, New - Stair I	70.00	rs	1,200.00	84,000
190	Metal Pan Stairs, New - Stair K	42.00	rs	1,200.00	50,400
191	Stair Treads - Finish Allowance	3,517.00	lf	50.00	175,850
	C2010 - Stair Construction				997,100
	C20 - STAIRS				997,100
	C30 - INTERIOR FINISHES				
	C3010 - Wall Finishes				
192	AWP - Acoustical Wall Panel	6,552.00	sf	25.00	163,800
193	Paint - Allowance	388,262.00	sf	2.25	873,590
194	Paint Premium for Auditorium - Allowance	1.00	ls	150,000.00	150,000
	C3010 - Wall Finishes				1,187,390
	C3020 - Floor Finishes				
195	Repair, Clean & Protect Existing Terrazzo	56,163.00	sf	6.00	336,978
196	Poured Epoxy Floor w/ Integral Epoxy Base	16,903.00	sf	12.00	202,836

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	C30 - INTERIOR FINISHES				
	C3020 - Floor Finishes				
197	DF - Dance Flooring	2,308.00	sf	30.00	69,240
198	HRWD - Hardwood Flooring	2,684.00	sf	30.00	80,520
199	Refinish Existing Stage Flooring & Stair	3,000.00	sf	15.00	45,000
200	LT - Linoleum Tile	132,214.00	sf	7.50	991,605
201	RB - Rubber Base	23,075.00	lf	3.50	80,763
202	SCT - Synthetic Carpet Tile	3,066.00	sy	45.00	137,970
203	Sealed Concrete Floor	7,867.00	sf	1.00	7,867
204	Flash Patch/Floor Prep	297,133.00	sf	1.50	445,700
	C3020 - Floor Finishes				2,398,478
	C3030 - Ceiling Finishes				
205	GWB Soffits	1,242.00	lf	55.00	68,310
206	Rated GWB Ceilings	386.00	sf	15.00	5,790
207	GWB Ceilings	16,546.00	sf	12.00	198,552
208	GWB Header @ Int. Glazing Partitions	438.00	lf	150.00	65,700
209	ACT-4 - "Wedge" Lay-In ACT 2x2	2,534.00	sf	16.00	40,544
210	ACT Clouds - Suspended ACT Panels w/ Unistrut Grid System	5,057.00	sf	65.00	328,705
211	ACT-1 - 2x4 ACT Ceilings	194,072.00	sf	6.00	1,164,432
212	Sound Isolation Ceilings - Allowance	1.00	ls	100,000.00	100,000
213	Paint - GWB Ceilings and Soffits	20,000.00	sf	1.00	20,000
214	Paint - Exposed Steel Deck and Structure	17,554.00	sf	2.00	35,108
	C3030 - Ceiling Finishes				2,027,141
	C30 - INTERIOR FINISHES				5,613,009
	D10 - CONVEYING				
	D1010 - Elevators & Lifts				
215	Elevator A - 3,000#, Front-Back Opng	4.00	stps	55,000.00	220,000
216	Elevator B - 2,500#, Front-Back Opng	4.00	stps	55,000.00	220,000
217	Elevator C - 4,000#, Front Opng	5.00	stps	65,000.00	325,000
218	Elevator D - 2,500#, Front-Back Opng	2.00	stps	65,000.00	130,000
219	Cab Finish Allowance	4.00	ea	25,000.00	100,000
220	Delete Roof Stop - Includes Other Trades	(1.00)	ea	83,334.00	(83,334)
	D1010 - Elevators & Lifts				911,666
	D10 - CONVEYING				911,666
	D20 - PLUMBING				
	D2000 - Plumbing				
221	Commissioning support/lump sum	1.00	ls	9,160.00	9,160

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D20 - PLUMBING				
	D2000 - Plumbing				
222	General requirements/square foot	297,133.00	sf	0.75	222,850
223	Demolition/cut, drop & make safe/lump sum	1.00	ls	7,500.00	7,500
224	Premium for project phasing	1.00	ls	6,450.00	6,450
	D2000 - Plumbing				245,960
	D2003 - Insulation/Plumbing (INS)				
225	INS - Armaflex/Copper Pipe - Trap primer feed UG	230.00	lf	8.55	1,966
226	INS - Fiberglass/Copper Pipe - Domestic water	16,000.00	lf	9.29	148,567
227	INS - Fiberglass/Cast Iron Pipe - RL/horiz. only	3,600.00	lf	12.97	46,685
228	INS - Fiberglass/Copper Pipe - Tempered water	200.00	lf	9.06	1,813
229	INS - Fiberglass/Copper Pipe - Non-potable water	2,650.00	lf	9.29	24,606
	D2003 - Insulation/Plumbing (INS)				223,637
	D2010 - Plumbing Fixtures				
230	Drinking fountain/bottle fill/bi-level/ADA	15.00	ea	2,636.44	39,547
231	Water closet/wall mount/carrier/sensor FV	36.00	ea	1,769.44	63,700
232	Water closet/wall mount/carrier/sensor FV/ADA	58.00	ea	1,769.44	102,628
233	Urinal/wall mount/carrier/sensor flush valve	7.00	ea	1,340.08	9,381
234	Urinal/wall mount/carrier/sensor flush valve/ADA	11.00	ea	1,340.08	14,741
235	Lavatory/wall hung/carrier/sensor gooseneck faucet/ADA	79.00	ea	1,568.14	123,883
236	Trough type wash sink/3-faucet	6.00	ea	6,306.28	37,838
237	Sink/1-bowl/gooseneck faucet	8.00	ea	1,198.78	9,590
238	Sink/1-bowl/gooseneck faucet/ADA	7.00	ea	1,266.84	8,868
239	Mop sink/floor mount/24"x24"	7.00	ea	1,370.90	9,596
240	Emergency shower/eye wash/cabinet type	9.00	ea	2,703.44	24,331
241	- Rough-ins/Fixtures	326.00	ea	157.24	51,260
242	Sink/Art room/gooseneck faucet	3.00	ea	1,841.84	5,526
243	- Mixing valve/emergency shower/eye wash	9.00	ea	984.30	8,859
244	Valve & drain box/washing machine	2.00	ea	360.30	721
245	- Solids interceptor tank/5 gallon/Striem #HLT-117602	3.00	ea	693.48	2,080
246	Faucet, trap & stops/integral science sink/gooseneck	51.00	ea	431.30	21,996
247	Faucet, trap & stops/integral science sink/gooseneck/ADA	15.00	ea	499.36	7,490
	D2010 - Plumbing Fixtures				542,034
	D2020 - Domestic Water System				
248	Type L Copper Pipe & Ftgs/95-5 Solder - Domestic water	16,000.00	lf	33.53	536,426
249	Type L Copper Pipe & Ftgs/95-5 Solder - Tempered water	200.00	lf	25.38	5,075

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D20 - PLUMBING				
	D2020 - Domestic Water System				
250	Type L Copper Pipe & Ftgs/95-5 Solder - Non-Potable water	2,650.00	lf	29.00	76,861
251	Type K Soft Copper Pipe & Ftgs/95-5 Solder - Trap primer feed U/G	230.00	lf	16.39	3,771
252	Ductile Iron Pipe & Ftgs - Dom. water entrance 4" U/G	20.00	lf	365.70	7,314
253	Water filter/in-line/refrigerator	2.00	ea	273.03	546
254	Shock absorbers/61 to 113 FU's/#400	3.00	ea	956.67	2,870
255	Shock absorbers/34 to 60 FU's/#300	9.00	ea	405.67	3,651
256	Shock absorbers/12 to 33 FU's/#200	32.00	ea	277.06	8,866
257	Shock absorbers/1 to 11 FU's/#100	37.00	ea	154.06	5,700
258	Trap primer/drip type/2 - 4-outlet	4.00	ea	214.96	860
259	Trap primer/drip type/1-outlet	15.00	ea	131.90	1,978
260	Hose bibbs/encased/exterior - HB-2	13.00	ea	757.24	9,844
261	Hose bibbs/interior - HB-1	19.00	ea	224.18	4,259
262	Thermostatic mixing valve - Domestic	1.00	ea	2,846.72	2,847
263	Expansion tank/ASME/potable	1.00	ea	1,998.48	1,998
264	Recirculation pump/bronze	1.00	ea	867.48	867
265	Backflow preventers/RPBZ/4"	1.00	ea	2,062.84	2,063
266	Water meter w/remote readout/entrance/4"	1.00	ea	2,387.84	2,388
267	Backflow preventer/Cooling towers make-up	1.00	ea	298.34	298
268	Backflow preventer/Non-potable system	6.00	ea	378.57	2,271
269	Backflow preventerBoiler make-up	1.00	ea	221.12	221
	D2020 - Domestic Water System				680,976
	D2030 - Sanitary Waste & Vent System				
270	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Sanitary W&V UG	2,000.00	lf	71.35	142,701
271	No-Hub C.I. Pipe & Ftgs/Clamp - Sanitary W&V AG	11,000.00	lf	66.54	731,917
272	Wall cleanouts	8.00	ea	201.24	1,610
273	Floor cleanouts/heavy duty	6.00	ea	373.24	2,239
274	Floor cleanouts	23.00	ea	301.24	6,929
275	Floor drains	19.00	ea	310.24	5,895
276	Floor drains/heavy duty	12.00	ea	371.24	4,455
277	Floor sinks/Kitchen	8.00	ea	1,028.81	8,230
278	Grease Interceptor/Interior/Culinary	1.00	ea	17,478.60	17,479
	D2030 - Sanitary Waste & Vent System				921,455
	D2040 - Storm Drainage System				
279	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Primary RL UG	400.00	lf	86.44	34,575
280	No-Hub C.I. Pipe & Ftgs/Clamp - Primary RL AG	2,250.00	lf	74.83	168,370

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D20 - PLUMBING				
	D2040 - Storm Drainage System				
281	No-Hub C.I. Pipe & Ftgs/Clamp - Overflow RL AG	2,200.00	lf	74.83	164,629
282	Roof Drains/Primary RL	15.00	ea	424.30	6,365
283	Roof Drains/Overflow RL	15.00	ea	728.30	10,925
284	Downspots/overflow RL	4.00	ea	867.90	3,472
285	Floor Cleanouts/RL	2.00	ea	320.24	640
286	Floor Cleanouts/RL/heavy duty	2.00	ea	353.24	706
287	Wall Cleanouts/RL	4.00	ea	131.12	524
	D2040 - Storm Drainage System				390,206
	D2060 - Natural/LP Gas System				
288	Sch 40 Black Steel (CW) Pipe & Ftgs/T&C - Gas piping	2,150.00	lf	30.43	65,432
289	Sch 40 Black Steel (ERW) Pipe & Ftgs/Weld - Gas piping	400.00	lf	99.31	39,725
290	- Paint exposed piping/Gas piping	200.00	lf	21.87	4,374
291	Emer. gas shut off cabinet w/1" ball valve (Lab bench)	15.00	ea	1,223.96	18,359
292	Emer. gas shut off cabinet w/1-1/2" ball valve (Lab room)	9.00	ea	1,377.96	12,402
293	Gas turret/bench or desk mount/single	30.00	ea	222.28	6,669
294	Gas turret/bench or desk mount/double	27.00	ea	335.12	9,048
	D2060 - Natural/LP Gas System				156,009
	D2077 - Acid Neutrilization System				
295	Sch 40 Polypro Fuseal/AW Pipe & Ftgs UG	50.00	lf	89.59	4,480
296	Sch 40 Polypro Fuseal/AW Pipe & Ftgs AG	2,820.00	lf	76.90	216,865
297	Acid neutrilization system/125 gal.tank	1.00	ea	42,851.36	42,851
298	- pH monitors/1 per tank/tie-into BMS	1.00	ea	7,536.92	7,537
299	- Limestone chips/50 lb. bag	26.00	ea	88.47	2,300
300	Acid waste/transfer lift station/50 gal. tank/20 gpm	-	excl	-	-
	D2077 - Acid Neutrilization System				274,033
	D2099 - Material Handling/Supports/Testing/Start Ups				
301	- Clean & test system/Domestic water	1.00	ea	2,415.84	2,416
302	- Fill & vent system/Domestic water	1.00	ea	2,265.84	2,266
303	- Offload & distribution/Fixtures	326.00	ea	132.24	43,110
304	- Hangers & clamps/Sanitary W&V	11,000.00	lf	3.32	36,546
305	- Hangers & clamps/Domestic water	18,850.00	lf	2.56	48,217
306	- Clean & test system/Sanitary W&V	1.00	ea	2,415.84	2,416
307	- Fill & vent system/Sanitary W&V	1.00	ea	2,265.84	2,266
308	- Hangers & clamps/RL	4,450.00	lf	3.32	14,785
309	- Clean & test system/RL	1.00	ea	1,157.92	1,158

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
A - Renovate Kouloheras (East)				
D20 - PLUMBING				
D2099 - Material Handling/Supports/Testing/Start Ups				
310 - Hangers & clamps/Gas piping	2,550.00	lf	2.56	6,523
311 - Clean & test system/Gas piping	1.00	ea	1,157.92	1,158
312 - Fill & vent system/Gas piping	1.00	ea	1,132.92	1,133
313 - Start up/HW boiler	1.00	ea	289.48	289
314 - Offload & rigging/HW boiler & tank	2.00	ea	1,157.92	2,316
315 - Fill & vent system/AW piping	1.00	ea	1,132.92	1,133
316 - Clean & test system/AW piping	1.00	ea	1,157.92	1,158
317 - Hangers & clamps/AW piping	2,820.00	lf	2.56	7,213
318 - Offload & rigging/Acid neutr. equipment	1.00	ea	2,586.88	2,587
D2099 - Material Handling/Supports/Testing/Start Ups				176,689
D3050 - Heating Systems				
319 HW Boilers/gas/high eff. condensing	650.00	mbh	29.73	19,323
320 - Condensate neutrilization kit	1.00	ea	303.12	303
321 Sch 80 Pipe & Ftgs/CPVC/4" - Direct vent piping	60.00	lf	29.33	1,760
322 Concentric vent kit/PVC/4" - Direct vent	1.00	ea	429.48	429
D3050 - Heating Systems				21,815
D3052 - Cooling Systems				
323 Domestic water storage tank/ASME/260 gals.	1.00	ea	8,465.88	8,466
D3052 - Cooling Systems				8,466
D20 - PLUMBING				3,641,280
D30 - HVAC				
D3000 - HVAC Common Work Requirements				
324 General requirements/square foot	297,133.00	sf	1.50	445,700
325 Demolition/cut, drop & make safe/lump sum	1.00	ls	18,000.00	18,000
326 Commissioning support/lump sum	1.00	ls	12,300.00	12,300
327 Premium for project phasing	1.00	ls	15,000.00	15,000
328 Delete East Building Courtyard Snow Melting	1.00	ls	(57,240.00)	(57,240)
D3000 - HVAC Common Work Requirements				433,760
D3003 - Insulation/HVAC (INS)				
329 INS - Armaflex/Copper Pipe - AC cond. drains	50.00	lf	8.07	404
330 INS - Fiberglass/Copper Pipe - CW	50.00	lf	8.37	418
331 INS - Fiberglass/Blk. Stl Weld Pipe - CW	150.00	lf	11.73	1,760
332 INS - Fiberglass/Copper Pipe - HW	22,000.00	lf	8.15	179,393
333 INS - Fiberglass/Copper Pipe - CHW	28,000.00	lf	8.15	228,319
334 INS - Fiberglass/Blk. Stl Weld Pipe - HW	2,600.00	lf	11.46	29,796
335 INS - Fiberglass/Blk. Stl Weld Pipe - CHW	2,600.00	lf	11.46	29,796

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D30 - HVAC				
	D3003 - Insulation/HVAC (INS)				
336	INS - Fiberglass/Copper Pipe - Snow melt	100.00	lf	8.15	815
337	INS - Weatherseal/Exterior exposed piping - CW (roof)	150.00	lf	5.96	894
338	INS - Weatherseal/Exterior exposed piping - CT make-up (roof)	50.00	lf	3.63	182
339	INS - Duct/Fiberglass Wrap	112,000.00	sf	4.99	558,678
	D3003 - Insulation/HVAC (INS)				1,030,455
	D3005 - Testing, Adjusting & Balancing (TAB)				
340	TAB - Testing Adjusting & Balancing	50.00	day	2,598.80	129,940
341	TAB commissioning support	16.00	day	974.40	15,590
	D3005 - Testing, Adjusting & Balancing (TAB)				145,530
	D3009 - Automatic Temperature Controls (ATC)				
342	ATC - VFD wiring for cooling towers (remote mnt.) - 2@3 pts. (mech. penthouse)	6.00	pts	465.36	2,792
343	ATC - VFD wiring for pumps (remote mnt.) - 12@3 pts. (mech. penthouse)	36.00	pts	465.35	16,753
344	ATC - Differential Psi swithches (DPS)/CHWS&R - 1@2 pts.	2.00	pts	519.42	1,039
345	ATC - Differential Psi swithches (DPS)/HWS&R - 1@2 pts.	2.00	pts	519.41	1,039
346	ATC - Pumps/CW system - 4@5 pts. (mech. penthouse)	20.00	pts	822.64	16,453
347	ATC - Pumps/CHW system - 4@5 pts. (mech. penthouse)	20.00	pts	822.64	16,453
348	ATC - Pumps/HW system - 4@5 pts. (mech. penthouse)	20.00	pts	822.64	16,453
349	ATC - Cooling towers/packaged/factory controls	2.00	ea	4,988.42	9,977
350	ATC - Chillers/packaged/factory controls (mech. penthouse)	2.00	ea	4,988.42	9,977
351	ATC - Boilers/packaged/factory controls (mech. penthouse)	2.00	ea	4,988.42	9,977
352	ATC - Commissioning support days	30.00	day	1,359.45	40,784
353	ATC - CO2 demand ventilation control	230,000.00	sf	0.41	95,011
354	ATC - System hardware, software & engineering	1.00	ea	28,226.49	28,226
355	ATC - Plumbing WH's & RCP's - 1@10 pts.	10.00	pts	652.71	6,527
356	ATC - Plumbing pH monitors - 1@15 pts.	15.00	pts	841.83	12,628
357	ATC - Unit heaters/HW/UH's - 1@2 pts. (mech. penthouse)	2.00	pts	474.07	948
358	ATC - Motorized dampers - 2@3 pts. (mech. penthouse)	6.00	pts	509.80	3,059
359	ATC - Exhaust fans/gen. exh./in-line - 1@4 pts. (mech. penthouse)	4.00	pts	822.63	3,291
360	ATC - Control valves/HW mains - 2@2 pts. (mech. penthouse)	4.00	pts	718.12	2,872
361	ATC - Control valves/CHW mains - 2@2 pts. (mech. penthouse)	4.00	pts	718.12	2,872

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D30 - HVAC				
	D3009 - Automatic Temperature Controls (ATC)				
362	ATC - Control valves/CW mains - 2@2 pts. (mech. penthouse)	4.00	pts	772.16	3,089
363	ATC - AHU's/custom/ATC F&I controls - 9@40 pts.	360.00	pts	1,683.67	606,120
364	ATC - Exhaust fans/gen. exh./rooftop - 6@5 pts.	30.00	pts	965.56	28,967
365	ATC - Exhaust fans/gen. exh./in-line - 3@5 pts.	15.00	pts	822.64	12,340
366	ATC - Exhaust fans/Lab exh./rooftop - 2@10 pts.	20.00	pts	1,019.59	20,392
367	ATC - Radiant snow melt manifolds - 2@4 pts.	8.00	pts	474.07	3,793
368	ATC - Pumps/in-line/Snow melt - 2@5 pts.	10.00	pts	822.64	8,226
369	ATC - Radiant ceiling panels/RCP's - 214@2 pts.	428.00	pts	474.07	202,900
370	ATC - Cabinet unit heaters/CUH's - 20@3 pts.	60.00	pts	474.07	28,444
371	ATC - Unit heaters/electric/EUH's - 5@2 pts.	10.00	pts	411.32	4,113
372	ATC - Unit heaters/HW/UH's - 5@2 pts.	10.00	pts	474.07	4,741
373	ATC - VAV box/ATC furnished & installed - 194@2 pts.	388.00	pts	519.39	201,524
374	ATC - Chilled beams/active/2-pipe - 148@4 pts.	592.00	pts	536.81	317,793
375	ATC - Condensing unit/factory controls/Mini-Split AC	1.00	ea	1,028.96	1,029
376	ATC - Indoor air handler/factory controls/Mini-Split AC	1.00	ea	514.48	514
377	ATC - Energy metering/Fuel, gas & water systems	1.00	ls	43,228.56	43,229
	D3009 - Automatic Temperature Controls (ATC)				1,784,342
	D3050 - Heating Systems				
378	Type L Copper Pipe & Pressfit Ftgs - HWS&R mains	6,000.00	lf	32.47	194,808
379	Type L Copper Pipe & Pressfit Ftgs - HWS&R branches	16,000.00	lf	24.40	390,328
380	Sch 40 Blk Stl Pipe & Ftgs/ERW/Grooved - HWS&R mains	2,600.00	lf	113.73	295,688
381	- Condensate neutrilization kits/Boilers (inc.)	-	ea	-	-
382	Boilers (3)/HW/gas fired/600 MBH ea. - B-1,2,3 (inc.)	-	mbh	-	-
	D3050 - Heating Systems				880,824
	D3052 - Cooling Systems				
383	Type L Copper Pipe & Ftgs/95-5 Solder - CWS&R	50.00	lf	29.00	1,450
384	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R mains	6,000.00	lf	33.53	201,160
385	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R branches	22,000.00	lf	25.38	558,298
386	Type L Copper Pipe & Ftgs/95-5 Solder 3/4"	50.00	lf	20.46	1,023
387	Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CWS&R	150.00	lf	185.39	27,808
388	Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CHWS&R mains	2,600.00	lf	114.73	298,293
389	Chillers (2)/water cooled/220 tons ea. - CH-1&2 (inc.)	-	ton	-	-
390	Buffer tank/CHW/ ? gals. - BT-1 (inc.)	-	ea	-	-
391	Condenser water sand filtration system	1.00	ea	22,789.60	22,790

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	A - Renovate Kouloheras (East)				
	D30 - HVAC				
	D3052 - Cooling Systems				
392	Cooling Towers (2-cell)/induced draft/stain. steel. - CT-1&2	440.00	ton	327.21	143,972
393	Mini-spilt AC system/1-zone/wall mnt. indoor/36 mbh - IDF Room	1.00	ea	4,275.98	4,276
394	- Mini-split condensate pump	1.00	ea	260.18	260
395	- Mini-split refrigeration line set/36 mbh - 50'	1.00	ea	773.96	774
	D3052 - Cooling Systems				1,260,105
	D3054 - Miscellaneous Heating/Cooling Systems				
396	Type L Copper Pipe & Ftgs/Pressfit - Snow melt	100.00	lf	39.27	3,927
397	Factory fabricated mechanical room rooftop enclosure	1.00	ea	1,521,158.40	1,521,158
398	Glycol feeder/50 gal. tank w/pump - Snow melt	1.00	ea	5,403.96	5,404
399	- Glycol solution/propylene/ ? %/Snow melt	165.00	gal	26.61	4,391
400	Heat exch./plate & frame/water to glycol/240 MBH - Snow melt	1.00	ea	7,060.80	7,061
	D3054 - Miscellaneous Heating/Cooling Systems				1,541,941
	D3055 - Pumps & Accessories/HVAC				
401	Flow meter/pitot tube/CHW system (inc.)	-	ea	-	-
402	Flow meter/pitot tube/HW system (inc.)	-	ea	-	-
403	Expansion tank/ASME/ ? gal./CHW system (inc.)	-	ea	-	-
404	Expansion tank/ASME/ ? gal./HW system - ET-1 (inc.)	-	ea	-	-
405	Air separator/CHW system (inc.)	-	ea	-	-
406	Air separator/HW system - AS-1 (inc.)	-	ea	-	-
407	- Triple duty valves/CW pumps (inc.)	-	ea	-	-
408	- Triple duty valves/CHW pumps (inc.)	-	ea	-	-
409	- Triple duty valves/HW pumps (inc.)	-	ea	-	-
410	- Flex connectors/pumps/CW pumps (inc.)	-	ea	-	-
411	- Flex connectors/pumps/CHW pumps (inc.)	-	ea	-	-
412	- Flex connectors/HW pumps (inc.)	-	ea	-	-
413	- Suction diffusers/CW pumps (inc.)	-	ea	-	-
414	- Suction diffusers/CHW pumps (inc.)	-	ea	-	-
415	- Suction diffusers/HW pumps (inc.)	-	ea	-	-
416	Pump/base mount/? hp/? gpm/? tdh/CW - P-9 - 12 (inc.)	-	ea	-	-
417	Pump/base mount/? hp/? gpm/? tdh/CHW - P-5 - 8 (inc.)	-	ea	-	-
418	Pump/base mount/? hp/? gpm/? tdh/HW - P-1 - 4 (inc.)	-	ea	-	-
419	Pump/in-line/? hp/? gpm/? tdh - Snow melt	2.00	ea	2,168.48	4,337
420	- Flex connectors/pumps - Snow melt	4.00	ea	167.90	672
421	- Triple duty valves - Snow melt	2.00	ea	540.69	1,081

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Koulohera s (East)				
	D30 - HVAC				
	D3055 - Pumps & Accessories/HVAC				
422	Air separator - Snow melt	1.00	ea	344.69	345
423	Expansion tank/ASME/? gal. - Snow melt	1.00	ea	1,726.60	1,727
	D3055 - Pumps & Accessories/HVAC				8,161
	D3056 - Chemical Treatment				
424	- Glycol solution/propylene 35%/CHW System (inc.)	330.00	gal	26.61	8,782
425	Glycol feeder/50 gal. tank w/pump/CHW System - GF-2 (inc.)	-	ea	-	-
426	- Glycol solution/propylene/ ? %/HW System	385.00	gal	26.61	10,246
427	Glycol feeder/50 gal. tank w/pump/HW System - GF-1 (inc.)	-	ea	-	-
428	Shot feeder/5 gallon/CW system (inc.)	-	ea	-	-
429	Shot feeder/5 gallon/CHW System (inc.)	-	ea	-	-
430	Shot feeder/5 gallon/HW System (inc.)	-	ea	-	-
431	Chemical treatment/HW System	1.00	ea	12,500.00	12,500
432	Chemical treatment/CHW System	1.00	ea	10,000.00	10,000
433	Chemical treatment/CW system	1.00	ea	5,000.00	5,000
	D3056 - Chemical Treatment				46,528
	D3057 - Air Distribution Systems				
434	SM - Boilers combustion air/galvanized	80.00	lf	162.44	12,995
435	SM - Boilers venting/aluminized stain. steel/double wall	80.00	lf	293.79	23,503
436	SM - Guy wires support (roof flue piping)	1.00	ea	3,448.80	3,449
437	Air Handling Unit/modular/cfm - AHU-1	19,000.00	cfm	12.54	238,260
438	Air Handling Unit/modular/cfm - AHU-5	18,000.00	cfm	12.54	225,720
439	Air Handling Unit/modular/cfm - AHU-4	24,000.00	cfm	12.54	300,960
440	Air Handling Unit/modular/cfm - AHU-3	24,000.00	cfm	12.54	300,960
441	Air Handling Unit/modular/cfm - AHU-2	19,000.00	cfm	12.54	238,260
442	Air Handling Unit/modular/cfm - AHU-6	7,500.00	cfm	12.54	94,050
443	Air Handling Unit/modular/cfm - AHU-7	11,000.00	cfm	12.54	137,940
444	Air Handling Unit/modular/cfm - AHU-8	11,000.00	cfm	12.54	137,940
445	Air Handling Unit/modular/cfm - AHU-9	4,000.00	cfm	12.54	50,160
446	SM - Galvanized ductwork - AHU's	171,875.00	lb	10.84	1,862,266
447	SM - Galvanized ductwork - Bathrooms exhaust 100 CFM/Fixt. - 1 Lb/CFM	12,000.00	lb	10.84	130,020
448	SM - Galvanized ductwork - Misc. exhaust	6,000.00	lb	10.84	65,010
449	SM - Stainless steel ductwork/welded seam - Lab hoods exhaust	12,500.00	lb	25.87	323,388
450	SM - Galvanized ductwork - Kiln exhaust	1,000.00	lb	10.84	10,835

SKANSKA

Estimate Detail		Lowell High School - Schematic Reconciled		
	Description	Qty	Unit Cost	Amount
	--- - Base			
	A - Renovate Kouloheras (East)			
	D30 - HVAC			
	D3057 - Air Distribution Systems			
451	SM - Diffusers, registers & grilles	280.00 ea	227.25	63,630
452	SM - Displacement diffusers/floor mount/275 CFM	132.00 ea	501.30	66,172
453	SM - Displacement diffusers/floor mount/450 CFM	268.00 ea	1,387.20	371,770
454	SM - Fire dampers/curtain type	130.00 ea	257.70	33,501
455	SM - Fire/smoke dampers/louver type	48.00 ea	620.40	29,779
456	SM - Motorized dampers	4.00 ea	815.40	3,262
457	SM - Duct smoke detector	18.00 ea	604.50	10,881
458	SM - Sound attenuators (18)/in-line - SATT's	275,000.00 cfm	0.50	137,499
459	EF/centrifugal downblast/belt drive/roof - Bath exh. fans Greenheck #GB200-5	3.00 ea	2,451.80	7,355
460	EF/centrifugal downblast/belt drive/roof - Misc. exh. fans Greenheck #GB121-3	3.00 ea	1,779.20	5,338
461	Lab exhaust fan/high plume/roof (3,000 cfm est.) - LEF Greenheck Vektor CD	1.00 ea	18,609.00	18,609
462	Lab exhaust fan/high plume/roof (6,000 cfm est.) - LEF Greenheck Vektor CD	1.00 ea	33,730.80	33,731
463	EF/centrifugal in-line/belt drive/box/? cfm (inc.) Greenheck # BSQ140-7	- ea	-	-
464	EF/centrifugal in-line/belt drive/box- Misc. exh. fans Greenheck # BSQ120-5	3.00 ea	2,077.75	6,233
465	- Roof curb/standard/EF's (roof)	6.00 ea	1,287.20	7,723
466	Louver/36"x36"/? free area/? cfm (inc.)	- ea	-	-
467	Kiln exhaust hood/ ? cfm Vent-A-Kiln	1.00 ea	1,472.00	1,472
	D3057 - Air Distribution Systems			4,952,670
	D3058 - Terminal Equipment			
468	VAV box/small - VAV's	68.00 ea	618.30	42,044
469	VAV box/medium - VAV's	78.00 ea	778.10	60,692
470	VAV box/large - VAV's	46.00 ea	965.90	44,431
471	- Sound attenuators/VAV's	192.00 ea	463.60	89,011
472	Unit heater/hydronic/ceiling mnt./propeller/? mbh (inc.)	- ea	-	-
473	Cabinet unit heater/hydronic/wall mount exposed - CUH's	8.00 ea	1,757.20	14,058
474	Cabinet unit heater/hydronic/ceiling mount - CUH's	12.00 ea	1,845.75	22,149
475	Unit heater/hydronic/ceiling mnt./propeller - UH's	5.00 ea	1,260.40	6,302
476	Unit heater/electric/propeller - EUH's	5.00 ea	1,330.60	6,653

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D30 - HVAC				
	D3058 - Terminal Equipment				
477	Chilled beam/hydr. 2-pipe/clg. mnt./active/4'x2' - CHB's	30.00	ea	729.50	21,885
478	Chilled beam/hydr. 2-pipe/clg. mnt./active/8'x2' - CHB's	508.00	ea	1,150.40	584,403
479	Outdoor PEX tubing - Snow melt	6,115.00	sf	8.94	54,644
480	- Manifolds - Snow melt	2.00	ea	704.50	1,409
481	- Control panel/outdoor system - Snow melt	2.00	ea	593.60	1,187
	D3058 - Terminal Equipment				948,868
	D3090 - Variable Frequency Drives				
482	Variable Frequency Drives/ ? HP/CHW pumps (inc.)	-	ea	-	-
483	Variable Frequency Drives/ ? HP/HW pumps (inc.)	-	ea	-	-
484	Variable Frequency Drives/ ? HP/CW pumps (inc.)	-	ea	-	-
	D3090 - Variable Frequency Drives				-
	D3099 - Material Handling/Supports/Testing/Start Ups				
485	- Accessories installation/CT's	2.00	ea	974.40	1,949
486	- Crane & rigging/AHU's (rooftop)	3.00	day	12,397.60	37,193
487	- Accessories installation/AHU's	9.00	ea	974.40	8,770
488	- Start up/Boilers	3.00	ea	3,673.76	11,021
489	- Start up/CH's	2.00	ea	3,673.76	7,348
490	- Start up/CT's	2.00	ea	1,836.88	3,674
491	- Crane & rigging/CT's	1.00	day	12,397.60	12,398
492	- Crane & rigging/Prefab. mech. penthouse	1.00	day	30,846.40	30,846
493	- Assemby & conn's/Prefab mech. penthouse	1.00	ea	44,232.00	44,232
494	- Start up/CW pumps	4.00	ea	446.72	1,787
495	- Start up/CHW pumps	4.00	ea	446.72	1,787
496	- Start up/HW pumps	4.00	ea	446.72	1,787
497	- Inertia base/CW pumps (inc.)	-	ea	-	-
498	- Inertia base/CHW pumps (inc.)	-	ea	-	-
499	- Inertia base//HW pumps (inc.)	-	ea	-	-
500	- Start up/AHU's	9.00	ea	1,224.40	11,020
501	- Offload & rigging/SATT's	18.00	ea	1,074.40	19,339
502	- Support steel/SATT's	18.00	ea	354.50	6,381
503	- Crane & rigging/EF's (roof)	2.00	day	10,448.80	20,898
504	- Start up/EF's	11.00	ea	33.06	364
505	- Support steel/EF's (indoor)	3.00	ea	354.50	1,064
506	- Offload & rigging/Ef's (indoor)	3.00	ea	465.40	1,396
507	- Roof support stands/LEF's	4.00	ea	514.60	2,058
508	- Fill & vent system/CW piping	1.00	ea	1,132.92	1,133

SKANSKA

	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D30 - HVAC				
	D3099 - Material Handling/Supports/Testing/Start Ups				
509	- Clean & test system/CW piping	1.00	ea	1,157.92	1,158
510	- Heat tracing/CW make-up piping	50.00	lf	31.61	1,581
511	- Roof support stands/CW piping (roof)	8.00	ea	413.36	3,307
512	- Hangers & clamps/CW piping	200.00	lf	3.32	664
513	- Fill & vent system/HW piping	1.00	ea	2,265.84	2,266
514	- Clean & test system/HW piping	1.00	ea	2,415.84	2,416
515	- Hangers & clamps/HW piping	33,600.00	lf	2.56	85,946
516	- Fill & vent system/CHW piping	1.00	ea	2,240.84	2,241
517	- Clean & test system/CHW piping	1.00	ea	2,390.84	2,391
518	- Hangers & clamps/CHW piping	30,600.00	lf	3.32	101,665
519	- Hangers & clamps/Snow melt	100.00	lf	2.56	256
520	- Clean & test system/Snow melt	1.00	ea	1,157.92	1,158
521	- Fill & vent system/Snow melt	1.00	ea	1,132.92	1,133
522	- Offload & distribution/VAV's	192.00	ea	182.70	35,078
523	- Support steel/VAV's	192.00	ea	354.50	68,064
524	- Offload & distribution/UH's & CUH's	30.00	ea	121.80	3,654
525	- Support steel/UH's & CUH's	22.00	ea	293.60	6,459
526	- Start up/UH's & CUH's	30.00	ea	33.06	992
527	- Offload & distribution/CHB's	538.00	ea	121.80	65,528
528	- Support steel/CHB's	538.00	ea	146.80	78,978
529	- Offload & rigging/Kiln	1.00	ea	1,074.40	1,074
530	- Start up/Kiln	1.00	ea	314.48	314
531	- Offload & distribution/Mini-split AC	2.00	ea	243.60	487
532	- Start up/Mini-split AC	1.00	ea	314.48	314
533	- Roof support stands/Mini-split AC	2.00	ea	397.70	795
534	- Hangers & clamps/AC cond. drains	50.00	lf	1.79	90
	D3099 - Material Handling/Supports/Testing/Start Ups				694,454
	D30 - HVAC				13,727,637
	D40 - FIRE PROTECTION				
	D4000 - Fire Suppression				
535	Project management	1.00	ls	7,500.00	7,500
536	Commissioning support/lump sum	1.00	ls	5,000.00	5,000
537	Demolition/cut, drop & make safe/lump sum	1.00	ls	10,000.00	10,000
538	General requirements/square foot	297,133.00	sf	0.35	103,997
	D4000 - Fire Suppression				126,497

SKANSKA

Estimate Detail				Lowell High School - Schematic Reconciled
	Description	Qty	Unit Cost	Amount
	--- - Base			
	A - Renovate Kouloheras (East)			
	D40 - FIRE PROTECTION			
	D4020 - Fire Supression Equipment			
539	Double check valve assembly/Entrance/6"	1.00 ea	6,376.36	6,376
540	Wet Alarm Check Valve Assembly 6"	1.00 ea	4,629.35	4,629
541	Dry Alarm Check Valve Assembly (Attic)	1.00 ea	5,254.75	5,255
542	Check Valve/Swing/Grooved 4"	2.00 ea	456.57	913
543	Control valve assembly/Floor/2-1/2"	13.00 ea	3,614.69	46,991
544	Valve w/fire hose connection/Floor/2-1/2"	30.00 ea	1,308.43	39,253
545	Inspector test & drain station/Floor/2-1/2"	13.00 ea	1,933.09	25,130
546	Air Compressor 1/2 HP	1.00 ea	8,320.70	8,321
547	Sprinkler head/Upright Avg. = 130sf/Head	350.00 ea	111.41	38,992
548	Sprinkler head/Pendant/Semi-recessed Avg. = 130sf/Head	2,000.00 ea	163.81	327,612
549	Sprinkler head/Sidewall/Exposed Avg. = 130sf/Head	50.00 ea	117.38	5,869
550	Sprinkler head/Dry pendant/Exposed (Attic) Avg. = 130sf/Head\b\i	500.00 ea	254.84	127,419
551	Hose Connection/Single (Storz) - 4"	4.00 ea	353.42	1,414
552	Hose Connection/Roof manifold - 2-1/2"	1.00 ea	479.60	480
553	Water motor gong	1.00 ea	1,618.46	1,618
	D4020 - Fire Supression Equipment			640,272
	D4030 - Fire Protection Specialties			
554	Recessed Fire Extinguishers/Fire Extinguisher Cabinets 1 every 2,500sf	155.00 ea	400.00	62,000
	D4030 - Fire Protection Specialties			62,000
	D4050 - Fire Supression Sprinkler Piping			
555	Sch 40 Galv Steel (ERW) Pipe & Ftgs/T&C - SPK branches	1,500.00 lf	35.36	53,045
556	Sch 10 Galv Steel (LW) Pipe & Ftgs/Grooved - SPK mains	500.00 lf	115.27	57,633
557	Sch 40 Galv Steel (ERW)/Grooved - SPK FD valves to check valves	100.00 lf	118.26	11,826
558	Ductile Iron/Cement-Lined - Fire service entrance 6"	20.00 lf	447.42	8,948
559	Sch 40 Black Steel (ERW) Pipe & Ftgs/Grooved - SPK branches	11,750.00 lf	32.45	381,306
560	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK mains	2,500.00 lf	109.70	274,260
561	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK drains	500.00 lf	59.70	29,848
	D4050 - Fire Supression Sprinkler Piping			816,867

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail			Lowell High School - Schematic Reconciled			
	Description		Qty		Unit Cost	Amount
	--- - Base					
	A - Renovate Kouloheras (East)					
	D40 - FIRE PROTECTION					
	D4099 - Material Handling/Supports/Testing/Start Ups					
562	- Hangers & clamps/SPK piping		16,100.00	lf	3.32	53,491
563	- Clean & test system/SPK piping		1.00	ea	2,415.84	2,416
564	- Fill & vent system/SPK piping		1.00	ea	2,265.84	2,266
565	- Offload & rigging/FP air comp.		1.00	ea	264.48	264
566	- Start up/FP air comp.		1.00	ea	33.06	33
567	- Hangers & clamps/SPK piping		2,000.00	lf	3.32	6,645
568	- Clean & test system/SPK piping		1.00	ea	893.44	893
	D4099 - Material Handling/Supports/Testing/Start Ups					66,008
	D40 - FIRE PROTECTION					1,711,644
	D50 - ELECTRICAL					
	D5010 - Electrical Service & Distribution					
569	MSB-BE : 4000 amp 480/277 volt, 17- Cb's & 1-Main Main + 17 Cb's		1.00	ea	275,599.32	275,599
570	Distribution Panel 1,200 amp 208/120 volt		2.00	ea	15,119.87	30,240
571	Distribution Panel 400 amp 480/277 volt		4.00	ea	5,772.26	23,089
572	Meter Pan		1.00	ea	500.00	500
573	Service Grounding		1.00	ea	5,000.00	5,000
574	Digital Monitoring		1.00	ea	3,500.00	3,500
575	Surge Protector - Pnl Mounted		22.00	ea	200.00	4,400
576	Surge Protector - Swbd		1.00	ea	750.00	750
577	Enclosed CB's 225Amp		1.00	ea	1,500.00	1,500
578	Enclosed CB's 150Amp		1.00	ea	750.00	750
579	Recpt Panel 225 amp 208/120 volt K		5.00	ea	1,941.35	9,707
580	Recpt Panel 225 amp 208/120 volt two section K		4.00	ea	3,358.31	13,433
581	Lighting Panel 225 amp 480/277 volt		4.00	ea	2,210.28	8,841
582	Dimming Panel : 225A-208V-3Ph		1.00	ea	72,979.45	72,979
583	Dry-Type Transformer Copper Windings 75 KVA		1.00	ea	3,738.69	3,739
584	Dry-Type Transformer Copper Windings 300 KVA K-13		2.00	ea	20,001.20	40,002
585	Change Panelboard Bussing to AL		1.00	ea	(45,170.00)	(45,170)
	D5010 - Electrical Service & Distribution					448,860
	D5011 - Normal Feeder					
586	A Normal Feeder Detail 4 Wire + Ground		60.00	lf	367.70	22,062
587	A Normal Feeder Detail 4 Wire + Ground		250.00	lf	100.23	25,059
588	A Normal Feeder Detail 3 Wire + Ground		100.00	lf	79.66	7,966
589	A Normal Feeder Detail 3 Wire + Ground		90.00	lf	24.97	2,247
590	A Normal Feeder Detail 5 Wire + Ground		2,000.00	lf	50.20	100,397

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
A - Renovate Kouloheras (East)						
D50 - ELECTRICAL						
D5011 - Normal Feeder						
591	A	Normal Feeder Detail 4 Wire + Ground	500.00	lf	41.75	20,873
592	A	Normal Feeder Detail 4 Wire + Ground	200.00	lf	42.28	8,456
593		Precast Manhole 8'x10'x8' ID	1.00	ea	16,267.12	16,267
		D5011 - Normal Feeder				203,326
D5012 - Emergency/UPS Distribution						
594		UPS System 45 KW - 8 Min	1.00	ea	70,842.98	70,843
595		ATS-LS-PE : 150 amp 480 volt	1.00	ea	8,198.62	8,199
596		ATS-OS-PE : 400 amp 480 volt	1.00	ea	12,922.94	12,923
597		Distribution Panel 400 amp 208/120 volt	1.00	ea	4,522.26	4,522
598		Distribution Panel 225 amp 480/277 volt	1.00	ea	3,635.29	3,635
599		Distribution Panel 400 amp 480/277 volt	1.00	ea	5,772.26	5,772
600		Recpt Panel 125 amp 208/120 volt K	1.00	ea	1,292.37	1,292
601		Recpt Panel 125 amp 208/120 volt two section K	1.00	ea	3,358.30	3,358
602		Lighting Panel 100 amp 480/277 volt	4.00	ea	1,579.89	6,320
603		EPO Switch	1.00	ea	400.00	400
604		Dry-Type Transformer Copper Windings 75 KVA K-13	1.00	ea	5,763.88	5,764
605		DS 200 a 480v Fused NEMA 1	1.00	ea	794.07	794
		D5012 - Emergency/UPS Distribution				123,823
D5014 - Emergency/UPS Feeder						
606	A	Normal Feeder Detail 4 Wire + Ground	960.00	lf	93.77	90,020
607	A	Normal Feeder Detail 4 Wire + Ground	1,250.00	lf	40.58	50,731
608	A	Normal Feeder Detail 3 Wire + Ground	30.00	lf	36.72	1,102
609	A	Normal Feeder Detail 4 Wire + Ground	1,000.00	lf	20.50	20,500
610	A	Normal Feeder Detail 5 Wire + Ground	400.00	lf	23.42	9,370
		D5014 - Emergency/UPS Feeder				171,723
D5015 - Equipment Connections						
611	A	Elevator Connection Main	2.00	ea	2,375.52	4,751
612	A	Elevator Connection Auxilliary	2.00	ea	1,677.39	3,355
613		Mechanical Connections	289,500.00	sf	2.00	579,000
		D5015 - Equipment Connections				587,106
D5016 - Lightning Protection						
614		Lightning Protection	65,213.00	sf	1.85	120,655
		D5016 - Lightning Protection				120,655
D5020 - LIGHTING						
615	A	TH1 Track - Pendant Unistrut Support	1,134.00	lf	50.19	56,913
616	A	TH1 Track Head	128.00	ea	349.18	44,695

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail			Lowell High School - Schematic Reconciled		
	Description		Qty	Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D50 - ELECTRICAL				
	D5020 - LIGHTING				
617	A	Unspecified Track Head	144.00 ea	336.68	48,482
618	A	Unistrut Support	1,134.00 lf	55.43	62,854
619	A	Aisle Ltg	112.00 ea	757.75	84,868
620	A	Transformer Aisle Ltg	2.00 ea	1,467.91	2,936
621	A	SL3 : LED Wall Mtd	3.00 ea	1,235.24	3,706
622	A	SL4 : LED Wall Mtd	7.00 ea	1,297.73	9,084
623	A	HR : LED Handrail	1.00 ea	30,202.29	30,202
624	A	Exit Light	169.00 ea	696.15	117,649
625	A	EL : 4Ft Utility	39.00 ea	414.00	16,146
626	A	LC4 : Cove Lighitng	1.00 ea	827.62	828
627	A	LC6 : Cove Lighting	1.00 ea	5,651.90	5,652
628	A	LC6 EM : Cove Lighting	1.00 ea	28,455.71	28,456
629	A	LC8 : Cove Lighting	1.00 ea	3,965.24	3,965
630	A	LC8 EM : Cove Ltg	1.00 ea	33,852.97	33,853
631	A	LP8 : 8Ft Pendant Indirect/Direct - Corridor	568.00 ea	873.95	496,404
632	A	LP8 : 8Ft Pendant Indirect/Direct	755.00 ea	983.95	742,883
633	A	LR4 : 4Ft Recessed	5.00 ea	781.56	3,908
634	A	LR8 : 8Ft Recessed	11.00 ea	1,383.95	15,223
635	A	LR24 : 4Ft Recessed	308.00 ea	781.55	240,718
636	A	LS8 : 8ft Utility Fixture	3.00 ea	471.44	1,414
637	A	LS8B : 8ft Utility	56.00 ea	471.45	26,401
638	A	LS8 EM : 8Ft Utility Fixture	8.00 ea	471.45	3,772
639	A	LV4 : 4ft Gasketed	3.00 ea	490.28	1,471
640	A	LV8 : 8Ft Gasketed	20.00 ea	596.45	11,929
641	A	LV8 : 8Ft Gasketed	20.00 ea	596.45	11,929
642	A	PC1 : 6" Dowlight	69.00 ea	669.56	46,200
643	A	PC1 Em : 6" Pendant Downlight	60.00 ea	669.57	40,174
644	A	P48 : 48" Dia Pendant Downlight	14.00 ea	2,497.17	34,960
645	A	P48 EM : 48" Dia Pendant Downlight	15.00 ea	2,350.48	35,257
646	A	RC1 : 6" Downlight	48.00 ea	669.57	32,139
647	A	RSH : 6" Downlight	11.00 ea	669.57	7,365
648		Install & Wire Theatrical Lights	1.00 ls	120,000.00	120,000
		Theatrical Lighting FF&E (FBO)			
		D5020 - LIGHTING			2,422,437
		D5021 - LIGHTING CONTROL SYSTEM			
649	A	OS - Occ Sensor Ceiling	206.00 ea	278.18	57,305

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
A - Renovate Kouloheras (East)						
D50 - ELECTRICAL						
D5021 - LIGHTING CONTROL SYSTEM						
650	A	PS - Photoelectric Sensor	156.00	ea	552.96	86,262
651	A	L - Local Switching	171.00	ea	331.84	56,745
652		Stage Lighting Dimming System	1.00	ea	100,000.00	100,000
653		Building Lighting Control System	289,500.00	sf	1.50	434,503
654		Install Pipe Grid	1.00	ls	15,000.00	15,000
		D5021 - LIGHTING CONTROL SYSTEM				749,814
D5025 - POWER BRANCH WIRING						
655	A	Receptacle	739.00	ea	282.50	208,768
656	A	Receptacle Corridor	182.00	ea	355.57	64,715
657	A	Quad Receptacle	432.00	ea	383.03	165,470
658	A	TVE : Quad Receptacle	121.00	ea	383.03	46,347
659	A	Receptacle GFI	67.00	ea	369.94	24,786
660	A	Special Receptacle	24.00	ea	527.27	12,655
661	A	Cord Reel	48.00	ea	685.92	32,924
662	A	Receptacle GFI WP	40.00	ea	684.04	27,362
663	A	JB Projector	130.00	ea	798.94	103,862
664	A	Clock Hanger Outlet	150.00	ea	246.24	36,936
665	A	JB Hand Dryer	16.00	ea	629.31	10,069
666		Wiremold EFSB4 & Wiremold EFSB4 Box	95.00	ea	250.00	23,750
667		AV System Power Connection (Allow)	1.00	ls	50,000.00	50,000
		D5025 - POWER BRANCH WIRING				807,642
D5031 - FIRE ALARM & DETECTION SYSTEM						
668	A	Fire Alarm Control Panel	1.00	ea	16,202.95	16,203
669	A	Data Gathering Panel	3.00	ea	2,831.36	8,494
670	A	Pull Station	42.00	ea	661.10	27,766
671	A	Smoke Detector Corridor	160.00	ea	615.26	98,441
672	A	Smoke Detector Stair/Utility Room	50.00	ea	773.66	38,683
673	A	Smoke Detector Elev	8.00	ea	615.26	4,922
674	A	Heat Detector	20.00	ea	742.66	14,853
675	A	Duct Detector, Cond & Wire	16.00	ea	1,189.65	19,034
676	A	Duct Detector Remote Test	16.00	ea	398.40	6,374
677	A	Tamper Switch	24.00	ea	712.66	17,104
678	A	Flow Switch	24.00	ea	712.66	17,104
679	A	Control Module	70.00	ea	800.66	56,046
680	A	Strobe - Classroom	121.00	ea	602.73	72,931
681	A	Monitor Module	60.00	ea	709.30	42,558

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail		Lowell High School - Schematic Reconciled			
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	D50 - ELECTRICAL				
	D5031 - FIRE ALARM & DETECTION SYSTEM				
682	A Fireman Phone	8.00	ea	609.73	4,878
683	A Outdoor Gong	1.00	ea	791.60	792
684	A Door Holder	144.00	ea	679.73	97,881
685	A Speaker Strobe	280.00	ea	656.56	183,838
686	A Strobe	35.00	ea	602.73	21,096
687	A Remote Annunciator	1.00	ea	4,326.99	4,327
	D5031 - FIRE ALARM & DETECTION SYSTEM				753,325
	D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				
688	Card Reader	12.00	ea	4,273.97	51,288
	Adjusted Base on Reconcilliation- No CR in Classroom				
689	Card Reader Headend	1.00	ea	34,743.15	34,743
690	Classroom Intercom	121.00	ls	2,136.99	258,575
	D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				344,606
	D5033 - ELECTRONIC SURVEILLANCE				
691	Security Head End Equipment	1.00	ea	190,294.52	190,295
692	Motion Detector	52.00	ea	1,068.49	55,562
693	Camera Wp 360 Deg - IP	6.00	ea	4,099.32	24,596
694	Camera - IP	2.00	ea	3,474.31	6,949
695	Corridor Camera - IP	74.00	ea	3,474.32	257,099
696	Dome Camera - IP	28.00	ea	3,474.32	97,281
	D5033 - ELECTRONIC SURVEILLANCE				631,781
	D5034 - Clock System				
697	Synchronous Wireless Clock	150.00	ea	389.90	58,485
698	Tone Generator	4.00	ea	2,749.11	10,996
699	GPS Receiver & Transmitter	8.00	ea	5,334.76	42,678
	D5034 - Clock System				112,160
	D5040 - Telephone Data System				
700	Telephone Data System	289,500.00	sf	3.50	1,013,250
701	LV Cable Tray	3,500.00	lf	50.00	175,000
	D5040 - Telephone Data System				1,188,250
	D5044 - Audio Visual System				
702	AV System Rough in (Allowance)	1.00	ls	25,000.00	25,000
703	Install AV Equipment (Allowance)	1.00	ls	125,000.00	125,000
	D5044 - Audio Visual System				150,000
	D5045 - Two Way Communication System				
704	Two Way Communication System	8.00	sf	3,500.00	28,000

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail			Lowell High School - Schematic Reconciled			
	Description		Qty		Unit Cost	Amount
--- - Base						
A - Renovate Kouloheras (East)						
D50 - ELECTRICAL						
	D5045 - Two Way Communication System					28,000
	D5046 - Distributed Antenna System					
705		Distributed Antenna System	289,500.00	sf	0.50	144,952
	D5046 - Distributed Antenna System					144,952
	D5050 - Public Address System					
706	A	Speaker Recessed Mounted	160.00	ea	223.66	35,786
707	A	Speaker Corridor	170.00	ea	223.66	38,022
708	A	Equalizer	4.00	ea	2,860.54	11,442
709	A	Amplifier	4.00	ea	3,136.23	12,545
	D5050 - Public Address System					97,795
	D5060 - Renewable Energy System					
710		PV System 100 KW Grid - Excluded	1.00	ls	-	-
	D5060 - Renewable Energy System					-
	D5090 - MIscellaneous System					
711		Temporary Power & Light	289,500.00	sf	1.75	506,878
712		Labelling	289,000.00	sf	0.05	14,702
713		Coring & Firestop Seal	1.00	ls	35,000.00	35,000
714		Safe-off Wiring	1.00	ls	6,986.36	6,986
	D5090 - MIscellaneous System					563,567
D50 - ELECTRICAL						9,649,820
E10 - EQUIPMENT						
	E1090 - Other Equipment					
715		Stage Curtain & Rigging - Allowance	1.00	ea	315,000.00	315,000
716		Classroom Equipment Allowance	1.00	ea	165,000.00	165,000
717		AV Equipment Allowance	1.00	ea	585,000.00	585,000
718		Fixed Auditorium Seating	1,279.00	ea	300.00	383,700
719		Residential Equipment Allowance	1.00	ea	25,000.00	25,000
720		Protect and Repair Histrocie Clock	1.00	ea	20,000.00	20,000
	E1090 - Other Equipment					1,493,700
E10 - EQUIPMENT						1,493,700
E20 - FURNISHINGS						
	E2010 - Fixed Furnishings					
721		Upper Cabinets	400.00	lf	300.00	120,000
722		Lower Cabinets w/ SS Top	530.00	lf	550.00	291,500
723		Tall Storage Units	261.00	ea	2,000.00	522,000
724		Work Station Desk w/ Shelving	120.00	lf	450.00	54,000
725		Work Counters	55.00	lf	325.00	17,875

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	E20 - FURNISHINGS				
	E2010 - Fixed Furnishings				
726	Book Cases	390.00	NIC	-	-
	FF&E				
727	Lab Upper Cabinets	800.00	lf	550.00	440,000
728	Lab Lower Cabinets w/ Epoxy Top	800.00	lf	700.00	560,000
729	Epoxy Mobile Lab Tables	108.00	ea	2,500.00	270,000
730	Mailbox Unit	5.00	ea	300.00	1,500
731	Band Instrument Storage Unit	1.00	ea	5,000.00	5,000
732	Window Treatments	22,647.00	sf	8.00	181,176
733	Window Treatments - Motorized @ Music Room	1.00	ls	25,000.00	25,000
734	Delete Interior Shades	1.00	ea	(15,000.00)	(15,000)
	E2010 - Fixed Furnishings				2,473,051
	E20 - FURNISHINGS				2,473,051
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				
735	Select Exterior Demolish - Windows, Perimeter Sealants & Prep for New Window (572ea)	21,236.00	sf	10.00	212,360
736	Select Exterior Demolish - Storefront	3,190.00	sf	5.00	15,950
737	Select Exterior Demolish - Remove 50% of Sills & Capstone	282.00	ea	200.00	56,400
	Per note on AD-202				
738	Select Exterior Demolish - Lightwells (SOG, Walls & Windows)	4.00	ea	10,000.00	40,000
739	Select Exterior Demolish - Skylights	617.00	sf	10.00	6,170
740	Select Exterior Demolish - Roofing	-	na	-	-
741	Select Exterior Demolish - Brick	316.00	sf	15.00	4,740
742	Select Exterior Demolish - Steel Security Screens	124.00	ea	150.00	18,600
743	Select Exterior Demolish - Entrance	1,512.00	sf	25.00	37,800
744	Select Interior Demolish - Wood Framed Tiered Platforms	5,576.00	sf	5.00	27,880
745	Select Interior Demolish - Elevators & ADA lifts	4.00	ea	8,000.00	32,000
746	Select Interior Demolish - Storefront	3,570.00	sf	3.00	10,710
747	Select Interior Demolish - CMU & Clay Tile Walls	96,889.50	sf	5.00	484,448
748	Select Interior Demolish - GWB Walls	98,739.00	sf	3.50	345,587
749	Select Interior Demolish - Concrete Slabs (Ramps, Stairs, Mech Pads, SOG & SOMD)	6,473.00	sf	18.00	116,514
750	Select Interior Demolish - Doors	433.00	ea	150.00	64,950
751	Select Interior Demolish - Specialties, Millwork, Equipment & Ceilings	297,133.00	sf	2.50	742,833
752	Select Interior Demolish - Flooring	238,133.00	sf	1.50	357,200

SKANSKA

	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	A - Renovate Kouloheras (East)				
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				
753	Select Interior Demolish - Mezzanine	3,433.00	sf	20.00	68,660
754	Abatement of Hazardous Materials	1.00	ea	1,003,000.00	1,003,000
	The 1922's East building abatement allowance does not included the bridge abatement cost. The Bridge abatement cost is broken out in Section E Bridges.				
755	Select Exterior Demolish - Stairs	5.00	ea	15,000.00	75,000
	F2010 - Building Elements Demolition				3,720,800
	F20 - SELECTIVE BUILDING DEMOLITION				3,720,800
	A - Renovate Kouloheras (East)				69,707,451
	B - Renovation / Addition Lord (West)				
	A10 - FOUNDATIONS				
	A1010 - Standard Foundations				
756	Grade Beams	180.00	cy	650.00	117,000
757	Pile Caps	286.00	cy	650.00	185,900
758	Canopy Foundations - Allowance	1.00	ls	60,000.00	60,000
759	Elevator Pit Walls	203.00	sf	50.00	10,150
760	Elevator Pit Slab	155.00	sf	25.00	3,875
	A1010 - Standard Foundations				376,925
	A1020 - Special Foundations				
761	Pile Mobilization & Testing	1.00	ls	40,000.00	40,000
762	Pile Layout	215.00	ea	200.00	43,000
763	Column Piles - 45'	181.00	ea	4,050.00	733,050
764	Slab Piles - 45'	34.00	ea	4,050.00	137,700
765	Pile Pre-Drilling	215.00	ea	450.00	96,750
	A1020 - Special Foundations				1,050,500
	A10 - FOUNDATIONS				1,427,425
	B10 - SUPERSTRUCTURE				
	A1010 - Standard Foundations				
766	Slab on Metal Deck - 6-1/4" NWC	40,621.00	sf	8.00	324,968
767	Thickened Slab @ Slab Piles	9.00	yds	750.00	6,750
768	Structural Slab on Grade - 10"	26,160.00	sf	25.00	654,000
769	Slab Depressions	1,190.00	sf	20.00	23,800
770	MEP Housekeeping Pads	600.00	sf	25.00	15,000
	A1010 - Standard Foundations				1,024,518
	B1010 - Floor Construction				
771	Structural Steel & Metal Deck	395.00	tons	3,900.00	1,540,500
772	Misc. Metals	156,693.00	sf	1.50	235,040

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	B10 - SUPERSTRUCTURE				
	B1010 - Floor Construction				1,775,540
	B1020 - Roof Construction				
773	Structural Steel for Equipment Screen, Galvanized	4.00	tons	6,000.00	24,000
774	Brace Frames (HSS8x8x1/2)	94.00	tons	10,000.00	940,000
775	Brace Frames - Reinforce or Replace Existing Beams	16.00	tons	10,000.00	160,000
776	Miscellaneous Unforeseen Metal Fabrications	65,564.00	sf	1.50	98,346
777	Aircraft Cable Wires for Banner Support	12.00	ea	500.00	6,000
778	Canopy Steel Framing	2,984.00	sf	50.00	149,200
	B1020 - Roof Construction				1,377,546
	B10 - SUPERSTRUCTURE				4,177,604
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
779	Replace Exist Precast Lintel	57.00	loc	550.00	31,350
780	4" Polished CMU - W.14	3,770.00	ea	34.00	128,180
781	4" Brick Veneer	9,340.00	sf	38.00	354,920
782	Wash & Minor Repoint - Exist Brick to Remain	12,735.00	sf	8.75	111,431
783	Scaffold & Material Hoist	12,735.00	sf	5.45	69,406
784	8" 18-ga Galv Mtl Framing - Behind Masonry	13,110.00	sf	11.75	154,043
785	5/8" Densdeck Sheathing - Behind Masonry	13,110.00	sf	1.75	22,943
786	5/8" Densdeck Sheathing - Behind Metal Panels	1,370.00	sf	1.75	2,398
787	6" Rockwool Insulation - Behind Masonry	13,110.00	sf	6.75	88,493
788	6" Rockwool Insulation - Behind Metal Panels	1,370.00	sf	6.75	9,248
789	Air / Vapor Barrier - Behind Masonry	13,110.00	sf	7.50	98,325
790	Air / Vapor Barrier - Behind Metal Panels	1,370.00	sf	7.50	10,275
791	Air / Vapor Barrier - Window Perimeters	4,375.00	lf	6.50	28,438
792	Metal Panel Surrounds - Ext Column	1,440.00	sf	85.00	122,400
793	Metal Panel Soffit & Fascia - Canopies	6,260.00	sf	60.00	375,600
794	Equipment Screen - Rooftop	3,595.00	sf	65.00	233,675
795	Perimeter Flashing & Sealants	3,615.00	lf	8.50	30,728
796	Repoint Exist Brick Surrounding Replacement Windows	3,615.00	sf	12.00	43,380
797	Repoint Cracks in Exist Foundation	101.00	sf	35.00	3,535
798	Expansion Joint - Between Buildings	90.00	lf	35.00	3,150
799	Sealants & Backer Rod - Windows	3,615.00	lf	9.00	32,535
800	Sealants & Misc Closures - Masonry Wall	14,480.00	sf	3.25	47,060
801	2L 5/8" GWB - Inside Face of Outside Wall	14,480.00	sf	5.80	83,984
	B2010 - Exterior Walls				2,085,494

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	B - Renovation / Addition Lord (West)				
	B20 - EXTERIOR CLOSURE				
	B2020 - Exterior Windows				
802	Alum Window w/ Triple Pane Insul Glass, Insect Screen & 3-Coat Pt Fin	63.00	ea	5,870.00	369,810
803	Credit for Dual Pane Insulated Glass in lieu Triple Pane	1.00	ea	(220,000.00)	(220,000)
804	Credit for Storefront in lieu of Curtainwall on first Floor	1.00	ea	(62,500.00)	(62,500)
805	Alum Curtain Wall (CW2X & CW3x) w/ Triple Pane Insul Glass & Custom Pt Fin	15,645.00	sf	150.00	2,346,750
806	Ballistic Glass - Premium	45.00	sf	60.00	2,700
	B2020 - Exterior Windows				2,436,760
	B2030 - Exterior Doors				
807	6'-0" x 7'-0"Pr Steel Ext Door w/ & Hardware	1.00	pr	4,696.70	4,697
808	6'-0" x 7'-0"PR Alum & Glass Doors w/ Hardware	7.00	pr	17,214.80	120,504
809	Automatic Door Operator	4.00	ea	3,800.00	15,200
	B2030 - Exterior Doors				140,400
	B20 - EXTERIOR CLOSURE				4,662,654
	B30 - ROOFING				
	B3010 - Roof Coverings				
810	Pavers & Planters - Green Roof, Link	3,470.00	sf	20.00	69,400
811	Pavers & Planters - Green Roof, 3rd Fl Addition	2,750.00	sf	25.00	68,750
812	Expansion Joint - Between Buildings	110.00	lf	35.00	3,850
813	Canopy Roof Membrane - FL2	3,380.00	sf	16.00	54,080
814	TPO Roof Assembly	48,800.00	sf	20.00	976,000
815	Green Roof Membrane - 3rd Fl, Link	3,470.00	sf	35.00	121,450
816	Green Roof Membrane - 3rd Fl, Addition	2,750.00	sf	35.00	96,250
817	Miss Roof Work	48,800.00	sf	2.00	97,600
818	Guardrail - Green Roof	175.00	lf	450.00	78,750
819	Gravel Stop - Bulkheads	270.00	lf	15.00	4,050
820	Copings & Counter Flashings - Main Roof	1,850.00	lf	25.00	46,250
821	Copings & Counter Flashings - Geen Roof, 3rd Fl Addition	210.00	lf	25.00	5,250
	B3010 - Roof Coverings				1,621,680
	B3020 - Roof Openings				
822	Misc Roof Accessories - Allowance	1.00	ea	15,000.00	15,000
	B3020 - Roof Openings				15,000
	B30 - ROOFING				1,636,680
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
823	8" CMU 18'H	6,402.00	sf	25.00	160,050

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
824	2-5/8" thick Polished CMU Wainscott to 5'4"H, w/ Hardwood Cap - Corridor Side Only	9,371.00	sf	35.00	327,985
825	8" CMU 13'4"H	15,141.00	sf	20.00	302,820
826	8" CMU 18'6"H	2,550.00	sf	25.00	63,750
827	4"H CMU Base @ Lockers	678.00	lf	20.00	13,560
828	Interior Glazing Partition 10'	7,000.00	sf	100.00	700,000
829	Change Interior Glazing Partition to Standard	700.00	sf	(65.00)	(45,500)
830	Double Glass Door & Hardware	1.00	ea	5,000.00	5,000
831	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 18'	3,916.00	sf	24.00	93,984
832	2hr Shaftwall 13'4"	3,096.00	sf	18.00	55,728
833	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 13'4"	58,107.00	sf	20.00	1,162,140
834	3-5/8"Studs w/2" Spray Foam Insulation & (2) layers 5/8" GWB - Inside Ext. Wall 13'4"	15,808.00	sf	22.00	347,776
835	Installation of D/F/H	161.00	ea	650.00	104,650
836	Installation of Toilet Accessories	434.00	ea	65.00	28,210
837	Operable Partition 13'4"H - 1 ea	827.00	sf	60.00	49,620
	C1010 - Partitions				3,369,773
	C1020 - Interior Doors				
838	Double Door & Frame	36.00	ea	850.00	30,600
839	Single Door w/ Side Light & Frame	84.00	ea	700.00	58,800
840	Single Door & Frame	41.00	ea	550.00	22,550
841	Hardware Allowance	161.00	ea	750.00	120,750
	C1020 - Interior Doors				232,700
	C1030 - Building Specialties				
842	Millwork Blocking	2,546.00	lf	6.00	15,276
843	Misc. Rough Carpentry/Blocking	65,564.00	sf	0.50	32,782
844	Circulation Desk w/ SS Top @ Media Center	15.00	lf	1,200.00	18,000
845	Display/Trophy Case 84"H x 18"D	176.00	lf	750.00	132,000
846	Sliding White Boards - 8'L	15.00	ea	4,500.00	67,500
847	White Boards	886.00	sf	20.00	17,720
848	Tackboards	550.00	sf	15.00	8,250
849	Standard Toilet Partition	12.00	ea	1,200.00	14,400
850	ADA Toilet Partition	4.00	ea	1,800.00	7,200
851	Urinal Screen	2.00	ea	350.00	700
852	Interior Room Signage & Code Directional Signage - Allowance	65,564.00	sf	0.75	49,173
853	Removal & Reinstallation of Existing Wood Panels w/ Plaques	4.00	ea	1,000.00	4,000

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	C10 - INTERIOR CONSTRUCTION				
	C1030 - Building Specialties				
854	Exterior Banner Stanchions	10.00	ea	2,500.00	25,000
855	Backlit School Logo	1.00	ea	2,500.00	2,500
856	Backlit Post 24"H Letters	16.00	ea	500.00	8,000
857	8" Brushed Aluminum Stand-Off Letters	108.00	ea	175.00	18,900
858	Lockers	542.00	ea	450.00	243,900
859	Toilet Accessories for Single Use Toilet Room	26.00	rms	1,095.00	28,470
860	Toilet Accessories for Gang Toilet Room	10.00	rms	2,275.00	22,750
	C1030 - Building Specialties				716,521
	C10 - INTERIOR CONSTRUCTION				4,318,994
	C20 - STAIRS				
	C2010 - Stair Construction				
861	Metal Pan Stairs, Renovation - Stair M	54.00	rs	650.00	35,100
862	Metal Pan Stairs, Renovation - Stair N	54.00	rs	650.00	35,100
863	Metal Pan Stairs, New - Stair O	54.00	rs	1,200.00	64,800
864	Metal Pan Stairs, New - Stair R	77.00	rs	1,200.00	92,400
865	Metal Pan Stairs, New - Stair S - Monumental	31.00	rs	3,000.00	93,000
866	Stair Treads - Finish Allowance	1,504.00	lf	50.00	75,200
867	Stair Treads - Finish Allowance @ Monumental Stair	326.00	lf	250.00	81,500
	C2010 - Stair Construction				477,100
	C20 - STAIRS				477,100
	C30 - INTERIOR FINISHES				
	C3010 - Wall Finishes				
868	FRP - Fiberglass Reinforced Panel	14,020.00	sf	12.00	168,240
869	AWP - Acoustical Wall Panel	584.00	sf	25.00	14,600
870	Tectum Wall Treatment @ Cafeteria	1,981.00	sf	25.00	49,525
871	Paint - Allowance	65,564.00	sf	3.25	213,083
	C3010 - Wall Finishes				445,448
	C3020 - Floor Finishes				
872	Poured Epoxy Floor w/ Integral Epoxy Base	13,976.00	sf	12.00	167,712
873	LT - Linoleum Tile	120,463.00	sf	7.50	903,473
874	Premium for Laser Cutting School Logo into Linoleum Floor @ Lobby	1.00	ls	15,000.00	15,000
875	RB - Rubber Base	18,780.00	lf	3.50	65,730
876	SCT - Synthetic Carpet Tile	981.00	sy	45.00	44,145
877	Sealed Concrete Floor	4,800.00	sf	1.00	4,800
878	Flash Patch/Floor Prep	65,564.00	sf	1.00	65,564

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	C30 - INTERIOR FINISHES				
	C3020 - Floor Finishes				
879	Flash Patch/Floor Prep - West Renovations	91,129.00	sf	2.00	182,258
	C3020 - Floor Finishes				1,448,682
	C3030 - Ceiling Finishes				
880	GWB Soffits	1,344.00	lf	55.00	73,920
881	Rated GWB Ceilings	675.00	sf	15.00	10,125
882	GWB Ceilings	3,002.00	sf	12.00	36,024
883	GWB Header @ Int. Glazing Partitions	700.00	lf	150.00	105,000
884	Tavola Beam & Baffle Metal Ceiling	22,310.00	sf	65.00	1,450,150
	Allowance				
885	ACT-2 - Moisture Resistant ACT	9,820.00	sf	14.00	137,480
886	ACT-1 - 2x4 ACT Ceilings	109,136.00	sf	6.00	654,816
887	Sound Isolation Ceilings - Allowance	1.00	ls	150,000.00	150,000
888	Paint - GWB Ceilings and Soffits	6,200.00	sf	1.00	6,200
889	Paint - Exposed Steel Deck and Structure	23,073.00	sf	2.00	46,146
	C3030 - Ceiling Finishes				2,669,861
	C30 - INTERIOR FINISHES				4,563,991
	D10 - CONVEYING				
	D1010 - Elevators & Lifts				
890	Elevator E - 2,500#, Front-Back Opng	3.00	stps	55,000.00	165,000
891	Elevator F - 3,000#, Front-Back Opng	4.00	stps	55,000.00	220,000
892	Cab Finish Allowance	2.00	ea	25,000.00	50,000
893	Delete Roof Stop - Includes Other Trades	(1.00)	ea	83,333.00	(83,333)
	D1010 - Elevators & Lifts				351,667
	D10 - CONVEYING				351,667
	D20 - PLUMBING				
	D2000 - Plumbing				
894	Commissioning support/lump sum	1.00	ls	7,320.00	7,320
895	Demolition/cut, drop & make safe/lump sum	1.00	ls	6,250.00	6,250
896	General requirements/square foot	168,316.00	sf	0.75	126,237
897	Premium for project phasing	1.00	ls	3,225.00	3,225
	D2000 - Plumbing				143,032
	D2003 - Insulation/Plumbing (INS)				
898	INS - Armaflex/Copper Pipe - Trap primer feed UG	120.00	lf	8.55	1,026
899	INS - Fiberglass/Cast Iron Pipe - RL/horiz. only	5,500.00	lf	12.97	71,324
900	INS - Fiberglass/Copper Pipe - Non-potable water	3,000.00	lf	9.29	27,856
901	INS - Fiberglass/Copper Pipe - Domestic water	7,050.00	lf	9.29	65,462

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D20 - PLUMBING				
	D2003 - Insulation/Plumbing (INS)				
902	INS - Fiberglass/Copper Pipe - Tempered water	220.00	lf	9.06	1,994
	D2003 - Insulation/Plumbing (INS)				167,662
	D2010 - Plumbing Fixtures				
903	- Rough-ins/Fixtures	258.00	ea	157.24	40,568
904	Drinking fountain/bottle fill/bi-level/ADA	5.00	ea	2,636.44	13,182
905	- Mixing valve/emergency shower/eye wash	11.00	ea	984.30	10,827
906	Emergency shower/eye wash/cabinet type	11.00	ea	2,703.44	29,738
907	Mop sink/floor mount/24"x24"	3.00	ea	1,370.90	4,113
908	Sink/1-bowl/gooseneck faucet/ADA	9.00	ea	1,266.84	11,402
909	Sink/1-bowl/gooseneck faucet	4.00	ea	1,198.78	4,795
910	Lavatory/wall hung/carrier/sensor gooseneck faucet/ADA	41.00	ea	1,568.14	64,294
911	Urinal/wall mount/carrier/sensor flush valve/ADA	3.00	ea	1,340.08	4,020
912	Urinal/wall mount/carrier/sensor flush valve	4.00	ea	1,340.08	5,360
913	Water closet/wall mount/carrier/sensor FV/ADA	26.00	ea	1,769.44	46,005
914	Water closet/wall mount/carrier/sensor FV	19.00	ea	1,769.44	33,619
915	Faucet, trap & stops/integral science sink/gooseneck	58.00	ea	431.30	25,015
916	Faucet, trap & stops/integral science sink/gooseneck/ADA	17.00	ea	499.36	8,489
917	Sink/Kitchen/Rough-in only/Provided by KES	16.00	ea	198.36	3,174
918	Sink/Culinary/Rough-in only/Provided by KES	24.00	ea	198.36	4,761
919	Valve & drain box/washing machine	1.00	ea	360.30	360
920	Valve box/ice machine	2.00	ea	244.18	488
921	Valve box/refrigerator	4.00	ea	244.18	977
	D2010 - Plumbing Fixtures				311,188
	D2020 - Domestic Water System				
922	Type L Copper Pipe & Ftgs/95-5 Solder - Domestic water	7,050.00	lf	33.53	236,363
923	Type L Copper Pipe & Ftgs/95-5 Solder - Non-Potable water	3,000.00	lf	29.00	87,012
924	Type L Copper Pipe & Ftgs/95-5 Solder - Tempered water	220.00	lf	25.38	5,583
925	Type K Soft Copper Pipe & Ftgs/95-5 Solder - Trap primer feed U/G	120.00	lf	16.39	1,967
926	Ductile Iron Pipe & Ftgs - Dom. water entrance 4" U/G	20.00	lf	365.70	7,314
927	Shock absorbers/61 to 113 FU's/#400	3.00	ea	956.67	2,870
928	Shock absorbers/34 to 60 FU's/#300	1.00	ea	405.67	406
929	Shock absorbers/12 to 33 FU's/#200	12.00	ea	277.06	3,325
930	Shock absorbers/1 to 11 FU's/#100	24.00	ea	154.06	3,697
931	Trap primer/drip type/2 - 4-outlet	3.00	ea	214.96	645

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D20 - PLUMBING				
	D2020 - Domestic Water System				
932	Hose bibbs/encased/exterior - HB-2	7.00	ea	757.24	5,301
933	Hose bibbs/interior - HB-1	6.00	ea	224.18	1,345
934	Thermostatic mixing valve - Culinary	1.00	ea	2,195.60	2,196
935	Backflow preventer/Cooling towers make-up	1.00	ea	298.34	298
936	Backflow preventer/Non-potable system	4.00	ea	378.57	1,514
	D2020 - Domestic Water System				359,836
	D2030 - Sanitary Waste & Vent System				
937	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Grease W&V UG (Kitchen)	400.00	lf	58.44	23,374
938	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Sanitary W&V UG	930.00	lf	71.35	66,356
939	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Grease W&V UG (Culinary)	400.00	lf	58.44	23,374
940	No-Hub C.I. Pipe & Ftgs/Clamp - Sanitary W&V AG	5,550.00	lf	66.54	369,285
941	No-Hub C.I. Pipe & Ftgs/Clamp - Grease W&V AG (Kitchen)	250.00	lf	50.42	12,606
942	No-Hub C.I. Pipe & Ftgs/Clamp - Grease W&V AG (Culinary)	250.00	lf	50.42	12,606
943	Wall cleanouts	5.00	ea	201.24	1,006
944	Floor cleanouts/heavy duty	7.00	ea	373.24	2,613
945	Floor cleanouts	12.00	ea	301.24	3,615
946	Floor sinks/Kitchen	8.00	ea	1,028.81	8,230
947	Floor drains/heavy duty	8.00	ea	371.24	2,970
948	Floor drains	6.00	ea	310.24	1,861
949	Grease Interceptor/Interior/Kitchen	1.00	ea	24,720.28	24,720
	D2030 - Sanitary Waste & Vent System				552,617
	D2040 - Storm Drainage System				
950	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Primary RL UG	600.00	lf	86.44	51,862
951	No-Hub C.I. Pipe & Ftgs/Clamp - Overflow RL AG	3,400.00	lf	74.83	254,426
952	No-Hub C.I. Pipe & Ftgs/Clamp - Primary RL AG	3,500.00	lf	74.83	261,909
953	Wall Cleanouts/RL	6.00	ea	131.12	787
954	Floor Cleanouts/RL/heavy duty	2.00	ea	353.24	706
955	Floor Cleanouts/RL	8.00	ea	320.24	2,562
956	Downspots/overflow RL	6.00	ea	867.90	5,207
957	Roof Drains/Overflow RL	25.00	ea	728.30	18,208
958	Roof Drains/Primary RL	25.00	ea	424.30	10,608
	D2040 - Storm Drainage System				606,275
	D2060 - Natural/LP Gas System				
959	Sch 40 Black Steel (CW) Pipe & Ftgs/T&C - Gas piping	2,060.00	lf	30.43	62,693

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D20 - PLUMBING				
	D2060 - Natural/LP Gas System				
960	- Paint exposed piping/Gas piping	150.00	lf	21.87	3,280
961	Sch 40 Black Steel (ERW) Pipe & Ftgs/Weld - Gas piping	680.00	lf	99.31	67,532
962	- Flex connectors/Gas piping/Culinary equipment	9.00	ea	70.28	633
963	Gas turret/bench or desk mount/double	22.00	ea	335.12	7,373
964	Gas turret/bench or desk mount/single	28.00	ea	222.28	6,224
965	Solonoid valve & ANSUL interlock - Culinary	1.00	ea	1,455.60	1,456
966	Emer. gas shut off cabinet w/1-1/2" ball valve (Lab room)	8.00	ea	1,377.96	11,024
967	Emer. gas shut off cabinet w/1" ball valve (Lab bench)	13.00	ea	1,223.96	15,911
	D2060 - Natural/LP Gas System				176,126
	D2077 - Acid Neutrilization System				
968	Sch 40 Polypro Fuseal/AW Pipe & Ftgs AG	3,200.00	lf	76.90	246,088
969	Sch 40 Polypro Fuseal/AW Pipe & Ftgs UG	50.00	lf	89.59	4,480
970	Acid waste/transfer lift station/50 gal. tank/20 gpm	-	ea	-	-
971	- Limestone chips/50 lb. bag	26.00	ea	88.47	2,300
972	- pH monitors/1 per tank/tie-into BMS	1.00	ea	7,536.92	7,537
973	Acid neutrilization system/125 gal.tank	1.00	ea	42,851.36	42,851
	D2077 - Acid Neutrilization System				303,256
	D2099 - Material Handling/Supports/Testing/Start Ups				
974	- Fill & vent system/Gas piping	1.00	ea	1,132.92	1,133
975	- Clean & test system/Gas piping	1.00	ea	1,157.92	1,158
976	- Hangers & clamps/Gas piping	2,740.00	lf	2.56	7,009
977	- Fill & vent system/Sanitary W&V	1.00	ea	2,265.84	2,266
978	- Clean & test system/Sanitary W&V	1.00	ea	2,415.84	2,416
979	- Hangers & clamps/Sanitary W&V	5,550.00	lf	3.32	18,439
980	- Fill & vent system/Domestic water	3.00	ea	2,265.84	6,798
981	- Clean & test system/Domestic water	3.00	ea	2,415.84	7,248
982	- Heat tracing/Non-potable water loop	3,000.00	lf	29.63	88,885
983	- Hangers & clamps/Domestic water	10,270.00	lf	2.56	26,270
984	- Offload & distribution/Fixtures	258.00	ea	132.24	34,118
985	- Hangers & clamps/AW piping	3,200.00	lf	2.56	8,185
986	- Clean & test system/AW piping	1.00	ea	1,157.92	1,158
987	- Fill & vent system/AW piping	1.00	ea	1,132.92	1,133
988	- Clean & test system/RL	1.00	ea	1,736.88	1,737
989	- Hangers & clamps/RL	6,900.00	lf	3.32	22,925
990	- Offload & rigging/HW boiler	1.00	ea	1,157.92	1,158

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D20 - PLUMBING				
	D2099 - Material Handling/Supports/Testing/Start Ups				
991	- Start up/HW boiler	1.00	ea	289.48	289
992	- Offload & rigging/Acid neutr. equipment	1.00	ea	2,586.88	2,587
993	- Hangers & clamps/Grease W&V (Kitchen)	250.00	lf	3.32	831
994	- Hangers & clamps/Grease W&V (Culinary)	250.00	lf	3.32	831
	D2099 - Material Handling/Supports/Testing/Start Ups				236,572
	D3050 - Heating Systems				
995	HW Boiler/gas/high eff. condensing - Culinary	285.00	mbh	29.73	8,473
996	- Condensate neutrilization kit	1.00	ea	303.12	303
997	Sch 80 Pipe & Ftgs/CPVC/4" - Direct vent piping	60.00	lf	29.33	1,760
998	Concentric vent kit/PVC/4" - Direct vent	1.00	ea	429.48	429
	D3050 - Heating Systems				10,965
	D20 - PLUMBING				2,867,529
	D30 - HVAC				
	D3000 - HVAC Common Work Requirements				
999	General requirements/square foot	168,316.00	sf	1.50	252,474
1000	Demolition/cut, drop & make safe/lump sum	1.00	ls	9,500.00	9,500
1001	Commissioning support/lump sum	1.00	ls	6,000.00	6,000
1002	Premium for project phasing	1.00	ls	7,500.00	7,500
	D3000 - HVAC Common Work Requirements				275,474
	D3003 - Insulation/HVAC (INS)				
1003	INS - Armaflex/Copper Pipe - AC cond. drains	50.00	lf	8.07	404
1004	INS - Fiberglass/Blk. Stl Weld Pipe - CW	250.00	lf	11.73	2,933
1005	INS - Fiberglass/Blk. Stl Weld Pipe - CHW	1,500.00	lf	11.46	17,190
1006	INS - Fiberglass/Blk. Stl Weld Pipe - HW	1,500.00	lf	11.46	17,190
1007	INS - Fiberglass/Copper Pipe - CW	50.00	lf	8.37	418
1008	INS - Fiberglass/Copper Pipe - CHW	15,500.00	lf	8.15	126,391
1009	INS - Fiberglass/Copper Pipe - HW	12,000.00	lf	8.15	97,851
1010	INS - Weatherseal/Exterior exposed piping - CT make-up (roof)	50.00	lf	3.63	182
1011	INS - Weatherseal/Exterior exposed piping - CW (roof)	140.00	lf	5.96	834
1012	INS - Duct/Fiberglass Wrap	75,000.00	sf	4.99	374,115
1013	INS - Duct/Firemaster Blanket/Kitchen exhaust	2,600.00	sf	21.71	56,452
	D3003 - Insulation/HVAC (INS)				693,959
	D3005 - Testing, Adjusting & Balancing (TAB)				
1014	TAB - Testing Adjusting & Balancing	30.00	day	2,598.80	77,964
1015	TAB commissioning support	10.00	day	974.40	9,744

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D30 - HVAC				
	D3005 - Testing, Adjusting & Balancing (TAB)				87,708
	D3009 - Automatic Temperature Controls (ATC)				
1016	ATC - VFD wiring for cooling towers (remote mnt.) - 2@3 pts.	6.00	pts	403.93	2,424
1017	ATC - Cooling towers/packaged/factory controls	2.00	ea	4,329.75	8,660
1018	ATC - Commissioning support days	15.00	day	1,179.94	17,699
1019	ATC - CO2 demand ventilation control	120,000.00	sf	0.36	43,025
1020	ATC - System hardware, software & engineering	1.00	ea	12,174.65	12,175
1021	ATC - Melink Intelli-Hood system (Culinary exhaust)	1.00	ea	14,647.80	14,648
1022	ATC - Melink system control wiring (Culinary exhaust) - 1@8 pts.	8.00	pts	442.49	3,540
1023	ATC - Plumbing WH's & RCP's - 1@10 pts.	10.00	pts	566.52	5,665
1024	ATC - AHU's/custom/ATC F&I controls - 8@40 pts.	320.00	pts	1,461.34	467,630
1025	ATC - MUA's/custom/ATC F&I controls - 1@20 pts.	20.00	pts	1,166.36	23,327
1026	ATC - Exhaust fans/gen. exh./in-line - 1@4 pts. (mech. penthouse)	4.00	pts	714.05	2,856
1027	ATC - Exhaust fans/gen. exh./rooftop - 4@5 pts.	20.00	pts	838.05	16,761
1028	ATC - Exhaust fans/gen. exh./in-line - 2@5 pts.	10.00	pts	714.02	7,140
1029	ATC - Exhaust fans/Lab exh./rooftop - 2@10 pts.	20.00	pts	884.96	17,699
1030	ATC - Radiant ceiling panels/RCP's - 105@2 pts.	210.00	pts	411.47	86,408
1031	ATC - VAV box/ATC furnished & installed - 107@2 pts.	214.00	pts	450.81	96,473
1032	ATC - Cabinet unit heaters/CUH's - 13@3 pts.	39.00	pts	411.47	16,047
1033	ATC - Unit heaters/electric/EUH's - 4@2 pts.	4.00	pts	357.01	1,428
1034	ATC - Unit heaters/HW/UH's - 2@2 pts.	4.00	pts	411.50	1,646
1035	ATC - Chilled beams/active/2-pipe - 66@4 pts.	264.00	pts	465.93	123,005
1036	ATC - Plumbing pH monitors - 1@15 pts.	15.00	pts	730.67	10,960
1037	ATC - Exhaust fans/Culinary hood/rooftop - 1@8 pts.	8.00	pts	861.50	6,892
1038	ATC - Exhaust fans/dishwasher hood/rooftop - 1@6 pts.	6.00	pts	838.05	5,028
1039	ATC - Indoor air handler/factory controls/Mini-Split AC	1.00	ea	514.48	514
1040	ATC - Condensing unit/factory controls/Mini-Split AC	1.00	ea	1,028.96	1,029
1041	ATC - Energy metering/Fuel, gas & water systems	1.00	ls	18,760.19	18,760
	D3009 - Automatic Temperature Controls (ATC)				1,011,440
	D3050 - Heating Systems				
1042	Type L Copper Pipe & Pressfit Ftgs - HWS&R branches	8,600.00	lf	24.40	209,801
1043	Type L Copper Pipe & Pressfit Ftgs - HWS&R mains	3,400.00	lf	32.47	110,391
1044	Sch 40 Blk Stl Pipe & Ftgs/ERW/Grooved - HWS&R mains	1,500.00	lf	113.73	170,589
	D3050 - Heating Systems				490,782

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
B - Renovation / Addition Lord (West)				
D30 - HVAC				
D3052 - Cooling Systems				
1045 Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R branches	12,100.00	lf	25.38	307,064
1046 Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R mains	3,400.00	lf	33.53	113,991
1047 Type L Copper Pipe & Ftgs/95-5 Solder - CWS&R	50.00	lf	29.00	1,450
1048 Type L Copper Pipe & Ftgs/95-5 Solder 3/4"	50.00	lf	20.46	1,023
1049 Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CHWS&R mains	1,500.00	lf	114.73	172,092
1050 Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CWS&R	250.00	lf	185.39	46,347
1051 Condenser water sand filtration system	1.00	ea	22,789.60	22,790
1052 Cooling Towers (2-cell)/induced draft/stain. steel. - CT-3&4	550.00	ton	327.21	179,965
1053 - Mini-split refrigeration line set/36 mbh - 50'	1.00	ea	773.96	774
1054 - Mini-split condensate pump	1.00	ea	260.18	260
1055 Mini-spilt AC system/1-zone/wall mnt. indoor/36 mbh - IDF Room	1.00	ea	4,275.98	4,276
D3052 - Cooling Systems				850,032
D3056 - Chemical Treatment				
1056 Chemical treatment/HW System	1.00	ea	6,000.00	6,000
1057 Chemical treatment/CHW System	1.00	ea	4,800.00	4,800
1058 Chemical treatment/CW system	1.00	ea	2,500.00	2,500
D3056 - Chemical Treatment				13,300
D3057 - Air Distribution Systems				
1059 Air Handling Unit/modular/cfm - AHU-15	17,000.00	cfm	12.54	213,180
1060 Make-up air unit/HW & CHW coils/std. roof curb/ ? cfm - MAU-2 Est. CFM/no info. provided.	5,000.00	cfm	8.50	42,500
1061 Air Handling Unit/modular/cfm - AHU-16	12,000.00	cfm	12.54	150,480
1062 Air Handling Unit/modular/cfm - AHU-17	12,000.00	cfm	12.54	150,480
1063 Air Handling Unit/modular/cfm - AHU-18	6,500.00	cfm	12.54	81,510
1064 Air Handling Unit/modular/cfm - AHU-19	9,000.00	cfm	12.54	112,860
1065 Air Handling Unit/modular/cfm - AHU-20	9,500.00	cfm	12.54	119,130
1066 Air Handling Unit/modular/cfm - AHU-21	10,500.00	cfm	12.54	131,670
1067 Air Handling Unit/modular/cfm - AHU-22	10,500.00	cfm	12.54	131,670
1068 SM - Galvanized ductwork - Bathrooms exhaust 100 CFM/Fixt. - 1 Lb/CFM	5,500.00	lb	10.84	59,593
1069 SM - Galvanized ductwork - AHU's	115,000.00	lb	10.84	1,246,025
1070 SM - Black iron ductwork/grease rated/welded seam - Kitchen hood exhaust	4,000.00	lb	19.02	76,088
1071 SM - Aluminum ductwork - Dishwasher exhaust	2,500.00	lb	22.97	57,424

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D30 - HVAC				
	D3057 - Air Distribution Systems				
1072	SM - Stainless steel ductwork/welded seam - Lab hoods exhaust	11,875.00	lb	25.87	307,218
1073	SM - Galvanized ductwork - Misc. exhaust	3,000.00	lb	10.84	32,505
1074	SM - Sound attenuators (17)/in-line - SATT's	158,000.00	cfm	0.50	78,999
1075	SM - Duct smoke detector	17.00	ea	604.50	10,277
1076	SM - Motorized dampers	4.00	ea	815.40	3,262
1077	SM - Fire/smoke dampers/louver type	36.00	ea	620.40	22,334
1078	SM - Fire dampers/curtain type	65.00	ea	257.70	16,751
1079	SM - Displacement diffusers/floor mount/450 CFM	130.00	ea	1,387.20	180,336
1080	SM - Displacement diffusers/floor mount/275 CFM	65.00	ea	501.30	32,585
1081	SM - Diffusers, registers & grilles	140.00	ea	227.25	31,815
1082	Lab exhaust fan/high plume/roof (2,000 cfm est.) - LEFs Greenheck Vektor CD	1.00	ea	12,487.20	12,487
1083	EF/centrifugal downblast/belt drive/roof - Misc. exh. fans Greenheck #GB121-3	2.00	ea	1,779.20	3,558
1084	EF/centrifugal downblast/belt drive/roof - Bath exh. fans Greenheck #GB200-5	2.00	ea	2,451.80	4,904
1085	Kitchen exhaust fan/centrifugal upblast/roof - KEF Greenheck #USGF	1.00	ea	7,224.40	7,224
1086	Dishwasher exhaust fan/centrifugal upblast/roof - DEF	1.00	ea	3,353.64	3,354
1087	Lab exhaust fan/high plume/roof (6,000 cfm est.) - LEFs Greenheck Vektor CD	1.00	ea	33,730.80	33,731
1088	EF/centrifugal in-line/belt drive/box- Misc. exh. fans Greenheck # BSQ120-5	2.00	ea	2,077.75	4,156
1089	- Roof curb/standard/EF's (roof)	6.00	ea	1,287.20	7,723
	D3057 - Air Distribution Systems				3,365,827
	D3058 - Terminal Equipment				
1090	- Sound attenuators/VAV's	120.00	ea	463.60	55,632
1091	VAV box/large - VAV's	35.00	ea	965.90	33,807
1092	VAV box/medium - VAV's	45.00	ea	778.10	35,015
1093	VAV box/small - VAV's	40.00	ea	618.30	24,732
1094	Unit heater/electric/propeller - EUH's	2.00	ea	1,330.60	2,661
1095	Unit heater/hydronic/ceiling mnt./propeller - UH's	2.00	ea	1,260.40	2,521
1096	Cabinet unit heater/hydronic/ceiling mount - CUH's	8.00	ea	1,845.75	14,766
1097	Cabinet unit heater/hydronic/wall mount exposed - CUH's	5.00	ea	1,757.20	8,786

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D30 - HVAC				
	D3058 - Terminal Equipment				
1098	Radiant ceiling panels/2'x4' - RCP's	365.00	ea	241.35	88,093
1099	Radiant ceiling panels/2'x2' - RCP's	30.00	ea	154.17	4,625
1100	Chilled beam/hydr. 2-pipe/clg. mnt./active/8'x2' - CHB's	175.00	ea	1,150.40	201,320
1101	Chilled beam/hydr. 2-pipe/clg. mnt./active/4'x2' - CHB's	10.00	ea	729.50	7,295
	D3058 - Terminal Equipment				479,252
	D3099 - Material Handling/Supports/Testing/Start Ups				
1102	- Accessories installation/CT's	2.00	ea	974.40	1,949
1103	- Accessories installation/AHU's	9.00	ea	974.40	8,770
1104	- Crane & rigging/AHU's (rooftop)	3.00	day	12,397.60	37,193
1105	- Hangers & clamps/HW piping	18,500.00	lf	2.56	47,322
1106	- Clean & test system/HW piping	1.00	ea	1,207.92	1,208
1107	- Fill & vent system/HW piping	1.00	ea	1,132.92	1,133
1108	- Hangers & clamps/CHW piping	17,000.00	lf	3.32	56,481
1109	- Hangers & clamps/CW piping	300.00	lf	3.32	997
1110	- Roof support stands/CW piping (roof)	8.00	ea	413.36	3,307
1111	- Clean & test system/CW piping	1.00	ea	628.96	629
1112	- Fill & vent system/CW piping	1.00	ea	603.96	604
1113	- Heat tracing/CW make-up piping	50.00	lf	31.61	1,581
1114	- Crane & rigging/CT's	1.00	day	12,397.60	12,398
1115	- Start up/CT's	2.00	ea	1,836.88	3,674
1116	- Start up/AHU's	9.00	ea	1,224.40	11,020
1117	- Support steel/SATT's	17.00	ea	354.50	6,027
1118	- Offload & rigging/SATT's	17.00	ea	1,074.40	18,265
1119	- Start up/EF's	10.00	ea	33.06	331
1120	- Support steel/EF's (indoor)	2.00	ea	354.50	709
1121	- Offload & rigging/EF's (indoor)	2.00	ea	465.40	931
1122	- Crane & rigging/EF's (roof)	2.00	day	10,448.80	20,898
1123	- Roof support stands/LEF's	4.00	ea	514.60	2,058
1124	- Fill & vent system/CHW piping	1.00	ea	1,132.92	1,133
1125	- Clean & test system/CHW piping	1.00	ea	1,207.92	1,208
1126	- Start up/UH's & CUH's	17.00	ea	33.06	562
1127	- Support steel/UH's & CUH's	12.00	ea	293.60	3,523
1128	- Offload & distribution/UH's & CUH's	17.00	ea	121.80	2,071
1129	- Support steel/RCP's	395.00	ea	85.90	33,931
1130	- Offload & distribution/RCP's	395.00	ea	121.80	48,111
1131	- Support steel/CHB's	185.00	ea	146.80	27,158

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D30 - HVAC				
	D3099 - Material Handling/Supports/Testing/Start Ups				
1132	- Offload & distribution/CHB's	185.00	ea	121.80	22,533
1133	- Support steel/VAV's	120.00	ea	354.50	42,540
1134	- Offload & distribution/VAV's	120.00	ea	182.70	21,924
1135	- Start up/Mini-split AC	1.00	ea	314.48	314
1136	- Hangers & clamps/AC cond. drains	50.00	lf	1.79	90
1137	- Roof support stands/Mini-split AC	2.00	ea	397.70	795
1138	- Offload & distribution/Mini-split AC	2.00	ea	243.60	487
	D3099 - Material Handling/Supports/Testing/Start Ups				443,860
	D30 - HVAC				7,711,635
	D40 - FIRE PROTECTION				
	D4000 - Fire Suppression				
1139	Project management	1.00	ls	3,750.00	3,750
1140	Commissioning support/lump sum	1.00	ls	2,500.00	2,500
1141	Demolition/cut, drop & make safe/lump sum	1.00	ls	5,000.00	5,000
1142	General requirements/square foot	168,316.00	sf	0.35	58,911
1143	Fire Suppression - Light Well Deluge Systems	2.00	ea	15,000.00	30,000
	D4000 - Fire Suppression				100,161
	D4020 - Fire Supression Equipment				
1144	Wet Alarm Check Valve Assembly 6"	1.00	ea	4,629.35	4,629
1145	Dry Alarm Check Valve Assembly (Walk-in coolers)	1.00	ea	4,326.84	4,327
1146	Butterfly Valve w/Tamper Switch/Grooved 6"	2.00	ea	1,010.68	2,021
1147	Check Valve/Swing/Grooved 4"	2.00	ea	456.57	913
1148	Control valve assembly/Floor/2-1/2"	15.00	ea	3,614.69	54,220
1149	Valve w/fire hose connection/Floor/2-1/2"	21.00	ea	1,308.43	27,477
1150	Inspector test & drain station/Floor/2-1/2"	15.00	ea	1,933.09	28,996
1151	Sprinkler head/Upright Avg. = 130sf/Head	225.00	ea	111.41	25,067
1152	Sprinkler head/Pendant/Semi-recessed Avg. = 130sf/Head	900.00	ea	163.81	147,425
1153	Sprinkler head/Sidewall/Exposed Avg. = 130sf/Head	25.00	ea	117.38	2,934
1154	Hose Connection/Roof manifold - 2-1/2"	1.00	ea	479.60	480
	D4020 - Fire Supression Equipment				298,490
	D4030 - Fire Protection Specialties				
1155	Recessed Fire Extinguishers/Fire Extinguisher Cabinets 1 every 2,500sf	26.00	ea	400.00	10,400

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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		Estimate Detail			Lowell High School - Schematic Reconciled	
		Description	Qty		Unit Cost	Amount
		--- - Base				
		B - Renovation / Addition Lord (West)				
		D40 - FIRE PROTECTION				
		D4030 - Fire Protection Specialties				10,400
		D4050 - Fire Supression Sprinkler Piping				
1156		Sch 40 Galv Steel (ERW) Pipe & Ftgs/T&C - SPK branches	200.00	lf	35.36	7,073
1157		Sch 40 Black Steel (ERW) Pipe & Ftgs/Grooved - SPK branches	6,000.00	lf	32.45	194,710
1158		Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK mains	1,250.00	lf	109.70	137,130
1159		Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK drains	400.00	lf	59.70	23,879
		D4050 - Fire Supression Sprinkler Piping				362,791
		D4099 - Material Handling/Supports/Testing/Start Ups				
1160		- Fill & vent system/SPK piping	1.00	ea	2,265.84	2,266
1161		- Clean & test system/SPK piping	1.00	ea	2,415.84	2,416
1162		- Hangers & clamps/SPK piping	8,850.00	lf	3.32	29,403
1163		- Hangers & clamps/SPK piping	200.00	lf	3.32	664
1164		- Clean & test system/SPK piping	1.00	ea	289.48	289
		D4099 - Material Handling/Supports/Testing/Start Ups				35,039
		D40 - FIRE PROTECTION				806,881
		D50 - ELECTRICAL				
		D5010 - Electrical Service & Distribution				
1165		Distribution Panel 400 amp 480/277 volt	2.00	ea	5,772.26	11,545
1166		Recpt Panel 225 amp 208/120 volt K	3.00	ea	1,941.35	5,824
1167		Recpt Panel 225 amp 208/120 volt two section K	4.00	ea	3,358.30	13,433
1168		Lighting Panel 225 amp 480/277 volt	3.00	ea	2,210.27	6,631
1169		Surge Protector - Pnl Mounted	16.00	ea	200.00	3,200
1170		Dry-Type Transformer Copper Windings 75 KVA K-13	7.00	ea	5,763.88	40,347
1171		Change Panelboard Bussing to AL	1.00	ea	(8,000.00)	(8,000)
		D5010 - Electrical Service & Distribution				72,980
		D5011 - Normal Feeder				
1172	A	Normal Feeder Detail 4 Wire + Ground	800.00	lf	74.13	59,301
1173	A	Normal Feeder Detail 3 Wire + Ground	750.00	lf	23.04	17,283
1174	A	Normal Feeder Detail 4 Wire + Ground	800.00	lf	40.41	32,329
1175	A	Normal Feeder Detail 5 Wire + Ground	250.00	lf	54.55	13,638
		D5011 - Normal Feeder				122,550
		D5012 - Emergency/UPS Distribution				
1176		Lighting Panel 100 amp 480/277 volt	3.00	ea	1,579.88	4,740
1177		Surge Protector - Pnl Mounted	3.00	ea	200.00	600
		D5012 - Emergency/UPS Distribution				5,340

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Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
B - Renovation / Addition Lord (West)						
D50 - ELECTRICAL						
D5014 - Emergency/UPS Feeder						
1178	A	Normal Feeder Detail 4 Wire + Ground	1,150.00	lf	20.30	23,348
		D5014 - Emergency/UPS Feeder				23,348
D5015 - Equipment Connections						
1179	A	Elevator Connection Main	2.00	ea	2,375.50	4,751
1180	A	Elevator Connection Auxilliary	2.00	ea	1,677.37	3,355
1181		Mechanical Connections	175,839.00	sf	2.00	351,678
		D5015 - Equipment Connections				359,784
D5016 - Lightning Protection						
1182		Lightning Protection	19,146.00	sf	2.00	38,309
		D5016 - Lightning Protection				38,309
D5020 - LIGHTING						
1183	A	SL3 : LED Wall Mtd	9.00	ea	1,172.71	10,554
1184	A	SL4 : LED Wall Mtd	7.00	ea	1,297.73	9,084
1185	A	HR : LED Handrail	2.00	ea	36,392.81	72,786
1186	A	Exit Light	101.00	ea	706.85	71,392
1187	A	EL : 4Ft Utility	18.00	ea	339.67	6,114
1188	A	LC4 : Cove Lighitng	2.00	ea	3,220.77	6,442
1189	A	LC6 : Cove Lighting	2.00	ea	3,440.27	6,881
1190	A	LC8 : Cove Lighting	2.00	ea	10,953.06	21,906
1191	A	LP8 : 8Ft Pendant Indirect/Direct - Corridor	279.00	ea	880.71	245,718
1192	A	LP8 : 8Ft Pendant Indirect/Direct	310.00	ea	989.38	306,708
1193	A	LR24 : 4Ft Recessed	244.00	ea	783.26	191,116
1194	A	LS8B : 8ft Utility	56.00	ea	533.95	29,901
1195	A	P48 : 48" Dia Pendant Downlight	9.00	ea	2,583.87	23,255
1196	A	P48 EM : 48" Dia Pendant Downlight	10.00	ea	2,320.04	23,200
1197	A	SL5 : LED Dnlt - Damp Location	62.00	ea	1,047.39	64,938
1198	A	SL6 : LED Uplight - Flagpole	12.00	ea	1,331.93	15,983
1199		Green Roof	4,349.00	sf	5.00	21,749
1200		Cafeteria High Ceiling	2,638.00	sf	8.00	21,106
1201		Freshman Caferia/Servery	12,047.00	sf	8.00	96,387
1202		Fundamentals, Nurse Culinary	4,229.00	sf	9.50	40,179
1203		Restaurant, Culinary Kitchens	4,775.00	sf	10.00	47,754
1204		Support Areas	3,975.00	sf	7.50	29,816
		D5020 - LIGHTING				1,362,970
D5021 - LIGHTING CONTROL SYSTEM						
1205	A	OS - Occ Sensor Ceiling	124.00	ea	278.19	34,495

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
B - Renovation / Addition Lord (West)						
D50 - ELECTRICAL						
D5021 - LIGHTING CONTROL SYSTEM						
1206	A	PS - Photoelectric Sensor	51.00	ea	1,080.12	55,086
1207	A	L - Local Switching	171.00	ea	331.84	56,745
1208		Building Lighting Control System	175,839.00	sf	1.50	263,912
		D5021 - LIGHTING CONTROL SYSTEM				410,238
D5025 - POWER BRANCH WIRING						
1209	A	Receptacle	455.00	ea	282.50	128,538
1210	A	Receptacle Corridor	74.00	ea	355.57	26,312
1211	A	Quad Receptacle	279.00	ea	423.10	118,046
1212	A	TVE : Quad Receptacle	40.00	ea	531.01	21,240
1213	A	Receptacle GFI	18.00	ea	568.86	10,240
1214	A	Special Receptacle	8.00	ea	820.67	6,565
1215	A	Receptacle GFI WP	20.00	ea	903.26	18,065
1216	A	JB Projector	31.00	ea	2,434.26	75,462
1217	A	Clock Hanger Outlet	50.00	ea	246.24	12,312
1218	A	JB Hand Dryer	6.00	ea	629.32	3,776
1219		Wiremold EFSB4 & Wiremold EFSB4 Box	31.00	ea	250.00	7,750
1220		Power Connection to AV Equipment	1.00	ls	3,000.00	3,000
1221		Green Roof	4,349.00	sf	1.50	6,527
1222		Freshman Caferia/Servery	12,047.00	sf	10.00	120,481
1223		Fundamentals, Nurse Culinary	4,229.00	sf	5.00	21,149
1224		Restaurant, Culinary Kitchens	4,775.00	sf	12.00	57,304
1225		Support Areas	3,975.00	sf	3.00	11,928
		D5025 - POWER BRANCH WIRING				648,696
D5031 - FIRE ALARM & DETECTION SYSTEM						
1226	A	Strobe - Classroom	40.00	ea	602.73	24,109
1227	A	Data Gathering Panel	3.00	ea	2,831.36	8,494
1228	A	Pull Station	15.00	ea	661.10	9,916
1229	A	Smoke Detector Corridor	74.00	ea	615.26	45,529
1230	A	Smoke Detector Stair/Utility Room	20.00	ea	1,011.26	20,225
1231	A	Smoke Detector Elev	6.00	ea	615.26	3,692
1232	A	Heat Detector	5.00	ea	1,691.41	8,457
1233	A	Duct Detector, Cond & Wire	8.00	ea	1,031.81	8,254
1234	A	Duct Detector Remote Test	8.00	ea	398.40	3,187
1235	A	Tamper Switch	16.00	ea	791.86	12,670
1236	A	Flow Switch	16.00	ea	791.86	12,670
1237	A	Control Module	50.00	ea	864.02	43,201

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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		Estimate Detail			Lowell High School - Schematic Reconciled	
		Description	Qty		Unit Cost	Amount
		--- - Base				
		B - Renovation / Addition Lord (West)				
		D50 - ELECTRICAL				
		D5031 - FIRE ALARM & DETECTION SYSTEM				
1238	A	Monitor Module	40.00	ea	788.51	31,540
1239	A	Fireman Phone	6.00	ea	609.74	3,658
1240	A	Door Holder	62.00	ea	679.73	42,143
1241	A	Speaker Strobe	120.00	ea	762.53	91,504
1242	A	Strobe	15.00	ea	708.70	10,630
1243	A	Remote Annunciator	1.00	ea	4,326.95	4,327
		D5031 - FIRE ALARM & DETECTION SYSTEM				384,208
		D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				
1244		Card Reader	9.00	ea	4,273.97	38,466
		Misc Areas, as per Reconciallation				
1245		Card Reader WP	1.00	ea	4,523.98	4,524
1246		Classroom Intercom	31.00	ea	2,136.99	66,247
1247		Intercom. Wp	1.00	ea	2,511.99	2,512
1248		Card Reader Head End	1.00	ls	25,261.99	25,262
		D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				137,010
		D5033 - ELECTRONIC SURVEILLANCE				
1249		Security Head End Equipment	1.00	ea	67,169.52	67,170
1250		Motion Detector	21.00	ea	1,068.49	22,438
1251		Camera Wp 360 Deg - IP	3.00	ea	4,099.32	12,298
1252		Camera 360 Deg - IP	10.00	ea	3,474.32	34,743
1253		Corridor Camera - IP	27.00	ea	3,474.31	93,807
1254		Dome Camera - IP	11.00	ea	3,474.32	38,217
		D5033 - ELECTRONIC SURVEILLANCE				268,673
		D5034 - Clock System				
1255		GPS Receiver & Transmitter	3.00	ea	5,334.76	16,004
1256		Tone Generator	3.00	ea	2,749.11	8,247
1257		Synchronous Wireless Clock	50.00	ea	389.90	19,495
		D5034 - Clock System				43,747
		D5040 - Telephone Data System				
1258		Telephone Data System	175,839.00	sf	2.75	483,557
1259		LV Cable Tray	2,000.00	lf	50.00	100,000
		D5040 - Telephone Data System				583,557
		D5044 - Audio Visual System				
1260		Install AV Equipment	1.00	ls	10,000.00	10,000
1261		AV System Empty Conduit	1.00	ls	5,000.00	5,000
		D5044 - Audio Visual System				15,000

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Estimate Detail			Lowell High School - Schematic Reconciled		
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	D50 - ELECTRICAL				
	D5045 - Two Way Communication System				
1262	Two Way Communication System	6.00	sf	3,500.00	21,000
	D5045 - Two Way Communication System				21,000
	D5046 - Distributed Antenna System				
1263	Distributed Antenna System	175,839.00	sf	0.50	87,927
	D5046 - Distributed Antenna System				87,927
	D5050 - Public Address System				
1264	A Speaker Recessed Mounted	100.00	ea	229.91	22,991
1265	A Speaker Corridor	80.00	ea	235.39	18,831
1266	A Equalizer	3.00	ea	2,880.83	8,642
1267	A Amplifier	3.00	ea	3,156.52	9,470
1268	Speaker	1.00	ea	5,334.76	5,335
	D5050 - Public Address System				65,269
	D5060 - Renewable Energy System				
1269	PV System 100 KW Grid - Excluded	1.00	ls	-	-
	D5060 - Renewable Energy System				-
	D5090 - MIscellaneous System				
1270	Labelling	175,839.00	sf	0.05	8,946
1271	Temporary Power & Light	175,839.00	sf	1.75	307,872
1272	Coring & Firestop Seal	1.00	ls	22,000.00	22,000
1273	Safe-off Wiring	1.00	ls	5,239.76	5,240
	D5090 - MIscellaneous System				344,057
	D50 - ELECTRICAL				4,994,662
	E10 - EQUIPMENT				
	E1010 - Commercial Equipment				
1274	Servery & Kitchen Equipment - Allowance	1.00	ls	1,775,000.00	1,775,000
	E1010 - Commercial Equipment				1,775,000
	E1090 - Other Equipment				
1275	Classroom Equipment Allowance	1.00	ea	180,000.00	180,000
1276	AV Equipment Allowance	1.00	ea	110,000.00	110,000
1277	Residential Equipment Allowance	1.00	ea	40,000.00	40,000
	E1090 - Other Equipment				330,000
	E10 - EQUIPMENT				2,105,000
	E20 - FURNISHINGS				
	E2010 - Fixed Furnishings				
1278	Mailbox Unit	2.00	ea	300.00	600

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	E20 - FURNISHINGS				
	E2010 - Fixed Furnishings				
1279	Epoxy Mobile Lab Tables	122.00	ea	2,500.00	305,000
1280	Lab Lower Cabinets w/ Epoxy Top	800.00	lf	700.00	560,000
1281	Lab Upper Cabinets	600.00	lf	550.00	330,000
1282	Book Cases	78.00	NIV	-	-
	FF&E				
1283	Work Station Desk w/ Shelving	200.00	lf	450.00	90,000
1284	Tall Storage Units	94.00	ea	2,000.00	188,000
1285	Lower Cabinets w/ SS Top	188.00	lf	550.00	103,400
1286	Upper Cabinets	164.00	lf	300.00	49,200
1287	Built-In Bench @ Corridor	50.00	lf	500.00	25,000
1288	Custom Double-Sided Built-In Seating Booth @ Cafeteria	4.00	ea	10,000.00	40,000
1289	REM - Recessed Entry Mat	162.00	sy	65.00	10,530
1290	Window Treatments	9,017.00	sf	8.00	72,136
1291	Window Treatments - Motorized @ Cafeteria	1.00	ls	50,000.00	50,000
1292	Delete Interior Shades	1.00	ea	(50,000.00)	(50,000)
	E2010 - Fixed Furnishings				1,773,866
	E20 - FURNISHINGS				1,773,866
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				
1293	Abatement of Hazardous Materials	1.00	ea	2,163,910.00	2,163,910
1294	Complete Building Demolition	71,675.00	sf	5.00	358,375
1295	Select Interior Demolish - Floors, Specialties, Millwork, Equipment & Ceilings	94,637.00	sf	4.00	378,548
1296	Select Interior Demolish - Doors	111.00	ea	150.00	16,650
1297	Select Interior Demolish - Concrete Slabs (Ramps, Stairs, Mech Pads, SOG & SOMD)	7,183.00	sf	15.00	107,745
1298	Select Interior Demolish - Wood Framed Tiered Platforms	697.00	sf	5.00	3,485
1299	Select Interior Demolish - GWB Walls	79,156.00	sf	3.00	237,468
1300	Select Exterior Demolish - Stairs	5.00	ea	15,000.00	75,000
1301	Select Exterior Demolish - Paneling	1,125.00	sf	8.00	9,000
1302	Select Exterior Demolish - Roofing	31,687.00	sf	7.00	221,809
1303	Select Exterior Demolish - Lightwells (SOG, Walls & Windows)	1,514.00	sf	15.00	22,710
1304	Select Exterior Demolish - Storefront	5,784.00	sf	5.00	28,920
1305	Select Exterior Demolish - Windows, Perimeter Sealants & Prep for New Window (74ea)	4,874.00	sf	10.00	48,740
1306	Select Interior Demolish - Tolley Cables	1.00	ea	25,000.00	25,000

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	B - Renovation / Addition Lord (West)				
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				3,697,360
	F20 - SELECTIVE BUILDING DEMOLITION				3,697,360
	B - Renovation / Addition Lord (West)				45,573,046
	C - New Gym				
	A10 - FOUNDATIONS				
	A1010 - Standard Foundations				
1307	Grade Beams	160.00	cy	650.00	104,000
1308	Pile Caps	166.00	cy	650.00	107,900
1309	Canopy Foundations - Allowance	1.00	ls	45,000.00	45,000
	A1010 - Standard Foundations				256,900
	A1020 - Special Foundations				
1310	Pile Mobilization & Testing	1.00	ls	40,000.00	40,000
1311	Pile Layout	148.00	ea	200.00	29,600
1312	Column Piles - 45'	112.00	ea	4,050.00	453,600
1313	Slab Piles - 45'	36.00	ea	4,050.00	145,800
1314	Pile Pre-Drilling	148.00	ea	450.00	66,600
	A1020 - Special Foundations				735,600
	A10 - FOUNDATIONS				992,500
	B10 - SUPERSTRUCTURE				
	A1010 - Standard Foundations				
1315	Slab on Metal Deck - 5" NWC	885.00	sf	10.00	8,850
1316	Slab on Metal Deck - 6-1/4" NWC	35,784.00	sf	8.00	286,272
1317	Thickened Slab @ Slab Piles	10.00	yds	750.00	7,500
1318	Structural Slab on Grade - 10"	34,345.00	sf	25.00	858,625
1319	MEP Housekeeping Pads	1,500.00	sf	25.00	37,500
	A1010 - Standard Foundations				1,198,747
	B1010 - Floor Construction				
1320	Structural Steel & Metal Deck	490.00	tons	3,900.00	1,911,000
1321	Structural Steel Bar Joists	250.00	tons	3,750.00	937,500
1322	Misc. Metals	70,984.00	sf	1.50	106,476
	B1010 - Floor Construction				2,954,976
	B1020 - Roof Construction				
1323	Miscellaneous Unforeseen Metal Fabrications	70,984.00	sf	1.50	106,476
1324	Aircraft Cable Wires for Banner Support	75.00	ea	500.00	37,500
1325	Canopy Steel Framing	2,098.00	sf	50.00	104,900
	B1020 - Roof Construction				248,876

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	B10 - SUPERSTRUCTURE				4,402,599
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
1326	4" Polished CMU - W.14 Lower Wall	7,890.00	ea	34.00	268,260
1327	4" Polished CMU - W.14 Upper Wall	10,410.00	ea	34.00	353,940
1328	8" CMU Backup - 1st Floor	7,745.00	sf	43.00	333,035
1329	8" CMU Backup - 2nd Floor	4,620.00	sf	43.00	198,660
1330	3-5/8" 18-ga Galv Mtl Framing - Behind Masonry	8,540.00	sf	6.00	51,240
1331	3/4" Plywood Sheathing, Fire Treated	12,365.00	sf	2.75	34,004
1332	6" Rockwool Insulation - Behind Masonry	12,365.00	sf	6.75	83,464
1333	Sealant & Misc Closure	12,365.00	sf	3.25	40,186
1334	Air / Vapor Barrier - Behinf Masonry	12,365.00	sf	7.50	92,738
1335	Tectum Wall Panels	8,540.00	sf	20.00	170,800
	B2010 - Exterior Walls				1,626,326
	B2020 - Exterior Windows				
1336	Credit for Dual Pane Insulated Glass in lieu Triple Pane	1.00	ea	(35,000.00)	(35,000)
1337	Alum Curtain Wall (CW2X & CW3x) w/ Triple Pane Insul Glass & Custom Pt Fin	2,675.00	sf	150.00	401,250
1338	Kalwall - Clear w/ Insulating Fill	265.00	sf	65.00	17,225
1339	Kalwall - Translucent w/ Insulating Fill	11,425.00	sf	65.00	742,625
1340	Spandrel Glass - Premium	475.00	sf	20.00	9,500
1341	Aluminum Louvers - Outside Glass 3rd Floor	1,330.00	sf	80.00	106,400
	B2020 - Exterior Windows				1,242,000
	B2030 - Exterior Doors				
1342	6'-0" x 7'-0"Pr Steel Ext Door w/ Hardware	2.00	pr	4,696.70	9,393
1343	3'-0" x 7'-0" Steel Ext Door w/ Glass Lite & Hardware	3.00	ea	2,500.00	7,500
1344	6'-0" x 7'-0"Pr Alum & Glass Doors w/ Hardware	2.00	pr	17,214.81	34,430
1345	6'-0" x 8'-0"Pr Steel Ext Door w/ Hardware	1.00	pr	8,503.00	8,503
1346	Automatic Door Operator	4.00	ea	3,800.00	15,200
	B2030 - Exterior Doors				75,026
	B20 - EXTERIOR CLOSURE				2,943,352
	B30 - ROOFING				
	B3010 - Roof Coverings				
1347	Blocking & Misc Carpentry	34,715.00	sf	2.50	86,788
1348	Standing Seam Metal Roof - Changed to Ribbed Membrane	29,455.00	sf	25.00	736,375
1349	TPO Roof Assembly - Flat Area	5,260.00	sf	20.00	105,200
1350	Copings & Counter Flashing - Flat Roof	335.00	lf	25.00	8,375
1351	Copings - Sloped Roof	705.00	lf	25.00	17,625

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	C - New Gym				
	B30 - ROOFING				
	B3010 - Roof Coverings				954,363
	B3020 - Roof Openings				
1352	Misc Roof Accessories - Allowance	1.00	ea	40,000.00	40,000
	B3020 - Roof Openings				40,000
	B30 - ROOFING				994,363
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
1353	8" CMU 13'4"H	20,166.00	sf	20.00	403,320
1354	8" CMU 18'6"H	41,295.00	sf	25.00	1,032,375
1355	4"H CMU Base @ Lockers	966.00	lf	20.00	19,320
1356	Installation of D/F/H	55.00	ea	650.00	35,750
1357	Installation of Toilet Accessories	98.00	ea	65.00	6,370
1358	Operable Partition 13'4"H - 1 ea	1,741.00	sf	60.00	104,460
1359	Operable Partition 18'6"H - 1 ea	1,406.00	sf	70.00	98,420
	C1010 - Partitions				1,700,015
	C1020 - Interior Doors				
1360	Double Door & Frame	15.00	ea	850.00	12,750
1361	Single Door w/ Side Light & Frame	5.00	ea	700.00	3,500
1362	Single Door & Frame	31.00	ea	550.00	17,050
1363	Double Door w/ Side Light & Frame	4.00	ea	1,000.00	4,000
1364	Hardware Allowance	55.00	ea	750.00	41,250
	C1020 - Interior Doors				78,550
	C1030 - Building Specialties				
1365	Millwork Blocking	66.00	lf	6.00	396
1366	Misc. Rough Carpentry/Blocking	70,984.00	sf	0.50	35,492
1367	Display/Trophy Case 84"H x 18"D	48.00	lf	750.00	36,000
1368	Standard Toilet Partition	7.00	ea	1,200.00	8,400
1369	ADA Toilet Partition	4.00	ea	1,800.00	7,200
1370	Urinal Screen	4.00	ea	350.00	1,400
1371	Interior Room Signage & Code Directional Signage - Allowance	70,984.00	sf	0.75	53,238
1372	Backlit Post 24"H Letters	8.00	ea	500.00	4,000
1373	8" Brushed Aluminum Stand-Off Letters	18.00	ea	175.00	3,150
1374	Lockers	706.00	ea	450.00	317,700
1375	Locker Room Bench	385.00	lf	75.00	28,875
1376	Toilet Accessories for Single Use Toilet Room	2.00	rms	1,095.00	2,190
1377	Toilet Accessories for Gang Toilet Room	4.00	rms	2,275.00	9,100

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	C10 - INTERIOR CONSTRUCTION				
	C1030 - Building Specialties				507,141
	C10 - INTERIOR CONSTRUCTION				2,285,706
	C20 - STAIRS				
	C2010 - Stair Construction				
1378	Metal Pan Stairs, New - Stair P	54.00	rs	1,200.00	64,800
1379	Metal Pan Stairs, New - Stair Q - Monumental	31.00	rs	3,000.00	93,000
1380	Stair Treads - Finish Allowance	333.00	lf	50.00	16,650
1381	Stair Treads - Finish Allowance @ Monumental Stair	253.00	lf	250.00	63,250
	C2010 - Stair Construction				237,700
	C20 - STAIRS				237,700
	C30 - INTERIOR FINISHES				
	C3010 - Wall Finishes				
1382	AWP - Acoustical Wall Panel	13,462.00	sf	25.00	336,550
1383	Paint - Allowance	70,984.00	sf	3.75	266,190
	C3010 - Wall Finishes				602,740
	C3020 - Floor Finishes				
1384	Poured Epoxy Floor w/ Integral Epoxy Base	15,115.00	sf	12.00	181,380
1385	Athletic Wood Competition Court	8,286.00	sf	25.00	207,150
1386	LT - Linoleum Tile	8,271.00	sf	7.50	62,033
1387	RAF - Rubber Athletic Flooring	10,667.00	sf	22.50	240,008
1388	SAF - Synthetic Athletic Flooring	19,377.00	sf	22.50	435,983
1389	RB - Rubber Base	1,647.00	lf	3.50	5,765
1390	Sealed Concrete Floor	1,310.00	sf	1.00	1,310
1391	Flash Patch/Floor Prep	70,984.00	sf	1.00	70,984
	C3020 - Floor Finishes				1,204,611
	C3030 - Ceiling Finishes				
1392	GWB Soffits	2,766.00	lf	55.00	152,130
1393	Rated GWB Ceilings	7,056.00	sf	15.00	105,840
1394	GWB Ceilings	1,576.00	sf	12.00	18,912
1395	ACT-1 - 2x4 ACT Ceilings	9,121.00	sf	6.00	54,726
1396	Sound Isolation Ceilings - Allowance	1.00	ls	150,000.00	150,000
1397	Paint - GWB Ceilings and Soffits	14,200.00	sf	1.00	14,200
1398	Paint - Exposed Steel Deck and Structure	42,069.00	sf	2.00	84,138
	C3030 - Ceiling Finishes				579,946
	C30 - INTERIOR FINISHES				2,387,297

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D20 - PLUMBING				
	D2000 - Plumbing				
1399	Commissioning support/lump sum	1.00	ls	2,560.00	2,560
1400	General requirements/square foot	70,984.00	sf	0.75	53,238
1401	Demolition/cut, drop & make safe/lump sum	1.00	ls	3,750.00	3,750
1402	Premium for project phasing	1.00	ls	1,612.50	1,613
	D2000 - Plumbing				61,161
	D2003 - Insulation/Plumbing (INS)				
1403	INS - Armaflex/Copper Pipe - Trap primer feed UG	60.00	lf	8.55	513
1404	INS - Fiberglass/Cast Iron Pipe - RL/horiz. only	1,700.00	lf	12.97	22,046
1405	INS - Fiberglass/Copper Pipe - Domestic water	3,925.00	lf	9.29	36,445
	D2003 - Insulation/Plumbing (INS)				59,004
	D2010 - Plumbing Fixtures				
1406	- Rough-ins/Fixtures	540.00	ea	157.24	84,910
1407	Drinking fountain/bottle fill/bi-level//ADA	5.00	ea	2,636.44	13,182
1408	Shower valve & access./ADA (tile enclosure by GC)	3.00	ea	1,391.08	4,173
1409	Shower valve & access. (tile enclosure by GC)	3.00	ea	915.72	2,747
1410	Mop sink/floor mount/24"x24"	2.00	ea	1,370.90	2,742
1411	Sink/1-bowl/gooseneck faucet/ADA	1.00	ea	1,266.84	1,267
1412	Sink/1-bowl/gooseneck faucet	2.00	ea	1,198.78	2,398
1413	Lavatory/wall hung/carrier/sensor gooseneck faucet/ADA	16.00	ea	1,568.14	25,090
1414	Urinal/wall mount/carrier/sensor flush valve/ADA	3.00	ea	1,340.08	4,020
1415	Urinal/wall mount/carrier/sensor flush valve	4.00	ea	1,340.08	5,360
1416	Water closet/wall mount/carrier/sensor FV/ADA	8.00	ea	1,769.44	14,156
1417	Water closet/wall mount/carrier/sensor FV	7.00	ea	1,769.44	12,386
	D2010 - Plumbing Fixtures				172,431
	D2020 - Domestic Water System				
1418	Type L Copper Pipe & Ftgs/95-5 Solder - Domestic water	3,925.00	lf	33.53	131,592
1419	Type K Soft Copper Pipe & Ftgs/95-5 Solder - Trap primer feed U/G	60.00	lf	16.39	984
1420	Thermostatic mixing valve - Domestic	1.00	ea	2,846.72	2,847
1421	Expansion tanks/ASME/potable	3.00	ea	1,998.48	5,995
1422	Recirculation pumps/bronze	3.00	ea	867.48	2,602
1423	Backflow preventers/RPBZ/4"	1.00	ea	2,062.84	2,063
1424	Water meter w/remote readout/entrance/4"	1.00	ea	2,387.84	2,388
1425	Shock absorbers/61 to 113 FU's/#400	1.00	ea	956.67	957
1426	Shock absorbers/34 to 60 FU's/#300	1.00	ea	405.67	406
1427	Shock absorbers/12 to 33 FU's/#200	7.00	ea	277.06	1,939

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D20 - PLUMBING				
	D2020 - Domestic Water System				
1428	Shock absorbers/1 to 11 FU's/#100	10.00	ea	154.06	1,541
1429	Trap primer/drip type/2 - 4-outlet	4.00	ea	214.96	860
1430	Hose bibbs/encased/exterior - HB-2	6.00	ea	757.24	4,543
1431	Hose bibbs/interior - HB-1	4.00	ea	224.18	897
1432	Thermostatic mixing valve - Kitchen	1.00	ea	2,478.66	2,479
1433	Backflow preventerBoiler make-up	1.00	ea	221.12	221
	D2020 - Domestic Water System				162,313
	D2030 - Sanitary Waste & Vent System				
1434	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Sanitary W&V UG	750.00	lf	71.35	53,513
1435	No-Hub C.I. Pipe & Ftgs/Clamp - Sanitary W&V AG	2,950.00	lf	66.54	196,287
1436	Wall cleanouts	4.00	ea	201.24	805
1437	Floor cleanouts/heavy duty	2.00	ea	373.24	746
1438	Floor cleanouts	6.00	ea	301.24	1,807
1439	Floor drains/heavy duty	3.00	ea	371.24	1,114
1440	Shower drains/2"	10.00	ea	235.24	2,352
1441	Floor drains	6.00	ea	310.24	1,861
	D2030 - Sanitary Waste & Vent System				258,486
	D2040 - Storm Drainage System				
1442	SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Primary RL UG	200.00	lf	86.44	17,287
1443	No-Hub C.I. Pipe & Ftgs/Clamp - Overflow RL AG	1,050.00	lf	74.83	78,573
1444	No-Hub C.I. Pipe & Ftgs/Clamp - Primary RL AG	1,100.00	lf	74.83	82,314
1445	Wall Cleanouts/RL	2.00	ea	131.12	262
1446	Floor Cleanouts/RL/heavy duty	1.00	ea	353.24	353
1447	Floor Cleanouts/RL	2.00	ea	320.24	640
1448	Downspots/overflow RL	2.00	ea	867.90	1,736
1449	Roof Drains/Overflow RL	7.00	ea	728.30	5,098
1450	Roof Drains/Primary RL	7.00	ea	424.30	2,970
	D2040 - Storm Drainage System				189,234
	D2060 - Natural/LP Gas System				
1451	Sch 40 Black Steel (CW) Pipe & Ftgs/T&C - Gas piping	20.00	lf	30.43	609
1452	- Paint exposed piping/Gas piping	250.00	lf	21.87	5,467
1453	Sch 40 Black Steel (ERW) Pipe & Ftgs/Weld - Gas piping	160.00	lf	99.31	15,890
1454	- Flex connectors/Gas piping/Kitchen equipment	4.00	ea	70.29	281
1455	Solonoid valve & ANSUL interlock - Kitchen	1.00	ea	1,455.60	1,456
	D2060 - Natural/LP Gas System				23,702

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	C - New Gym				
	D20 - PLUMBING				
	D2099 - Material Handling/Supports/Testing/Start Ups				
1456	- Start up/HW boilers	2.00	ea	289.48	579
1457	- Offload & rigging/HW boilers & tanks	4.00	ea	1,157.92	4,632
1458	- Fill & vent system/Gas piping	1.00	ea	553.96	554
1459	- Clean & test system/Gas piping	1.00	ea	578.96	579
1460	- Hangers & clamps/Gas piping	180.00	lf	2.56	460
1461	- Fill & vent system/Sanitary W&V	1.00	ea	2,265.84	2,266
1462	- Clean & test system/Sanitary W&V	1.00	ea	2,415.84	2,416
1463	- Hangers & clamps/Sanitary W&V	2,950.00	lf	3.32	9,801
1464	- Fill & vent system/Domestic water	1.00	ea	2,265.84	2,266
1465	- Clean & test system/Domestic water	1.00	ea	2,415.84	2,416
1466	- Hangers & clamps/Domestic water	3,925.00	lf	2.56	10,040
1467	- Offload & distribution/Fixtures	54.00	ea	132.24	7,141
1468	- Clean & test system/RL	1.00	ea	1,157.92	1,158
1469	- Hangers & clamps/RL	2,150.00	lf	3.32	7,143
	D2099 - Material Handling/Supports/Testing/Start Ups				51,450
	D3050 - Heating Systems				
1470	- Condensate neutrilization kits	2.00	ea	303.12	606
1471	HW Boiler/gas/high eff. condensing - Domestic	850.00	mbh	29.73	25,269
1472	HW Boiler/gas/high eff. condensing - Kitchen	285.00	mbh	29.73	8,473
1473	Concentric vent kit/PVC/4" - Direct vent	2.00	ea	429.48	859
1474	Sch 80 Pipe & Ftgs/CPVC/4" - Direct vent piping	120.00	lf	29.33	3,519
	D3050 - Heating Systems				38,726
	D3052 - Cooling Systems				
1475	Domestic water storage tank/ASME/260 gals. - Domestic	2.00	ea	8,465.88	16,932
	D3052 - Cooling Systems				16,932
	D20 - PLUMBING				1,033,439
	D30 - HVAC				
	D3000 - HVAC Common Work Requirements				
1476	General requirements/square foot	70,984.00	sf	1.50	106,476
1477	Demolition/cut, drop & make safe/lump sum	1.00	ls	4,500.00	4,500
1478	Commissioning support/lump sum	1.00	ls	2,700.00	2,700
1479	Premium for project phasing	1.00	ls	3,750.00	3,750
	D3000 - HVAC Common Work Requirements				117,426
	D3003 - Insulation/HVAC (INS)				
1480	INS - Fiberglass/Blk. Stl Weld Pipe - CHW	800.00	lf	11.46	9,168

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D30 - HVAC				
	D3003 - Insulation/HVAC (INS)				
1481	INS - Fiberglass/Blk. Stl Weld Pipe - HW	800.00	lf	11.46	9,168
1482	INS - Fiberglass/Blk. Stl Weld Pipe - CW	420.00	lf	11.73	4,928
1483	INS - Fiberglass/Copper Pipe - CHW	9,000.00	lf	8.15	73,388
1484	INS - Fiberglass/Copper Pipe - HW	6,500.00	lf	8.15	53,003
1485	INS - Duct/Fiberglass Wrap	66,000.00	sf	4.99	329,221
1486	INS - Duct/Firemaster Blanket/Kitchen exhaust	2,600.00	sf	21.71	56,452
	D3003 - Insulation/HVAC (INS)				535,327
	D3005 - Testing, Adjusting & Balancing (TAB)				
1487	TAB - Testing Adjusting & Balancing	15.00	day	2,598.80	38,982
1488	TAB commissioning support	5.00	day	974.40	4,872
	D3005 - Testing, Adjusting & Balancing (TAB)				43,854
	D3009 - Automatic Temperature Controls (ATC)				
1489	ATC - VFD wiring for pumps (remote mnt.) - 12@3 pts.	36.00	pts	246.82	8,885
1490	ATC - Pumps/HW system - 4@5 pts.	20.00	pts	436.31	8,726
1491	ATC - Chillers/packaged/factory controls	2.00	ea	2,645.75	5,292
1492	ATC - Boilers/packaged/factory controls	2.00	ea	2,645.76	5,292
1493	ATC - Pumps/CHW system - 4@5 pts.	20.00	pts	436.31	8,726
1494	ATC - Pumps/CW system - 4@5 pts.	20.00	pts	436.31	8,726
1495	ATC - Plumbing WH's & RCP's - 1@10 pts.	10.00	pts	346.19	3,462
1496	ATC - System hardware, software & engineering	1.00	ea	3,056.06	3,056
1497	ATC - CO2 demand ventilation control	55,000.00	sf	0.22	12,050
1498	ATC - Commissioning support days	7.00	day	721.04	5,047
1499	ATC - AHU's/custom/ATC F&I controls - 5@40 pts.	200.00	pts	892.99	178,597
1500	ATC - MUA's/custom/ATC F&I controls - 1@20 pts.	20.00	pts	712.73	14,255
1501	ATC - Exhaust fans/gen. exh./rooftop - 4@5 pts.	20.00	pts	512.11	10,242
1502	ATC - Exhaust fans/gen. exh./in-line - 2@5 pts.	10.00	pts	436.32	4,363
1503	ATC - Radiant ceiling panels/RCP's - 55@2 pts.	110.00	pts	251.44	27,658
1504	ATC - Cabinet unit heaters/CUH's - 8@3 pts.	24.00	pts	251.44	6,035
1505	ATC - Unit heaters/electric/EUH's - 1@2 pts.	2.00	pts	218.16	436
1506	ATC - Unit heaters/HW/UH's - 2@2 pts.	4.00	pts	251.44	1,006
1507	ATC - Chilled beams/active/2-pipe - 28@4 pts.	112.00	pts	284.72	31,888
1508	ATC - VAV box/ATC furnished & installed - 107@2 pts.	214.00	pts	275.48	58,952
1509	ATC - Melink Intelli-Hood system (Culinary exhaust)	1.00	ea	8,030.88	8,031
1510	ATC - Melink system control wiring (Culinary exhaust) - 1@8 pts.	8.00	pts	270.39	2,163
1511	ATC - Exhaust fans/Culinary hood/rooftop - 1@8 pts.	8.00	pts	526.44	4,211

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D30 - HVAC				
	D3009 - Automatic Temperature Controls (ATC)				
1512	ATC - Exhaust fans/dishwasher hood/rooftop - 1@6 pts.	6.00	pts	512.12	3,073
1513	ATC - Energy metering/Fuel, gas & water systems	1.00	ls	5,731.91	5,732
	D3009 - Automatic Temperature Controls (ATC)				425,904
	D3050 - Heating Systems				
1514	Type L Copper Pipe & Pressfit Ftgs - HWS&R mains	1,800.00	lf	32.47	58,442
1515	Type L Copper Pipe & Pressfit Ftgs - HWS&R branches	4,700.00	lf	24.40	114,659
1516	Sch 40 Blk Stl Pipe & Ftgs/ERW/Grooved - HWS&R mains	800.00	lf	113.73	90,981
1517	Boilers (3)/HW/gas/high eff. condensing - B-1,2,3	16,800.00	mbh	18.15	304,873
1518	- Condensate neutrilization kits/Boilers	3.00	ea	303.12	909
	D3050 - Heating Systems				569,865
	D3052 - Cooling Systems				
1519	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R mains	1,750.00	lf	33.53	58,672
1520	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R branches	7,250.00	lf	25.38	183,985
1521	Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CHWS&R mains	800.00	lf	114.73	91,782
1522	Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CWS&R	420.00	lf	185.39	77,863
1523	Chillers (2)/water cooled - CH-3&4	550.00	ton	669.09	368,001
1524	Buffer tank/CHW/ ? gals. - BT-2	1.00	ea	9,090.84	9,091
	D3052 - Cooling Systems				789,394
	D3055 - Pumps & Accessories/HVAC				
1525	Pump/base mount/ ? hp/ ? gpm/ ? tdh/HW system - P-1 - 4	4.00	ea	8,713.88	34,856
1526	- Suction diffusers/HW pumps	4.00	ea	1,866.66	7,467
1527	- Flex connectors/HW pumps	8.00	ea	679.48	5,436
1528	- Triple duty valves/HW pumps	4.00	ea	4,392.72	17,571
1529	Air separator/HW system - AS-1	1.00	ea	3,051.72	3,052
1530	Flow meter/pitot tube/HW system	2.00	ea	1,257.96	2,516
1531	Expansion tank/ASME/ ? gal./HW system - ET-1	1.00	ea	7,666.20	7,666
1532	Expansion tank/ASME/ ? gal./CHW system	1.00	ea	7,306.20	7,306
1533	Air separator/CHW system	1.00	ea	3,051.72	3,052
1534	Flow meter/pitot tube/CHW system	2.00	ea	1,257.96	2,516
1535	- Flow meter readout kit	1.00	ea	1,262.12	1,262
1536	- Triple duty valves/CHW pumps	4.00	ea	4,392.72	17,571
1537	- Flex connectors/pumps/CHW pumps	8.00	ea	679.48	5,436
1538	- Suction diffusers/CHW pumps	4.00	ea	1,866.66	7,467
1539	Pump/base mount/ ? hp/ ? gpm/ ? tdh/CHW system - P-5 - 8	4.00	ea	8,713.88	34,856

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D30 - HVAC				
	D3055 - Pumps & Accessories/HVAC				
1540	Pump/base mount/ ? hp/ ? gpm/ ? tdh/CW system - P-9 - 12	4.00	ea	6,951.40	27,806
1541	- Suction diffusers/CW pumps	4.00	ea	1,866.66	7,467
1542	- Flex connectors/pumps/CW pumps	8.00	ea	679.48	5,436
1543	- Triple duty valves/CW pumps	4.00	ea	4,392.72	17,571
	D3055 - Pumps & Accessories/HVAC				216,307
	D3056 - Chemical Treatment				
1544	Shot feeder/5 gallon/CHW System	1.00	ea	805.60	806
1545	Shot feeder/5 gallon/HW System	1.00	ea	805.60	806
1546	Shot feeder/5 gallon/CW system	1.00	ea	805.60	806
1547	Glycol feeder/50 gal. tank w/pump/HW System - GF-1	1.00	ea	5,403.96	5,404
1548	- Glycol solution/propylene/ ? %/HW System	385.00	gal	26.61	10,246
1549	Glycol feeder/50 gal. tank w/pump/CHW System - GF-2	1.00	ea	5,403.96	5,404
1550	- Glycol solution/propylene 35%/CHW System	330.00	gal	26.61	8,782
1551	Chemical treatment/HW System	1.00	ea	2,725.00	2,725
1552	Chemical treatment/CHW System	1.00	ea	2,180.00	2,180
1553	Chemical treatment/CW system	1.00	ea	2,500.00	2,500
	D3056 - Chemical Treatment				39,657
	D3057 - Air Distribution Systems				
1554	SM - Boilers combustion air/galvanized	100.00	lf	162.44	16,244
1555	SM - Boilers venting/aluminized stain. steel/double wall	100.00	lf	293.79	29,379
1556	SM - Guy wires support (roof flue piping)	1.00	ea	3,448.80	3,449
1557	- Guy wires support/Roof gen. exh. piping	1.00	ea	1,474.40	1,474
1558	Make-up air unit/HW coil/std. roof curb/ ? cfm - MAU-1	5,000.00	cfm	8.50	42,500
	Est. CFM/no info. provided.				
1559	Air Handling Unit/modular/cfm - AHU-10	15,000.00	cfm	11.99	179,850
1560	Air Handling Unit/modular/cfm - AHU-11	15,000.00	cfm	11.99	179,850
1561	Air Handling Unit/modular/cfm - AHU-12	15,000.00	cfm	11.99	179,850
1562	Air Handling Unit/modular/cfm - AHU-13 (dehumid.)	14,000.00	cfm	15.25	213,500
1563	Air Handling Unit/modular/cfm - AHU-14	6,000.00	cfm	11.99	71,940
1564	SM - Galvanized ductwork - Bathrooms exhaust	3,000.00	lb	10.84	32,505
	100 CFM/Fixt. - 1 Lb/CFM				
1565	SM - Galvanized ductwork - AHU's	70,125.00	lb	10.84	759,804
1566	SM - Stainless steel ductwork - Lockers & Team rooms (AHU-13)	13,165.00	lb	23.07	303,711
1567	SM - Black iron ductwork/grease rated/welded seam - Kitchen hood exhaust	4,000.00	lb	19.02	76,088

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
C - New Gym				
D30 - HVAC				
D3057 - Air Distribution Systems				
1568 SM - Aluminum ductwork - Dishwasher exhaust	2,500.00	lb	22.97	57,424
1569 SM - Galvanized ductwork - Misc. exhaust	3,000.00	lb	10.84	32,505
1570 SM - Ductwork & accessories - Generator intake/exhaust	1.00	ea	15,846.40	15,846
1571 SM - Sound attenuators (11)/in-line - SATT's	135,000.00	cfm	0.50	67,499
1572 SM - Duct smoke detector	11.00	ea	604.50	6,650
1573 SM - Motorized dampers	4.00	ea	815.40	3,262
1574 SM - Fire/smoke dampers/louver type	16.00	ea	620.40	9,926
1575 SM - Fire dampers/curtain type	40.00	ea	257.70	10,308
1576 SM - Diffusers, registers & grilles	180.00	ea	227.25	40,905
1577 EF/centrifugal downblast/belt drive/roof - Misc. exh. fans Greenheck #GB121-3	2.00	ea	1,779.20	3,558
1578 EF/centrifugal downblast/belt drive/roof - Bath exh. fans Greenheck #GB200-5	2.00	ea	2,451.80	4,904
1579 Dishwasher exhaust fan/centrifugal upblast/roof - DEF	1.00	ea	3,353.64	3,354
1580 Kitchen exhaust fan/centrifugal upblast/roof - KEF Greenheck #USGF	1.00	ea	7,224.40	7,224
1581 EF/centrifugal in-line/belt drive/box- Misc. exh. fans Greenheck # BSQ120-5	2.00	ea	2,077.75	4,156
1582 - Roof curb/standard/EF's (roof)	6.00	ea	1,287.20	7,723
D3057 - Air Distribution Systems				2,365,389
D3058 - Terminal Equipment				
1583 - Sound attenuators/VAV's	86.00	ea	463.60	39,870
1584 VAV box/large - VAV's	24.00	ea	965.90	23,182
1585 VAV box/medium - VAV's	32.00	ea	778.10	24,899
1586 VAV box/small - VAV's	30.00	ea	618.30	18,549
1587 Unit heater/electric/propeller - EUH's	1.00	ea	1,330.60	1,331
1588 Unit heater/hydronic/ceiling mnt./propeller - UH's	2.00	ea	1,260.40	2,521
1589 Cabinet unit heater/hydronic/ceiling mount - CUH's	8.00	ea	1,845.75	14,766
1590 Cabinet unit heater/hydronic/wall mount exposed - CUH's	2.00	ea	1,757.20	3,514
1591 Chilled beam/hydr. 2-pipe/clg. mnt./active/8'x2' - CHB's	78.00	ea	1,150.40	89,731
1592 Chilled beam/hydr. 2-pipe/clg. mnt./active/4'x2' - CHB's	4.00	ea	729.50	2,918
D3058 - Terminal Equipment				221,280
D3070 - Generator Exhaust System				
1593 Emer. Gen. Exhaust/Muffler (install only)	1.00	ea	2,115.84	2,116
1594 Sch 40 Blk Stl Pipe & Ftgs/SMLS/Butt Weld	50.00	lf	122.10	6,105

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D30 - HVAC				
	D3070 - Generator Exhaust System				8,221
	D3080 - Facility Fuel Oil System				
1595	Fuel oil storage tank/AG/dbl. wall steel/2,500 gals. Mech. Innovations of NE	1.00	ea	74,231.68	74,232
1596	Fuel oil pumpset/duplex/ ? gpm	1.00	ea	12,822.40	12,822
1597	Fuel oil day tank/50 gals.	1.00	ea	993.96	994
1598	Fuel oil tank monitor system (Veeder Root)	1.00	ea	8,086.88	8,087
1599	- Firomatic valves	1.00	ea	163.12	163
1600	- Safety valves	1.00	ea	268.18	268
1601	- Fill box/exterior	1.00	ea	393.36	393
1602	- Vent cap/exterior	1.00	ea	129.12	129
1603	Fuel oil fill & vent/sch 40 blk. stl. t&c - 1-1/2"	30.00	lf	33.22	997
1604	Fuel oil fill & vent/sch 40 blk. stl. t&c - 2"	30.00	lf	36.88	1,107
1605	Fuel oil double wall containment piping/sch 40 blk. stl.	100.00	lf	197.43	19,743
1606	Fuel oil s&r/sch 40 blk. stl. t&c	40.00	lf	27.81	1,112
	D3080 - Facility Fuel Oil System				120,048
	D3090 - Variable Frequency Drives				
1607	Variable Frequency Drives/ ? HP/HW pumps	4.00	ea	8,842.24	35,369
1608	Variable Frequency Drives/ ? HPC/HW pumps	4.00	ea	8,842.24	35,369
1609	Variable Frequency Drives/ ? HPC/W pumps	4.00	ea	6,932.24	27,729
	D3090 - Variable Frequency Drives				98,467
	D3099 - Material Handling/Supports/Testing/Start Ups				
1610	- Crane & rigging/AHU's (rooftop MAU)	1.00	day	10,448.80	10,449
1611	- Accessories installation/AHU's	6.00	ea	974.40	5,846
1612	- Offload & rigging/AHU's per section (indoor AHU's)	25.00	ea	1,224.40	30,610
1613	- Offload & rigging/Boilers	3.00	ea	2,198.80	6,596
1614	- Start up/Boilers	3.00	ea	2,365.84	7,098
1615	- Offload & rigging/HW pumps	4.00	ea	1,074.40	4,298
1616	- Inertia base//HW pumps	4.00	ea	1,678.80	6,715
1617	- Start up/HW pumps	4.00	ea	314.48	1,258
1618	- Offload & rigging/CHW pumps	4.00	ea	1,074.40	4,298
1619	- Inertia base/CHW pumps	4.00	ea	1,678.80	6,715
1620	- Start up/CHW pumps	4.00	ea	314.48	1,258
1621	- Offload & rigging/CW pumps	4.00	ea	1,074.40	4,298
1622	- Inertia base/CW pumps	4.00	ea	1,678.80	6,715
1623	- Start up/CW pumps	4.00	ea	314.48	1,258
1624	- Offload & rigging/CH's	2.00	ea	5,423.20	10,846

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D30 - HVAC				
	D3099 - Material Handling/Supports/Testing/Start Ups				
1625	- Start up/CH's	2.00	ea	2,315.84	4,632
1626	- Start up/AHU's	6.00	ea	1,224.40	7,346
1627	- Fill & vent system/CHW piping	1.00	ea	843.44	843
1628	- Clean & test system/CHW piping	1.00	ea	893.44	893
1629	- Hangers & clamps/CHW piping	9,800.00	lf	3.32	32,560
1630	- Fill & vent system/HW piping	1.00	ea	843.44	843
1631	- Clean & test system/HW piping	1.00	ea	893.44	893
1632	- Hangers & clamps/HW piping	10,100.00	lf	2.56	25,835
1633	- Fill & vent system/CW piping	1.00	ea	603.96	604
1634	- Clean & test system/CW piping	1.00	ea	628.96	629
1635	- Hangers & clamps/CW piping	420.00	lf	3.32	1,395
1636	- Support steel/SATT's	11.00	ea	354.50	3,900
1637	- Offload & rigging/SATT's	11.00	ea	1,074.40	11,818
1638	- Start up/EF's	6.00	ea	33.06	198
1639	- Support steel/EF's (indoor)	2.00	ea	354.50	709
1640	- Offload & rigging/Ef's (indoor)	2.00	ea	465.40	931
1641	- Crane & rigging/EF's (roof)	1.00	day	10,448.80	10,449
1642	- Start up/UH's & CUH's	13.00	ea	33.06	430
1643	- Support steel/UH's & CUH's	11.00	ea	293.60	3,230
1644	- Offload & distribution/UH's & CUH's	13.00	ea	121.80	1,583
1645	- Support steel/CHB's	82.00	ea	146.80	12,038
1646	- Offload & distribution/CHB's	82.00	ea	121.80	9,988
1647	- Support steel/VAV's	86.00	ea	354.50	30,487
1648	- Offload & distribution/VAV's	86.00	ea	182.70	15,712
1649	- Hangers & clamps/FO piping	200.00	lf	2.56	512
1650	- Roof support stands/FO piping	4.00	ea	291.24	1,165
1651	- Clean & test system/FO piping	1.00	ea	1,157.92	1,158
1652	- Hangers & clamps/Gen exh. piping	50.00	lf	3.32	166
	D3099 - Material Handling/Supports/Testing/Start Ups				289,205
	D30 - HVAC				5,840,344
	D40 - FIRE PROTECTION				
	D3000 - HVAC Common Work Requirements				
1653	Manlift rental/month (Gymnasium)	6.00	mo	1,989.48	11,937
	D3000 - HVAC Common Work Requirements				11,937
	D4000 - Fire Suppression				
1654	Project management	1.00	ls	1,875.00	1,875

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D40 - FIRE PROTECTION				
	D4000 - Fire Suppression				
1655	Commissioning support/lump sum	1.00	ls	1,250.00	1,250
1656	Demolition/cut, drop & make safe/lump sum	1.00	ls	2,500.00	2,500
1657	General requirements/square foot	70,984.00	sf	0.35	24,844
	D4000 - Fire Suppression				30,469
	D4020 - Fire Supression Equipment				
1658	Double check valve assembly/Entrance/6"	1.00	ea	6,376.36	6,376
1659	Wet Alarm Check Valve Assembly 6"	1.00	ea	4,629.35	4,629
1660	Check Valve/Swing/Grooved 6"	1.00	ea	980.13	980
1661	Air Compressor 1/2 HP	1.00	ea	8,320.70	8,321
1662	Sprinkler head/Upright Avg. = 130sf/Head	400.00	ea	111.41	44,563
1663	Sprinkler head/Pendant/Semi-recessed Avg. = 130sf/Head	100.00	ea	163.81	16,381
1664	Sprinkler head/Sidewall/Exposed Avg. = 130sf/Head	20.00	ea	117.38	2,348
1665	Fire Pump Test Header/4-way	1.00	ea	3,477.78	3,478
1666	Hose Connection/Single (Storz) - 4"	1.00	ea	353.42	353
1667	Electric Fire Pump w/Controller (1,000 GPM)	1.00	ea	25,173.76	25,174
1668	Jockey Pump	1.00	ea	3,607.92	3,608
	D4020 - Fire Supression Equipment				116,210
	D4030 - Fire Protection Specialties				
1669	Recessed Fire Extinguishers/Fire Extinguisher Cabinets 1 every 2,500sf	28.00	ea	400.00	11,200
	D4030 - Fire Protection Specialties				11,200
	D4050 - Fire Supression Sprinkler Piping				
1670	Sch 40 Galv Steel (ERW)/Grooved - SPK FD valves to check valves	60.00	lf	118.26	7,095
1671	Ductile Iron/Cement-Lined - Fire service entrance 6"	20.00	lf	447.42	8,948
1672	Sch 40 Black Steel (ERW) Pipe & Ftgs/Grooved - SPK branches	2,950.00	lf	32.45	95,732
1673	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK mains	700.00	lf	109.70	76,793
1674	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK drains	200.00	lf	59.70	11,939
	D4050 - Fire Supression Sprinkler Piping				200,508
	D4099 - Material Handling/Supports/Testing/Start Ups				
1675	- Offload & rigging/FP air comp.	1.00	ea	264.48	264
1676	- Offload & rigging/FP fire pump	1.00	ea	1,157.92	1,158

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Estimate Detail			Lowell High School - Schematic Reconciled		
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D40 - FIRE PROTECTION				
	D4099 - Material Handling/Supports/Testing/Start Ups				
1677	- Start up/FP fire pump	1.00	ea	264.48	264
1678	- Start up/FP air comp.	1.00	ea	33.06	33
1679	- Fill & vent system/SPK piping	1.00	ea	2,265.84	2,266
1680	- Clean & test system/SPK piping	1.00	ea	2,415.84	2,416
1681	- Hangers & clamps/SPK piping	3,850.00	lf	3.32	12,791
	D4099 - Material Handling/Supports/Testing/Start Ups				19,193
	D40 - FIRE PROTECTION				389,517
	D50 - ELECTRICAL				
	D5010 - Electrical Service & Distribution				
1682	MSB-LD2 : 2500 amp 480/277 volt w/ 17CB's & Main	1.00	ea	273,852.74	273,853
1683	MSB-LD1 : 2500 amp 480/277 volt w/ 17CB's & Main	1.00	ea	273,852.74	273,853
1684	Meter Pan	2.00	ea	500.00	1,000
1685	Service Grounding	2.00	ea	5,000.00	10,000
1686	Digital Monitoring	2.00	ea	3,500.00	7,000
1687	Recpt Panel 125 amp 208/120 volt	2.00	ea	1,198.63	2,397
1688	Lighting Panel 225 amp 480/277 volt	2.00	ea	2,210.28	4,421
1689	Surge Protector - Pnl Mounted	6.00	ea	200.00	1,200
1690	Surge Protector - Swbd	2.00	ea	750.00	1,500
1691	Dry-Type Transformer Copper Windings 45 KVA	2.00	ea	2,766.27	5,533
1692	Change Panelboard Bussing to AL	1.00	ea	(53,430.00)	(53,430)
	D5010 - Electrical Service & Distribution				527,326
	D5011 - Normal Feeder				
1693	A Normal Feeder Detail 4 Wire + Ground	200.00	lf	42.28	8,456
1694	A Normal Feeder Detail 3 Wire + Ground	60.00	lf	16.17	970
1695	A Normal Feeder Detail 4 Wire + Ground	60.00	lf	28.16	1,689
1696	Multi-Connection Enclosure	1.00	ea	-	-
	D5011 - Normal Feeder				11,115
	D5012 - Emergency/UPS Distribution				
1697	UPS System 45 KW - 8 Min	1.00	ea	70,842.95	70,843
1698	Generator : 600 KW 480V-3Ph-Indoor with 250KW Load Bank	1.00	ea	544,349.32	544,349
1699	ATS-LS-3W : 150 amp 480 volt	1.00	ea	8,198.63	8,199
1700	ATS--OS-3W : 400 amp 480 volt	1.00	ea	12,922.95	12,923
1701	Distribution Panel 400 amp 208/120 volt	1.00	ea	4,522.26	4,522
1702	Distribution Panel 225 amp 480/277 volt	1.00	ea	3,635.27	3,635
1703	Distribution Panel 400 amp 480/277 volt	1.00	ea	5,772.26	5,772

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Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
C - New Gym						
D50 - ELECTRICAL						
D5012 - Emergency/UPS Distribution						
1704		Recpt Panel 125 amp 208/120 volt K	2.00	ea	1,292.38	2,585
1705		Recpt Panel 125 amp 208/120 volt two section K	1.00	ea	3,358.30	3,358
1706		Lighting Panel 100 amp 480/277 volt	2.00	ea	1,579.88	3,160
1707		Surge Protector - Pnl Mounted	3.00	ea	220.01	660
1708		EPO Switch	1.00	ea	400.00	400
1709		Dry-Type Transformer Copper Windings 75 KVA K-13	1.00	ea	5,763.86	5,764
1710		DS 200 a 480v Fused NEMA 1	1.00	ea	794.08	794
		D5012 - Emergency/UPS Distribution				666,964
D5014 - Emergency/UPS Feeder						
1711	A	Normal Feeder Detail 4 Wire + Ground	300.00	lf	20.76	6,229
1712	A	Normal Feeder Detail 3 Wire + Ground	150.00	lf	22.63	3,395
1713	A	Normal Feeder Detail 4 Wire + Ground	400.00	lf	74.16	29,664
1714	A	Normal Feeder Detail 4 Wire + Ground	200.00	lf	26.95	5,389
1715	A	Normal Feeder Detail 4 Wire + Ground	800.00	lf	20.36	16,287
		D5014 - Emergency/UPS Feeder				60,964
D5015 - Equipment Connections						
1716		Mechanical Connections	70,984.00	sf	2.00	141,968
		D5015 - Equipment Connections				141,968
D5016 - Lightning Protection						
1717		Lightning Protection	33,804.00	sf	1.85	62,569
		D5016 - Lightning Protection				62,569
D5020 - LIGHTING						
1718	A	RSH : 6" Downlight	18.00	ea	705.83	12,705
1719	A	LPG : 4Ft Mtd on Pipe Grid	134.00	ea	1,060.06	142,048
1720	A	Exit Light	19.00	ea	702.92	13,355
1721	A	EL : 4Ft Utility	9.00	ea	414.00	3,726
1722	A	LC4 : Cove Lighitng	1.00	ea	827.63	828
1723	A	LC6 : Cove Lighting	1.00	ea	12,411.66	12,412
1724	A	LC8 : Cove Lighting	1.00	ea	10,775.26	10,775
1725	A	LP8 : 8Ft Pendant Indirect/Direct - Corridor	34.00	ea	873.95	29,714
1726	A	LR4 : 4Ft Recessed	5.00	ea	781.56	3,908
1727	A	LR24 : 4Ft Recessed	24.00	ea	781.55	18,757
1728	A	LS8 : 8ft Utility Fixture	24.00	ea	597.89	14,349
1729	A	LS8B : 8ft Utility	16.00	ea	351.27	5,620
1730	A	LS8 EM : 8Ft Utility Fixture	5.00	ea	490.10	2,451
1731	A	LV4 : 4ft Gasketed	6.00	ea	526.82	3,161

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
C - New Gym						
D50 - ELECTRICAL						
D5020 - LIGHTING						
1732	A	LV8 : 8Ft Gasketed	20.00	ea	596.45	11,929
		D5020 - LIGHTING				285,738
D5021 - LIGHTING CONTROL SYSTEM						
1733	A	OS - Occ Sensor Ceiling	31.00	ea	73.61	2,282
1734	A	PS - Photoelectric Sensor	8.00	ea	4,619.09	36,953
1735	A	L - Local Switching	29.00	ea	689.65	20,000
1736		Building Lighting Control System	70,984.00	sf	1.50	106,538
		D5021 - LIGHTING CONTROL SYSTEM				165,772
D5025 - POWER BRANCH WIRING						
1737	A	Clock Hanger Outlet	50.00	ea	246.24	12,312
1738	A	Receptacle Gym	30.00	ea	945.09	28,353
1739	A	Receptacle Dedicated Circuit	20.00	ea	798.94	15,979
1740	A	Equipment Connection	8.00	ea	1,298.76	10,390
1741	A	JB Hand Dryer	1.00	ea	2,566.10	2,566
1742	A	Receptacle	93.00	ea	282.50	26,273
1743	A	Receptacle Corridor	11.00	ea	1,491.55	16,407
1744	A	Quad Receptacle	16.00	ea	2,282.96	36,527
1745	A	Receptacle GFI	26.00	ea	485.17	12,614
1746	A	Special Receptacle	4.00	ea	1,260.78	5,043
1747	A	Receptacle GFI WP	8.00	ea	976.34	7,811
1748		Power Connection to AV Equipment	1.00	ls	15,000.00	15,000
		D5025 - POWER BRANCH WIRING				189,275
D5031 - FIRE ALARM & DETECTION SYSTEM						
1749	A	Remote Annunciator	1.00	ea	4,326.93	4,327
1750	A	Door Holder	16.00	ea	679.73	10,876
1751	A	Fire Alarm Control Panel	1.00	ea	16,202.93	16,203
1752	A	Pull Station	6.00	ea	1,134.64	6,808
1753	A	Smoke Detector Corridor	36.00	ea	615.26	22,149
1754	A	Smoke Detector Stair/Utility Room	10.00	ea	1,407.26	14,073
1755	A	Duct Detector, Cond & Wire	16.00	ea	1,189.65	19,034
1756	A	Duct Detector Remote Test	16.00	ea	398.40	6,374
1757	A	Tamper Switch	10.00	ea	934.42	9,344
1758	A	Flow Switch	10.00	ea	934.42	9,344
1759	A	Control Module	30.00	ea	1,222.32	36,670
1760	A	Monitor Module	30.00	ea	1,025.56	30,767
1761	A	Fireman Phone	4.00	ea	768.41	3,074

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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		Estimate Detail	Qty		Unit Cost	Lowell High School - Schematic Reconciled Amount
		--- - Base				
		C - New Gym				
		D50 - ELECTRICAL				
		D5031 - FIRE ALARM & DETECTION SYSTEM				
1762	A	Speaker Strobe	50.00	ea	1,022.15	51,108
1763	A	Strobe	10.00	ea	801.42	8,014
		D5031 - FIRE ALARM & DETECTION SYSTEM				248,164
		D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				
1764		Card Reader Headend	1.00	ea	10,999.40	10,999
1765		Card Reader	5.00	ea	4,273.97	21,370
		D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				32,369
		D5033 - ELECTRONIC SURVEILLANCE				
1766		Security Head End Equipment	1.00	ea	17,169.52	17,170
1767		Motion Detector	4.00	ea	1,068.50	4,274
1768		Corridor Camera - IP	6.00	ea	3,474.32	20,846
1769		Dome Camera - IP	5.00	ea	3,474.32	17,372
		D5033 - ELECTRONIC SURVEILLANCE				59,661
		D5034 - Clock System				
1770		GPS Receiver & Transmitter	1.00	ea	5,334.76	5,335
1771		Tone Generator	1.00	ea	2,749.12	2,749
1772		Synchronous Wireless Clock	7.00	ea	389.90	2,729
		D5034 - Clock System				10,813
		D5040 - Telephone Data System				
1773		Telephone Data System	70,984.00	sf	2.00	141,968
1774		LV Cable Tray	300.00	lf	50.00	15,000
		D5040 - Telephone Data System				156,968
		D5044 - Audio Visual System				
1775		Install AV Equipment	1.00	ls	45,000.00	45,000
1776		AV System Empty Conduit	1.00	ls	15,000.00	15,000
		D5044 - Audio Visual System				60,000
		D5046 - Distributed Antenna System				
1777		Distributed Antenna System	70,984.00	sf	0.50	35,495
		D5046 - Distributed Antenna System				35,495
		D5050 - Public Address System				
1778	A	Speaker	30.00	ea	223.66	6,710
1779		Speaker	1.00	ea	5,334.76	5,335
		D5050 - Public Address System				12,045
		D5060 - Renewable Energy System				
1780		PV System 100 KW Grid - Excluded	1.00	ls	-	-

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	D50 - ELECTRICAL				
	D5060 - Renewable Energy System				-
	D5090 - MIscellaneous System				
1781	Labelling	70,984.00	sf	0.05	3,611
1782	Temporary Power & Light	70,984.00	sf	1.75	124,284
1783	Coring & Firestop Seal	1.00	ls	8,500.00	8,500
1784	Safe-off Wiring	1.00	ls	2,619.92	2,620
	D5090 - MIscellaneous System				139,015
	D50 - ELECTRICAL				2,866,223
	E10 - EQUIPMENT				
	E1090 - Other Equipment				
1785	AV Equipment Allowance	1.00	ea	115,000.00	115,000
1786	Gymnasium Wall Pads	250.00	lf	90.00	22,500
1787	Gymnasium Divider Curtains	17,250.00	sf	15.00	258,750
1788	Retractable/Adjustable Basketball Backboards	10.00	ea	15,000.00	150,000
1789	Chin-Up Bars	8.00	ea	500.00	4,000
1790	Climbing Ropes	8.00	ea	1,000.00	8,000
1791	Volleyball Sleeves	10.00	ea	1,000.00	10,000
1792	Long Jump/Triple Jump Pit	2.00	ea	25,000.00	50,000
1793	Center Digital 4-sided Scoreboard - Allowance	1.00	ea	50,000.00	50,000
1794	Wall Mounted Scoreboards	8.00	ea	7,500.00	60,000
1795	Fixed Bleachers	630.00	lf	110.00	69,300
1796	Moveable Bleachers	1,260.00	lf	120.00	151,200
1797	Drop-Down Batting Cage	1.00	ea	8,500.00	8,500
1798	Shot Put Cage	1.00	ea	15,000.00	15,000
1799	Miscellaneous Gym Equipment	1.00	ls	50,000.00	50,000
1800	Residential Equipment Allowance	1.00	ea	15,000.00	15,000
	E1090 - Other Equipment				1,037,250
	E10 - EQUIPMENT				1,037,250
	E20 - FURNISHINGS				
	E2010 - Fixed Furnishings				
1801	Upper Cabinets	9.00	lf	300.00	2,700
1802	Lower Cabinets w/ SS Top	9.00	lf	550.00	4,950
1803	Tall Storage Units	2.00	ea	2,000.00	4,000
1804	REM - Recessed Entry Mat	35.00	sy	65.00	2,275
	E2010 - Fixed Furnishings				13,925
	E20 - FURNISHINGS				13,925

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	C - New Gym				
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				
1805	Demo Buildings	70,140.00	sf	10.00	701,400
1806	Abatement of Hazardous Materials @ 75 Arcand Street	1.00	ea	465,000.00	465,000
1807	Demo 75 Arcand Street	15,000.00	sf	10.00	150,000
	F2010 - Building Elements Demolition				1,316,400
	F20 - SELECTIVE BUILDING DEMOLITION				1,316,400
	C - New Gym				26,740,615
	D - Freshman Academy				
	A10 - FOUNDATIONS				
	A1010 - Standard Foundations				
1808	Grade Beams	200.00	cy	650.00	130,000
1809	Pile Caps	178.00	cy	650.00	115,700
1810	Elevator Pit Slab	146.00	sf	25.00	3,650
1811	Elevator Pit Walls	180.00	sf	50.00	9,000
1812	Canopy Foundations - Allowance	1.00	ls	30,000.00	30,000
	A1010 - Standard Foundations				288,350
	A1020 - Special Foundations				
1813	Pile Mobilization & Testing	1.00	ls	40,000.00	40,000
1814	Pile Layout	108.00	ea	200.00	21,600
1815	Column Piles - 45'	95.00	ea	4,050.00	384,750
1816	Slab Piles - 45'	13.00	ea	4,050.00	52,650
1817	Pile Pre-Drilling	108.00	ea	450.00	48,600
	A1020 - Special Foundations				547,600
	A10 - FOUNDATIONS				835,950
	B10 - SUPERSTRUCTURE				
	A1010 - Standard Foundations				
1818	Thickened Slab @ Slab Piles	4.00	yds	750.00	3,000
1819	Structural Slab on Grade - 10"	17,900.00	sf	25.00	447,500
1820	Slab on Metal Deck - 6-1/4" NWC	71,846.00	sf	8.00	574,768
1821	MEP Housekeeping Pads	1,000.00	sf	25.00	25,000
	A1010 - Standard Foundations				1,050,268
	B1010 - Floor Construction				
1822	Structural Steel & Metal Deck	785.00	tons	3,900.00	3,061,500
1823	Misc. Metals	93,970.00	sf	1.50	140,955
1824	Spray Fireproofing	93,970.00	sf	2.50	234,925
1825	Spray Fireproofing Patching	15.00	cd	2,500.00	37,500
	B1010 - Floor Construction				3,474,880

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	B10 - SUPERSTRUCTURE				
	B1020 - Roof Construction				
1826	Miscellaneous Unforeseen Metal Fabrications	93,970.00	sf	1.50	140,955
1827	Canopy Steel Framing	1,424.00	sf	50.00	71,200
	B1020 - Roof Construction				212,155
	B10 - SUPERSTRUCTURE				4,737,303
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
1828	4" Polished CMU - W.14	6,900.00	ea	34.00	234,600
1829	4" Brick Veneer - Jumbo	26,700.00	sf	31.26	834,600
1830	8" 18-ga Galv Mtl Framing - Behind Masonry	33,600.00	sf	11.75	394,800
1831	Exterior Soffits - Under 2nd Floor	1,360.00	sf	65.00	88,400
1832	Galv Steel Support - Rooftop Screen Wall	48.00	tn	4,550.00	218,400
1833	5/8" Densdeck Sheathing - Behind Masonry	33,600.00	sf	1.75	58,800
1834	6" Rockwool Insulation - Behind Masonry	33,600.00	sf	6.75	226,800
1835	Air / Vapor Barrier - Behinf Masonry	33,600.00	sf	7.50	252,000
1836	Sealant & Misc Closure	33,600.00	sf	3.25	109,200
1837	Equipment Screen - Rooftop	3,650.00	sf	25.00	91,250
1838	1L 5/8" GWB - Inside Face of Outside Wall	33,600.00	sf	2.50	84,000
1839	High Canopy - EL: 107'-4"	505.00	sf	135.00	68,175
	B2010 - Exterior Walls				2,661,025
	B2020 - Exterior Windows				
1840	Credit for Dual Pane Insulated Glass in lieu Triple Pane	1.00	ea	(270,000.00)	(270,000)
1841	Credit for Storefront in lieu of Curtainwall on first Floor	1.00	ea	(50,000.00)	(50,000)
1842	Alum Curtain Wall (CW0X) w/ Triple Pane Insul Glass & Custom Pt Fin	5,815.00	sf	150.00	872,250
1843	Alum Curtain Wall (CW2X) w/ Triple Pane Insul Glass & Custom Pt Fin	9,870.00	sf	150.00	1,480,500
1844	Spandrel Conditions - Premium	2,845.00	sf	20.00	56,900
1845	Alum Curtain Wall w/ Triple Pane Insul Glass - Entrances & Roof	5,400.00	sf	150.00	810,000
	B2020 - Exterior Windows				2,899,650
	B2030 - Exterior Doors				
1846	4'-0" x 7'-0" Steel Ext Door w/ Glass Lite & Hardware	1.00	ea	2,896.70	2,897
1847	3'-0" x 7'-0" Steel Ext Door w/ Glass Lite & Hardware	1.00	ea	2,500.00	2,500
	B2030 - Exterior Doors				5,397
	B20 - EXTERIOR CLOSURE				5,566,072

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	Estimate Detail	Lowell High School - Schematic Reconciled			
	Description	**Qty**		**Unit Cost**	**Amount**
	--- - Base				
	D - Freshman Academy				
	B30 - ROOFING				
	B3010 - Roof Coverings				
1848	Blocking & Misc Carpetry	26,775.00	sf	2.50	66,938
1849	TPO Roof Assembly	20,015.00	sf	20.00	400,300
1850	Copings & Counter Flashings - Main Roof	595.00	lf	25.00	14,875
1851	Gravel Stop - Stair Bulkhead	110.00	lf	18.00	1,980
	B3010 - Roof Coverings				484,093
	B3020 - Roof Openings				
1852	Misc Roof Accessories - Allowance	1.00	ea	15,000.00	15,000
	B3020 - Roof Openings				15,000
	B30 - ROOFING				499,093
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
1853	8" CMU 18'H	7,889.00	sf	25.00	197,225
1854	8" CMU 13'4"H	23,802.00	sf	20.00	476,040
1855	2-5/8" thick Polished CMU Wainscott to 5'4"H, w/ Hardwood Cap - Corridor Side Only	3,712.00	sf	35.00	129,920
1856	4"H CMU Base @ Lockers	594.00	lf	20.00	11,880
1857	Interior Glazing Partition 10'	2,910.00	sf	100.00	291,000
1858	Change Interior Glazing Partition to Standard	291.00	sf	(65.00)	(18,915)
1859	Double Glass Door & Hardware	8.00	ea	5,000.00	40,000
1860	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 18'	12,939.00	sf	24.00	310,536
1861	6" Mtl Stud w/ (2) layers 5/8" GWB Both Sides - 13'4"	41,040.00	sf	20.00	820,800
1862	Installation of D/F/H	137.00	ea	650.00	89,050
1863	Installation of Toilet Accessories	335.00	ea	65.00	21,775
1864	Operable Partition 13'4"H - 1 ea	1,082.00	sf	60.00	64,920
	C1010 - Partitions				2,434,231
	C1020 - Interior Doors				
1865	Double Door & Frame	24.00	ea	850.00	20,400
1866	Single Door w/ Side Light & Frame	85.00	ea	700.00	59,500
1867	Single Door & Frame	28.00	ea	550.00	15,400
1868	Hardware Allowance	137.00	ea	750.00	102,750
	C1020 - Interior Doors				198,050
	C1030 - Building Specialties				
1869	Millwork Blocking	2,003.00	lf	6.00	12,018
1870	Misc. Rough Carpentry/Blocking	93,970.00	sf	0.50	46,985
1871	Display/Trophy Case 84"H x 18"D	24.00	lf	750.00	18,000
1872	Sliding White Boards - 8'L	36.00	ea	4,500.00	162,000

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	C10 - INTERIOR CONSTRUCTION				
	C1030 - Building Specialties				
1873	White Boards	1,388.00	sf	20.00	27,760
1874	Tackboards	880.00	sf	15.00	13,200
1875	Standard Toilet Partition	18.00	ea	1,200.00	21,600
1876	ADA Toilet Partition	8.00	ea	1,800.00	14,400
1877	Urinal Screen	2.00	ea	350.00	700
1878	Interior Room Signage & Code Directional Signage - Allowance	93,970.00	sf	0.75	70,478
1879	Backlit Post 24"H Letters	18.00	ea	500.00	9,000
1880	8" Brushed Aluminum Stand-Off Letters	53.00	ea	175.00	9,275
1881	Lockers	475.00	ea	450.00	213,750
1882	Toilet Accessories for Single Use Toilet Room	15.00	rms	1,095.00	16,425
1883	Toilet Accessories for Gang Toilet Room	10.00	rms	2,275.00	22,750
	C1030 - Building Specialties				658,341
	C10 - INTERIOR CONSTRUCTION				3,290,622
	C20 - STAIRS				
	C2010 - Stair Construction				
1884	Metal Pan Stairs, New - Stair T	123.00	rs	1,200.00	147,600
1885	Metal Pan Stairs, New - Stair U	100.00	rs	1,200.00	120,000
1886	Stair Treads - Finish Allowance	1,350.00	lf	50.00	67,500
	C2010 - Stair Construction				335,100
	C20 - STAIRS				335,100
	C30 - INTERIOR FINISHES				
	C3010 - Wall Finishes				
1887	Paint - Allowance	93,970.00	sf	3.25	305,403
	C3010 - Wall Finishes				305,403
	C3020 - Floor Finishes				
1888	Poured Epoxy Floor w/ Integral Epoxy Base	3,113.00	sf	12.00	37,356
1889	LT - Linoleum Tile	79,453.00	sf	7.50	595,898
1890	RB - Rubber Base	11,533.00	lf	3.50	40,366
1891	Sealed Concrete Floor	2,187.00	sf	1.00	2,187
1892	Flash Patch/Floor Prep	93,970.00	sf	1.00	93,970
	C3020 - Floor Finishes				769,776
	C3030 - Ceiling Finishes				
1893	GWB Soffits	1,906.00	lf	55.00	104,830
1894	Rated GWB Ceilings	49.00	sf	15.00	735
1895	GWB Ceilings	2,821.00	sf	12.00	33,852

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	C30 - INTERIOR FINISHES				
	C3030 - Ceiling Finishes				
1896	GWB Header @ Int. Glazing Partitions	291.00	lf	150.00	43,650
1897	ACT-1 - 2x4 ACT Ceilings	79,659.00	sf	6.00	477,954
1898	Sound Isolation Ceilings - Allowance	1.00	ls	160,000.00	160,000
1899	Paint - GWB Ceilings and Soffits	6,682.00	sf	1.00	6,682
1900	Paint - Exposed Steel Deck and Structure	307.00	sf	2.00	614
	C3030 - Ceiling Finishes				828,317
	C30 - INTERIOR FINISHES				1,903,496
	D10 - CONVEYING				
	D1010 - Elevators & Lifts				
1901	Elevator G - 2,500#, Front-Back Opng	6.00	stps	55,000.00	330,000
1902	Cab Finish Allowance	1.00	ea	25,000.00	25,000
1903	Delete Roof Stop - Includes Other Trades	(1.00)	ea	83,333.00	(83,333)
	D1010 - Elevators & Lifts				271,667
	D10 - CONVEYING				271,667
	D20 - PLUMBING				
	D2000 - Plumbing				
1904	Commissioning support/lump sum	1.00	ls	5,960.00	5,960
1905	General requirements/square foot	93,970.00	sf	0.75	70,478
1906	Premium for project phasing	1.00	ls	2,365.00	2,365
	D2000 - Plumbing				78,803
	D2003 - Insulation/Plumbing (INS)				
1907	INS - Armaflex/Copper Pipe - Trap primer feed UG	150.00	lf	8.55	1,282
1908	INS - Fiberglass/Cast Iron Pipe - RL/horiz. only	4,400.00	lf	12.97	57,059
1909	INS - Fiberglass/Copper Pipe - Non-potable water	1,920.00	lf	9.29	17,828
1910	INS - Fiberglass/Copper Pipe - Domestic water	7,900.00	lf	9.29	73,355
1911	INS - Fiberglass/Copper Pipe - Tempered water	160.00	lf	9.06	1,450
	D2003 - Insulation/Plumbing (INS)				150,975
	D2010 - Plumbing Fixtures				
1912	- Rough-ins/Fixtures	177.00	ea	157.24	27,831
1913	Drinking fountain/bottle fill/bi-level//ADA	5.00	ea	2,636.44	13,182
1914	- Mixing valve/emergency shower/eye wash	8.00	ea	984.30	7,874
1915	Emergency shower/eye wash/cabinet type	8.00	ea	2,703.44	21,628
1916	Mop sink/floor mount/24"x24"	5.00	ea	1,370.90	6,855
1917	Sink/1-bowl/gooseneck faucet/ADA	3.00	ea	1,266.84	3,801
1918	Sink/1-bowl/gooseneck faucet	2.00	ea	1,198.78	2,398

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
D - Freshman Academy				
D20 - PLUMBING				
D2010 - Plumbing Fixtures				
1919 Lavatory/wall hung/carrier/sensor gooseneck faucet/ADA	44.00	ea	1,568.14	68,998
1920 Urinal/wall mount/carrier/sensor flush valve/ADA	4.00	ea	1,340.08	5,360
1921 Urinal/wall mount/carrier/sensor flush valve	3.00	ea	1,340.08	4,020
1922 Water closet/wall mount/carrier/sensor FV/ADA	24.00	ea	1,769.44	42,467
1923 Water closet/wall mount/carrier/sensor FV	23.00	ea	1,769.44	40,697
1924 Faucet, trap & stops/integral science sink/gooseneck	36.00	ea	431.30	15,527
1925 Faucet, trap & stops/integral science sink/gooseneck/ADA	12.00	ea	499.36	5,992
D2010 - Plumbing Fixtures				266,630
D2020 - Domestic Water System				
1926 Type L Copper Pipe & Ftgs/95-5 Solder - Domestic water	7,900.00	lf	33.53	264,860
1927 Type L Copper Pipe & Ftgs/95-5 Solder - Non-Potable water	1,920.00	lf	29.00	55,688
1928 Type L Copper Pipe & Ftgs/95-5 Solder - Tempered water	160.00	lf	25.38	4,060
1929 Type K Soft Copper Pipe & Ftgs/95-5 Solder - Trap primer feed U/G	150.00	lf	16.39	2,459
1930 Shock absorbers/61 to 113 FU's/#400	5.00	ea	956.67	4,783
1931 Shock absorbers/12 to 33 FU's/#200	9.00	ea	277.06	2,494
1932 Shock absorbers/1 to 11 FU's/#100	34.00	ea	154.06	5,238
1933 Trap primer/drip type/2 - 4-outlet	5.00	ea	214.96	1,075
1934 Hose bibbs/encased/exterior/#Z1300 - HB-2	7.00	ea	757.24	5,301
1935 Hose bibbs/interior - HB-1	10.00	ea	224.18	2,242
1936 Backflow preventer/Non-potable system	8.00	ea	378.57	3,029
D2020 - Domestic Water System				351,228
D2030 - Sanitary Waste & Vent System				
1937 SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Sanitary W&V UG	100.00	lf	71.35	7,135
1938 No-Hub C.I. Pipe & Ftgs/Clamp - Sanitary W&V AG	5,720.00	lf	66.54	380,597
1939 Wall cleanouts	10.00	ea	201.24	2,012
1940 Floor cleanouts	6.00	ea	301.24	1,807
1941 Floor drains	10.00	ea	310.24	3,102
D2030 - Sanitary Waste & Vent System				394,654
D2040 - Storm Drainage System				
1942 SVC Wt B&S C.I. Pipe & Ftgs/Gasket - Primary RL UG	200.00	lf	86.44	17,287
1943 No-Hub C.I. Pipe & Ftgs/Clamp - Overflow RL AG	2,750.00	lf	74.83	205,786
1944 No-Hub C.I. Pipe & Ftgs/Clamp - Primary RL AG	2,800.00	lf	74.83	209,527
1945 Wall Cleanouts/RL	4.00	ea	131.12	524
1946 Floor Cleanouts/RL	4.00	ea	320.24	1,281

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D20 - PLUMBING				
	D2040 - Storm Drainage System				
1947	Downspots/overflow RL	4.00	ea	867.90	3,472
1948	Roof Drains/Overflow RL	20.00	ea	728.30	14,566
1949	Roof Drains/Primary RL	20.00	ea	424.30	8,486
	D2040 - Storm Drainage System				460,930
	D2060 - Natural/LP Gas System				
1950	Sch 40 Black Steel (CW) Pipe & Ftgs/T&C - Gas piping	1,640.00	lf	30.43	49,911
1951	Sch 40 Black Steel (ERW) Pipe & Ftgs/Weld - Gas piping	260.00	lf	99.31	25,821
1952	Gas turret/bench or desk mount/single	48.00	ea	222.28	10,670
	HPH - WATTS REGULATORY COMPANY				
1953	Emer. gas shut off cabinet w/1-1/2" ball valve (Lab room)	8.00	ea	1,377.96	11,024
1954	Emer. gas shut off cabinet w/1" ball valve (Lab bench)	12.00	ea	1,223.96	14,688
	D2060 - Natural/LP Gas System				112,113
	D2077 - Acid Neutrilization System				
1955	Sch 40 Polypro Fuseal/AW Pipe & Ftgs UG	50.00	lf	89.59	4,480
1956	Sch 40 Polypro Fuseal/AW Pipe & Ftgs AG	2,040.00	lf	76.90	156,881
1957	Acid waste/transfer lift station/50 gal. tank/20 gpm	-	excl	-	-
1958	- Limestone chips/50 lb. bag	26.00	ea	88.47	2,300
1959	- pH monitors/1 per tank/tie-into BMS	1.00	ea	7,536.92	7,537
1960	Acid neutrilization system/125 gal.tank	1.00	ea	42,851.36	42,851
	D2077 - Acid Neutrilization System				214,049
	D2099 - Material Handling/Supports/Testing/Start Ups				
1961	- Fill & vent system/Gas piping	1.00	ea	843.44	843
1962	- Clean & test system/Gas piping	1.00	ea	918.44	918
1963	- Hangers & clamps/Gas piping	1,900.00	lf	2.56	4,860
1964	- Fill & vent system/Sanitary W&V	1.00	ea	2,265.84	2,266
1965	- Clean & test system/Sanitary W&V	1.00	ea	2,415.84	2,416
1966	- Hangers & clamps/Sanitary W&V	5,720.00	lf	3.32	19,004
1967	- Fill & vent system/Domestic water	3.00	ea	2,265.84	6,798
1968	- Clean & test system/Domestic water	3.00	ea	2,415.84	7,248
1969	- Heat tracing/Non-potable water loop	1,920.00	lf	29.63	56,887
1970	- Hangers & clamps/Domestic water	9,980.00	lf	2.56	25,528
1971	- Offload & distribution/Fixtures	177.00	ea	132.24	23,406
1972	- Fill & vent system/AW piping	1.00	ea	1,132.92	1,133
1973	- Clean & test system/AW piping	1.00	ea	1,157.92	1,158
1974	- Hangers & clamps/AW piping	2,040.00	lf	2.56	5,218

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D20 - PLUMBING				
	D2099 - Material Handling/Supports/Testing/Start Ups				
1975	- Clean & test system/RL	1.00	ea	1,157.92	1,158
1976	- Hangers & clamps/RL	5,550.00	lf	3.32	18,439
1977	- Offload & rigging/Acid neutr. equipment	1.00	ea	2,586.88	2,587
	D2099 - Material Handling/Supports/Testing/Start Ups				179,867
	D20 - PLUMBING				2,209,248
	D30 - HVAC				
	D3000 - HVAC Common Work Requirements				
1978	General requirements/square foot	93,970.00	sf	1.55	145,654
1979	Commissioning support/lump sum	1.00	ls	4,000.00	4,000
1980	Premium for project phasing	1.00	ls	5,500.00	5,500
	D3000 - HVAC Common Work Requirements				155,154
	D3003 - Insulation/HVAC (INS)				
1981	INS - Fiberglass/Blk. Stl Weld Pipe - CHW	1,100.00	lf	11.46	12,606
1982	INS - Fiberglass/Blk. Stl Weld Pipe - HW	1,100.00	lf	11.46	12,606
1983	INS - Fiberglass/Copper Pipe - CHW	11,200.00	lf	8.15	91,327
1984	INS - Fiberglass/Copper Pipe - HW	9,550.00	lf	8.15	77,873
1985	INS - Duct/Fiberglass Wrap	44,000.00	sf	4.99	219,481
	D3003 - Insulation/HVAC (INS)				413,893
	D3005 - Testing, Adjusting & Balancing (TAB)				
1986	TAB - Testing Adjusting & Balancing	20.00	day	2,598.80	51,976
1987	TAB commissioning support	7.00	day	974.40	6,821
	D3005 - Testing, Adjusting & Balancing (TAB)				58,797
	D3009 - Automatic Temperature Controls (ATC)				
1988	ATC - Differential Psi swithches (DPS)/HWS&R - 1@2 pts.	2.00	pts	429.48	859
1989	ATC - Differential Psi swithches (DPS)/CHWS&R - 1@2 pts.	2.00	pts	429.48	859
1990	ATC - System hardware, software & engineering	1.00	ea	7,035.58	7,036
1991	ATC - CO2 demand ventilation control	75,000.00	sf	0.34	25,620
1992	ATC - Commissioning support days	20.00	day	1,124.20	22,484
1993	ATC - AHU's/custom/ATC F&I controls - 3@40 pts.	120.00	pts	1,392.30	167,076
1994	ATC - Exhaust fans/gen. exh./rooftop - 4@5 pts.	20.00	pts	798.46	15,969
1995	ATC - Exhaust fans/gen. exh./in-line - 2@5 pts.	10.00	pts	680.28	6,803
1996	ATC - Exhaust fans/Lab exh./rooftop - 1@10 pts.	10.00	pts	843.15	8,432
1997	ATC - Radiant ceiling panels/RCP's - 86@2 pts.	172.00	pts	392.03	67,429
1998	ATC - Cabinet unit heaters/CUH's - 4@3 pts.	12.00	pts	392.03	4,704
1999	ATC - Unit heaters/electric/EUH's - 1@2 pts.	2.00	pts	340.11	680

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D30 - HVAC				
	D3009 - Automatic Temperature Controls (ATC)				
2000	ATC - Chilled beams/active/2-pipe - 42@4 pts.	168.00	pts	443.92	74,578
2001	ATC - VAV box/ATC furnished & installed - 160@2 pts.	320.00	pts	429.51	137,443
2002	ATC - Plumbing pH monitors - 1@15 pts.	15.00	pts	696.15	10,442
2003	ATC - Energy metering/Fuel, gas & water systems	1.00	ls	13,405.41	13,405
	D3009 - Automatic Temperature Controls (ATC)				563,820
	D3050 - Heating Systems				
2004	Type L Copper Pipe & Pressfit Ftgs - HWS&R mains	2,300.00	lf	32.47	74,676
2005	Type L Copper Pipe & Pressfit Ftgs - HWS&R branches	7,250.00	lf	24.40	176,868
2006	Sch 40 Blk Stl Pipe & Ftgs/ERW/Grooved - HWS&R mains	1,100.00	lf	113.73	125,099
	D3050 - Heating Systems				376,643
	D3052 - Cooling Systems				
2007	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R mains	2,200.00	lf	33.53	73,759
2008	Type L Copper Pipe & Ftgs/95-5 Solder - CHWS&R branches	9,000.00	lf	25.38	228,395
2009	Sch 40 Blk Stl Pipe & Ftgs/ERW/Butt Weld - CHWS&R mains	1,100.00	lf	114.73	126,201
	D3052 - Cooling Systems				428,354
	D3056 - Chemical Treatment				
2010	Chemical treatment/HW System	1.00	ea	3,775.00	3,775
2011	Chemical treatment/CHW System	1.00	ea	3,020.00	3,020
	D3056 - Chemical Treatment				6,795
	D3057 - Air Distribution Systems				
2012	Air Handling Unit/modular/cfm - AHU-25	18,000.00	cfm	12.54	225,720
2013	Air Handling Unit/modular/cfm - AHU-24	18,000.00	cfm	12.54	225,720
2014	Air Handling Unit/modular/cfm - AHU-23	18,000.00	cfm	12.54	225,720
2015	SM - Galvanized ductwork - Bathrooms exhaust 100 CFM/Fixt. - 1 Lb/CFM	6,000.00	lb	10.84	65,010
2016	SM - Galvanized ductwork - AHU's	67,500.00	lb	10.84	731,363
2017	SM - Stainless steel ductwork/welded seam - Lab hoods exhaust	10,500.00	lb	25.87	271,646
2018	SM - Galvanized ductwork - Misc. exhaust	3,000.00	lb	10.84	32,505
2019	SM - Sound attenuators (6)/in-line - SATT's	108,000.00	cfm	0.50	54,000
2020	SM - Duct smoke detector	6.00	ea	604.50	3,627
2021	SM - Fire/smoke dampers/louver type	45.00	ea	620.40	27,918
2022	SM - Fire dampers/curtain type	45.00	ea	257.70	11,597
2023	SM - Displacement diffusers/floor mount/450 CFM	90.00	ea	1,387.20	124,848
2024	SM - Displacement diffusers/floor mount/275 CFM	50.00	ea	501.30	25,065

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled
Description	Qty		Unit Cost	Amount
--- - Base				
D - Freshman Academy				
D30 - HVAC				
D3057 - Air Distribution Systems				
2025 SM - Diffusers, registers & grilles	100.00	ea	227.25	22,725
2026 Lab exhaust fan/high plume/roof (8,000 cfm est.) - LEF Greenheck Vektor CD	1.00	ea	44,974.40	44,974
2027 EF/centrifugal downblast/belt drive/roof - Misc. exh. fans Greenheck #GB121-3	2.00	ea	1,779.20	3,558
2028 EF/centrifugal downblast/belt drive/roof - Bath exh. fans Greenheck #GB200-5	2.00	ea	2,451.80	4,904
2029 EF/centrifugal in-line/belt drive/box- Misc. exh. fans Greenheck # BSQ120-5	2.00	ea	2,077.75	4,156
2030 - Roof curb/standard/EF's (roof)	4.00	ea	1,287.20	5,149
2031 Change 8 Fume Hood to Ductless in lieu of Ducted	(1.00)	ea	165,000.00	(165,000)
D3057 - Air Distribution Systems				1,945,203
D3058 - Terminal Equipment				
2032 - Sound attenuators/VAV's	124.00	ea	463.60	57,486
2033 VAV box/large - VAV's	36.00	ea	965.90	34,772
2034 VAV box/medium - VAV's	46.00	ea	778.10	35,793
2035 VAV box/small - VAV's	42.00	ea	618.30	25,969
2036 Unit heater/electric/propeller - EUH's	1.00	ea	1,330.60	1,331
2037 Cabinet unit heater/hydronic/ceiling mount - CUH's	2.00	ea	1,845.75	3,692
2038 Cabinet unit heater/hydronic/wall mount exposed - CUH's	2.00	ea	1,757.20	3,514
2039 Chilled beam/hydr. 2-pipe/clg. mnt./active/8'x2' - CHB's	118.00	ea	1,150.40	135,747
2040 Chilled beam/hydr. 2-pipe/clg. mnt./active/4'x2' - CHB's	6.00	ea	729.50	4,377
D3058 - Terminal Equipment				302,681
D3099 - Material Handling/Supports/Testing/Start Ups				
2041 - Accessories installation/AHU's	3.00	ea	974.40	2,923
2042 - Crane & rigging/AHU's (rooftop)	1.00	day	12,397.60	12,398
2043 - Start up/medium AHU's	3.00	ea	1,224.40	3,673
2044 - Support steel/SATT's	6.00	ea	354.50	2,127
2045 - Offload & rigging/SATT's	6.00	ea	1,074.40	6,446
2046 - Start up/EF's	7.00	ea	33.06	231
2047 - Support steel/EF's (indoor)	2.00	ea	354.50	709
2048 - Offload & rigging/Ef's (indoor)	2.00	ea	465.40	931
2049 - Crane & rigging/EF's (roof)	2.00	day	10,448.80	20,898
2050 - Roof support stands/LEF's	2.00	ea	514.60	1,029
2051 - Fill & vent system/HW piping	1.00	ea	2,265.84	2,266

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D30 - HVAC				
	D3099 - Material Handling/Supports/Testing/Start Ups				
2052	- Clean & test system/HW piping	1.00	ea	2,415.84	2,416
2053	- Hangers & clamps/HW piping	13,400.00	lf	2.56	34,276
2054	- Fill & vent system/CHW piping	1.00	ea	2,240.84	2,241
2055	- Clean & test system/CHW piping	1.00	ea	2,390.84	2,391
2056	- Hangers & clamps/CHW piping	12,300.00	lf	3.32	40,866
2057	- Start up/UH's & CUH's	5.00	ea	33.06	165
2058	- Support steel/UH's & CUH's	3.00	ea	293.60	881
2059	- Offload & distribution/UH's & CUH's	5.00	ea	121.80	609
2060	- Support steel/CHB's	124.00	ea	146.80	18,203
2061	- Offload & distribution/CHB's	124.00	ea	121.80	15,103
2062	- Support steel/VAV's	124.00	ea	354.50	43,958
2063	- Offload & distribution/VAV's	124.00	ea	182.70	22,655
	D3099 - Material Handling/Supports/Testing/Start Ups				237,395
	D30 - HVAC				4,488,734
	D40 - FIRE PROTECTION				
	D2000 - Plumbing				
2064	Premium for project phasing	1.00	ls	15,000.00	15,000
	D2000 - Plumbing				15,000
	D4000 - Fire Suppression				
2065	Project management	1.00	ls	1,000.00	1,000
2066	Commissioning support/lump sum	1.00	ls	800.00	800
2067	General requirements/square foot	93,970.00	sf	0.35	32,890
	D4000 - Fire Suppression				34,690
	D4020 - Fire Supression Equipment				
2068	Wet Alarm Check Valve Assembly 6"	1.00	ea	4,629.35	4,629
2069	Butterfly Valve w/Tamper Switch/Grooved 6"	2.00	ea	1,010.68	2,021
2070	Check Valve/Swing/Grooved 4"	2.00	ea	456.57	913
2071	Control valve assembly/Floor/2-1/2"	10.00	ea	3,614.69	36,147
2072	Valve w/fire hose connection/Floor/2-1/2"	25.00	ea	1,308.43	32,711
2073	Inspector test & drain station/Floor/2-1/2"	10.00	ea	1,933.09	19,331
2074	Sprinkler head/Sidewall/Exposed	10.00	ea	117.38	1,174
	Avg. = 130sf/Head				
2075	Sprinkler head/Pendant/Semi-recessed	660.00	ea	163.81	108,112
	Avg. = 130sf/Head				
2076	Sprinkler head/Upright	50.00	ea	111.41	5,570
	Avg. = 130sf/Head				

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Estimate Detail			Lowell High School - Schematic Reconciled		
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D40 - FIRE PROTECTION				
	D4020 - Fire Supression Equipment				
2077	Hose Connection/Roof manifold - 2-1/2"	1.00	ea	479.60	480
	D4020 - Fire Supression Equipment				211,088
	D4030 - Fire Protection Specialties				
2078	Recessed Fire Extinguishers/Fire Extinguisher Cabinets 1 every 2,500 sf	38.00	ea	400.00	15,200
	D4030 - Fire Protection Specialties				15,200
	D4050 - Fire Supression Sprinkler Piping				
2079	Sch 40 Black Steel (ERW) Pipe & Ftgs/Grooved - SPK branches	3,900.00	lf	32.45	126,561
2080	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK mains	800.00	lf	109.70	87,763
2081	Sch 10 Black Steel (LW) Pipe & Ftgs/Grooved - SPK drains	300.00	lf	59.70	17,909
	D4050 - Fire Supression Sprinkler Piping				232,233
	D4099 - Material Handling/Supports/Testing/Start Ups				
2082	- Fill & vent system/SPK piping	1.00	ea	2,265.84	2,266
2083	- Clean & test system/SPK piping	1.00	ea	2,415.84	2,416
2084	- Hangers & clamps/SPK piping	5,000.00	lf	3.32	16,612
	D4099 - Material Handling/Supports/Testing/Start Ups				21,294
	D40 - FIRE PROTECTION				529,505
	D50 - ELECTRICAL				
	D5010 - Electrical Service & Distribution				
2085	Distribution Panel 1,200 amp 208/120 volt	1.00	ea	15,119.86	15,120
2086	Distribution Panel 400 amp 208/120 volt	3.00	ea	4,522.26	13,567
2087	Distribution Panel 400 amp 480/277 volt	3.00	ea	5,772.26	17,317
2088	Recpt Panel 225 amp 208/120 volt two section K	3.00	ea	3,358.31	10,075
2089	Lighting Panel 225 amp 480/277 volt	3.00	ea	2,210.27	6,631
2090	Surge Protector - Pnl Mounted	12.00	ea	200.00	2,400
2091	Dry-Type Transformer Copper Windings 300 KVA K-13	1.00	ea	20,001.20	20,001
2092	Change Panelboard Bussing to AL	1.00	ea	(8,400.00)	(8,400)
	D5010 - Electrical Service & Distribution				76,710
	D5011 - Normal Feeder				
2093	A Normal Feeder Detail 4 Wire + Ground	850.00	lf	256.82	218,294
2094	A Normal Feeder Detail 4 Wire + Ground	900.00	lf	72.90	65,609
2095	A Normal Feeder Detail 3 Wire + Ground	60.00	lf	85.48	5,129
2096	A Normal Feeder Detail 4 Wire + Ground	200.00	lf	42.28	8,456
2097	A Normal Feeder Detail 5 Wire + Ground	250.00	lf	52.18	13,045

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Estimate Detail			Lowell High School - Schematic Reconciled			
	Description		Qty		Unit Cost	Amount
--- - Base						
D - Freshman Academy						
D50 - ELECTRICAL						
	D5011 - Normal Feeder					310,533
	D5012 - Emergency/UPS Distribution					
2098		Lighting Panel 100 amp 480/277 volt	3.00	ea	1,579.88	4,740
2099		Surge Protector - Pnl Mounted	3.00	ea	200.00	600
	D5012 - Emergency/UPS Distribution					5,340
	D5014 - Emergency/UPS Feeder					
2100	A	Normal Feeder Detail 4 Wire + Ground	2,100.00	lf	20.21	42,439
	D5014 - Emergency/UPS Feeder					42,439
	D5015 - Equipment Connections					
2101		Mechanical Connections	93,970.00	sf	2.00	187,940
	D5015 - Equipment Connections					187,940
	D5016 - Lightning Protection					
2102		Lightning Protection	18,596.00	sf	2.00	37,210
	D5016 - Lightning Protection					37,210
	D5020 - LIGHTING					
2103	A	SL3 : LED Wall Mtd	3.00	ea	1,235.23	3,706
2104	A	SL4 : LED Wall Mtd	1.00	ea	420.84	421
2105	A	Exit Light	35.00	ea	699.46	24,481
2106	A	EL : 4Ft Utility	27.00	ea	414.00	11,178
2107	A	LC4 : Cove Lighitng	1.00	ea	6,920.87	6,921
2108	A	LC6 : Cove Lighting	1.00	ea	42,540.79	42,541
2109	A	LC8 : Cove Lighting	1.00	ea	14,823.19	14,823
2110	A	LP8 : 8Ft Pendant Indirect/Direct - Corridor	128.00	ea	873.95	111,866
2111	A	LP8 : 8Ft Pendant Indirect/Direct	348.00	ea	983.95	342,415
2112	A	LR24 : 4Ft Recessed	36.00	ea	781.55	28,136
2113	A	LS8B : 8ft Utility	26.00	ea	533.95	13,883
	D5020 - LIGHTING					600,370
	D5021 - LIGHTING CONTROL SYSTEM					
2114	A	OS - Occ Sensor Ceiling	68.00	ea	204.63	13,915
2115	A	PS - Photoelectric Sensor	68.00	ea	837.40	56,943
2116	A	L - Local Switching	88.00	ea	400.76	35,267
2117		Building Lighting Control System	93,970.00	sf	1.50	141,037
	D5021 - LIGHTING CONTROL SYSTEM					247,162
	D5025 - POWER BRANCH WIRING					
2118	A	Receptacle	265.00	ea	282.50	74,863
2119	A	Receptacle Corridor	182.00	ea	355.57	64,715
2120	A	Quad Receptacle	186.00	ea	479.68	89,220

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled		
		Description	Qty		Unit Cost	Amount
--- - Base						
D - Freshman Academy						
D50 - ELECTRICAL						
D5025 - POWER BRANCH WIRING						
2121	A	TVE : Quad Receptacle	58.00	ea	462.41	26,820
2122	A	Receptacle GFI	24.00	ea	500.86	12,021
2123	A	Special Receptacle	24.00	ea	527.27	12,655
2124	A	Receptacle GFI WP	8.00	ea	976.33	7,811
2125	A	JB Projector	58.00	ea	1,434.61	83,207
2126	A	Clock Hanger Outlet	58.00	ea	(275.80)	(15,996)
2127	A	JB Hand Dryer	10.00	ea	674.82	6,748
2128		Wiremold EFSB4 & Wiremold EFSB4 Box	58.00	ea	250.00	14,500
2129		Power Connection to AV Equipment	1.00	ls	5,000.00	5,000
		D5025 - POWER BRANCH WIRING				381,562
D5031 - FIRE ALARM & DETECTION SYSTEM						
2130	A	Strobe - Classroom	58.00	ea	602.73	34,959
2131	A	Fire Alarm Control Panel	1.00	ea	16,202.92	16,203
2132	A	Data Gathering Panel	3.00	ea	2,831.35	8,494
2133	A	Pull Station	10.00	ea	913.66	9,137
2134	A	Smoke Detector Corridor	40.00	ea	615.26	24,610
2135	A	Smoke Detector Stair/Utility Room	10.00	ea	1,407.26	14,073
2136	A	Duct Detector, Cond & Wire	16.00	ea	1,189.65	19,034
2137	A	Duct Detector Remote Test	16.00	ea	398.40	6,374
2138	A	Tamper Switch	10.00	ea	934.42	9,344
2139	A	Flow Switch	10.00	ea	934.42	9,344
2140	A	Control Module	30.00	ea	1,222.32	36,670
2141	A	Monitor Module	30.00	ea	1,025.56	30,767
2142	A	Fireman Phone	10.00	ea	625.52	6,255
2143	A	Speaker Strobe	100.00	ea	799.62	79,962
2144	A	Strobe	10.00	ea	801.42	8,014
2145	A	Remote Annunciator	1.00	ea	4,326.95	4,327
2146	A	Door Holder	32.00	ea	679.73	21,751
		D5031 - FIRE ALARM & DETECTION SYSTEM				339,318
D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION						
2147		Card Reader Headend	1.00	ea	9,743.14	9,743
2148		Card Reader	2.00	ea	4,273.98	8,548
		Misc Area				
2149		Classroom Intercom	58.00	ls	2,136.99	123,945
		D5032 - ELECTRONIC ACCESS CONTROL & INTRUSION DETECTION				142,236

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Estimate Detail			Lowell High School - Schematic Reconciled		
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D50 - ELECTRICAL				
	D5033 - ELECTRONIC SURVEILLANCE				
2150	Security Head End Equipment	1.00	ea	28,544.54	28,545
2151	Motion Detector	10.00	ea	1,068.49	10,685
2152	Corridor Camera - IP	10.00	ea	3,474.32	34,743
2153	Dome Camera - IP	10.00	ea	3,474.31	34,743
	D5033 - ELECTRONIC SURVEILLANCE				108,716
	D5034 - Clock System				
2154	GPS Receiver & Transmitter	5.00	ea	5,334.76	26,674
2155	Tone Generator	5.00	ea	2,749.11	13,746
2156	Synchronous Wireless Clock	58.00	ea	389.90	22,614
	D5034 - Clock System				63,034
	D5040 - Telephone Data System				
2157	Telephone Data System	93,970.00	sf	3.50	328,895
2158	LV Cable Tray	1,000.00	lf	50.00	50,000
	D5040 - Telephone Data System				378,895
	D5044 - Audio Visual System				
2159	Install AV Equipment	1.00	ls	10,000.00	10,000
2160	AV System Empty Conduit	1.00	ls	3,000.00	3,000
	D5044 - Audio Visual System				13,000
	D5045 - Two Way Communication System				
2161	Two Way Communication System	10.00	sf	3,500.00	35,000
	D5045 - Two Way Communication System				35,000
	D5046 - Distributed Antenna System				
2162	Distributed Antenna System	93,970.00	sf	0.50	47,050
	D5046 - Distributed Antenna System				47,050
	D5050 - Public Address System				
2163	A Speaker	100.00	ea	223.66	22,366
2164	A Speaker Corridor	60.00	ea	223.66	13,420
2165	A Equalizer	5.00	ea	2,892.32	14,462
2166	A Amplifier	5.00	ea	3,168.00	15,840
2167	Speaker	1.00	ea	5,334.76	5,335
	D5050 - Public Address System				71,422
	D5060 - Renewable Energy System				
2168	PV System 100 KW Grid - Excluded	1.00	ls	-	-
	D5060 - Renewable Energy System				-
	D5090 - MIscellaneous System				
2169	Labelling	93,970.00	sf	0.05	4,781

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

SKANSKA

Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	D - Freshman Academy				
	D50 - ELECTRICAL				
	D5090 - MIscellaneous System				
2170	Temporary Power & Light	93,970.00	sf	1.75	164,530
2171	Coring & Firestop Seal	1.00	ls	11,000.00	11,000
2172	Safe-off Wiring	1.00	ls	2,619.91	2,620
	D5090 - MIscellaneous System				182,930
	D50 - ELECTRICAL				3,270,867
	E10 - EQUIPMENT				
	E1090 - Other Equipment				
2173	Classroom Equipment Allowance	1.00	ea	145,000.00	145,000
2174	AV Equipment Allowance	1.00	ea	35,000.00	35,000
2175	Residential Equipment Allowance	1.00	ea	10,000.00	10,000
	E1090 - Other Equipment				190,000
	E10 - EQUIPMENT				190,000
	E20 - FURNISHINGS				
	E2010 - Fixed Furnishings				
2176	Mailbox Unit	1.00	ea	300.00	300
2177	Epoxy Mobile Lab Tables	96.00	ea	2,500.00	240,000
2178	Lab Lower Cabinets w/ Epoxy Top	580.00	lf	700.00	406,000
2179	Lab Upper Cabinets	260.00	lf	550.00	143,000
2180	Book Cases	168.00	NIC	-	-
	FF&E				
2181	Work Station Desk w/ Shelving	200.00	lf	450.00	90,000
2182	Tall Storage Units	119.00	ea	2,000.00	238,000
2183	Lower Cabinets w/ SS Top	369.00	lf	550.00	202,950
2184	Upper Cabinets	369.00	lf	300.00	110,700
2185	Window Treatments	10,773.00	sf	8.00	86,184
2186	Delete Interior Shades	1.00	ea	(50,000.00)	(50,000)
	E2010 - Fixed Furnishings				1,467,134
	E20 - FURNISHINGS				1,467,134
	D - Freshman Academy				29,594,789
	E - Bridges				
	A10 - FOUNDATIONS				
	A1010 - Standard Foundations				
2187	Pile Cap	100.00	cy	650.00	65,000
	A1010 - Standard Foundations				65,000
	A1020 - Special Foundations				
2188	Pile Mobilization & Testing	1.00	ls	40,000.00	40,000

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	E - Bridges				
	A10 - FOUNDATIONS				
	A1020 - Special Foundations				
2189	Pile Layout	36.00	ea	200.00	7,200
2190	Column Piles - 45'	36.00	ea	4,050.00	145,800
2191	Pile Pre-Drilling	36.00	ea	450.00	16,200
	A1020 - Special Foundations				209,200
	A10 - FOUNDATIONS				274,200
	B10 - SUPERSTRUCTURE				
	A1010 - Standard Foundations				
2192	Slab on Metal Deck	4,556.00	sf	15.00	68,340
2193	Slab Modifications @ Bridge Connections	2.00	ea	7,500.00	15,000
	A1010 - Standard Foundations				83,340
	B1010 - Floor Construction				
2194	Structural Steel & Metal Deck	120.00	tons	7,500.00	900,000
	B1010 - Floor Construction				900,000
	B1020 - Roof Construction				
2195	Miscellaneous Unforeseen Metal Fabrications	1.00	ls	50,000.00	50,000
	B1020 - Roof Construction				50,000
	B10 - SUPERSTRUCTURE				1,033,340
	B20 - EXTERIOR CLOSURE				
	B2010 - Exterior Walls				
2196	Exterior Soffits - Under of Bridge	4,065.00	sf	65.00	264,225
	B2010 - Exterior Walls				264,225
	B2020 - Exterior Windows				
2197	Alum Curtain Wall w/ Triple Pane Insul Glass & Custom Pt Fin	9,800.00	sf	135.00	1,323,000
2198	Hanging Scaffold - Allowance	1.00	ea	210,000.00	210,000
	B2020 - Exterior Windows				1,533,000
	B20 - EXTERIOR CLOSURE				1,797,225
	B30 - ROOFING				
	B3010 - Roof Coverings				
2199	Blocking & Misc Carpetry	4,065.00	sf	3.50	14,228
2200	TPO Roof Assembly	4,065.00	sf	20.00	81,300
2201	Copings & Edge Details	725.00	lf	22.00	15,950
2202	Scuppers for Overflow	28.00	ea	150.00	4,200
2203	Alum Gutters	665.00	lf	10.50	6,983
2204	Downspouts, 15'-0" Long	16.00	ea	125.00	2,000
	B3010 - Roof Coverings				124,660

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Estimate Detail				Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	E - Bridges				
	B30 - ROOFING				124,660
	C10 - INTERIOR CONSTRUCTION				
	C1010 - Partitions				
2205	Double Glass Door & Hardware	4.00	ea	5,000.00	20,000
	C1010 - Partitions				20,000
	C10 - INTERIOR CONSTRUCTION				20,000
	C30 - INTERIOR FINISHES				
	C3010 - Wall Finishes				
2206	Paint - Allowance	4,556.00	sf	5.00	22,780
	C3010 - Wall Finishes				22,780
	C3020 - Floor Finishes				
2207	Flooring @ Bridge - Allowance	4,556.00	sf	20.00	91,120
	C3020 - Floor Finishes				91,120
	C3030 - Ceiling Finishes				
2208	Bridge Ceiling Treatment	4,556.00	sf	40.00	182,240
	C3030 - Ceiling Finishes				182,240
	C30 - INTERIOR FINISHES				296,140
	D30 - HVAC				
	D3000 - HVAC Common Work Requirements				
2209	General requirements/square foot	4,556.00	sf	1.00	4,556
2210	Commissioning support/lump sum	1.00	ls	1,000.00	1,000
2211	Premium for project phasing	1.00	ls	1,500.00	1,500
	D3000 - HVAC Common Work Requirements				7,056
	D3003 - Insulation/HVAC (INS)				
2212	INS - Fiberglass/Copper Pipe - HW	500.00	lf	8.15	4,077
	D3003 - Insulation/HVAC (INS)				4,077
	D3009 - Automatic Temperature Controls (ATC)				
2213	ATC - Fintube radiation zones/FTR - 8@2 pts.	16.00	pts	438.66	7,019
	D3009 - Automatic Temperature Controls (ATC)				7,019
	D3050 - Heating Systems				
2214	Type L Copper Pipe & Ftgs/95-5 Solder - HWS&R	500.00	lf	29.00	14,502
	D3050 - Heating Systems				14,502
	D3058 - Terminal Equipment				
2215	Fintube radiation/arch./pedestal mount/2-row - FTR	335.00	lf	220.68	73,926
	D3058 - Terminal Equipment				73,926
	D3099 - Material Handling/Supports/Testing/Start Ups				
2216	- Offload & distribution/FTR	42.00	ea	60.90	2,558

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	Estimate Detail			Lowell High School - Schematic Reconciled	
	Description	Qty		Unit Cost	Amount
	--- - Base				
	E - Bridges				
	D30 - HVAC				
	D3099 - Material Handling/Supports/Testing/Start Ups				
2217	- Hangers & clamps/HWS&R	500.00	lf	1.79	897
2218	- Clean & test system/HWS&R	1.00	ea	578.96	579
2219	- Fill & vent system/HWS&R	1.00	ea	528.96	529
	D3099 - Material Handling/Supports/Testing/Start Ups				4,562
	D30 - HVAC				111,142
	D40 - FIRE PROTECTION				
	D4000 - Fire Suppression				
2220	Fire Suppression - allowance	4,556.00	sf	5.00	22,780
	D4000 - Fire Suppression				22,780
	D40 - FIRE PROTECTION				22,780
	D50 - ELECTRICAL				
	D5010 - Electrical Service & Distribution				
2221	Electrical	8,600.00	sf	15.90	136,740
	D5010 - Electrical Service & Distribution				136,740
	D50 - ELECTRICAL				136,740
	F20 - SELECTIVE BUILDING DEMOLITION				
	F2010 - Building Elements Demolition				
2222	Demo Bridges - North & South Bridge	4,389.00	sf	15.00	65,835
2223	Abatement of Hazardous Materials - (Transite Panels)	1,600.00	sf	10.00	16,000
	F2010 - Building Elements Demolition				81,835
	F20 - SELECTIVE BUILDING DEMOLITION				81,835
	E - Bridges				3,898,062
	F - Site				
	G10 - SITE PREPARATION				
	G1020 - Site Demolition & Relocations				
2224	Soil Remediation Allowance	1.00	ea	615,000.00	615,000
2225	Site Demolition	1.00	ea	450,000.00	450,000
2226	Site earthwork	1.00	ea	300,000.00	300,000
	G1020 - Site Demolition & Relocations				1,365,000
	G10 - SITE PREPARATION				1,365,000
	G20 - SITE IMPROVEMENTS				
	G2030 - Pedestrian Paving				
2227	Site Surfaces	90,000.00	sf	18.00	1,620,000
2228	Concrete Entry Ramp	799.00	sf	25.00	19,975
2229	Concrete Entry Slab	558.00	sf	20.00	11,160

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Estimate Detail			Lowell High School - Schematic Reconciled		
	Description	Qty		Unit Cost	Amount
--- - Base					
F - Site					
G20 - SITE IMPROVEMENTS					
G2030 - Pedestrian Paving					
2230	Concrete Entry Steps	177.00	lf	250.00	44,250
2231	Concrete Entry Footings	293.00	lf	150.00	43,950
2232	Concrete Entry Walls	1,465.00	sf	50.00	73,250
2233	Ramp & Stair Railings	386.00	lf	300.00	115,800
2234	Concrete Entry Ramp	799.00	sf	25.00	19,975
2235	Concrete Entry Slab	558.00	sf	20.00	11,160
2236	Concrete Entry Steps	177.00	lf	250.00	44,250
2237	Concrete Entry Footings	293.00	lf	150.00	43,950
2238	Concrete Entry Walls	1,465.00	sf	50.00	73,250
2239	Ramp & Stair Railings	386.00	lf	300.00	115,800
	G2030 - Pedestrian Paving				2,236,770
G2040 - Site Development					
2240	Site Improvements	1.00	ea	350,000.00	350,000
2241	Site Landscaping	1.00	ea	380,000.00	380,000
2242	Site Furnishings	1.00	ea	665,000.00	665,000
	G2040 - Site Development				1,395,000
	G20 - SITE IMPROVEMENTS				3,631,770
G30 - SITE CIVIL/MECHANICAL UTILITIES					
G3010 - Water Supply					
2243	Fire Protection Lines	65.00	lf	335.00	21,775
2244	Chlorination and Hydrostatic Testing	1.00	ea	2,500.00	2,500
2245	Domestic Water Service	207.00	lf	225.00	46,575
2246	Chlorination and Hydrostatic Testing	1.00	ea	2,500.00	2,500
	G3010 - Water Supply				73,350
G3020 - Sanitary Sewer					
2247	Subsurface Infiltration System	10,500.00	sf	35.00	367,500
2248	Sanitary Service	300.00	lf	295.00	88,500
2249	Sanitary Sewer Manhole	3.00	ea	4,000.00	12,000
2250	Greese Trap	1.00	ea	10,000.00	10,000
2251	CTE SMH	2.00	ea	3,500.00	7,000
	G3020 - Sanitary Sewer				485,000
	G30 - SITE CIVIL/MECHANICAL UTILITIES				558,350
G40 - SITE ELECTRICAL UTILITIES					
G4010 - Electrical Distribution					
2252	A 4000Amp - Secondary Service	380.00	lf	914.12	347,366
2253	A Underground Feeder Secondary Detail (INCL EXCAV)	50.00	lf	662.71	33,136

Grouping: MasterGrp / UDF1 / Uniformat2 / Uniformat3

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Estimate Detail			Lowell High School - Schematic Reconciled			
		Description	Qty		Unit Cost	Amount
--- - Base						
F - Site						
G40 - SITE ELECTRICAL UTILITIES						
G4010 - Electrical Distribution						
2254	A	Underground Feeder Secondary Detail (INCL EXCAV)	60.00	lf	641.99	38,520
G4010 - Electrical Distribution						419,021
G4090 - Site Utilities						
2255	A	Primary Electric Service (East & West)	850.00	lf	56.19	47,763
2256	A	Telephone Service (East & West)	1,100.00	lf	87.10	95,810
2257	A	SL1 : Single LED Head Pole Mtd	26.00	ea	5,309.46	138,046
2258	A	SL2 : Twin LED Head Pole Mtd	10.00	ea	5,984.12	59,841
2259		Communications Ductback	500.00	lf	100.00	50,000
2260		Site Security Blue Phones	1.00	ea	35,000.00	35,000
2261		Precast Manhole 8'x10'x8' ID	2.00	ea	16,267.13	32,534
2262		Ductbank Concrete	900.00	lf	150.00	135,000
2263		Precast Light Pole Foundation	36.00	ea	487.15	17,537
2264		Break-in to Existing Manhole	2.00	ea	2,720.89	5,442
2265		Concrete Utility Transformer Pad	2.00	ea	3,125.00	6,250
G4090 - Site Utilities						623,223
G40 - SITE ELECTRICAL UTILITIES						1,042,245
F - Site						6,597,365
--- - Base						182,111,329

APPENDIX I – VALUE ENGINEERING SUMMARY

Reconciled estimates were within the district's budget and value engineering was not required at this time.

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