

**Schematic Design  
Outline Specification  
SD Pricing Set**

February 15, 2019

**New Driscoll School**

**Brookline Massachusetts**

**Jonathan Levi Architects**  
266 Beacon Street  
Boston, Massachusetts 02116



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**SECTION 011000 - SUMMARY**

1. Project Identification and Description of Work
  - a. Project Identification: The name of the Project on Contract Documents is "New Driscoll School", located in Brookline, Massachusetts.
2. Description: Project consists of constructing a new School for grades Pre-K through 8 in Boston, MA.
3. Phased landscape development, paving, site utility work, and other site improvements are required as part of the Work.
4. Existing Driscoll School building hazardous materials abatement and building demolition are required as part of the Work.
5. Project shall have early bid packages for site preparation.
6. Project shall achieve at minimum a LEED for Schools V4 Silver rating.
7. Project shall shall use Construction Manager at Risk project delivery method.

-END OF SECTION-



**SECTION 011001 – Project Schedule**

1. Package No. 1 – Site prep

Award	3/1/20
Substantial Completion	9/1/20
  
2. Package No. 2 - Building Construction

Award	9/1/20
Substantial Completion	6/15/2021
  
3. Building Demolition

Start Work	7/1/2021
Substantial Completion	12/20/2021

-END OF SECTION-



**SECTION 011002 - Alternates**

- 1) Provide alternate to provide artificial turf playfield

Base bid: Provide natural turf playfield

Alternate: Provide synthetic turf playfield

-END OF SECTION-







CDW CONSULTANTS, INC.  
CIVIL & ENVIRONMENTAL ENGINEERS

**DRAFT**  
**HAZARDOUS MATERIALS SUMMARY REPORT**

Michael Driscoll School  
64 Westbourne Terrace  
Brookline, MA 02446

Prepared for

Jonathan Levi Architects  
266 Beacon Street  
Boston MA 02116



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## **1.0 INTRODUCTION**

CDW Consultants, Inc. (CDW) is pleased to present this letter report summarizing the findings of the preliminary suspect asbestos-containing materials (ACM) and lead-based paint (LBP) inspection of the Michael Driscoll School (“Site”) located in Brookline, Massachusetts. The ACM and LBP survey were conducted in support of the Feasibility Study for the building project. In November 2018, Ms. Susan Cahalan (Massachusetts DLS Asbestos Inspector #AI60784) conducted an inspection for suspect materials. An inspection is required by the United States Environmental Protection Agency (USEPA) National Emission Standards for Hazardous Air Pollutants (NESHAPs), prior to scheduled building renovations. Samples of suspect materials were collected to confirm the presence or absence of ACM, and LBP. Suspect materials were grouped into homogenous areas. A homogenous area is an area that is similar in color, texture and date of application. Hand tools were used to collect bulk samples which were promptly placed in sealed plastic bags using a unique numbering system. Samples were not collected of non-suspect materials, including wood, fiberglass, plastic/vinyl, ceramic, concrete, neoprene/rubber, glass, and carpeting.

## **2.0 PROJECT UNDERSTANDING**

The hazardous materials survey was conducted as a preliminary survey as part of a Feasibility Study at the Site. This preliminary survey was not conducted to support renovation or demolition activities.

## **3.0 GENERAL SITE CONDITIONS**

The Driscoll School was originally built in 1910 (central portion). The school was expanded in 1928 (southeast) and 1953 (northwest). Prefabricated buildings (modulars) were added in 1980 and one of the prefabricated buildings (main gym) became permanent with the addition of a masonry facade in 1988. The original auditorium was converted to the library during this time period. A small gym was converted to an auditorium in 1995. Improvements were made to the cafeteria and accessibility issues were addressed in 2006 including the installation of an elevator and the creation of a new accessible entrance to the building. The School building is 90,292 square feet, and has exterior brick and masonry. The windows were last replaced in in 2004 and contain rubber glazing and silicone caulking. The roof is a combination of pitched areas with shingles and rubber in the flat (low slope) areas.

Interior ceilings consist of spline and dropped ceiling tiles. Most of the walls are made of plaster and painted brick. The flooring consists of wood, carpeting, matting, ceramic tile and composition tile. There are various styles of lights such as fixed pendant, recessed, 2x4, and 4x4 energy efficient/retro-fitted. The Driscoll School consists of 34 original classrooms. Classroom sizes range from 600 sq. ft. to 1200 square feet. The building has a full size gymnasium (with no stands for spectator viewing) and a small gym for younger grades. There is one library/media center, a kitchen and cafeteria/common area. The boiler room contains a newer boiler, and fiberglass insulated pipes.



#### 4.0 ASBESTOS SURVEY

##### 4.1 AHERA Review

CDW Reviewed the AHERA re-inspection report, dated April 6<sup>th</sup>, 2017, prepared by EFI Global (EFI), Inc. Materials found during EFI’s inspection found **to not** contain asbestos included:

Wing	Confirmed Non-ACM Materials Sampled (AHERA Inspection, 2017)
1912	<ul style="list-style-type: none"> <li>• 2’x4’ white dented ceiling tile</li> <li>• 2’x4’ white dot ceiling tile</li> <li>• Grey skim coat plaster</li> <li>• 12”x12” light blue floor tile</li> <li>• Yellow glue associated with blue cove base molding</li> <li>• Sheetrock</li> <li>• Joint compound</li> <li>• Mud in ribbed boilers</li> <li>• Boiler breeching duct insulation</li> <li>• Red cove base &amp; yellow mastic</li> <li>• Yellow vinyl flooring</li> <li>• Red vinyl flooring</li> <li>• 2’x6’ tectum ceiling panel</li> <li>• Red ceramic floor tile grout</li> <li>• 2’x4’ vinyl rock ceiling tile</li> <li>• 12”x12” red floor tile &amp; yellow mastic</li> <li>• 2’x2’ white ceiling tile</li> </ul>
1928	<ul style="list-style-type: none"> <li>• Grey vinyl flooring &amp; yellow mastic</li> <li>• Black cove base &amp; yellow mastic</li> <li>• Homosote board</li> <li>• White skim coat plaster</li> <li>• Grey base coat plaster</li> <li>• 12”x12” green floor tile &amp; yellow mastic</li> <li>• Green cove base &amp; yellow mastic</li> <li>• 2’x4’ white squiggle ceiling tile</li> <li>• Large grey cove base &amp; yellow mastic</li> </ul>
1953	<ul style="list-style-type: none"> <li>• Terracotta brick</li> <li>• Terracotta mortar</li> <li>• Blown-in insulation in attic</li> <li>• White sealant on fiberglass pipe insulation</li> <li>• Ceramic wall tile adhesive</li> <li>• 12”x12” light blue floor tile</li> <li>• Black rubber flooring &amp; yellow mastic</li> </ul>



Wing	Confirmed Non-ACM Materials Sampled (AHERA Inspection, 2017)
	<ul style="list-style-type: none"> <li>• Sheetrock</li> <li>• Joint compound</li> <li>• White skim coat plaster</li> <li>• Gray base coat plaster</li> <li>• Plaster ceiling</li> <li>• 1’x1’ pinhole ceiling tile</li> <li>• Brown glue daubs associated with: A. 1’x1’ fissured ceiling tile, B. 1’x1’ pinhole ceiling tile C. 1’x1’ large pinhole ceiling tile, and D. 1’x1’ large dot ceiling tile</li> <li>• Red fire stopping caulk</li> <li>• 1’x1’ fissured ceiling tile</li> <li>• 12”x12” green floor tile &amp; associated black mastic</li> <li>• Gray linoleum &amp; associated red backing</li> <li>• Yellow carpet glue</li> <li>• Green sink undercoat</li> <li>• 1’x1’ large pinhole ceiling tile</li> <li>• Blue vinyl flooring in 107</li> <li>• White floor leveler associated with blue vinyl flooring</li> <li>• Red rubber flooring</li> <li>• Textured paint</li> <li>• 12”x12” cloudy blue floor tile &amp; associated black mastic</li> <li>• Blue vinyl flooring &amp; associated black mastic in Room 205</li> <li>• Pyrobar wall block</li> <li>• Tan cove base &amp; associated yellow mastic</li> <li>• Black mastic under: A. Carpet in First Floor hallway, B. 9”x9” grey floor tile, and C. 9”x9” green floor tile</li> <li>• 12”x12” white floor tile &amp; associated black mastic</li> <li>• Yellow ceramic wall tile grout</li> <li>• Ceramic floor tile grout</li> <li>• 12”x12” black floor tile &amp; associated black mastic</li> </ul>

**ACM identified in the AHERA report includes:**

Wing	Confirmed ACM (AHERA Inspection, 2017)
1912	<ul style="list-style-type: none"> <li>• Lab bench table top</li> <li>• 12”x12” white floor tile &amp; associated black mastic</li> <li>• Black mastic associated with 12”x12” light blue floor tile</li> <li>• Blue cove base</li> <li>• Black mastic associated with red and yellow vinyl flooring</li> </ul>

Wing	Confirmed ACM (AHERA Inspection, 2017)
1928	<ul style="list-style-type: none"> <li>• White duct insulation in attic</li> </ul>
1953	<ul style="list-style-type: none"> <li>• Black mastic associated with 12”x12” light blue floor tile</li> <li>• Pipe fittings and insulation</li> <li>• Black mastic on concrete slab floor</li> <li>• Black mastic associated with red rubber flooring</li> <li>• Tan vinyl sheeting &amp; associated black mastic</li> <li>• 9”x9” grey floor tile</li> <li>• 9”x9” green floor tile</li> <li>• Black sink coating</li> </ul>

## 4.2 Methods

The investigative work for the asbestos survey included conducting a limited visual inspection of physically accessible areas of the subject areas. Once the visual inspection was completed, the building components were categorized into homogeneous areas. CDW collected bulk samples of different homogeneous suspect materials for asbestos analysis. The bulk samples were delivered under chain of custody to Asbestos Identification Laboratory, Inc. (AIL) located in Woburn, Massachusetts. AIL is a state licensed (#AA000208) and NVLAP-accredited laboratory (lab code #200919-0) for asbestos analysis. Bulk samples were analyzed for asbestos content by polarized light microscopy (PLM) using EPA Method 600/R-93/116. A positive stop method was used – if one sample in a homogeneous group is positive then additional samples of the same material are not analyzed. The asbestos analytical results are provided in Attachment A. Samples analyzed to contain greater than 1% asbestos are to be treated as ACM as defined by the USEPA and Commonwealth of Massachusetts Department of Environmental Protection (MassDEP). The laboratory analytical reports are included in Appendix A.

## 4.3 Findings

Laboratory ID	Material	Location	Result
1A, 1B, 1C	White Glue Daub	Behind Wall Pads Little Gym	ND
2A, 2B, 2C	Levelastic Glue Mix	Under Carpet Little Gym	ND
3A, 3B, 3C	Hard Ceiling Plaster	Little Gym	ND
4A, 4B	Interior Door Glaze	Wood Door Near Gym	ND
5A, 5B, 5C, 5D, 5E	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	ND
6A,6B, 6C, 6D, 6E	2x4 Ceiling Tile	Ground Floor Hall	ND

Laboratory ID	Material	Location	Result
7	Interior Door Window Glaze	Music Room	ND
8A, 8B, 8C	Red Floor Tile	Under Carpet Over Wood - Art	ND
9A, 9B, 9C	Yellow Mastic	Under Red Floor Tile - Art	ND
10A, 10B	Interior Window Glaze	Window Transom 2 <sup>nd</sup> Floor Stair – 1928 Wing	ND
11A, 11B	Window Glaze	Interior Door Assembly to Stairs – 1928 Wing	ND
12A, 12B	Wood Door Window Glaze	Classrooms 322/ 318	2% Detected Asbestos Chrysotile
13A, 13B, 13C	Concrete Skim Layer with Black Coating	Hall – Base of Brick Wall Near Room 322	ND
14A, 14B, 14C	Grey Carpet Glue	Hall Near Room 322	ND
15A, 15B, 15C	Yellow Brown Carpet Glue	Room 322	ND
16A, 16B	Interior Window Glaze	Classroom Windows to Hallway, Rooms 318 and 320	ND
17A, 17B, 17C, 17D, 17E	2'x4' Fissured Ceiling Tile	2 <sup>nd</sup> Floor	ND
18A, 18B, 18C, 18D, 18E	Joint Compound	2 <sup>nd</sup> Floor Classrooms – 1928 Wing	ND
19A, 19B	Brown Fabric	Old Announcement Boxes	ND
20A, 20B, 20C	Black Coating on Brick	Base Wall Hallway 2 <sup>nd</sup> Floor	ND
21A, 21B, 21C, 21D, 21E	Brown Wall Covering	2 <sup>nd</sup> Floor Hall – 1928 Wing	ND
22	Tan Material	Inside Door 2 <sup>nd</sup> Floor Staff Bathroom	ND
23A, 23B	Classroom Door Glaze	Rooms 317 and 310A	2% Detected Asbestos Chrysotile
24A, 24B, 24C	Brown Wall Covering	On Concrete 2 <sup>nd</sup> Floor Classrooms – 1910 Wing	ND
25A, 25B, 25C, 25D, 25E	Thin Grey/Tan Concrete Layers Over Wood Floors	Rooms 310, 310A, 315, 313, 317	ND
26A, 26B	Black Sink Coating	1950's Classrooms	20% Detected Asbestos Chrysotile

Laboratory ID	Material	Location	Result
27A, 27B, 27C, 27D, 27E	1'x1' Pi Dot Wall Tile	1950's Classrooms Wing	ND
28A, 28B, 28C, 28D, 28E	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	ND
29A, 29B, 29C, 29D, 29E	Linoleum Floor	1950s Wing Classrooms	30% Detected Asbestos Chrysotile
30A, 30B, 30C, 30D, 30E	Yellow Mastic	Under Linoleum Floor	ND
31A, 31B, 31C, 31D, 31E	Thin Concrete Coating with Black Layer	Under Linoleum	ND
32A, 31B	Door Window Glaze	Door Assembly Top of Stairs – 1950s Wing	ND
32	White Window Glaze	Front Door	ND
33A, 33B, 33C	Yellow Carpet Glue	Library	ND
34	White Sink Coating	Staff Room	ND
35A, 35B, 35C	Gray Grout	Staff Room Under Blue Wall Tile 1950's Wing	ND
36	Interior Window Glaze	Room 201	2% Chrysotile
37A, 37B, 37C	Wall Plaster	Library	ND
38A, 38B	Black Skim Coat	Library Storage on Concrete Wall	ND
39A, 39B, 39C, 39D, 39E	Tan Stone Window Sills Exterior	Window Sills 1912 Section	ND
40A, 40B, 40C	Exterior Gray Caulk	On Brick, 1912 to 1950's Wing	20% Chrysotile
41A, 41B, 41C	Exterior Gray caulk	Univents	15% Chrysotile
42A, 42B, 42C	Black Skim Coat	Library Storage Interior Concrete	ND
43A, 43B, 43C, 43D, 43E	Exterior Gray Caulk	@ Concrete Columns – 1950s Wing	15% Chrysotile

ND = Not Detected

Chrysotile and Amosite = Asbestos Minerals

In addition to the AHERA findings, CDW's inspection and sampling at the Site revealed that the flowing building materials did not contain ACM:

Wing	Confirmed Non-ACM Materials Sampled (CDW Inspection, 2018)
1912	<ul style="list-style-type: none"> <li>• 2'x4' ceiling tile</li> <li>• Glazing</li> </ul>





Wing	Confirmed Non-ACM Materials Sampled (CDW Inspection, 2018)
	<ul style="list-style-type: none"> <li>• 2’x4’ Fissured Ceiling</li> <li>• Joint Compound, 2<sup>nd</sup> Floor Classrooms</li> <li>• Fabric Brown on Announcement Boxes</li> <li>• Black Coating on Brick</li> <li>• Brown Wall Covering</li> <li>• Tan Material on 2<sup>nd</sup> Floor Staff Bathroom</li> <li>• Gray/Tan Concrete Layers Over Wood Floors</li> <li>• Door Window Glaze</li> <li>• White Window Glaze</li> <li>• White sink Coating</li> <li>• Tan Stone Exterior</li> </ul>
1928	<ul style="list-style-type: none"> <li>• White glue daubs in little gym</li> <li>• Levelastic Glue Mix</li> <li>• Hard ceiling Plaster</li> <li>• Interior Door Glaze</li> <li>• Red/Brown Levelastic</li> <li>• 2’x4’ ceiling tile</li> <li>• Interior Door Window Glaze</li> <li>• Red Floor Tile</li> <li>• Yellow Mastic</li> <li>• Interior Window Glaze</li> <li>• Window Glaze</li> <li>• Concrete Skim Layer with Black Coating</li> <li>• Gray Carpet Glue</li> <li>• Yellow Brown Carpet</li> <li>• Glazing</li> <li>• 2’x4’ Fissured Ceiling</li> <li>• Joint Compound, 2<sup>nd</sup> Floor Classrooms</li> <li>• Fabric Brown on Announcement Boxes</li> <li>• Black Coating on Brick</li> <li>• Brown Wall Covering</li> <li>• Door Window Glaze</li> <li>• Yellow Carpet Glue</li> <li>• Wall Plaster</li> <li>• Black Skim Coat</li> </ul>
1953	<ul style="list-style-type: none"> <li>• 2’x4’ ceiling tile</li> <li>• Glazing</li> <li>• 2’x4’ Fissured Ceiling</li> <li>• Joint Compound, 2<sup>nd</sup> Floor Classrooms</li> <li>• Fabric Brown on Announcement Boxes</li> </ul>



Wing	Confirmed Non-ACM Materials Sampled (CDW Inspection, 2018)
	<ul style="list-style-type: none"> <li>• Black Coating on Brick</li> <li>• Brown Wall Covering</li> <li>• 1’x1’ Pi Dot Wall Tile</li> <li>• Brown Glue Daubs Under Pi Dot</li> <li>• Yellow Mastic Under Linoleum Floors</li> <li>• Thin Concrete Coating with Black Layers</li> <li>• Door Window Glaze</li> <li>• Gray Grout</li> </ul>

In addition to the AHERA findings, CDW’s inspection of the Site analysis revealed the following additional ACM:

Wing	Confirmed ACM (CDW Inspection, 2018)
1912	<ul style="list-style-type: none"> <li>• Classroom Door Glaze (Rooms 310A + 317)</li> <li>• Exterior Gray Caulk on Bricks</li> </ul>
1928	<ul style="list-style-type: none"> <li>• Wood Door Window Glaze (Rooms 318 + 322)</li> </ul>
1953	<ul style="list-style-type: none"> <li>• Black Sink Coating in Classrooms</li> <li>• Linoleum Floors</li> <li>• Window Glaze</li> <li>• Exterior Gray Caulk on Bricks, Univents, and on Concrete Columns</li> </ul>

Refer to Table 1 for ACM and presumed asbestos containing materials quantities. The laboratory analytical report is provided in Appendix A.

### 4.3 Recommendations

Prior to disturbance, the ACM identified must be abated by a Commonwealth of Massachusetts-licensed asbestos abatement contractor following all federal, state & local regulations governing asbestos abatement. A copy of the asbestos Waste Shipment record must be received within 30 days of removal from the Site. Asbestos air quality sampling must be conducted under USEPA regulations following asbestos abatement and prior to re-occupancy of the spaces. If additional materials are discovered that have not been sampled, those materials should be considered ACMs until laboratory analysis determines otherwise.

## 5.0 LEAD-BASED PAINT

### 5.1 Methods

CDW performed a visual inspection of painted surfaces. CDW collected samples from different color paints on various types of building component substrates. Samples were submitted to EMSL Laboratories in Cinnaminson, New Jersey for analysis via Atomic Absorption Spectrometry (AAS).



## 5.2 Findings

The results of the testing revealed that four of the nine samples analyzed had detectable concentrations of lead. The Environmental Protection Agency (EPA) defines LBP as any paint or surface coating that contains lead equal to exceeding one milligram per square centimeter (1.0 mg/cm<sup>2</sup>) or 0.5% by weight. The OSHA lead-in-construction standard defines lead containing paint (LCP) as a paint or coating containing any detectable level of lead. Based on the EPA and OSHA criteria listed above, XX samples contain detectable levels of lead. Samples that meet the criteria for LBP include: XX. The lead paint analytical results are provided in the below table. The laboratory analytical report is included in Appendix B.

Sample ID	Location	Lead Concentration (% Weight)

## 5.3 Recommendations

Based on the conclusions of this testing, the following recommendations are offered:

- Removal of the LBP is not required. However, in accordance with the EPA Lead Renovation, Repair, and Painting (RRP) Rule 40 CFR 745, workers, students, visitors and the public must be protected from lead dust generated during the demolition of LBP or LCP coated surfaces.
- Components identified to contain the presence of lead should not be disturbed in an uncontrolled manner. Disturbance of these materials should only be done by properly trained



- personnel in a controlled and documented manner to allow for the safety of the workers, bystanders and disposal of waste materials.
- Specifications for the proper work practices, controls and disposal should be developed to document compliance with all applicable regulations.
- Those components/colors not tested, or in locations not inventoried in this report, should be tested for lead content prior to disturbance that may cause airborne release of lead.

## **6.0 HAZARDOUS MATERIALS SURVEY**

### **6.1 Methods**

#### OHM Visual Inspection

CDW visually inspected the Site building for universal, special and hazardous wastes associated with building materials. These included but were not limited to the following:

- Mercury-containing devices (fluorescent light tubes, thermostats, gauges, etc.);
- Polychlorinated bi-phenyl (PCB)-containing articles, equipment and devices (light ballasts, electrical switches, etc.);
- Chlorofluorocarbon (CFC)-containing equipment (refrigerants, air conditioners/HVAC equipment, water bubblers, etc.)
- Tritium-containing devices (exit signs);
- Lead-Acid batteries (emergency lights, etc.); and
- Pressurized-cylinders (fire extinguishers, etc.).

### **6.2 Findings**

The visual survey for hazardous materials identified mercury-containing light tubes, remnant DEHP-containing light ballasts, mercury containing thermostats and switches, lead and tritium batteries, refrigerants, oil containing old door retractors and other hazardous materials. No hazardous materials sampling or analysis was conducted as part of this preliminary survey. A list of OHMs identified are included in Table 2.



### 6.3 Recommendations

Prior to removal, light tubes, ballasts, compact florescent bulbs, lead and tritium batteries, thermostats and switches will require proper handling, removal, transportation and off-site recycling/reclamation. Refrigerants, transformer fluid, elevator hydraulic fluid will require handling and disposal in accordance with regulations.

#### Limitations

The conclusions are limited to the information available at the time of the field survey and the scope of services, as defined. No subsurface soil or groundwater sampling and analysis was performed. Where access to portions of the Site or to structures on the site was unavailable or limited, CDW renders no opinion as to the presence of hazardous material or the presence of indirect evidence related to hazardous material in that portion of the site or structure. This report cannot be solely relied upon for renovation or demolition. The sampling performed forms the basis for conclusions expressed and areas inaccessible for testing limits those conclusions. No other conclusions, interpretations or recommendations are contained or implied in this report other than those expressed. While CDW followed industry standards during the inspection, we do not warrant that all suspect hazardous building materials were identified in or on the buildings and shall not be held liable related to future abatement costs related to hazardous materials that are either not discovered or not appropriately characterized. This is due in part to inherent problems with every building inspection, such as, but not limited to:

- Seemingly homogeneous materials that are not in fact homogeneous;
- Seemingly representative locations that are not in fact representative;
- Layered materials that are not uniformly present or are isolated;
- Materials that are present and accessible but were not considered to be hazardous,
- Materials that are present in an isolated and limited quantity; and
- Material that is present in locations that are unsafe or otherwise difficult to access.

Client acknowledges that CDW's inspection is limited and all hazardous materials may only become apparent during the course of future renovation or demolition. During the course of future renovation/demolition work, it is likely that additional hazardous materials or materials suspected of being hazardous will be identified. Such materials should be assumed to be hazardous unless appropriate evaluation or sampling and analysis demonstrate otherwise. No other use of this report is warranted without the written consent of CDW Consultants, Inc.



Michael Driscoll School  
Brookline, MA  
CDW Project #1810.0

CDW appreciates the opportunity to provide our services to you on this project.

Very truly yours,

CDW CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read 'Susan Cahalan'.

Susan Cahalan, PG, ISSP-SA  
Senior Environmental Geologist

## **TABLES**

## **APPENDIX A**

## **APPENDIX B**





## Asbestos Identification Laboratory

165 New Boston St., Ste 227  
Woburn, MA 01801  
781-932-9600

Web: [www.asbestosidentificationlab.com](http://www.asbestosidentificationlab.com)  
Email: [mikemanning@asbestosidentificationlab.com](mailto:mikemanning@asbestosidentificationlab.com)

Batch: 37916



December 03, 2018

Susan Cahalan  
CDW Consultants, Inc.  
6 Huron Drive  
Natick, MA 01760

**Project Number:**

**Project Name:** Driscoll School, Brookline

**Date Sampled:** 2018-11-18

**Work Received:** 2018-11-26

**Work Analyzed:** 2018-11-30

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

Dear Susan Cahalan,

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 Susan Cahalan for your business.

Michael Manning  
Owner/Director

Susan Cahalan  
 CDW Consultants, Inc.  
 6 Huron Drive  
 Natick, MA 01760

**Project Number:**  
**Project Name:** Driscoll School, Brookline

**Date Sampled:** 2018-11-18  
**Work Received:** 2018-11-26  
**Work Analyzed:** 2018-11-30

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
1A	White Glue Daub	Behind Wall Pads Little Gym	white	Non-Fibrous 100	None Detected
417775					
1B	White Glue Daub	Behind Wall Pads Little Gym	white	Non-Fibrous 100	None Detected
417776					
1C	White Glue Daub	Behind Wall Pads Little Gym	white	Non-Fibrous 100	None Detected
417777					
2A	Levelastic Glue Mix	Under Carpet Little Gym	gray	Non-Fibrous 100	None Detected
417778					
2B	Levelastic Glue Mix	Under Carpet Little Gym	gray	Non-Fibrous 100	None Detected
417779					
2C	Levelastic Glue Mix	Under Carpet Little Gym	gray	Non-Fibrous 100	None Detected
417780					
3A	Hard Ceiling Plaster	Little Gym	multi	Non-Fibrous 100	None Detected
417781					
3B	Hard Ceiling Plaster	Little Gym	multi	Non-Fibrous 100	None Detected
417782					
3C	Hard Ceiling Plaster	Little Gym	multi	Non-Fibrous 100	None Detected
417783					
4A	Interior Door Glaze	Wood Door Near Gym	multi	Non-Fibrous 100	None Detected
417784					
4B	Interior Door Glaze	Wood Door Near Gym	multi	Non-Fibrous 100	None Detected
417785					
5A	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	multi	Non-Fibrous 100	None Detected
417786					
5B	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	multi	Non-Fibrous 100	None Detected
417787					
5C	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	multi	Non-Fibrous 100	None Detected
417788					

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
5D	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	multi	Non-Fibrous 100	None Detected
417789					
5E	Red/Brown Levelastic	Over Concrete Under Rubber Hall Near Gym	multi	Non-Fibrous 100	None Detected
417790					
6A	2x4 Ceiling Tile	Ground Floor Hall	gray	Mineral Wool 40	None Detected
417791				Cellulose 40	
6B	2x4 Ceiling Tile	Ground Floor Hall	gray	Mineral Wool 40	None Detected
417792				Cellulose 40	
6C	2x4 Ceiling Tile	Ground Floor Hall	gray	Mineral Wool 40	None Detected
417793				Cellulose 40	
6D	2x4 Ceiling Tile	Ground Floor Hall	gray	Mineral Wool 40	None Detected
417794				Cellulose 40	
6E	2x4 Ceiling Tile	Ground Floor Hall	gray	Mineral Wool 40	None Detected
417795				Cellulose 40	
7	Interior Door Window Glaze	Music Room	multi	Non-Fibrous 100	None Detected
417796					
8A	Red Floor Tile	Under Carpet Over Wood Art	red	Non-Fibrous 100	None Detected
417797					
8B	Red Floor Tile	Under Carpet Over Wood Art	red	Non-Fibrous 100	None Detected
417798					
8C	Red Floor Tile	Under Carpet Over Wood Art	red	Non-Fibrous 100	None Detected
417799					
9A	Yellow Mastic	Under Red Floor Tile	yellow	Non-Fibrous 100	None Detected
417800					
9B	Yellow Mastic	Under Red Floor Tile	yellow	Non-Fibrous 100	None Detected
417801					
9C	Yellow Mastic	Under Red Floor Tile	yellow	Non-Fibrous 100	None Detected
417802					
10A	Interior Window Glaze	Window Transom 2nd Floor Stair	multi	Non-Fibrous 100	None Detected
417803					
10B	Interior Window Glaze	Window Transom 2nd Floor Stair	multi	Non-Fibrous 100	None Detected
417804					
11A	Window Glaze	Interior Door Assembly to Stairs	multi	Non-Fibrous 100	None Detected
417805					
11B	Window Glaze	Interior Door Assembly to Stairs	multi	Non-Fibrous 100	None Detected
417806					

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
12A	Wood Door Window Glaze	Classrooms 322 / 318	tan	Non-Fibrous 98	Detected Chrysotile 2
417807					
12B	Wood Door Window Glaze	Classrooms 322 / 318			Not Analyzed
417808					
13A	Concrete Skim Layer With Black Coating	Hall Near 322	gray	Non-Fibrous 100	None Detected
417809					
13B	Concrete Skim Layer With Black Coating	Hall Near 322	gray	Non-Fibrous 100	None Detected
417810					
13C	Concrete Skim Layer With Black Coating	Hall Near 322	gray	Non-Fibrous 100	None Detected
417811					
14A	Gray Carpet Glue	Hall Near 322	gray	Non-Fibrous 100	None Detected
417812					
14B	Gray Carpet Glue	Hall Near 322	gray	Non-Fibrous 100	None Detected
417813					
14C	Gray Carpet Glue	Hall Near 322	gray	Non-Fibrous 100	None Detected
417814					
15A	Yellow Brown Carpet Glue	Rm 322	multi	Non-Fibrous 100	None Detected
417815					
15B	Yellow Brown Carpet Glue	Rm 322	multi	Non-Fibrous 100	None Detected
417816					
15C	Yellow Brown Carpet Glue	Rm 322	multi	Non-Fibrous 100	None Detected
417817					
16A	Glazing		tan	Non-Fibrous 100	None Detected
417818					
16B	Glazing		tan	Non-Fibrous 100	None Detected
417819					
17A	2'x4' Fissured Ceiling Tile	2nd Floor	gray	Mineral Wool 40	None Detected
417820				Cellulose 40	
17B	2'x4' Fissured Ceiling Tile	2nd Floor	gray	Mineral Wool 40	None Detected
417821				Cellulose 40	
17C	2'x4' Fissured Ceiling Tile	2nd Floor	gray	Mineral Wool 40	None Detected
417822				Cellulose 40	
17D	2'x4' Fissured Ceiling Tile	2nd Floor	gray	Mineral Wool 40	None Detected
417823				Cellulose 40	
17E	2'x4' Fissured Ceiling Tile	2nd Floor	gray	Mineral Wool 40	None Detected
417824				Cellulose 40	

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
18A	Joint Compound	2nd Floor Classrooms	white	Non-Fibrous 100	None Detected
417825					
18B	Joint Compound	2nd Floor Classrooms	white	Non-Fibrous 100	None Detected
417826					
18C	Joint Compound	2nd Floor Classrooms	white	Non-Fibrous 100	None Detected
417827					
18D	Joint Compound	2nd Floor Classrooms	white	Non-Fibrous 100	None Detected
417828					
18E	Joint Compound	2nd Floor Classrooms	white	Non-Fibrous 100	None Detected
417829					
19A	Fabric Brown	Old Annocment Boxes	brown	Synthetic 100	None Detected
417830					
19B	Fabric Brown	Old Annocment Boxes	brown	Synthetic 100	None Detected
417831					
20A	Black Coating on Brick	Base Wall Hallway 2nd Floor	black	Non-Fibrous 100	None Detected
417832					
20B	Black Coating on Brick	Base Wall Hallway 2nd Floor	black	Non-Fibrous 100	None Detected
417833					
20C	Black Coating on Brick	Base Wall Hallway 2nd Floor	black	Non-Fibrous 100	None Detected
417834					
21A	Brown Wall Covering	2nd Floor Hall	brown	Cellulose 90	None Detected
417835				Non-Fibrous 10	
21B	Brown Wall Covering	2nd Floor Hall	brown	Cellulose 90	None Detected
417836				Non-Fibrous 10	
21C	Brown Wall Covering	2nd Floor Hall	brown	Cellulose 90	None Detected
417837				Non-Fibrous 10	
21D	Brown Wall Covering	2nd Floor Hall	brown	Cellulose 90	None Detected
417838				Non-Fibrous 10	
21E	Brown Wall Covering	2nd Floor Hall	brown	Cellulose 90	None Detected
417839				Non-Fibrous 10	
22	Tan Material	Inside Door 2nd Floor Staff Bathroom	tan	Non-Fibrous 100	None Detected
417840					
23A	Classroom Door Glaze	317 + 310A	tan	Non-Fibrous 98	Detected Chrysotile 2
417841					
23B	Classroom Door Glaze	317 + 310A			Not Analyzed
417842					

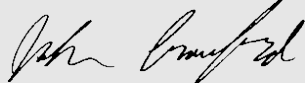
FieldID	Material	Location	Color	Non-Asbestos %		Asbestos %
LabID						
24A	Brown Wall Covering	On Concrete 2nd Flr Classrooms	brown	Cellulose	90	None Detected
417843				Non-Fibrous	10	
24B	Brown Wall Covering	On Concrete 2nd Flr Classrooms	brown	Cellulose	90	None Detected
417844				Non-Fibrous	10	
24C	Brown Wall Covering	On Concrete 2nd Flr Classrooms	brown	Cellulose	90	None Detected
417845				Non-Fibrous	10	
25A	Thin Gray/Tan Concrete Layer Over Wood Floors	310, 310A, 315, 313, 317	multi	Cellulose	10	None Detected
417846				Non-Fibrous	90	
25B	Thin Gray/Tan Concrete Layer Over Wood Floors	310, 310A, 315, 313, 317	multi	Cellulose	10	None Detected
417847				Non-Fibrous	90	
25C	Thin Gray/Tan Concrete Layer Over Wood Floors	310, 310A, 315, 313, 317	multi	Cellulose	10	None Detected
417848				Non-Fibrous	90	
25D	Thin Gray/Tan Concrete Layer Over Wood Floors	310, 310A, 315, 313, 317	multi	Cellulose	10	None Detected
417849				Non-Fibrous	90	
25E	Thin Gray/Tan Concrete Layer Over Wood Floors	310, 310A, 315, 313, 317	multi	Cellulose	10	None Detected
417850				Non-Fibrous	90	
26A	Black Sink Coating	1950's Classrooms	black	Non-Fibrous	80	Detected Chrysotile 20
417851						
26B	Black Sink Coating	1950's Classrooms				Not Analyzed
417852						
27A	1'x1' Pin Dot Wall Tile	1950's Classrooms Wing	brown	Cellulose	100	None Detected
417853						
27B	1'x1' Pin Dot Wall Tile	1950's Classrooms Wing	brown	Cellulose	100	None Detected
417854						
27C	1'x1' Pin Dot Wall Tile	1950's Classrooms Wing	brown	Cellulose	100	None Detected
417855						
27D	1'x1' Pin Dot Wall Tile	1950's Classrooms Wing	brown	Cellulose	100	None Detected
417856						
27E	1'x1' Pin Dot Wall Tile	1950's Classrooms Wing	brown	Cellulose	100	None Detected
417857						
28A	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	brown	Non-Fibrous	100	None Detected
417858						
28B	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	brown	Non-Fibrous	100	None Detected
417859						
28C	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	brown	Non-Fibrous	100	None Detected
417860						

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
28D	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	brown	Non-Fibrous 100	None Detected
417861					
28E	Brown Glue Daub	Under 1'x1' Pin Dot Wall Tile	brown	Non-Fibrous 100	None Detected
417862					
29A	Linoleum Floor	1950'x Wing Classrooms	multi	Non-Fibrous 70	Detected Chrysotile 30
417863					
29B	Linoleum Floor	1950'x Wing Classrooms			Not Analyzed
417864					
29C	Linoleum Floor	1950'x Wing Classrooms			Not Analyzed
417865					
29D	Linoleum Floor	1950'x Wing Classrooms			Not Analyzed
417866					
29E	Linoleum Floor	1950'x Wing Classrooms			Not Analyzed
417867					
30A	Yellow Mastic	Under Linoleum Floor	yellow	Non-Fibrous 100	None Detected
417868					
30B	Yellow Mastic	Under Linoleum Floor	yellow	Non-Fibrous 100	None Detected
417869					
30C	Yellow Mastic	Under Linoleum Floor	yellow	Non-Fibrous 100	None Detected
417870					
30D	Yellow Mastic	Under Linoleum Floor	yellow	Non-Fibrous 100	None Detected
417871					
30E	Yellow Mastic	Under Linoleum Floor	yellow	Non-Fibrous 100	None Detected
417872					
31A	Thin Concrete Coating with Black Layer	Under Linoleum	gray	Non-Fibrous 100	None Detected
417873					
31B	Thin Concrete Coating with Black Layer	Under Linoleum	gray	Non-Fibrous 100	None Detected
417874					
31C	Thin Concrete Coating with Black Layer	Under Linoleum	gray	Non-Fibrous 100	None Detected
417875					
31D	Thin Concrete Coating with Black Layer	Under Linoleum	gray	Non-Fibrous 100	None Detected
417876					
31E	Thin Concrete Coating with Black Layer	Under Linoleum	gray	Non-Fibrous 100	None Detected
417877					
32A	Door Window Glaze	Door Assembly Top of Stairs	multi	Non-Fibrous 100	None Detected
417878					

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
32B	Door Window Glaze	Door Assembly Top of Stairs	multi	Non-Fibrous 100	None Detected
417879					

Monday 03 December

Analyzed by:



End of Report

Batch: 37916

Page 7 of 7

























Disc 1

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope					Asbestos Minerals	Optical Properties							RI	Non-Asbestos Percentage (%)							
			Temp in Celcius =	% of Asbestos	Color	Homogeneity	Texture		Friable	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous	
20	17A	Material Location 2x4 fibers used Cenving Tire 2nd Floor		Black N	Black N	Black N	Black N	Chrysotile										1 R	40 Y0					20
21	17B	Material Location		Black N	Black N	Black N	Black N	Chrysotile										1 R	40 Y0					20
22	17C	Material Location		Black N	Black N	Black N	Black N	Chrysotile										1 R	40 Y0					20
23	17D	Material Location		Black N	Black N	Black N	Black N	Chrysotile										1 R	40 Y0					20
24	17E	Material Location		Black N	Black N	Black N	Black N	Chrysotile										1 R	40 Y0					20







Discall

Page 5 of 22

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius =	Stereo Scope				Asbestos Minerals	Optical Properties						Non-Asbestos Percentage (%)									
			Material / Location	% of Asbestos	Color	Homogeneity		Texture	Friable	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
40	22		Material Tan Mortar Location Hydral floor 3rd floor	0	TY	6N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite	2	W	1+	+	20W/C 153/156											160
41	23A		Material Classroom Door Location 317 + 310A	+	Y	6N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																98
42	23B		Material " " Location "				Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																
43	24A		Material brown wall Location in concrete and the classroom	+	Br	6N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																90
44	24B		Material " " Location "	+	Br	6N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																90

DNA

D152011

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = _____	Stereo Scope					Asbestos Minerals	Optical Properties						RI	Non-Asbestos Percentage (%)									
			Material / Location	% of Asbestos	Color	Homogeneity	Texture		Friable	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence		Pleochroism	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous		
45	242	11	11	0 Br N	N	H <sub>br</sub> N	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite										R	20					10	
46	254	Thin gray TAN CONCRETE Location 310 30A 315 313 312 311	11	0 ml N	N	F <sub>br</sub> N	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite											R	10					90
47	258	11	11	0 ml N	N	F <sub>br</sub> N	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite											R	10					90
48	252	11	11	0 ml N	N	F <sub>br</sub> N	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite											R	10					90
49	251	11	11	0 ml N	N	F <sub>br</sub> N	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite											R	10					90



Discell

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope						Optical Properties						Non-Asbestos Percentage (%)																									
			Temp in Celcius =		% of Asbestos	Color	Homogeneity	Texture	Asbestos Minerals		Asbestos %		Morphology		Extinction		Sign of Elongation		Birefringence		Pleochroism		RI																	
			Friable		Fiberglass		Mineral Wool		Cellulose		Hair		Synthetic		Other		Non-Fibrous																							
50	295E	Material Location "		Amc N	Y	N																																		
51	296A	Material Location Back Sink 1950's classrooms		Br Y	Gr N																																			
52	296B	Material Location "																																						
53	277A	Material Location 74' findorite wall tile 1950's classrooms		Br Y	F Y																																			
54	278	Material Location "		Br Y	F Y																																			

DNA



Driscoll

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = _____	Stereo Scope					Asbestos Minerals	Optical Properties						Non-Asbestos Percentage (%)									
			Material / Location	% of Asbestos	Color	Homogeneity	Texture		Friable	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous	
60	28C	Material " "		0 Br	Y	Gr	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																
61	28D	Material " "		0 Br	Y	Gr	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																
62	28E	Material " "		0 Br	Y	Gr	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																
63	29A	Material Location 1980s classrooms	Undern floor	30 ac	N	Gr	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite	30	W	+	Dist N C / BS / SS D												70
64	29B	Material " "						Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																

DNA

Driscoll

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius =	Stereo Scope					Asbestos Minerals	Optical Properties						Non-Asbestos Percentage (%)										
			% of Asbestos	Color	Homogeneity	Texture	Friable		Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous			
65	29C	11					Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																		
66	29D	11					Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																		
67	29E	11					Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																		
68	30A	Under Floor					Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																		
69	30B	11					Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																		

DNA

DNA

DNA

100

100







## Asbestos Identification Laboratory

165 New Boston St., Ste 227  
Woburn, MA 01801  
781-932-9600

Web: [www.asbestosidentificationlab.com](http://www.asbestosidentificationlab.com)  
Email: [mikemanning@asbestosidentificationlab.com](mailto:mikemanning@asbestosidentificationlab.com)

Batch: 38016



December 06, 2018

Susan Cahalan  
CDW Consultants, Inc.  
6 Huron Drive  
Natick, MA 01760

**Project Number:**

**Project Name:** Driscoll School

**Date Sampled:** 2018-11-29

**Work Received:** 2018-12-03

**Work Analyzed:** 2018-12-05

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

Dear Susan Cahalan,

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.

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- 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 Susan Cahalan for your business.

Michael Manning  
Owner/Director

Susan Cahalan  
 CDW Consultants, Inc.  
 6 Huron Drive  
 Natick, MA 01760

**Project Number:**  
**Project Name:** Driscoll School

**Date Sampled:** 2018-11-29  
**Work Received:** 2018-12-03  
**Work Analyzed:** 2018-12-05

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
32	White Window Glaze	Front Door	white	Non-Fibrous 100	None Detected
419123					
33A	Yellow Carpet Glue	Library	yellow	Non-Fibrous 100	None Detected
419124					
33B	Yellow Carpet Glue	Library	yellow	Non-Fibrous 100	None Detected
419125					
33C	Yellow Carpet Glue	Library	yellow	Non-Fibrous 100	None Detected
419126					
34	White Sink Coating	Staff Room	white	Non-Fibrous 100	None Detected
419127					
35A	Gray Grout	Staff Room Under Blue Wall Tile 1950's Wing	gray	Non-Fibrous 100	None Detected
419128					
35B	Gray Grout	Staff Room Under Blue Wall Tile 1950's Wing	gray	Non-Fibrous 100	None Detected
419129					
35C	Gray Grout	Staff Room Under Blue Wall Tile 1950's Wing	gray	Non-Fibrous 100	None Detected
419130					
36	Window Glaze	Rm 201	tan	Non-Fibrous 98	Detected Chrysotile 2
419131					
37A	Wall Plaster	Library	multi	Non-Fibrous 100	None Detected
419132					
37B	Wall Plaster	Library	multi	Non-Fibrous 100	None Detected
419133					
37C	Wall Plaster	Library	multi	Non-Fibrous 100	None Detected
419134					
38A	Black Skim Coat	Library Storage on Concrete Wall	multi	Non-Fibrous 100	None Detected
419135					
38B	Black Skim Coat	Library Storage on Concrete Wall	multi	Non-Fibrous 100	None Detected
419136					

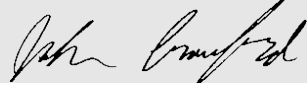


FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
39A	Tan Stone Exterior	Window Sills 1912 Section	tan	Non-Fibrous 100	None Detected
419137					
39B	Tan Stone Exterior	Window Sills 1912 Section	tan	Non-Fibrous 100	None Detected
419138					
39C	Tan Stone Exterior	Window Sills 1912 Section	tan	Non-Fibrous 100	None Detected
419139					
39D	Tan Stone Exterior	Window Sills 1912 Section	tan	Non-Fibrous 100	None Detected
419140					
39E	Tan Stone Exterior	Window Sills 1912 Section	tan	Non-Fibrous 100	None Detected
419141					
40A	Exterior Gray Caulk	On Brick 1912 to 1950's Wing	multi	Non-Fibrous 80	<b>Detected Chrysotile 20</b>
419142					
40B	Exterior Gray Caulk	On Brick 1912 to 1950's Wing			Not Analyzed
419143					
40C	Exterior Gray Caulk	On Brick 1912 to 1950's Wing			Not Analyzed
419144					
41A	Exterior Gray Caulk	Univents	gray	Other 5 Non-Fibrous 80	<b>Detected Chrysotile 15</b>
419145					
41B	Exterior Gray Caulk	Univents			Not Analyzed
419146					
41C	Exterior Gray Caulk	Univents			Not Analyzed
419147					
42A	Black Skim Coat	Library Storage Interior Concrete	black	Non-Fibrous 100	None Detected
419148					
42B	Black Skim Coat	Library Storage Interior Concrete	black	Non-Fibrous 100	None Detected
419149					
42C	Black Skim Coat	Library Storage Interior Concrete	black	Non-Fibrous 100	None Detected
419150					
43A	Exterior Gray Caulk	@ Concrete Columns 1950's Wing	gray	Other 5 Non-Fibrous 80	<b>Detected Chrysotile 15</b>
419151					
43B	Exterior Gray Caulk	@ Concrete Columns 1950's Wing			Not Analyzed
419152					
43C	Exterior Gray Caulk	@ Concrete Columns 1950's Wing			Not Analyzed
419153					
43D	Exterior Gray Caulk	@ Concrete Columns 1950's Wing			Not Analyzed
419154					

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
43E	Exterior Gray Caulk	@ Concrete Columns 1950's Wing			Not Analyzed
419155					

Thursday 06

Analyzed by:



End of Report

Batch: 38016

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Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = _____	Stereo Scope					Asbestos Minerals	Optical Properties						Non-Asbestos Percentage (%)						
			% of Asbestos	Color	Homogeneity	Texture	Friable		Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other
41	39E	"		Ø	Y	Gr	N	Chrysotile													100
42	40A	Material: EXTENSIVE GREAT CARBONATE Location: ON BRICE 1912 TO 1952'S WINDS						Chrysotile	20	W	12	+	LOW ANG	SS3/SS0							80
43	40B	"						Chrysotile													
44	40C	"						Chrysotile													
45	41A	Material: EXTENSIVE GREAT CARBONATE Location: ON BRICE 1912 TO 1952'S WINDS						Chrysotile	15	W	12	+	LOW ANG	SS3/SS0							5

DNA  
DNA





Disc coll

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = _____	Stereo Scope					Optical Properties							Non-Asbestos Percentage (%)								
			Material / Location	% of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
51	43A	Material: <u>steria grain</u> Location: <u>concrete columns</u>					Chrysotile	15															5% gc
52	43B	Material: " Location: "					Amosite	u															
53	43C	Material: " Location: "					Crocidolite																
54	43D	Material: " Location: "					Tremolite																
419155	43E	Material: " Location: "					Actinolite																

5% gc

DNA

DNA

DNA

DNA



### **SECTION 024119 - BUILDING DEMOLITION**

1. Work Included: Demolish and remove existing buildings, materials, systems, equipment, and structures indicated on the Drawings.
2. Occupancy: Buildings to be demolished will be unoccupied prior to commencement of demolition.
3. Temporary Protections: Provide temporary barricades and other forms of protection as required to for protection of personnel from injury due to demolition operations.
  - a. Provide shoring and bracing as required to prevent collapse of existing systems and adjacent facilities or work to remain.
  - b. Remove temporary protections at completion of the work.
4. Coordination with Owner: Coordinate schedule of building demolition operations with Owner in order to allow Owner plenty of time to install temporary heating systems to the adjacent Walsh building.
5. Locate, identify, stub-off, and disconnect utility services that are indicated not to remain. Provide by-pass services as necessary to maintain continuity of service to occupied areas.
6. Where items are indicated to be salvaged, carefully remove indicated items, clean items, and deliver to storage area designated by Owner.
7. Material resulting from demolition and not identified for salvaging shall become the property of the Contractor and shall be legally transported and disposed of off-site. Disposal shall be performed as promptly as possible and not left until the final clean up.

-END OF SECTION-



SECTION 035413

GYPSUM CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.2 SUMMARY

- A. Section includes self-leveling, gypsum cement underlayment and acoustical mat for application below interior VCT floor coverings on the second and third floor.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- 1. STC Rating of assembly shall be STC-57.

2.2 GYPSUM CEMENT UNDERLAYMENTS

- A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in uniform thickness.

- 1. Basis-Of-Design Product: Provide Gyp-Crete 2000/3.2K Floor Underlayment as manufactured by Maxxon Corporation, or equal products by one of the following, or equal:

- a. ARDEX Americas.
- b. Euclid Chemical Company (The); an RPM company.
- c. Hacker Industries, Inc.
- d. MAPEI Corporation.
- e. Maxxon Corporation.
- f. United States Gypsum Company.

- 2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
- 3. Compressive Strength: Not less than 3,000 psi at 28 days when tested according to ASTM C 109/C 109M.
- 4. Density: Not less than 115 pounds per cubic foot.

2.3 ACCESSORIES

- A. Sound Mat:

- 1. Basis-Of-Design: Provide the Acousti-Mat II HP Sound Mat, or equal by one of the

following, or equal:

- a. Allied Custom Gypsum Plasterworks, LLC.
- b. Dura Undercushions Ltd.
- c. Hacker Industries, Inc.
- d. Keene Building Products.
- e. Maxxon Corporation.
- f. United States Gypsum Company.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
- B. Sound Control Mat: Install sound control materials according to manufacturer's written instructions.
  - 1. Do not install mechanical fasteners that penetrate through the sound control materials.

#### 3.2 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
- B. Apply surface sealer at rate recommended by manufacturer.
- C. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

#### 3.3 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 042000

UNIT MASONRY ASSEMBLIES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide unit masonry work, as indicated on Drawings and as specified herein.
  - 1. Brick masonry veneer.
  - 2. Masonry reinforcing, anchors, and ties.
  - 2. Cavity wall insulation.
- B. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels and shelf angles for unit masonry, furnished under Section 055000, METAL FABRICATIONS.

PART 2 PRODUCTS

2.01 BRICK VENEER

- A. Provide face brick conforming to ASTM C 216, Grade SW, Type FBS. Provide building brick conforming to ASTM C 62. Use building brick only where concealed from view. Provide brick masonry as follows:
  - 1. Size: 8 in. x 8 in.
  - 2. Shapes: Provide special shapes where indicated. Never expose cores, frogs, or unfinished surfaces. Provide solidly-grouted bricks at tops of walls and under wall openings.
  - 3. Color/Finish/Texture:
    - a. Brick Type 1: Color shall be equal to Endicott's Medium Iron Spot #46; as manufactured by Endicott Clay Products; or approved equal by Belden Brick or Morin Brick. Finish of Brick shall be smooth.
      - 1) Brick shall have factory cut false 3/8 in. joints; 4 different patterns (1 without joint).

2.02 MORTAR MATERIALS

- A. Portland cement: ASTM C 150, Type I, free from water soluble salts and alkalis. Provide cement which exhibits no efflorescence when tested in conformance with these specifications.
- B. Lime: ASTM C 207, hydrated, Type S.
- C. Grout Aggregate: Complying with ASTM C 404.
- D. Mortar Aggregate: Complying with ASTM C 144, well graded.
- E. Mortar Pigment: Natural and synthetic oxides of iron and chrome, compounded for use in

mortar. Use only pigments with proven record of performance. Provide products equal to Davis Colors or Solomon Grind-Chem.

- F. Water: Clean, potable.

## 2.03 REINFORCING TIES AND ANCHORS

- A. Masonry Tie to Steel Z-Furring: Masonry Ties for anchoring of masonry veneer facing wythes to galvanized steel z-channels shall be "HB-345-BT", as manufactured by Hohmann & Barnard, Inc; or approved equal.
- B. Miscellaneous Ties: Provide stainless steel straps, bars, rods, and similar items which are fabricated from minimum 16 gage stainless steel sheet or 3/16 in. diameter stainless steel wire.

## 2.04 MISCELLANEOUS MATERIALS

- A. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches.
- B. Cavity Drainage Material: thickness as required to fit firmly between back of masonry veneer and face of cavity wall insulation, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings. Subject to compliance with requirements, provide one of the following:
1. Mortar Break; Advanced Building Products, Inc.
  2. CavClear Masonry Mat; CavClear.
  3. Mortar Net; Mortar Net USA, Ltd.
  4. Mortar Stop; Polytite Manufacturing Corp.

## 2.05 MORTAR AND GROUT MIXES

- A. Mortar: Provide mortar complying with ASTM C 270. Mix using known volume measures. Do not batch by shovel.
1. Provide Type N mortar for masonry above grade exterior work, except as indicated otherwise.
- B. Do not use admixtures or anti-freeze agents. Do not use masonry cement. Do not use calcium chloride or any compounds or mortar ingredients containing chlorides.
1. To prevent color variations, do not retemper mortar which contains color pigments.
- B. Mortar Color: Provide mortar with color as determined by Architect. Do not exceed pigment to mortar ratio by 1:10.

END OF SECTION



## I. Structural Systems Overview

The proposed new building will consist of four stories with a lower level below grade primarily for parking. The proposed building structure will be a structural steel frame with concrete floor slabs on composite steel deck. The roof will be steel roof deck except at areas where concrete is required for sound attenuation below rooftop mechanical equipment or for fire ratings. Lateral loads will be resisted by structural steel braced frames. Foundations will be cast-in-place reinforced concrete walls, slabs-on-grade, and spread footings.

## II. Foundations

Based on information provided by McPhail Associates in the 27 November 2018 document titled "Preliminary Foundation Engineering Report", foundations for the project will be as follows:

### A. Walls

Typical foundation walls will be 16-inch thick reinforced concrete with 8-inch wide shelves as required to support façade elements. Exterior foundation walls will extend down to a minimum of 4'-0" below finished exterior grade. A drainage system will be installed around the perimeter of the foundation to divert ground water away from the building. All foundation walls enclosing below-grade space shall be waterproofed on the exterior surface.

### B. Slab-on-Grade

The lower level and first floor slab-on-grade will be a 5-inch thick slab-on-grade. A 15-mil vapor barrier and a 12-inch layer of crushed stone will be placed beneath the slab to provide an adequate substrate and to allow for an under-slab drainage system. An allowance shall be provided for depressions, and trenches, and other potential equipment requirements.

### C. Footings

The foundations will be reinforced concrete spread footings and continuous wall footings bearing on compacted structural fill or undisturbed soil. The allowable bearing pressure will be per the recommendations of the geotechnical report which states a maximum uniform design force of 2 tons per square foot.

### D. Pits

Elevator and other pits that may be required pits will consist of an 18-inch thick reinforced concrete base slab and 12-inch thick reinforced concrete pit walls. All pits shall receive waterproofing.

#### E. Foundation Requirements

Based on the geotechnical report the site is underlain with fill and organics of significant thickness, up to 22 feet, which are unsuitable for building foundation support. New foundations and slabs-on-grade shall be supported on aggregate piers installed through the fill and organic layers. This method of construction is a form of ground improvement and permits the use of conventional foundations for building support once the ground improvements are complete.

### III. Gravity Load System

#### A. Ground Floor

Slab-on-grade as described above.

#### B. Typical Floor Construction

Floor construction will be 3¼-inch lightweight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6¼-inches. The floor slab will be reinforced with WWF 6x6-W4.0xW4.0 throughout. Beams and girders will be structural steel rolled shapes (typically W14, W16, & W18) made composite with the floor slabs via ¾-inch diameter, 5½-inch long welded steel shear studs. Columns will be structural steel rolled shapes (typically W12).

#### C. Typical Roof Construction

The roof will be 3-inch deep, 18 gage, galvanized steel roof deck. Roof beams and girders will be structural steel rolled shapes. Where it is preferred or necessary to place concrete on the roof, the construction will be similar to the typical floor construction described above. Hot-dipped galvanized steel dunnage will be provided on top of the roof if necessary to support mechanical equipment and for mechanical equipment screening.

#### D. Typical Façade Support

Continuous support of the building façade is expected to occur from each framed level above grade. This may likely consist of hung steel angle frames with all material outside the air and vapor barrier system to be hot-dipped galvanized.

#### E. Central Atrium Design

The central atrium will connect all three wings of the new building through a central opening in all floors above level one beneath a large skylight roof opening. Cantilever balconies will extend beyond the classroom walls to the edge of the central opening and will be supported by steel tension rods. Each of three upper levels will be interconnected by central stairs that traverse the central opening at various plan locations. The aesthetic solution for the hangers will result in a random placement of the hangers in a pattern that keeps the distance between adjacent hanger attachments to the balcony edge in the 20-foot to 24-foot range. Hangers will extend

up to the upper floors or directly to the roof where they will attach to the main roof girders or purlins spanning between the girders with various angles of alignment that will yield a visual experience of random sloped hangers.

#### IV. Lateral Load System

The lateral force resisting system will consist of concentrically braced steel frames in both primary structural directions. Structural steel tubes will be oriented diagonally in vertical planes between columns to provide resistance to wind and seismic forces. Final locations of the frames will be coordinated with the architectural layout as design progresses.

#### V. Structural Quantities for Estimating

- A. Steel wide flange framing, tube columns and tube bracing for the floor and roof construction shall be estimated at 12 pounds per square foot of framed area.
- B. Headed shear studs shall be used at all new slabs that bear on steel framing and shall consist of studs that are  $\frac{3}{4}$ " diameter and 4 inches high and shall be estimated at 200 per every 1,000 square feet of deck slab area.
- C. The mechanical duct path will require that reinforced steel web openings be placed in some steel beams which should be all shop installed with a quantity estimated at 20 reinforced penetrations per floor.
- D. Façade support framing for masonry relief shall consist of hung angles and angle bracing in addition to slab-support relief with all framing outside the air and vapor barrier to be hot dipped galvanized and shall be estimated at 0.5 pounds per square foot of framed area.
- E. Bay window framing shall consist of HSS sections fabricated into the bay configurations with welded joints and shall be estimated at 0.5 pounds per square foot of framed area.
- F. Floor and roof slab construction shall consist of 3" high, 18 gage galvanized composite steel deck with  $3\frac{1}{2}$ " of normal weight concrete topping for a total slab thickness of  $6\frac{1}{2}$ " and shall be reinforced with WWF – W3.0xW3.0.
- G. Atrium framing shall be added to the steel tonnage listed above and shall consist of 8 plate girders totaling 8 tons each and 50 rod hanger at 2 inch diameter approximately 30 feet long each consisting of high strength rod and clevis and pin connections with threaded ends and midspan turnbuckles for adjustment with both ends attached to custom plate brackets with an architectural finish.
- H. Atrium steel stair framing shall be added to the steel tonnage listed above and shall consist of heavy HSS sections with steel plate not exposed to view and shall be estimated at 30 tons total for all three atrium stairs.

- I. Steel framing for roof screening and equipment dunnage shall be hot-dipped galvanized HSS sections with bolted connections totaling 30 tons which shall be added to the steel tonnage listed above.
- J. Column spread footings shall be estimated at 8 feet x 8 feet x 2 feet deep with 60 pounds of reinforcement per cubic yard of concrete and shall be counted as one footing per 700 square feet of building footprint area.
- K. Perimeter wall footings shall be estimated at 4 feet by 18 inches deep with 100 pounds of reinforcement per cubic yard of concrete.
- L. Foundation walls shall be estimated at 16 inches thick with 6.5 pounds of reinforcement per square foot area of wall.
- M. Concrete slab on grade shall be 6 inches thick and shall be reinforced with WWF – W3.0xW3.0.
- N. Pits for elevators and mechanical and plumbing systems shall have 18-inch-thick base slabs and 12 inch thick walls and shall be reinforced at 150 pounds per cubic foot of concrete.

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SECTION 054000

COLD FORMED METAL FRAMING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish and install cold formed steel framing, as indicated on the Drawings and as specified herein. Cold formed steel framing includes but is not necessarily limited to:
1. Cold formed steel stud exterior vertical and horizontal framing, including cross-bridging, bracing, and anchoring to the building structure, complete in all respects.
  2. Z-furring at exterior walls.
  3. Interior soffit framing.
  4. Interior partition supports, including box beams and hangers at classroom corridor walls.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
1. AllSteel Products, Inc.
  2. Clark Steel Framing.
  3. Craco Metals Manufacturing, LLC.
  4. Dale/Incor.
  5. Dietrich Metal Framing; a Worthington Industries Company.
  6. MarinoWare; a division of Ware Industries.
  7. Steel Construction Systems.
  8. United Metal Products, Inc.

2.02 FRAMING COMPONENTS

- A. Studs shall be 16 gauge or heavier except where noted on the Drawings. Studs shall be manufactured from steel sheet meeting the requirements of ASTM A 1003, Structural Grade, Type H with a minimum yield strength of 50,000 psi. Studs shall have pre-punched holes. Studs shall be hot dip galvanized in accordance with the following:
1. Grade: ST50H (ST340H).
  2. Coating: G90 (Z275).
- C. Z-Furring: Provide ZF\_Series Z-furring as manufactured by Dietrich Metal Framing, or approved equal. Z-furring shall be minimum 20 gage galvanized steel, sizes as required.
- D. Tracks shall be 18 gauge or heavier unpunched tracks manufactured of commercial quality steel sheet meeting the requirements of ASTM A 1003 with a minimum yield strength of 50,000 psi. Provide special shaped tracks with one 4 in. high leg where required. Tracks shall be hot dip galvanized in accordance with the following:
1. Grade: ST50H (ST340H).

2. Coating: G90 (Z275).
- E. Bridging shall be manufacturer's recommended type to meet the design criteria set forth in Paragraph 1.08 of this Section.
- F. Attachment angles, closure angles, and other miscellaneous components shall be manufactured of commercial quality steel sheet meeting the requirements of ASTM A 446 with a minimum yield strength of 50,000 psi and shall be formed to profiles. All components shall be hot dip galvanized in accordance with ASTM A 525, G 60 Coating Designation.
- G. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with un-stiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads, and as follows:
  1. Minimum Uncoated-Steel Thickness: 0.0538 inch (1.37 mm).
  2. Flange Width: A minimum of 2 inches (50 mm), unless otherwise noted.
- H. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with un-stiffened flanges.
  1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads, and as follows:
    - a. Minimum Uncoated-Steel Thickness: 0.0538 inch (1.37 mm).
    - b. Flange Width: A minimum of 3 inches (75 mm), unless otherwise noted.
  2. Inner Track: Of web depth indicated, and as follows:
    - a. Minimum Uncoated-Steel Thickness: 0.0538 inch (1.37 mm).
    - b. Flange Width: Minimum flange width of 4 inches (100 mm).
- I. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure.

## 2.03 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 55] threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.04 PAINT

A. Zinc Rich Paint: Zinc rich paint for touch up repair of galvanized coatings damaged during handling and erection and field welding shall conform to ASTM A 780 for zinc-rich primer. Paint shall be equal to one of the following:

<u>Product</u>	<u>Manufacturer</u>
ZRC Cold Galvanize Compound ZIRP	ZRC Duncan Industries

B. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

END OF SECTION





## **SECTION 055000 - METAL FABRICATION**

1. Description of Work: The scope of work includes:
  - a. Steel handrails, guardrails and railings.
  - b. Steel pipe bollards.
  - c. Miscellaneous framing and supports for the following:
    - 1) Framing, platforms, and supports for equipment.
    - 2) Counters, benches, and vanities.
  - d. Shop priming and finish painting of hot-dip galvanized work.
  
2. Materials, General: Provide products and materials of new stock, free from defects, and of best commercial quality for each intended purpose.
  - a. Steel Plates, Shapes, and Bars: ASTM A 36.
  - b. Steel Tubing: ASTM A 500 or A 501, hot or cold rolled, as required for design loading.
  - c. Steel Pipe: ASTM A 53, schedule 40, Type S (seamless), black except where galvanized is indicated, Grade A for cold-bending.
  - d. Steel Sheet: ASTM A 366, A 570, or A 611, grade required for design loading.
  - e. Bolts and fasteners: ASTM A 307 and A 325.
  - f. Concrete: Concrete fill for steel bollards is specified in Section 033000, CAST-IN-PLACE CONCRETE.
  - g. Inserts: Threaded or wedge type, galvanized ferrous castings; either ASTM A 47 malleable iron, or ASTM A 27 cast steel. Provide threaded inserts and wedge inserts.
  - h. Provide exposed fastenings of same material and finish as metal to which applied, unless otherwise noted.
  - i. Welding rods: Conform to AWS Standards and recommendations of welding rod manufacturer.
  - j. Grout for Interior Applications: Pre-mixed, non-staining, non-corrosive, non-shrink, non-metallic complying with CE CRD-C-621, Type D.
  - k. Grout for Exterior Applications: Provide Factory-packaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at project site. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating.

3. Fabrication - General: Fabricate work of this Section to be straight, plumb, level and square, and to sizes, shapes and profiles indicated on approved shop drawings. Ease exposed edges. Cut, reinforce, drill and tap metal work as required for proper assembly.
  - a. Fabricate miscellaneous supports, brackets, braces and the like required to fully complete the work.
  - b. Obtain loading requirements from suppliers of work to be supported. Design and support systems with a safety factor of at least 6 unless otherwise indicated.
  - c. Allow for thermal movement resulting from 100°F change in ambient temperature.
  - d. Shear and punch metals accurately. Remove burrs.
  - e. Ease exposed edges to a radius of approximately 1/32 in., unless indicated otherwise. Form bent corners to smallest radius possible without causing grain separation or impairing work.
  - f. Remove sharp or rough areas on exposed traffic surfaces.
  - g. Weld seams continuously. Spot welding is permitted for temporary welding only.
4. Work Exposed to View: For work exposed to view, select materials with special care. Provide materials which are smooth and free of blemishes such as pits, roller marks, trade names, scale and roughness. Fabricate work with uniform hairline joints. Form welded joints and seams continuously. Grind welds flush to be smooth after painting. For exposed fasteners, use hex head bolts or Phillips head machine screws.
5. Radius/Curved Work: Form radius/curved work to true radius without segmentation, buckling, warping, or otherwise altering member dimensions or appearance. Where member cannot be formed to required dimensions, provide equal shape and size member fabricated from equivalent plate stock, fabricated, welded and ground to provide required appearance and performance.
6. Galvanizing: Hot-dip galvanize exterior metal fabrications, items located at exterior locations, and other items indicated to be galvanized, in compliance with ASTM A 123, ASTM A 153, or ASTM A 386. Provide minimum 1.5 oz./ft.<sup>2</sup> zinc coating. Galvanize after fabrication.
7. Steel Handrails and Guardrails: Conform to ASTM E 985 for design and engineering for 9 performance based on testing performed in accordance with ASTM E 894 and ASTM E 935, using load and deflection values specified below. Design and fabricate handrails and guardrails to support 50 lb. per linear foot uniform load and 200 lb. concentrated load, located at any point to cause greatest stress horizontally or vertically.. Load conditions do not act concurrently. Design maximum deflection of any member under load conditions shall not exceed L/360.
8. Concrete Filled Pipe Bollard Fabrication: Provide minimum 8 in. diameter Schedule 80 steel pipe of length to extend from at least 64 in. below grade to at least 48 in. above grade, unless otherwise indicated.
9. Miscellaneous Framing and Supports: Fabricate miscellaneous framing and supports to adequately support live and dead loads with a safety factor of 6. Provide necessary anchors, inserts, and fasteners. Fabricate support system to carry entire load of work being supported to structure above. Do not transfer any loads to ceiling systems.
10. Counter and Bench Supports: Fabricate counter and bench support brackets to support weight of counter, bench or table, plus an additional 500 lbs. concentrated load located to create greatest stress. Fabricate brackets to be inconspicuous from normal viewing angles, unless otherwise indicated on Drawings. Drill brackets for anchor bolts and fasteners.

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-END OF SECTION-



**SECTION 061000 - ROUGH CARPENTRY**

1. Description of Work: Provide all rough carpentry work, as indicated on the Drawings and as specified herein. Rough carpentry shall include but not be limited to:
  - a. Rough hardware, inserts, and related metal components.
  - b. Rough carpentry sleepers, blockings, curbs, cants, edgings, grounds, nailers, and furring.
  - c. Wood preservative treatments and applications.
  - d. Fire-retardant treatments and applications.
  - e. Construction panels, including plywood backing panels for electrical and telephone equipment; plywood sheathing at exterior walls.

2. Miscellaneous Wood Framing and Blocking: Provide lumber for miscellaneous wood framing, blocking, cant strips, nailers, etc. for all work of the Project, including, but not limiting to, handrails, railings, roofing, flashing, sheet metal work, wall mounted toilet accessories, Dressing Room counters, and the like.

3. General Carpentry Material Schedule shall be as follows:

<u>Item</u>	<u>Grade</u>	<u>Species</u>
Lumber 2 in. nominal thickness or greater	Construction Grade	Spruce-Pine-Fire
Lumber less than 2 in. nominal thickness	Construction Grade	Spruce-Pine-Fire

4. Pressure Preservative Treated Lumber: Pressure preserve wood products using only Arsenic and Chromium-free products in accordance with ACQ Preserve Standard ACQ-99. Pressure preservative treat lumber above ground and in contact with roofing, flashing, sheet metal, masonry, concrete, dampproofing, and waterproofing in conformance with AWPA C1, C2, C5, C9, C15, C17, and P5 as applicable. Provide pressure preservative treated lumber with a minimum net retention of 0.25 pcf. Dry lumber to maximum moisture content of 19% after treatment. Use only waterborne preservatives which conform to AWPA P5. Creosote preservatives and preservatives containing Arsenic or Chromium are not acceptable.

- a. Pressure preservative treat lumber in contact with ground in compliance with AWPA C2 and AWPB LP-22 with a minimum net retention of 0.40 pcf.

5. Construction Panels: Construction panels required to complete the work of this Section include, but is not limited to the following:

- a. Electrical and telephone equipment backing panels, consisting of APA trademarked, Performance-Rated sheathing, UL fire-retardant treated, C-D Plugged, Exposure 1 panels, not less than 5/8 in. thick. Provide fire-retardant treatment which yields a flame spread rating of not more than 25 when tested in conformance with ASTM E 84, and conforms to AWPA C 27, Interior Type A. Kiln dry after treatment to a maximum moisture content of 15%.
  - b. Exterior Plywood Sheathing: Provide plywood sheathing consisting of APA trademarked, Performance-Rated sheathing, UL fire-retardant treated, C-D Plugged,

Exposure 1 panels, not less than 5/8 in. thick. Provide fire-retardant treatment which yields a flame spread rating of not more than 25 when tested in conformance with ASTM E 84, and conforms to AWWPA C 27, Interior Type A. Kiln dry after treatment to a maximum moisture content of 15%.

6. Inserts, Anchors, and Fasteners: Provide inserts, anchors, anchor bolts, lag bolts, screws, washers, nuts, nails, and other rough hardware. Assist other trades as necessary in the placement of inserts and anchor bolts in concrete and masonry. Furnish full instructions regarding locations, sizes, and other requirements to ensure proper preparation. Provide rough hardware which complies with requirements of the governing laws and codes.
7. Rough Hardware: Provide rough hardware items for use at roof and other exterior uses hot-dip galvanized in accordance with ASTM A 153. Provide other concealed items cadmium plated or zinc chromate plated.

-END OF SECTION-

SECTION 062000

FINISH CARPENTRY

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide all finish carpentry and millwork as indicated on the Drawings and as specified herein. Include, but do not limit to:
1. Interior standing and running trim.
  2. Solid surface countertops with undermount stainless steel sinks.

1.02 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
1. American National Standards Institute (ANSI):

A161.2	Performance Standards for Fabricated High Pressure Decorative Laminate Countertops
A208.1	Particleboard, Mat-Formed Wood
  2. American Society for Testing and Materials (ASTM):

E 84	Surface Burning Characteristics of Building Materials
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  3. National Electric Manufacturers Association (NEMA):

LD 3	High Pressure Decorative Laminates
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  4. The Architectural Woodwork Institute (AWI):

Quality Standards	Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program
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1.03 QUALITY STANDARDS

- A. Quality Standard: Provide work complying with applicable requirements of AWI Quality Standards. Where not otherwise indicated, fabricator may choose among options permitted by AWI for grade of work specified.
1. Panel Products: Provide minimum 45 pounds per cubic foot medium density fiberboard. Do not use hardboard.
  2. Fire Performance: All concealed work in this section shall be UL labeled fire-retardant treated. Exposed woodwork shall have a flame spread of less than 200 when tested in compliance with ASTM E 84.

- C. Mockups required for each type of construction.

## PART 2 PRODUCTS

### 2.01 INTERIOR STANDING AND RUNNING TRIM

- A. Quality Standard: Provide AWI Premium Grade materials and workmanship.
- B. Wood Species and Cuts: Provide as follows:
  - 1. Paint Finished Work: FSC Certified Poplar.

### 2.02 SOLID SURFACING MATERIAL

- A. Basis-Of-Design: Provide Staron Sheet and Staron Sinks and Bowls, as manufactured by Samsung Chemical USA, Inc.; or one of the following solid surfacing materials, or Architect approved equal, in color selected by Architect:
  - 1. Staron Sheet; Samsung Chemical USA, Inc.
  - 2. Corian by DuPont.
  - 3. Fountainhead; Nevamar Corporation; Odenton, MD 21113.
- B. Scope: Solid surfacing work includes, but is not limited to:
  - 1. Countertops.
  - 2. Vanities.
- C. Provide solid surfacing material in sizes, profiles, and configurations indicated on Drawings. Color shall be standard color selected by Architect. Thickness shall be as indicated on Drawings.
- D. Vanities shall include undermounted stainless steel sinks

END OF SECTION



SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide architectural woodwork as shown on Drawings and specified herein. Work of this Section includes, without limitation, the following:

1. Custom plastic laminate casework and sills.
2. Custom plastic laminate paneling.
3. Custom plastic laminate benches.
4. Upholstered cushions for benches.
5. Wood handrails.

1.02 REFERENCES

- A. Comply with applicable requirements of following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American National Standards Institute (ANSI):

A161.2	Performance Standards for Fabricated High Pressure Decorative Laminate Countertops
A208.1	Particleboard, Mat-Formed Wood
2. American Society for Testing and Materials (ASTM):

E 84	Surface Burning Characteristics of Building Materials
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3. The Architectural Woodwork Institute (AWI):

Quality Standards	Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program
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1.03. QUALITY ASSURANCE

- a. Mockups for each form of construction.

PART 2 PRODUCTS

2.01 PLASTIC LAMINATE CASEWORK

- A. Basis-Of-Design: Plastic laminate types, colors and textures are based on those manufactured by Aborite. Provide these products, or equal from one of the following, or equal:

1. Aborite.
2. Formica.

3. Nevamar.
  4. Wilsonart.
- B. Scope: Custom plastic laminate casework includes, but is not limited to, the following:
1. Cabinets.
  2. Cubbies.
  3. Display cases.
  4. Benches and seats.
  5. Wall paneling.
  6. Miscellaneous plastic laminate casework.
- B. Quality Standard: Provide AWI Premium Grade materials and workmanship. Provide exposed facing materials as follows:
1. Provide vertical grade high pressure plastic laminate for both sides of swinging and sliding doors, drawer fronts, and all exposed cabinet ends.
  2. Color/Texture/Pattern: Provide laminates in colors, textures and patterns selected by Architect. Up to 4 different colors of woodgrain Plastic Laminate may be selected.
- C. Preparation for Related Work: Prepare casework for all related electrical, telephone, mechanical, and plumbing work.
- D. Medium-Density Fiberboard (MDF) Cores for Laminated Products: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde. Provide Sierra Pine's "Medex," "Medex NC," and "Medite II" or Weyerhaeuser's "Premier Plus" fiberboard, or equal.
1. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- E. Cabinets and Casework: Provide casework matching elevations and details indicated. Provide cabinets having the following features and characteristics:
1. Construction/Style: Provide overlay construction with flush doors and drawer fronts, unless otherwise detailed. Provide cabinets with sliding/swinging doors, with interior cabinet surfaces to be melamine. Cabinets without doors shall have interior surfaces of plastic laminate. Provide solid Maple hardwood noses, or vinyl edges as detailed.
  2. Typical Doors: Provide minimum 3/4 in. MDF with both faces plastic laminate adhered to core. Provide plastic laminate on all edges as detailed.
  3. Lumber Core Doors: At locations indicated, provide minimum 3/4 in. lumber-core doors with both faces plastic laminate adhered to core. Provide plastic laminate on all edges as detailed.
  4. Drawers: Provide cabinet drawers with applied drawer fronts.
  5. Shelves: Provide minimum 3/4 in. MDF with laminate both sides, top and bottom; and edges finished with vinyl nosing or solid Maple nosing as indicated. All shelves shall be adjustable as detailed and shall meet AWI standards for deflection.
- F. Plastic Laminate Casework Hardware: Provide the following or Architect approved equal:
1. Hinges: Provide heavy-duty overlay hinges. Provide at least two hinges per door leaf.
  2. Drawer and Door Pulls: Integral or continuous pulls as detailed.
  3. Drawer Slides: 75 lb. Accuride C3800, or equal manufactured by Blum or Hafele.
  4. Door Silencers: Glynn Johnson GJ-65, or equal manufactured by Blum or Hafele.

- Provide resilient pads to silence door and drawer closing.
5. Plastic Tracks and Guides for Sliding Doors: Basis-Of-Design shall be Knappe & Vogt #P2417; color as selected by Architect, or equal from Hafele or Rakks.
  6. Pegs for Adjustable Shelving: Basis-Of-Design shall be Knappe & Vogt #331; color as selected by Architect, or equal from Hafele or Rakks.
  7. Storage Cabinet Lock: Basis-Of-Design shall be Shlage Cabinet Door Lock #CL100PB, bright brass 605 finish; or equal from Best or Russwin.
  8. Cubby Hook: Basis-Of-Design shall be Hewi Series 477 Triple Hook; or equal from Hafele or Bobrick.
  9. Aluminum Grille: Provide 1/8 in. perforated aluminum, finished to match Satin Bronze. Peroration pattern shall be as selected by Architect.
  10. Coat Rod: Basis-Of-Design shall be Knappe & Vogt #660; with #734 and #735 tubing flange, or equal from Hafele or Rakks.
- G. Upholstered Cushions: Provide upholstered cushions whose fire performance characteristics comply with Business and Institutional Furniture Manufacturer's Association Standard F-1. Provide padding covered by fabric sewed into boxed construction without welts and attached by slipping over foam cushion with zippers on least visible edge. Accurately match fabric pattern at seams. Provide double sewn seams with interlocking stitches and overlapped fabric.
1. Foam Cushions: Provide Dynamic Systems, Inc. as manufactured by Sunmate ([www.sunmatecushions.com/sunmate.php](http://www.sunmatecushions.com/sunmate.php)). Provide medium pressure quality.
  2. Upholstery Fabric for Seat and Seat Backs: Knoll Textiles fabric "Field Day" (K124); or equal by Maharam or Guilford.

## 2.02 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated, FSC Certified softwood lumber, kiln dried to less than 15 percent moisture content.
- B. Exposed Hardwood for Wood Handrails, and Elsewhere as Indicated: AWI Premium Grade, FSC Certified, White Maple, Quarter sawn.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- D. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
  1. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant applications.
- E. Plastic Glazing: Furnished under section 088000, GLAZING.

## 2.03 SHOP FINISHING

- A. Grade: Provide finishes of same grades as items to be finished.
- B. General: Finish exposed wood components of architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, toning, cleaning, and polishing until after installation.

- C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing exposed wood components of architectural woodwork, as applicable to each unit of work.
- D. Transparent Finish:
  - 1. Grade: Premium.
  - 2. AWI Finish System: TR5-Catalyzed Vinyl.
  - 3. Staining: Match approved sample for color.
  - 4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.
  - 5. Toner: Provide applications of toner as required or as field directed by Architect in order to ensure that finished Architectural Woodwork and wood doors matches in colors and tones.
  - 6. Colors: Match Architect's samples.
  - 7. Preparation for Finishing: Comply with AWI Quality Standards for sanding, filling, countersinking, sealing of concealed surfaces, and similar preparation requirements for finishing of work of this Section.

END OF SECTION

**SECTION 071613 – BITUMINOUS DAMPPROOFING**

1. Description of Work: Provide below-grade bituminous dampproofing at foundation walls.
2. Dampproofing Product: Asphalt-based emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.
  - a. Spray Grade: Emulsified asphalt, prepared with mineral-colloid emulsifying agents without fibrous reinforcement, complying with ASTM D 1227, Type III.
3. Protection Course: ASTM D 6506, 1/8-inch- (3-mm-) thick, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

-END OF SECTION-



SECTION 072100  
THERMAL INSULATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide building insulation work as indicated on Drawings, and as specified, including but not limited to:
1. Rigid extruded polystyrene foundation insulation.
  2. Stone wool exterior wall insulation
  3. Underslab insulation.
  4. Installation of Sound-Absorbing Insulation at Acoustical Metal Deck.

PART 2 PRODUCTS

2.01 RIGID EXTRUDED POLYSTYRENE INSULATION

- A. Extruded-Polystyrene Board Foundation Wall and Underslab Insulation: Provide extruded polystyrene insulation conforming to ASTM C 578, minimum 25 lbs. per sq. in. compressive strength at 0.1 in. deformation, 2.0 lbs. per cu. ft. density "K" factor of 0.185 at 40°F. and 0.20 at 75°F. per in. thickness, water vapor transmission of 1.0 perm, and water absorption by volume of 0.1%.
1. Provide one of the following products, or equal:
    - a. DiversiFoam Products.
    - b. Dow Chemical Company.
    - c. Owens Corning.
    - d. Pactiv Building Products Division.
  2. R-Values: Provide the following minimum R-Values:
    - a. Underslabs on Grade: Minimum R=10.
    - b. Foundation Walls: Minimum R=10.

2.02 STONE WOOL EXTERIOR WALL INSULATION

- A. Provide non-combustible, lightweight and water repellent, semi-rigid insulation board, for use in cavity wall applications. Stone wool insulation shall be in compliance with FM Global Data Sheet 1-12. Provide one of the following, or equal:
1. CavityRock® DD; as manufactured by Roxul, Inc.
  2. Rainbarrier 45; as manufactured by Thermafiber
  3. Owens-Corning equal.
- B. Mechanically Adhesively Attached, Spindle-Type Anchors (Stick-Pins): Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated.
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square. Plate shall have 2 screws each.
  2. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
  3. Mastic adhesive shall have a VOC content not more than 80 g/L.

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END OF SECTION



## SECTION 072720

### AIR AND VAPOR BARRIERS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. Work Included: Provide continuous air and vapor barrier system at exterior wall assemblies as indicated on the Drawings, including connections with adjacent materials and air barrier at roof.

The air and vapor barrier membrane shall be located, constructed and flashed to perform as an air and water barrier to discharge to the outside any incidental condensation or water penetration. The air and vapor barrier membrane shall accommodate movements of building materials by providing expansion and control joints, with appropriate air and vapor seal materials at such locations, changes in substrate and perimeter conditions.

#### PART 2 PRODUCTS

##### 2.01 FLUID-APPLIED MEMBRANE AIR AND VAPOR BARRIER MATERIALS

- A. Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.
1. Products: Subject to compliance with requirements, provide one of the following, or equal:
    - a. Elastomeric, Modified Bituminous Membrane:
      - 1) Henry Company; Air-Bloc 06 WB.
      - 2) Meadows, W. R., Inc.; Air-Shield LM.
      - 3) Tremco Incorporated, an RPM company; ExoAir 120SP/R.
    - b. Synthetic Polymer Membrane:
      - 1) Grace, W. R., & Co. - Conn.; Perm-A-Barrier Liquid.
      - 2) Henry Company; Air-Bloc 32.
  2. Physical and Performance Properties:
    - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
    - b. Vapor Permeance: Maximum 0.1 perm (5.8 ng/Pa x s x sq. m); ASTM E 96/E 96M.
    - c. Ultimate Elongation: Minimum [500] <Insert number> percent; ASTM D 412, Die C.

##### 2.02 AUXILIARY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.

- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Counterflashing Strip: Modified bituminous, 40-mil- (1.0-mm-) thick, self-adhering sheet consisting of 32 mils (0.8 mm) of rubberized asphalt laminated to an 8-mil- (0.2-mm-) thick, cross-laminated polyethylene film with release liner backing.
- D. Butyl Strip To Terminate Air Barrier to EPDM or TPO Roofing Membranes: Vapor retarding, 30 to 40 mils (0.76 to 1.0 mm) thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- E. Modified Bituminous Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.
- F. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.
- G. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0250 inch (0.64 mm) thick, and Series 300 stainless-steel fasteners.
- J. Sprayed Polyurethane Foam Sealant To Fill Gaps at Penetrations and Openings: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- K. Modified Bituminous Transition Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.
- L. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil- (1.3- to 1.6-mm-) thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.
- M. Preformed Seal for Openings in Wall: Manufacturer's standard system consisting of cured low-modulus silicone or fiberglass, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding to substrates.
  - 1. Products: Subject to compliance with requirements, provide one of the following, or equal:
    - 1. Dow Corning Corporation; 123 Silicone Seal.
    - 2. Momentive Performance Materials Inc.; US11000 UltraSpan.
    - 3. Pecora Corporation; Sil-Span.
    - 4. Tremco Incorporated, an RPM company; Spectrem Simple Seal or Proglaze.
- N. Joint Sealant: ASTM C920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O.

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END OF SECTION



## **SECTION 074233 – Phenolic Wall Panels**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

A. Exterior solid phenolic cladding panel system and accessories as required for a complete drained and back-ventilated rainscreen system.

1. Wall panels.
2. Horizontal soffits.

B. National Fire Protection Association (NFPA):

1. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
2. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

#### 1.2 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary panel products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.

B.

C. Mock-Up: Provide a mock-up for evaluation of the product and application workmanship.

1. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

#### 1.3 WARRANTY

A. Warranty: At project closeout, provide manufacturer's limited ten year

warranty covering defects in materials.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Basis of Design: Trespa International B.V.; P.O. Box 110, 6000 AC Weert  
Wetering 20, 6002 SM Weert The Netherlands; [www.trespa.com](http://www.trespa.com).

### 2.2 WALL PANELS

A. Solid Phenolic Wall Panels: Trespa Meteon by Trespa International.

1. Material: Solid panel manufactured using a combination of high pressure and temperature to create a flat panel created from thermosetting resins, homogenously reinforced with wood-based fibers and an integrated decorative surface or printed décor.
2. Color: As selected by the Architect from manufacturer's standard color palette.
3. Finish: Satin sheen.
4. Panel Core: Fire retardant (FR) black core.
5. Panel Thickness: 3/8 inch (10 mm).
6. Fire Performance:
  - a. Flame Spread: Class A, ASTM E 84.
  - b. Smoke Development: Less than 450, ASTM E 84.
7. Finish Performance: in conformance with the following general requirements:
  - a. Weather Exposure: Accelerated - 3000 hours in Atlas Type Weatherometer using cycle of 90 minutes light and 30 minutes diminished light and demineralized water with a maximum color change of 5 Delta E units from the original color according to ASTM D-2244,
  - b. Color Stability: The decorative surface comply with, classification, 4 - 5 measured with the grey scale according to ISO 105 A02-93 according to test method EN 438-2:29.
  - c. Microbial Characteristics: Will not support micro-organic growth (ISO 846).

B. Mounting System:

1. TS220 - Concealed fastening over variable depth aluminum sub-framing.

C. Aluminum Sub Structure: Aluminum sub-structure designed to withstand structural loading due to wind load and the dead load of the panel, painted as required to conceal behind the open joinery of the attachment system.

1. Extrusions, including corner closures, joint closures and vent screens, formed members, sheet, and plate shall conform with the recommendations of the manufacturer.

-END OF SECTION-





## **SECTION 075300 – SINGLE PLY MEMBRANE ROOFING**

1. Work Included: The scope of work includes:
  - a. Fully-adhered single ply, reinforced thermoply roofing membrane.
  - b. Roof flashings.
  - c. Roof insulation at membrane roofing.
  - d. Zinc-coated copper flashing.
  - e. Roof pavers.
  
2. Manufacturers: Provide Thermoplastic PVC Sheet, uniform, flexible sheet formed from thermoplastic PVC, and as manufactured by one of the following:
  - a. Sarnafil.
  - b. Carlisle SynTec, Inc.
  - c. Johns Manville
  
3. Roof System: Provide Sarnafil G410 membrane as manufactured by Sarnafil, 60-mil thick reinforced.
  - a. Provide thermoply roofing system consisting of adhered single-ply PVC sheet and mechanically-attached insulation over roof deck. Provide system conforming to UL Class A and Factory Mutual Class 1. Roof system shall conform to Factory Mutual Windstorm Resistance Classification I-90.
  
  - b. Membrane Color: Provide white membrane color.
  
4. Isocyanurate Board Roof Insulation: Provide indicated thickness of flat and tapered rigid isocyanurate foam roof insulation consisting of isocyanurate integrally laminated on top and bottom with non-reflective facer. Provide insulation conforming to Fed. Spec. HH-I-1972, and that is acceptable to roofing system manufacturer.
  - a. Rigid isocyanurate shall have minimum density of 2 lb. cu. ft., minimum compressive strength (ASTM D 1621) of 25 psi, maximum moisture vapor transmission (ASTM E 96) of 2.0 perm, "C" factor of 0.16 (1 in.) or better, and "R" value of 6.67 (1 in.).
  
  - b. Insulation shall be approved by Factory Mutual (FM) for Class 1 Insulated Steel Deck Construction and shall be UL listed Class A.
  
5. Underlayment Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **5/8 in.**
  - a. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-Pacific Corporation, or designer approved equal.
  
6. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **1/2 in. thick.**
  - a. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-

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Pacific Corporation, or designer approved equal.

7. Roof Vapor Retarder: Provide Griffolyn TX-1200 FR, manufactured by Reef Industries, Inc., Houston, TX 77275, or Designer approved equal.
  - a. Weight: 43 lb. per 1,000 sq. ft.; per ASTM D 2776.
  - b. Permeance: 0.035 grains; per ASTM E 96.
  - c. Tensile Strength: 100 lb./4,504 PSI; per ASTM D 882.
  - d. Puncture Strength: 36 lb.; per ASTM D 4833.
8. Membrane Flashing: Provide manufacturer's standard PVC membrane flashing material, compatible with roofing sheets.
9. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway **pads or rolls**, approximately 3/16 in. thick, and acceptable to membrane roofing system manufacturer.

-END OF SECTION-



## **SECTION 076200 - SHEET METAL FLASHING AND TRIM**

1. Work Included: The scope of work includes:
  - a. Roof and Wall flashings.
2. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - a. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.
    - 1) Color: Provide standard color, selected by Architect.
3. Formed Roof Edge Units: Provide prefabricated metal roof edge units consisting of formed hot-dip galvanized sheet steel cleats and 0.063 in. thick aluminum cap equal to "Permasnap Gravel Stops", manufactured by W.P. Hickman Co.; "Snap-Lok Gravel Stops", manufactured by MM Systems Corp.; or "AP Snap-Tight Gravel Stops", manufactured by Architectural Products Company.
4. Elastomeric Flashing: Elastomeric sheet flashing/membrane shall be polyethylene reinforced sheet flashing 60 mil thick rubberized asphalt sheet, equal to Perm-A-Barrier Wall Flashing, manufactured by W. R. Grace & Company, or approved equal.
  - a. Material shall be 40 mil thick consisting of 8 mil thick high-strength cross-laminated polyethylene integrally bonded to 32 mil thick layer of rubberized asphalt.
5. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
6. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.
7. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."
8. Paper Slip Sheet: 5-lb/square red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.
9. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

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10. Fabrication, General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

-END OF SECTION-

## **SECTION 078410 - THROUGH PENETRATION FIRESTOP SYSTEMS**

1. Work Included: Provide firestop systems consisting of a material, or combination of materials, installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, or gases through penetrations in fire-rated barriers. Firestops shall be used in locations including, but not limited to, the following:
  - a. Penetrations for the passage of duct, cable, cable trays, conduit, piping, electrical busways, and electrical raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor slabs and floor/ceiling assemblies), and vertical service shafts.
  - b. Openings between structurally separate sections of walls or floors.
  - c. Above walls or partitions extending to underside of ceiling or roof assemblies above.
  - d. Concealed furring spaces behind finishes.
  - e. Where pipes, conduits, ducts, and other items pass through fire-rated assemblies.
  - f. Openings for items mounted on or within fire-rated assemblies.
2. UL Listed Designs: Firestopping materials and systems shall be installed in each location and type of installation conforming to listed UL designs.
  - a. Firestopping materials shall be UL Classified as "Fill, Void, or Cavity Material" for use in through-penetration firestop systems.
  - b. Provide firestop systems that are UL listed with a fire-resistance rating equal to the hourly resistance rating of the fire-rated barrier being penetrated.
3. Fire-Resistance: Provide materials and construction identical to fire-rated assemblies tested in compliance with ASTM E 119, ASTM E 814, UL 263, or NFPA 251, by independent agencies acceptable to Designer and governing authorities.
4. Burning Characteristics: Provide products with maximum ASTM E 84 surface burning characteristics of flame spread 25 and smoke developed 25.
5. Firestop systems shall have been tested in accordance with ASTM E 814 or UL 1479 under a minimum positive pressure of 0.01 in. of water.

-END OF SECTION-





## **SECTION 079200 - JOINT SEALANTS**

1. Description of Work: Work includes the following:
  - a. Joint sealing of joints in exterior construction.
  - b. Joint sealing of interior joints.
  
2. Self-Leveling Joint Sealants: Provide two or more part, self-leveling, polyurethane based elastomeric sealant, complying with ASTM C 920, FS TT-S-00227E Type 1 Class A, having Shore A hardness of not less than 30 when tested according to ASTM C 920, cured modulus of elasticity at 100% elongation of not more than 150 psi when tested according to ASTM D 412, and tear resistance of not less than 50 lbs./inch when tested according to ASTM D 624.
  - a. Provide one of the following products that meet or exceed specified requirements:
    - 1) Pecora Urexpan NR-200.
    - 2) Mameco Vulkem 245 or 255.
    - 3) Sika 2C, SL.
    - 4) Sonneborn Sonolastic PvJtSt.
    - 5) Tremco THC 900.
  - b. Extent: Provide self-leveling polyurethane sealant for paving and floor joints not indicated to be sealed with another type of sealant.
  
3. Non-Sag Joint Sealants: Provide multi-part, non-sag, polyurethane based elastomeric sealant, complying with ASTM C 920 Type M, Grade NS, Class 25, Fed. Spec. TT-S-00227E Class A, having Shore A hardness of 20 to 30, cured modulus of elasticity at 100% elongation of not more than 75 psi, and tear resistance of not less than 50 lbs./inch when tested according to ASTM D 624.
  - a. Provide one of the following products that meet or exceed specified requirements:
    - 1) Mameco International Vulkem 227
    - 2) Sika Sikaflex 2c NS.
    - 3) Sonneborn Sonolastic NP 2.
    - 4) Tremco Dymeric
  - b. Extent: Provide non-sag polyurethane sealant for all metal to metal joints, metal to concrete joints, metal to metal window joints, wood to metal joints, wood to wood joints, and other joints not indicated to be sealed with another type of sealant.
  
4. Silicone Rubber Sealants: Provide one part, silicone rubber based elastomeric sealant, complying with ASTM C 920 Type S, Class 25, Grade NS and Fed. Spec. TT-S-001543A Class A.
  - a. Provide one of the following products or approved equal:
    - 1) Dow 786.
    - 2) General Electric 1702 Sanitary.
    - 3) Pecora 863.
    - 4) Rhodorsil 6b White.
    - 5) Sonneborn OmniPlus.
    - 6) Tremco Proglaze.

- b. Extent: Provide silicone rubber sealant for interior joints around plumbing fixtures and tile to tile joints in ceramic tile work.
5. Acrylic Latex Sealants: Provide permanently flexible, latex rubber modified acrylic emulsion sealant, complying with ASTM C 834.
- a. Provide one of following products or approved equal:
    - 1) Pecora AC-20
    - 2) Tremco Acrylic Latex 834
    - 3) Sonneborn Sonolac
  - b. Extent: Provide acrylic latex sealant for use at mirrors, for exposed acoustical sealant, and for interior joints except where silicone rubber sealant is indicated.
6. Miscellaneous Sealant Materials: Provide as follows:
- a. Primer: Provide primer recommended by sealant manufacturer for surfaces to be adhered to.
  - b. Bond Breaker Tape: Provide polyethylene or other plastic tape recommended by sealant manufacturer to prevent three-sided adhesion.
  - c. Sealant Back-Up Rod: Closed-cell, non-gassing, polyethylene rod "Ethafom" by Dow Chemical Co. or approved equal. The diameter of the rod shall be approximately 25 percent in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.
  - d. Foamed-In-Place Sealant: Provide two-component polyurethane foam, UL Fire Hazard Classification Class I, consisting of polymeric isocyanurate and polyether polyol components, pressurized with nitrogen, and dispensed from portable, self-contained insulation frothing kit, equal to "Froth-Pak" by Insta-Foam, or equal as approved by Designer.

-END OF SECTION-

## **SECTION 081100 - STEEL DOORS AND FRAMES**

1. Work Included: Provide steel doors and frames and related items as indicated on Drawings and as specified herein. Include, but do not limit to, the following:
  - a. Interior and exterior flush doors.
  - b. Interior and exterior steel frames.
  - c. Door louvers.
2. Fire Doors and Frames: For doors and frames installed in fire-rated assemblies and where indicated or required by authorities having jurisdiction, provide door and frame assemblies that comply with NFPA 80, and which have been tested, listed and labeled in compliance with ASTM E 152 by an independent agency acceptable to authorities having jurisdiction.
  - a. Temperature Rise Rating: Labeled fire doors within an interior exitway stairway shall have a label indicating a maximum transmitted temperature end point of not more than 450°F. above ambient at the end of 30 minutes of standard fire test exposure.
3. Hot Rolled Steel: ASTM A 568 and ASTM A 569, commercial quality, pickled and oiled.
4. Cold Rolled Steel: ASTM A 366 and ASTM 568, commercial quality carbon steel.
5. Galvanized Sheet Steel: Roller leveled commercial quality zinc coated carbon steel sheets complying with ASTM A 525, G60, mill phosphatized.
6. Exterior Work: Fabricate exterior doors and frames from galvanized sheet steel with closed tops and bottoms.
7. Faces: Fabricate exposed faces from stretcher leveled cold rolled steel.
8. Interior Doors (Non-Rated): SDI-100, Grade II, Heavy Duty, 16 gage minimum face sheets, Model 3 or 4, seamless construction.
9. Interior Doors (Fire-Rated): SDI-100, Grade II, Heavy Duty, 16 gage minimum face sheets, Model 4, with seamless mineral fiberboard composite construction.
10. Exterior Doors: SDI-100, Grade III, Extra Heavy Duty, 14 gage minimum face sheets, seamless, Model 4, maximum U-factor of 0.24 BTU/HR/FT<sup>2</sup>/°F, ASTM C 236. Frames shall be demountable at service entries.

-END OF SECTION-



## **SECTION 081416 - WOOD DOORS**

1. Work Included: The work of this section includes, but is not limited to, the following:
  - a. Flush Wood Doors: Solid core flush wood doors with veneer faces.
  - b. Stile and Rail Wood Doors: Solid stile and rail wood doors wood panels.
  - c. Prefitting and premachining of wood doors.
2. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
3. Solid Core Wood Doors, General: AWI PC-5 construction as specified in AWI Quality Standards Section 1300-G-3. Core, stiles, and rails shall be glued together before sanding. Wood for stiles and rails shall be thoroughly seasoned, kiln-dried stock with 5% to 8% moisture content. Exposed wood door edges of stiles and rails for doors to receive transparent finish shall be same species and cut of wood to match face veneers.
  - a. Core for non-fire-rated doors shall be lumber staves, edge-glued, kiln-dried softwood lumber of single species, with horizontal joints staggered in contiguous rows.
  - b. Core for fire-rated doors shall be manufacturer's standard mineral core conforming to ANSI A208.1, Algoma Weldrok core, or approved equal.
  - c. Crossbands shall be 1/16 in. thick hardwood, full width of door, with grain at right angle to face veneer grain.
  - d. Veneers for transparent finishes shall be Premium Grade Select Quarter-Sawn FSC-Certified White Maple, at least 1/50 in. thick, adhered to 1/16 in. hardwood crossband, core, rails, and stiles by hot press method. Provide veneers book matched, balance matched, and pair matched.
4. Mineral Core Flush Wood Fire-Rated Doors: Flush wood-faced mineral core doors, 1-3/4 in. thick, five-ply, with crossbanding and face veneers bonded to both faces, of fire-rated construction, equal to Superstile Edge Architectural Wood Composite Fire Door manufactured by Algoma Hardwoods, Inc. or approved equal doors by above listed manufacturers. Provide blocking for hardware so that screws fasten into hardwood for entire length. Furnish UL Label of indicated Class and Hour rating affixed to hinge jamb of each door.
5. Solid Core Flush Interior Wood Doors: Flush type, Algoma Grade Novodor of five-ply construction with crossband and veneers bonded to both faces. Doors shall be 1-3/4 in. thick.
6. Solid Stile and Rail Interior Wood Doors: Interior doors complying with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors," fabricated from FSC-Certified White Maple.
7. Factory Finishing of Wood Doors: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - a. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
  - b. Finish doors at factory.
  - c. Transparent Finish:

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- 1) Grade: Premium.
- 2) Finish: AWI catalyzed polyurethane system.
- 3) Staining: As required to match Architectural Woodwork.
- 4) Effect: Filled finish.
- 5) Sheen: Satin.

-END OF SECTION-

**SECTION 083113 - ACCESS DOORS AND FRAMES**

1. Description of Work: Furnish access doors and access panels for installation under work of other Sections as indicated on Drawings and as specified.
2. Access Doors and Panels: Furnish metal access doors and panels for access to valves, damper controls, pipes, conduits, switches, regulators, etc., to the proper trades for building into the work, except that any access panels specifically specified under the Mechanical or Electrical Sections of the Specifications to be furnished by those trades are excluded from the work of this Section.
3. Furnish flush-type access doors, 18 ga. minimum thickness specially designed for each type of wall and ceiling finish and construction with which used, with factory-applied prime finish, as manufactured by Karp Associates, Inc., Birmingham Ornamental Iron Co., Miami-Carey, Babcock-Davis, or equal approved by Architect. Refer to Architectural, Mechanical, and Electrical Drawings for locations, sizes, and materials with which used.
  - a. Where installed at fire-rated walls or ceilings access panels shall be of fire-resistive construction and shall bear the U.L. 2-hr. label.
  - b. Where installed in surfaces finished with ceramic tile, access panels shall be stainless steel with No. 4 finish.
  - c. Where installed in drywall construction, access panel frames shall be flush edge-frame type, designed for drywall insert.
  - d. Access panels shall have concealed hinges.

-END OF SECTION-





## **SECTION 083340 - OVERHEAD COILING GRILLES**

1. Work Included: Work of this Section consists of furnishing all labor, materials, equipment, and services necessary to complete the work indicated, and without limiting the generality thereof includes:
  - a. Electrically operated overhead coiling grilles.
  - b. Hand operated horizontal "curtain type" grilles
2. Overhead coiling grilles shall be linked-rod type, up-rolling, manufactured by Atlas Door Corp., Edison, NJ 08818, equivalent products of Kinnear Walter Balfour and Co., Inc., Cookson Co., or Cornell Iron Works, Inc., or approved equal.
3. Grille Curtain: Grille curtains shall be straight-linked rectangular design, constructed of horizontal aluminum rods not less than 5/16 in. diameter, continuous from jamb to jamb and spaced not more than 2 in. on center. Rods shall be held in position by aluminum links in rectangular grid pattern, spaced not more than 9 in. on center. The ends of each horizontal rod shall be secured to an end link to lock the curtain in the guides. Bottom of curtain shall be equipped with aluminum angle or tube rail.
4. Guides: Guides shall be formed of aluminum and shall be provided with wood or vinyl pipe stripping on both sides to reduce noise and friction.
5. Electrical Operation: Equip coiling grilles with manufacturer's standard electrical operator specially designed for size, type, and operation of coiling grille, operating from 208 V, 3 phase, 60 HZ power sources as indicated on Drawings. Locate operator to clear obstructions. Operator shall be UL listed. Equip each operator with remote control switch to be installed and connected under Division 26, ELECTRICAL at locations indicated on Drawings. Provide key operated controls for each grille. Keying shall be as directed by Owner.

END OF SECTION



## **SECTION 084113 - ALUMINUM ENTRANCES AND STOREFRONTS**

1. Work Included: Provide aluminum entrances and storefront work as indicated on the Drawings and as specified herein, including, but not limited to the following:
  - a. Storefront framing systems.
  - b. Entrance and vestibule doors.
2. Manufacturers: Provide storefronts and entrance systems of one of the following manufacturers that meet or exceed requirements of these specifications:
  - a. EFCO
  - b. Kawneer Company, Inc.
  - c. Tubelite Div., Indal Inc.
  - d. United States Aluminum Corp.
3. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125 in. thick extrusions for door stiles and storefront framing. Provide 0.050 in. thick aluminum for glazing moldings.
4. Storefront Type: Storefront framing shall be Tri-Fab Series 451T, manufactured by Kawneer, or equal by Tubelite Div., Indal Inc.; EFCO; or approved equal.
  - a. Thermal-Break Construction: Fabricate aluminum storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in manner which eliminates direct metal-to-metal contact. Provide manufacturer's standard construction which has been in use for similar projects for at least three years.
  - b. Framing shall be field glazed with 1 in. float glass or tempered glass (where required by law). Glass and glazing is specified as work of Section 088000, GLAZING.
5. Entrance and Vestibule Doors: Aluminum doors shall be TuffLine Series 350 Medium Stile factory-glazed aluminum doors, manufactured by Kawneer Company, Inc., or approved equal.
  - a. Aluminum doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.1875 in. thick for door stiles and 0.050 in. thick for glazing molding.
  - b. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.
  - c. Corners shall be Dual-Moment welded.
  - d. Each door shall be factory glazed with 1/4 in. thick, clear tempered glass at interior vestibule doors, and 1 in. thick insulating glass at exterior doors set in neoprene glazing gasket. Glass shall conform to requirements of Section 088000, GLAZING.

6. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.
  - a. Color: Provide standard color, selected by Architect.

-END OF SECTION-

## **SECTION 085113 - ALUMINUM WINDOWS**

1. Description of Work: Furnish and install aluminum window systems, as indicated on Drawings and as specified herein. Types of aluminum windows include, but are not limited to:
  - a. Fixed windows.
  - b. Operable awning units.
  - c. Operable awning units.
2. Acceptable Manufacturers: Provide windows of one of the following manufacturers that meet or exceed specified requirements:
  - a. Oldcastle Building Envelope;
  - b. EFCO
  - c. Kawneer.
3. General: Provide High Performance, Heavy Commercial (HC) windows complying with all specified performance requirements.
4. Types: Provide the types as indicated on the Drawings.
5. Aluminum Extrusions: Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application indicated, but not less than 22,000,000 psi ultimate strength and not less than 0.125 in. thickness at any locations.
6. Fasteners: Comply with referenced standards. Provide non-magnetic stainless steel fasteners. Provide concealed fasteners to the greatest extent possible. Provide Phillips flathead screws for exposed fasteners.
7. Weatherstripping: For awning windows, provide manufacturer's standard compressible stripping of molded EPDM or neoprene.
8. Screens: Provide manufacturer's standard 18 x 16 stainless steel wire, 0.009 in. diameter mesh.
9. Low 'E' Coated Insulated Glass: Provide high-performance, clear, metallic coating, "Solarscreen VE1-2M" as manufactured by Viracon, or approved equal. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1 in. insulating units, exterior lite 1/4 in. clear, interior lite 1/4 in. clear:
  - a. Visible Light Transmittance: 70%.
  - b. Shading Coefficient: 0.44.
  - c. Center of Glass U-Factor: 0.29 (winter); 0.26 (summer).

10. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.
  - a. Color: Provide standard color, selected by Architect.

END OF SECTION

## **SECTION 086200 - METAL FRAMED SKYLIGHTS**

1. Work Included: Provide glazed aluminum-framed skylight work as indicated on Drawings and as specified. Include, but do not limit to:
  - a. Design and engineering of complete skylight systems.
  - b. Factory finishing of exposed aluminum members.
  - c. Flashing and counterflashing of skylight system.
  - d. Components and accessories required to complete framing for the skylight system.
  
2. Acceptable Manufacturers: Provide products of one of the following manufacturers that meet or exceed specified requirements:
  - a. Bohem Skylights, Inc.
  - b. EPI Architectural Systems, Inc.
  - c. Fisher Skylights, Inc.
  - d. Super Sky Products, Inc.
  - e. Wasco Products, Inc.
  
3. Skylight framing sections shall be extruded aluminum conforming to ASTM B 221, 6063-T5 alloy and temper. Brake-metal work shall be sheet aluminum. Alloys and tempers of aluminum shall be as recommended by manufacturer for strength, corrosion resistance, and specified finish, but of not less than 27,000 psi ultimate tensile strength and not less than 0.109 in. (framing members) and 0.094 in. (interior and exterior caps) thickness at any location for extrusions and not less than 0.062 in. thick for sheet metal.
  
4. Glazing Gaskets: Shall be extruded neoprene glazing with Shore A Hardness of 45 to 55 durometer.
  
5. Clear Tempered Glass: ASTM C1048, Condition A-Uncoated, Type I-Transparent, Flat, Class 1-Clear, Quality q3, Kind FT.
  
6. Sloped Insulating Glass: Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 774, and as follows:
  - a. Sealing System: Dual Seal.
  - b. Primary Sealant: Polyisobutylene.
  - c. Secondary Sealant: Silicone, General Electric ISG 3204 or ISG 3100, Rhodorsil Rhodotherm 542 Or 543, or Dow Corning 982.
  - d. Spacer: Clear finish aluminum with welded, soldered, or bent corners.
  - e. Dessicant: Molecular sieve, or silica gel, or blend of both.
  - f. Air Space: 1/2 in.
  - g. Outer Pane: Clear Tempered Glass, with Low 'E' coating on #2 surface.
  - h. Inner Pane: Translucent Laminated Safety Glass.

7. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.
  - a. Color: Provide standard color, selected by Architect.

END OF SECTION



## **SECTION 087100 - HARDWARE**

1. Work Included: Provide Finish Hardware to provide correct functions for intended use. Provide related items and services as indicated on the Drawings and as specified. Furnish hardware schedules and templates as required for fabrication of doors and frames under other Sections. Provide hardware that complies with applicable codes and requirements of authorities which have jurisdiction.
2. QUALITY ASSURANCE
  - a. Hardware for Fire-Rated Openings: NFPA 80, and local requirements.
  - b. Handicapped Accessibility: ANSI A117.1, and local requirements.
  - c. Materials and Application: ANSI A156 series standards
3. PRODUCTS
  - a. Door Hardware:
    - 1) Quality Level: Commercial type.
    - 2) Locksets and Latchsets: Mortise type.
    - 3) Lock Cylinders: Interchangeable type.
    - 4) Keying: Owner's requirements keying and key control system.
    - 5) Hinges and Butts: Full-mortise type with nonremovable pins at exterior doors.
    - 6) Closers, Door Control: Barrier-free type; concealed in public areas.
    - 7) Pivots: Offset or center-hung type.
    - 8) Push/Pull Units: Through-bolted type.
    - 9) Hardware Finishes: US 32D satin stainless steel on exposed surfaces.
    - 10) Electromagnetic locks and power supply coordinated with security system.
    - 11) Exit Devices: Concealed vertical rod, typical.
  - b. Auxiliary Materials:
    - 1) Door Trim Units: Kickplates, edge trim, viewers, and related trim.
    - 2) Stops and overhead door holders.
    - 3) Door Silencers.
    - 4) Soundstripping.
    - 5) Weatherstripping and thresholds.
    - 6) Electromagnetic hold-open devices.
    - 7) Card-operated opening devices, including all entrance doors.
  - c. Power Door Operators: Door operators for power-assisted doors.
    - 1) Power Units: Two-way swing door type.
    - 2) Operator: Electromechanical operator.
    - 3) Automatic Door Control: Infrared motion detector automatic controls.
    - 4) Manual Door Control: Rail-supported switch.
    - 5) Wall push-plate switch.

END OF SECTION



## **SECTION 088000 - GLAZING**

1. Work Included: The scope of work, includes interior glass and glazing work and exterior glass at entrances and storefronts, and includes:
  - a. Interior glass for doors, sidelights, borrowed lights, etc.
  - b. Exterior glass for aluminum entrances and storefronts.
  - c. Mirrors.
  - d. Note: Glass and glazing for skylights is specified in Section 086200, METAL FRAMED SKYLIGHTS; glass and glazing for aluminum windows are specified under Section 085113, ALUMINUM WINDOWS.
2. Clear Float Glass: ASTM C 1036 ,Type I-Transparent, Flat, Class 1-Clear, Quality q3.
3. Clear Heat Strengthened Glass: ASTM C 1048, Condition A-Uncoated, Type I-Transparent, Flat, Class 1-Clear, Quality q3, Kind HS.
4. Clear Tempered Glass: ASTM C1048, Condition A-Uncoated, Type I-Transparent, Flat, Class 1-Clear, Quality q3, Kind FT.
5. Low 'E' Coated Insulated Glass: Provide high-performance, clear, metallic coating, "Solarscreen VE1-2M" as manufactured by Viracon, or approved equal. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1 in. insulating units, exterior lite 1/4 in. clear, interior lite 1/4 in. clear:
  - a. Visible Light Transmittance: 70%.
  - b. Shading Coefficient: 0.44.
  - c. Center of Glass U-Factor: 0.29 (winter); 0.26 (summer).
6. Vertical Insulating Glass: Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 774, and as follows:
  - a. Sealing System: Dual Seal.
  - b. Primary Sealant: Polyisobutylene.
  - c. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, Rhodorsil Rhodortherm 542 or 543, or Dow Corning 982.
  - d. Spacer: Clear finish aluminum with welded, soldered, or bent corners.
  - e. Desiccant: Molecular sieve, silica gel, or blend of both.
  - f. Air Space Thickness: 1/2 in.
  - g. Outer Lite: Refer to Glazing Schedule at end of this Section.
  - h. Inner Lite: Refer to Glazing Schedule at end of this Section.
7. Mirrors: 1/4 in., Quality q2, clear float glass with silver, copper, and organic coating, and as follows:
  - a. Edges: Uniformly ground and polished.
8. General Glazing Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:

- a. Dow Corning 795.
  - b. General Electric Silglaze N 2500 or Contractors SCS-1000.
  - c. Rhodorsil 3B, 5C, or 6B.
  - d. Tremco Proglaze.
9. Weather Seal Sealant: Provide non-acid curing sealant with movement range  $\pm$  50%, ASTM C 719. Provide one of the following:
- a. Dow Corning 795.
  - b. General Electric Silpruf.
  - c. Rhodorsil 3B, 5C, or 6B.
  - d. Tremco Spectrum 2.
10. Structural Sealant: Provide one of the following structural sealants recommended by manufacturer for structural glazing applications.
- a. Dow Corning 795 or 983.
  - b. General Electric Ultraglaze SSG 4000 or SSG 4200.
  - c. Tremco Proglaze II.
11. Mirror Adhesive: Palmer's Mirro-Mastic.
12. Glass Schedule: Provide following glass types.
- a. Type 1: Storefront Glazing, 1 in. thick insulating units comprised of two 1/4 in. glass lites within 1/2 in. air space, high performance low-e coating on #2 surface.
  - b. Type 2: 1/4 in. clear annealed glass.
  - c. Type 3: 1/4 in. clear tempered glass.
  - d. Type 4: 1/4 in. mirror glass.

-END OF SECTION-

**SECTION 089000 - METAL WALL LOUVERS**

1. Work Included: Furnish and install metal wall louvers, as indicated on Drawings and as specified herein.
2. Metal wall louvers shall be the products of one of the following manufacturers, or approved equal:
  - a. Construction Specialties Inc., Cranford, NJ 07016.
  - b. Airolite Company, Marietta, OH, 45750.
  - c. Industrial Louvers, Inc., Delano, MN 55328.
3. Aluminum Extrusions:
  - a. ASTM B 221, alloy 6063-T52.
  - b. Minimum Thickness: 0.081 in.
4. Fabrication: Unless otherwise indicated, exterior stormproof louvers shall be 4 in. deep, continuous blade, drainable type, with 40% minimum free air area and channel frame as indicated.
5. Construction:
  - a. Assemble louvers by heli-arc welding.
  - b. Arrange louvers in full height and width panels without exposed vertical mullions.
  - c. Heads, sills, and jambs shall be one piece structural members.
  - d. Manufacturer shall provide all necessary structural supports and bracing to carry wind load of not less than 20 psf.
6. Screens: Provide louvers with 1/2 in. mesh, 0.063 in. diameter aluminum wire intercrimp bird screens secured in removable extruded aluminum frames.
7. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.
  - a. Color: Provide standard color, selected by Architect.

-END OF SECTION-



## **SECTION 092900 - GYPSUM BOARD ASSEMBLIES**

1. Work Included: Furnish and install gypsum drywall work, as indicated on the Drawings and as specified. Include, but do not limit to:
  - a. Steel suspension systems for ceilings and soffits.
  - b. Screwable steel stud interior partition framing.
  - c. Screwable steel stud framed and furred enclosures at columns and beams.
  - d. Blockings and attachments for fixture supports.
  - e. Gypsum wallboard finishes.
  - f. Concealed acoustical sealant work, and acoustical insulation of gypsum wallboard finishes at steel stud framed partitions and furrings where indicated.
  - g. Installation of access doors.
  - h. Other gypsum drywall work called for on the Drawings or reasonably required to complete the Project intent.
  
2. Metal Ceiling Suspension System Components: Provide components that conform to ASTM C 754 for materials and sizes, unless indicated otherwise. Provide all metal runners, hangers, studs, and channels hot-dip galvanized conforming to ASTM A 525, G60, unless noted otherwise.
  - a. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, 12 gauge minimum.
  - b. Hanger Rods: Where required for loading or by local authorities, provide mild-steel rods, sized as required, hot-dip galvanized.
  - c. Flat Hangers: Where required for loading or by local authorities, provide mild-steel flat hangers, sized as required, hot-dip galvanized.
  - d. Channels: Provide cold-rolled steel channels, minimum 16 gauge with 7/16 in. wide flanges, protected with corrosion-resistant coating, and as follows:
    - 1) Carrying Channels: 1-1/2 in. deep, 475 lb. per 1,000 lin. ft., hot-dip galvanized.
    - 2) Furring Channels: 25 ga. hot-dip galvanized, screwable, pressed steel furring channels, 7/8 in. thick, hat section.
    - 3) Steel Studs for Furring Channels: ASTM C 645, minimum 25 gage, hot-dip galvanized, with flange edges bent back 90 degrees and doubled over to form minimum 3/16 in. lip, depth as indicated.
    - 4) Resilient Channels for Mounting at Emergency Generator Room Ceiling: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
      - a. Configuration: Asymmetrical.
    - 5) Clips for attachment of steel furring channels to steel carrying channels shall be proprietary clips as recommended by manufacturer.
  
3. Ceiling Suspension System: Provide a complete, mechanical suspension system conforming to ASTM C 645, consisting of cold-rolled steel channel main runners, screwable steel furring channels hangers and anchors and all required clips and other components, required for complete installation.
  
4. Steel Stud Wall Framing Systems: Unless otherwise indicated, steel stud system for walls and partitions shall be a complete proprietary framing system consisting of prefabricated, non-load bearing, screwable 20 ga. and 25 ga. steel studs, steel track, anchors, and related

items, conforming to ASTM C 645. Provide all metal runners, hangers, studs, and channels hot-dip galvanized conforming to ASTM A 525, G60, unless noted otherwise..

- a. Special system at gypsum shaft-wall construction shall be as above, except with "C-H" Type galvanized steel studs, or equivalent.
  - b. Provide minimum 20 gage steel studs at jambs of door and fixed glass frames, at open partition ends, and where the partition is to receive wall-mounted shelves, heavy fixtures, etc.
5. Gypsum Wallboard: Indicated thickness(es) by 48 in. width by lengths as required, tapered edge, paper finish, conforming to ASTM C 36. Where used in fire-rated assemblies, provide Type X fire resistant type.
  6. Water Resistant Gypsum Backer Board: Provide water resistant type gypsum backing board conforming to ASTM C 630 at locations indicated.
  7. Impact-Resistant Drywall: Where indicated, interior gypsum board partitions in public areas shall be 5/8 in. thick, tapered edge, Gold Bond Fire-Shield Type X Hi-Impact 3000 Wallboard, as manufactured by National Gypsum Co.; or equal by US Gypsum; Domtar Gypsum; or approved equal.
  8. Gypsum Shaft Wall Liner: 1 in. thick solid gypsum core, in multilayered, moisture-resistant green paper, 24 in. wide by lengths as required to eliminate end joints.
  9. Preformed Reveals: Preformed reveals and corners for gypsum wallboard partitions shall be equal to Softforms Commercial Grade Standard Extrusions, manufactured by Softforms Division, Pittcon Industries, Inc., or approved equal. Shapes shall be extruded 6063-T5 aluminum alloy 1/8 in. thick, minimum (profile areas). Shapes shall be primed; plaster and paints shall be capable of bonding to primed surface. Fire rating shall be Class A. Provide all required shapes and radii indicated or required to complete the work.
  10. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
    - a. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
    - b. Level 2: Panels that are substrate for tile.
    - c. Level 5: At all wall and ceiling surfaces that will be exposed to view unless otherwise indicated.

-END OF SECTION-



## **SECTION 093000 - TILING**

1. Work Included: The scope of work, without limiting the generality thereof, consists of furnishing all labor, materials, plant, transportation, equipment, accessories, appurtenances, and services necessary and/or incidental to the proper completion of all tile work shown on the Drawings, described in the Specifications, or as reasonably inferred from either, in the opinion of the Architect, as being required, and includes:
  - A. Work of this Section includes but is not limited to:
    1. Floor quarry tile.
    2. Porcelain floor tile.
    3. Ceramic wall tile.
    4. Base tile.
    5. Marble thresholds
2. Tile for Thin-Set Installation:
  - a. Porcelain floor tile.
  - b. Ceramic wall tile.
  - c. Base tile.
3. QUALITY ASSURANCE
  - a. Mockups for each form of construction.
  - b. Tile Installation: ANSI 108 Series Standard Specifications and Tile Council of America, handbook for ceramic tile installation.
  - c. Tile Materials: ANSI 118 series Standard Specifications.
4. MATERIALS
  - a. Mortar: Latex-Portland cement for thin-set tile installation.
  - b. Grout: Latex-Portland cement, color as selected by Architect.
5. TILE MATERIALS
  - A. Quarry Tile: 6 in. by 6 in. by 1/2 in. thick, unglazed, natural clay quarry tile, edge ground for exact and consistent face size, with ribbed or other bonding features on back, and with non-slip abrasive grit applied to face, equal to American-Olean "Murray", Midstate Tile Co. "Quarry Tile", Summitville "Quarry Tile", or equal. Color shall be as selected by Architect.
    1. Provide matching 6 in. by 6 in. coved sanitary base with rounded or square tops as indicated.

- B. Floor Tile: 1 in. Penny-Round ceramic floor tile, equal to "Complete Tile Collection" by Penny Rounds; or approved equal as manufactured by DalTile; American-Olean, Summitville, or equal. Colors shall be as follows:
1. Color: Art White, matte.
- C. Ceramic Wall Tile: 4-1/4 in. by 12-3/4 in., ceramic wall tile, equal to DalTile "Modern Dimensions"; or approved equal as manufactured by American-Olean, Summitville, or equal. Color shall equal to DalTile "Matte Arctic White" 0790.
1. Provide bullnose trim pieces at all exposed edges and corners.
  2. Flat-Top Cove Base: 4-1/4 in. x 8-1/2 in. to match wall tile color.
- D. Ceramic Accent Tile: 1 in. Penny-Round ceramic wall accent tile, equal to "Complete Tile Collection" by Penny Rounds; or approved equal as manufactured by DalTile; American-Olean, Summitville, or equal. Colors shall be as follows:
1. CT-A1: Color 1 (Art White, gloss).
  2. CT-A2: Color 2 (Iron Azul, gloss).
  3. CT-A3: Color 3 (Rojo Coral, gloss).
  4. CT-A4: Color 4 (Amarillo).
6. Tile Installation Methods: Install and grout tile in accordance with the provisions of the standard specification and published details hereinbefore listed, generally as follows, in accordance with TCA "Recommended Uses":
- a. Floor Tile, Thinsset: Latex-Portland Cement Mortar, TCA Method F113, with Latex-Portland Cement Grout.
  - b. Ceramic Wall Base: Latex-Portland Cement Mortar, Applied to Cementitious Tile Backerboard, TCA Method W244, with Latex-Portland Cement Grout.

-END OF SECTION-

## SECTION 095113

### ACOUSTICAL PANEL CEILINGS

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Provide suspended acoustical ceilings as indicated on Drawings and as specified. Work of this Section includes, but is not limited to:
1. Acoustical panel lay-in ceiling with exposed suspension system.

##### 1.02 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build minimum 10 ft. x 10 ft. mockup of each typical ceiling area.

##### 1.03 EXTRA MATERIAL

- A. Provide packaged, wrapped and labeled maintenance stock equal to 2% of the actual quantity installed for the following items of work:
1. Each type of ceiling tile and panel.
  2. Each type of suspension system component.

#### PART 2 PRODUCTS

##### 2.00 SUSTAINABILITY CHARACTERISTICS

- A. Minimum Recycled Content defined in Section 018113 "Sustainable Design Requirements".
1. Steel Products: 25%.
  2. Acoustical Ceiling Panel Products: 35%
- B. Regional Content defined in Section 018113 "Sustainable Design Requirements". Report Regional Content only. No minimum requirement.
- C. VOC content limitations defined in Section 018123 "Volatile Organic Compound Limits".

##### 2.01 SUSPENSION SYSTEM

- A. Provide products of one of the following manufacturers that meet or exceed requirements specified, or equal:

1. Chicago Metallic Corporation
2. Donn Corporation
3. Armstrong World Industries.
4. National Rolling Mills
5. Technical Ceiling Systems

- B. Narrow Exposed Suspension System: Provide manufacturers narrow exposed "Tee", commercial quality cold-rolled, electro-galvanized steel grid system, equal to Armstrong 9/16 in. Suprafine XL, complying with ASTM C 635 for "Intermediate-Duty System". Provide grid modules to match ceiling panel sizes. Provide manufacturer's standard white baked enamel finish on steel exposed surfaces.

## 2.03 ACOUSTICAL PANELS AND TILES

- A. Provide ceiling panel and tile products of one of the following manufacturers that meet or exceed requirements specified:
1. Armstrong World Industries, Inc.
  2. Celotex Corporation.
  3. United States Gypsum Co.
  4. CertainTeed
- B. Interior Ceiling Panels, Basis-Of-Design: Provide as follows, or approved equal:
1. Typical ACT Ceiling: Provide ACT plank system in varying sizes as shown on Drawings, equal to Armstrong World Industries "Health Zone Optima" 24 in. x 24 in. (#3216); 24 in. x 48 in. (#3217); or equal products by Celotex; United States Gypsum "Mars ClimaPlus HRC; or CertainTeed "Symphony M. System shall be designed to interface with a 9/16 in. Suprafine XL grid.
  2. Band and Chorus Rooms: Basis of Design USG Geometrix
  3. Practice Rooms: Basis of design Armstrong Ultima

END OF SECTION

**SECTION 096446 - WOOD SPORTS-FLOOR ASSEMBLIES**

1. Scope: Work of this Section includes, but is not limited to:
  - a. Gymnasium strip flooring system.
  - b. Field finishing of work of this Section.
  
2. Wood Flooring (Gymnasiums): Wood Flooring System shall be one of the following:
  - a. "Rezill Channel" system, manufactured by Connor AGA, Amasa, MI 49903;
  - b. "Bio-Channel" system as manufactured by Robbins Sports Surfaces, Cincinnati, OH, 45226;
  - c. "AacerChannel" system as manufactured by Aacer Flooring, LLC, Peshtigo, WI 54157.
    - 1) Flooring system shall be tested and evaluated for Athletic Performance according to the International Standard DIN 18032, Part 2.
  
3. Wood Flooring Treatment And Finishing Materials: Provide as follows:
  - a. Treatment: Treat all flooring with MFMA tested and listed wood preservative. Stamp each bundle with official treating plant certificate and number.
  - b. Finish Materials: Provide Robbins Miracle Oil modified polyurethane sealer and finish, or Architect approved equal. Provide game-line paints as recommended by finishing materials manufacturer to be compatible with finish.
    - 1) Provide game lines and solid painted areas in layouts indicated, or if not indicated, as recommended by MFMA Ref. 3.
    - 2) Game Line and Solid Painted Area Colors: Provide game lines and solid painted areas in colors selected by Architect. Five different colors will be selected. Match Architect's color chip for each color selected.

END OF SECTION



SECTION 096500

RESILIENT FLOOR TILE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide resilient flooring and related items, as indicated on the Drawings and as specified herein. Work of this Section includes, but is not limited to:

1. Vinyl composition tile flooring.
2. Mastics and leveling compounds.

1.02 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):

D 570	Test Method for Water Absorption of Plastics
D 638	Test Method for Tensile Properties of Plastics
D 2047	Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces
E 84	Surface Burning Characteristics of Building Materials

2. Federal Specifications (Fed. Spec.):

SS-T-312B	Tile, Floor, Asphalt, Rubber Vinyl, and Vinyl Composition
SS-W-40	Wall Base; Rubber and Vinyl Plastic.

1.03 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every type, color, and pattern of floor tile installed.

## PART 2 PRODUCTS

### 2.01 VINYL COMPOSITION FLOORING

- A. Acceptable Manufacturers: Provide products of one of the following manufacturers that meet or exceed specified requirements:
1. Armstrong World Industries, Inc.
  2. Tarkett .
  3. Johnsonite.
- B. Basis-Of-Design Vinyl Composition Tile Type: 1/8 in. thick, 18 in. by 18 in. "Excelon Stonetex" Series, manufactured by Armstrong World Industries, Inc. or approved equal manufactured by Johnsonite or Tarkett. Tile shall meet or exceed Fed. Spec. SS-T-312B, Type IV.
1. Colors: Provide colors as follows to create patterns:
    1. VCT1 = Limestone Beige 52139
    2. VCT2 = Chamotte 52172
    3. VCT3 = Spanish Moss 52180
    4. VCT4 = Hermit Shale 52186
    5. VCT5 = Golden Bamboo 52170
  2. Layout: Layout of tile shall be running bond.

### 2.02 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
1. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant applications
  2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Floor Polish: Provide protective liquid acrylic floor polish products as recommended by manufacturer.

## PART 3 EXECUTION



3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.

3.03 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.

3.04 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.
- B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply three coats.
- C. Cover floor tile until Substantial Completion.

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END OF SECTION

**SECTION 096513 - RESILIENT BASE**

1. Work Included: Work includes the following:
  - a. Rubber base.
2. Rubber Base: Smooth-surface, toeless carpet type at carpeted floors and set-on cove type at other floor conditions, as indicated, 0.125 in. thick, 4 in. high, with rounded tops. Include preformed internal and external corners. Base of toe of cove type base shall conform to floor variations of 1/8 in.
3. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
  - a. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - 1) Floor Adhesives: Not more than 60 g/L.

-END OF SECTION-



SECTION 097112

CEMENTITIOUS WOOD FIBER WALL PANELS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide cementitious wood fiber wall panels as indicated on Drawings and as specified.

PART 2 PRODUCTS

2.01 ACOUSTICAL PANEL SYSTEM

- A. System: For purposes of establishing a standard of quality and not for the purposes of limiting competition, the basis of the specification is Tectum Standard Interior Wall Panels, as manufactured by Tectum, Inc., or equal, and as follows:
  - 1. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
  - 2. Thickness: 1 in.
  - 3. Widths: 3 standard widths; to be field cut and beveled where other than standard widths apply (corners). Match patterns indicated on Drawings.
  - 4. Lengths: Varies, as indicated on Drawings.
  - 5. Edge Condition: Beveled design, square ends.
  - 6. Color: Factory painted white.
- B. Mounting Style: 'A'; provide all fasteners.

END OF SECTION



Section 09 72 33  
DRY-ERASE WALL COVERING

**PART 1 – GENERAL**

1.1 SUMMARY

- A. The work of this Section consists of dry-erase wall coverings where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following scope.
- B. Furnish and install the following:
  - 1. Dry-erase surface.
  - 2. Accessories.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
  - 1. Koroseal Interior Products, Fairlawn, OH.
  - 2. OptiMA, Inc., Shrewsbury, MA.
  - 3. Smarter Surfaces, Dublin, Ireland.

2.2 MAGNETIC/PROJECTABLE DRY ERASE WRITING SURFACE

- A. Basis of Design: Basis of Design: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Koroseal Interior Products, Fairlawn, OH, "Walltalkers" series, product: "Projectable Mag-rite", model "M2PR," of sizes indicated on Drawings.
  - 1. Description: Dry erase writing surface, having scrim backing, impregnated with ferrous powder, pigmented vinyl capped with dry erase film.
  - 2. Characteristics:
    - a. Conforming to ASTM E-84, Class A Flammability Testing.
    - b. Roll width: 47/48 inches (1.19/1.22m) width.
    - c. Fabric: Woven Polyester
    - d. Laminate thickness: 24 mils.
    - e. Tensile strength, (warp x fill): 80 by 80 pounds.
    - f. Surface: Matte finish.
    - g. Colors: As selected by the Architect from manufacturer's full range of options.

2.3 ACCESSORIES

- A. Trim and marker tray:
  - 1. Cap Wallcovering Trim: Clear satin, anodized aluminum, low profile trim.
  - 2. J-Trim: 1/4 inch extruded aluminum, clear anodized.
  - 3. Marker Tray: Clear anodized aluminum marker tray, continuous along full width of dry erase wallcovering.

### **PART 3 - EXECUTION**

#### **3.2 INSTALLATION**

- A. Comply with manufacturer's printed installation instructions.
- B. For seamed applications, using a seam and strip cutter remove the factory edge of one sheet. Using the same tool, overlap and trace cut the mating edge of the second sheet. Repeat this step for as many sheets as required for the job.
- C. Scribe, cut, and fit material to butt tightly to adjacent surfaces, built-in casework, and permanent fixtures and pipes.

End of Section



**SECTION 097625 - FIBERGLASS-REINFORCED PLASTIC PANELS (FRP)**

1. Scope of Work: Provide FRP wall panels as indicated on Drawings and as specified.
2. Panels: Provide FRP panels as manufactured by The Kemlite Company; or approved equal.
  - a. Nominal Thickness: Not less than 0.12 inch (3.0 mm).
  - b. Surface Finish: Smooth.
  - c. Panel Color: As selected by Architect.
3. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
  - a. Color: Match panels.
4. Adhesive: As recommended by plastic paneling manufacturer.
  - a. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
5. Sealant: Single-component, mildew-resistant, acid-curing silicone sealant recommended by plastic paneling manufacturer.
  - a. Sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

END OF SECTION



SECTION 097713

FABRIC-WRAPPED TACKABLE PANELS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Work of this Section consists of furnishing all labor, materials, equipment, and services necessary to furnish and install acoustical metal wall panels as indicated, as follows:
1. Fabric wrapped tackable panels, Type 1 and Type 2.

PART 2 PRODUCTS

2.01 TYPE 1 FABRIC-WRAPPED TACKABLE PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide The H.I.R. #1 Tackable Panels, as manufactured by Decoustics Limited; or comparable product by one of the following, or equal:
1. Armstrong World Industries.
  2. Decoustics Limited; a CertainTeed Ceilings company.
  3. Kinetics Noise Control, Inc.
- B. Requirements of Regulatory Agencies: Acoustical wall panels shall comply with the fire-resistant requirements for interior finish and shall be classified as Class I material.
1. Maximum flame spread: 0-25
  2. Testing: ASTM E 84
- C. Noise Reduction:
1. NRC: For 1-1/8 in. panel NRC shall be 0.90 minimum.
- D. Fabric-Wrapped Wall Panel: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
1. Mounting: Back mounted with manufacturer's standard adhesive.
  2. Core: Manufacturer's standard glass-fiber board.
  3. Core-Face Layer: Manufacturer's standard tackable, impact-resistant, high-density board.
  4. Edge Construction: Manufacturer's standard resin hardened core.
  5. Edge Profile: Square.
  6. Facing Material: Fabric from same dye lot; color and pattern as selected by Architect from manufacturer's full range].
  7. Nominal Overall Panel Thickness: 1-1/8 inches.
  8. Panel Width: As indicated on Drawings.

9. Panel Height: As indicated on Drawings.

2.02 TYPE 2 FABRIC-WRAPPED TACKABLE PANELS

- A. Acceptable Manufacturer: Homasote Company, P.O. Box 7240, West Trenton, NJ 08628-0240; ASD. Tel: (609) 883-3300, Fax: (609) 530-1584, Internet address: <http://www.homasote.com>; or equal.
- B. Provide Class A Panels: Homasote DesignWall(tm) Interior Panels, or equal.
1. Substrate: NCFR(R) fiberboard manufactured from 100 percent recycled wood fiber material; physical properties as follows:
    - a. Thickness: 1/2 inch (13 mm).
    - b. Density: 34-40 pcf (545-640 kg/cubic m).
    - c. Water Absorption by volume (2 hour immersion): 5 percent maximum.
    - d. Expansion, 50 to 90 percent relative humidity: 0.30 percent.
    - e. NRC: 0.20.
    - f. Flame Spread: 25, per ASTM E 84.
    - g. Smoke Developed: 20, per ASTM E 84.
    - h. Fuel Contributed: 10.
    - i. Classification: Class A, per NFPA.
  2. Fabric: FR 701(R), as manufactured by Guilford of Maine or equal, physical properties as follows:
    - a. Content: 100 percent polyester.
    - b. Weight: 16.0 +/- 0.5 oz./lin. yard (50 kg +/-16 g/m).
    - c. Colorfastness to Light: No less than Grade 4 after 40 hours, per AATCC 16, Option A.
    - d. ASTM E 84: Class A.
    - e. NFPA-701: Passes.
    - f. UL Test No. 214: Passes.
    - g. FAA (PARA.25.853B): Passes.
    - h. Boston Fire Code BFD IX-1: Passes.
    - i. State of Massachusetts 527 CMR 21.00: Passes.
    - j. Color: As selected by Architect from manufacturer's standard range.
  3. Fabrication: Wrap fabric around long edges of panel to back side and laminate to substrate.

END OF SECTION

**SECTION 099100 - PAINTING**

1. Work Included: The scope of work consists of all painting work shown on the Drawings, described in the Specifications, or as reasonably inferred from either, in the opinion of the Architect, as being required, and includes:
  - a. Surface preparation and field painting of the following:
    - 1) Exposed exterior items and surfaces;
    - 2) Exposed interior items and surfaces;
    - 3) Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surfaces treatments specified in other sections.
  - b. Paint exposed surfaces whether or not colors are designated in "schedules", except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint same as similar adjacent materials or surfaces. If color or finish is not selected, the Designer will select colors or finishes from manufacturer's available choices.
    - 1) Painting work of this Section includes field painting exposed bare and covered pipes and conduits (including color coding), hangers, exposed steel and iron work, and metal surfaces of athletic, mechanical, and electrical equipment.
2. Latex and Alkyd Based Paints: Provide products of one of the following manufacturers that meet or exceed specified requirements, or approved equal:
  - a. Benjamin Moore and Co. (Moore).
  - b. Pratt & Lambert. (P & L).
  - c. The Sherwin Williams Company (S-W)
3. High Performance Paint Coatings: Provide products of one of the following manufacturers that meet or exceed specified requirements, or approved equal:
  - a. Tnemec Corporation (Tnemec).
  - b. International Protective Coatings (IPC).
  - c. Ameron Corporation (Ameron).
4. Interior Gypsum Wallboard for Eggshell, or Satin Finish:

One Coat	<ol style="list-style-type: none"><li>1. Benjamin Moore; Eco-Spec Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).</li><li>2. Duron Equal</li><li>3. S-W Equal</li></ol>
Two Coats	<ol style="list-style-type: none"><li>1. Benjamin Moore; Eco-Spec Latex Eggshell Enamel: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).</li><li>2. Duron Equal</li><li>3. S-W Equal</li></ol>

5. Interior Gypsum Wallboard Ceilings for Flat Finish:
- |           |   |
|-----------|---|
| One Coat  | 1. Benjamin Moore; Eco-Spec Interior Latex Primer:<br>Applied at a dry film thickness of not less than 1.2 mils (0.030 mm). |
|           | 2. Duron Equal  |
|           | 3. S-W Equal  |
| Two Coats | 1. Benjamin Moore; Eco-Spec Latex Flat: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).               |
|           | 2. Duron Equal  |
|           | 3. S-W Equal  |
6. Interior Finish Carpentry, for Satin-Gloss Paint Finish (softwoods, paint grade hardwoods, MDO, and hardwood veneers):
- |           |   |
|-----------|---|
| One Coat  | 1. Benjamin Moore; Eco-Spec Interior Latex Primer:<br>Applied at a dry film thickness of not less than 1.2 mils (0.030 mm). |
|           | 2. Duron Equal  |
|           | 3. S-W Equal  |
| Two Coats | 1. Benjamin Moore; Eco-Spec Latex Eggshell Enamel:<br>Applied at a dry film thickness of not less than 1.3 mils (0.033 mm). |
|           | 2. Duron Equal  |
|           | 3. S-W Equal  |
7. Interior Finish Carpentry for Satin Transparent Finish (all hardwoods and hardwood veneers, except paint grade and factory-finished items):
- |           |   |
|-----------|---|
| Sand      | 120 grit sandpaper.                               |
| Sand      | 220 grit sandpaper.                               |
| Stain     | 1. Moore Interior Wood Finishes Penetrating Stain |
|           | 2. Devoe Equal                                    |
|           | 3. S-W Equal                                      |
| Two Coats | 1. Moore Benwood Polyurethane Finish              |
|           | 2. Devoe Equal                                    |
|           | 3. S-W Equal                                      |
8. Interior Metals not Specified to Receive other Coating Systems:
- |           |  |
|-----------|--|
| One Coat  | 1. Approved primer, in shop under other Sections (where specified) |
| One Coat  | Field Primer (only where shop primer is not specified):            |
|           | 1. S-W Universal metal primer.                                     |
| Two Coats | 1. S-W Acrylic Enamel.   |

9. Interior Mechanical and Electrical Work (Paint all exposed items throughout the interior project except factory finished items with factory-applied baked enamel finishes which occur in mechanical rooms, and excepting chrome or nickel plating, stainless steel, and aluminum other than mill finished. Paint all exposed ductwork and inner portion of all ductwork visible through grilles and registers):

Same as specified for other interior metals, hereinabove.

10. Exterior Galvanized Steel for Acrylic Polyurethane Finish (exterior handrail and railing assemblies, steel bollards):

One Coat 1. Epoxy Primer in fabricator's shop, under other Sections.

Finish Coat 1. Urethane top coats in fabricator's shop, under other Sections.

11. Exterior Galvanized Steel Doors and Frames for Acrylic Polyurethane Finish:

One Shop Coat 1. Shop Primer in fabricator's shop, under Section 081100.

After Installation:

Barrier Coat: 1. As recommended by manufacturer for compatibility between shop coats and field coats.

First Field Coat 1. Tnemec "No. N69 Hi-Build Epoxoline" Epoxy  
2. IPC Equal  
3. Valspar Equal

Second Field Coat 1. Tnemec "No. 1081 Endura-Shield III"  
(dry film 1.5 to 2.0 mils) 2. IPC Equal  
3. Valspar Equal

12. Exterior Finish for Wood Siding, Trim, and Trellis Work:

Two Coats 1. Benjamin Moore Exterior Finish Deck and Siding Translucent Alkyd (#326).

13. Interior Steel Doors and Frames for Acrylic Polyurethane Finish:

One Shop Coat 1. Shop Primer in fabricator's shop, under Section 081100.

After Installation:

Barrier Coat: 1. As recommended by manufacturer for compatibility between shop coats and field coats.

First Field Coat 1. Tnemec "No. N69 Hi-Build Epoxoline" Epoxy  
2. IPC Equal  
3. Valspar Equal

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Second Field Coat  
(dry film 1.5 to  
2.0 mils)

1. Tnemec "No. 1081 Endura-Shield III"
2. IPC Equal
3. Valspar Equal

END OF SECTION



## **SECTION 101400 - SIGNAGE**

### 1.1 SUMMARY

#### A. Section Includes:

1. Provide wall and door plaques as scheduled.
2. Provide cut-out metal letters.
3. Provide occupancy signs in spaces required by code or local ordinance.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Melamine Plastic: Material shall be "self-extinguishing" and furnished with a "life-of-building" warranty. Material shall be as manufactured by Westinghouse, Wilson, General Electric, or approved equal in thickness required for intended use.
- B. Bronze Plate: ASTM B 36/B 36M, Alloy UNS No. C22000 (commercial bronze).
- C. Paint: Water based aliphatic polyurethane, as manufactured by Tnemec, IPC, or PPG.
- D. Vinyl Die-Cut Letters and Film: Opaque, non-reflective vinyl film. 0.0035 in. minimum thickness, with pressure sensitive adhesive backing, suitable for exterior use as well as interior applications.
- E. Aluminum: Provide aluminum sheet and tubing of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

#### 2.2 DIMENSIONAL CHARACTERS

- A. Cutout Characters: Characters with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; and as follows:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal:
    - a. APCO Graphics, Inc.
    - b. ASI Sign Systems, Inc.
    - c. Gemini Incorporated.
    - d. Matthews International Corporation; Bronze Division.
    - e. Metal Arts; Division of L & H Mfg. Co.
    - f. Nelson-Harkins Industries.

g. Southwell Company (The).

2. Character Material: Sheet or plate bronze.
3. Character Height: As indicated.
4. Thickness: 0.25 inch.
5. Finishes:
  - a. Integral Metal Finish: As selected by Architect from full range of industry finishes.
6. Mounting: Projecting studs.
7. Typeface: As indicated.

2.3 INTERIOR ROOM SIGNS

- A. Provide raised tactile ADA complying signage meeting the following:
1. Solid-Sheet Sign: Bronze sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:
    - a. Thickness: 0.125 inch (3.18 mm).
    - b. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
  2. Surface Finish and Applied Graphics:
    - a. Integral Metal Finish: As selected by Architect from full range of industry finishes.
  3. Mounting: Surface mounted to wall with concealed anchors or fasteners.

2.4 OCCUPANCY SIGNS

- A. Frame for occupancy certificate, maximum occupancy and Building signs shall be bronze, satin finish, with one side of frame removable.
- B. For size of frame see Drawings, minimum ½ in. face width.
- C. Provide ¼ in. plywood backing in the frames.
- D. Secure frames to walls using tamperproof devices suitable for intended substrate.
- E. Text shall be white lettering on a bronze background and shall be as follows: "Maximum Occupancy" (3 in. high, ¾ in. stroke)  
"Not to Exceed" (2 in. high, ½ in. stroke) "XXX Persons" (3 in. high, ¾ in. stroke)

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END OF SECTION



## **SECTION 102113 - PLASTIC LAMINATE TOILET COMPARTMENTS**

1. Work Included: The work of this Section consists of providing plastic laminate toilet compartments including related accessories, hardware, and related items, including, but not limited to:
  - a. Plastic laminate toilet partitions and urinal screens, completely erected.
  - b. Related mounting brackets, fastening devices, and anchors.
  - c. Related finish hardware and accessories, as specified.
2. Manufacturer: Provide products of the following that meets or exceeds specified requirements:
  - a. Model: Classic Series.
3. Partitions, Stiles, Screens, and Doors:
  - a. Plastic Laminate: Shall be high pressure laminated plastic, NEMA LDS-19 minimum thickness 0.0625 in., color as selected by Architect from complete range of standard and standard special colors offered by manufacturer. No limit is placed on the number of colors to be used, and will vary from floor to floor.
  - b. Core:
    - 1) Stiles: three ply resin impregnated particle board bonded to each side of an 11 gauge steel reinforcing core.
    - 2) Panels, doors, and wall post: three ply resin impregnated particle board, Type II, Grade DB, 45 lb. density.
4. Adhesives: Shall be type which will prevent delamination from heat and moisture in public washrooms.
5. Hardware and Fittings:
  - a. Metal: Stainless steel, Type 304.
  - b. Finish: Stainless steel: No. 4 Satin finish.
6. Leveling Device: Shall be 3/8 in. by 1 in. steel bar.
7. Fasteners:
  - a. Hinge and Latch: Shall be factory installed threaded steel inserts and stainless steel one-way machine screws; latch track factory installed thread T-

- nuts.
  - b. Door Hardware: Shall be stainless steel one-way sheet metal screws.
  - c. Mounting Brackets: Shall be stainless steel phillips head sheet metal screws.
  - d. Leveling Device: Shall be 3/8 in. threaded rod, nuts, and sleeve anchor.
8. Stile Shoes: Shall be one piece, 4 in. high, Type 304, stainless steel with No. 4 Satin finish.
9. Configuration:
- a. Toilet partitions shall be floor supported, overhead braced.
  - b. Screens shall be wall hung.
10. Stiles, Partitions, Screens, and Doors:
- a. Bonded high pressure plastic laminated to core material with adhesive specially formulated to prevent delamination in moist, warm areas of public washrooms. Bond edges prior to bonding face sheets. Make no splices or joints in faces or edges.
  - b. Install threaded steel inserts for mounting hinge and latch.
  - c. Pre-drill screw holes for coat hook and keeper.
  - d. Finish thickness - 1 in. for uniform flush front.
11. Anchoring and Leveling Devices: Continuously weld anchoring and leveling device to steel reinforcing core of stile.
12. Door Hardware:
- a. Hinge: Shall be self-lubricating balanced hinge adjustable hold open feature.
  - b. Latch: Shall be combination slide latch and bumper equipped for emergency access, without use of tools.
  - c. No hardware for brackets will be permitted on the outside of compartment except on compartments with outswinging doors.
13. Accessories:
- a. One combination coat hook and bumper shall be installed on each toilet enclosure door, and shall be manufacturer's standard, subject to Architect's approval.

-END OF SECTION-

**SECTION 102800 - TOILET ACCESSORIES**

1. Work Included: Furnish and install all toilet accessories as required to complete the work of the Contract.
2. Manufacturers: Accessories shall be manufactured by Bobrick Washroom Equipment Company; American Specialties, Inc.; Bradley Corporation Washroom Specialties Division; or approved equal.
3. Toilet Accessories:
  - a. Lavatory mirror: Bobrick B-290 1830
  - b. Soap dispenser: Bobrick B-2111
  - c. Towel dispenser/waste receptacle: Bobrick B-36903
  - d. Toilet paper dispenser: Bobrick B-2888
  - e. Sanitary napkin/tampon disposal: Bobrick B-254
  - f. Grab bars (HC toilet): Bobrick B-5806.99 x 42, 2 per stall

-END OF SECTION-





**SECTION 104400 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES**

1. Work Included: Furnish and install fire extinguishers, cabinets, and accessories as required to complete the work of the Contract. Include, but do not limit to:
  - a. Fire extinguishers.
  - b. Fire extinguisher cabinets.
  - c. Mounting brackets.
2. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.
3. Fire Extinguisher Cabinets and Accessories: Subject to compliance with requirements, provide products of one of the following manufacturers; Catalog designations of Larsen's Manufacturing Company cabinets are specified herein to establish standard of quality.
  - a. Larsen's Manufacturing Company, Minneapolis, MN 55432.
  - b. J. L. Industries.
  - c. Muckle Manufacturing, Division of Technico, Inc.
  - d. Profile International, Inc.
4. Fire Extinguishers: General Fire Extinguisher Co., Multi-Purpose Dry Chemical Type (4A-60BC-FE): UL-rated 4-A:60-B:C, 10 lb. nominal capacity, in enameled steel container, for Class A, Class B, and Class C fires; No substitutions will be permitted.
5. Fire Extinguisher Cabinet, Fully Recessed Type at all Public Spaces: Larsen Model #2409, with the following features:
  - a. Break glass door.
  - b. Red fire handle.
  - c. Bronze finish.
  - d. Rough Opening: 24-1/2 in. x 10-1/2 in. x 6-1/4 in.
6. Fire Extinguisher Cabinet, Semi-Recessed: Larsen Architectural Series Model #2409-R2 for fully-recessed cabinets; and Model 2409-6R for semi-recessed cabinets, with vertical duo door style, with the following features:
  - a. Tempered glass in door.
  - b. Red fire handle.
  - c. Bronze finish.
  - d. Tub, 6 in. id.
  - e. 2 hr. fire rated where installed in rated walls.
7. Cabinet Construction: Manufacturer's standard enameled steel box as required, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
8. Wall Brackets: Where cabinet is not required, provide extinguisher manufacturer's recommended standard wall mounting bracket, sized to fit extinguisher.

-END OF SECTION-



## **SECTION 106520 - OPERABLE PANEL PARTITIONS**

1. Work Included: Provide manually operated, individual folding panel partition assemblies.
2. Sound Transmission Classification (STC): Provide units which have STC rating of at least 51 (NSSEA Class G) when tested according to ASTM E 90.
3. Manufacturers: Provide products of one of the following manufacturers if they meet or exceed the requirements of these specifications:
  - a. Advanced Equipment.
  - b. Hufcor, Inc.
  - c. Modernfold Division of American Standard Co.
4. Operations: Single panel operation of individual panels, manually operated, flat steel panels, top supported with individual crank or level operated seals.
5. Panel Construction: All steel construction, nominal 4 in. thick in manufacturers standard panel widths, with trimless vertical joints.
6. Suspension Systems and Tracks:
  - a. For Panels:
    - 1) Overhead track and suspension system (aluminum or steel). If aluminum with steel running surfaces.
    - 2) Trolleys shall be all steel; with four (4) formed ball bearing, all steel wheels.
7. Sound Seals: Airtight closure around the perimeter of each panel with retractable floor seals.
8. Accessories:
  - a. Pass Doors with hardware and exit sign, if required.
  - b. Pocket Doors of same construction as panel.
9. Finish Surface:
  - a. Apply porcelain-enamel steel "white-board" writing surface, on both sides of panels.

END OF SECTION



**SECTION 111320 - PROJECTION SCREENS**

1. Work Included: Work of this Section includes, but is not limited to:
  - a. Electrically operated projection screens.
2. Manufacturers: Provide products from one of the following manufacturers, or Architect approved equal:
  - a. Bretford Manufacturing Co., Schiller Park, IL 60176
  - b. Da-Lite Screen Co., Inc., Warsaw IN 46580
  - c. Draper Shade and Screen Co., Inc., Spiceland, IN 47385-0425
3. Manufacturer and Type: Provide "BoardRoom" Electrically Operated Projection Screen, manufactured by Da-Lite Screen Company, Inc., or approved equal from another specified manufacturer.
4. Description: Provide projection screen with glass beaded surface on flame and mildew resistant fabric, with 2 in. black masking borders. Provide screen electrically operated, ceiling recessed, and mounted on a roller of rigid metal, minimum 3 in. diameter, mounted on vibration and sound absorbing supports in a wood case with a metal-lined wiring compartment, complete with metal bracket hangers. Electrical operation shall be three wire, quick reverse type with accessible pre-set limit switches to stop screen automatically in up and down positions, with motor within roller. Motor shall be suitable for 115 volt, 60 Hz electric current. Unit shall be UL-listed.
5. Include remote three-position control switch to be installed and wired by electrical trade.

-END OF SECTION-



## **SECTION 116653 - GYMNASIUM EQUIPMENT**

1. Scope: Furnish and install the athletic equipment work, as indicated on the Drawings and as specified herein. Include but not be limited to:
  - a. Basketball backstops, backboards and goals.
  - b. Sleeves and floor plates for badminton and volleyball uprights.
  - c. Protective wall padding
  
2. Folding Basketball Backstops: Provide as required forward folding backstop assemblies. Folding backstop assemblies shall be overhead structure supported with supplemental framing and shall include tempered glass backboards and collapsible goals, as manufactured by Porter Athletic Equipment Company (Porter), or approved equal as manufactured by Proline Athletic, or Performance Sports Systems; or approved equal. Porter catalog designations are specified to establish standard of quality for performance and materials. All backstop assemblies shall be suitable for basketball competition play in accordance with the requirements of NCAA Basketball. All backstop framing and supplemental framing shall be painted flat (matte) white. Provide capacity in backstop and supplemental framing to support shot clocks where such are indicated to be backstop mounted.
  - a. Forward Folding Backstops: Provide where indicated Porter Model 950 series Center-Strut Ceiling Suspended, Forward-Fold, Front Braced, Bent Mast Backstop.
  - b. Provide each backstop with backboard. Backboard shall be Porter Model 00208-000 rectangular tempered glass backboard with aluminum faced tubular steel frame. Backboard shall be 72 inch wide by 42 inch high with fused target and boarder markings. Marking color shall be white.
  - c. Provide each backboard with Porter Model 00326-000 Bolt-On Backboard Safety Padding. Color shall be manufacturer's standard medium gray.
  - d. Provide goal with net at each backstop. Goal shall be Porter Model 00250-500 Torq-Flex at each backstop. Provide each goal properly mounted to transfer goal loads directly to backstop without loading backboard.
  - e. Provide each backstop with electrically operated winch. Winch shall be Porter Model 00706-000 1/2 horsepower or model 00707-000 3/4 horsepower as required by backstop and applied loads. Winch shall be prewired with 54 inch long rubber covered cable with polarized plug attached. Provide keyed switch with cover plate for each winch. Keyed switch shall be located within room as directed by Designer unless indicated otherwise.
  - f. Provide each backstop with safety lock. Safety lock shall be Porter Model 10797-100 Saf-Strap basketball safety lock.
  - g. Conduit, outlet receptacles, connectors, and wiring shall be provided as a part of the work of Division 26, ELECTRICAL.

3. Control Center: Provide one (1) Porter Model 2500 Control Center for each Gymnasium.
4. Badminton Floor Plates and Sleeves: Provide cast brass nominal 0.20 in. thick flush-mount floor plate with hinged door, suitable for use of badminton uprights, with pre-drilled holes for anchors. Plates shall be Type KA 25 S manufactured by Senoh and distributed by Sports Imports Incorporated, Columbus, OH 43221, or approved equal.
  - a. Sleeves shall be 3 in. internal diameter steel barrel with 0.14 in. thick walls and top screw-down flange. Sleeve shall be approximately 9 in. Base of sleeve barrel shall be flanged for setting into asphaltic concrete slab.
5. Volleyball Floor Plates and Sleeves: Provide volleyball floor plate and sleeve Schelde model 62107 sleeve and Model 62126 Oversized Floor Plate. Cover to be solid brass with hinged access cover, set flush in wood floor. Floor plate to be 7-7/16 inch outside diameter. Sleeve to have pre-drilled flanges for fastening of cover plate. Sleeve shall be 12-3/8 in. long. Inside diameter of the sleeve shall be 4 in.
6. Corner and Wall Padding: Provide as follows:
  - a. Wall protection mats shall be polyester reinforced solid vinyl, 14 oz. minimum, with 2 in., thick urethane foam padding. Mats shall have fire retardant covering. Sizes shall be as indicated on the Drawings.
  - b. Wall Pad: Porter No. 00355-600, 6' - 0" wall pad with Velcro attachment strips, manufactured by Porter Athletic Equipment Co., or approved equal.
  - c. Column Pad: Porter No. 00356-600, 6' - 0" column pads with Velcro attachment strips, manufactured by Porter Athletic Equipment Co., or approved equal.
  - d. Wrap Around Column Pad: Porter No. 97060-000, wrap around column mat, manufactured by Porter Athletic Equipment Co., or approved equal.
  - e. Color of matting and padding shall be selected by Architect from manufacturer's standard colors.
7. Tennis Net System: Provide floor mounted tennis net systems Porter Athletic Equipment Corporation model 02991-042 (net), 00947-00 (posts/standards), and 00875-200 (floor sleeves) or equal.
8. Batting Cage: Provide ceiling suspended, retractable batting cage, Porter Athletic Equipment model 90920. Batting cages shall be electrically operated from basketball goal control location.

END OF SECTION



**SECTION 124813 - ENTRANCE MATS AND FRAMES**

1. Work Included: The work of this Section includes, but is not limited to:
  - a. Entrance mats
2. Basis-Of-Design Products: Provide Grate Mat XT foot grille by Mats Inc., PO Box 839, 37 Shuman Avenue, Stoughton, MA, 02072; telephone 800-628-7462 or 781-344-1536; fax 781-344-1537; [www.matsinc.com](http://www.matsinc.com).
3. Exposed hinge rail connectors shall be vinyl hinge only complete with perforations for drainage. Tread rails shall be manufactured from aluminum, complete with co-extruded soft-durometer cushions, supplied in mill finish.
4. Tread Insert Options: Carpet shall meet the Carpet and Rug Institute's standard for indoor air quality. Fibers shall include a minimum of 100, 12 mil monofilament fibers per square inch and colorfast, solution dyed nylon. Available in one of 11 standard colors as offered by manufacturer. Each carpet fiber and monofilament shall be fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths. Carpet weight shall be 33 oz./sq. yd.
5. Framing for Aluminum Foot Grille: Aluminum frame shall be a 1 in. deep recessed frame in 6063-T5 aluminum alloy with 1/8 in. wide exposed surface. Frame color shall be mill finish.

-END OF SECTION-



**SECTION 125220 - ROLLER SHADES**

1. Description of Work: Work of this Section includes, but is not limited to:
  - a. Electrically operated window shades
  - b. Manually operated window shades
  
2. Electrically Operated Window Shades: Provide Mecho Electri-Shades, as manufactured by Mecho Shade Systems, Inc., or approved equal as manufactured by Nysan. Provide shade fabrics and features as follows:
  - a. Shade Cloth: Provide "EcoVeil" non-PVC shade cloth, color shall be as indicated on Drawings.
  
3. Manually Operated Shades: Provide Mecho Shades SlimShades, as manufactured by Mecho Shade Systems, Inc., or approved equal as manufactured by Nysan. Provide shade fabrics and features as follows:
  - a. Shade Cloth: Provide "EcoVeil" non-PVC shade cloth, color shall be as indicated on Drawings.

END OF SECTION



Section 126100  
FIXED AUDIENCE SEATING

**PART 1 - GENERAL**

1.1 SUMMARY

- A. The work of this Section consists of furnishing and installing fixed audience seating where shown on the Drawings, as specified herein, for a complete and proper installation.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Basis of Design (Specified Manufacturer): To establish a standard of quality, design and function desired, Drawings and specifications have been based on KI Furniture and Seating (KI):
  - 1. Seating Style: KI "Lancaster" Series.
  - 2. Wood species: KI "Standard Wood" series, color "Kensington Maple on Maple".
  - 3. Laminate: KI "Seating Laminates" series, color: "Kensington Maple".
- B. Acceptable manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
  - 1. KI Furniture and Seating, Green Bay, WI.
  - 2. Sedia Systems, Chicago IL.
  - 3. American Seating, Grand Rapids, MI.

2.2 MATERIALS - GENERAL

- A. Steel standards and back wings: All steel shall have smooth surfaces and be of sufficient gauge thickness and designed to withstand strains of normal use and abuse.
- B. Padding material: Seat and back padding material shall be of new (prime manufacture) polyurethane foam. Padding material shall comply with the flammability requirements outlined in California Technical Information Bulletin No. 117, Resilient Cellular Materials, Section A and D, dated February 1975, when tested in accordance with Federal Test Method Standard 191, Method 5903.2.
  - 1. Padding shall be securely adhered to plywood inner shell.
  - 2. Thickness: 2 inches.
- C. Wood: Plywood, exposed or concealed, hardwood, made with adhesive containing no added urea formaldehyde (NAUF).

- D. Upholstery Fabric: Fabric shall meet class 1 flammability requirements of US Department of Commerce Commercial Standard 191 per California Technical Bulletin No. 117.
  - 1. Treat fabric for fire retardance to comply with Massachusetts Fire Code Regulation FPR 20 and California Technical Fire Safety Bulletin 117 Section E, NFPA 701 and as additionally required by City of Boston Fire Marshall.
  - 2. Fabric color and pattern shall as selected by Architect, acceptable manufacturers include the following or approved equal.
    - a. KI Furniture and Seating, Green Bay, WI.
    - b. CF Stinson, Rochester Hills, MI.
    - c. Mayer Fabrics (Mayer-Paetz Inc.), Indianapolis, IN.
- E. Injection molded plastic: one-piece high-impact, linear polyethylene with built-in ultraviolet light inhibitors to retard fading. Plastic shall have a burn rate of 1 inch per minute when tested in accordance with ASTM D635 or the Department of Transportation Motor Vehicle Safety Standard No. 302. Color shall be selected from manufacturer's standard color range.

## 2.3 SEATING

- A. General: Floor attached type chairs, 19 to 23 inch widths, consisting of an attached inner upholstered back and hinged fully upholstered seat which automatically returns to an upright three-quarter fold position.
  - 1. Not more than 15 percent of all seating may be 19-inch width. No 19-inch width seats shall be placed adjacent to another 19-inch width seat. 19-inch width seats shall be randomly distributed throughout the auditorium and lecture halls in the widest possible dispersion pattern.
  - 2. Provide armless seats in compliance with accessibility requirements, where indicated on the Drawings.
  - 3. Provide transfer seats in compliance with accessibility requirements.
  - 4. Provide accessible locations as indicated.
- B. Standards: Floor mounted formed steel.
  - 1. Standards: The standards shall be pedestal design made by a rectangular tube, nominally 1 by 3 inches, with heavy gauge steel. A reinforced bracket for seat pan attachment shall be integrated into the standard which has an inlay at midpoint for resistance upon force.
  - 2. Aisle Standards-Rectangular-3/4 size design: The aisle standards shall be fabricated in the same manner as the center standards with a formed panel of 16 gauge steel welded to the column to accept a decorator panel:
    - a. Rectangular shaped end standard shall be painted with epoxy powder finish.
- C. Chair backs: Manufacturer's optional wood back panel with 3/8 inch thick veneer core and 1/16 inch thick maple veneer face, attached to 7/16 inch thick molded

plywood inner structure bonded with 2 inches of 1.8 pcf density urethane foam.

- D. Seat assembly: Self-lifting seat, padded and upholstered with one-piece injection molded outer panel and hardwood inner upholstery panel.
  - 1. Counter Balance: The seat pan shall rotate on two solid steel rods with lifetime lubricated nylon shoulder bushings. The rear area of the pan shall be weighted to create a counterbalance that allows the seat to return to 90 degree vertical position by means of gravity.
  - 2. Provide seat numbers and locate them on the front edge of the seat pan.
- E. Armrests: Solid wood, 3/4 inch thick by 2-1/4 inches wide and 12 inches long, steamed, kiln dried, with translucent finish.
  - 1. Finish:
    - a. Stain: Color as selected by the Architect.
    - b. Finish coats: 2 coats factory applied polyurethane.
  - 2. ADA swing-up armrests to hinge with cantilevered end standards to allow equal access for disabled patrons. Accessible chairs shall include the universal handicapped symbol on the cantilevered end aisle standard for clear identification.
    - a. Provide not less than eight seats or 1 percent of total seating whichever is greater with ADA transfer armrests.
    - b. Provide at each ADA companion seat:
      - 1) Manufacturer's signage for companion seating adjacent to all seats with ADA transfer armrests at locations as indicated on the Drawings and in compliance with all applicable laws, regulations, and codes.
- F. Aisle Lights (locate as indicated on approved shop drawings): UL listed, pre-wired and finished complete with utility box, light socket, LED lamp and detachable lens plate, located under arms.
  - 1. Provide 1 light per riser/step to be on side of seating areas coordinate with Division 26 – Electrical.
- G. Number and letter plates: 5/8 by 1-5/8 inch brushed aluminum finished plates with Helvetica Medium letter and numerals.
  - 1. Attach plates with escutcheon pins with matching finish.

## 2.4 FINISHES

- A. All exposed metal, including bolted connections shall have a baked enamel finish in color selected by Architect.

## PART 3 - EXECUTION

### 3.2 INSTALLATION

- A. Install chairs in locations indicated on reviewed and accepted shop drawings in

accordance with manufacturers written instructions.

1. Check all dimensions against shop drawings and make necessary adjustments for discrepancies in layout.

End of Section



## **SECTION 126600 - TELESCOPING BLEACHERS**

1. Work Included: Provide all labor, materials, equipment, and services necessary to complete the work indicated, and without limiting the generality thereof includes:
  - a. Retractable bleacher seating – wall attached, motorized telescoping wood bleachers (w/ plastic seats) with all associated hardware and railings.
2. Product: Provide Hussey Maxam Series Telescopic Gym Seat System or approved equal and as follows:
  1. Manufacturer: Hussey Seating Company, U.S.A.  
Address: North Berwick, Maine, 03906  
Telephone: (207) 676-2271; Fax: (207) 676-9690
  2. Model: MXM26 Series Telescopic Gym Seats, adjustable row spacing in two inch increments from 22 inches [559] to 26 inches [660].
    - 1) Aisle Type: foot level aisles, intermediate aisle steps.
    - 2) Seat Type: MVP (plastic seat module).
    - 3) Seat color finish: manufacturers 15 standard.
    - 4) Rail Type: Self-storing rail, aisle hand rails
    - 5) Operation: electrical power
    - 6) Electrical Power System: Integral power with pendant control.
  3. Product Description/Criteria:
    - 1) Bank Length: (2) banks @ 96'-6" long
    - 2) Aisle Widths: 4'6 wide
    - 3) Number of Tiers: 10 tiers
    - 4) Row Spacing(s): 26"
    - 5) Row Rise: 9 5/8"
    - 6) Open Dimension: 20'-7"
    - 7) Closed Dimension: 3'-7"
    - 8) Overall Unit Height: 7'-10"
  4. Miscellaneous Product Accessories: end panels, seat number's, row letters.
  5. Handicap Seating Provisions: Provide first tier handicap cutouts per requirements of (ADA) Americans with Disability Act located as indicated.
  6. Special Seating Graphics: Provide contrasting or matching seat top or seat base colors to create graphic pattern as indicated.
3. Lumber: ANSI/Voluntary Product 20, B & B Southern Pine
4. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.

5. Structural Steel Shapes, Plates and Bars: ASTM A 36.
6. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.
7. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45, or 50, Structural Quality, Hot-Rolled Strip.
8. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.
9. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, structural quality.
10. Structural Tubing: ASTM A500 Grade B, cold-formed.
11. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation; in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
12. Fasteners: Vibration-proof, of size and material standard with manufacturer.
13. Frame System:
  - a. Wheels: Not less than 5" diameter by 1-1/4" with non-marring soft rubber face to protect wood and synthetic floor surfaces, with molded-in sintered iron oil impregnated bushings to fit 3/8" diameter axles secured with E-type snap rings.
  - b. Lower Track: Continuous Positive Interglide System interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and through-bolted guide at front to prevent separation and misalignment. Each CPI unit shall contain a Low Profile Posi-Lock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacings.
  - c. Slant Columns: High tensile steel, tubular shape.
  - d. Sway Bracing: High tensile steel members through-bolted to columns.
  - e. Upper Guide: High tensile steel through-bolted to nose and riser. Interlocks with adjacent upper tier to prevent separation and misalignment. Provide adjustable stops to allow field adjustment of row spacings.
  - f. Deck Support: Securely captures decking for entire length of section.
14. Deck System:
  - a. Section Lengths: Each bank shall contain sections not to exceed 25'-6" in length with a minimum of two supporting frames per row, each section.
  - b. Nosing and Rear Riser: Continuous roll formed galvanized steel members.
  - c. Attachment: Through-Bolted fore/aft to deck guides, and frame cantilevers.
  - d. Decking: 5/8", AC grade, tongue & groove, transversely oriented plywood, interior type with exterior glue, 5-ply, all plies Southern Pine with plugged crossbands, produced in accordance with National Bureau of Standards PS-1-83. Longest unsupported span: MXM 26, 21-1/2"; MXM 33, 28 1/2".
  - e. Deck End Overhang: Not to exceed frame support by more than 5'-7".
15. MVP Seat System:

- a. Seat Modules: 18" long unitized, interlocking, engineered, high density polyethylene modules providing scuff resistant textured 10" wide anatomically contoured seat surface. 1/2" minimum interlock on seat and face.
  - b. Profile: Designed with internal reinforcement ribs and cantilevered to the rear to provide not less than 3" smooth toe space beneath the seat.
  - c. Seat Support: Each seat support module shall be secured against fore/aft movement by not less than (2) two longitudinally sited steel fasteners spaced no less than 2 1/4" on center, creating a steel to steel connection, tying the structure firmly to the steel nosing.
  - d. Number Plates: Seat module shall be designed to accept seat number plates.
  - e. End Caps: Each end of row shall be enclosed with matching end caps. End caps shall be designed with concealed attachment and provide indent for row letters. Color to match seat top.
16. Integral Power: Furnish and install Hussey (PF 1, 2, 3, or 4), an integral automatic electro-mechanical propulsion system, to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed.
- a. Operation shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward, and reverse control of the power operation.
  - b. Each Powered Frame unit shall consist of output shaft gear reducer with 6" diameter x 4" wide wheels covered with non-marring 1/2" thick composite rubber. Reducers shall be fitted with induction motors which will provide an average operating speed of (46/25) f.p.m.
  - c. Operating Loads: Each Powered Frame provides (220 / 550) lbs pull force which equals approximately (28 / 35) lbs psi lateral force on the floor.
  - d. Limit Switches: Furnish and install both open and closed limit switches for the integral power system. The limit switches will automatically stop integral power operation when seating has reached the fully extended or closed position.
17. Power operation shall utilize a combination of contactors and limit switches to insure the wiring is not energized except during operation. Straight wired electric system is not allowed.
- a. Motion Monitor: Provide flashing light with self-contained warning horn rated at 85 db at 10' mounted under telescopic seating for audio and visual warning during integral power operation.
  - b. Electrical: Seating Manufacturer shall provide all wiring within seating bank including pendant control.
    - 1) Each unit is power operated by a 1/2 horsepower, 1725 R.P.M., 208 Volts, 50/60 Hz., three phase 1.25 service factor motor. This motor draws a full load current of 2.2 amperes. Power supply required shall be 120/208 volts three phase 4 wire plus ground service with 20 amps. Motors, housing, and wiring shall be installed and grounded in complete accord with the National Electric Code.
    - 2) The electrical contractor shall provide required power source with no greater than 4% voltage drop at the seatings junction box. The electrical contractor shall perform all wiring connections in junction box that are attached to or a part of the building.

18. Flex-Row: Provide first ROW modular units to be utilized by persons in wheelchairs and able bodied persons. Each Flex-Row unit shall have an unlock lever for easy deployment if wheelchair access is needed. Unlock lever shall lock the bleacher seats into position when fully opened.
  - a. Provide a black full surround skirting 1/2" off the floor for safety and improved aesthetics.
  - b. Provide a black injection molded end cap for the nose beam for safety and improved aesthetics.
  - c. Provide a mechanical positive lock when the Flex-Row system is in the open and used position.
  - d. Flex-Row modular units are designed to achieve multi-use front row seating to accommodate team seating, ADA requirements and facility specific requirements. Flex-Row units are available in modular units from 2 - 7 seats wide as well as full section widths.
19. Provide a removable belt barrier with or without signage for the rear of each recoverable Flex-Row module to assist with seating identification.
20. Front Aisle Steps: Provide at each vertical aisle location front aisle step. Front steps shall engage with front row to prevent accidental separation or movement. Steps shall be fitted with four non-skid rubber feet each 1/2" in diameter. Blow molded end caps shall have full radius on all four edges. Quantity and location as indicated.
21. Non-Slip Tread: Provide at front edge of each aisle locations an adhesive-backed abrasive non-slip tread surface.
22. Foot Level Aisles: Provide deck level full width vertical aisles located as indicated.
23. Intermediate Aisle Steps: Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Step shall have non-skid on surface. Quantity and location as indicated.
24. Intermediate Aisle Handrails: Provide single pedestal mount handrails 34" high with terminating mid rail. Handrails shall be attached to the socket and shall rotate 90° for easy storage in socket. Aisle handrails that are detached from the socket for storage are unacceptable.
25. End Panel: Provide closure end panels for stack position at each exposed bank ends. End panels shall be constructed of 5/8" Southern pine plywood or Polydeck.
26. Self Storing End Rails: Provide steel self-storing 42" high above seat, end rail with tubular supports and intermediate members designed with 4" sphere passage requirements.
27. Seat Numbers: Provide each plastic seat module with a 1-3/4" x 1 1/4" oval etched Lexan plate. Easy to read black numerals will be on the plate fitted in a vandal resistant recess

28. Row Letters: Provide at each row end of plastic seat a 1 3/4" x 1 1/4" oval etched Lexan plate with black numerals. Plates to be fitted flush in vandal resistant end cap recess.
29. Poly Deck: Shall be a high-density polyethylene overlay panel fabricated with a skid-resistant textured top surface of 100% moisture barrier bonded to a plywood substrate with an exterior glue. Panel thickness shall be 5/8" with top polyethylene surface colored weathered gray.

END OF SECTION



**SECTION 142400 - HYDRAULIC ELEVATORS**

1. Work Included: Provide as follows:
  - a. Hydraulic passenger elevator.
  - b. Electrical work to provide power and telephone wiring from disconnect switch in equipment room to hoistway and elevator.
2. Comply with the requirements of ANSI A17.1.
3. Comply with NFPA codes relating to electrical work, elevators, and fire-resistance ratings of hoistway entrances. Comply with NFPA 80 and provide UL labeled entrances with 30 minute temperature rise labels.
4. Comply with MDPS regulations when in conflict with ANSI A117.1 and ANSI A17.1. Where conflicts exist between codes and standards, MDPS Elevator Code shall take precedent.
5. Manufacturers: Provide products of one of the following manufacturers that meet or exceed requirements specified:
  - a. Dover Elevator Co.
  - b. Montgomery Elevator Co.
  - c. Otis Elevator Co.
  - d. Schindler Elevator Corp.
  - e. U. S. Elevator Co.
6. Product: Provide pre-engineered, packaged or custom hydraulic elevator unit that fulfill the Specification requirements and have the features and characteristics scheduled.
7. Single Car Elevator Control: Provide solid state "Selective Collective Automatic Operation", as defined by ANSI A17.1, for each hydraulic elevator.
8. Passenger Elevator:

Quantity:	One
Type:	Passenger
Elevator No.:	1
Speed:	100 fpm
Capacity:	2,500 lb.
Landings Served:	Two
Number of Openings:	Two
Operation:	Simplex Selective Collective
Door Operation:	Single Speed Side Opening
Power Supplied:	480 volts, 3-phase, 60 hertz
Car Enclosure:	Stainless steel panels on walls and ceilings
Door Finish:	Stainless steel on cab and hoistway doors

END OF SECTION





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## **FIRE PROTECTION SYSTEMS**

### **NARRATIVE REPORT**

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system, as well as, the Basis of Design.

1. CODES
  - A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. 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 Fire Protection work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000 s.f. must be protected with an automatic sprinkler system.
4. DESCRIPTION
  - A. The new building will be served by a new 8-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.
  - B. System will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.
  - C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain. Standpipes meeting the requirements of NFPA 14-2013 shall be provided in the egress stairwells and in the Stage area.
  - D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.
  - E. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.
5. BASIS OF DESIGN
  - A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; stage is considered Ordinary Hazard Group 2; all other areas are considered light hazard.

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B. Required Design Densities:

Light Hazard Areas = 0.10 GPM over 1,500 s.f.  
Ordinary Hazard Group 1 = 0.15 GPM over 1,500 s.f.  
Ordinary Hazard Group 2 = 0.20 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):

Light Hazard Areas = 225 s.f.  
Ordinary Hazard Areas = 130 s.f.

D. A flow test will be performed to confirm the Municipal water supply capacity.

6. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

7. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

8. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

9. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

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10. SPRINKLERS

- A. All sprinklers to be used on this project shall be Quick Response type. Sprinklers shall be manufactured by Tyco, Victaulic, Viking, or equal.
- B. Furnish spare heads of each type installed located in a cabinet along with special sprinkler wrenches. The number of spares and location of cabinet shall be in complete accord with NFPA 13-2013.
- C. Upright sprinkler heads in areas with no ceilings shall be Tyco Model "TY-FRB" Quick Response, upright natural brass finish heads. Include heavy duty sprinkler guards in all mechanical rooms and storage rooms.
- D. Sidewall heads shall be Tyco Model "TY-FRB" Quick Response with white polyester head and escutcheon.
- E. Pendent wet sprinkler heads shall be Tyco Model "TY-FRB" Quick Response recessed adjustable escutcheon, white polyester finish.
- F. Concealed heads shall be Tyco Model "RFII" Quick Response concealed type, 1-1/2 inch adjustment white cover plate. In special areas, as may be noted on the Drawings, provide alternate cover plate finishes.
- G. Use of flexible stainless steel hose with fittings for fire protection service that connect sprinklers to branch lines in suspended ceilings is acceptable. Flexible hoses shall be UL/FM approved and shall comply with NFPA 13 standards. Hose assemblies shall be type 304 stainless steel with minimum 1-inch true-bore internal hose diameter. Ceiling bracket shall be galvanized steel and include multi-port style self-securing integrated snap-on clip ends that attach directly to the ceiling with tamper resistant screws.



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## **PLUMBING SYSTEMS**

### **NARRATIVE REPORT**

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

#### 1. CODES

- A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

#### 2. DESIGN INTENT

- A. 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 Plumbing work and all items incidental thereto, including commissioning and testing.

#### 3. GENERAL

- A. The Plumbing Systems that will serve the project are cold water, hot water, tempered water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas.
- B. The Building will be serviced by Municipal water and Municipal sewer system.
- C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

#### 4. DRAINAGE SYSTEM

- A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.
- B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and server area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.
- C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point 10 feet outside the building.
- D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.

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- E. A separate Special Waste System shall be provided starting with a connection to an interior limestone chip acid neutralizer, running thru the building to collect science classroom fixtures and terminating with vent terminals through the roof. Special Waste and Vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

5. WATER SYSTEM

- A. New 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.
- B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.
- C. Water piping will be type 'L' copper with wrought copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high density fiberglass.
- D. A dedicated non-potable water system will be provided to Science Classrooms. Water system will be protected with a reduced pressure backflow preventer.
- E. Tepid (70 deg. F – 90 deg. F) water will be provided to the emergency shower/eyewash fixtures in Science Classrooms as required by code.
- F. Domestic hot water will be provided with electric, point-of-use, instantaneous water heaters.

6. FIXTURES **LEED v4**

- A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.
- B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
- D. Fixtures shall be as scheduled on drawings.
  - 1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.
  - 2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.
  - 3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet.

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4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.
5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.
7. Laboratory Sinks: Faucets with vacuum breakers and 0.74 GPM aerators.

7. DRAINS

- A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

8. VALVES

- A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

9. INSULATION

- A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

10. CLEANOUTS

- A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.
- B. Cleanouts for Special Waste System shall be Zurn #Z9A-C04 polypropylene cleanout plug with Zurn #ZANB-1463-VP nickel bronze scoriated floor access cover.

11. ACCESS DOORS

- A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.





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## HVAC SYSTEMS

### NARRATIVE REPORT

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system 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.

#### 1. CODES

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

#### 2. 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.

#### 3. BASIS OF DESIGN: (MASS CODE)

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.

Outside: Winter 5 deg. F, Summer 91 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 is provided at the rate in accordance with ASHRAE guide 62.1-2013 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

#### 4. SYSTEM DESCRIPTION

##### A. Central Heating and Cooling Plant: **LEED for Schools v4 Credit Ep2 & Ec2**

Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including (5) five water to water source simultaneous heating/cooling heat pump chillers with heat recovery with a capacity of 78 tons each. The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with condenser water from evaporative fluid coolers.

A new supplemental boiler plant shall be provided with (3) 2,300 MBH output electric boilers, each will be located in the mechanical room. Boilers shall each be sized for approximately 50% of the building heating load.

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The heat pump chiller plant and supplemental 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 plant shall supply a maximum hot water temperature of 160°F on a design heating day. Primary and standby end suction base mounted pumps with a capacity of 500 gpm and will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

The heat pump chiller plant will distribute between 45°F and 55°F chilled water to the roof mounted air handling units and a compensated chilled water distribution system located throughout the building will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels and induction units. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Chilled water pumps with a capacity of 800 gpm and variable frequency drives (which will control down to maintain a minimum flow to the chiller) will be provided for overall variable flow chilled water system distribution. In addition to pumps, new chilled water accessories including air separators and expansion tanks shall be provided.

Primary and standby condenser water pumps with a capacity of 800 gpm and variable frequency drives (which will control down to maintain a minimum flow to the heat pumps chillers) will be provided for overall variable flow condenser water system distribution. In addition to pumps, new condenser water accessories including air separators and expansion tanks shall be provided.

#### Net Zero Geothermal Option

As an alternate option, a closed-loop geothermal well system can be utilized in lieu of the fluid cooler and supplemental electric boilers described above. The heat pump heat recovery chillers will be provided with ground-source condenser water from (56) 675' deep closed loop type ground source geothermal quad wells.

Under this alternate, the plant shall supply a maximum hot water temperature of 130°F on a design heating day and the condenser water pumps will have a capacity of 1,000 gpm.

- B. Classroom Heating, Ventilation & Air Conditioning (*General Classrooms, Art/Music/Drama Rooms, Science Classrooms, Administration Areas, Dining Commons, Gymnasiums, Locker Rooms, Multi-Purpose, Stage, Media Center, and Support Areas*) (**Full Air Conditioning VAV Displacement System**)  
**LEED of Schools v4 Credit Ep2 & 4, Ec2, IEQp1, IEQc1, 2, 3, & 4**

The air-conditioned areas are to be served by new air handling units of the recirculation type design providing a fully air conditioned variable volume displacement ventilation air distribution systems.

New air handling units with supply and return fan with VFDs, energy recovery 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. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided

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along exterior walls.

Each space 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 areas:

AHU-1: Air handling unit with a capacity of 6,000 CFM (16 tons cooling, 230 MBH heating), to serve the Gymnasium Areas

AHU-2: Air handling unit with a capacity of 4,500 CFM (12 tons cooling, 170 MBH heating), to serve the Small Gymnasium and Locker Room Areas

AHU-4: Air handling unit with a capacity of 45,000 CFM (120 tons cooling, 1700 MBH heating), to serve the Classrooms (West), Science Classrooms, Administration Areas, Media Center, and Support Areas

AHU-5: Air handling unit with a capacity of 55,000 CFM (147 tons cooling, 2100 MBH heating), to serve the Classrooms (East), Art/Music/Drama Rooms, Science Classrooms, Dining Commons, Multi-Purpose, Stage, and Support Areas

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

The kitchen areas shall be provided with a kitchen exhaust fan from a new kitchen exhaust air fan system. It is estimated that a kitchen exhaust fan system with a capacity of 5,000 CFM is required. The kitchen will be heated and provided with make-up air from a 4,500 CFM make-up air handling unit (AHU-3) and will include supply and return fans with VFDs, 170 MBH hot water heating section with modulating capacity control, 12 ton chilled water cooling coil with modulating capacity control, energy recovery wheel, and MERV 13 filtration.

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.

D. 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 common circulation air handling unit systems.

E. Custodial Support Areas:

Custodial support areas will be heated and ventilated. 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.

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F. 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.

G. Testing, Adjusting, Balancing & Commissioning:

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

H. 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).

Lighting control and door access control system shall be integrated into the BMS system.

The control system shall be as manufactured by Johnson Controls (Metasys), Siemens (Apogee) or Delta Controls.

5. TESTING REQUIREMENTS:

A. The mechanical contractor shall provide testing of the following systems with the owner and owner's representative present:

1. Net Zero Option – Ground-source Heat Pump system
2. VRF (Variable Refrigerant Flow) System
3. Air handling unit systems including all indoor and rooftop air handling systems and exhaust air systems
4. Terminal heating and cooling devices
5. Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the engineer for review and approval before providing to the owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS: When the project is completed, the mechanical contractor shall provide operation and maintenance manuals to the owner.

7. 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.

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

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## ELECTRICAL SYSTEMS

### NARRATIVE REPORT

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system 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. This project shall conform to a Platinum award level and has a minimum target of a Silver award level. The project has a goal of Net Zero.

#### 1. CODES

All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2015 and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

#### 2. DESIGN INTENT

The work of Section 260000 is indicated in this narrative report. 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.

#### 3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Classroom and corridor lighting will be controlled via “addressable relays”, which is achieved through programming. The control of the relays shall be by automatic means such as an occupancy sensor in each classroom and corridors. The lighting controls will be part of the Building Management System.
- B. Exterior lighting will be controlled by photocell “on” and “schedule” for “off” operation. The vehicle circulation area lighting will be controlled by “zones” and will have dimming-level control.
- C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions.

#### 4. DESCRIPTION OF THE SYSTEMS

##### A. Electrical Distribution System:

- 1. New construction service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100% rating at 277/480 volt, 3Ø, 4wire. New lighting and power panels will be provided to accommodate respective loads. The service capacity will be sized for 20% spare capacity. The service will be central to main building and feed other buildings. A single meter will be used for entire site so that future PV will serve all loads on site.

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B. Interior Lighting System:

1. Classroom lighting fixtures consist of indirect cove mounted LED luminaires with dimming drivers. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Office lighting fixtures will consist of similar fixtures to classrooms. Offices on the perimeter with windows shall have daylight dimming controls.

In general lighting power density will be 40 percent less than IECC 2015. The power density reduction relates to **LEED for Schools Credit EAC1**.

2. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with **LEED for Schools IEQ 6.1**.
3. Gymnasium and multi-purpose lighting will be comprised of indirect cove mounted LED fixtures with dimming drivers. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 40 foot candles.

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

4. Corridor lighting will be comprised of linear indirect lighting using LED light source. The corridor light level will be designed for approximately 20 foot candles. Corridor lighting will be on a schedule through the BMS system control and only "on" during occupied hours. The corridor lighting will have two level control.
5. Cafeteria lighting will be LED fixtures with dimming drivers. The light levels will be designed for approximately 30 foot candles.
6. Kitchen and Servery lighting will consist of recessed 1 ft. x 4 ft. lensed and gasketed LED panels. Light levels will be approximately 50 foot candles.
7. Library lighting will consist of indirect fixtures with LED dimmable drivers. Light levels will be approximately 30 foot candles.
9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room where natural light is available for dimming of light fixtures. The manual controls will allow user to dim each scene.
10. The entire school will be controlled with an automatic lighting control system using the BMS control system for schedule and programming of lights controls.

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C. Emergency Lighting System:

1. An interior 400 kW natural gas fuelled indoor emergency generator will be provided. Emergency 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.
2. The generator will be sized to include life safety systems, kitchen refrigeration, non-fossil fuel HVAC equipment (heating for freeze protection) and communications systems.

D. Site Lighting System

1. Fixtures for area lighting will be pole-mounted cut-off 'LED' luminaries in the drop-off areas. Pole heights will be below 12 ft. The exterior lighting will be connected to the BMS system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5 foot candle minimum for parking areas in accordance with Illuminating Engineering Society.
2. Building perimeter fixtures will be wall mounted cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. 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. Refer to drawings.
2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25 foot intervals.
4. Exterior weatherproof receptacles will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with 60 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 control panel shall be manufactured by Notifier.
2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.

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4. 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. A mass notification system shall be provided integral with fire alarm system.
  5. Manual pull stations will be provided at exit discharge doors.
  6. The system will be remotely connected to automatically report alarms to fire department via wireless master box (32 zones).
- G. Uninterruptible Power Supply (UPS):
1. One (1) 30kw, three (3) phase centralized UPS systems will be provided with battery back-up.
  2. 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, communication systems, etc. during a prolonged power outage.
  3. The UPS systems will also be connected to the stand by generator.
- H. Lightning Preventer System:
1. Lightning preventer devices will be provided to provide coverage for the entire building.
  2. The lightning preventer equipment will include lightning preventers, conductors, conduits, fasteners, connectors, ground rods, etc.
5. NET ZERO OPTION – NON USE OF FOSSIL FUELS

The following items are regarding the Net Zero Energy Design for the Electrical Systems without the use of fossil fuels.

The Electrical service will be increased in size to compensate for electric cooking and domestic hot water. The anticipated electrical load is approximately 150 KW. Presently, the service size 2,000 amps, 277/480 volt, 3 phase, 4 wire with 3,000 amp bussing to accommodate the PV System.

The additional service increase of approximately 181 amps will result in utilizing a service of 2,500 amps, 277/480 volt, 3 phase, 4 wire with 4,000 amp bussing to accommodate the PV system.



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6. 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.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.

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

7. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

8. 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.

9. COMMISSIONING

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

10. RENEWABLE ENERGY PROVISIONS

Provisions for a renewable energy system will consist of largest capacity (restricted by roof area) grid connected photovoltaic PV system intended to reduce the facilities demand for electricity and reduce carbon emissions. The photovoltaic system will be installed at a future date. The project will be PV ready.

11. SITE UTILITIES

The Electric, Telephone and Cable TV utilities will be underground for each system provided.

12. CCTV

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).

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The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

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.

### 13. INTRUSION SYSTEM

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.

The system will include a digital communicator to summons the central station in the event of an alarm condition.

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

### 14. CARD ACCESS

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.

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.

The system is modular and may be easily expanded to accommodate any additional devices.

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## **TECHNOLOGY SYSTEMS**

### **NARRATIVE REPORT**

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

#### 1. CODES

- A. All work installed under Section 270000 shall comply with the Massachusetts Building Code, IBC 2015, and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

#### 2. DESIGN INTENT

- A. 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 and Security work and all items incidental thereto, including commissioning and testing.

#### 3. TECHNOLOGY

- A. The data system infrastructure will consist of fiber optic backbone cabling. Horizontal wiring will consist of Category 6A UTP Non-Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate VOIP based voice systems. An IP telephone system will be used.
- B. Each classroom will have 2 data outlets for student computers. Two data with video and audio connections to a wall mounted touch screen monitor will be provided at teacher's station. A wall phone will be provided for communications with administration in each classroom. Wireless access points will be provided in all classrooms and other spaces with (2) CAT6A cables.
- C. A central paging system will be provided and integrated with the telephone system. The speakers shall be IP and manufactured by Valcom with InformaCast License.
- D. A wireless GPS/LAN based master clock system will be provided with 120V wireless remote clocks that act as transceivers.
- E. 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 40 Gbps Ethernet.

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4. TESTING REQUIREMENTS

A. The Technology and Security Contractors shall provide testing of the following systems with the Owner and Owner's representative present:

- Telephone and data cabling
- Fiber optic backbone cabling
- IP Paging system
- Wireless clock system
- A/V wiring for classrooms

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

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

A. 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.

7. COMMISSIONING

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



**PRELIMINARY FOUNDATION  
ENGINEERING REPORT**

**MICHAEL DRISCOLL SCHOOL**

**BROOKLINE, MASSACHUSETTS**

**NOVEMBER 27, 2018**

Prepared For:

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**PROJECT NO. 6693.2.00**



November 27, 2018

Jonathan Levi Architects  
266 Beacon Street  
Boston, MA 02116

Attention: Ms. Carol Harris

Reference: Michael Driscoll School; Brookline, Massachusetts  
Preliminary Foundation Engineering Report

Ladies and Gentlemen:

This report documents the results of our subsurface exploration program and preliminary foundation design study for the proposed redevelopment of the Michael Driscoll School (MDS) located in Brookline, Massachusetts.

This report was prepared in accordance with our proposal dated October 29, 2018, and the subsequent authorization of Jonathan Levi Architects (JLA). These services are subject to the limitations contained in **Appendix A**.

### **Purpose and Scope**

The purpose of our preliminary foundation design study was to obtain initial subsurface information across the proposed building site and to identify preliminary foundation design considerations associated with the proposed building.

### **Available Information**

Information provided to McPhail Associates, LLC (McPhail) by JLA included the following:

- A 30-scale drawing entitled "Existing Conditions Plan of Land in Brookline, MA" dated November 6, 2018 prepared by Hancock Associates, Inc.;
- An undated plan entitled "Concept Design Thumbnail Site Plan" prepared JLA; and
- A set of drawing entitled "Alternations to Michael Driscoll School for the Town of Brookline, Massachusetts" dated December 12, 1928 and prepared by Little and Russel Architects.

In addition, for this report McPhail utilized Sanborn Maps dated 1898, 1925, 1957, 1965 and 1969 obtained from Environmental Data Resources (EDR) website and a map entitled "Town of Brookline - Atlas 1876" obtained from Brookline Historical Society - Maps and Atlases website. These maps are contained in **Appendix B**.



### **Existing Site Conditions**

The existing Michael Driscoll School fronts onto Westbourne Terrace to the north, and is bounded by Bartlett Street to the west. Bartlett Crescent parallels the school to the southwest. Currently, an existing 2 to 3-story brick school building occupies the northern portion of the site, a playground, an athletic field and tennis courts are present at the southern and eastern ends of the school property. The existing ground surface across the project site generally slopes from north to south ranging from approximately Elevation +125 along Westbourne Street to about Elevation +103 along Washington Street.

Based on our review of historic Town of Brookline maps, the site formerly contained a drainage feature which ran through the existing school property from the northwest to the southeast roughly parallel to Washington Street and extending to Beacon Street. In addition, based on our review of historic United States Geological Survey (USGS) maps, the northern portion of the site is located along the edge of Corey's Hill. Based on the information obtained from Sanborn maps, it is understood that the original school building was constructed in the early 1900's and that three (3) building additions were constructed to the existing school building to the northwest in 1928, and to the southeast in 1957 and in the 1960s.

Based on the review of available drawings, it is understood that the northwestern portion of the existing building was benched into the existing slope along the Westbourne Terrace, while other building additions are level with the existing ground surface that surrounds the existing building. Also, it is understood that except within the boiler area, the school building does not contain below grade space. Generally, the first-floor slab of the existing building ranges from Elevation +108.5 to Elevation +113.1. Furthermore, the existing drawings indicate that the existing school addition that was built in 1928 building is supported on a conventional footing foundation system in conjunction with a soil-supported slab-on-grade. Since the northern portion of the site is located along Corey's Hill, it is anticipated that the school building with its additions is supported on conventional footing foundation system.

Elevations cited herein are in feet and are referenced to Town of Brookline Datum.

### **Proposed Construction**

Based on the information provided to us, it is understood that the proposed project is in the planning phase, and that the proposed construction is anticipated to be located within the southern portion of the parcel as a new building or potential new additions to the existing school building. At this phase of the project, it is unknown if the proposed structure will contain below grade space. Based on the information provided to us, the proposed structure will generally be located within the existing playground, athletic field or tennis courts.



### **Subsurface Explorations**

A subsurface exploration program consisting of five (5) borings was conducted at the site on November 9, 2018 by Carr-Dee Corp. under contract to McPhail. The borings were performed utilizing truck-mounted drilling equipment. Boring logs prepared by McPhail are contained in **Appendix C**. Approximate plan locations of the borings are as indicated on the enclosed Subsurface Exploration Plan, **Figure 2**.

The borings were performed utilizing NW casing using a truck-mounted drill rig. Standard 2-inch O.D. split-spoon samples and standard penetration tests (SPT) were generally obtained at approximate 5-foot intervals of depth, in general accordance with the standard procedures described in ASTM D1586.

Borings B-1 through B-5 were terminated within a glacial till or glacial outwash deposit at depths ranging from 22 to 32 feet below the existing ground surface. A groundwater observation well was installed within completed borehole B-2 (OW).

The borings were observed by representatives of McPhail who performed field layout, prepared field logs, obtained and visually classified soil samples, monitored groundwater conditions in the open boreholes and observation well, and determined the required boring depths based upon the actual subsurface conditions encountered.

Field locations of the borings were determined by taping from existing site features indicated on the existing conditions plan provided to us. The existing ground surface elevation at each boring location was determined by a level survey performed by our field staff utilizing vertical control information indicated on the plan.

### **Laboratory Testing**

At the completion of the subsurface exploration program, soil samples were returned to our laboratory for more detailed classification, analysis, and testing. The laboratory testing consisted of sieve analyses to determine the grain size distribution and confirm the visual classifications of the fill material, subsoil, glacial outwash and glacial till deposits. Laboratory test procedures were in general accordance with applicable ASTM Standards. Results of the gradation testing appear on **Figure 3, Figure 4, Figure 5 and Figure 6** following the text of this report.

### **Subsurface Conditions**

A detailed description of the subsurface conditions encountered within the borings are documented on the boring logs contained in **Appendix C**. In addition, a summary of the boring explorations is contained in the enclosed **Table 1**. Based on the results of these explorations, the following is a description of the generalized subsurface conditions encountered across the site from ground surface downward.





The surface treatments encountered at boring locations consisted of a 3-inch thickness of asphalt or a 6-inch thickness of topsoil. Below the surface treatment, a fill material of about 9.5 to 18.2 feet in thickness was encountered and observed to generally range from a loose to compact, light to dark brown sand and gravel with some silty and gravelly sand with trace brick and asphalt. Grain size distributions of representative samples of the fill material are presented on **Figure 3**.

A 2-foot thick layer of subsoil was encountered below the fill deposit within boring B-4. The subsoil was generally observed to consist of a loose, orange to brown sandy silt with trace gravel. Grain size distribution of a sample of the subsoil is indicated on **Figure 4**.

Underlying the fill deposit, two (2) borings, B-2 (OW) and B-5, performed within the central portion of the site, encountered a 2 to 3.5-foot thick organic deposit, which consist of a stiff, brown to black, organic silt with some sand and peat fibers.

The presence of the fill and organic soils encountered in the borings is anticipated to be associated with the former drainage feature that was located at the site as indicated in the "Existing Site Conditions" portion of the report.

A natural glacial outwash deposit was encountered in boring B-2 (OW) underlying the fill and organic silt deposits. The natural glacial outwash deposit was encountered within the boring at a depth of 22 feet below ground surface corresponding to Elevation +82.2. The glacial outwash deposit was generally observed to consist of a compact to dense, gray to brown, silty sand some gravel. Grain size distribution of a sample of the glacial outwash deposit is indicated on **Figure 5**.

Below the fill, subsoil, and/or organic deposits, a natural glacial till deposit was encountered at depths ranging from 10 to 22 feet below ground surface corresponding to Elevation +97.0 to Elevation +84.7. The glacial till was observed to vary from a compact to very dense, orange/brown to gray/brown, sand and gravel with some silt to a sandy gravel with some silt. Grain size distributions of samples of the glacial till deposit are shown on **Figure 6**.

Groundwater was observed within the completed boreholes at approximate depths of 9 to 17 feet below ground surface, corresponding to about Elevation +98.2 to Elevation +87.0, respectively. Groundwater levels recorded in observation well B-2 (OW) range from depths of 9 to 10.9 feet below ground surface corresponding to Elevation +95.2 to Elevation +93.3. A groundwater monitoring report is contained in **Appendix D**. It is anticipated that the groundwater level at the site may vary due to factors such as normal seasonal changes, runoff particularly during or following periods of heavy precipitation, and alterations of existing drainage patterns.



### **Preliminary Foundation Design Recommendations**

It is understood that the specific location and scope of the proposed construction is undetermined based on the current phase of the project. In consideration of the results of the preliminary subsurface explorations, a significant thickness (up to 22 feet) of soil unsuitable for foundation support is present across the site which will likely result in premium foundation costs. However, given the site topography and the subsurface conditions encountered in boring B-3, it is anticipated that the natural inorganic soil deposits will likely be encountered at shallower depths towards the Westbourne Terrace side of the site. Therefore, to reduce premium foundation costs, it is recommended that the proposed construction be located towards the northern portion of the site and include a basement level. This approach is anticipated to reduce the amount of unsuitable soil which may be encountered below the foundation level. Alternatively, foundation support of the proposed construction should be addressed as indicated below.

Due to the very loose relative density of the surficial fill and the organic deposit, it is anticipated that support of the proposed building will require the building loads to be transferred to the surface of the underlying glacial outwash and glacial till deposits. Therefore, based on the anticipated structural loads from the proposed structure and the subsurface conditions encountered at the site, for preliminary design purposes it is recommended that foundation support of the proposed structure be provided by conventional spread footing foundation and a soil supported slab-on-grade. It is recommended that the proposed spread footings and conventional slab-on-grade of the proposed building footprint be improved by Aggregate Pier (AP) installed through the existing fill and organic silt deposits. Based on the results of the preliminary explorations, the APs would extend to the top of the glacial outwash/till deposit and range up to about 22 feet in length.

It is recommended that the footings be proportioned utilizing a maximum allowable design bearing pressure of two (2) tons per square-foot (tsf). Recommended minimum footing widths for continuous and isolated spread footings are 24 and 30 inches, respectively.

### **Ground Improvement**

In general, an AP cavity is created by either augering open-hole or driving an approximately 12 to 16-inch closed-end diameter casing to the surface of the glacial outwash/till deposit. Aggregate is then introduced either through a top-feed or bottom-feed system and the subsequent dynamic compaction of aggregate layers introduced into the cavity. The use of a closed-ended temporary casing with bottom-feed capability eliminates spoils as all penetrated soils are displaced laterally. After creating the AP cavity to the design depth, aggregate is placed inside the void. The aggregate is compacted into layers of about 1-foot in thickness and the process is repeated to the top of the cavity, forming the AP. The compaction densifies the aggregate and increases the lateral stress in the soil matrix beneath the proposed buildings.



Additionally, the aggregate may be grouted to increase the stiffness of the AP in very loose granular deposits or in organic materials. Potential for larger settlements is reduced by improving the unsuitable soils to a stiffer composite soil matrix with the installation of the AP.

Since ground improvement techniques are provided by a design-build consultant, detailed design calculations should be submitted to the Architect for review prior to the beginning of construction. A detailed explanation of the design parameters for capacity and settlement calculations should be included in the design submittal. The design submittal should also include a testing program to demonstrate the design capacity of the aggregate pier elements is being achieved. All calculations and drawings should be prepared and sealed by a Professional Engineer licensed in the Commonwealth of Massachusetts and retained by the Contractor who is to perform the work.

The following general criteria should be utilized in the design of aggregate piers:

1. Aggregate piers should extend at least to the surface of the glacial outwash/till deposit;
2. The maximum allowable bearing pressure supported on a reinforced ground surface which extends to the glacial outwash/till deposit should be equal to or less than 2 tsf;
3. Estimated long-term settlement for footings should be less than 1-inch;
4. Estimated long-term differential settlement of adjacent footings should be less than 1/2-inch; and
5. A modulus load test should be performed on at least one aggregate pier to 150 percent of the maximum design stress.

To control potential cosmetic cracking of the lowest-level slab within areas where the fill and organic silt deposits remain below the slab-on-grade, APs can be installed in a grid pattern for support of the slab. Typically, the APs are installed on an approximately 10-foot square grid which would be designed by the AP Contractor.

Additional subsurface explorations will be necessary to further delineate the areas of the proposed building.

#### General Foundation Recommendations

The lowest-level slab within the conventional footing foundation portion of the building should consist of a conventional slab-on-grade.

Underslab and perimeter drainage should be provided where the lowest-level slab is greater than 12 inches below the finished exterior grade. Therefore, the proposed grading plan should be provided to McPhail for review to determine if foundation and underslab drainage is required. Recommendations for foundation drainage, if required, would be contained in the Final Foundation Engineering Report.



Perimeter foundations and interior foundations located adjacent to unheated areas should be provided with a minimum 4-foot thickness of soil cover as frost protection. Interior footings below heated areas should be located such that the top of the foundation concrete is at least 6 inches below the underside of the lowest level slab. All foundations should be located such that they bear below a theoretical line drawn upward and outward at 2 to 1 (horizontal to vertical) from the bottom exterior edge of all existing adjacent footings, structures and utilities

All localized depressions in the lowest level slab (such as elevator pits, etc.) should be provided with properly tied continuous waterstops in all construction joints and cementitious waterproofing to protect against groundwater intrusion. Furthermore, the perimeter below-grade foundation walls should receive a trowelled-on bitumastic damproofing.

Below-grade foundation walls receiving lateral support at the top and bottom (i.e. restrained walls) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 60 pounds per cubic-foot. Similarly, drained cantilevered retaining walls, (i.e. receiving no lateral support at the top) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 40 pounds per cubic-foot. To these values must be added the pressures attributable to earthquake forces per Section 1610.2 of the Code.

Lateral forces can be considered to be transmitted from the structure to the soil by passive pressure against the foundation walls utilizing an equivalent fluid density of 120 pounds per cubic-foot providing that the walls are designed to resist these pressures. Lateral force can also be considered to be transmitted from the structure to the soil by friction on the base of footings using a coefficient of 0.35, to which a safety factor of 1.5 should be applied.

### **Seismic Design Considerations**

For the purposes of determining parameters for structural seismic design, this site is considered to be a Site Class D as defined in Chapter 20 of American Society of Civil Engineers (ASCE) Standard 7-10 "Minimum Design Loads for Buildings and Other Structures". Further, the bearing stratum on the proposed site is not considered to be subject to liquefaction during an earthquake based on the criterion of Section 1806.4 of the Code.

### **Preliminary Foundation Construction Considerations**

The primary foundation construction considerations that are anticipated to have an impact on the design of the structure include removal of potential obstructions to AP installation, impact AP installation on surrounding structures, the preparation of the foundation bearing surfaces, construction dewatering, and off-site disposal of excess excavated material. Additional foundation construction considerations, such as preparation of foundation bearing



surfaces, construction dewatering, and off-site disposal of excess excavated material, will be discussed in the final foundation engineering report.

It is recommended to remove potential obstructions located within the fill deposit at the proposed APs locations prior to their installation.

The installation of the aggregate piers will likely result in some ground vibrations and noise which may be disruptive to the building occupants and could potentially cause cosmetic damage to existing structures. Therefore, it is recommended that ground vibration monitoring be performed with the use of seismographs during the installation of the aggregate piers.

To minimize disturbance of the AP-improved soil bearing surfaces, it is recommended that the final excavation to expose the surface of the bearing stratum at footing locations be performed utilizing an excavator that has a smooth-edged "toothless" bucket. Further, it is recommended that bearing surfaces be immediately covered with a 3-inch thickness of 3/4-inch crushed stone to minimize disturbance of the subgrade during subsequent forming operations.

It is anticipated that portions of the excavated fill material may be re-used on-site as structural fill for support of footings and the slab-on-grade and ordinary fill outside of the proposed building footprint provided it is maintained in a dry condition and can be properly compacted. Stockpiled excavated material designated for reuse should be covered at all times with 6-mil polyethylene for protection from precipitation and also as a dust mitigation measure. If, due to any of the above conditions the excavated material becomes unsuitable for reuse as structural fill, an off-site gravel fill should be used.

### **Final Comments**

Based on our current understanding of the project scope, it is recommended that McPhail Associates, LLC be retained to prepare a final foundation engineering report once the details of the proposed school are finalized. The final report would provide final foundation recommendations based on the specific project design requirements. Additional subsurface explorations are recommended to further delineate the subsurface conditions across the proposed building footprint and possibly to confirm and document the geometry and composition of the existing foundations, if required.

It is also recommended that McPhail Associates, LLC be retained to provide design assistance to the design team during the final design phase of this project. The purpose of this involvement would be to review the structural foundation drawings and foundation notes for conformance with the recommendations herein, and to generate or review the earthwork specification section for inclusion into the Contract Documents for construction.



JLA  
November 27, 2018  
Page 9

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call us.

Very truly yours,

McPHAIL ASSOCIATES, LLC

A handwritten signature in blue ink that reads "Fatima Babic-Konjic". The signature is written in a cursive style with a large initial 'F'.

Fatima Babic-Konjic, P.E.

A handwritten signature in blue ink that reads "Chris M. Erikson". The signature is written in a cursive style with a large initial 'C'.

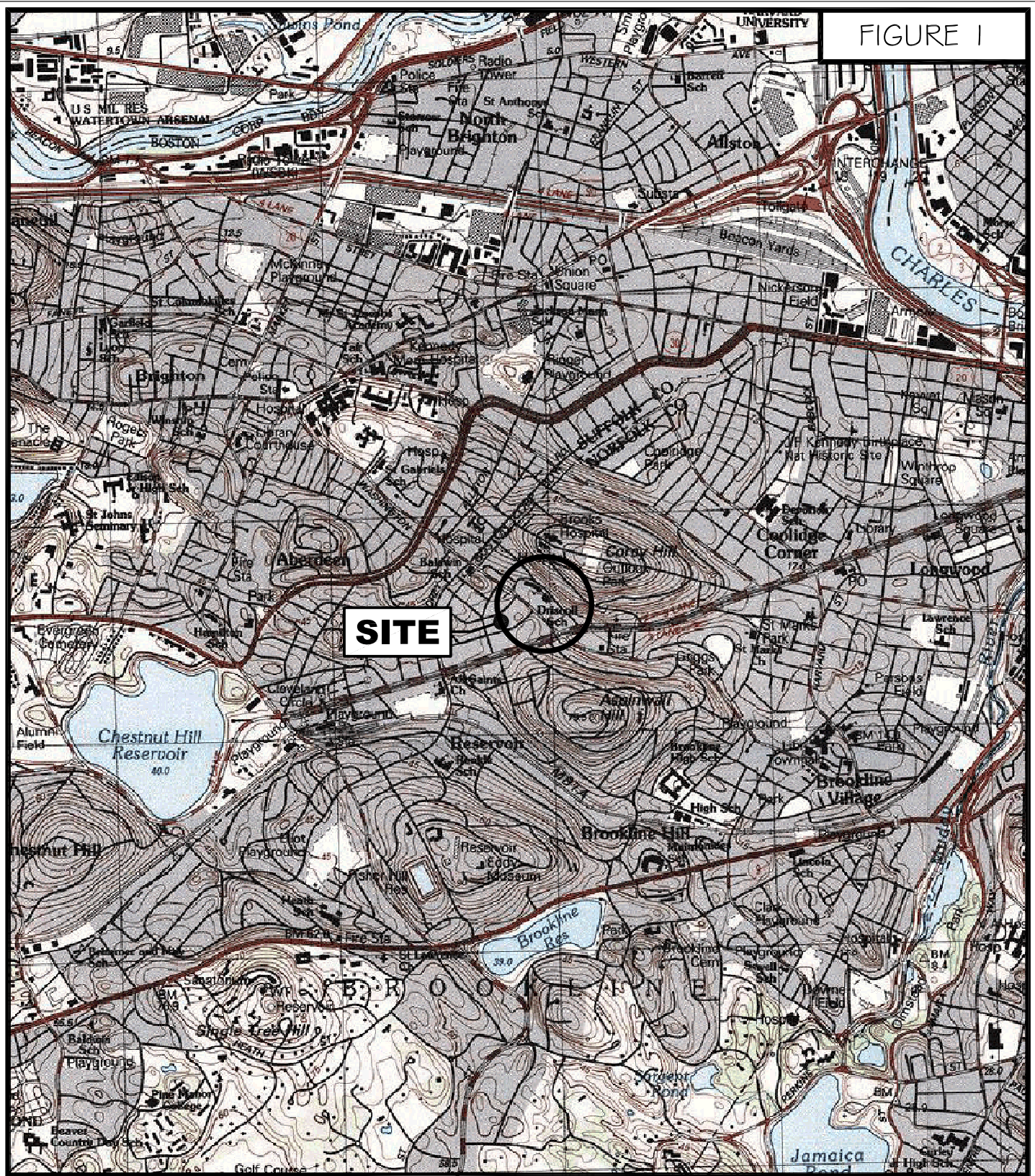
Chris M. Erikson, P.E.

N:\Working Documents\Reports\6693\_PFER\_112718.docx

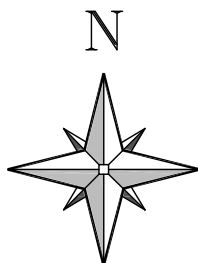
FBK/cme



FIGURE I



Geotechnical and  
 Geoenvironmental Engineers  
 2269 Massachusetts Avenue  
 Cambridge, MA 02140  
 617/868-1420  
 617/868-1423 (Fax)  
 www.mcphailgeo.com



SCALE 1:25,000

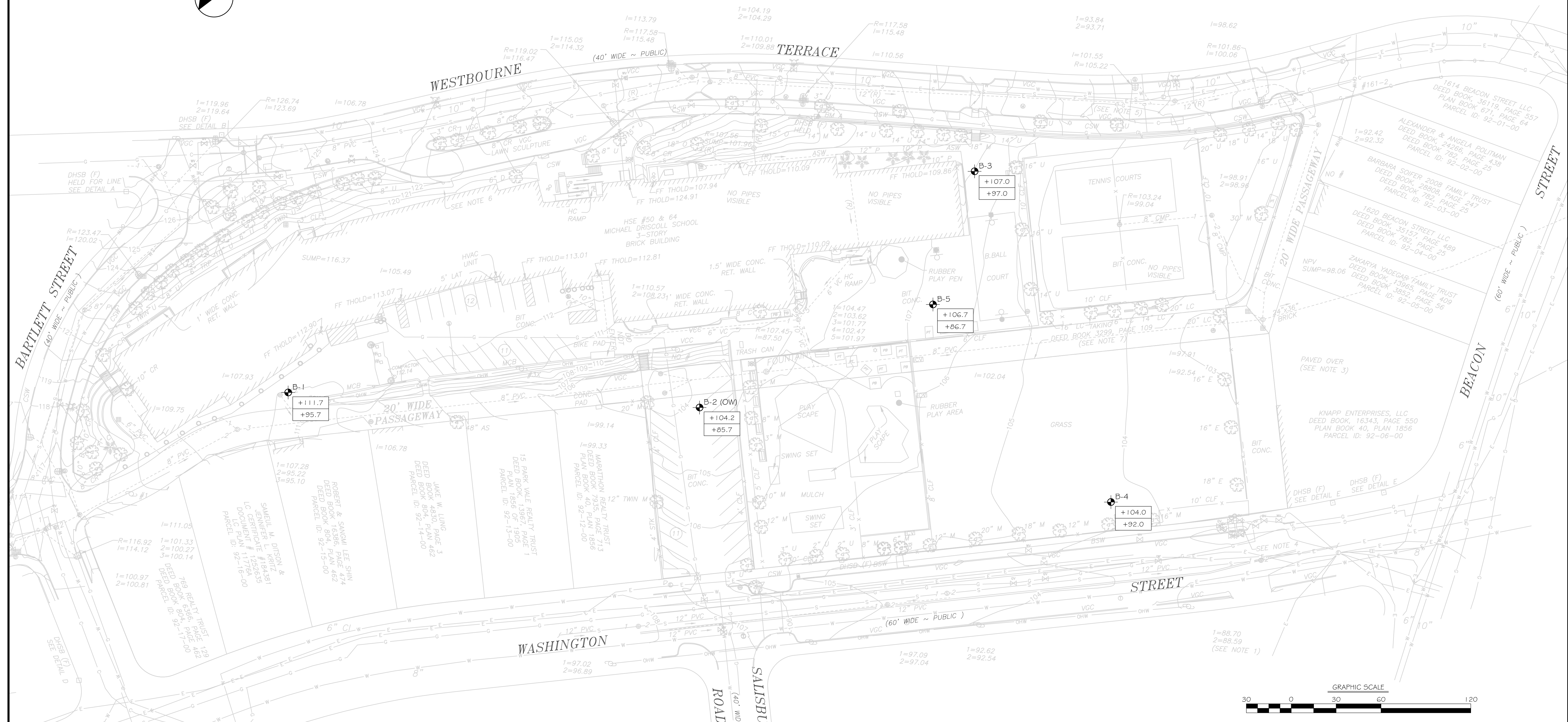
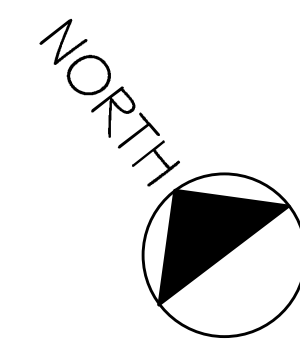
# PROJECT LOCATION PLAN

## DRISCOLL SCHOOL

BROOKLINE

MASSACHUSETTS





- LEGEND**
- — APPROXIMATE LOCATION OF BOREHOLE PERFORMED BY CARR-DEE CORP. ON NOVEMBER 9, 2018 FOR McPHAIL ASSOCIATES, LLC
  - (OW) — INDICATES OBSERVATION WELL INSTALLED WITHIN COMPLETED BOREHOLE
  - +104.0 — ELEVATION OF EXISTING GROUND SURFACE
  - +92.0 — ELEVATION OF NATURAL BEARING SURFACE (GLACIAL OUTWASH OR GLACIAL TILL)

REFERENCE: THIS PLAN WAS PREPARED FROM A 30-SCALE DRAWING ENTITLED "EXISTING CONDITIONS PLAN OF LAND" UNDATED, PREPARED BY HANCOCK ASSOCIATES

Geotechnical and Geoenvironmental Engineers  
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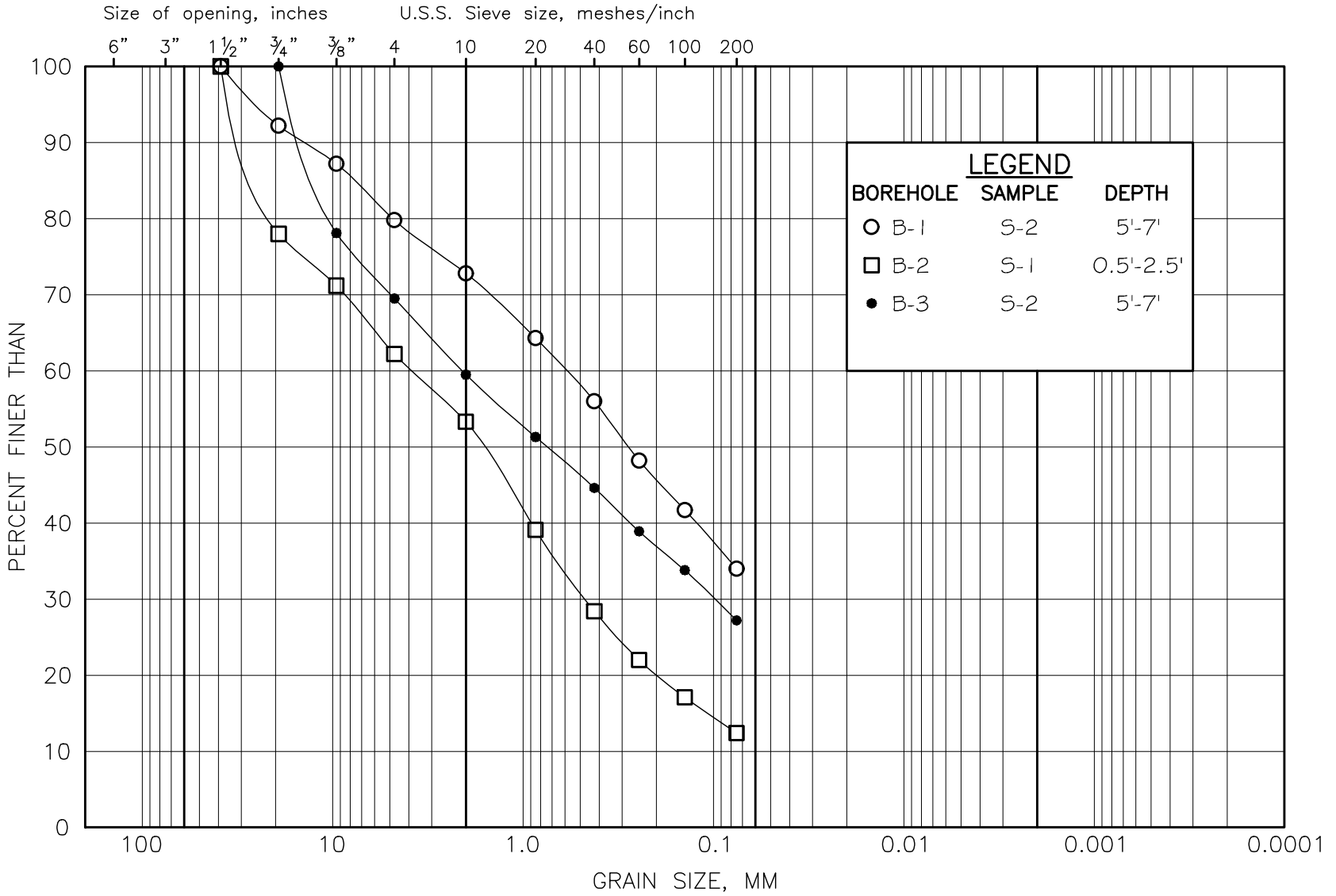
<b>DRISCOLL SCHOOL</b>			
BROOKLINE		MASSACHUSETTS	
SUBSURFACE EXPLORATION PLAN			
FOR			
JONATHAN LEVI ARCHITECTS			
BY			
McPHAIL ASSOCIATES, LLC			
Date: NOVEMBER 2018	Dwn: I.J.M.	Chkd: F.B.K.	Scale: 1" = 30'
Project No: 6693			FIGURE 2

FILE NAME: N:\McPhail\0959\6693\F02a.dwg



McPHAIL ASSOCIATES, LLC

M.I.T. GRAIN SIZE SCALE



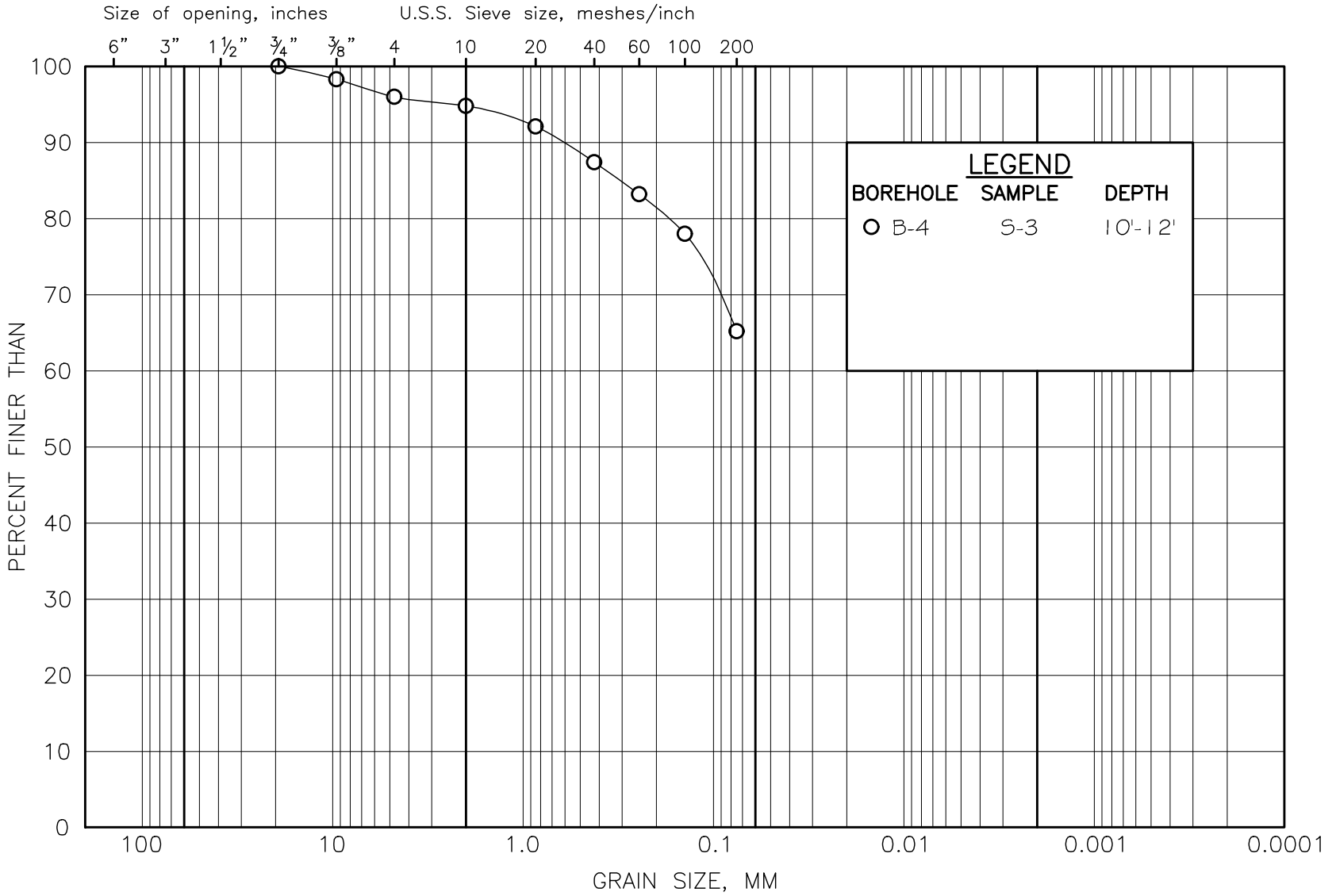
LEGEND		
BOREHOLE	SAMPLE	DEPTH
○	B-1	S-2 5'-7'
□	B-2	S-1 0.5'-2.5'
●	B-3	S-2 5'-7'

COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

GRAIN SIZE DISTRIBUTION  
FILL

FIGURE 3

M.I.T. GRAIN SIZE SCALE



**LEGEND**  
 BOREHOLE SAMPLE DEPTH  
 ○ B-4 S-3 10'-12'

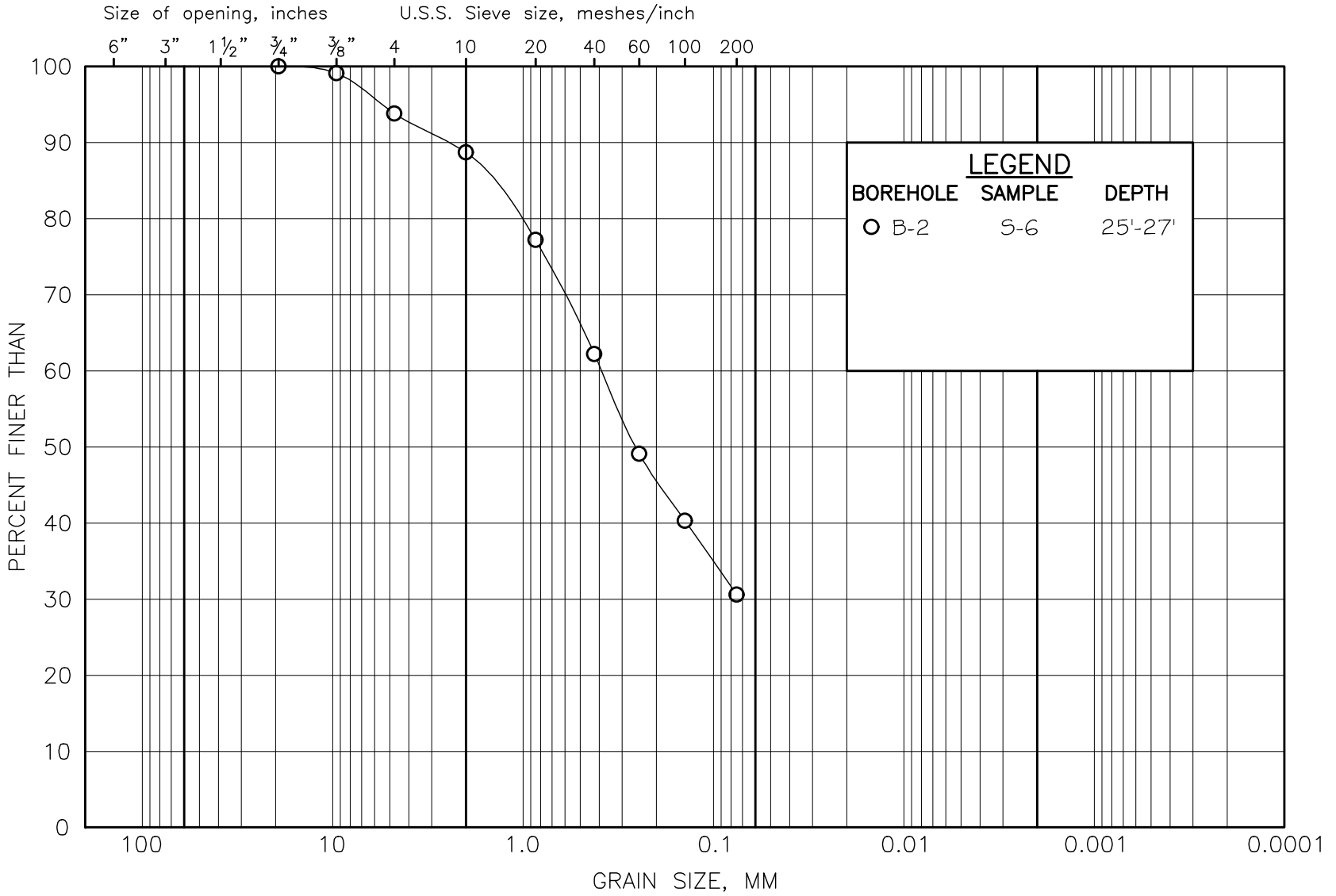
McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION  
SUBSOIL

COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

FIGURE 4

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION  
GLACIAL OUTWASH

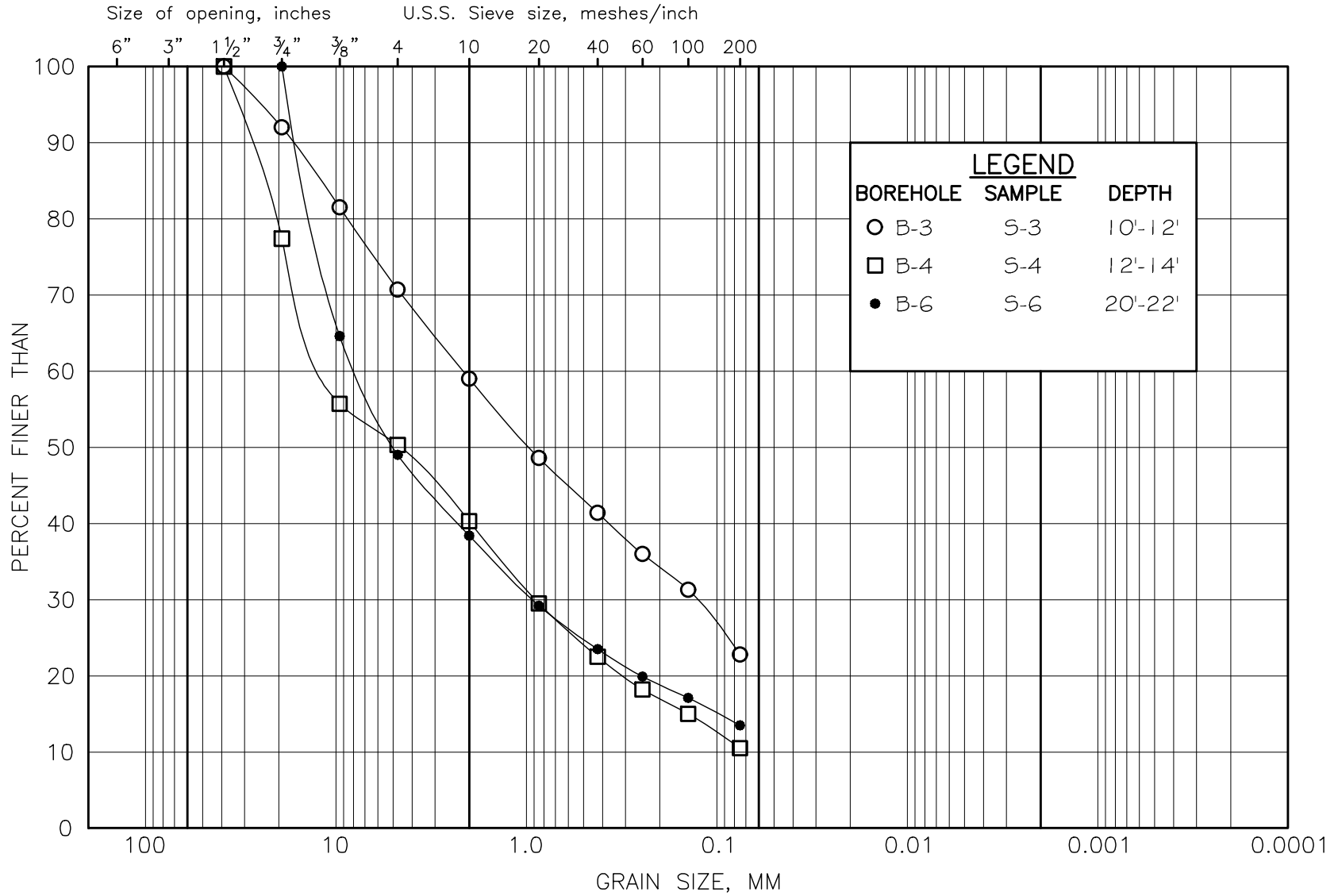
FIGURE 5

McPHAIL ASSOCIATES, LLC

M.I.T. GRAIN SIZE SCALE

GRAIN SIZE DISTRIBUTION  
GLACIAL TILL

FIGURE 6



COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

**Table 1**  
**Summary of Boring Explorations**  
**Michael Driscoll School**  
 Brookline, Massachusetts  
 McPhail Job No. 6693

Exploration No.	Ground Surface Elevation	Thickness of Stratum					Depth from Ground Surface to Top of Deposit					Elevation of Top of Deposit	Depth to Groundwater	Elevation of Groundwater	Total Depth of Exploration
		Asphalt	Topsoil	Fill	Subsoil	Organic Deposit	Fill	Subsoil	Organic Deposit	Glacial Outwash	Glacial Till	Natural Inorganic Soil			
	[Feet]	[Feet]					[Feet]					[Feet]	[Feet]		[Feet]
B - 1	+111.7	0.3	NE	15.7	NE	NE	0.3	NE	NE	NE	16.0	+95.7	13.5	+98.2	25.3
B - 2 (OW)	+104.2	0.3	NE	18.2	NE	3.5	0.3	NE	18.5	22.0	NE	+82.2	9.0	+95.2	32.0
B - 3	+107.0	0.3	NE	9.7	NE	NE	0.3	NE	NE	NE	10.0	+97.0	14.5	+92.5	26.0
B - 4	+104.0	NE	0.5	9.5	2.0	NE	0.5	10.0	NE	NE	12.0	+92.0	17.0	+87.0	22.0
B - 5	+106.7	0.3	NE	17.7	NE	2.0	0.3	NE	18.0	NE	20.0	+86.7	17.0	+89.7	27.0

NE = Strata Not Encountered at Exploration Location.  
 Natural Inorganic Soil is defined as Glacial Outwash and Glacial Till Deposits.



**APPENDIX A:**  
**LIMITATIONS**



## **LIMITATIONS**

This preliminary report has been prepared on behalf of and for the exclusive use of Jonathan Levi Architects for specific application to the proposed new construction to be located on the campus of the Michael Driscoll School in Brookline, Massachusetts in accordance with generally accepted soil and geotechnical engineering practices. No other warranty, expressed or implied, is made.

The recommendations contained in this report are for preliminary pricing and design purposes only. Final subsurface exploration program and foundation engineering analyses will be required for the design and construction of the proposed project. In the event that any changes in nature or design of the proposed construction are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail Associates, LLC.

The preliminary analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.



**APPENDIX B:**

**SANBORN MAPS AND TOWN OF BROOKLINE ATLAS 1876 MAP**



Driscoll School  
64 Westbourne Terrace  
Brookline, MA 02446

Inquiry Number: 5466239.3

October 26, 2018

## Certified Sanborn® Map Report



6 Armstrong Road, 4th floor  
Shelton, CT 06484  
Toll Free: 800.352.0050  
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# Certified Sanborn® Map Report

10/26/18

**Site Name:**

Driscoll School  
64 Westbourne Terrace  
Brookline, MA 02446  
EDR Inquiry # 5466239.3

**Client Name:**

McPhail Associates  
2269 Massachusetts Ave  
Cambridge, MA 02140  
Contact: Michael Sachs



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**Certification #** BA33-48E7-81A2

**PO #** 6693

**Project** Driscoll School

**Maps Provided:**

1969  
1965  
1957  
1950  
1925  
1898



Sanborn® Library search results

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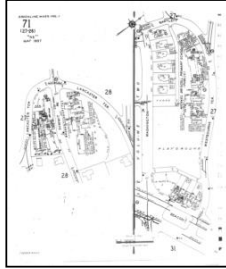
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### 1969 Source Sheets



Volume 1, Sheet 27  
1969



Volume 1, Sheet 71  
1969



Volume 2, Sheet 108  
1969

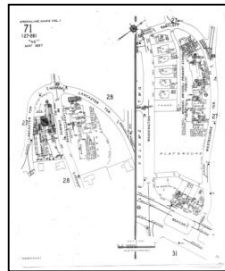
### 1965 Source Sheets



Volume 2, Sheet 108  
1965



Volume 1, Sheet 27  
1965

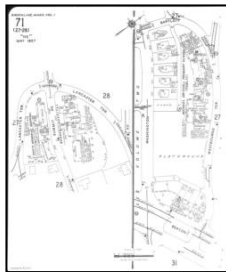


Volume 1, Sheet 71  
1965

### 1957 Source Sheets



Volume 1, Sheet 27  
1957



Volume 1, Sheet 71  
1957



Volume 2, Sheet 108  
1957

### 1950 Source Sheets



Volume 1, Sheet 27  
1950



Volume 1, Sheet 70  
1950

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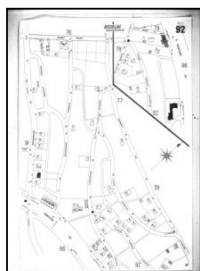


Volume 1, Sheet 27  
1925

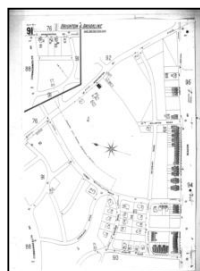


Volume 1, Sheet 70  
1925

### 1898 Source Sheets

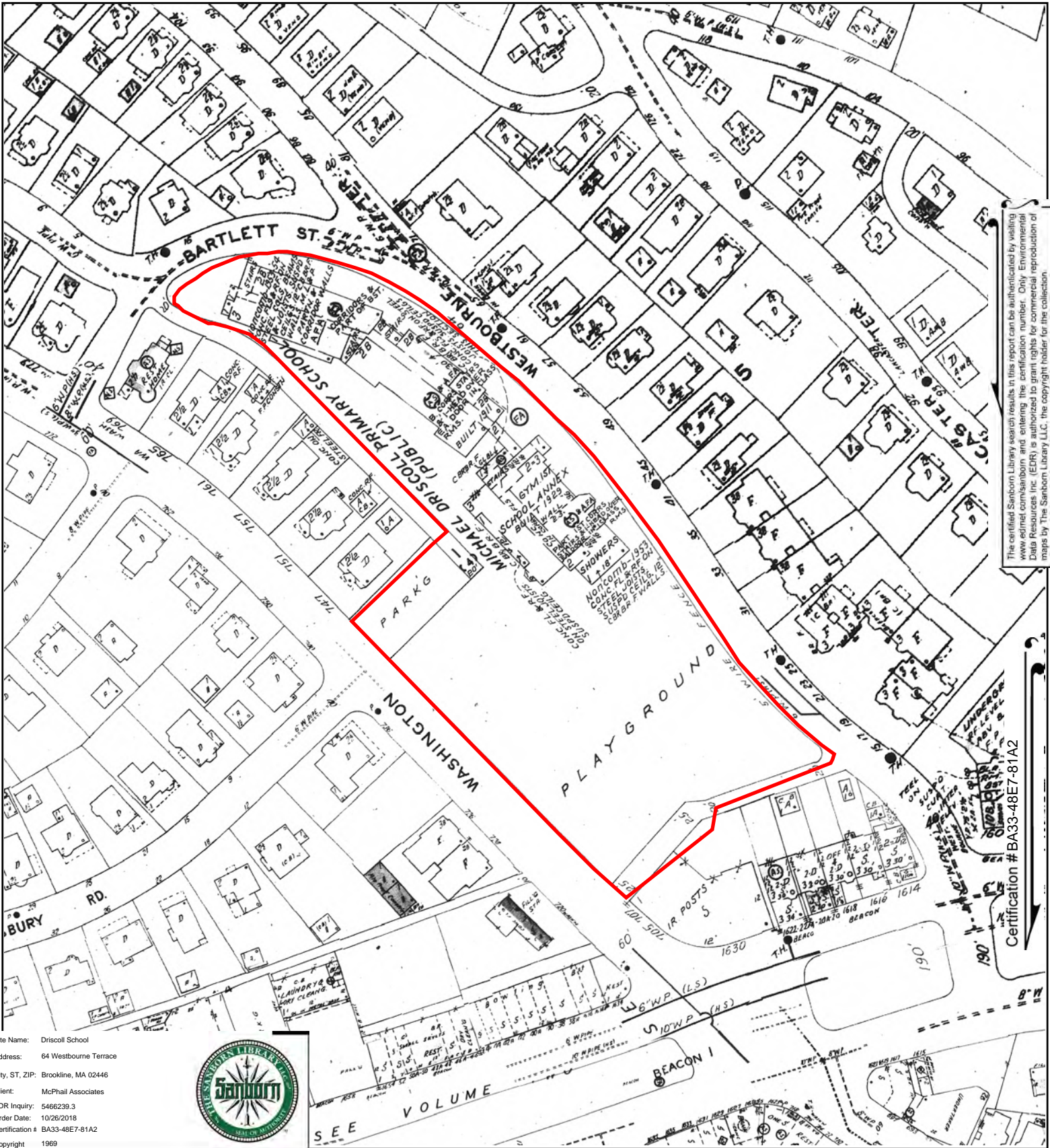


Volume 6, Sheet 92  
1898



Volume 6, Sheet 91  
1898





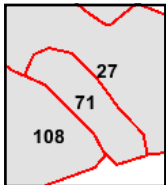
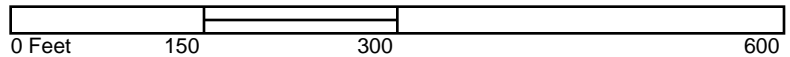
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Certification # BA33-48E7-81A2

Site Name: Driscoll School  
 Address: 64 Westbourne Terrace  
 City, ST, ZIP: Brookline, MA 02446  
 Client: McPhail Associates  
 EDR Inquiry: 5466239.3  
 Order Date: 10/26/2018  
 Certification # BA33-48E7-81A2  
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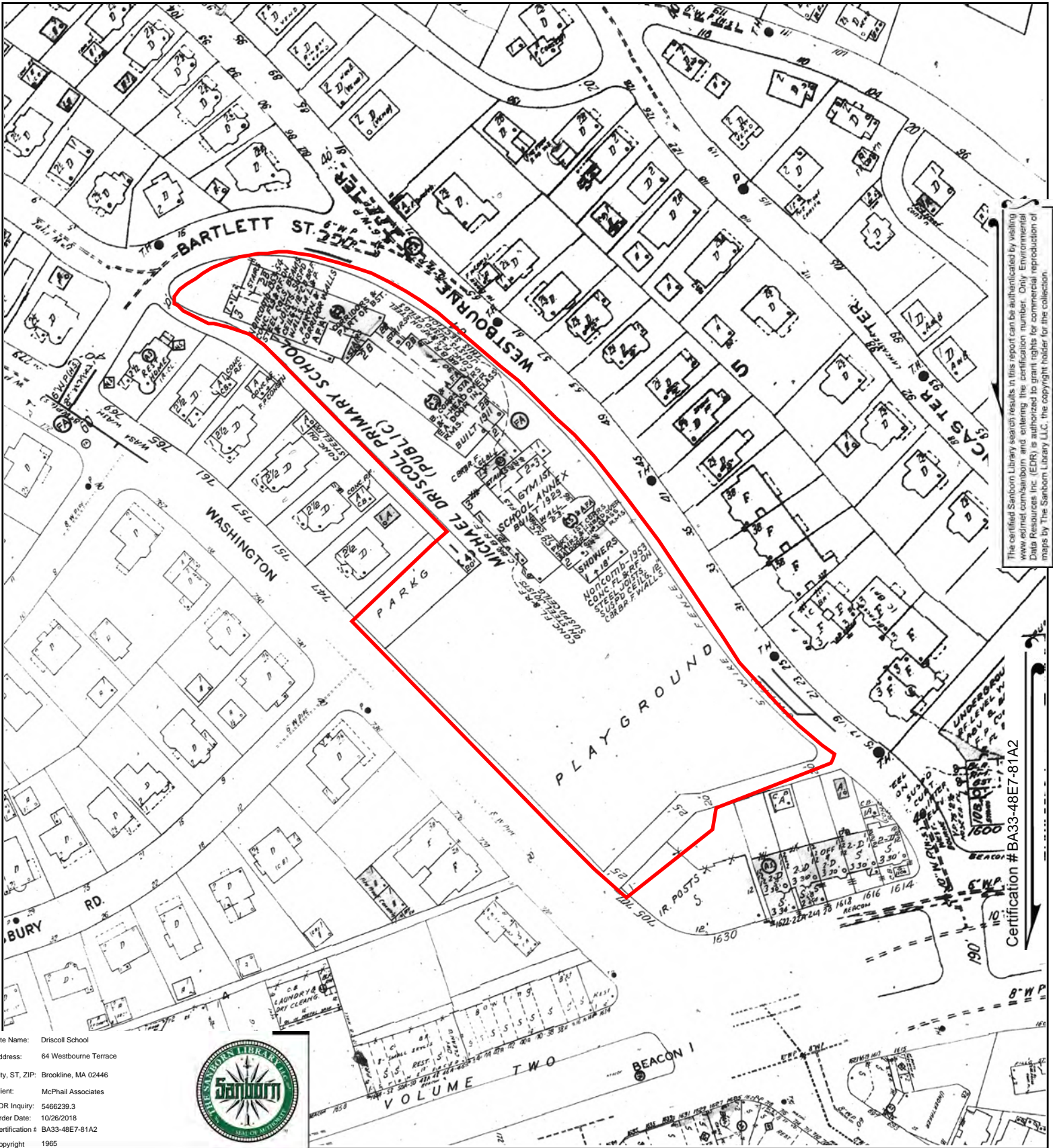
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 Volume 1, Sheet 27







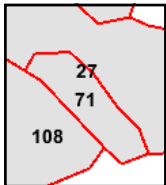
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 City, ST, ZIP: Brookline, MA 02446  
 Client: McPhail Associates  
 EDR Inquiry: 5466239.3  
 Order Date: 10/26/2018  
 Certification #: BA33-48E7-81A2  
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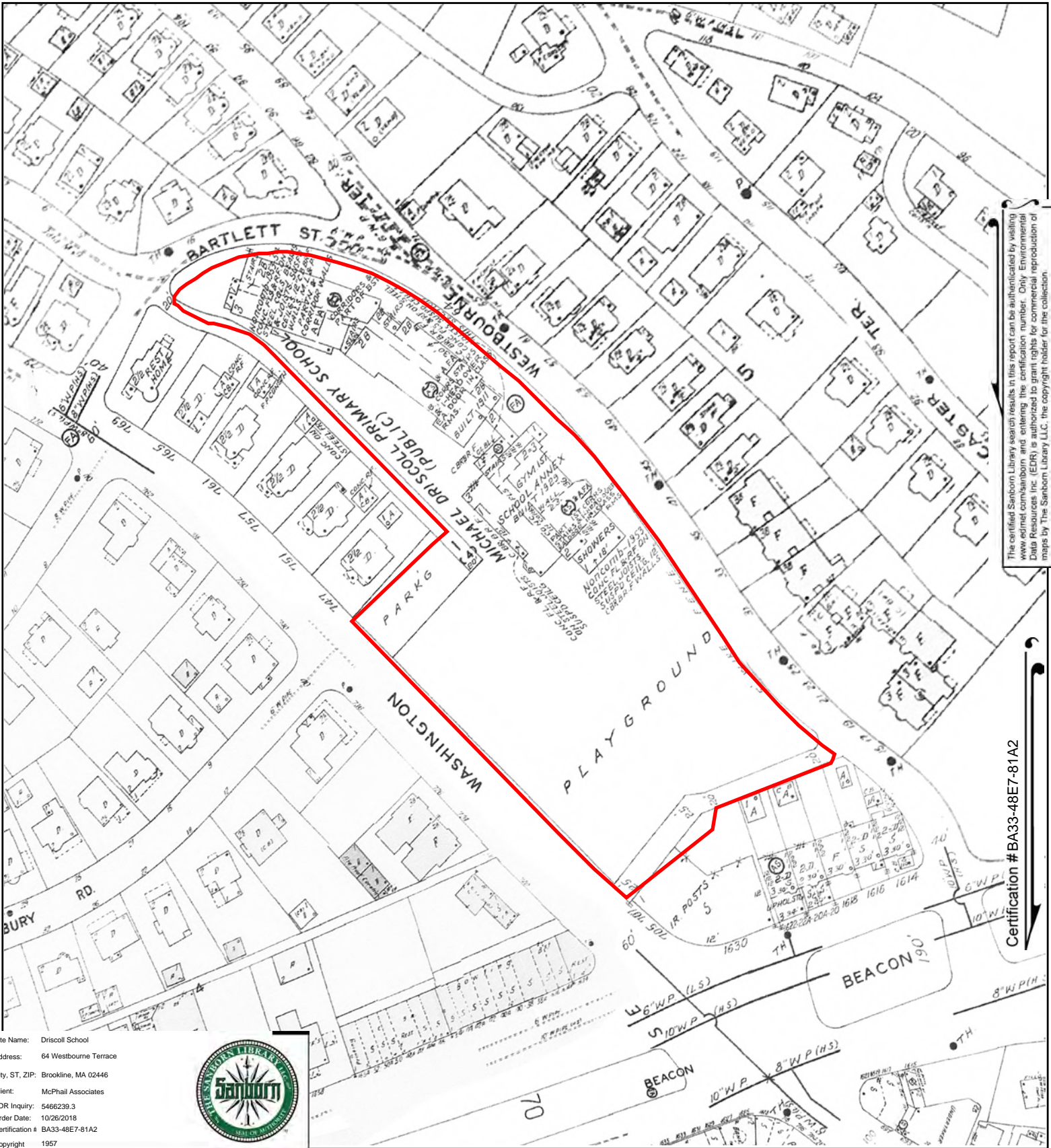
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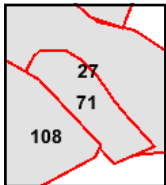
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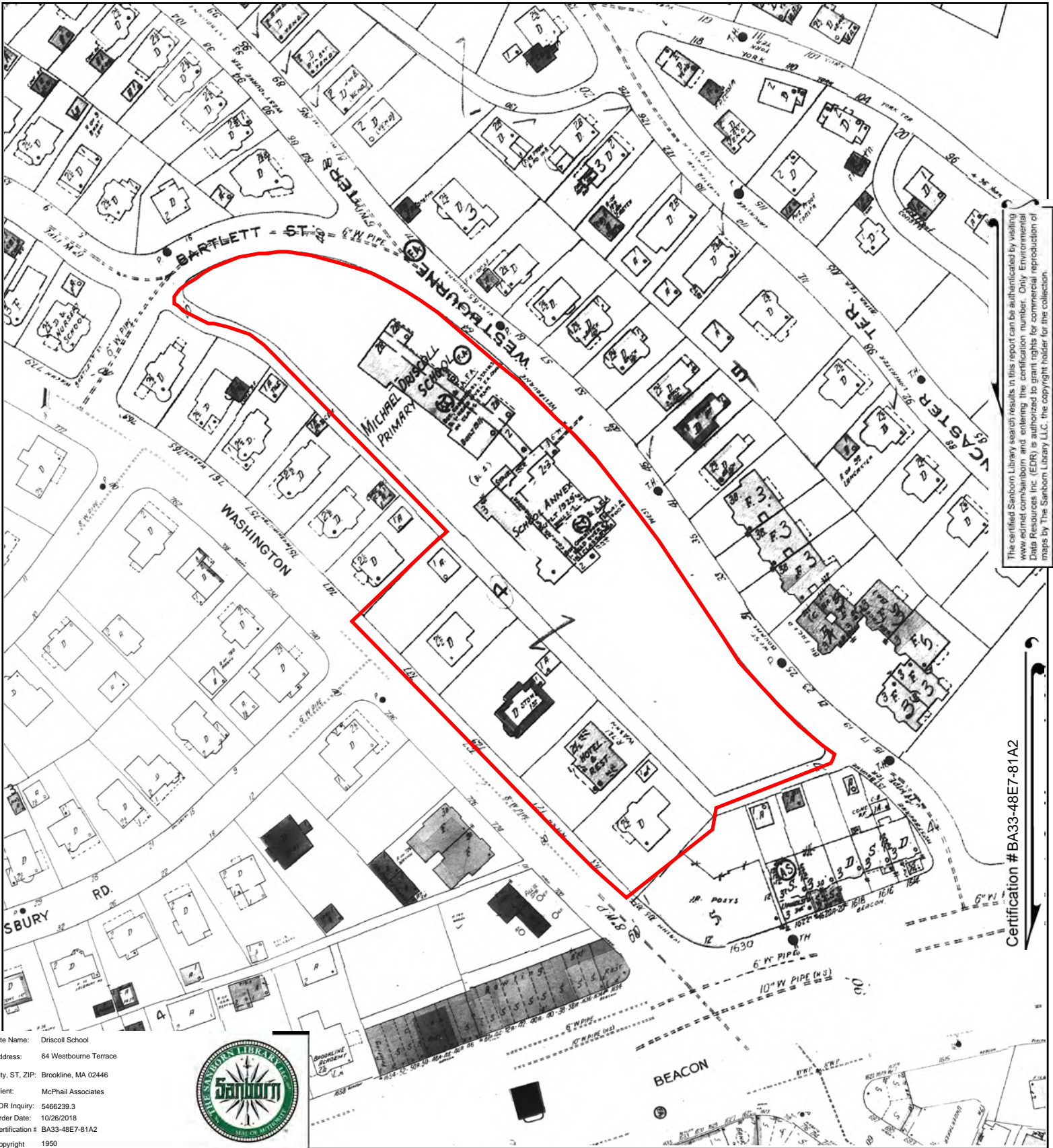
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 Volume 1, Sheet 27







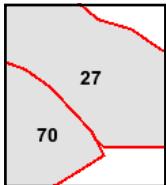
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Certification # BA33-48E7-81A2

Site Name: Driscoll School  
 Address: 64 Westbourne Terrace  
 City, ST, ZIP: Brookline, MA 02446  
 Client: McPhail Associates  
 EDR Inquiry: 5466239.3  
 Order Date: 10/26/2018  
 Certification # BA33-48E7-81A2  
 Copyright 1950



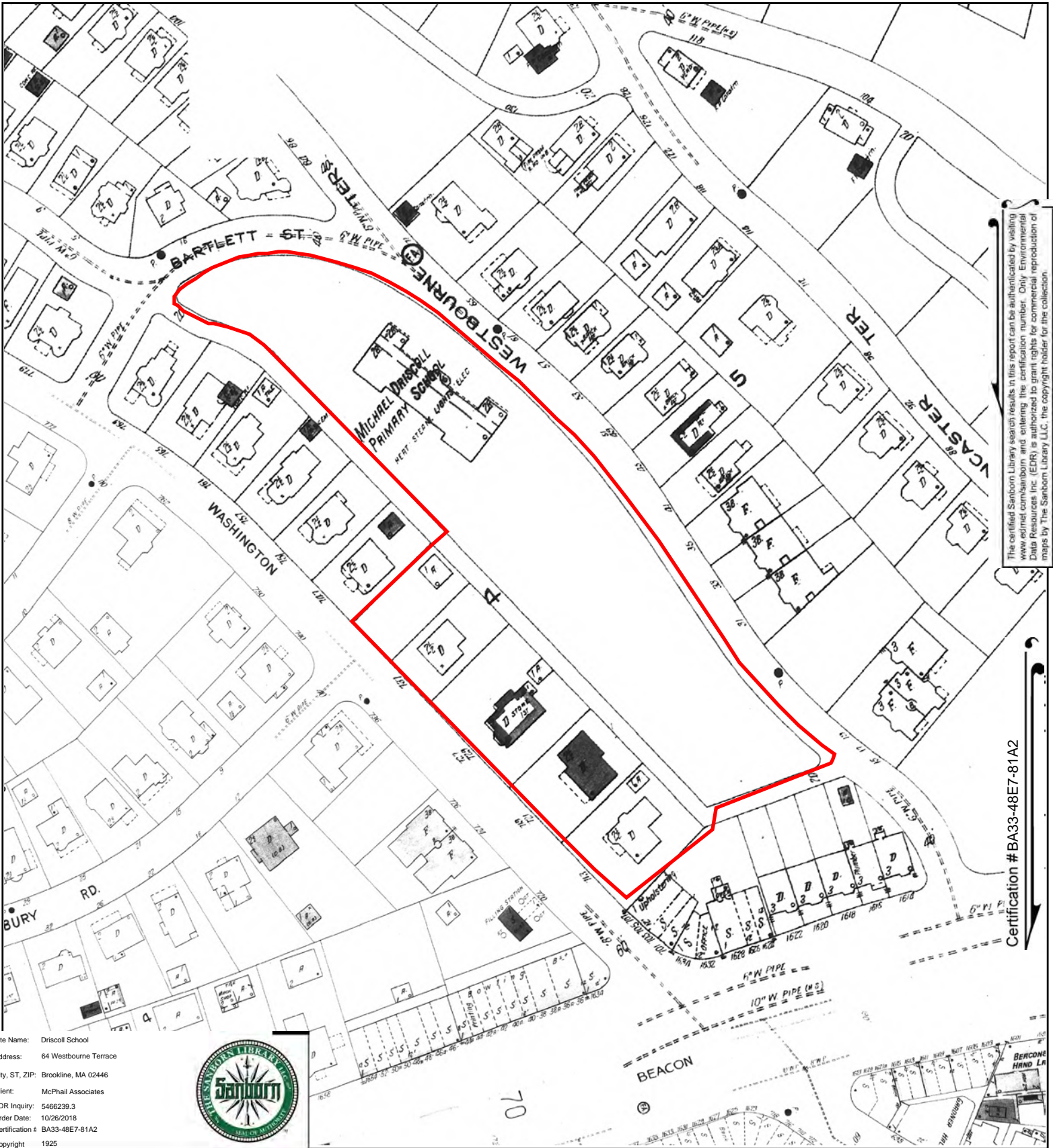
This Certified Sanborn Map combines the following sheets. Outlined areas indicate map sheets within the collection.



Volume 1, Sheet 70  
 Volume 1, Sheet 27







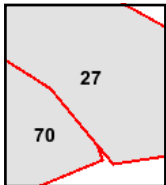
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Site Name: Driscoll School  
 Address: 64 Westbourne Terrace  
 City, ST, ZIP: Brookline, MA 02446  
 Client: McPhail Associates  
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 Order Date: 10/26/2018  
 Certification # BA33-48E7-81A2  
 Copyright 1925

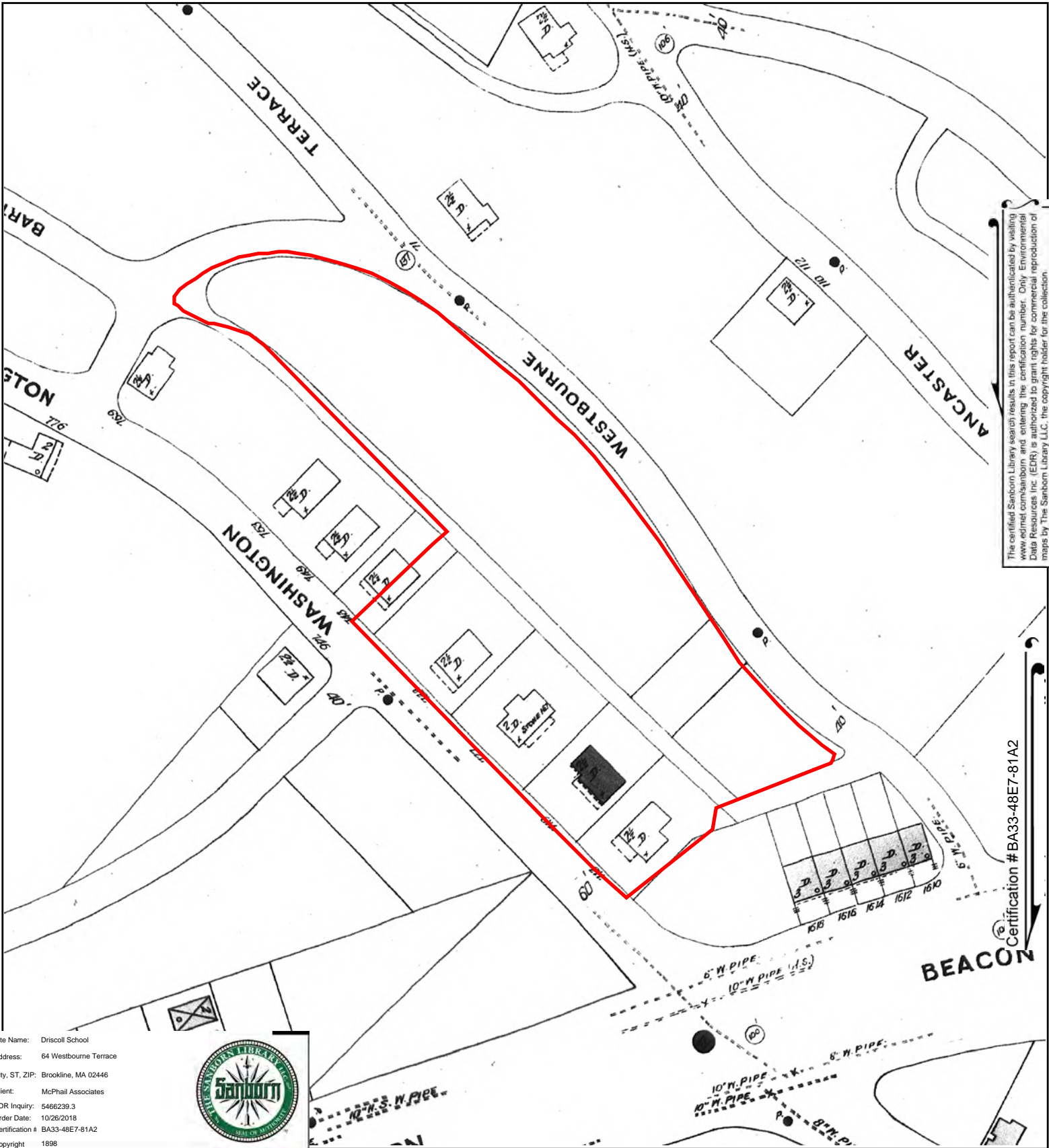


This Certified Sanborn Map combines the following sheets.  
 Outlined areas indicate map sheets within the collection.



Volume 1, Sheet 70  
 Volume 1, Sheet 27





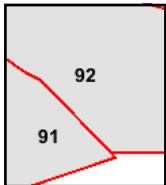
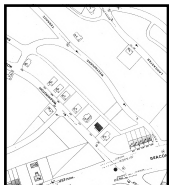
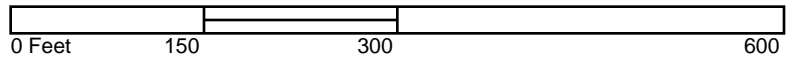
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Site Name: Driscoll School  
 Address: 64 Westbourne Terrace  
 City, ST, ZIP: Brookline, MA 02446  
 Client: McPhail Associates  
 EDR Inquiry: 5466239.3  
 Order Date: 10/26/2018  
 Certification # BA33-48E7-81A2  
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Volume 6, Sheet 91  
 Volume 6, Sheet 92







Approximate Location  
of the Subject Site.

Town of  
**BROOKLINE.**  
Scale: 800 feet to the inch.





**APPENDIX C:**

**BORING LOGS B-1 THROUGH B-5  
PREPARED BY MCPHAIL**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.:</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-1</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> 3"	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Jay/Neil	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	Date	Depth
<b>Logged By/Reviewed By:</b> D. Trussel	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	13.5
<b>Surface Elevation (ft):</b> 111.7	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	Elev.	Notes
		98.2	

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes	
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"		
1	111	[Cross-hatch symbol]	0.3 / 111.4	ASPHALT	12	S1	24/8	0.0-2.0	7 6 6 12	Compact, dark brown to light brown, SILT and SAND, some gravel. (Fill)	
2	110										
3	109										
4	108										
5	107										
6	106					15	S2	24/14	5.0-7.0	5 7 8 8	Compact, light brown, silty and gravelly SAND. (Fill)
7	105										
8	104				FILL						
9	103										
10	102										
11	101					8	S3	24/12	10.0-12.0	5 4 4 4	Loose, light brown, SILT, some sand, some gravel. (Fill)
12	100										
13	99										
14	98										
15	97										
16	96			16.0 / 95.7		35	S4	18/10	15.0-16.5	4 10 25	Dense, light brown to gray to dark brown, SILT, some sand, some gravel. Layer of dark brown to black SAND at 16'. (Fill)
17	95	[Stippled symbol]			16	S4A	6/3	16.5-17.0	8	Compact, gray, SILT, trace sand, trace gravel, trace clay. (Glacial Till)	
18	94										
19	93										
20	92				GLACIAL TILL						
21	91					100/2"	S5	2/2	20.0-20.2	100/2"	Very dense, gray to brown, GRAVEL and SAND, some silt. (Glacial Till)
22	90										
	89									Obstruction 20'2" below ground surface.	

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	Weather: Overcast; 40
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	




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**Page 1 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.:</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-1</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> 3"	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Jay/Neil	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> D. Trussel	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	13.5
<b>Surface Elevation (ft):</b> 111.7	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	
24	88		25.3 / 86.5	GLACIAL TILL						
25	87			100/3"	S6	6/3	25.0-25.5	100/3"	Very dense, gray, SAND and SILT, some gravel. (Glacial Till)	
26	86			Bottom of borehole 25.3 feet below ground surface.						
27	85									
28	84									
29	83									
30	82									
31	81									
32	80									
33	79									
34	78									
35	77									
36	76									
37	75									
38	74									
39	73									
40	72									
41	71									
42	70									
43	69									
44	68									
45	67									
	66									

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		
COHESIVE SOILS		<b>Notes:</b>  Weather: Overcast; 40	
BLOWS/FT.	CONSISTENCY		
<2	V.SOFT		
2-4	SOFT		
4-8	FIRM		
8-15	STIFF		
15-30	V.STIFF		
>30	HARD		



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**Page 2 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-2 (OW)</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> 3"	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Jay/Neil	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> D. Trussel	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	9
<b>Surface Elevation (ft):</b> 104.2	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	11-12-18	10.9
			<b>Elev.</b>
			95.2
			<b>Notes</b>

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes		
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"			
	104		0.3 / 103.9	ASPHALT								
1	103	[Symbol: Diagonal Hatching]		FILL	14	S1	24/14	0.5-2.5	6 6 8 9	Compact, dark brown to light brown, SAND and GRAVEL, some silt, trace brick. (Fill)		
2	102											
3	101											
4	100											
5	99						12	S2	24/5	5.0-7.0	5 7 5 10	Compact, light brown to gray, SILT and SAND, some gravel. (Fill)
6	98											
7	97											
8	96											
9	95											
10	94						14	S3	24/0	10.0-12.0	9 8 6 6	Compact, light brown to gray, SILT and SAND, some gravel. (Fill) No recovery on first drive. Drove spoon a second time to obtain soil sample.
11	93											
12	92											
13	91											
14	90											
15	89				6	S4	24/6	15.0-17.0	6 4 2 1	Loose, gray, SILT, some sand, some gravel. (Fill)		
16	88											
17	87											
18	86		18.5 / 85.7									
19	85	[Symbol: Downward Arrows]		ORGANIC DEPOSIT								
20	84											
21	83						9	S5	18/15	20.0-21.5	2 3 6 12	Stiff, brown to black, organic SILT. (Organic Deposit)
22	82				22.0 / 82.2							
				GLACIAL OUTWASH								

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	Observation Well installed with completed boring to a depth of 15 feet below ground surface. 5-foot screen and 10-foot riser.
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	

Weather: Clear; 40



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**Page 1 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-2 (OW)</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> 3"	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Jay/Neil	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> D. Trussel	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	9
<b>Surface Elevation (ft):</b> 104.2	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	11-12-18	10.9
			Elev.
			Notes

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes	
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"		
24	80	[Symbol: Dotted pattern]	32.0 / 72.2	GLACIAL OUTWASH							
25	79										
26	78				28	S6	24/16	25.0-27.0	5 9 19 28	Compact, gray to brown, silty SAND, some gravel. (Glacial Outwash) Oxidation evidence observed at 26' and 26.5' below ground surface.	
27	77										
28	76										
29	75										
30	74										
31	73				41	S7	24/8	30.0-32.0	30 23 18 16	Dense, gray to brown, silty SAND, some gravel. (Glacial Outwash)	
32	72										
33	71						Bottom of borehole 32 feet below ground surface.				
34	70										
35	69										
36	68										
37	67										
38	66										
39	65										
40	64										
41	63										
42	62										
43	61										
44	60										
45	59										

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	Observation Well installed with completed boring to a depth of 15 feet below ground surface. 5-foot screen and 10-foot riser.
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	

Weather: Clear; 40



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**Page 2 of 2**



<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-3</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	14.5
<b>Surface Elevation (ft):</b> 107.0	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	<b>Elev.</b>	<b>Notes</b>

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes			
					N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"				
			0.3 / 106.7	ASPHALT									
1	106	[Cross-hatch symbol]			28	S1	24/10	0.5-2.5	7 13 15 14	Compact, light brown, SAND and GRAVEL, some silt. (Fill)			
2	105												
3	104												
4	103												
5	102												
6	101	[Dotted symbol]	10.0 / 97.0	FILL	5	S2	24/12	5.0-7.0	1 2 3 2	Loose, brown, sandy and silty GRAVEL, trace asphalt. (Fill)			
7	100												
8	99												
9	98												
10	97												
11	96						47	S3	24/14		10.0-12.0	6 11 36 18	Dense, brown, sandy GRAVEL, some silt. (Glacial Till)
12	95												
13	94												
14	93												
15	92												
16	91	[Dotted symbol]		GLACIAL TILL	19	S4	24/18	15.0-17.0	11 9 10 11	Compact, light brown, silty SAND, trace gravel. (Glacial Till)			
17	90												
18	89												
19	88												
20	87												
21	86						39	S5	24/20		20.0-22.0	17 19 20 32	Dense, light brown, silty SAND, some gravel. (Glacial Till)
22	85												

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	Weather: Clear; 40
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	



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**Page 1 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-3</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	14.5
<b>Surface Elevation (ft):</b> 107.0	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"		

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	
24	83	●●●●●	26.0 / 81.0	GLACIAL TILL						Very dense, light brown to brown, silty SAND, some gravel. (Glacial Till)
25	82				72	S6	24/24	24.0-26.0	24 36 100/2"	
26	81			Bottom of borehole 26 feet below ground surface.						
27	80									
28	79									
29	78									
30	77									
31	76									
32	75									
33	74									
34	73									
35	72									
36	71									
37	70									
38	69									
39	68									
40	67									
41	66									
42	65									
43	64									
44	63									
45	62									

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	Weather: Clear; 40



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**Page 2 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.:</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-4</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	17
<b>Surface Elevation (ft):</b> 104.0	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	<b>Elev.</b>	<b>Notes</b>
		87.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes			
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"				
		0.5 / 103.5		TOPSOIL	4	S1	6/6	0.0-0.5	4	Very loose to loose, brown, silty SAND. (Topsoil)			
1	103	[Cross-hatch symbol]		FILL	40	S1A	18/14	0.5-2.0	7 12 28	Dark brown to brown, silty SAND and GRAVEL. (Fill)			
2	102												
3	101												
4	100												
5	99										7	Compac, light brown, silty SAND, some gravel. (Fill)	
6	98							14	S2	24/16	5.0-7.0	7 7 7	
7	97												
8	96												
9	95												
10	94				10.0 / 94.0							4	Loose, orange-brown to brown, sandy SILT, trace gravel. (Subsoil)
11	93	[Vertical lines symbol]		SUBSOIL	7	S3	24/16	10.0-12.0	3 4 4				
12	92			12.0 / 92.0									
13	91	[Stippled symbol]		GLACIAL TILL	23	S4	24/14	12.0-14.0	13 20 17 12	Compact, gray-brown to brown, SAND and GRAVEL, some silt. (Glacial Till)			
14	90												
15	89												
16	88							40	S5	24/12	15.0-17.0	18 21 19 17	Dense, gray-brown to brown, SAND and GRAVEL, trace silt. (Glacial Till)
17	87												
18	86												
19	85												
20	84												
21	83	[Stippled symbol]			53	S6	24/20	20.0-22.0	17 21 32 50	Very dense, orange-brown to brown, silty SAND, some gravel. (Glacial Till)			
22	82			22.0 / 82.0									
				Bottom of borehole 22 feet below									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

SOIL COMPONENT	
DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

**Notes:**

Weather: Clear; 40



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<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-4</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	Date	Depth
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	17
<b>Surface Elevation (ft):</b> 104.0	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	Elev.	Notes
		87.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes
					N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	
				ground surface.						
24	80									
25	79									
26	78									
27	77									
28	76									
29	75									
30	74									
31	73									
32	72									
33	71									
34	70									
35	69									
36	68									
37	67									
38	66									
39	65									
40	64									
41	63									
42	62									
43	61									
44	60									
45	59									

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	Weather: Clear; 40



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**Page 2 of 2**

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.:</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-5</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	<b>Date</b>	<b>Depth</b>
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	17
<b>Surface Elevation (ft):</b> 106.7	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	<b>Elev.</b>	<b>Notes</b>
		89.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/Elev. to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes			
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"				
			0.3 / 106.4	ASPHALT									
1	106	[Cross-hatched symbol]			11	S1	24/8	0.5-2.5	6 8 3 3	Compact, brown to dark brown, silty SAND, trace gravel, trace asphalt. (Fill)			
2	105												
3	104												
4	103												
5	102												
6	101	[Cross-hatched symbol]		FILL	6	S2	24/12	5.0-7.0	3 4 2 2	Loose, light brown, silty SAND and GRAVEL. (Fill)			
7	100												
8	99												
9	98												
10	97												
11	96							16	S3	24/12	10.0-12.0	7 9 7 10	Compact, light brown, silty SAND and GRAVEL. (Fill)
12	95												
13	94												
14	93												
15	92												
16	91				21	S4	24/12	15.0-17.0	10 14 7 7	Compact, light brown to brown, silty SAND, some gravel. (Fill)			
17	90												
18	89		18.0 / 88.7										
19	88	[Downward arrows symbol]		ORGANIC DEPOSIT	13	S5	24/8	18.0-20.0	9 8 5 7	Stiff, organic SILT, some sand, trace organic fibers. (Organic Deposit)			
20	87												
21	86	[Stippled symbol]		GLACIAL TILL	30	S6	24/12	20.0-22.0	12 14 16 23	Compact to dense, light brown, sandy GRAVEL, some silt. (Glacial Till)			
22	85												
	84												

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

SOIL COMPONENT	
DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

**Notes:**

Weather: Overcast; 40




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Page 1 of 2

<b>Project:</b> Michael Driscoll School	<b>Job #:</b> 6693.2.00	<b>Boring No.</b>
<b>Location:</b> 64 Westbourne Terrace	<b>Date Started:</b> 11-9-18	<b>B-5</b>
<b>City/State:</b> Brookline, MA	<b>Date Finished:</b> 11-9-18	

<b>Contractor:</b> Carr Dee	<b>Casing Type/Depth (ft):</b> HSA	<b>Groundwater Observations</b>	
<b>Driller/Helper:</b> Steve/Frank	<b>Casing Hammer (lbs)/Drop (in):</b> 300lbs/24"	Date	Depth
<b>Logged By/Reviewed By:</b> C. Connors	<b>Sampler Size/Type:</b> 24" Split Spoon	11-9-18	17
<b>Surface Elevation (ft):</b> 106.7	<b>Sampler Hammer (lbs)/Drop (in):</b> 140lbs/30"	Elev.	Notes
		89.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample					Sample Description and Boring Notes
					N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	
24	83		27.0 / 79.7	GLACIAL TILL						Dense, light brown, silty SAND and GRAVEL. (Glacial Till)
25	82									
26	81				46	S7	24/20	25.0-27.0	30 26 20 25	
27	80									
28	79			Bottom of borehole 27 feet below ground surface.						
29	78									
30	77									
31	76									
32	75									
33	74									
34	73									
35	72									
36	71									
37	70									
38	69									
39	68									
40	67									
41	66									
42	65									
43	64									
44	63									
45	62									
	61									

GRANULAR SOILS		SOIL COMPONENT	
BLOWS/FT.	DENSITY	DESCRIPTIVE TERM	PROPORTION OF TOTAL
0-4	V.LOOSE	"TRACE"	0-10%
4-10	LOOSE	"SOME"	10-20%
10-30	COMPACT	"ADJECTIVE" (eg SANDY, SILTY)	20-35%
30-50	DENSE	"AND"	35-50%
>50	V.DENSE		

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

COHESIVE SOILS		Notes:
BLOWS/FT.	CONSISTENCY	
<2	V.SOFT	Weather: Overcast; 40
2-4	SOFT	
4-8	FIRM	
8-15	STIFF	
15-30	V.STIFF	
>30	HARD	



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**Page 2 of 2**



**APPENDIX D:**

**A GROUNDWATER MONITORING REPORT B-2 (OW)  
PREPARED BY MCPHAIL**







**PHASE I ENVIRONMENTAL SITE  
ASSESSMENT REPORT**

**DRSICOLL SCHOOL  
64 WESTBOURNE TERRACE**

**BROOKLINE, MASSACHUSETTS**

**NOVEMBER 30, 2018**

Prepared For:

Jonathan Levi Architects  
266 Beacon Street  
Boston, MA 02116

2269 Massachusetts Avenue  
Cambridge, MA 02140  
www.mcphailgeo.com  
(617) 868-1420

**PROJECT NO. 6693**



November 30, 2018

Jonathan Levi Architects  
266 Beacon Street  
Boston, MA 02116

Attention: Ms. Carol Harris

Reference: Driscoll School, 64 Westbourne Terrace; Brookline, MA  
Phase I Environmental Site Assessment Report

Ladies and Gentlemen:

Enclosed herewith is our Phase I Environmental Site Assessment Report (ESA) prepared for the property known as Driscoll School with the address of 64 Westbourne Terrace located in Brookline, Massachusetts (the "subject site"). The general site locus is shown on the enclosed **Figure 1**, and the boundaries of the subject site are shown on the enclosed **Figure 2**.

This report was prepared by McPhail Associates, LLC in accordance with our Agreement for Services with Jonathan Levi Architects dated October 25, 2018. These services are subject to the limitations in **Appendix A**.

This environmental site assessment was conducted in general accordance with the provisions contained in the following: (1) Massachusetts Oil and Hazardous Materials (OHM) Release Prevention and Response Act (MGL Chapter 21E); (2) Massachusetts Contingency Plan (MCP) 310 CMR 40.0000; and (3) ASTM E 1527-13 Standard Guide for Environmental Site Assessment: Phase I Environmental Site Assessment Process, as referred to in 40 CFR Part 312 (the All Appropriate Inquiries Rule). The objective of the environmental assessment was to identify the potential presence of Recognized Environmental Conditions (RECs), Historical RECs (HREC) and/or Controlled RECs (CREC) at the subject site or at surrounding properties that may potentially pose a threat to the subject site.

Our scope of services for this Phase I ESA consisted of the following: (i) an assessment of the subject site history relative to the possible presence of oil and hazardous materials; (ii) a visual reconnaissance of the subject site and surrounding area; (iii) a search of Federal databases and records, including the National Priorities List, the SEMS List and the RCRIS Handlers List by EDR Inc.; (iv) a search of information from the offices of the Town of Brookline; (v) a review of the Massachusetts Department of Environmental Protection (DEP) database relative to incidents involving releases of OHM on or in the vicinity of the subject site; and (vi) assessing the above and documenting the results in a Phase I Environmental Site Assessment (ESA) Report.

Tasks excluded from our Phase I Environmental Site Assessment scope of work consisted of but were not limited to an environmental lien search, an assessment for the presence of lead-based paint, mold, mildew, asbestos-containing materials, or other naturally occurring pollutants such as radon gas. Further no sampling or laboratory analysis of soil,



groundwater, soil gas or indoor air samples was conducted as part of this assessment. No attempt was made to check on the compliance of present or past owners of the site with federal, state or local laws and regulations except as documented herein.

The existing Driscoll School is located on an approximate 172,716 square-foot property which fronts onto Westbourne Terrace to the northeast and is bound by Bartlett Crescent and residential properties to the southwest. A three-story school building containing approximately 98,000 gross square feet of space currently occupies the site.

Based on our historical research, the subject site was vacant, undeveloped land prior to construction of the subject site building. The subject site has remained generally unchanged since development in the early 1900's.

A search of information from the Town of Brookline municipal offices for records of permits issued for the storage and/or use of oil or hazardous materials at the subject site did not indicate the presence of an REC.

EDR's review of local, state and federal databases indicated that the subject site is a MassDEP listed release site. According to the Massachusetts Department of Environmental Protection (DEP) Waste Site database, the subject site is listed with the DEP under Release Tracking Number (RTN) 3-14448 due to a 120-day release condition. As reported by others, RTN 3-14448 is associated with a release of No. 4 fuel oil to soils which was encountered during the replacement of one (1) fuel oil underground storage tanks (UST). As identified by the DEP database, RTN 3-14448 was closed out under a Class A-2 Response Action Outcome in April of 1997 and a Permanent Solution (regulatory closure) has been achieved for the release. The RTN 3-14448 MassDEP release site is considered an HREC with respect to the subject site. The subject site is also listed on the EDR report as an asbestos remediation site. Surrounding sites identified in the database searched by EDR did not identify the presence of an REC.

A review of the online MassDEP Release Site database did not identify the presence of a release site in the vicinity of the subject site which would be considered an REC.

In conclusion, we have performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM Practice E 1527-13 for the property identified as the Driscoll School with the address of 64 Westbourne Terrace located in Brookline, Massachusetts. This assessment has identified no Recognized Environmental Conditions (RECs) or CRECs in connection with the subject site and has identified one (1) HREC with connection to the subject site.



Jonathan Levi Architects  
January 19, 2018  
Page 3

We trust that the above is sufficient for your present requirements. Should you have any questions concerning this report, please do not hesitate to call us.

Very truly yours,

McPHAIL ASSOCIATES, LLC

A handwritten signature in blue ink, appearing to read "Michael G. Sachs".

Michael G. Sachs

A handwritten signature in blue ink, appearing to read "Joseph G. Lombardo Jr.".

Joseph G. Lombardo Jr., L.S.P.

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MGS/jgl



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**FIGURES:**

FIGURE 1: PROJECT LOCATION PLAN

FIGURE 2: SITE PLAN

**APPENDICES:**

APPENDIX A: LIMITATIONS

APPENDIX B: MCP PHASE I SITE ASSESSMENT MAP, USER QUESTIONNAIRE AND SITE PHOTOGRAPHS

APPENDIX C: SANBORN MAPS, AERIAL PHOTOGRAPHS, TOPOGRAPHIC MAPS AND CITY DIRECTORIES

APPENDIX D: TOWN OF BROOKLINE FILES AND RECORDS

APPENDIX E: EDR DATABASE REPORT



## **INTRODUCTION**

This report documents the results of our Phase I Environmental Site Assessment for the property known as Driscoll School located at 64 Westbourne Terrace in Brookline, Massachusetts (the "subject site").

These services were performed and this report was prepared in accordance with an Agreement for Services with Jonathan Levi Architects dated October 25, 2018. These services are subject to the limitations in **Appendix A**.

## **PURPOSE AND SCOPE**

The assessment was conducted for the above referenced property in accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process (ASTM E 1527-13) as referenced in 40 CFR Part 312 (the All Appropriate Inquiries Rule). Standards utilized in our evaluation included those set forth in the Massachusetts Oil and Hazardous Materials (OHM) Release Prevention and Response Act (MGL Chapter 21E) and the Massachusetts Contingency Plan (310 CMR 40.0000).

Our scope of services for this Phase I ESA consisted of the following: (i) an assessment of the subject site history relative to the possible presence of oil and hazardous materials; (ii) a visual reconnaissance of the subject site and surrounding area; (iii) a search of Federal databases and records, including the National Priorities List, the SEMS List and the RCRIS Handlers List by EDR Inc.; (iv) a search of information from the offices of the Town of Brookline; (v) a review of the Massachusetts Department of Environmental Protection (DEP) database relative to incidents involving releases of OHM on or in the vicinity of the subject site; and (vi) assessing the above and documenting the results in a Phase I Environmental Site Assessment (ESA) Report.

Tasks excluded from our Phase I Environmental Site Assessment scope of work consisted of but were not limited to an environmental lien and title search, an assessment for the presence of lead-based paint, mold, mildew, asbestos-containing materials, or other naturally occurring pollutants such as radon gas. Further sampling and laboratory analysis of soil, groundwater, soil gas or indoor air was not conducted as part of this assessment. No attempt was made to check on the compliance of present or past owners of the site with federal, state or local laws and regulations except as documented herein.



The objective of the Phase I Environmental Site Assessment, as defined in the ASTM E 1527-13 Standard, is to identify the potential presence of Recognized Environmental Conditions (RECs), Historical RECs (HREC) and/or Controlled RECs (CREC) at the subject site or at surrounding properties that may potentially pose a threat to the subject site.

The term REC is defined by ASTM E 1527-13 as "the presence or likely presence of any hazardous substance or petroleum products in, on, or at a property; (1) due to a release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment". The term HREC is defined by ASTM E 1527-13 as "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls". The term CREC is defined by ASTM E 1527-13 as "a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority..., with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls".

Our professional opinion is based solely on the scope of work conducted and pertains to the subject site limits as shown on **Figure 2** and defined herein.

## **SITE AND LOCUS DESCRIPTION**

The Driscoll School development is understood to be a school consisting of grades kindergarten through 8<sup>th</sup> grade. The school consists of 27 classrooms, a cafeteria/kitchen, a play area, a parking lot and tennis courts. The project site is comprised of one parcel totaling approximately 172,716 square feet and is bounded by Westbourne Terrace to the northeast, Bartlett Crescent and Washington Street to the southwest, commercial developments to the south, and single-family residences to the north and east. The limits of the subject site are shown on the enclosed **Figure 2**.

The subject site latitude and longitude are 42° 20' 26.80" N and 71° 8' 9.95" W, respectively, and the Universal Transverse Mercator (UTM) coordinates are 324,031.7 meters east and 4,689,609 meters north in Zone 19. In general, the area within



500 feet of the subject site is occupied by a mixture of residential and commercial properties.

**SITE ENVIRONMENTAL SETTING** Based on an on-line edition of the Massachusetts Geographic Information Systems MassDEP Phase I Site Assessment Map viewed on October 26, 2018, the subject site is not located within the boundaries of a Sole Source Aquifer, Potentially Productive Aquifer or within a Zone II, Interim Wellhead Protection Area as defined by the Massachusetts Department of Environmental Protection. Further, there are no public drinking water supply wells, no Areas of Critical Environmental Concern, no fish habitats and no Threatened or Endangered Species within specified distances of the subject site.

The closest body of water to the subject site is identified as the Brookline Reservoir, which is located approximately 4,500 feet to the south of the subject site. The Map also indicated that Protected Open Space is located on the north of the subject site. No areas designated as solid waste sites (landfills) are noted as being located within 1,000 feet of the site. A copy of the Massachusetts Phase I Site Assessment Map is included in **Appendix B**.

**SITE HISTORY** Our research into the history of the subject property included a review of Sanborn Maps, historical aerial photographs, topographic maps and City Directories supplied by EDR. Copies of the Sanborn Maps, aerial photographs, topographic maps, and City Directories are included in **Appendix C**.

Sanborn Maps dated 1898, 1925, 1950, 1957, 1965 and 1969 have been provided by EDR for the subject site. According to the Sanborn Maps the subject site was undeveloped in 1898 and the subject site was bounded by residential properties. The 1925 Sanborn Map identifies the Michael Driscoll School building on the northern end of the subject site. Surrounding the property at this time is residential houses to the north east and west and commercial properties to the south of the subject site. The 1950 Sanborn Map identifies the expansion of the school to the south and the school is bound primarily by residential properties.

From the 1957 through 1969 Sanborn Maps the subject site is shown in its present footprint with the southern portion of the subject site consisting of a playground. Surrounding properties to





the subject site are primarily residential with some commercial properties to the south of the subject site along Beacon Street.

Available aerial photographs dated 1938, 1952, 1955, 1960, 1969, 1970, 1978, 1980, 1986, 1995, 2008, 2012 and 2016 have been provided by EDR. The aerial photographs indicate similar results as to the Sanborn Maps. The 1969 through the most recent aerial photograph of 2016 show the present footprint of the subject site with the addition of the tennis courts in the 2008 aerial photograph.

The surrounding properties were indicated by the aerial photographs to be primarily residential properties directly surrounding the subject site. Commercial properties are indicated to be located to the south of the subject site along Beacon Street.

Historical City Directories supplied by EDR for the years 1969, 1974, 1985, 1989, 1992, 1995, 2000, 2005, 2010 and 2014 indicated that the subject site was not listed under the Westbourne Terrace address until 1985. The 1985 city directory identifies the subject site as Driscoll Extended with the address of 64 Westbourne Terrace. From the 1985 through 2014 city directories the subject site would remain identified under the address of 64 Westbourne Terrace. Surrounding properties to the subject site in close proximity are primarily residential properties.

Historical topographic maps supplied by EDR for the years of 1893, 1903, 1943, 1944, 1946, 1949, 1954, 1956, 1970, 1987 and 2012 identify the subject site Driscoll School to be mapped on the 1944 through 1987 maps. Although the school is not mapped on the 2012 topographic map it is still present there based on the Sanborn Maps and aerial photographs.

**EVALUATION OF DATA FAILURE** In accordance with ASTM E 1527-13, Article 8.3.2 and Article 8.3.2.1 the uses of the property shall be identified back to the property's first developed use, or back to 1940, whichever is earlier, and the maximum interval between historical sources is 5 years. During the time period between the initial development of the subject site to the present time, some intervals between historical sources exceeded 5 years; therefore, data failure was encountered. However, the indicated use of the subject site between sources was consistent and, therefore, the data failure is not considered to constitute a significant data gap.



## **INTERVIEW WITH USER OF REPORT**

As part of our research into the historical use of the subject site, an interview was conducted with Mr. Raymond D. Masak from the Town of Brookline in accordance with the User Questionnaire contained in Appendix X.3 of ASTM E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. A copy of the User Questionnaire was provided to Mr. Masak by email and returned to us on November 16, 2018. According to Mr. Masak's knowledge of the property, there are no environmental cleanup liens filed or recorded against the subject site, nor any activity and use limitations, engineering controls, land use restrictions, or institutional controls in place or recorded in a registry under federal, state or local law. Information provided in the User Questionnaire by Mr. Masak has been incorporated into this report. A copy of the completed User Questionnaire is provided in **Appendix B**.

## **SITE RECONNAISSANCE**

A visual reconnaissance of the subject site and surrounding properties was performed on November 9, 2018 by a representative of McPhail Associates LLC. Ms. Carol Harris of Jonathan Levi Architects met McPhail on-site and Mr. Larry Cronk of Brookline Public Schools accompanied McPhail on the subject site tour. The site reconnaissance included visual observation of the school including majority of the individual classrooms. Mr. Cronk indicated that the subject site was serviced by electrical, municipal water, municipal sewer, and municipal gas. Observations of readily visible portions of adjacent and nearby properties were also made. However, in general, these observations were made from outside the boundaries of these properties. The extent of the subject site is shown on **Figure 2**. Photographs taken during our site reconnaissance are included in **Appendix B**.

### **Subject Site**

In general, the subject site was observed to be occupied by a Pre-kindergarten through 8<sup>th</sup> grade public school identified as the Michael Driscoll School, a playground, playing fields, basketball court, tennis courts and a parking lot. The school is a 3-story brick building that consists of several classrooms, a nurses' room, a cafeteria, a library, a computer lab, a gymnasium, a theater, a art room and science labs. The subject site is bounded by Westbourne Terrace to the northeast, Bartlett Street to the north, Bartlett Crescent and residential properties to the southeast and commercial properties to the south.



The subject site is connected to public utilities for gas, electric and water according to Mr. Cronk. One 10,000-gallon underground storage tank (UST) is located at the subject site at the southwest side of the building along Bartlett Crescent. According to Mr. Cronk the UST at the time of the visit had approximately 2,400-gallons of No. 4 Fuel oil in it and is used once a year for routine inspection. The UST located on the subject site is further discussed in the Town of Brookline Fire Department section. Located on the ground floor of the subject site is a boiler room that consists of three (3) boilers that operate off of natural gas. In the boiler room is two (2) gas powered hot water heaters for the school, which are 85-gallon and 40-gallon in size. The concrete slab in the boiler room is in good shape and no staining on the concrete was noted at the time of the visit. Located across from the boiler room on the ground floor is the sprinkler room and the compressor room. No staining of the concrete slabs was observed in either of these rooms.

Located on the ground floor is the cafeteria, which consists of dining room and kitchen. The kitchen has a hot bar line, dish pit, stacked ovens, gas burners, meal preparation areas, three (3) freezers, one (1) walk in refrigerator and dry food storage.

The school has one (1) elevator, which operates on hydraulic fluid as well as a dumbwaiter that is no longer in operation. No staining was visible on the tile floor in the elevator maintenance room during the time of the visit. A condensation pump room is located on the southern end of the school for the steam lines.

Two (2) separate unfinished attics exist at the subject site in the northern and southern portions of the subject site building. These are accessed via the third floor by ladder and through a hatch.

No spills, odors or staining were identified inside the subject site building, which would indicate the presence of an REC.

#### *Exterior*

The exterior portions of the subject site were observed to be occupied by asphalt-paved roadways and recreation areas, such as a playground, tennis courts, a basketball court and a grass athletic field.

In summary, no RECs were identified on the exterior portions of the subject site during our July 13, 2018 site reconnaissance.



## Adjacent and Nearby Properties

The subject site was observed to be bounded by primarily residential properties along Bartlett Crescent, Bartlett Street, Washington Street and Westbourne Terrace. To the south of the subject site the southern end abuts the northern side commercial properties that front to the south on Beacon Street. Commercial properties to the south of the subject site consist of restaurants, a veterinary clinic, a dentistry office, jewelry store and a bank. In summary, no surficial indications of the presence of RECs were observed on adjacent or nearby properties.

## MUNICIPAL AND STATE RECORD REVIEW

McPhail completed a municipal records review pertaining to information relevant to the potential use, storage, generation, or disposal of OHM at the subject site and surrounding properties. Our records review included on-line research, or inquiries of the Town of Brookline Assessors' database, Town of Brookline Building Department, Town of Brookline Health Department, Town of Brookline Fire Department, and the DEP UST Registry On-Line Database was also reviewed.

### 1. Town of Brookline Assessors' Office

According to the Assessors' Office of the Town of Brookline, the subject site is listed with the addresses of 50 Westbourne Terrace and the Geographic Information Systems lists the subject site under the address of 64 and 50 Westbourne Terrace. The Parcel ID for the subject site is 092-18-00 and is listed as Driscoll School and Playground owned by the Town of Brookline. A copy of the on-line Assessors' information is included in **Appendix D**.

### 2. Town of Brookline Building Department

A in-person inquiry was made to the Town of Brookline Building Department on November 1, 2018 for files pertaining to the subject site. The available records for the subject site in general do not pertain to the storage, use, or release of OHM at the subject site. In general, the records pertained to general construction permitting. There was one (1) non-dated record on file indicating that the subject site has a boiler, which uses oil. The subject site has a UST located on the property, which is further discussed in the Town of Brookline fire records. A copy of the Town of Brookline building department information is included in **Appendix D**.



### **3. Town of Brookline Health Department**

An in-person inquiry was made to the Town of Brookline Health Department on November 9, 2018 for files pertaining to the subject site. Files were reviewed on a computer at the Town of Brookline Health Department. Several files are on record pertaining to asbestos abatement and general health complaints. No records pertaining to the storage, use, or release of OHM at the subject site were identified.

### **4. Town of Brookline Fire Department**

A in person inquiry was made to the Town of Brookline Fire Department on November 1, 2018 for files pertaining to the subject site. According the Brookline Fire Department the subject site contains one (1) 10,000-gallon of No. 4 fuel oil fiberglass UST based on an application for permit for the installation or alteration of fuel oil burning equipment dated May 14, 1997. The fire records indicate that the original UST was removed and replaced on July 31, 1996 and the tank was transported off-site on August 19, 1996. The MassDEP records identify that the original UST leaked to the soil, which was discovered during the replacement of the UST and was assigned Release Tracking Number (RTN) 3-14448. This is further discussed in the Massachusetts DEP records review section of this report. Other records on file pertain to temporary storage tanks on-site including propane, a generator with up to 80-gallons of diesel fuel and a burn permit for the use of oxygen and acetylene on the subject site. Given the use of the UST on the subject site this does not constitute an REC with respect to he subject site. A copy of the Town of Brookline fire department information is included in **Appendix D**.

### **5. Massachusetts DEP On-Line Database of Underground Storage Tanks (USTs)**

Our review of the MassDEP UST Registry Online Database on October 31, 2018, did not identify records of past presence or current use of USTs at the subject site.

## **ENVIRONMENTAL DATABASE REPORT**

Research of Federal and State records was conducted by EDR Inc. of Shelton, Connecticut, and is summarized in a database report dated October 31, 2018. The report includes a records search of federal and state database information indicating potential environmental matters within ASTM-established minimum search



distances. A copy of the EDR database report is included in **Appendix E**.

Based upon information provided in the EDR report, the subject site is listed in the databases searched by EDR. The Release Tracking Number (RTN) 3-14448 with the address of 64 Westbourne Terrace, which is located on the subject site and is further discussed in the Massachusetts DEP Records Review Section of this report. The subject site is also listed in the Massachusetts registry for Asbestos and according to the EDR report asbestos abatement work has been completed.

The EDR report indicated two (2) Resource Conservation and Recovery Act (RCRA) Conditionally Exempt Small Quantity Generator (CESQG) of hazardous waste facilities located within 0.25-miles of the subject site based on the database updated as of March 1, 2018. The RCRA-CESQG facilities are identified as Fabriclene Inc. with the address 1629 Beacon Street, which is located approximately 300 feet to the southeast of the subject site; and AA Waste Oil with the address 1601 Beacon Street, which is located approximately 425 feet to the southeast of the subject site. Given that these RCRA-CESQG facilities are located downgradient of the subject site they are not considered RECs with respect to the subject site.

The EDR report identifies 175 Massachusetts State Hazardous Waste Sites (MA SHWS) located within one (1) mile of the subject site based on the report updated July 10, 2018. Each of the listed facilities located at a higher gradient and within a 1/8 mile relative to the subject site have had Permanent Solution Statements filed with the MassDEP and are not considered RECs with respect to the subject site. The other listed facilities are either over a 1/4-mile away from the subject site or are relatively down gradient from the subject site and based on locations and distances and nature of the release conditions, are therefore not considered to be RECs with respect to the subject site.

A total of seven (7) leaking aboveground storage tanks (LAST) and 32 leaking underground storage tanks (LUST) have been identified in the EDR report within 0.5-miles of the subject site based on the report updated October 31, 2018. Each of these identified LAST and LUST facilities have had Permanent Solution Statements, and hence, are not considered to be RECs with respect to the subject site.



The EDR report identifies three (3) UST facilities located within 0.25-miles of the subject site based on the EDR report updated September 21, 2018. The facility identified as Brighton Auto Clinic with the address 3 Washington Street, is located approximately 690 feet to the northwest of the subject site and relatively upgradient. This facility is listed as having three (3) tanks listed as in-use, which are 8,000-gallon gasoline motor vehicle tanks installed in April 1992. Given that this facility is a listed disposal site that has had Permanent Solution Statement filed with the MassDEP it is not considered a REC with respect to the subject site. The two (2) other listed facilities are relatively downgradient of the subject site and are each listed as having the USTs removed. Given the location and distance these sites are not considered RECs with respect to the subject site.

According to the EDR report there is one (1) AST located within 0.25-miles of the subject site based on the EDR report updated October 31, 2018. The listed facility is identified as US 1 Petroleum with the address of 3 Washington Street, which is located approximately 690 feet to the northwest of the subject site. Given the distance and location and that there is not a reported release from this AST it is not considered a REC with respect to the subject site.

The EDR report identifies four (4) MA INST Control (Activity and Use Limitations) facilities located within 0.5-miles of the subject site based on the report updated July 10, 2018. Given that the AULs nature and extent is determined and the location of these facilities the MA INST Control facilities are not considered RECs with respect to the subject site.

The EDR report identifies two (2) RCRA Non-Generators (NonGen) of hazardous waste sites located within 0.25-miles of the subject site based on the database last updated on March 1, 2018. Each of the identified facilities are listed as having no violations. The identified NonGen sites are not considered RECs with respect to the subject site.

The EDR report identifies three (3) MA Drycleaners located within 0.25-miles of the subject site based on the database last updated on September 21, 2018. The facility identified as Fabriclene Inc. with the address 1629 Beacon Street, located approximately 300 feet to the southeast of the subject site has the RTN 3-4554. This facility has had a Permanent Solution Statement filed with the MassDEP and the extent of the contamination is defined, which does not impact the subject site. The RTN 3-4554 associated with





Fabriclene is further discussed in the Massachusetts DEP records review section of this report. Each of these drycleaners are located relatively downgradient of the subject site and based on location and distance, are not considered to be RECs with respect to the subject site.

According to the EDR report there are ten (10) MA hazardous waste generators (HW GEN) within 0.25-miles of the subject site based on the report updated September 19, 2018. Given that these facilities are either over a 1/8-mile from the subject site or in relatively down gradient direction with respect to the subject they are not considered RECs with respect to the subject site.

The EDR database identifies one (1) facility listed on the Rhode Island Manifest for hazardous materials located within 0.125-miles of the subject site based on the report updated October 31, 2018. This facility is identified as Fabriclene Inc., which is further discussed in the Massachusetts DEP records review section of this report. Although this facility has received violations and is a listed disposal site, which has had a Permanent Solution Statement it is not considered to be an REC with respect to the subject site due to its relative lower elevation to the subject site.

The EDR database identified four (4) Historical drycleaners and two (2) Historical Automotive within 0.125-miles of the subject site. The subject site. Given that the listed historical drycleaners and historical automotive facilities are all located relatively downgradient of the subject site and that any former releases have had Permanent Solution Statements these facilities are not considered RECs with respect to the subject site. A review of EDR's list of "orphan sites"—those sites with inadequate address information—did not indicate sites to be in close proximity to the subject site.

#### **MASSACHUSETTS DEP RECORDS REVIEW**

According to the EDR review, the subject site has a MassDEP reported release with the associated RTN 3-14448. The majority of DEP-listed disposal sites are either located at distances greater than 0.25-miles from the subject site and/or have achieved a Permanent Solution in accordance with the Massachusetts Contingency Plan (MCP), which indicates that a condition of No Significant Risk exists. Therefore, these sites are not likely to pose a threat of impact to the subject site. However, the following release sites were further evaluated for their potential to impact the subject site.





## **1. Driscoll School, 64 Westbourne Terrace; RTN 3-14448**

This MCP listed site is located at the subject site at the Driscoll School, with the address 64 Westbourne Terrace. The report entitled "Initial Site Investigation Activities Report for The Property Known as The Driscoll School, 64 Westbourne Terrace, Brookline, Massachusetts, RTN # 3-14448" dated March 14, 1997 and prepared by Gemini Geotechnical Associates, Inc. LLC. (Gemini), documents the removal of an UST and the associated contaminated soil. The UST on the subject site was removed under a Limited Removal Action (LRA) and after the fact analytical results of the remaining soil identified certain polynuclear aromatic hydrocarbons (PAHs) in excess of RCS-1 Reportable Conditions, triggering a 120-day reporting notification condition to the MassDEP.

On August 2, 1996 a 10,000-gallon No. 4 fuel oil tank was removed from the southwestern side of the Driscoll School. During the removal of the UST headspace screening was conducted utilizing photoionization detection (PID) of the soil. PID of the soil from around the supply piping to the UST ranged from 40 to 70 parts per million (ppm) and ranged from not detected to 5 ppm from the bottom of the UST grave. Approximately 30 cubic yards of contaminated soil was removed from the site. Composited samples of soil from the bottom of the UST grave were collected, which exhibited concentrations of benzo(a)anthracene, benzo(b)fluoranthene and benzo(a)pyrene in both of the soil samples to exceed the RCS-1 reportable concentrations. A 120-day Release Notification Form (RNF) was submitted to the MassDEP on October 16, 1996.

A limited site investigation was conducted to evaluate the environmental impact from the removed UST to the soil and groundwater. Three (3) borings were completed on February 19, 1997 in the vicinity of the UST and one (1) monitoring well was installed. The soil from the three (3) boreholes as well as the one (1) monitoring well was analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) and polynuclear aromatic hydrocarbons (PAHs). The analytical results of the soil and groundwater were below the laboratory detection limits. Based on these results Gemini concluded that the soil contamination in the vicinity of the removed UST was managed through excavation. A Class A-2 Permanent Solution Statement has been filed with the MassDEP for this site and given this outcome this would be an HREC in relation to the subject site.



## **2. 15-25 Westbourne Terrace; RTN 3-27022**

This release site is located at 15 to 25 Westbourne Terrace and according to the report entitled "Immediate Response Action Completion and Response Action Outcome Report, #2 Fuel Oil Release, 15-25 Westbourne Terrace, Brookline, Massachusetts, RTN 3-27022" dated September 24, 2007 and prepared by Exeter Environmental Associates, Inc. LLC. (Exeter), documents the release of No. 2 fuel oil to soil and groundwater. The release was discovered during the closure of an 2,000-gallon UST on August 7, 2007. At this time the soil from the bottom of the UST grave exhibited a PID reading of 147 ppm, which exceeds the 72-hour reporting threshold of 100 ppm established by the MassDEP. The MassDEP was notified and gave oral permission to conduct an Immediate Response Action (IRA), which included the removal of up to 100 cubic yards of impacted soil.

The impacted soil was excavated by Removal Specialists, which began on August 9, 2007 and continued through August 24, 2007. Soil impacted by the UST was transported via conveyor belts to a truck on Westbourne Terrace. During the excavation of the soil was screened with a PID to determine the limits of the excavation. The boundaries of the excavation were limited to the existing building and to a depth of approximately seven (7) to nine (9) feet below ground surface. Groundwater was not encountered during the excavation activities. A total of approximately 159 tons of petroleum impacted soil was trucked to the Aggregate Industries facility in Stoughton, MA for recycling.

A total of nine (9) soil samples were collected from the limits of the completed excavation. PID screenings of the soil ranged from 3 to 80 ppm. Each of the soil samples was analyzed for extractable petroleum hydrocarbons (EPH) and two of the soil samples with elevated PID screenings were analyzed for volatile petroleum hydrocarbons (VPH) as well. The soil samples did not exceed the applicable S-1 soil standards for the petroleum hydrocarbons. Indoor air screening in the condominium unit closest to the release did not exhibit readings on the PID over 0.0 ppm. With the completion of the IRA it is in the opinion of Exeter that these response actions met the requirements of a Class A-2 Permanent Solution Statement. Given that the remediation has been completed and Permanent Solution Statement has been completed for the site, RTN 3-27022 is not considered a REC with respect to the subject site.



### **3. 1629 Beacon Street; RTN 3-4554**

This release site is located at 1629 Beacon Street approximately 300 feet to the southeast. According to the report entitled "Phase III Identification, Evaluation, & Selection of Comprehensive Remedial Action Alternatives & Class C-1 Response Action Outcome, Release Tracking Number 3-4554, 1629 Beacon Street Brookline, MA 02445" dated January 3, 2012 and prepared by FSL Associates, Inc. (FSL) a release of chlorinated volatile organic compounds (CVOCs) was identified from Fabriclene Inc. (a dry cleaners) to soil and groundwater. The DEP was notified of the release condition on October 1, 1993.

The release of the CVOCs was located in the rear alley way where CVOc vapors were being released to ambient air through an exhaust vent. Condensation and downwash from this vent are likely the primary source of contamination to soil and groundwater.

Tetrachloroethene (PCE) was detected in groundwater at concentrations well above the applicable MCP RCS-1 reportable concentrations. PCE was also identified in soil vapor.

The extent of the release of VOCs has been defined and RTN 3-4554 has been closed out with joint Permanent Solution Statements for the disposal site with a Class B-2 for 1629-1639 Beacon Street and a Class C-1 for 1627 Beacon Street. An AUL was placed on a portion of the disposal site to restrict the site from any use for residential, day care, school, hotel, community center and/or recreational uses. This release is located downgradient of the subject site and as documented in the mentioned report the extent of the contamination has been defined and does not impact the subject site. Therefore, given the distance, location, and DEP status of the release site, the RTN 3-4554 MCP release site is not considered to be a threat to the subject site. Accordingly, this release site is not a REC with respect to the subject site.

#### **DATA GAPS**

In accordance with ASTM E 1527-13, the Phase I report shall identify and comment on any significant data gaps that affect the ability of the environmental professional to identify RECs.

There were no significant data gaps identified during the completion of this assessment.



## **SUMMARY AND CONCLUSIONS**

A Phase I Environmental Site Assessment Report has been completed for the property known as the Driscoll School with the address of 64 Westbourne Terrace (the "subject site"), located in Brookline, Massachusetts. The purpose of this report was to document the physical characteristics of the subject site with regard to whether there has been a release or threat of release at the site of oil or hazardous materials, as defined in Massachusetts General Laws Chapter 21E and the Massachusetts Contingency Plan, 310 CMR 40.0000. This report has been prepared in a manner which is consistent with the ASTM E 1527-13 standard for Phase I ESA reporting.

The existing Driscoll School is located on an approximate 172,716 square-foot property which fronts onto Westbourne Terrace to the northeast and is bound by Bartlett Crescent and residential properties to the southwest. The three-story building contains approximately 98,000 gross square feet of space.

According to the Town of Brookline Assessor, the subject site buildings were constructed in 1911. Based on our historical research, the subject site was vacant, undeveloped land prior to construction of the subject site building. The subject site has remained generally unchanged since development.

A search of information from the Town of Brookline municipal offices for records of permits issued for the storage and/or use of oil or hazardous materials at the subject site did not indicate the presence of an REC.

EDR's review of local, state and federal databases indicated that the subject site is a MassDEP listed release site. According to the Massachusetts Department of Environmental Protection (DEP) Waste Site database, the subject site is listed with the DEP under Release Tracking Number (RTN) 3-14448 due to a 120-day release condition. As reported by others, RTN 3-14448 is associated with a release of No. 4 fuel oil to soils which was encountered during the replacement of one (1) fuel oil underground storage tanks (UST). As identified by the DEP database, RTN 3-14448 was closed out under a Class A-2 Response Action Outcome in April of 1997 and a Permanent Solution has been achieved for the release. The RTN 3-14448 is considered a HREC with respect to the subject site. The subject site is also listed on the EDR report as an asbestos remediation site and the abatement was completed. Surrounding sites



identified in the database searched by EDR did not identify the presence of an REC.

A review of the online MassDEP Release Site database did not identify the presence of a release site in the vicinity of the subject site which would be considered an REC.

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 for the Driscoll School located in Brookline, Massachusetts. This assessment has identified no Recognized Environmental Conditions (RECs) or CRECs in connection with the subject site and has identified one (1) HREC with connection to the subject site from the removal and replacement of the UST located at the subject site.

**ENVIRONMENTAL  
PROFESSIONAL  
STATEMENT**

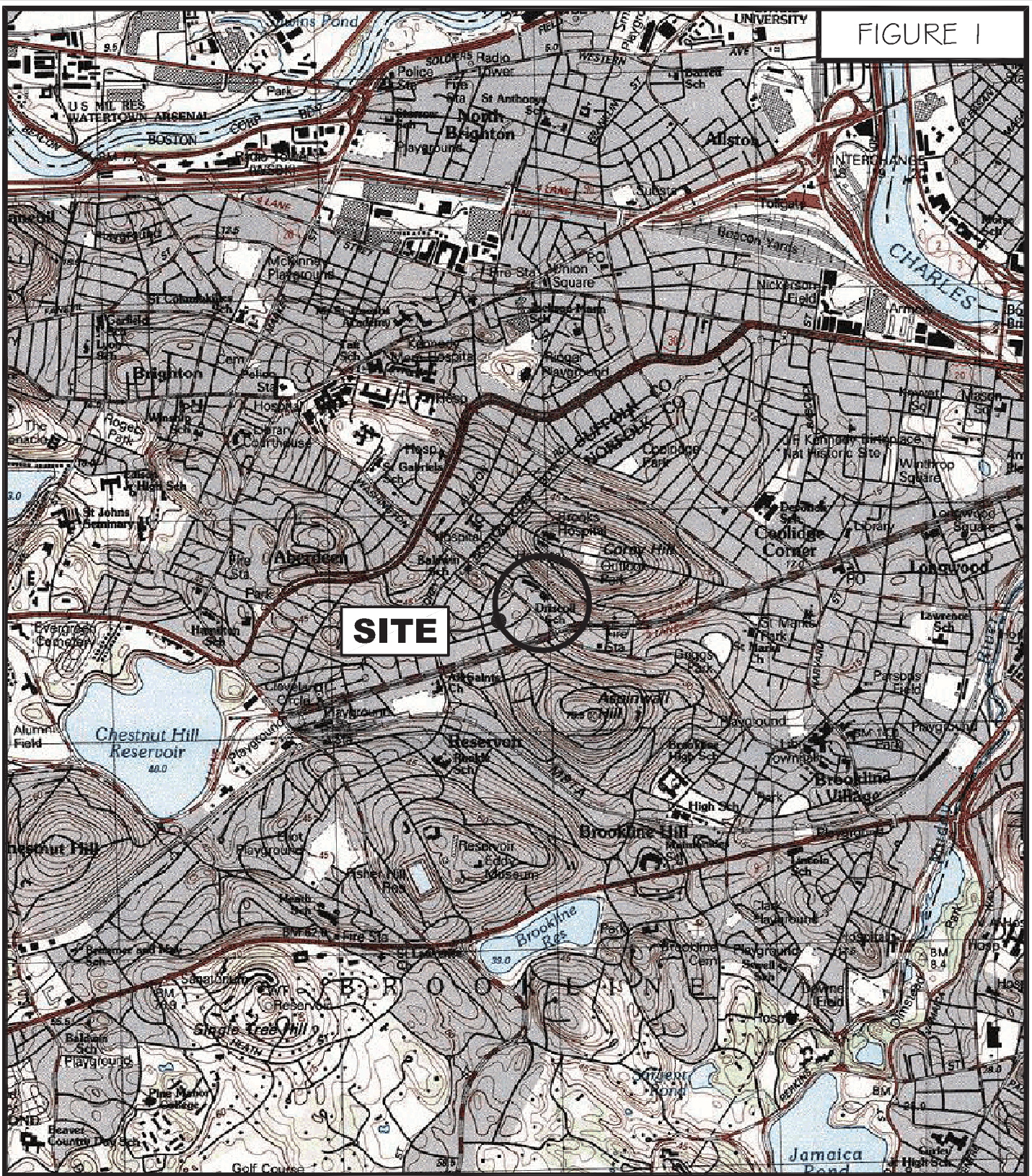
I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in Section 312.10 of 40 CFR 312. Further, I have the specific qualifications based on education, training and experience to assess a property of the nature, history, and setting of the subject site. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in CFR Part 312.

A handwritten signature in blue ink, appearing to read "Joseph G. Lombardo Jr.", is written over a horizontal line.

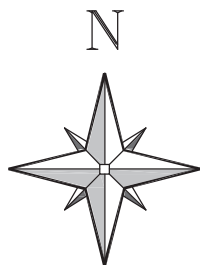
Joseph G. Lombardo Jr., L.S.P.  
Environmental Professional



FIGURE 1



Geotechnical and  
Geoenvironmental Engineers  
2269 Massachusetts Avenue  
Cambridge, MA 02140  
617/868-1420  
617/868-1423 (Fax)  
www.mcphailgeo.com



SCALE 1:25,000

# PROJECT LOCATION PLAN

## DRISCOLL SCHOOL

BROOKLINE

MASSACHUSETTS







311000

CLEARING AND GRUBBING

- A. Description: Perform all site preparation as indicated herein. Unless otherwise indicated, the areas to be cleared, grubbed and stripped shall consist of the entire worksite, with the exception of those areas specifically designated to remain in an undisturbed, natural condition.
- B. Functional Requirements:
1. Design Requirements:
    - a. Cut and remove all roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground in the area of construction, as indicated on the Contract Drawings as the limit of work.
    - b. Grub and remove all stumps, roots in excess of 1-1/2-inches in diameter, matted roots, brush, timber, logs, concrete rubble and other debris encountered to a depth of 30 inches below original grade or 18 inches beneath the bottom of excavations, whichever is deeper.
    - c. Strip topsoil and subsoil from all areas to be excavated as detailed on the contract drawings. Topsoil shall be free from brush, trash, stones larger than 2 inches in diameter and other extraneous material. Avoid mixing topsoil with subsoil. Stockpile and protect topsoil in area.
    - d. Contractor shall dispose of rubbish and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area. No rubbish or debris of any kind shall be buried on the site.
    - e. Trees and other vegetation not indicated to be removed in the contract drawings shall remain and shall be protected from damage by all construction operations. Provide protection to prevent damage to surrounding trees, not within the limit of work or specified to be removed, from the felling operations. Clearing operations shall be conducted in a manner so as to provide for the safety of employees and others.

END OF 311000

Jonathan Levi Architects  
266 Beacon Street  
Boston, Massachusetts

NEW DRISCOLL SCHOOL  
Brookline, Massachusetts

312000

EARTH MOVING

A. Description: Perform all required excavation, fill and grading to complete the Work as indicated on the contract drawings and as specified herein. The work shall include excavation for drain manholes, drain pipes, and paving; all backfilling, compaction and fill; embankment and grading; disposal of waste and surplus materials; temporary support of excavation, excavation dewatering and surface water control during excavation. All materials not re-used on-site shall be disposed of by the Contractor. Materials required in the Work which are not available from on-site excavated materials shall be imported from approved off-site sources. Unless otherwise indicated, the areas to be cleared, grubbed and stripped shall consist of the entire worksite, with the exception of those areas specifically designated to remain in an undisturbed, natural condition.

B. Functional Requirements:

1. Design Requirements:

a. Structural Fill: Structural fill shall be gravel, sandy gravel, or gravelly sand free of organic material, wood, trash, snow, ice, frozen soil and other materials which may be compressible or which cannot be compacted as specified herein and shall be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
4 in	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

b. Controlled Density Fill: Controlled Density Fill shall conform to the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges, as amended, specification M4.08.0.

c. Common Fill: Common Fill shall consist of mineral soil free from organic materials, topsoil, wood, trash and other objectionable materials which may be compressible or which cannot be properly compacted. Common Fill shall not contain stones that are greater than 2/3 the lift thickness of common fill being placed. Common fill shall not contain granite blocks, broken concrete, masonry rubble or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Snow, ice and frozen soil will not be permitted. Soil excavated as part of the Work which meets the above requirements in this paragraph, as shown by a certified sieve analysis may be used in the Work.

- d. Select Common Fill: Select Common Fill shall be as specified above for Common Fill, except that the material shall contain no stones larger than 2-in in diameter. Soil excavated as part of the Work which meets the requirements of this paragraph, as shown by a properly executed and certified sieve analysis may be used in the Work.
- e. Riprap: Riprap shall be sound, durable rock which is angular in shape. Rounded stones, boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale and organic material, and meet the following Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges, as amended:
- 1) Type 1: M2.02.2 (Dumped Riprap)
  - 2) Type 2: M2.02.4 (Modified Rockfill)
  - 3) Type 3: M2.06.0 (Slope Paving)
- f. Crushed Stone:
- 1) Crushed stone for temporary access ways, construction entrances, walkways, setting bed for riprap, and sediment filtration devices shall conform to the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges, as amended, specification M2.01.3.
  - 2) Dense-graded crushed stone for subbase material in project pavement sections shall conform to the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges, as amended, specification M2.01.7.
- g. Screened Gravel:
- 1) Screened gravel shall be used for drainage pipe and drainage structures bedding as indicated or if standing water is observed in the pipe trench prior to installation and at other locations as specified on the Contract Drawings.
  - 2) Screened gravel shall consist of hard, durable, rounded or subangular particles of proper size and gradation and shall be free from sand, loam, clay, excess fines and deleterious materials. The gravel shall be graded within the following limits:
- | <u>Sieve Size</u> | <u>Percent Finer by Weight</u> |
|-------------------|--------------------------------|
| 3-in              | 100                            |
| No. 4             | 40 to 75                       |
| No. 50            | 8 to 28                        |
| No. 200           | 0 to 10                        |
- h. Sand: Sand shall conform to ASTM C33 for fine aggregate.

i. Manufactured Topsoils:

- 1) Manufactured topsoils shall be friable and capable of promoting and supporting healthy plant growth, as determined by soil testing described in this section, when mixed with fertilizer and soil conditioners as specified. Manufactured topsoils shall be free of slag, stones greater than 2 inches in diameter, plants or their roots, sticks, clay clods, toxic substances or any material harmful to plant growth. Manufactured topsoils shall have a pH between 5.5 and 7.5.
- 2) Manufactured topsoil - Type I shall contain between 4 and 6 percent organic matter, and shall be used in reinforced steep slope facing and all other grassed areas as indicated.
- 3) Manufactured topsoils shall be classified as a sandy loam, loam, or sandy clay loam, using the following USDA textural classification system based on the percentage of clay (<0.002mm), silt (0.05 to 0.002mm) and sand (2mm-0.05mm) in the fine earth fraction (<2mm). In addition, the gravel (2mm-2-in) content shall be less than 10 percent.
- 4) The organic matter content for manufactured topsoils shall be by weight as determined by loss on ignition of moisture free test samples oven dried to a constant weight at a temperature of 100°C. To adjust organic matter content, the manufactured topsoils may be amended with organic amendments.
- 5) Soluble salts shall not be greater than 160 ppm.

j. Organic Amendments for use in Producing Manufactured Topsoil:

- 1) On-site topsoil shall be screened and used as organic amendment to create manufactured topsoils.
- 2) Compost material may also be used as an organic amendment. The compost shall be a stable, humus-like material produced from the aerobic decomposition of organic residues. The residues may include biosolids as well as yard wastes, and agricultural wastes. The compost shall be of a dark brown to black color and be capable of supporting plant growth in conjunction with the addition of fertilizers and other amendments. The composted material shall have been stabilized so as not to have an unpleasant odor. An organic amendment not stabilized and having an objectionable odor may be rejected at the discretion of the Owner.

END OF 312000



312500

EROSION AND SEDIMENTATION CONTROLS

- A. Description: Erosion and sedimentation control shall be provided as shown on the Contract Drawings and Order of Conditions by the Framingham Conservation Commission with materials and procedures as specified herein. The plan shall implement erosion and sedimentation control prevention and treatment procedures such that stormwater runoff discharged from the site shall meet the following general requirements:
1. All work shall be performed in accordance with the erosion control measures shown on The Plan.
  2. Best management practices (BMPs) shall be used to address storm water pollution prevention in accordance with MADEP Stormwater Management Guidelines & EPA NPDES Regulations.
  3. The Plan shall be implemented and installed prior to commencement of earthwork activities.
  4. The EPA NPDES Stormwater Pollution Prevention Plan Shall be kept on-site at all times and review / project inspections shall take place as specified therein.
- B. Functional Requirements:
1. Design Requirements:
    - a. In order to minimize erosion, the natural vegetation of the area shall be preserved at locations adjacent to and outside the limits of work as indicated on the Contract Drawings. All earthwork, grading, moving of equipment and other operations likely to cause disturbed soil conditions and erosion and siltation and tracking of sediments, shall be planned and performed in a sequence as to avoid sedimentation and erosion of disturbed soil.
    - b. Furnish all labor, materials, equipment and incidentals required to perform installation, maintenance, temporary pumping, removal and area cleanup related to erosion and sedimentation control work as indicated and as specified herein.
    - c. Crushed Stone: For temporary access ways, staging areas, stone filter boxes, stone filter berms, setting bed for riprap, and sediment filtration devices, crushed stone shall conform to the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges, as amended, SSHB M2.01.3.
    - d. Geosynthetic Materials:
      - 1) Drainage Fabric, Silt Fence, Filter Fabric and Filter Cloth shall be Mirafi Envirofence; American Excelsior "Siltstop" fence or DGIP series siltfence, or approved equal.

- 2) Stabilization Fabric: Erosion control blanket shall be constructed of a porous, biodegradable geotextile matting specifically manufactured to retain soil moisture, to hold soil temperatures and to generally stabilize soils where stormwater flows in channels, swales or on recently planted slopes such as Mirafi 100X; Curlex Excelsior, North American Green Bionet 575BN, or approved equal. Erosion control blanket shall be installed to protect soil and seedlings where specified. The erosion control fabric shall be 'stapled' to the surface which it is installed in accordance with the recommendation of the selected manufacturer. All materials used in the construction of and installation of the fabric must be biodegradable and require no maintenance by the Owner.

e. Sediment Fence:

- 1) Wooden stakes shall be 4-ft in length, 2-in by 2-in oak.
- 2) Sediment fence fabric shall be a woven, polypropylene, ultraviolet resistant, selected to provide a barrier to prevent the transport of sediment laden water with fines and debris, yet provide the passage of water.
- 3) Prefabricated commercial sediment fence may be substituted for built-in-field fence.
- 4) 1/4-in woven wire mesh shall be galvanized steel or hardware cloth.
- 5) Temporary mulch  
Wood chip mulch or bark chip mulch: Chipped material shall have a uniform consistency and be free of rock and soil. Material shall be stockpiled on the site in approved areas at the direction of the Owner. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain a minimum of 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.
- 6) Hay bales shall be bales made of straw of oats, wheat, barley, rye or natural hay and shall be utilized to control sediment runoff during construction activities. Each bale shall be either wire-bound or string tied. Bales shall be placed with bindings oriented around the bale rather than over and under. Furnish oak wood stakes 2-in x 2-in x 4-ft long or 1/2-in x 4-ft long rebar as indicated.
- 7) Tackifier for use on straw mulch areas shall be a latex acrylic copolymer emulsion specifically manufactured for use as a tackifier. Asphalt tackifier shall not be used.
- 8) Temporary seeding for erosion control
- 9) Dust Control
- 10) Cloth Filters: Cloth filters at catch basins shall be The Dandy Bag as manufactured by Dandy Products, Inc. or equal; Siltsack as manufactured by Jennian Enterprises; Drainpac as manufactured by Drainworks.



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Boston, Massachusetts

NEW DRISCOLL SCHOOL  
Brookline, Massachusetts

END OF 312500



321 216

ROADWAY PAVEMENT

- A. Description: Furnish labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Hot-mix asphalt pavement at all excavations made in any existing pavement.
  2. Pavement-marking paint.
- B. Functional Requirements:
1. Design Requirements:
    - a. Hot –mix asphalt pavement bituminous concrete paving shall be Class 1, as specified in Mass DOT Standard Specifications for Highways and Bridges Section M3.11.0
    - b. Asphalt tack coat shall consist of either emulsified asphalt, Grade RS-1 conforming to Mass DOT Section M3.03.0, or cutback asphalt, Grade RC-70 or RC-250 conforming to Mass DOT Section M3.02.0.
    - c. Pavement-marking paint shall be acrylic/latex type, low VOC, traffic marking paint.

END OF 321216

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321218

PEDESTRIAN PAVEMENT

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- A. Description: Furnish and install concrete walkways.
  
- B. Functional Requirements:
  - 1. Design Requirements:
    - a. Concrete shall be no less than 4,000 psi at 28 days with 5% to 7% air entrainment.
    - b. Welded wire fabric shall conform to ASTM A185 and shall be of size and gauge shown.
    - c. Expansion joint filler shall be bituminous type, ½-inch thick meeting AASHTO M-213-65.
    - d. Concrete sidewalks shall have a broom finish.

END OF 321220

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## **SECTION 321320 – DECORATIVE CONCRETE PAVING**

1. Description of Work: Provide decorative concrete paving and related items, as indicated on the Drawings and as specified herein. Work of this Section includes, but is not limited to:
  - a. Stamped concrete paving.
2. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  - a. Use flexible or uniformly curved forms for curves of a radius of 100 feet (30.5 m) or less. Do not use notched and bent forms.
  - b. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
3. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
4. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
5. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
6. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - a. Portland Cement: ASTM C 150, white portland cement Type I.
7. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
  - a. Maximum Aggregate Size: 3/4 inch (19 mm).
  - b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
8. Water: Potable and complying with ASTM C 94/C 94M.
9. Air-Entraining Admixture: ASTM C 260.
10. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
  - a. Water-Reducing Admixture: ASTM C 494/C 494M, Type A[, **colored**].
  - b. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

- c. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
11. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1) ChemMasters.
  - 2) Davis Colors.
  - 3) Scofield, L. M. Company.
  - 4) Solomon Colors, Inc.  
Specialty Concrete Products, Inc.
12. Stamp Mats: Semirigid polyurethane mats with projecting textured and ridged underside capable of imprinting texture and joint patterns on plastic concrete.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1) Bomanite Corporation.
  - 2) Matcrete Precision Stamped Concrete Tools.
  - 3) Scofield, L. M. Company.
  - 4) Stampcrete International Ltd.
13. Stamp Tools: Open-grid, aluminum or rigid-plastic stamp tool capable of imprinting joint patterns on plastic concrete.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following]:
- 1) Matcrete Precision Stamped Concrete Tools.
  - 2) Scofield, L. M. Company.
  - 3) SuperStone, Inc.

END OF SECTION



## **SECTION 32 90 00 PLANTING**

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions and general requirements of the Contract, Division 0 and applicable parts of Division 1, apply to the work under this Section.
- B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or Approved Equal" shall be as determined by the Landscape Architect and the City, per MGL c. 30 s. 39M, part b, criteria 1.
- C. Contractor shall comply with all laws, regulations, and quarantines for agricultural and horticultural products.

#### 1.2 WORK INCLUDED

- A. The work of this Section consists of the provision of all materials, labor, equipment and the like for the complete execution of all lawn establishment by sodding and related items as indicated on the Drawings and/or as specified herein.
- B. Work includes but is not limited to the following:
  - 1. Topsoil (loam borrow), fine grading and loaming;
  - 2. Plant Materials;
  - 3. Soil additives;
  - 4. Mulch;
  - 5. Hydro-seeded Lawns;
  - 6. Sod;
  - 7. Meadow Grass Seed Mix;
  - 8. Erosion Control Fabric;
  - 9. Maintenance, watering, and protection of plantings until final acceptance.

#### 1.3 SPECIAL CONDITIONS

- A. No burning will be permitted on the project site.
- B. Prior to commencing work, the Contractor shall submit a plan for legal disposal of removed materials, acceptable to the Owner.

#### 1.4 REFERENCES

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all other trades and all departments of the City and coordinate all work under this Section therewith.

B. Related items include but are not limited to work under the Sections listed below:

1. Section 02 41 00 – Demolition and Site Preparation
2. Section 31 00 00 – Earthwork

#### 1.5 SUBMITTALS

A. Prior to ordering the below listed materials, submit representative samples to Landscape Architect for selection and approval, in accordance with requirements of General Condition and special provisions as follows. Do not order material until Landscape Architect's approval has been obtained. Delivered materials shall closely match the approved samples.

1. Topsoil: The Contractor shall provide a one (1) cubic foot representative sample from each proposed source for testing and approval as directed by the Landscape Architect. The Contractor shall deliver samples to testing laboratory prior to any loaming and shall have the testing report sent directly to the Landscape Architect, and pay all costs.
  - a. Mechanical and chemical (pH soluble salts) analysis shall be by public extension service agency or a certified private testing laboratory in accordance with the current standards of the Association of Official Agricultural Chemists.
  - b. Report shall be submitted at least one (1) month before any loaming is to be done. Soil tests shall be for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and Lead, and show acidity and USDA classification of the soil.
2. Submit a written guarantee of conformance to specifications for sod.
3. Submit material specifications and installation instructions where applicable attesting that soil additives meet the requirements specified.

#### 1.6 DEFINITIONS

A. The following related items are included herein and shall mean:

1. S.S.H.B.: The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, latest edition
2. A.O.A.C.: Association of Official Agricultural Chemists
3. A.A.N.: American Association of Nurserymen

#### 1.7 PRODUCT DELIVERY AND HANDLING

A. All topsoil, whether from stockpiles on site or loam borrow, shall be stored in piles not to exceed six feet in height, and shall not be handled when frozen or not in a friable condition.

#### 1.8 CERTIFICATION OF ACCEPTANCE AND GUARANTEE

- A. The Contractor shall be responsible for maintenance until the LATER of: the acceptance of the project as substantially complete, or 90 days after installation. After the minimum ninety (90) day maintenance period and substantial completion of the project, the Contractor shall request of the Landscape Architect, in writing, an inspection to determine whether the lawns and plantings are acceptable. If the plant material and workmanship are acceptable, written notice will be given by the Landscape Architect to the Contractor stating that the guarantee period begins from the date of the Certificate of Acceptance. Acceptance shall be given only for the entire lawn area covered by the Contract, and for all plantings.
- B. Lawns shall exhibit a uniform, thick, well-developed stand of grass, which has received a minimum of three cuttings. Lawn areas shall have no bare spots in excess of four inches in diameter, and bare spots shall comprise no more than two percent of the total area of the lawn. No lawn areas shall exhibit signs of damage from erosion, washouts, gullies, or other causes.
- C. Lawns, shrubs, and perennials shall be guaranteed for a period of one calendar year after inspection and acceptance and shall be alive and in satisfactory growth at the end of the guarantee period. Trees 3" caliper or greater shall be guaranteed for a period of two calendar years after inspection and acceptance.
- D. At the end of the guarantee period, inspection will be made again. Any lawn area or planting covered under this contract that is dead or unsatisfactory shall be replaced according to the planting seasons called for herein, until the lawn or planting lives through one guarantee period. A final inspection for acceptance will be made after the replacement plantings have lived through one guarantee period. Contractor shall test soil and add fertilizer and lime as needed in the fall after installation.
- E. All replacements shall be the same turf mix (sod), seed mix (meadow mix and seeded lawns) or species and cultivar (plantings) as originally installed and accepted. The cost shall be borne by the Contractor.

#### 1.9 SITE CONDITIONS

- A. All areas to be planted shall be inspected by the Contractor before starting work and any defects such as incorrect grading, etc., shall be reported to the Landscape Architect prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be planted and he shall assume full responsibility.
- B. Environmental Requirements: Contractor shall not work on or with soils when they are dry, wet, or frozen. Field Test: Form soil in palm of hand; if soil retains shape and crumbles upon touching, then it may be worked (if it will not retain its shape, it is too dry; if it does not crumble, it is too wet). Landscape Architect shall be final authority on condition of soil.

#### 1.10 PROTECTION

- A. The Contractor shall be liable for any damage to property caused by the work, and all areas disturbed shall be returned to their original condition to the satisfaction of the Landscape Architect. During all work of this section, the Contractor shall protect

- all site improvements from contact with agricultural chemicals, soil amendments, and fertilizers.
- B. The Contractor shall provide all erosion, sedimentation, and environmental controls necessitated by site and governing codes.
  - C. Damage no plant to remain by burning, by pumping of water, by cutting of live roots or branches, or by any other means. No plant to be saved shall be used for crane stays, guys, or their fastenings. Vehicles shall not be parked within the dripline of trees to remain, or wherever damage may result to trees to be saved. Construction material shall not be stored beneath trees to be saved. See Drawings for Tree Protection.

## PART 2 - PRODUCTS

### 2.1 TOPSOIL/LOAM

- A. Loam shall be a "fine sandy loam" or a "sandy loam" determined by mechanical analysis and based on the USDA classification system. It shall be of uniform composition, without admixture of subsoil. It shall be free of stones greater than one inch, lumps, plants and their roots, debris and other extraneous matter over one inch in diameter or excess of smaller pieces of the same materials as determined by the Landscape Architect. It shall not contain toxic substances harmful to plant growth. Loam shall contain not less than 4% nor more than 10% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 F, plus or minus 9.
- B. Loam shall have an acidity range of pH 5.6 to pH 6.5.
- C. The amount of either sulfur or limestone required to adjust the planting loam to the proper pH range (above) shall be determined by the Landscape Architect on the basis of soil tests as specified herein.
- D. Soil tests for this area shall be through the University of Massachusetts Amherst Cooperative Extension Soil Testing Laboratory, with recommendations for both Grasses/Lawns and Trees/Shrubs, or Approved Equal testing service (submit proposed alternative before testing).

### 2.2 PLANT MATERIALS

- A. The Contractor shall furnish and plant all plants shown on the Drawings, as specified, and in quantities listed on the Plant List. No substitutions will be permitted. All plants shall be nursery-grown unless specifically authorized to be collected.
- B. Plants shall be in accordance with the USA Standard for Nursery Stock of the American Association of Nurserymen, latest edition.
- C. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within the hardiness Zones 1 through 6, as established by the United States Department of Agriculture, will be accepted. The Contractor's suppliers must certify in writing that

the stock has actually been grown under Zone 6 or hardier conditions for a minimum of 2 years. Plants not so certified will not be accepted.

- D. The root system of each shall be well provided with fibrous roots. All parts shall be moist and show active green cambium when cut. They shall be sound, healthy, and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae.
- E. All plants must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated eight (8) ounce burlap, firmly held in place by a stout cord or wire. The diameter and depth of the balls of earth must be sufficient to encompass the fibrous and root feeding system necessary for the healthy development of the plant. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during the process of planting or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and balls shall remain intact during all operations. All plants that cannot be planted at once must be heeled in by setting in the ground and covering the balls with soil and then watering them.
- F. The caliper of the trees shall be not less than the minimum size designated. Take caliper measurement six inches (6") above ground level up to and including four (4") caliper size and twelve inches (12") above ground for larger sizes. The trunk of each tree shall be a single trunk growing from a single unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire or other causes. No pruning wounds shall be present having a diameter exceeding two inches (2") and such wounds must show vigorous bark on all edges. Plants shall not be pruned prior to delivery.
- G. Plants delivered by truck and plants requiring storage on site shall be properly wrapped and covered to prevent wind-drying and desiccation of branches, leaves or buds; plant balls should be firmly bound, unbroken, reasonably moist to indicate watering prior to delivery and during storage and tree trunks should be free from fresh scars and damage in handling. No trees with double-leaders or twin-heads shall be acceptable without the written approval of the Landscape Architect. The Contractor shall reject such plants at time of delivery by the nursery/supplier unless such plants were selected by the Landscape Architect as indicated by tags and seals. No plant material from cold storage will be accepted.

## 2.3 SOIL ADDITIVES

- A. Commercial fertilizer, manufactured compost, peat, humus or other additives shall be used to counteract soil deficiencies as recommended by the soil analysis and as directed by the Landscape Architect.
  - 1. Commercial fertilizer shall be a product complying with the State and United States Fertilizer Laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's Certificate of Compliance covering analysis which shall be furnished to the Landscape Architect. At least 50% by weight of the Nitrogen content shall be derived from organic materials. Fertilizer

shall contain not less than the percentages of weight of ingredients as follows or as recommended by the soil analysis:

	Nitrogen	Phosphorus	Potash
For All Plants	10%	10%	10%

2. Fertilizer plan, including schedule and specific mix, must be submitted and approved by the Landscape Architect and the Owner's Representative.
- B. Ground dolomite limestone shall be an approved agricultural limestone containing not less than 85% of total calcium or magnesium carbonates. Limestone shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve.
- C. Humus shall be natural humus, reed peat or sedge peat. It shall be free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C., latest edition, the acidity range shall be approximately 5.5 pH to 7.6 pH and the organic matter shall be not less than 85% as determined by loss on ignition. The minimum water absorbing ability shall be 200% by weight on an oven-dry basis.
- D. Peat moss shall be composed of the partly decomposed stems and leaves of any or several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue and other foreign matter. It shall have an acidity range of 3.5 pH to 5.5 pH as determined in accordance with the methods of testing of A.O.A.C., latest edition. Its water absorbing ability shall be a minimum of 1,100% by weight on an oven-dry basis. Manufactured Compost of comparable qualities will be accepted in lieu of peat moss.
- E. Superphosphate: Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than 18% available phosphoric acid.
- F. Water retention gel shall be used where appropriate. Mix with soil per manufacturer's directions.

#### 2.4 BARK MULCH

- A. Mulch shall be pine bark aged a minimum of six (6) months. The mulch shall be dark brown in color, free of chunks and pieces of wood thicker than one-quarter inch (1/4"). Mulch must be free of stringy material over three inches (3") in length and shall not contain, in the judgment of the Landscape Architect, an excess of fine particles. Mulch shall be 98% organic matter with the pH range of 3.5 to 4.5. Moisture content of packaged material shall not exceed 35%. Submit sample for the Landscape Architect's approval.

#### 2.5 LAWN SEED MIX

- A. Seed Mix shall be "Black Beauty Ultra" by Jonathan Green Co. of Reading, PA or Approved Equal low-fertilizer-requirement mix designed to minimize need for irrigation.

- B. Grass seed for lawn areas shall be fresh, clean, dry, new crop seed, which meets the standard of the Federal Seed Act. Seed shall be mixed in proportion by weight and testing the minimum percentages of purity and germination. Seed shall be nursery grown seed composed of grasses grown from the following seed mixtures. Lawn Areas:

Approx % by Wt.	Common Name of Grass	% Germination
70	Tall Fescues	92
20	Perennial Ryegrass	92
10	Kentucky Bluegrass	85

- C. Weed seed shall not exceed 0.1% by weight. Tall Fescue shall be a mix of "Tonto," "Montana," "Dorado," or similar cultivar tall fescues. Bluegrass shall be "Madison," "Deepblue," "Prosperity," or similar cultivar Kentucky bluegrass. Perennial Rye shall be "Frontier," "Singular," or similar cultivar Perennial Ryegrass.

## 2.6 SOD MIX

- A. Sod shall be nursery grown sod composed of grasses grown from the following seed mixtures.

% by Weight	Common Name of Grass
70	Tall Fescue
20	Kentucky Bluegrass
10	Perennial Ryegrass

- B. The sod shall be "Black Beauty Turf Type Fescue" grown by Sodco, Inc. of Slocum, Rhode Island, or other approved New England source; submit proposed sod specifications and source for approval.
- C. Weed seed shall not exceed 0.1% by weight. Tall fescue shall be a mix of "Golconda", "Montana", "Dorado", or similar cultivar tall fescues. Bluegrass shall be a mix of "Deepblue," "Prosperity," or similar cultivar Kentucky bluegrass. Perennial Rye shall be a mix of "Frontier," "Singular," or similar cultivar Perennial Ryegrass.
- D. Sod shall be machine cut at a uniform soil thickness of  $\frac{3}{4}$  inch, plus or minus  $\frac{1}{4}$  inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and length shall be 5%. Broken pads and torn or uneven ends will not be acceptable. Sod shall be at least one (1) year old from time of original seeding.
- E. Sod shall be furnished and installed in either of the following dimensions, to be selected by the Contractor:
- F. In rectangular sod strips measuring 12 inches or 16 inches in width and from 4 feet to 6 feet in length, stored in rolls with the grass top side inverted so that the topsoil is to the exterior.
- G. Sod shall be harvested, delivered and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved by the Landscape Architect prior to its installation. Soil on sod pads shall be kept moist at all times.

- H. If delivered in multiple shipments, the sods shall match one another in texture and consistency, in the judgment of the Landscape Architect.

## 2.7 MEADOW GRASS SEED MIX

- A. Seed for wildflower areas shall be fresh, clean, dry, new crop seed, which meets the standard of the Federal Seed Act. Seed shall be mixed in proportion by weight and testing the minimum percentages of purity and germination. Seed shall be nursery grown seed composed of grasses grown from the following species:

<u>Botanical Name</u>	<u>Common Name</u>
Schizachyrium scoparium	Little Bluestem
Festuca rubra	Red Fescue
Sorghastrum nutans	Indian Grass
Chamaecrista fasciculata	Partridge Pea
Elymus canadensis	Canada Wild Rye
Elymus virginicus	Virginia Wild Rye
Verbena hastata	Blue Vervain
Asclepias tuberosa	Butterfly Milkweed
Sisyrinchium angustifolium	Narrowleafed Blue Eyed Grass
Rudbeckia hirta	Black Eyed Susan
Aster lateriflorus	Starved/Calico Aster
Aster novae-angliae	New England Aster
Eupatorium fistulosum	Hollow Stem Joe Pye Weed
Liatris spicata	Spiked Gayfeather
Solidago juncea	Early Goldenrod

- B. Weed seed shall not exceed 0.5% by weight.
- C. Seed mix shall be: New England Wildflower Seed Mix by New England Wetland Plants Inc. Amherst, MA (ph: 1.413.548.8000), or approved equal.

## 2.8 EROSION CONTROL MAT

- A. Erosion Control Mat to be ECS-1B Single Net Straw Biodegradable Rolled Erosion Control Product by East Coast Erosion Control, 443 Bricker Road, Bernville, PA 19506 (ph1-800-582-4005) or approved equal to match specifications.
- B. Erosion control mat to be made of uniformly distributed 100% agricultural straw and one organic jute net securely sewn together with biodegradable. Net opening to be .5"x.1".
- C. The erosion control fabric to have a functional longevity of approximately 12 months. The erosion control fabric to meet Type 2.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17
- D. Erosion control fabric to come in 2 sizes. Standard to be 8' wide by 112.5' long, Mega to be 16' wide by 112.5' long.

## 2.9 INSECTICIDE



- A. No insecticide shall be used except as specifically approved in writing by the Landscape Architect and the Owner's Representative.

## 2.10 WATER

- A. The Contractor shall be responsible to furnish his/her own supply of water to the site at no extra cost.
- B. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.
- C. All new trees shall be furnished with a Portable Drip Irrigation System (PDIS) water bag, "Gator Bags" or Approved Equal. PDIS water bags shall be UV-treated, reinforced polyethylene bags with a nylon toothed zipper extending from top to bottom of bag, capable of holding a minimum of 20 gallons of water, constructed so that they can be attached to the trees, which provide water from a minimum of three drip points.

## PART 3 - EXECUTION

### 3.1 FINE GRADING AND LOAM

- A. After the areas to be loamed have been brought to subgrade, and immediately prior to dumping and spreading the loam, the subgrade shall be loosened by disking or rototilling to a depth of at least three inches (3") to permit bonding of the loam to the subsoil. Remove all stones greater than two inches (2") and all debris or rubbish. Such material shall be removed from the site.
- B. Loam shall be placed and spread over approved areas to a depth sufficiently greater than six inches (6") so that after natural settlement and light rolling, the completed work will conform to the lines, grading and elevations indicated. Supply additional loam, after testing and approval, as may be needed to give the specified depths and finished grades under the contract without additional cost to the Owner.
- C. No subsoil or loam shall be handled in any way if it is in a wet, dry, or frozen condition.
- D. Sufficient grade stakes shall be set for checking the finished grades. Grades shall be established which are accurate to one-tenth (1/10th) of a foot either way. Connect contours and spot elevations with an even slope.
- E. After lime, fertilizer, and humus if required have been spread and incorporated into the bed, it shall be carefully prepared by scarifying or harrowing and hand raking. All large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter, and stones over one inch (1") in diameter shall be removed from the loam. Loam shall also be free of smaller stones in excessive quantities as determined by the Landscape Architect.
- F. The whole surface shall then be rolled with a hand roller weighing not more than 100 lbs. per foot of width. During the rolling, all depressions caused by settlement or rolling shall be filled with additional loam and the surface shall be regraded and

rolled until presenting a smooth and even finish to the required grade. The finish grades shall be inspected by the Landscape Architect for approval before final acceptance.

### 3.2 PLANTING

- A. Furnishing and planting of any plant material includes the digging of the holes, provision of soil additives and loam, furnishing the plants of specified size with roots in the specified manner, the labor of planting and mulching and guying and staking where called for.
- B. Season for Planting
  - 1. Spring:
    - a. Deciduous materials      March 21 through May 15
    - b. Evergreen materials      April 15 through June 1
  - 2. Fall:
    - a. Deciduous materials      October 1 through December 1
    - b. Evergreen materials      August 15 through October 15
- C. Planting
  - 1. Location for all plants and outlines for planting areas shall be staked on the ground by the Contractor for approval by the Landscape Architect before any plant pits or plant beds are dug.
  - 2. At least fifteen (15) days prior to the expected planting date, the Contractor shall request that the Landscape Architect provide a representative to select and tag stock to be planted under this Section. The Contractor shall provide for the transportation and overnight accommodations, if necessary, for the Landscape Architect's representative during the period of time required to select and tag the plant material, at no extra cost to the Owner.
  - 3. Plants shall be selected by the Landscape Architect at the place of growth for conformity to specification requirements as to quality, size, and variety. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work. Cost of replacement shall be borne by the Contractor.
  - 4. Plant pits shall be circular pits with sloping sides, except for plants specifically indicated to be planted in beds. Holes for trees and shrubs shall be at least two feet (2') greater in diameter than the ball, and shall be at least three (3) times the diameter of the ball for trees where space allows, and shall be of a depth that maintains the plant's prior relation to finish grade. Bottom of pit shall be flat or deepest at the perimeter. If pit is dug deeper than required to maintain plant's relation to finish grade, then soil replaced under root ball shall be compacted to prevent subsequent settling of tree or shrub. If soil at bottom of pit is impermeable or poorly drained, pit shall be dug one extra foot, backfilled with planting soil mix, and compacted before installing plant.

5. After excavation, fill pit twice successively with water. If water does not drain out of pit at a minimum of two inches per hour, provisions for drainage must be made. Contractor shall document drainage test results for review by Landscape Architect.
  6. Topsoil, organic material and fertilizer mix for planting soil mix shall be thoroughly premixed in the proportions of one (1) part of organic material with four (4) parts of topsoil together with fertilizer at the rate determined by soil test. The organic material to be added shall be as directed by the Landscape Architect. One part of existing soil shall be mixed with two parts of planting soil mix for use in back filling around root ball. Maintain at all times during the planting operations one or more stockpiles of approved planting soil mix.
  7. Install slow release fertilizer packets per manufacturers' directions with each newly planted tree.
  8. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation and on the ground until the final planting. The plants shall be planted in the center of the holes and at the same depth as they previously grew (see a. below). Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structures. Remove burlap, rope, wires, etc., from the sides and tops of root balls. Do not pull burlap out from under root balls. Any girdling roots or badly damaged roots must be cleanly pruned off. Planting soil mix shall be backfilled in layers of not more than six inches (6") and each layer watered sufficiently to settle before the next layer is put in place. Enough planting soil mix shall be used to bring the surface to finish grade when settled. A saucer shall be formed around each plant at a depth of six inches (6") for trees.
    - a. The Root Flare of each plant shall be located at the finish grade and visible. All planting depths shall be inspected by the Landscape Architect and the Owner's Representative, and if not at the proper depth shall be corrected at the Contractor's expense.
- D. All plants shall be flooded with water twice within the first 24 hours of the time of planting and all plants during the maintenance period shall be watered at least twice each week. At each watering the soil around each plant shall be thoroughly saturated. If sufficient moisture is retained in the soil, as determined by the Landscape Architect, the required watering may be reduced. Trees will require a minimum of ten (10) gallons of water each.
- E. Mulch material shall be placed over entire saucer areas of individual trees and over the entire area of planting beds to a depth of three inches (3") after settlement, not later than one (1) week after planting. No mulch shall be applied prior to the first watering of plant materials. Mulch shall be pulled back two inches (2") from tree trunks.
- F. Portable Drip Irrigation System watering bags shall be installed as directed by the bag manufacturer, and shall be kept filled as necessary to maintain optimum health.
- G. Antidesiccant shall be applied to all plants before digging at the nursery and/or as directed by the Landscape Architect once the plants have been delivered to the site.

- H. Antidesiccant shall be applied to all evergreen plants in the late fall as directed by the Landscape Architect.
- I. If planting is done after lawn preparation or installation proper protection of lawn areas shall be provided and any damage resulting from planting operations shall be repaired immediately at no cost to the Owner.
- J. In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work to be done under this Contract, alternate locations may be selected by the Landscape Architect.
- K. Absolutely no debris may be left on the site. Excavated material shall be removed as directed by the Landscape Architect. Repair any damage to site or structures to restore them to their original condition as directed by the Landscape Architect, at no cost to the Owner.

### 3.3 SOIL ADDITIVES

- A. Follow all recommendations for soil additives as determined by an approved Soil Testing Laboratory, and all manufacturers' instructions pertaining to additives.

### 3.4 BARK MULCH

- A. Contractor shall install approved bark mulch material to the limits and depths shown on the Drawings and specified herein.

### 3.5 HYDROSEEDING

- A. Limit of seeding shall be shown on the Drawings. All areas on the plan shall be loamed and seeded only after written approval of the finished grading or as directed by the Landscape Architect. All seeded areas are to be hydroseeded.

The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and be accepted practice in this locality. At his/her option and on his/her responsibility the Contractor may plant seed under unseasonable conditions without additional compensation, but subject to the Architect's approval as to time and methods.

- B. Planting may be done between August 15 and October 15, or between April 15 and June 15.
- C. Soil additives shall be spread and thoroughly incorporated into the later of loam and the upper 1 inch of the underlying subsoil by harrowing or other methods approved by the Architect. The following soil additives shall be incorporated:
  - 1. Ground limestone as required by soil analysis to achieve a pH of 6.0 to 6.5.
  - 2. Fertilizer as required by soil analysis.
  - 3. Superphosphate at the rate of 20 lbs. Per 1,000 square feet.
  - 4. Humus as required by soil analysis.

5. Compost at a rate of 1 part compost per 4 parts planting loam.
- D. Seeding of lawns shall be done only by experienced workmen under the supervision of qualified foreman. Seeding shall consist of soil preparation, rolling, hydroseeding, weeding, fertilizing, watering and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf.
- E. The soil on which the seed is spread shall be reasonably moist and shall be watered, if directed by the Architect. The seeded areas shall be watered evenly and at a rate of 5 gallons per square yard, unless otherwise directed by the Architect.
- F. Contractor shall place and maintain barriers (in a neat condition) around hydroseeded areas to keep people off during the first sixty (60) days.
- G. The actual seeding of lawns shall be done only during periods within the season which are normal for such work as determined by weather conditions and by accepted practice in this locality, except as approved by the Architect.
- H. The application of grass seed, fertilizer, limestone, and a suitable wood fiber or other mulch shall be accomplished in one operation for hydroseeding.
- I. Hydroseeding shall be done by use of an approved spraying machine, which shall be operated only by personnel thoroughly familiar with this type of seeding operation.
- J. Prior to starting work, Contractor shall furnish the Architect with a certified statement as to the number of pounds of materials to be used per 100 gallons of water and the number of square feet to be covered with the quantity of solution in the hydroseeder.
  1. Materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water.
  2. Solution shall be sprayed evenly over the area so that resulting deposits of all materials shall equal the required rates.
  3. Spraying equipment shall be thoroughly cleaned and flushed prior to start of work and after every ten acres.
  4. When inoculum is required, if the inoculum is left in the solution with fertilizer for longer than thirty minutes, a fresh charge of inoculum shall be added to the mixture.

### 3.6 MEADOW GRASS SEED MIX

- A. Always apply on clean bare soil. Preparation of a clean weed free soil surface is necessary for optimal results. The mix may be applied by hydro-seeding, by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper seed to soil contact. Late Spring and early Summer seeding will benefit with a light mulching of weed-free straw to conserve moisture. If conditions

are drier than usual, watering may be required. Fertilization is not required unless the soils are particularly infertile.

- B. Best results are obtained with a Spring seeding. Late Fall and Winter dormant seeding require an increase in the seeding rate.

### 3.7 SODDING

- A. Limit of sodding shall be shown on the Drawings. All areas on the plan shall be loamed and sodded only after written approval of the finished grading or as directed by the Landscape Architect.
- B. Planting season for sod shall be from April 15 to June 1. The actual planting of sod shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and be accepted practice in this locality. At this option and on his responsibility the Contractor may plant sod under unseasonable conditions without additional compensation, but subject to the Landscape Architect's approval as to time and methods.
- C. Soil additives shall be spread and thoroughly incorporated into the later of loam and the upper 1 inch of the underlying subsoil by harrowing or other methods approved by the Landscape Architect. The following soil additives shall be incorporated:
  - 1. Ground limestone as required by soil analysis to achieve a pH of 6.0 to 6.5.
  - 2. Fertilizer as required by soil analysis.
  - 3. Superphosphate at the rate of 20 lbs. Per 1,000 square feet.
  - 4. Humus as required by soil analysis.
- D. Sodding of lawns shall be done only by experienced workmen under the supervision of qualified foreman. Sodding shall consist of soil preparation, sodding, rolling, pegging, weeding, fertilizing, watering and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf.
- E. The soil on which the sod is laid shall be reasonably moist and shall be watered, if directed by the Landscape Architect. The sod shall be laid smoothly, edge to edge, and where continuous or solid sodding is called for on the plans sod shall be laid with the longest dimension parallel to the contours. Sodding shall start at the base of slopes and progress upward in continuous parallel rows. Vertical joints between sods shall be staggered. Immediately after laying, so shall be pressed firmly into contact with the sod bed by tamping, rolling, or by other approved method – press firmly as to eliminate all air pockets, provide true and even surfaces, ensure knitting and protect all exposed sod edges, but without displacement of the sod or deformation of the sod surfaces. The sodded areas shall be watered evenly and at a rate of 5 gallons per square yard, unless otherwise directed by the Landscape Architect.

### 3.8 EROSION CONTROL FABRIC

- A. Install as shown in Drawings and per Manufacturer's instructions.
- B. Erosion control mat should be secured by 11 gauge staples at a minimum size of 6" long and 1" crown. Staple pattern should reflect the layouts for the corresponding slope given by the manufacture.

### 3.9 MAINTENANCE AND PROTECTION OF PLANTS AND LAWN AREAS

- A. Maintenance shall begin immediately after an area is planted or sodded and shall continue until final acceptance. The minimum maintenance period shall be ninety (90) calendar days after completion of all plant installations including lawn. Watering and mowing shall be done by the Contractor for the full 90 days. Final acceptance of the plant material cannot be made until the full 90 maintenance period has elapsed.
- B. Maintenance shall include replacement of shrubs, mowing, watering, weeding, and fertilizing.
- C. Watering of Lawn Areas:
  - 1. First week: The Contractor shall provide all labor and arrange for all watering necessary for rooting of the plant materials. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantity to maintain moist soil to a depth of at least 4 inches. Watering shall not be done during the heat of the day to help prevent wilting.
  - 2. Second and Subsequent weeks: The Contractor shall water the lawn and plantings as required to maintain adequate moisture, until final acceptance, in the upper 4 inches of soil.
  - 3. Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment to apply one (1) complete coverage to the lawn areas and plantings in an eight (8) hour period.
- D. Watering of Tree Plantings:
  - 1. Portable Drip Irrigation System watering bags shall be kept filled as needed to maintain optimal plant health. Bags shall be filled a minimum of once each week regardless of rain conditions. The contractor shall be responsible for ensuring that watering bags are kept full for one full growing season after installation.
- E. Mowing:
  - 1. The first mowing of lawn areas shall not be attempted until the lawn is firmly rooted and secure in place. Not more than 40% of the grass leaf shall be removed by initial or subsequent mowings. Grass height shall be maintained between 2 inches and 2-1/2 inches unless otherwise specified. Thereafter grass shall be maintained at 2 inches until acceptance.
- F. Fertilizing:
  - 1. A second application of fertilizer, as specified herein and as outlined in the fertilizing schedule to be submitted by the Contractor, shall be applied approximately 6 weeks after the sod has been installed as directed by the Landscape Architect. Fertilizer shall be applied at the rate of 10 pounds per 1,000 square feet or as otherwise approved as part of the fertilizing schedule.

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END OF SECTION



331000

SITE DOMESTIC WATER DISTRIBUTION

- A. Description: Furnish and install buried ductile iron pipe, valves, fittings, polyethylene services and appurtenances as shown on the drawings and as specified herein.
- B. Functional Requirements:
1. Design Requirements:
    - a. Ductile Iron Pipe:
      - 1) All ductile iron pipe shall conform to AWWA C151, Class 52.
      - 2) All ductile iron pipe shall have a bituminous outside coating in accordance with AWWA C151.
      - 3) All ductile iron pipe shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.
    - b. Ductile Iron Fittings:
      - 1) Ductile iron fittings shall conform to AWWA C110 or C153, Class 350.
      - 2) All ductile iron fittings shall have a bituminous outside coating in accordance with AWWA C110.
      - 3) All ductile iron fittings shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.
    - c. Joints:
      - 1) Joints for pipe and fittings shall be restrained push-on or restrained mechanical joints conforming to AWWA C111. Gaskets shall be of SBR. Un-restrained joints may not be used.
      - 2) Joints shall be suitable for 250 psi working pressure and be fabricated of heavy section ductile iron casting.
      - 3) Bolts and nuts shall be low carbon and conforming to ASTM A307, Grade
    - d. Solid Sleeves:
      - 1) Solid sleeves shall be long body type, ductile iron with mechanical joints and retainer glands shall be of the solid type, long laying length.
      - 2) Solid sleeves shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.

- e. Flexible Couplings: Flexible Couplings shall be cast iron with rubber gaskets.
- f. Retainer Glands: Retainer glands shall be Ebba Iron Sales Inc. – Mega Lug or Ford Co. – 1400 Series.
- g. Valves: Valves shall be resilient seated gate valves for buried service, and be manufactured in accordance with AWWA C509. Valves shall be provided with a minimum of two O-ring stem seals. Valves shall be epoxy coated, 8mm thick, interior and exterior.
- h. Valve Boxes and Covers: Valve Boxes and covers shall be cast iron, tar coated, two piece adjustable sliding type which include cast iron covers.
- i. Water Services:
  - 1) Corporation Cocks shall be ball valves, open left, with compression fittings.
  - 2) Curb Stops shall be ball valves, open left, with compression fittings.
  - 3) Curb stops shall have service boxes which shall be tar coated, cast iron, sliding type with inlaid covers. Shaft shall be 2 ½ inches diameter with extension rods.
  - 4) Service pipe shall be high density polyethylene copper tube size for use with compression fittings. The pipe shall be polyethylene #4508, SDR-9 rates for 200 psi.
  - 5) Compression fittings shall be used for joining polyethylene tubing.
  - 6) Coupling shall be straight coupling, 3 part, both ends pack joints for polyethylene pipe with a split locking clamp with stainless steel screw.
  - 7) Cut and remove all roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground in the area of construction, as indicated on the Contract Drawings as the limit of work.

END OF 331000

333000

SANITARY SEWERAGE PIPING

- A. Description: Installation and testing of polyvinyl chloride (PVC) sewer pipe, fittings and appurtenances
- B. Functional Requirements:
1. Design Requirements:
    - a. PVC solid wall gravity pipe and fittings shall be Type PSM, PVC SDR 35 and conform to ASTM 3034.
    - b. Pipe shall be furnished in standard laying lengths in accordance with ASTM 3034 and fittings shall be furnished in lengths of not more than 3 feet.
    - c. PVC pipe and fittings shall have bell and spigot push-on ends. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly.
  2. Testing:
    - a. All PVC pipe shall be field tested. Supply all labor, equipment, material, gauges, pumps, meter and incidentals for testing.
    - b. Gravity pipe shall be visibly inspected for leakage.
  3. Cleaning:
    - a. Prior to final completion of the Work, thoroughly clean all new pipelines and remove all dirt, stones, pieces of wood or other materials.

END OF 33 000

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334000

STORM DRAINAGE PIPING

- A. Description: Installation of high density polyethylene (HDPE) pipe, fittings and appurtenances.
- B. Functional Requirements:
1. Design Requirements:
    - a. HDPE pipe resins shall be high molecular weight, high density polyethylene with a cell classification number of 345434C per ASTM D3350.
    - b. HDPE pipe shall meet requirements of ASTM F714.
    - c. Pipe shall be furnished in standard laying lengths not exceeding 25 feet.
    - d. All high density polyethylene pipe and fittings shall be made from the same resin.
  2. Pipe Identification: The following shall be continuously indent printed on the pipe and spaced at intervals not exceeding 5 feet:
    - a. Name and/or trademark of the pipe manufacturer.
    - b. Nominal pipe size.
    - c. Dimension ratio.
    - d. The letters PE followed by the polyethylene grade in accordance with ASTM D1248, followed by the hydrostatic design basis in 100's of psi, e.g. PE 3408.
    - e. Manufacturing standard reference, e.g., ASTM F714.
    - f. A production code from which the date and place of manufacture can be determined.
  3. Testing:
    - a. All HDPE pipe shall be field tested. Supply all labor, equipment, material, gauges, pumps, meter and incidentals required for testing. Pressure test each pipe upon completion of the pipe laying and backfilling operations.
  4. Cleaning:
    - a. Prior to final completion of the Work, thoroughly clean all new pipelines and remove all dirt, stones, pieces of wood or other materials.

END OF 334000

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334200

SITE STORM WATER DRAINS

- A. Description: Furnish, install and test precast concrete manholes, catch basins, stormwater pretreatment separator, frames and covers, frames and grates and appurtenances as shown on the drawings and as specified herein.
- B. Functional Requirements:
1. Design Requirements:
    - a. General:
      - 1) Cement shall conform to ASTM C150, Type II cement or equal.
      - 2) Provide lifting lugs or holes in each precast section for proper handling.
      - 3) Like items of material/equipment shall be end products of one manufacturer.
      - 4) Precast sections shall be properly cured prior to shipping.
    - b. Precast Concrete Manhole Sections and Catch Basins: Precast concrete base sections, riser sections, transition top sections, flat slab tops and grade rings shall conform to ASTM C478 and meet the following requirements:
      - 1) Design precast concrete base and flat slab for their own weight, weight of soil, and a live load equal to AASHTO H-20 truck loading applied at finish grade.
      - 2) Bottom slab thickness shall equal the riser wall thickness or flat slab thickness, whichever is greater.
      - 3) Construct precast concrete base as shown on the drawings.
      - 4) Base, riser, and transition top sections shall have tongue and groove joints.
      - 5) Top section shall be eccentric cone where cover over pipe exceeds 4-feet and as shown on the Drawings. Top section shall be flat slab where cover over pipe is 4-feet or less.
      - 6) Provide integrally cast knock out panels in precast concrete manhole sections at locations, and with sizes shown on the drawings. Knock out panels shall have no steel reinforcing.
    - c. Stormwater Pretreatment Separator:
      - 1) The stormwater pretreatment separator shall be approved by the Massachusetts Stormwater Technology Evaluation project (MASTEP).
      - 2) Design Criteria: Performance objective of 80% TSS to recharge system at design flow.

- 3) The stormwater pretreatment separator shall be capable of containing spills of floatable substances such as oil and gasoline.
  - 4) The manhole risers and frames and covers for the stormwater pretreatment separator shall be provided by the manufacturer.
  - 5) Design precast concrete base and flat slab for their own weight, weight of soil, and a live load equal to AASHTO H-20 truck loading applied at finish grade.
  - 6) The particle separator shall be easy to maintain.
- d. Brick Masonry:
- 1) Bricks for channels and shelves shall conform to ASTM C32, grade SS.
  - 2) Brick for raising frames to finished grade shall conform to ASTM C62.
  - 3) Mortar shall be composed of 1 part Portland cement, 2 parts sand, and hydrated lime not to exceed ten-pounds to each bag of cements. Portland cement shall be ASTM C150, Type II; hydrated lime shall conform to ASTM C207.
  - 4) Sand shall be washed, cleaned, screened, well graded with all particles passing a No. 4 sieve and conform to ASTM C33.
- e. Frames and Covers and Frames and Grates:
- 1) Frames and covers and frames and grates shall be cast iron. Cast iron shall conform to ASTM A48, Class 30.
  - 2) Frames and covers shall have a 24-inch diameter clear opening unless otherwise indicated on the drawings.
  - 3) Frames and grate shall have a 24-inch square clear opening unless otherwise indicated on the drawings.
- f. Jointing Precast Concrete Sections:
- 1) Seal tongue and groove joints of precast sections with either rubber O-ring gasket or preformed flexible joint sealant.
  - 2) Completed joint shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.
- g. Pipe Connections: Connect pipe to precast concrete structures as follows:
- 1) Flexible sleeve- integrally cast sleeve in precast section or install sleeve in a formed or cored opening.
  - 2) Compression gasket – integrally cast compression gasket in precast concrete section.
  - 3) At the discretion of the Engineer, grout in place using non-shrink and waterproof mortar.



- h. Manhole Rungs: Manhole rungs shall be steel reinforced, copolymer polypropylene, 14-inch wide, M.A. Industries Inc. Type PS2-PF-SL, or equal.
- i. Damp proofing: Sanitary precast structures shall have two coats of bituminous waterproofing applied to the exterior surfaces by brush or spray and in accordance with the manufacturer's recommendations. Damp proofing shall be Hydrocide 648 by Sonneborn Building Products; Dehydratine 4 by A. C. Horn Inc., RIW Marine Liquid by Toch Brothers or equal.

END OF 334200

