PROJECT MANUAL - Volume 1 of 3

Wilmington Elementary School

320 Salem Street, Wilmington, Massachusetts, 01887

Design Development - March 20, 2026

Dore & Whittier Architects Inc. Project Number: 23-0847

Awarding Authority / Owner
Town of Wilmington, Wilmington Public Schools

Architect
Dore & Whittier Architects Inc.

Geotechnical Consultant
Lahlaf Geotechnical Consulting

Civil Consultant
CDW Consultants, Inc.

Landscape Consultant
Terraink

Structural Consultant
Engineers Design Group

Plumbing and Fire Protection Consultant
Akal Engineering, Inc.

HVAC and Electrical Consultant
GGD Consulting Engineers, Inc.

Geoenvironmental Consultant
PEER Consultants, P.C.

Door Hardware Consultant
Allegion, PLC

Owner's Project Manager
LeftField Project Management

Construction Manager
Fontaine Brothers, Inc.

Sustainable Design Consultant
The Green Engineer

Environmental / HAZMAT Consultant
United Environmental Consultants

Technology Consultant
Edvance Technology Design

Acoustical Consultant
Acentech

Foodservice Consultant
Crabtree McGrath Associates, Inc.

Cost Estimating
PM&C

Traffic and Site Survey Consultant
Nitsch Engineering

DORE + WHITTIER

SECTION 00 01 07
SEALS PAGE

Dore & Whittier Architects Inc.
260 Merrimac Street, Building #7
Newburyport, MA 01950
(978) 499 - 2999

212 Battery Street
Burlington, VT 05401
(802) 863 - 1428

Project Name: Wilmington Elementary School
Dore & Whittier Architects Inc. Project Number: 23-0847

This document bears the seal and signature of the licensed professional who is responsible for its content. It may not be altered without the knowledge and consent of that professional. Be advised it is a violation of the law of the State of Massachusetts for any person - unless acting under the direction of the undersigned Architect or Engineer - to alter these documents in any way.

_____ _____

Donald M. Walter Date

END OF SECTION

SECTION 00 01 10
TABLE OF CONTENTS

VOLUME 1 OF 3

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01 - Project Title Page
00 01 07 - Seals Page
00 01 10 - Table of Contents
00 01 15 - List of Drawing Sheets
00 11 13 - Invitation to Bid [To be included in Bid Set]
00 21 13 - Instructions to Bidders [To be included in Bid Set]
00 21 14 - Supplemental Instructions to Bidders - E-Bid
00 21 15 - Workforce Diversity
00 21 16 - MBE-WBE-SD/VOBE Participation Goals
00 31 00 - Available Project Information
00 31 01 - Hazardous Materials Determination Survey
00 31 02 - Limited Subsurface Soil Investigation
00 31 03 - Preliminary Geotechnical Report
00 31 04 - Engineering Economic Analysis
00 31 05 - Wilmington Flow Test Report
00 31 06 - Wetland Resource Area Analysis Report
00 31 07 - DD Phase Geotechnical Report
00 31 08 - Hazardous Material Inspection Services
00 41 00 - Form for General Bid
00 41 01 - Form for Trade Contractor Bid
00 41 02 - Form for Filed Sub-Bid
00 43 01 - Bid Form Supplements
00 43 02 - Bid Bond Form
00 43 03 - MBE-WBE-SD/VOBE Schedule of Participation
00 43 04 - MBE-WBE-SD/VOBE Letter of Intent
00 43 05 - Bidder's Certificate of Payment of Prevailing Wages
00 43 06 - Bidder's Certificate of Non-Collusion
00 43 07 - Bidder's Certificate of Labor Harmony
00 43 08 - Bidder's Certificate of Tax Compliance
00 43 22 - Unit Prices Form
00 43 25 - Substitution Request Form - During Bidding
00 50 00.10 - Performance Bond
00 50 00.20 - Labor and Material Payment Bond
00 50 01 - Trade Contractor Agreement Form [To be included in Bid Set]
00 52 00 - Owner-Contractor Agreement Form [To be included in Bid Set]
00 60 01 - Prevailing Wage Rate Schedule [To be included in Bid Set]
00 72 00 - General Conditions of the Contract [To be included in Bid Set]
00 72 05 - MBE-WBE-SD/VOBE Participation Goals Pre-Bid Adjustment
00 73 00 - Supplementary Instructions to Bidders

DIVISION 01 -- GENERAL REQUIREMENTS

01 10 00 - Summary
01 20 00 - Price and Payment Procedures
01 22 00 - Unit Prices
01 23 00 - Alternates
01 25 00 - Substitution Procedures
01 25 01 - Substitution Request Form - During Construction
01 30 00 - Administrative Requirements
01 30 01 - Request for Interpretation Form
01 30 02 - Submittal Data Sheet
01 31 14 - Coordination
01 31 15 - Building Information Modeling Services
01 31 16 - Terms of Use of Digital Drawings and Electronic Data
01 32 16 - Construction Progress Schedule
01 40 00 - Quality Requirements
01 41 00 - Regulatory Requirements
01 45 23 - Testing and Inspecting Services
01 50 00 - Temporary Facilities and Controls
01 51 00 - Temporary Utilities
01 52 13 - Field Offices and Sheds
01 56 39 - Temporary Tree and Plant Protection
01 60 00 - Product Requirements
01 70 00 - Execution and Closeout Requirements
01 74 19 - Construction Waste Management and Disposal
01 78 00 - Closeout Submittals
01 78 29 - Final Site Survey
01 79 00 - Demonstration and Training
01 81 09 - Testing for Indoor Air Quality
01 81 13 - Sustainable Design Requirements
01 81 14 - LEED for Schools v4/v4.1 Project Scorecard
01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form
01 81 19 - Indoor Air Quality Requirements
01 91 13 - MEP Commissioning Requirements
01 91 19 - Building Enclosure Commissioning

VOLUME 2 OF 3

00 01 01 - Project Title Page
00 01 07 - Seals Page
00 01 10 - Table of Contents
00 01 15 - List of Drawing Sheets

DIVISION 02 -- EXISTING CONDITIONS

02 41 00 - Demolition
02 41 01 - Salvage Schedule
02 41 13 - Utility Line Removal

DIVISION 03 -- CONCRETE
03 30 00 - Cast-in-Place Concrete
03 30 00.13 - Cast-in-Place Concrete (Site)
03 30 05 - Moisture Vapor Reducing Admixture for Cast-in-Place Concrete
03 45 00 - Precast Architectural Concrete
03 54 00 - Concrete Toppings

DIVISION 04 -- MASONRY
04 00 01 - Masonry Trade Bid Summary
04 20 00 - Unit Masonry
04 43 00 - Site Stone Masonry
04 43 13 - Stone Masonry Panel Wall System
04 72 00 - Cast Stone Masonry

DIVISION 05 -- METALS
05 12 00 - Structural Steel Framing
05 15 00 - Stud Shear Connectors
05 21 00 - Steel Joist Framing
05 31 00 - Steel Decking
05 40 00 - Cold-Formed Metal Framing
05 50 00 - Metal Fabrications
05 51 00 - Metal Stairs
05 52 13 - Pipe and Tube Railings
05 53 05 - Metal Gratings and Floor Plates

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES
06 10 00 - Rough Carpentry
06 17 21 - Dowel-Laminated Timber
06 18 50 - Glued-Laminated Timber Beams and Decking
06 20 00 - Finish Carpentry
06 41 00 - Architectural Wood Casework
06 83 16 - Fiberglass Reinforced Paneling

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION
07 13 00 - Sheet Waterproofing
07 14 00 - Fluid-Applied Waterproofing
07 21 00 - Thermal Insulation
07 21 19 - Foamed-In-Place Insulation
07 22 00 - Fluid-Applied Thermal Breaks
07 27 00 - Vapor Retarder / Air Infiltration Barriers
07 42 13 - Metal Wall and Soffit Panels
07 42 14 - Metal Composite Material Wall Panels
07 54 00 - Thermoplastic Membrane Roofing
07 62 00 - Sheet Metal Flashing and Trim
07 72 00 - Roof Accessories

07 81 00 - Applied Fire Protection
07 81 23 - Intumescent Fire Protection
07 84 00 - Firestopping
07 91 00 - Preformed Joint Seals
07 92 00 - Joint Sealants

DIVISION 08 -- OPENINGS
08 00 01 - Metal Windows Trade Bid Summary
08 00 02 - Glass and Glazing Trade Bid Summary
08 11 13 - Hollow Metal Doors and Frames
08 14 16 - Flush Wood Doors
08 31 00 - Access Doors and Panels
08 33 26 - Overhead Coiling Grilles
08 34 53 - Bullet Resistant Entry Systems
08 34 73 - Sound Control Door Assemblies
08 36 13 - Sectional Doors
08 43 13 - Aluminum-Framed Storefronts
08 44 13 - Glazed Aluminum Curtain Walls
08 44 35 - Fire-Rated Glazed Assemblies
08 51 13 - Aluminum Windows
08 56 53 - Security Windows
08 56 59 - Service and Teller Window Units
08 71 00 - Door Hardware
08 80 00 - Glazing
08 83 00 - Mirrors
08 92 00 - Louvered Equipment Enclosures

DIVISION 09 -- FINISHES
09 00 06 - Terrazzo Trade Bid Summary
09 21 16 - Gypsum Board Assemblies
09 30 00 - Tiling
09 51 00 - Acoustical Ceilings
09 58 00 - Integrated Ceiling Assemblies
09 64 66 - Wood Athletic Flooring
09 65 00 - Resilient Flooring
09 65 66 - Resilient Athletic Flooring
09 66 23 - Thin Set Epoxy Terrazzo Flooring
09 67 00 - Fluid-Applied Flooring
09 68 13 - Tile Carpeting
09 72 00 - Wall Coverings
09 84 30 - Acoustic Wall and Ceiling Units
09 91 13 - Exterior Painting
09 91 23 - Interior Painting

DIVISION 10 -- SPECIALTIES
10 11 00 - Visual Display Units

10 14 16 - Plaques
10 14 19 - Dimensional Letter Signage
10 14 23 - General Signage
10 21 13.19 - Plastic Toilet Compartments
10 22 13 - Wire Mesh Partitions
10 22 39 - Folding Panel Partitions
10 26 00 - Wall Protection
10 26 41 - Ballistics Resistant Panels
10 28 00 - Toilet, Bath, and Laundry Accessories
10 43 00 - Emergency Aid Specialties
10 44 00 - Fire Protection Specialties
10 51 13 - Metal Lockers
10 71 13.43 - Fixed Sun Screens
10 75 00 - Flagpoles

DIVISION 11 -- EQUIPMENT
11 13 19 - Stationary Loading Dock Equipment
11 22 13.26 - Time Capsules
11 30 13 - Appliances
11 40 00 - Foodservice Equipment
11 52 13 - Projection Screens
11 61 43 - Stage Curtains
11 66 23 - Gymnasium Equipment
11 68 00 - Play Equipment and Structures
11 68 10 - Sports Equipment
11 95 13 - Kilns

DIVISION 12 -- FURNISHINGS
12 24 00 - Window Shades
12 31 00 - Manufactured Metal Casework
12 32 00 - Manufactured Wood Casework
12 35 53.15 - Music Education Storage Casework
12 36 00 - Countertops
12 48 13 - Entrance Floor Mats and Frames
12 66 13 - Telescoping Bleachers

DIVISION 13 -- SPECIAL CONSTRUCTION
13 28 00 - Climbing Walls

DIVISION 14 -- CONVEYING EQUIPMENT
14 24 00 - Hydraulic Elevators

VOLUME 3 OF 3

00 01 01 - Project Title Page
00 01 07 - Seals Page
00 01 10 - Table of Contents
00 01 15 - List of Drawing Sheets

DIVISION 21 -- FIRE SUPPRESSION

21 00 01 - Fire Protection Trade Bid Summary
21 05 00 - Common Work Results for Fire Suppression
21 05 16 - Expansion Fittings and Loops for Fire Suppression Piping
21 12 00 - Fire-Suppression Standpipes
21 13 13 - Wet-Pipe Sprinkler Systems

DIVISION 22 -- PLUMBING

22 00 01 - Plumbing Trade Bid Summary
22 05 00 - Common Work Results for Plumbing
22 05 13 - Common Motor Requirements for Plumbing Equipment
22 05 16 - Expansion Fittings and Loops for Plumbing Piping
22 05 19 - Meters and Gauges for Plumbing Piping
22 05 23 - General-Duty Valves for Plumbing Piping
22 05 29 - Hangers and Supports for Plumbing Piping and Equipment
22 05 53 - Identification for Plumbing Piping and Equipment
22 07 00 - Plumbing Insulation
22 11 16 - Domestic Water Piping
22 11 19 - Domestic Water Piping Specialties
22 11 23 - Domestic Water Pumps
22 13 16 - Sanitary Waste and Vent Piping
22 13 19 - Sanitary Waste Piping Specialties
22 13 23 - Sanitary Waste Interceptors
22 14 13 - Facility Storm Drainage Piping
22 14 23 - Storm Drainage Piping Specialties
22 14 29 - Sump Pumps
22 33 00 - Electric Domestic Water Heaters
22 40 00 - Plumbing Fixtures

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 00 01 - HVAC Trade Bid Summary
23 00 10 - HVAC
23 05 48 - Vibration Control and Seismic Restraint

DIVISION 25 -- INTEGRATED AUTOMATION (NOT USED)

DIVISION 26 -- ELECTRICAL

26 00 01 - Electrical Trade Bid Summary
26 00 10 - Electrical

DIVISION 27 -- COMMUNICATIONS

27 01 00 - Structured Cabling System
27 20 00 - Data Communication System
27 30 00 - Voice Communication System
27 40 00 - Audio-Video Communication Systems
27 50 00 - Distributed Communication System
27 53 19 - Emergency Responder Radio Signal Amplification System (BDA System)

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

28 00 10 - Integrated Security System

DIVISION 31 -- EARTHWORK

31 00 00 - Earth Moving
31 10 00 - Site Clearing
31 13 00 - Selective Tree and Shrub Removal, Trimming, and Root Pruning
31 21 13 - Sub-Slab Ventilation
31 25 00 - Erosion and Sediment Controls
31 50 00 - Excavation Support and Protection
31 60 00 - Ground Improvements

DIVISION 32 -- EXTERIOR IMPROVEMENTS

32 12 16 - Asphalt Paving
32 12 16.13 - Asphalt | Bituminous Concrete Paving (Pedestrian)
32 12 16.36 - Athletic Asphalt | Bituminous Concrete Sport Court Paving
32 12 40 - Granite Curb
32 13 13.13 - Concrete Paving (Site)
32 13 73 - Concrete Paving Joint Sealants
32 14 13 - Unit Paving on Bitumen Setting Bed
32 16 14 - Precast Concrete Curbs
32 17 00 - Landscape Paving Specialties
32 17 23 - Pavement Markings
32 17 26 - Tactile Warning Surfacing
32 17 26.13 - Detectable Warning Surface - Radial
32 18 10 - Court Surfacing
32 18 13 - Synthetic Turf Surfacing Active Use - Fall Zone
32 18 16.13 - Playground Protective Surfacing
32 18 23.43 - Recreational Pavement Markings
32 31 00 - Self-Latching Gate Latches and Locks
32 31 13 - Chain Link Fences and Gates
32 31 19.11 - Anti-Ram Metal Fences and Gates
32 31 21 - Enclosure Fences and Gates Metal Louver
32 31 29 - Wood Privacy Fences
32 33 00 - Site Furnishings
32 84 00 - Irrigation
32 90 00 - Underdrain System
32 91 31 - Athletic Fields

32 92 00 - Turf and Grasses
32 93 00 - Plants

DIVISION 33 -- UTILITIES
33 05 13 - Manholes and Structures
33 10 00 - Site Water Utilities
33 31 00 - Sanitary Utility Sewerage Piping
33 41 00 - Storm Utility Drainage Piping
33 49 23 - Storm Drainage Retention Structures

END OF SECTION

SECTION 00 01 15
LIST OF DRAWING SHEETS

GENERAL

G0.00	COVER SHEET
GC1.00	CODE SUMMARY
GC1.10	CODE PLANS
GC1.11	CODE PLANS
GD1.01	DEMOLITION - OVERALL PLANS
GD1.02	DEMOLITION - OVERALL PLANS
GD1.03	DEMOLITION - OVERALL PLANS
GD1.04	DEMOLITION - BUILDING IMAGES
GD1.05	DEMOLITION - BUILDING IMAGES
GP1.10	PHASING PLANS

SURVEY

EX-1.0	EXISTING CONDITIONS PLAN
EX-1.1	EXISTING CONDITIONS PLAN

CIVIL

C1.00	DEMOLITION AND EROSION CONTROL PLAN
C1.01	DEMOLITION AND EROSION CONTROL PLAN
C1.02	DEMOLITION AND EROSION CONTROL PLAN
C2.00	LAYOUT AND MATERIALS PLAN
C2.01	LAYOUT AND MATERIALS PLAN
C2.02	LAYOUT AND MATERIALS PLAN
C3.00	GRADING AND DRAINAGE PLAN
C3.01	GRADING AND DRAINAGE PLAN
C3.02	GRADING AND DRAINAGE PLAN
C4.00	UTILITIES PLAN
C4.01	UTILITIES PLAN
C4.02	UTILITIES PLAN
C5.00	CONSTRUCTION DETAILS
C5.01	CONSTRUCTION DETAILS
C5.02	CONSTRUCTION DETAILS
C5.03	CONSTRUCTION DETAILS

LANDSCAPE

L0.01	TREE PROTECTION AND REMOVAL PLAN
L1.00	LANDSCAPE KEY PLAN
L1.01	LAYOUT AND MATERIALS - WEST
L1.02	LAYOUT AND MATERIALS - NORTHEAST
L1.03	LAYOUT AND MATERIALS - SOUTHEAST
L1.04	ARRIVAL COURT PLAZA ENLARGEMENT
L1.05	3RD GRADE - 5TH GRADE PLAYGROUND ENLARGEMENT
L1.06	OUTDOOR CLASSROOM ENLARGEMENT
L1.07	PRE-K PLAYGROUND ENLARGEMENT
L1.08	K-2ND GRADE PLAYGROUND ENLARGEMENT
L1.09	COURTYARD ENLARGEMENT

L2.01	GRADING - WEST
L2.02	GRADING - NORTHEAST
L2.03	GRADING - SOUTHEAST
L3.01	SCREENING PLANTING - WEST
L3.02	SHADE STREET TREES AND LAWN - WEST
L3.03	PLAY AREAS ENLARGEMENT
L3.04	SCREENING PLANTING - NORTHEAST
L3.05	SHADE AND STREET TREES AND TURF - NORTHEAST
L3.06	FRONT OF SCHOOL ENLARGEMENT
L3.07	SHADE AND STREET TREES AND TURF - SOUTHEAST
L4.01	DETAILS
L4.02	DETAILS
L4.03	DETAILS
L4.04	DETAILS
L4.05	DETAILS
L4.06	DETAILS
L4.07	DETAILS - PLANTING
IR-100	OVERALL IRRIGATION LAYOUT PLAN
IR-101	IRRIGATION LAYOUT PLAN
IR-200	IRRIGATION DETAILS
IR-300	WEST UNDERDRAIN LAYOUT PLAN
IR-301	EAST UNDERDRAIN LAYOUT PLAN
IR-400	UNDERDRAIN DETAILS

STRUCTURAL

S0.01	GENERAL NOTES
S0.02	TYPICAL DETAILS
S0.03	TYPICAL DETAILS
S0.04	TYPICAL DETAILS
S0.05	TYPICAL DETAILS
S0.06	TYPICAL DETAILS
S0.07	TYPICAL DETAILS
S0.08	TYPICAL DETAILS
S1.11	FOUNDATION PLAN - AREA A
S1.13	FOUNDATION PLAN - AREA B
S1.21	LEVEL 2 FRAMING PLAN - AREA A
S1.23	LEVEL 2 FRAMING PLAN - AREA B
S1.31	LEVEL 3 FRAMING PLAN - AREA A
S1.33	LEVEL 3 FRAMING PLAN - AREA B
S1.41	ROOF FRAMING PLAN - AREA A
S1.43	ROOF FRAMING PLAN - AREA B
S2.01	DETAILS
S3.01	DETAILS
S4.01	BRACED FRAME ELEVATIONS - AREA A
S4.02	BRACED FRAME ELEVATIONS AND SHEAR WALLS - AREA B
S4.03	SHEAR WALLS - AREA B
S4.04	BRACED FRAME DETAILS

ARCHITECTURAL

AG0.01	ABBREVIATIONS SYMBOLS MATERIALS AND LEGEND
AG0.02	WALL TYPES, NOTES AND DETAILS
AG0.03	LEVEL 1, 2 AND 3 ACOUSTICAL SEPARATION DIAGRAMS
AG0.04	ENTRY SIGN PLAN, ELEVATIONS, SECTIONS, DETAILS
A0.11	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA A
A0.12	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA B
A0.21	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA A
A0.22	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA B
A0.31	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA A
A0.32	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA B
A1.10	LEVEL 1 OVERALL PLAN
A1.11	LEVEL 1 - AREA A
A1.12	LEVEL 1 - AREA B
A1.20	LEVEL 2 OVERALL PLAN
A1.21	LEVEL 2 - AREA A
A1.22	LEVEL 2 - AREA B
A1.30	LEVEL 3 OVERALL PLAN
A1.31	LEVEL 3 - AREA A
A1.32	LEVEL 3 - AREA B
A1.50	PLAN DETAILS
A1.70	ENLARGED TOILET ROOM PLANS
A1.71	ENLARGED TOILET ROOM PLANS
A1.72	ENLARGED TOILET ROOM PLANS
A1.73	ENLARGED TOILET ROOM PLANS
A1.74	ENLARGED TOILET ROOM PLANS
A1.75	ENLARGED TOILET ROOM PLANS
A2.11	LEVEL 1 REFLECTED CEILING PLAN - AREA A
A2.12	LEVEL 1 REFLECTED CEILING PLAN - AREA B
A2.21	LEVEL 2 REFLECTED CEILING PLAN - AREA A
A2.22	LEVEL 2 REFLECTED CEILING PLAN - AREA B
A2.31	LEVEL 3 REFLECTED CEILING PLAN - AREA A
A2.32	LEVEL 3 REFLECTED CEILING PLAN - AREA B
A2.50	CEILING DETAILS
A3.10	OVERALL ROOF PLAN
A3.11	ROOF PLAN - AREA A
A3.12	ROOF PLAN - AREA B
A4.00	EXTERIOR AXONS
A4.10	OVERALL EXTERIOR ELEVATIONS
A4.11	EXTERIOR ELEVATIONS
A4.12	EXTERIOR ELEVATIONS
A4.13	EXTERIOR ELEVATIONS
A4.14	EXTERIOR ELEVATIONS
A4.15	EXTERIOR ELEVATIONS
A5.10	BUILDING SECTIONS
A5.11	BUILDING SECTIONS
A5.12	BUILDING SECTIONS
A5.13	BUILDING SECTIONS
A6.10	WALL SECTIONS
A6.11	WALL SECTIONS

A6.12	WALL SECTIONS
A6.13	WALL SECTIONS
A6.14	WALL SECTIONS
A6.15	WALL SECTIONS
A6.16	WALL SECTIONS
A6.17	WALL SECTIONS
A6.18	WALL SECTIONS
A6.50	BASE OF WALL DETAILS
A6.51	BASE OF WALL DETAILS
A6.60	MID WALL DETAILS
A6.70	TOP OF WALL DETAILS
A7.10	STAIR AND ELEVATOR PLANS AND SECTIONS
A7.11	STAIR PLANS AND SECTIONS
A7.12	STAIR PLANS AND SECTIONS
A7.13	STAIR PLANS AND SECTIONS
A7.14	STAIR PLANS AND SECTIONS
A7.50	STAIR DETAILS
A7.51	STAIR AND RAMP DETAILS
A7.52	RAILING DETAILS
A7.53	ELEVATOR AND MISC. DETAILS
A8.10	DOOR SCHEDULE, DOOR AND BL TYPES
A8.11	DOOR SCHEDULE AND DOOR TYPES
A8.20	CURTAINWALL TYPES
A8.30	WINDOW AND STOREFRONT TYPES
A8.50	DOOR AND BL FRAME DETAILS
A8.51	DOOR AND LOUVER DETAILS
A8.60	WINDOW DETAILS
A8.70	CURTAINWALL DETAILS
A8.80	STOREFRONT DETAILS
A9.11	LEVEL 1 FINISH PLAN - AREA A
A9.12	LEVEL 1 FINISH PLAN - AREA B
A9.21	LEVEL 2 FINISH PLAN - AREA A
A9.22	LEVEL 2 FINISH PLAN - AREA B
A9.31	LEVEL 3 FINISH PLAN - AREA A
A9.32	LEVEL 3 FINISH PLAN - AREA B
A9.50	INTERIOR DETAILS
A9.51	INTERIOR DETAILS
A9.52	INTERIOR DETAILS
A9.60	INTERIOR SIGNAGE TYPES AND DETAILS
A9.90	FINISH SCHEDULE - LEVEL 1
A9.91	FINISH SCHEDULE - LEVEL 2 AND 3
A10.11	LEVEL 1 EQUIPMENT PLANS - AREA A
A10.12	LEVEL 1 EQUIPMENT PLANS - AREA B
A10.21	LEVEL 2 EQUIPMENT PLANS - AREA A
A10.22	LEVEL 2 EQUIPMENT PLANS - AREA B
A10.31	LEVEL 3 EQUIPMENT PLANS - AREA A
A10.32	LEVEL 3 EQUIPMENT PLANS - AREA B
A10.50	CASEWORK PLANS AND ELEVATIONS
A10.51	CASEWORK PLANS AND ELEVATIONS
A10.52	CASEWORK PLANS AND ELEVATIONS

A10.53	CASEWORK PLANS AND ELEVATIONS
A10.54	CASEWORK PLANS AND ELEVATIONS
A10.55	CASEWORK PLANS AND ELEVATIONS
A10.56	CASEWORK PLANS AND ELEVATIONS
A10.57	CASEWORK PLANS AND ELEVATIONS
A10.58	CASEWORK PLANS AND ELEVATIONS
A10.59	CASEWORK PLANS AND ELEVATIONS
A10.60	CASEWORK PLANS AND ELEVATIONS
A10.61	CASEWORK PLANS AND ELEVATIONS
A10.62	CASEWORK PLANS AND ELEVATIONS
A10.63	CASEWORK PLANS AND ELEVATIONS
A10.64	CASEWORK PLANS AND ELEVATIONS
A10.65	CASEWORK PLANS AND ELEVATIONS
A10.70	INTERIOR ELEVATIONS
A10.71	INTERIOR ELEVATIONS
A10.72	INTERIOR ELEVATIONS
A10.73	INTERIOR ELEVATIONS
A10.74	INTERIOR ELEVATIONS
A10.80	MILLWORK DETAILS
A10.90	CASEWORK SCHEDULE
A10.91	CASEWORK SCHEDULE

FOODSERVICE

FS1.12	LEVEL 1 - AREA B FOODSERVICE EQUIPMENT PLAN
FS2.01	ENLARGED FOODSERVICE EQUIPMENT PLAN

FIRE PROTECTION

FP0.01	FIRE PROTECTION LEGENDS, NOTES AND ABBREVIATIONS
FP0.02	FIRE PROTECTION DETAILS
FP1.11	FIRE PROTECTION LEVEL 1 - AREA A
FP1.12	FIRE PROTECTION LEVEL 1 - AREA B
FP2.11	FIRE PROTECTION LEVEL 2 - AREA A
FP2.12	FIRE PROTECTION LEVEL 2 - AREA B
FP3.11	FIRE PROTECTION LEVEL 3 - AREA A
FP3.12	FIRE PROTECTION LEVEL 3 - AREA B

PLUMBING

P0.01	PLUMBING LEGEND AND SCHEDULES
P1.00A	RADON PIPING AREA A
P1.00B	RADON PIPING AREA B
P1.01	UNDERSLAB PLUMBING- LEVEL 1 - AREA A
P1.02	UNDERSLAB PLUMBING- LEVEL 1 - AREA B
P1.11	PLUMBING- LEVEL 1 - AREA A
P1.12	PLUMBING- LEVEL 1 - AREA B
P1.21	PLUMBING- LEVEL 2 - AREA A
P1.22	PLUMBING- LEVEL 2 - AREA B
P1.31	PLUMBING- LEVEL 3 - AREA A
P1.32	PLUMBING- LEVEL 3 - AREA B
P1.33	PLUMBING KITCHEN
P1.41	PLUMBING ROOF PLAN
P3.01	PLUMBING DETAILS
P3.02	PLUMBING DETAILS 2

MECHANICAL

M0.11	LEGEND, NOTES AND DETAILS I
M0.12	DETAILS II
M0.13	DETAILS III
M0.14	DETAILS IV
M0.15	DETAILS V
M0.16	DETAILS VI
M0.17	DETAILS VII
M0.18	SCHEDULES I
M0.19	SCHEDULES II
M1.11	LEVEL 1 AREA A - DUCTWORK
M1.12	LEVEL 1 AREA B - DUCTWORK
M1.21	LEVEL 2 AREA A - DUCTWORK
M1.22	LEVEL 2 AREA B - DUCTWORK
M1.31	LEVEL 3 AREA A - DUCTWORK
M1.32	LEVEL 3 AREA B - DUCTWORK
M2.11	LEVEL 1 AREA A - PIPING
M2.12	LEVEL 1 AREA B - PIPING
M2.21	LEVEL 2 AREA A - PIPING
M2.22	LEVEL 2 AREA B - PIPING
M2.31	LEVEL 3 AREA A - PIPING
M2.32	LEVEL 3 AREA B - PIPING AND ENLARGED MECH RM
M3.11	ROOF AREA A
M3.12	ROOF AREA B
M4.11	CONTROLS I
M4.12	CONTROLS II
M4.13	CONTROLS III
M4.14	CONTROLS IV
M4.15	CONTROLS V
M4.16	CONTROLS VI
M4.17	CONTROLS VII
M4.18	CONTROLS VIII
M4.19	CONTROLS IX
VS1.11	VIBRATION AND SEISMIC

ELECTRICAL

E0.01	ELECTRICAL SYMBOL LIST
E0.02	LIGHTING FIXTURE SCHEDULE
E0.03	ALCS RISER AND DETAILS
E0.04	ELECTRICAL SITE PLAN
E0.05	ELECTRICAL SITE DETAILS
E0.06	ELECTRICAL SITE DETAILS
E1.11	LEVEL 1 AREA A - LIGHTING
E1.12	LEVEL 1 AREA B - LIGHTING
E1.21	LEVEL 2 AREA A - LIGHTING
E1.22	LEVEL 2 AREA B - LIGHTING
E1.31	LEVEL 3 AREA A - LIGHTING
E1.32	LEVEL 3 AREA B LIGHTING
E2.11	LEVEL 1 AREA A - POWER

E2.12	LEVEL 1 AREA B - POWER
E2.21	LEVEL 2 AREA A - POWER
E2.22	LEVEL 2 AREA B - POWER
E2.31	LEVEL 3 AREA A - POWER
E2.32	LEVEL 3 AREA B - POWER
E2.40	ROOF PLAN
E3.00	ELECTRICAL ROOM PART PLANS
E3.01	ELECTRICAL ONE LINE RISER
E3.02	ELECTRICAL PANEL SCHEDULES
E3.03	ELECTRICAL DETAILS
E3.04	ELECTRICAL DETAILS
E3.05	MECHANICAL EQUIPMENT SCHEDULE
E3.06	PLUMBING EQUIPMENT SCHEDULE
E3.07	KITCHEN SCHEDULE
E3.08	TELECOM RISER DIAGRAM
E3.09	BDA SYSTEM DIAGRAM
E4.01	FIRE ALARM RISER
E4.11	LEVEL 1 AREA A - FIRE ALARM
E4.12	LEVEL 1 AREA B - FIRE ALARM
E4.21	LEVEL 2 AREA A - FIRE ALARM
E4.22	LEVEL 2 AREA B - FIRE ALARM
E4.31	LEVEL 3 AREA A - FIRE ALARM
E4.32	LEVEL 3 AREA B - FIRE ALARM

TECHNOLOGY

T1.11	LEVEL 1 - AREA A TECHNOLOGY
T1.12	LEVEL 1 - AREA B TECHNOLOGY
T1.21	LEVEL 2 - AREA A TECHNOLOGY
T1.22	LEVEL 2 - AREA B TECHNOLOGY
T1.31	LEVEL 3 - AREA A TECHNOLOGY
T1.32	LEVEL 3 - AREA B TECHNOLOGY
T1.41	ROOF - AREA A TECHNOLOGY
T1.42	ROOF - AREA B TECHNOLOGY
T2.01	DETAIL SHEET TECHNOLOGY
T2.02	DETAIL SHEET TECHNOLOGY
T2.03	DETAIL SHEET TECHNOLOGY
T2.04	DETAIL SHEET TECHNOLOGY
T2.05	DETAIL SHEET TECHNOLOGY
T2.06	DETAIL SHEET TECHNOLOGY
T2.07	DETAIL SHEET TECHNOLOGY
T2.08	DETAIL SHEET TECHNOLOGY
T2.09	DETAIL SHEET TECHNOLOGY
T2.10	DETAIL SHEET TECHNOLOGY
T2.11	DETAIL SHEET TECHNOLOGY

END OF SECTION

SECTION 00 21 14
SUPPLEMENTAL INSTRUCTIONS TO BIDDERS - E-BID

PART 1 - GENERAL

1.01 ELECTRONIC BIDDING

A. This project is being electronically bid (E-Bid). All bids shall be submitted online at www.Projectdog.com, Project Code TO BE DETERMINED. Hard copy bids will not be accepted by the Awarding Authority.

B. Instructions prepared by the electronic bidding service, for registering and accessing the website and for preparing E-bids, are attached following this section, and consist of five pages.

C. Tutorials and instructions are available online at www.Projectdog.com. For assistance, contact Projectdog, Inc.. at (978) 499-9014.

END OF SECTION

Projectdog, Inc

Supplemental Instructions to Bidders for Electronic Bid Projects (E-Bid)

Table of Contents

Page

Sign Up 2

Login 2

Logoff 2

Forgotten Password 2

Account Information 2

Project Details 3

Acquire Documents 3

Document Recipients 3

Electronic Bid (E-Bid) 4

© Copyright by Projectdog.com, All rights reserved.

Sign Up

Every user of Projectdog.com has a unique username and password for their account. **MANDATORY: All users must keep usernames and passwords PRIVATE and SECURE. Do not share accounts.**

1. Go to **www.Projectdog.com**.
2. Select the "Sign Up" (Fig 1).
3. Complete all required form fields and press Submit. An automatic email will be sent to the registered email.
4. Select the confirmation link in the email to complete the registration.

Fig 1

Login

1. Go to **www.Projectdog.com**.
2. Enter a registered email address and password (Fig 1).
3. Press Login.

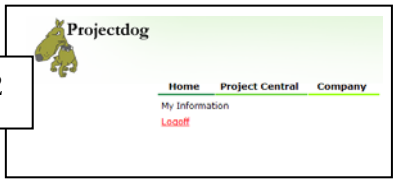


Fig 2

Logoff

1. Hover over Home (Fig 2).
2. Select "Logoff".

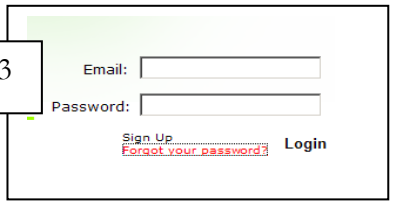


Fig 3

Forgotten Password

1. Select "Forgot your password?" (Fig 3).
2. Enter the e-mail address.
3. Select "Send Info". An automated e-mail will be sent with the password.

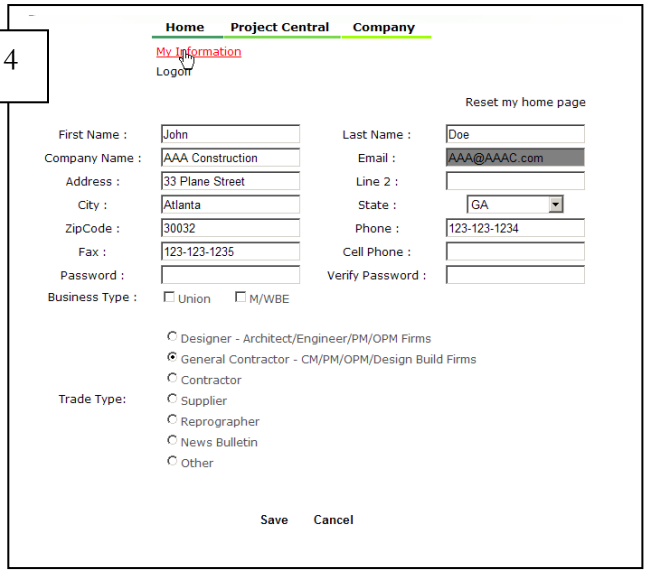


Fig 4

Account Information

View and edit user contact information. To change an email address, users must register a new account. Call Projectdog to have the old account removed.

1. Hover over Home (Fig 4).
2. Click "My Information".
3. Edit information as needed.
4. Click "Save" to finalize edits.

© Copyright by Projectdog.com, All rights reserved.

Project Details

Utilize the search page (Fig 5) or enter a Project Code (Fig 6) to view a project's "Project Details" page (Fig 7).

Fig 5

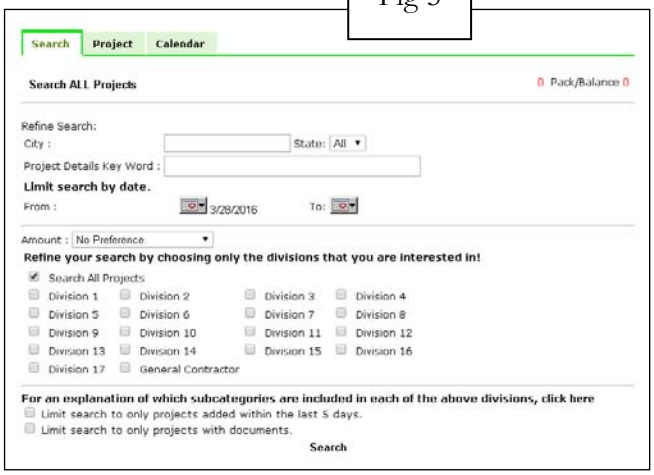
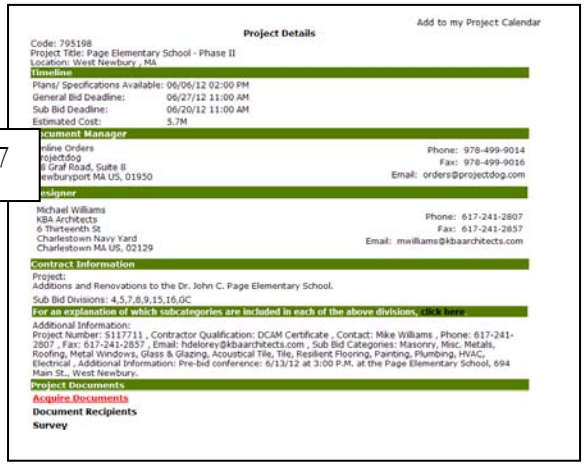


Fig 6

Fig 7



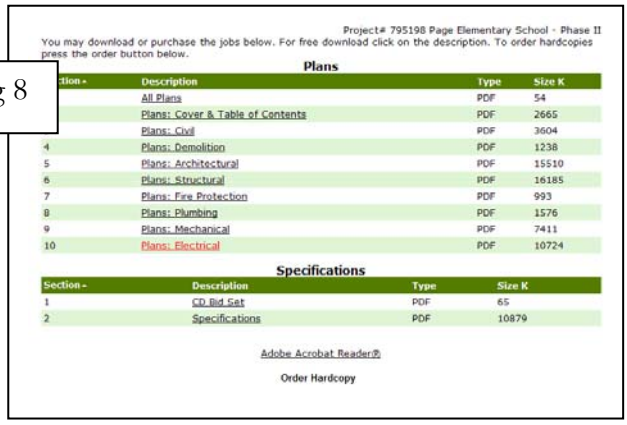
Acquire Documents

Download all project documents.

1. Click "Acquire Documents" link found on a project's "Project Details" page (Fig 7).
2. Respond to the Legal Notice after reviewing.
3. Click on any file description to open, review, or save a document (Fig 8).

   Users are automatically added to the project's "Document Recipients" list to receive update notifications upon viewing any document online.

Fig 8

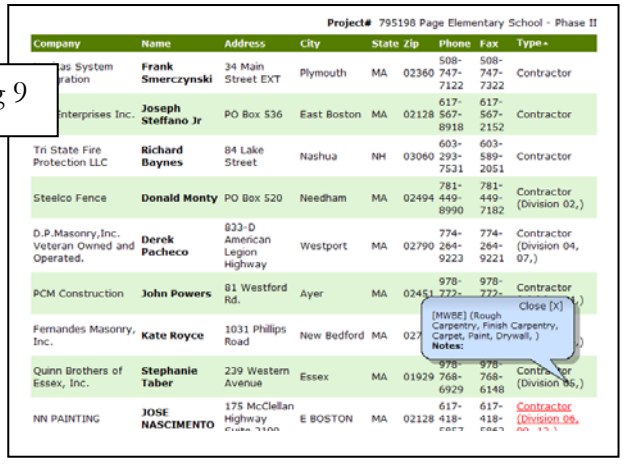


Document Recipients

Review all plan holders who have acquired documents.

1. Click "Document Recipients" link found on a project's "Project Details" page (Fig 7).
2. All potential bidders are listed and sorted by company type (Fig 9). Click on a column title to sort alphabetically.

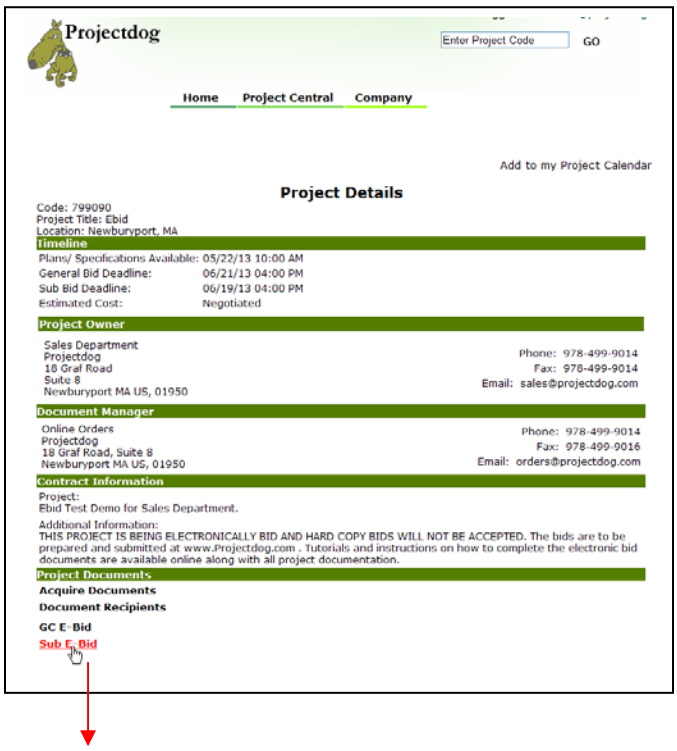
Fig 9

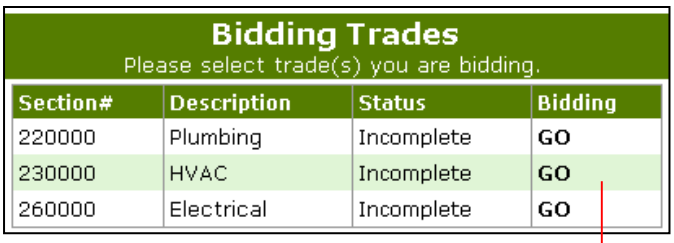


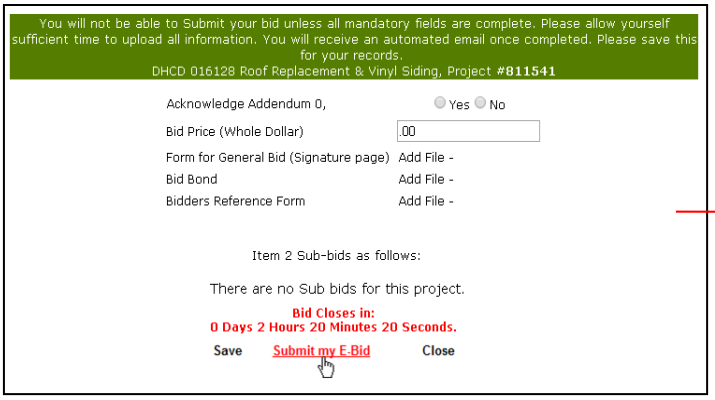
© Copyright by Projectdog.com, All rights reserved.

Electronic Bid (E-Bid)

This project is being **Electronically Bid** at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Go to www.Projectdog.com and Login with an existing account or click Sign Up to register for free. Enter a project code or search by keyword to access the "Project Details" page. Select "Acquire Documents" to download all bidding documents.







How to Submit an E-Bid

Complete and save all required forms as PDF files. Please be sure to sign all required signatures either digitally or manually.

1. Select the **GC E-Bid** or **Sub E-Bid** link located on the "Project Details" page.

   Subcontractors select a bidding trade;

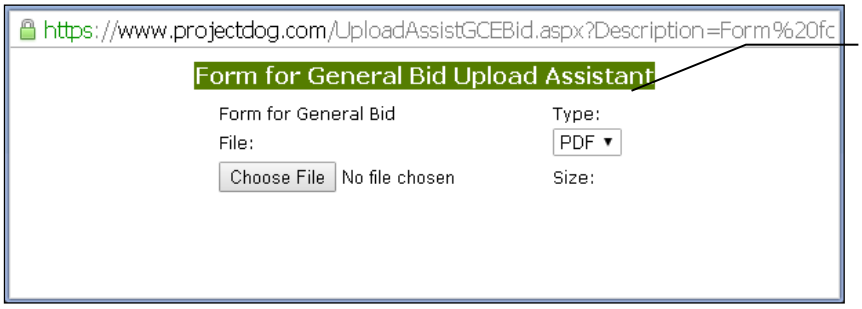
   General Contractors will not be able to submit an E-Bid until the official sub bid tabulation is released by the Awarding Authority.

2. Answer / enter / upload all required areas. Enter all dollar value amounts as a whole dollar values only.

3. Select "Submit My E-Bid." Review the submitted bid package via the "View My Bid Package" link.

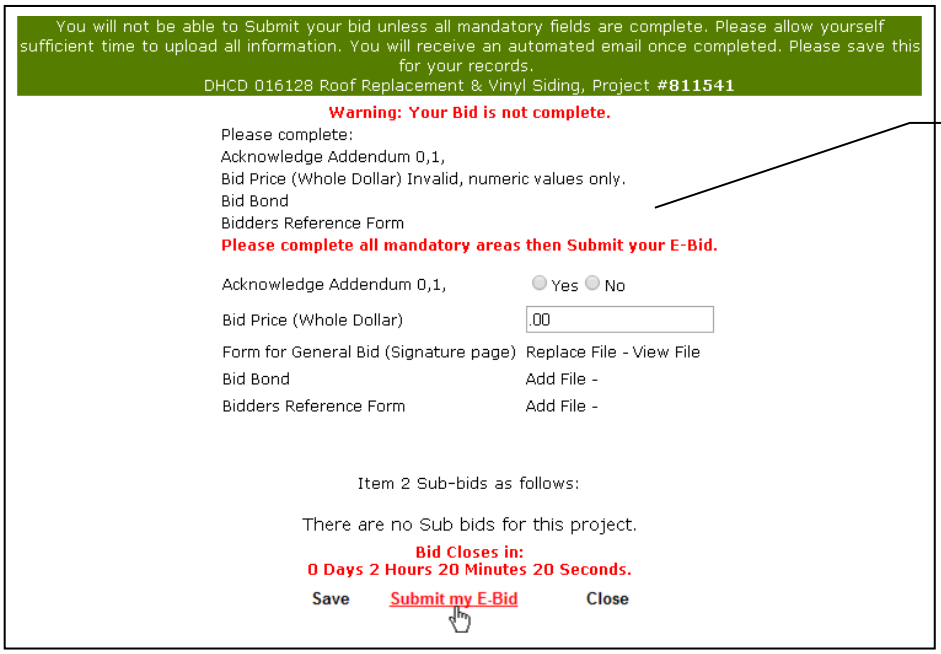
It's that simple!

© Copyright by Projectdog.com, All rights reserved.



Add File

Click "Add File" on the E-Bid page to open the Upload Assistant window. Then click "Browse" or "Choose File" to upload a PDF file.



Warning

E-Bids cannot be submitted unless all areas are complete.

Save before adding files or closing the window or E-Bid data may need to be re-entered.

Projectdog.com server time is set to industry standards at time-a.nist.gov. Bidders are encouraged to update their computer clock.

Bidders may save, submit or modify an Electronic Bid (E-Bid) at any time prior to bid close. Once submitted, a bid cannot be edited. To modify a bid the bidder must retract the bid, make any necessary changes, and then submit the bid again. Upon submitting or retracting the bidder will receive a convenience email for informational purposes only. Bidders are encouraged to contact Projectdog if an email is not received.

It is the bidder's responsibility to review and confirm online that a bid has been submitted and/or retracted and that the bid is 100% true, complete and accurate. All bidders are required to review their submitted E-Bid via the "View My Bid Package" link.

If a bid is submitted prior to an addendum being issued the bidder will receive an automated email for informational purposes only stating the bidder must review the addendum, retract the bid, acknowledge all addenda, and submit the bid again. If a bidder fails to acknowledge addenda their bid may be rejected by the Awarding Authority.

Once the bid deadline has closed the E-Bid links are no longer available. All E-Bids are compiled in real time upon bid close and published forthwith on the "Project Details" page titled as "List of Bids Received". Official bid tabulations are posted at the discretion of the Awarding Authority.

For additional assistance, call Projectdog at (978) 499-9014 (M-F, 9AM-5PM).

© Copyright by Projectdog.com, All rights reserved.

SECTION 00 21 15
WORKFORCE DIVERSITY

SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

PART 1 GENERAL

1.01 DEFINITIONS

A. For purposes of this contract, “Minority” means a person who meets one or more of the following definitions:
   1. American Indian or Native American means: all persons having origins in any of the original peoples of North America and who are recognized as an Indian by a tribe or tribal organization.
   2. Asian means: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands, including, but not limited to China, Japan, Korea, Samoa, India, and the Philippine Islands.
   3. Black means: All persons having origins in any of the Black racial groups of Africa, including, but not limited to, African Americans, and all persons having origins in any of the original peoples of the Cape Verdean Islands.
   4. Eskimo or Aleut means: All persons having origins in any of the peoples of Northern Canada, Greenland, Alaska, and Eastern Siberia.
   5. Hispanic means: All persons having their origins in any of the Spanish-speaking peoples of Mexico, Puerto Rico, Cuba, Central or South America, or the Caribbean Islands.

B. “State construction contract” means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility, or a contract for the construction, reconstruction, alteration, remodeling or repair of a public work undertaken by a department, agency, board, or commission of the commonwealth.

C. “State assisted construction contract” means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility undertaken by a political subdivision of the commonwealth, or two or more political subdivisions thereof, an authority, or other instrumentality and whose costs of the contract are paid for, reimbursed, grant funded, or otherwise supported, in whole or in part, by the commonwealth.

1.02 EQUAL OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION

A. During the performance of this Contract, the Construction Manager and all subcontractors (hereinafter collectively referred to as “Contractor”) for a state construction contract or a state assisted construction contract, for him/herself, his/her assignees and successors in interest, agree to comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

B. In connection with the performance of work under this contract, Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability, shall not discriminate in the selection or retention of subcontractors, and shall not discriminate in the procurement of materials and rentals of equipment.

C. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising, layoff or termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship or on-the-job training opportunity. Contractor shall comply with the provisions of chapter 151B of the Massachusetts General Laws, as amended, and all other applicable anti-discrimination and

equal opportunity laws, all of which are herein incorporated by reference and made a part of this Contract.

D. Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B).

E. In connection with the performance of work under this contract, Contractor shall undertake, in good faith, affirmative action measures to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. Such affirmative action measures shall entail positive and aggressive measures to ensure non-discrimination and to promote equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, apprenticeship and on-the-job training programs. A list of positive and aggressive measures shall include, but not be limited to, advertising employment opportunities in minority and other community news media; notifying minority, women and other community-based organizations of employment opportunities; validating all job specifications, selection requirements, and tests; maintaining a file of names and addresses of each worker referred to Contractor and what action was taken concerning such worker; and notifying the administering agency in writing when a union with whom Contractor has a collective bargaining agreement has failed to refer a minority or woman worker. These and other affirmative action measures shall include all actions required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. One purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradespeople for this and future Commonwealth public construction projects.

1.03 MINORITY AND WOMEN WORKFORCE PARTICIPATION

A. Pursuant to Contractor's obligations under the preceding section, Contractor shall strive to achieve on this project the labor participation goals contained herein. Said participation goals shall apply in each job category on this project including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers and those classes of work enumerated in Section 44F of Chapter 149 of the Massachusetts General Laws. The participation goals for this project shall be 15.3 percent for minorities and 6.9 percent for women. The participation goals, as set forth herein, shall not be construed as quotas or set asides; rather, such participation goals will be used to measure the progress of the Commonwealth’s equal opportunity, non-discrimination and affirmative action program. Additionally, the participation goals contained herein should not be seen or treated as a floor or as a ceiling for the employment of particular individuals or groups of individuals.

1.04 LIAISON COMMITTEE

A. At the discretion of the agency that administers the contract for the construction project there may be established for the life of the contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering the contract for the construction project, hereinafter called the administering agency, a representative from the Office of Affirmative action, and such other representatives as may be designated by the administering agency.

B. Contractor (or Contractor's agent, if any, designated by Contractor as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

1.05 REPORTS AND RECORDS

A. Contractor shall prepare projected workforce tables on a quarterly basis when required by the administering agency. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also, when updated, to the administering agency and the Liaison Committee when required.

B. Contractor shall prepare weekly reports in a form approved by the administering agency, unless information required is required to be reported electronically by the administering agency, the number of hours worked in each trade by each employee, identified as woman, minority, or non-minority. Copies of these shall be provided at the end of each such week to the administering agency and the Liaison Committee.

C. Records of employment referral orders, prepared by Contractor, shall be made available to the administering agency on request.

D. Contractor shall provide all information and reports required by the administering agency on instructions issued by the administering agency and shall permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the administering agency to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary non-discrimination, equal opportunity and access and opportunity contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, Contractor shall so certify to the administering agency and shall set forth what efforts Contractor has made to obtain the information.

1.06 ACCESS TO WORK SITE

A. A designee of the administering agency and a designee of the Liaison Committee shall each have a right to access the work site.

1.07 SOLICITATIONS FOR SUBCONTRACTS, AND FOR THE PROCUREMENT OF MATERIALS AND EQUIPMENT

A. In all solicitations either by competitive bidding or negotiation made by Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by Contractor of Contractor's obligations under this contract relative to non-discrimination and equal opportunity.

1.08 SANCTIONS

A. Whenever the administering agency believes the Construction Manageror any subcontractor may not be operating in compliance with the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B), the administering agency may refer the matter to the Massachusetts Commission Against Discrimination (“Commission”) for investigation.

B. Following the referral of a matter by the administering agency to the Massachusetts Commission Against Discrimination, and while the matter is pending before the MCAD, the administering agency may withhold payments from contractors and subcontractors when it has documentation that Contractor or subcontractor has violated the Fair Employment Practices Law with respect to its activities on the Project, or if the administering agency determines that Contractor has materially failed to comply with its obligations and the requirements of this section. The amount withheld shall not exceed a withhold of payment to the Construction Manager of 1/100 or 1 percent of the contract award price or $5,000, whichever sum is greater, or, if a subcontractor is in non-compliance, a withhold by the administering agency from the Construction Manager, to be assessed by the Construction Manager as a charge against the subcontractor, of 1/100 or 1 percent of the subcontractor price, or $1,000 whichever sum is greater, for each violation of the applicable law or contract requirements. The total withheld from any one Construction Manager

or subcontractor on a Project shall not exceed $20,000 overall. No withholding of payments or investigation by the Commission or its agent will be initiated without the administering agency providing prior notice to thContractor.

C. If, after investigation, the Massachusetts Commission Against Discrimination finds that a Construction Manager or subcontractor, in commission of a state construction contract or state-assisted construction contract, violated the provisions of the Fair Employment Practices Law, the administering agency may convert the amount withheld as set forth above into a permanent sanction, as a permanent deduct from payments to the Construction Manager or subcontractor, which sanction will be in addition to any such sanctions, fines or penalties imposed by the Massachusetts Commission Against Discrimination:

D. No sanction enumerated under this Section shall be imposed by the administering agency except after notice to the Construction Manager or subcontractor and an adjudicatory proceeding, as that term is used, under Massachusetts General Laws Chapter 30A, has been conducted.

1.09 SEVERABILITY

A. The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

1.10 CONSTRUCTION MANAGER'S CERTIFICATION

A. A bidder for a state construction contract or state assisted construction contract will not be eligible for award of the contract unless such bidder has submitted to the administering agency the following certification, which will be incorporated into the resulting contract, as attached to the end of this section.

1.11 SUBCONTRACTOR REQUIREMENTS

A. Prior to the award of any subcontract for a state construction contract or a state assisted construction contract, regardless of tier, the Construction Manager shall provide all prospective subcontractors with a complete copy of this section entitled " 00 21 15 - Workforce Diversity, Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program" and shall incorporate the provisions of this section by reference into any and all contracts or work orders for all subcontractors providing work on the Project. In order to ensure that the said subcontractor's certification becomes a part of all subcontracts under the prime contract, the Construction Manager shall certify in writing to the administering agency that it has complied with the requirements as set forth in the preceding paragraphs.

CONSTRUCTION MANAGER'S CERTIFICATION

_____ certifies that they:
(Construction Manager)

1. Shall not discriminate in their employment practices; and
2. Intend to use the following listed construction trades in the work under the contract
   _____
   _____
   _____; and
3. Shall make good faith efforts to comply with the minority employee and women employee workforce participation ratio goals and specific affirmative action steps contained herein; and
4. Are in compliance with all applicable federal and state laws, rules, and regulations governing fair labor and employment practices; and
5. Shall provide the provisions of the “Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program” to each and every subcontractor employed on the project and shall incorporate the terms of this section into all subcontracts and work orders entered into on the Project; and
6. Agree to comply with all provisions contained herein.

_____ _____
Signature of authorized representative of Construction Manager Date

_____
Printed name of authorized representative of Construction Manager

END OF SECTION

SECTION 00 21 16
MBE-WBE-SD/VOBE PARTICIPATION GOALS

Goals for Participation by MBE, WBE, and VBE / SDVOBE, pursuant to M.G.L. C. 7 § 61(N).

1. GOALS

The goals for minority business enterprise (MBE), woman business enterprise (WBE) and veteran business enterprise/service-disabled veteran business enterprise (VBE/SDVOBE) participation established for this Contract, in accordance with the Massachusetts Municipal Construction Affirmative Marketing Program, established pursuant to M.G.L. c. 7 § 61 (n) and (p) are as set forth below and in the Owner - Contractor Agreement. To count towards MBE, WBE and/or VBE/SDVOBE participation, the business must be a Supplier Diversity Office (SDO) certified MBE, WBE, and/or VBE/SDVOBE at the time of contract execution.

Certification Category	**Insert MBE, WBE, and VBE / SDVOBE Goals Below**
MBE	_____ percent
WBE	_____ percent
VBE / SDVOBE	3.0 percent

2. MBE, WBE, and VBE / SDVOBE PARTICIPATION CREDIT

A. If the Contractor is itself a MBE, WBE, and/or VBE/SDVOBE, MBE, WBE, and/or VBE / SDVOBE participation credit shall be given in an amount equal to the entire Contract Price. If the Contractor is not an MBE, WBE, and/or VBE/SDVOBE, then MBE, WBE, and/or VBE / SDVOBE participation credit will be given for the value of the Work that is actually performed by each MBE, WBE, or VBE / SDVOBE subcontractor or sub-subcontractor.

B. If the Contractor is a joint venture with one or more MBEs, WBEs, and/or VBEs / SDVOBEs participating in the joint venture, MBE, WBE, and/or VBE / SDVOBE participation credit shall be given to the joint venture as follows:

(1) If the joint venture is certified by the Supplier Diversity Office (SDO) as an MBE, WBE, and/or VBE / SDVOBE, then MBE, WBE, and/or VBE / SDVOBE Participation credit shall be given in an amount equal to the entire Contract Price.

(2) If the joint venture is not certified as an MBE, WBE, and/or VBE / SDVOBE by SDO, then MBE, WBE and/or VBE / SDVOBE participation credit shall be given to the joint venture for the value of the Work that is performed by the MBE, WBE, and/or VBE / SDVOBE joint venture(s), and for the value of the Work that is actually performed by each MBE, WBE, and/or VBE / SDVOBE subcontractor or sub-subcontractor.

C. If an MBE, WBE, and/or VBE / SDVOBE supplies, but does not install equipment or materials, MBE, WBE, and/or VBE / SDVOBE participation credit shall be given only if the MBE, WBE, and/or VBE / SDVOBE supplier is regularly engaged in sales of equipment or supplies to the construction industry from an established place of business. MBE, WBE, and/or VBE / SDVOBE participation credit shall be given the full amount of the purchase order only if the MBE, WBE, and/or VBE / SDVOBE supplier manufactures the goods or substantially alters them before resale. Otherwise, a contractor may count toward its MBE, WBE, and/or VBE /SDVOBE goal 60 percent of the total bid price for its expenditures of its materials and supplies required under a contract and obtained from a MBE, WBE, and/or VBE / SDVOBE regular supplier.

D. MBE participation credit shall be given for the work performed by MBEs only, WBE participation credit shall be given for the work performed by WBEs only and VBE / SDVOBE participation credit shall be given for the work performed by VBEs / SDVOBEs only. For example, MBE participation may not be substituted for WBE or VBE / SDVOBE participation, nor may WBE or VBE / SDVOBE participation be substituted for MBE participation.

3. ESTABLISHING MBE, WBE, and/or VBE / SDVOBE STATUS

A. A MBE, WBE, and/or VBE / SDVOBE shall be considered as an MBE, WBE, and/or VBE / SDVOBE respectively only if it has been certified by the SDO in its respective certification category at the time of contract award.

Should the Awarding Authority suspect a transfer of ownership to be in bad faith to take advantage of the MCAMP program, it reserves all available legal remedies, including but not limited to, termination of this contract. The Awarding Authority further reserves the right to enforce MCAMP participation goals to the fullest extent of the law, including, but not limited to, coordinating with the Massachusetts Attorney General's Office.

B. Certification as a disadvantaged business enterprise ("DBE"), certification as MBE, WBE and/or VBE/SDVOBE by any agency or organization other than the SDO, or submission of an application to SDO for certification as an MBE, WBE, and/or VBE / SDVOBE shall not confer MBE, WBE, and/or VBE / SDVOBE status on a firm for the purposes of this Contract.

4. SUBCONTRACTS WITH MBEs, WBEs, and/or VBEs / SDVOBEs

Within 30 days after the award of this Contract, the Contractor shall (i) execute a subcontract with each MBE, WBE, and/or VBE / SDVOBE Subcontractor which has executed a Letter of Intent Approved by the Awarding Authority, (ii) cause its Subcontractors to execute a sub-subcontract with each MBE, WBE, and/or VBE / SDVOBE sub-subcontractor, and (iii) furnish the Awarding Authority with a signed copy of each such subcontract and sub-subcontract.

5. PERFORMANCE OF CONTRACT WORK BY MBEs, WBEs, and/or VBEs/SDVOBEs.

A. The Contractor shall not perform with its own organization or subcontract or assign to any other firm work designated to be performed by any MBE, WBE, and/or VBE / SDVOBE in the Letters of Intent or Schedule of MBE, WBE, and/or VBE / SDVOBE Participation without the prior Approval of the Awarding Authority, nor shall any MBE, WBE, and/or VBE / SDVOBE assign or subcontract to any other firm, or permit any other firm to perform any of its MBE, WBE, and/or VBE / SDVOBE Work without the prior Approval of the Awarding Authority. Any such unapproved assignment, subcontracting, sub-subcontracting, or performances of MBE, WBE, and/or VBE / SDVOBE Work by other parties shall be a change in the MBE, WBE, and/or VBE / SDVOBE Work for the purposes of this Contract. **The Awarding Authority will not apply to the MBE, WBE, and/or VBE / SDVOBE participation goals(s) any sums attributable to such unapproved assignments, sub-contracts, sub-subcontracts, or performance of MBE, WBE, and/or VBE / SDVOBE work by others**.

B. The Contractor shall be responsible for monitoring the performance of MBE, WBE, and VBE / SDVOBE Work to ensure that each scheduled MBE, WBE, and/or VBE / SDVOBE performs its own MBE, WBE, and/or VBE / SDVOBE Work with its own workforce.

C. The Contractor and each MBE, WBE, and VBE / SDVOBE shall provide the Awarding Authority with all information and documentation that the Awarding Authority determines is necessary to ascertain whether or not an MBE, WBE, and/or VBE / SDVOBE has performed its own MBE, WBE, and/or VBE / SDVOBE Work. At the discretion of the Awarding Authority, failure to submit such documentation to the Awarding

Authority shall establish conclusively for the purpose of giving MBE, WBE, and/or VBE / SDVOBE participation credit under this Contract that such MBE, WBE, and/or VBE / SDVOBE did not perform such work.

(1) With each progress payment request submitted by the Contractor to the Awarding Authority, the Contractor must provide the Contractor Progress Payment Report (Exhibit A) indicating the value of payments for each MBE, WBE, and VBE / SDVOBE firms for that period.

Note that should it be deemed more efficient, the Awarding Authority may instruct the Contractor to utilize a different payment reporting methodology, including, but not limited to, an online reporting system, and/or modifications to the Contactor Progress Payment Report form.

6. NOTIFICATION OF CHANGES IN MBE, WBE and/or VBE/SDVOBE WORK

A. If at any time during the performance of the Contract the Contractor determines or has reason to believe that a scheduled MBE, WBE, and/or VBE / SDVOBE is unable or unwilling to perform its MBE, WBE, and/or VBE / SDVOBE Work, or that there has been or will be a change in any MBE, WBE, and/or VBE / SDVOBE Work, or that the Contractor shall be unable to meet the MBE, WBE, and/or VBE / SDVOBE participation goal(s) for this Contract for any reason, the Contractor shall immediately notify the Awarding Authority Contract Compliance Office in writing of such circumstances.

B. Any notice of a change in MBE, WBE, and/or VBE / SDVOBE Work pursuant to subparagraph “A” above shall include a revised Schedule of MBE, WBE, and/or VBE / SDVOBE Participation, and additional or amended Letters of Intent and subcontracts, as the case may be.

C. Contractor is expected to conduct reasonable efforts to replace MBE, WBE, and/or VBE / SDVOBE contractors in order to meet the participation goals set for this contract as stated below when doing so will not result in unreasonable project delay.

Contractor shall coordinate with the Awarding Authority and the SDO to locate other MBE, WBE, and/or VBE / SDVOBE contractors to participate on the project in the event a listed MBE, WBE, and/or VBE / SDVOBE should lose its certification status during the contract and be unable to recertify within a timely manner.

7. ACTIONS REQUIRED IF THERE IS A CHANGE IN MBE, WBE and/or VBE/SDVOBE PARTICIPATION

A. In the event there is a change or reduction in any MBE, WBE, and/or VBE / SDVOBE Work which will result in the Contractor failing to meet the MBE, WBE, and/or VBE / SDVOBE participation goal(s) for this Contract, other than a reduction in MBE, WBE, and/or VBE / SDVOBE Work resulting from a Change Order initiated by the Awarding Authority, then the Contractor shall immediately undertake a diligent, good faith effort to make up the shortfall in MBE, WBE, and/or VBE / SDVOBE participation as follows:

(1) The Contractor shall identify all items of the Work remaining to be performed under the Contract that may be made available for subcontracting to MBEs, WBEs and/or VBEs/SDVOBEs. The Contractor shall send a list of such items of work to the Awarding Authority, together with a list of the remaining items of the Work that was not made available to MBEs, WBEs, and/or VBEs / SDVOBEs and the reason for not making such work available for subcontracting to MBEs, WBEs, and/or VBEs / SDVOBEs.

(2) The Contractor shall send written notices soliciting proposals to perform the items of the Work that may be made available for subcontracting to MBEs, WBEs, and/or VBEs / SDVOBEs to all MBEs, WBEs, and/or VBEs / SDVOBEs qualified to perform such work. The Contractor shall advise the

Awarding Authority of (i) each MBE, WBE, and/or VBE / SDVOBE solicited, and (ii) each MBE, WBE. and/or VBE / SDVOBE listed in the SDO directory under the applicable trade category that was not solicited and the reasons therefore that no qualified MBEs, WBEs, and/or VBEs / SDVOBEs are available, qualified MBEs, WBEs. and/or VBEs / SDVOBEs did not respond, lack of eligible MBEs, WBEs, and/or VBEs / SDVOBEs in the geographical region, or there are no certified MBEs, WBEs, and/or VBEs / SDVOBEs certified in the scope of work of the project including the opportunity for subcontracting. The Contractor shall also advise the Awarding Authority of the dates notices were mailed and provide a copy of the written notice(s) sent.

(3) The Contractor shall make reasonable efforts to follow up the written notices sent to MBEs, WBEs, and/or VBEs / SDVOBEs with telephone calls or personal visits in order to determine with certainty whether the MBEs, WBEs, and/or VBEs / SDVOBEs were interested in performing the work. Phone logs or other documentation must be submitted to the Awarding Authority evidencing this effort.

(4) The Contractor shall make reasonable efforts to assist MBEs, WBEs, and/or VBEs / SDVOBEs that need assistance in obtaining insurance, bonds, or lines of credit in order to perform work under the Contract and shall provide the Awarding Authority with evidence that such efforts were made.

(5) The Contractor shall provide the Awarding Authority with a statement of the response received from each MBE, WBE, and/or VBE / SDVOBE solicited, including the reason for rejecting any MBE, WBE, and/or VBE / SDVOBE who submitted a proposal.

(6) The Contractor shall take any additional measures reasonably requested by the Awarding Authority to meet the MBE, WBE, and/or VBE / SDVOBE participation goal(s) established for this Contract, including, without limitation, placing advertisements in the Supplier Diversity Hub and in appropriate media and trade association publications announcing the Contractor's interest in obtaining proposals from MBEs, WBEs, and/or VBEs / SDVOBEs, and/or sending written notification to MBE, WBE. and/or VBE / SDVOBE economic development assistance agencies, trade groups and other organizations notifying them of the project and of the work available to be subcontracted by the Contractor to MBEs, WBEs, and/or VBEs / SDVOBEs.

B. If the Contractor is unable to meet the MBE, WBE, and/or VBE / SDVOBE participation goals for this Contract after complying fully with each of the requirements of paragraph “A” above, and the Contractor is otherwise in full compliance with the terms of this Appendix the Awarding Authority may adjust the MBE, WBE, and/or VBE / SDVOBE participation goals for this Contract to the extent that such goals cannot be achieved, as referenced in this document.

8. SUSPENSION OF PAYMENT and/or PERFORMANCE FOR NONCOMPLIANCE

A. If at any time during the performance of this Contract, the Awarding Authority determines or has reason to believe that (1) there has been a change or reduction in any MBE, WBE, and/or VBE / SDVOBE Work which will result in the Contractor failing to meet the MBE, WBE, and/or VBE / SDVOBE participation goal(s) for this Contract, other than a reduction in MBE, WBE and/or VBE / SDVOBE Work resulting from a change in the Contract work ordered by the Awarding Authority, and (2) the Contractor has failed to comply fully with all of the terms and conditions of paragraphs 1 through 7 above, the Awarding Authority may:

(1) Suspend payment to the Contractor of an amount equal to the value of the work which was to have been performed by an MBE, WBE, and/or VBE / SDVOBE pursuant to the Contractor’s Schedule of MBE, WBE, and VBE / SDVOBE Participation but which was not so performed, in order to ensure that sufficient Contract funds will be available if liquidated damages are assessed pursuant to paragraph 9, and/or:

(2) Suspend the Contractor's performance of this Contract in whole or in part.

B. The Awarding Authority shall give the Contractor prompt written notice of any action taken pursuant to paragraph A above and shall give the Contractor and any other interested party, including any MBEs, WBEs, and/or VBEs / SDVOBEs, an opportunity to present evidence to th eAwarding Authority that the Contractor is in compliance with the requirements of this Appendix or that there is some justifiable reason for waiving the requirements of this Appendix in whole or in part. The Awarding Authority may invite SDO to participate in any proceedings undertaken pursuant to this paragraph.

C. Upon a showing that the Contractor is in full compliance with the requirements of this Appendix, or that the Contractor has met or will meet the MBE, WBE, and VBE / SDVOBE participation goals for this Contract, the Awarding Authority shall release any funds withheld pursuant to clause A (1) above and lift any suspension of the Contractor's performance under clause A (2) above.

9. LIQUIDATED DAMAGES; TERMINATION

A. If payment by the Awarding Authority or performance by the Contractor is suspended by the Awarding Authority as provided in paragraph 8 above, the Awarding Authority shall have the following rights and remedies if the Contractor thereafter fails to take all action necessary to bring the Contractor into full compliance with the requirements of this Appendix, or if full compliance is no longer possible because the default of the Contractor is no longer susceptible to cure, if the Contractor fails to take such other action as may be required by the Awarding Authority to meet the MBE, WBE, and VBE / SDVOBE participation goals set forth in this Contract:

(1) The Awarding Authority may terminate this Contract, and/or

(2) The Awarding Authority may retain from final payment to the Contractor, as liquidated damages, an amount equal to the difference between:

(a) The total of the MBE, WBE, and VBE / SDVOBE participation goals set forth in this Contract, and

(b) The amount of MBE, WBE, and VBE / SDVOBE participation credit earned by the Contractor for MBE, WBE, and/or VBE / SDVOBE Work performed under this Contract as determined by the Awarding Authority, the parties agreeing that the damages for failure to meet the MBE, WBE, and VBE / SDVOBE participation goals are difficult to determine and that the foregoing amount to be retained by the Awarding Authority represents the parties' best estimate of such damages. Any liquidated damages will be assessed separately for MBE, WBE, and VBE / SDVOBE participation.

B. Before exercising its rights and remedies hereunder, the Awarding Authority may give the Contractor and any other interested party another opportunity to present evidence to the Awarding Authority that the Contractor is in compliance with the requirements of this Appendix or that there is some justifiable reason for waiving the requirements of this Appendix in whole or in part. The Awarding Authority may invite SDO to participate in any proceedings undertaken hereunder.

10. REPORTING REQUIREMENTS

The Contractor shall submit to the Awarding Authority all information or documentation that is necessary in the judgment of the Awarding Authority to ascertain whether or not the Contractor has complied with any of the provisions of this Article.

11. AWARDING AUTHORITY'S RIGHT TO WAIVE PROVISIONS OF THIS APPENDIX IN WHOLE OR IN PART

The Awarding Authority reserves the right to waive any provision or requirement of this Appendix if the Awarding Authority determines that such waiver is justified and in the public interest. No such waiver shall be effective unless it has been submitted by the Awarding Authority in writing to and subsequently approved in writing by the Executive Director of the Supplier Diversity Office (SDO). No other action or inaction by the Awarding Authority shall be construed as a waiver of any provision of this Appendix.

END OF SECTION

SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:

1. Hazardous Material Survey: Prepared by Universal Environmental Consultants, titled " Hazardous Materials Determination Survey", and dated October 10, 2023.
   a. A copy of the full report, consisting of 21 pages, follows this section.
2. Subsurface Soil Investigation: Prepared by PEER Consultants, P.C., titled "Limited Subsurface Soil Investigation Memorandum", and dated November 15, 2024.
   a. A copy of the full report, consisting of 81 pages, follows this section.
3. Geotechnical Report: Prepared by Lahlaf Geotechnical Consulting, Inc., titled "Preliminary Geotechnical Report", and dated December 10, 2024.
   a. A copy of the full report, consisting of 66 pages, follows this section.
4. Engineering Economic Analysis: Prepared by GGD Consulting Engineers, Inc., titled "Engineering Economic Analysis", and dated January 21, 2025.
   a. A copy of the full report, consisting of 69 pages, follows this section.
5. Flow Test Report: Prepared by John Hoadley and Sons, Inc., titled "Flow Test Report", and dated October 20, 2025.
   a. A copy of the full report, consisting of 1 pages, follows this section.
6. Wetland Resource Area Analysis: Prepared by LEC Environmental Consultants, Inc., titled "Wetland Resource Area Analysis Report", and dated October 20, 2025.
   a. A copy of the full report, consisting of 17 pages, follows this section.
7. Geotechnical Report: Prepared by Lahlaf Geotechnical Consulting, Inc., titled "DD Phase Geotechnical Report", and dated January 14, 2026.
   a. A copy of the full report, consisting of 129 pages, follows this section.
8. Air Quality Report: Prepared by Universal Environmental Consultants, titled "Report for Outdoor Air Quality Testing", and dated January 16, 2026.
   a. A copy of the full report, consisting of 9 pages, follows this section.
9. Hazardous Material Inspection Services: Prepared by Universal Environmental Consultants, titled "Hazardous Material Inspection Services", and dated January 22, 2026.
   a. A copy of the full report, consisting of 1 pages, follows this section.
10. Traffic Impact Study: Prepared by Nitsch Engineering, titled "Traffic Impact Study", and dated December 9, 2024.
    a. Original copy is available for inspection at Owner's offices during normal business hours.
11. Traffic Impact Study: Prepared by Nitsch Engineering, titled "Traffic Impact Study", and dated November 20, 2025.
    a. Original copy is available for inspection at Owner's offices during normal business hours.
12. Environmental Site Assessment: Prepared by PEER Consultants, titled "Phase 1 Environmental Site Assessment", and dated November 30, 2025.
    a. Original copy is available for inspection at Owner's offices during normal business hours.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

UEC universal environmental consultants

October 10, 2023

Ms. Rani Phillip
Dore & Whittier Architects
260 Merrimac Street
Newburyport, MA 01950

Reference: Hazardous Materials Determination Survey
North Intermediate School, Wilmington, MA

Dear Ms. Phillip:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for Hazardous Materials determination survey at North Intermediate School, Wilmington, MA.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

_____
Ammar M. Dieb
President

UEC:\223 514.00\Report.DOC

Enclosure

REPORT
FOR
HAZARDOUS MATERIALS DETERMINATION
SURVEY
AT THE
NORTH INTERMEDIATE SCHOOL
WILMINGTON, MASSACHUSETTS

PROJECT NO: 223 514.00

Survey Dates:
January 20, 2012
October 3, 2023, October 9, 2023

SURVEY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 BREWSTER ROAD
FRAMINGHAM, MA 01702

INTRODUCTION:
UEC has been providing comprehensive asbestos services since 2001 and has completed projects throughout New England. We have completed projects for a variety of clients including commercial, industrial, municipal, and public and private schools. We maintain appropriate asbestos licenses and staff with a minimum of thirty-five years of experience.

UEC was contracted by Dore & Whittier Architects to conduct the following services at the North Intermediate School, Wilmington, MA:

- Inspection and Testing for Asbestos Containing Materials (ACM).
- Inspection for Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures.
- Inspection for PCB's-Caulking.
- Inspection for Lead Based Paint (LBP).
- Mercury in Rubber Flooring inspection and sampling.
- Airborne Mold inspection and sampling.
- Radon sampling.

A comprehensive survey per the Environmental Protection Agency (EPA) NESHAP regulation would be required prior to any renovation or demolition activities.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos, determination of types of ACM found and cost estimates for remediation. Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) in accordance with EPA standard. Bulk samples were collected by a Massachusetts licensed asbestos inspector Mr. Jason Becotte (AI-034963) and analyzed by a Massachusetts licensed laboratory EMSL, Woburn, MA.

Airborne mold samples were analyzed by an EPA trained laboratory EMSL, Woburn, MA.

Radon samples were analyzed by an EPA licensed laboratory AccuStar, Ward Hill, MA.

Refer to samples results.

FINDINGS:
Asbestos Containing Materials (ACM):
The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed. All suspect materials were grouped into homogenous areas. By definition a homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to be ACM based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount of 1 percent or greater in accordance with DEP regulations.

All suspect materials that contain any amount of asbestos must be considered asbestos if it is scheduled to be removed per the Department of Environmental Protection (DEP) regulations.

Number of Samples Collected
January 12, 2012
Eight (8) bulk samples were collected from materials suspected of containing asbestos, including:

Type and Location of Sample

1. Ceiling tile at hallway outside gymnasium
2. Ceiling plaster at hallway outside room 207
3. Ceiling plaster at hallway outside room 211

4. Ceiling tile at hallway outside room 104
5. Ceiling plaster at hallway outside room 105
6. Ceiling plaster at hallway outside room 107
7. Ceiling plaster at first floor bathroom
8. Ceiling tile at hallway outside office

Sample Results

Type and Location of Sample	**Sample Result**
1. Ceiling tile at hallway outside gymnasium	No Asbestos Detected
2. Ceiling plaster at hallway outside room 207	No Asbestos Detected
3. Ceiling plaster at hallway outside room 211	No Asbestos Detected
4. Ceiling tile at hallway outside room 104	No Asbestos Detected
5. Ceiling plaster at hallway outside room 105	No Asbestos Detected
6. Ceiling plaster at hallway outside room 107	No Asbestos Detected
7. Ceiling plaster at first floor bathroom	No Asbestos Detected
8. Ceiling tile at hallway outside office	No Asbestos Detected

October 9, 2023
Twelve (12) bulk samples were collected from materials suspected of containing asbestos, including:

Type and Location of Sample

1. Exterior new door framing caulking
2. Exterior new door framing caulking
3. Exterior old door framing lintel caulking
4. Exterior old door framing lintel caulking
5. Exterior window framing caulking
6. Exterior window framing caulking
7. Exterior window framing caulking
8. Exterior window glazing caulking
9. Exterior window glazing caulking
10. Exterior unit vent grille caulking
11. Exterior unit vent grille caulking
12. Exterior unit vent grille caulking

Sample Results

Type and Location of Sample	**Sample Result**
1. Exterior new door framing caulking	No Asbestos Detected
2. Exterior new door framing caulking	No Asbestos Detected
3. Exterior old door framing lintel caulking	5% Asbestos
4. Exterior old door framing lintel caulking	5% Asbestos
5. Exterior window framing caulking	No Asbestos Detected
6. Exterior window framing caulking	No Asbestos Detected
7. Exterior window framing caulking	No Asbestos Detected
8. Exterior window glazing caulking	No Asbestos Detected
9. Exterior window glazing caulking	No Asbestos Detected
10. Exterior unit vent grille caulking	5% Asbestos
11. Exterior unit vent grille caulking	5% Asbestos
12. Exterior unit vent grille caulking	5% Asbestos

Observations and Recommendations:
The condition of ACM is very important. ACM in good condition does not present a health issue unless it is disturbed. Therefore, it is not necessary to remediate ACM in good condition unless it will be disturbed through renovation, demolition, or other activity.

1. Lab countertop was assumed to contain asbestos.
2. Hard joint insulation was assumed to contain asbestos. The ACM was found at various locations within the school including crawl space. ACM debris was found in the crawl space.
3. Flexible connector was assumed to contain asbestos.
4. 9" x 9" Vinyl floor tile and mastic were assumed to contain asbestos.
5. Transite panels were assumed to contain asbestos.
6. Interior windows glazing caulking was assumed to contain asbestos.
7. Sink coating was assumed to contain asbestos.
8. Blackboard/tackboard glue was assumed to contain asbestos.
9. Exterior old door framing lintel caulking was found to contain asbestos.
10. Exterior unit vent grille caulking was found to contain asbestos.
11. Exterior window framing caulking was found to contain asbestos.
12. Exterior window glazing caulking was found to contain asbestos.
13. Exterior door framing caulking was found to contain asbestos.
14. Gymnasium hardwood flooring paper and mastic were assumed to contain asbestos.
15. Transite sewer pipe was assumed to contain asbestos.
16. Damproofing on exterior and foundation walls was assumed to exist and assumed to contain asbestos. A Non-Traditional Work Plan will be required to be prepared and submitted to the DEP for approval.
17. Roofing material was assumed to contain asbestos. Roofing material does not have to be removed by a licensed asbestos contractor. However, the Demolition/Roofing Contractor must comply with OSHA regulation during demolition and with state regulations for proper disposal. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval
18. All other suspect materials were found not to contain asbestos. Hidden ACM may be found during demolition activities.

Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures:
Observations and Conclusions
Visual inspection of various equipment such as light fixtures, thermostats, exit signs and switches was performed for the presence of PCB's and mercury. Ballasts in light fixtures were assumed not to contain PCB's since there were labels indicating that "No PCB's" was found. Tubes in light fixtures, thermostats, signs, and switches were assumed to contain mercury. It would be very costly to test those equipment and dismantling would be required to access. Therefore, the above-mentioned equipment should be disposed in an EPA approved landfill as part of the demolition project.

PCB's in Caulking:
Observations and Conclusions
Caulking was assumed to contain PCB's.

Lead Based Paint (LBP):
Observations and Conclusions
LBP was assumed to exit on painted surfaces. A school is not considered a regulated facility. All LBP activities performed, including waste disposal, should be in accordance with applicable Federal, State, or local laws, ordinances, codes or regulations governing evaluation and hazard reduction. In the event of discrepancies, the most protective requirements prevail. These requirements can be found in OSHA 29 CFR 1926-Construction Industry Standards, 29 CFR 1926.62-Construction Industry Lead Standards, 29 CFR 1910.1200-Hazards Communication, 40 CFR 261-EPA Regulations. According to OSHA, any amount of LBP triggers compliance.

Mercury in Rubber Flooring:
Observations and Conclusions:
No rubber flooring exists in the school.

Airborne Mold:
Airborne mold testing was performed utilizing Zefon International Incorporated's Air-O-Cell® sampling device following all manufacturer supplied recommended sampling procedures.

The Air-O-Cell® is a direct read total particulate air sampling device. It works using the inertial impaction principle similar to other spore trap devices. It is designed for the rapid collection and analysis of airborne particulate including bioaerosols. The particulate includes fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers) opaque particles (e.g. fly ash, combustion particles, copy toner, oil droplets, paint), and bioaerosols (e.g. mold spores, pollen, insect parts, skin cell fragments).[1]

The method involves drawing a known quantity of air through a sterile sampling cassette. Subsequent to sampling, the cassette is sealed and transferred to a microbiology laboratory under chain of custody protocol for microscopic analysis. This method counts both viable and nonviable mold spores.

AIRBORNE MOLD and PARTICULATE

Lab ID #	Location	Total Mold Counts/M^3	Pollen	Insect Fragment	Hyphal Fragments
132306392-0001	Cafeteria	1,900	40	ND	ND
132306392-0002	Office	220	ND	ND	ND
132306392-0003	Teacher's Lounge	310	ND	ND	ND
132306392-0004	Library	130	ND	ND	ND
132306392-0005	Room 100 Art	150	ND	ND	ND
132306392-0006	Room 103	60	ND	ND	ND
132306392-0007	Room 102	220	ND	ND	ND
132306392-0008	Room 107	3,150	ND	ND	ND
132306392-0009	Room 104	20	ND	ND	ND
132306392-0010	Outside	26,130	ND	ND	ND

AIRBORNE MOLD and PARTICULATE
(Subjective Scales)

Lab ID #	Location	Skin Fragment Density (SFD)	Fibrous Particulates (FP)	Total Background Particulate (TBP)
132306392-0001	Cafeteria	1	1	1
132306392-0002	Office	1	1	1
132306392-0003	Teacher's Lounge	1	1	1
132306392-0004	Library	1	1	1
132306392-0005	Room 100 Art	1	1	1

[1] Zefon International Inc. <www.zefon.com>

Lab ID #	Location	Skin Fragment Density (SFD)	Fibrous Particulates (FP)	Total Background Particulate (TBP)
132306392-0006	Room 103	1	1	1
132306392-0007	Room 102	1	1	1
132306392-0008	Room 107	1	1	1
132306392-0009	Room 104	1	1	1
132306392-0010	Outside	-	1	1

Legend:
ND - Not Detected

Observations:
There are currently no guidelines or standards promulgated by a government agency or widely recognized scientific organization for the interpretation of airborne mold spore levels. The most commonly employed tool used to assess if mold growth is occurring in a structure is to compare quantities and species of mold outdoors to indoor. If there were more mold indoor, and/or if species were present indoor which were not present outdoors, then growth is occurring, and remediation is recommended.

Based on comparisons with historical data from projects of similar type, building utilization, geographic location and season, the indoor airborne levels are considered very low. Indoor mold spore counts in the fall are typically in the 1,500-3,500-spores/cubic meter range.

Pollen, insect fragments and Hyphal fragments were either not present or low in the samples. Hyphal fragment is a non-reproductive part of the mold.

Total background particulate on all samples was assessed as “1” on a scale of 1-5 where 1 is low and 5 is high. Skin fragment density on all samples was assessed as “1” on a scale of 1-4 where 1 is low and 4 is high. The total background levels are measured to determine airborne dust not related to airborne mold. Skin fragments are measured to determine proper housing cleaning.

Radon:
Number of Samples Collected
Eight (8) air samples were collected at the following locations:

Location of Sample

1. Office
2. Teacher’s lounge
3. Library
4. Room 100
5. Room 103
6. Room 102
7. Room 107
8. Room 104

Location of Sample	Sample Result
1. Office	0.8 pCi\L
2. Teacher’s lounge	0.8 pCi\L
3. Library	1.4 pCi\L
4. Room 100	0.8 pCi\L

5. Room 103 0.7 pCi\L
6. Room 102 1.5 pCi\L
7. Room 107 2.6 pCi\L
8. Room 104 1.6 pCi\L

Observations and Conclusions:
The measured radon concentrations of the samples were found to be much lower than the EPA guideline of 4 picoCuris of radon per liter of air (pCi/L). No further action is required based on the results.

COST ESTIMATES:
The cost includes removal and disposal of all accessible ACM, other Asbestos Containing materials and an allowance for removal and disposal of inaccessible or hidden ACM that may be found during the demolition project.

Location	Material	Approximate Quantity	Cost Estimate ($)
Interior	Flooring Materials	32,000 SF	160,000.00
	Hard Joint Insulation	1,000 Total	30,000.00
	Hidden Hard Joint Insulation	Unknown	50,000.00
	Debris/Soil in Crawl Space	10,000 SF	30,000.00
	Transite Panels	18 Total	9,000.00
	Windows	70 Total	14,000.00
	Hardwood Flooring/Paper	4,500 SF	45,000.00
	Lab Counter Tops	14 Total	7,000.00
	Flexible Connecters	16 Total	3,200.00
	Chalkboards/Tackboards	42 Total	16,800.00
	Miscellaneous Hazardous Materials	Unknown	25,000.00
Exterior	Lintel Caulking	50 LF	2,500.00
	Old Doors	3 Total	1,500.00
	Expansion Joint Caulking	120 LF	3,600.00
	Transite Sewer Pipes	Unknown[1]	50,000.00
	Damproofing on Walls	2,500 Tons[1]	700,000.00
	Roofing Materials	Unknown	75,000.00
Estimated costs for NESHAP Inspection and Testing Services			17,500.00
Estimated costs for Design, Construction Monitoring and Air Sampling Services			155,900.00
		TOTAL:	***1,400,000.00***
		TOTAL:	***1,650,000.00***[2]

[1]: Part of total demolition and site work.
[3]: Work to be Performed by a C.M at Risk Contractor.

DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:
Asbestos:
Bulk material samples were analyzed using PLM and dispersion staining techniques with EPA /600/R-93/116 method.

Airborne Mold:
The samples were analyzed by an EPA approved laboratory EMSL, Woburn, MA.

Radon:
Radon samples were analyzed by an EPA licensed laboratory AccuStar, Ward Hill, MA.

LIMITATIONS AND CONDITIONS:
This report has been completed based on visual and physical observations made and information available at the time of the site visits, as well as an interview with the Owner's representatives. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state, and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

Inspected By:

_____

Jason Becotte
Asbestos Inspector

131200321

131200321

ENVIROTEST LABORATORY, Inc.

639 Washington Street, Dedham, MA 02026 Tel 781-329-1133 Fax 781-329-1177

SAMPLE SHEET

Project Name: Town of Wilmington

Project Address: North Intermediate School
Wilmington

Contact: George Hooper

TURN-AROUND TIME: ☐ RUSH ☒ 24 HOURS ☐ 48 HOURS ☐ > 48 HOURS

Sample Date	Sample Number	Sample Location	Sample Description	Layer
1/20	N-1	Hall outside gym	Ceiling Tile	
	N-2	Hall outside Room 207	Ceiling Plaster	
	N-3	Hall outside Room 211	Ceiling Plaster	
	N-4	Hall outside Room 104	Ceiling Tile	
	N-5	Hall outside Room 105	Ceiling Plaster	
	N-6	Hall outside Room 107	Ceiling Plaster	
	N-7	1st Floor Boys Bathroom	Ceiling Plaster	
	N-8	Hall outside Office	Ceiling Tile	

RECEIVED
JAN 20 2012
By AK 1445

Relinquished by:
Date:
Time:

Received By:
Date:
Time:

EMSL Analytical, Inc.
7 Constitution Way, Suite 107, Woburn, MA 01801
Phone: (781) 933-8411 Fax: (781) 933-8412 Email: bostonlab@emsl.com

Attn: **Mark Gorham**
Envirotest Laboratory
639 Washington Street
Dedham, MA 02026

Fax: (781) 329-1177 Phone: (781) 329-1133

Project: **Town of Wilmington; North Intermediate School; Wilmington**

Customer ID: ENVT56
Customer PO:
Received: 01/20/12 2:45 PM
EMSL Order: 131200321

EMSL Proj:
Analysis Date: 1/24/2012

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
N-1 *131200321-0001*	Hall Outside Gym - Ceiling Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-2 *131200321-0002*	Hall Outside Room 207 - Ceiling Plaster	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-3 *131200321-0003*	Hall Outside Room 211 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-4 *131200321-0004*	Hall Outside Room 104 - Ceiling Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-5 *131200321-0005*	Hall Outside Room 105 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-6 *131200321-0006*	Hall Outside Room 107 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
N-7 *131200321-0007*	1st Fl Boys Bathroom - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Initial report from 01/24/2012 10:26:07

Analyst(s)

Kevin Pine (8)

Renaldo Drakes, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as < 1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available available upong request

Samples analyzed by EMSL Analytical, Inc. Woburn, MA NVLAP Lab Code 101147-0, CT PH-0315, MA AA000188, RI AAL-10713 and VT AL357102

EMSL Analytical, Inc.
7 Constitution Way, Suite 107, Woburn, MA 01801
Phone: (781) 933-8411 Fax: (781) 933-8412 Email: bostonlab@emsl.com

Attn: **Mark Gorham**
Envirotest Laboratory
639 Washington Street
Dedham, MA 02026

Fax: (781) 329-1177 Phone: (781) 329-1133

Project: **Town of Wilmington; North Intermediate School; Wilmington**

Customer ID: ENVT56
Customer PO:
Received: 01/20/12 2:45 PM
EMSL Order: 131200321

EMSL Proj:
Analysis Date: 1/24/2012

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	Description	Appearance	% Fibrous		% Non-Fibrous	% Type
N-8 *131200321-0008*	Hall Outside Office - Ceiling Tile	Gray Fibrous Homogeneous	80%	Min. Wool	20% Non-fibrous (other)	None Detected

Initial report from 01/24/2012 10:26:07

Analyst(s)

Kevin Pine (8)

Renaldo Drakes, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available available upong request

Samples analyzed by EMSL Analytical, Inc. Woburn, MA NVLAP Lab Code 101147-0, CT PH-0315, MA AA000188, RI AAL-10713 and VT AL357102

THIS IS THE LAST PAGE OF THE REPORT.

OrderID: 132306525

132306525

CHAIN OF CUSTODY

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM

24-hour TAT

Town/City: Wilmington, MA Building Name North Intermediate School

Sample	Description of Material	Sample Location
1	New Door Frame caulk	exterior door
2	" "	" "
3	old door caulk at Lintel	" "
4	" "	" "
5	window Frame Caulk	exterior window
6	" "	" "
7	" "	" "
8	window Glaze	" "
9	" "	" "
10	Unit vent Grill caulk	exterior vent Grill
11	" "	" "
12	" "	" "

Reported By: Jason Becotte Date: 10-9-23 Due Date: **24-Hours**

Received By: ---------- Date: ----------

REC'D EMSL-BOSTON OCT 09 2023 1300

wainin

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order:	132306525
Customer ID:	UEC63
Customer PO:	
Project ID:	

Attention:	Ammar Dieb	**Phone:**	(617) 984-9772
	Universal Environmental Consultants	**Fax:**	(508) 628-5488
	12 Brewster Road	**Received Date:**	10/09/2023 1:00 PM
	Framingham, MA 01702	**Analysis Date:**	10/10/2023
		Collected Date:	10/09/2023

Project: North Intermediate School; Wilmington, MA

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
1 *132306525-0001*	Exterior Door - New Door Frame Caulk	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2 *132306525-0002*	Exterior Door - New Door Frame Caulk	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
3 *132306525-0003*	Exterior Door - Old Door Caulk at Lintel	Tan Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
4 *132306525-0004*	Exterior Door - Old Door Caulk at Lintel	Tan Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
5 *132306525-0005*	Exterior Window - Window Frame Caulk	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
6 *132306525-0006*	Exterior Window - Window Frame Caulk	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7 *132306525-0007*	Exterior Window - Window Frame Caulk	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
8 *132306525-0008*	Exterior Window - Window Glaze	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
9 *132306525-0009*	Exterior Window - Window Glaze	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
10 *132306525-0010*	Exterior Vent Grill - Unit Vent Grill Caulk	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
11 *132306525-0011*	Exterior Vent Grill - Unit Vent Grill Caulk	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
12 *132306525-0012*	Exterior Vent Grill - Unit Vent Grill Caulk	Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile

Initial report from: 10/10/2023 11:30:39

EMSL Analytical, Inc.
5 Constitution Way, Unit A Woburn, MA 01801
Tel/Fax: (781) 933-8411 / (781) 933-8412
http://www.EMSL.com / bostonlab@emsl.com

EMSL Order:	132306525
Customer ID:	UEC63
Customer PO:	
Project ID:	

Analyst(s)
John McCarthy (12)

Steve Grise, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA NVLAP Lab Code 101147-0, CT PH-0315, MA AA000188, RI AAL-139, VT AL998919, ME LB-0039

Initial report from: 10/10/2023 11:30:39

OrderID: 132306392

UEC universal environmental consultants
12 Brewster Road
Framingham, MA 01702
Phone: 508.628.5486
Fax: 508.628.5488

132306392

CHAIN OF CUSTODY

BUILDING / SITE NAME: North Intermediate School
WORK AREA:
TOWN / CITY: Wilmington
STATE: MA

Analysis Type	Turnaround Time (x) 6-8 Hr	12 Hr	24 Hr	48 Hr	72 hr
TEM / AHERA					
TEM / Level II					
TEM / Dust					
TEM / Bulk					
TEM / Water					
PLM					
Mold			X		
Other:					

Specific Project Notes

SAMPLE ID	MATERIAL DESCRIPTION	SAMPLE LOCATION	START	STOP	TIME	L/MIN	VOLUME
1	3694 8309	Cafeteria	6:19	6:29	10	15	150
2	3694 8320	Mrs. Mangani's Office	6:20	6:30	10	15	150
3	3694 8310	Teachers Lounge	6:25	6:35	10	15	150
4	3694 8308	Library	6:31	6:41	10	15	150
5	3694 8305	Room 100 Art	6:35	6:45	10	15	150
6	3694 8306	Room 103	6:37	6:47	10	15	150
7	3694 8298	Room 102	6:43	6:53	10	15	150
8	3694 8304	Room 107	6:47	6:57	10	15	150
9	3694 8307	Room 104	6:49	6:59	10	15	150
10	3694 8316	Outside	7:23	7:33	10	15	150

SAMPLED BY: Sydney Faure 10/3/23 7:38 PM	DATE/TIME:	RECEIVED BY:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	RECEIVED IN LAB BY:	DATE/TIME:

REC'D EMSL-BOSTON OCT 04 2023
RHB-0830
DMH Bkg

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 132306392
Customer ID: UEC63
Customer PO:
Project ID:

Attention: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected Date: 10/03/2023
Received Date: 10/04/2023 08:30 AM
Analyzed Date: 10/05/2023

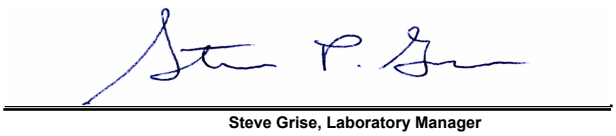
Project: North Intermediate School; Wilmington, MA

Test Report:Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	132306392-0001			132306392-0002			132306392-0003		
Client Sample ID:	1			2			3		
Volume (L):	150			150			150		
Sample Location:	Cafeteria			Mrs. Mangan's Office			Teachers Lounge		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	7	100	45.5	-	-	-
Basidiospores	84	1800	94.7	5	100	45.5	10	210	67.7
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	6	100	5.3	-	-	-	7	100	32.3
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	1	20	9.1	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**90**	**1900**	**100**	**13**	**220**	**100**	**17**	**310**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	2	40	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	21	-	-	21	-	-	21	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.



Steve Grise, Laboratory Manager
or other Approved Signatory

Skin Fragment and Fibrous Particulate ratings are based on the percent of non-fungal material they represent: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Background ratings are based on the total area covered by non-fungal particles: 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-99%), or 5 (100%; overloaded, prohibiting accurate detection and quantification). High levels of background will obscure spores and other particulates, leading to underestimation. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA LAP, LLC-EMLAP Accredited #180179

Initial report from: 10/05/2023 10:04 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.
5 Constitution Way, Unit A Woburn, MA 01801
Tel/Fax: (781) 933-8411 / (781) 933-8412
http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 132306392
Customer ID: UEC63
Customer PO:
Project ID:

Attention: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected Date: 10/03/2023
Received Date: 10/04/2023 08:30 AM
Analyzed Date: 10/05/2023

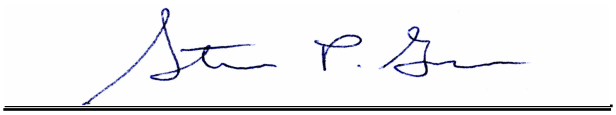
Project: North Intermediate School; Wilmington, MA

Test Report:Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	132306392-0004			132306392-0005			132306392-0006		
Client Sample ID:	4			5			6		
Volume (L):	150			150			150		
Sample Location:	Library			Room 100 Art			Room 103		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	2	40	30.8	4	90	60	-	-	-
Basidiospores	4	90	69.2	2	40	26.7	1	20	33.3
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	1	20	13.3	2	40	66.7
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**6**	**130**	**100**	**7**	**150**	**100**	**3**	**60**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	21	-	-	21	-	-	21	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.



Steve Grise, Laboratory Manager
or other Approved Signatory

Skin Fragment and Fibrous Particulate ratings are based on the percent of non-fungal material they represent: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Background ratings are based on the total area covered by non-fungal particles: 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-99%), or 5 (100%; overloaded, prohibiting accurate detection and quantification). High levels of background will obscure spores and other particulates, leading to underestimation. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA LAP, LLC-EMLAP Accredited #180179

Initial report from: 10/05/2023 10:04 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 132306392
Customer ID: UEC63
Customer PO:
Project ID:

Attention: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected Date: 10/03/2023
Received Date: 10/04/2023 08:30 AM
Analyzed Date: 10/05/2023

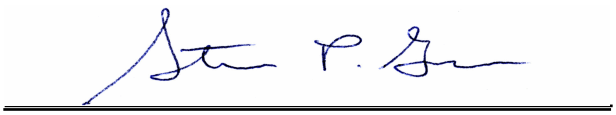
Project: North Intermediate School; Wilmington, MA

Test Report:Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	132306392-0007			132306392-0008			132306392-0009		
Client Sample ID:	7			8			9		
Volume (L):	150			150			150		
Sample Location:	Room 102			Room 107			Room 104		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	1	20	9.1	14	300	9.5	-	-	-
Basidiospores	7	100	45.5	129	2750	87.3	1	20	100
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	5	100	45.5	3	60	1.9	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	2	40	1.3	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**13**	**220**	**100**	**148**	**3150**	**100**	**1**	**20**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	21	-	-	21	-	-	21	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.



Steve Grise, Laboratory Manager
or other Approved Signatory

Skin Fragment and Fibrous Particulate ratings are based on the percent of non-fungal material they represent: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Background ratings are based on the total area covered by non-fungal particles: 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-99%), or 5 (100%; overloaded, prohibiting accurate detection and quantification). High levels of background will obscure spores and other particulates, leading to underestimation. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA LAP, LLC-EMLAP Accredited #180179

Initial report from: 10/05/2023 10:04 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 132306392
Customer ID: UEC63
Customer PO:
Project ID:

Attention: Ammar Dieb
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Phone: (617) 984-9772
Fax: (508) 628-5488
Collected Date: 10/03/2023
Received Date: 10/04/2023 08:30 AM
Analyzed Date: 10/05/2023

Project: North Intermediate School; Wilmington, MA

Test Report:Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	**132306392-0010**		
Client Sample ID:	**10**		
Volume (L):	**150**		
Sample Location:	**Outside**		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-
Ascospores	-	-	-
Aspergillus/Penicillium	-	-	-
Basidiospores	1190	25400	97.2
Bipolaris++	-	-	-
Chaetomium++	-	-	-
Cladosporium	22	470	1.8
Curvularia	-	-	-
Epicoccum	-	-	-
Fusarium++	-	-	-
Ganoderma	-	-	-
Myxomycetes++	11	240	0.9
Pithomyces++	-	-	-
Rust	-	-	-
Scopulariopsis/Microascus	-	-	-
Stachybotrys/Memnoniella	-	-	-
Unidentifiable Spores	1	20	0.1
Zygomycetes	-	-	-
Total Fungi	**1224**	**26130**	**100**
Hyphal Fragment	-	-	-
Insect Fragment	-	-	-
Pollen	-	-	-
Analyt. Sensitivity 600x	-	21	-
Analyt. Sensitivity 300x	-	7*	-
Skin Fragments (1-4)	-	-	-
Fibrous Particulate (1-4)	-	1	-
Background (1-5)	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Steve Grise, Laboratory Manager
or other Approved Signatory

Skin Fragment and Fibrous Particulate ratings are based on the percent of non-fungal material they represent: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Background ratings are based on the total area covered by non-fungal particles: 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-99%), or 5 (100%; overloaded, prohibiting accurate detection and quantification). High levels of background will obscure spores and other particulates, leading to underestimation. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA AIHA LAP, LLC-EMLAP Accredited #180179

Initial report from: 10/05/2023 10:04 AM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

AccuStar

Professional Radon Laboratory Services Since 1984

Radon in Air

NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Liquid Scintillation
NRPP Device Code 8088
NRSB Device Code 12193

Laboratory Report for:

Universal Environmental Consultant
12 Brewster Road
Framingham MA 01702

Property Tested:

North Intermediate School
320 Salem Street
Wilmington MA 01887

Log Number	Device Number	Test Exposure Duration:				Area Tested	Result pCi/L
8431175	4963395	10/03/2023	7:10 am	10/06/2023	10:52 am	Mrs. Manga i's Office	0.8
8431176	4963396	10/03/2023	7:11 am	10/06/2023	10:53 am	Teacher's Lounge	0.8
8431177	4963397	10/03/2023	7:06 am	10/06/2023	10:55 am	Library	1.4
8431178	4963398	10/03/2023	7:05 am	10/06/2023	10:56 am	Room 100 Art	0.8
8431179	4963399	10/03/2023	7:03 am	10/06/2023	10:57 am	Room 103	0.7
8431180	4963400	10/03/2023	6:58 am	10/06/2023	10:58 am	Room 102	1.5
8431181	4963401	10/03/2023	6:59 am	10/06/2023	10:59 am	Room 107	2.6
8431182	4963402	10/03/2023	7:01 am	10/06/2023	11:01 am	Room 104	1.6

Comment: Universal Environmental Consultant was emailed a copy of this report.

Test Performed By: Placed: Sydney Towne Retrieved: Sydney Towne

Distributed by: Universal Environmental Consultant

Date Received: 10/06/2023 Date Logged: 10/06/2023 Date Analyzed: 10/07/2023 Date Reported: 10/09/2023

Report Reviewed By: Elizabeth Negre Report Approved By:

Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:

The counting uncertainty of this radon measurement is ~+/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Laboratory personnel were not involved in the placement or retrieval of the samples. Analytical results relate to the samples as received by the laboratory. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.

PEER
CONSULTANTS, P.C.
Est. 1978

25 Mall Road, Suite 206 • Burlington, MA 01803
Phone: 781-238-8880 • Fax: 781-238-8884 • www.peercpc.com

Engineers • Scientists • Planners

November 15, 2024

Rani Philip, Assoc. AIA
Project Manager
DORE + WHITTIER
260 Merrimac Street
Newburyport, Massachusetts 01950

Re: WILMINGTON – WILDWOOD SCHOOL @ NORTH INTERMEDIATE SCHOOL
320 Salem Street, Wilmington, MA 01887
Limited Subsurface Soil Investigation Memorandum

Dear Ms. Philip:

PEER Consultants P.C. (PEER) completed an initial review of the environmental laboratory analytical results for the initial eight (8) combined geotechnical/geo-environmental borings completed at the North Intermediate School location on October 28, 2024 and October 29, 2024. The weather on October 28, 2024 was partly cloudy to sunny, and the temperature ranged from 34°F to 51°F. The weather on October 29, 2024 was cloudy with haze (smoke), and the temperature ranged from 36°F to 40°F. PEER understands that Soil X was the drilling contractor on the project site, and utilized a Dietrich D70 Turbo Track-Mounted Drill Rig, with hollow stem augers (and no drive and wash) to complete the borings. Soil X was represented by a driller, and driller's assistance. Lahlaf Geotechnical Consulting, Inc., the geotechnical contractor, was represented by Mr. Berke Hatipoglu. PEER was represented by Mr. Dave Gorden, Board Certified Environmental Scientist and Certified Professional Soil Scientist.

During the limited subsurface soil investigation at the North Intermediate School, combined with limited recovery of soil within the split spoons, PEER collected nine (9) separate, composited soil samples from specific boring depths, and/or from across multiple nearby borings, and related to an investigation for the presence or absence of pesticides and/or herbicides in Topsoil (TS) material, and related to an investigation of soil conditions for disposal pre-characterization purposes in Dry Native / Reworked Native / Suspected Imported Similar (DRY) material, and related to an investigation of soil conditions for disposal pre-characterization purposes in Wet Native (WET) material.

Please note that PEER considered reworked native soil to be soil which visually appeared similar to soil on the project site, and soil which was suspected of having been excavated during the development of the existing school, and then redeposited on the surface of other areas of the project site.

PEER selected representative aliquots of soil from the top soil (TS) of each one of the borings B1 through B8, at a depth, in general, from 0-2' (or consisting of the dark brown to black portion of the top soil) to be analyzed for Pesticides and Herbicides [**B1B8 TS**]. Please note that on November 13, 2024, subsequent to PEER receiving the analytical results for the entire sample delivery group from the analytical laboratory, PEER also requested that the analytical laboratory determine the concentration of arsenic in the sample [**B1B8 TS**].

PEER selected soil from the dry (not within the groundwater table) native soil / reworked native soil / suspect imported similar soil to be analyzed for Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), Metals, Polychlorinated Biphenyls (PCBs), Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO) {C10-C28}, and TPH Gasoline Range Organics (GRO) {C6-C10}, and for General Chemistry parameters such as Percent Solids, Conductivity, Corrosivity (pH), Flashpoint/Ignitability, Reactive Cyanide, and Reactive Sulfide.

Due to the predominance of visually similar soil across the completed borings down to the boring termination depth, PEER collected analytical samples for the above parameters based on the following depth intervals:

- **B3B4B5 DRY** was composited (including representative aliquots of) soil from Boring B3 at depths of 0-2', 2-4', and 4-6'; from Boring B4 at depths of 0-2', 2-2.9', and 4-6'; and from Boring B5 at depths of 0-2' and 4-6'. This composited sample did not include the dark brown to black portion of the top soil.
- **B1 DRY** was composited (including representative aliquots of) soil from Boring B1 at depths of 0-2' and 2-4'. This composited sample did not include the dark brown to black portion of the top soil.
- **B2 DRY** was composited (including representative aliquots of) soil from Boring B2 at depths of 0-2', 2-4', and 4-6'. This composited sample did not include the dark brown to black portion of the top soil.
- **B6 DRY** was composited (including representative aliquots of) soil from Boring B6 at depths of 0-2', 2-4', and 4-6'. This composited sample did not include the dark brown to black portion of the top soil.
- **B8 DRY** was composited (including representative aliquots of) soil from Boring B8 at depths of 0-2', 2-4', 4-6', and 6-8'. This composited sample did not include the dark brown to black portion of the top soil.

PEER selected soil from the presumed wet (due to groundwater) native soil to be analyzed for VOCs, SVOCs, Metals, PCBs, TPH DRO, TPH GRO, and for General Chemistry parameters such as Percent Solids, Conductivity, Corrosivity (pH), Flashpoint/Ignitability, Reactive Cyanide, and Reactive Sulfide.

Due to the predominance of visually similar soil across the completed borings at or below the groundwater table, and down to the boring termination depth, PEER collected analytical samples for the above parameters based on the following depth intervals:

- **B6B8 WET** was composited (included representative aliquots of) soil from Boring B6 at depths of 9-11' and 14-16'; and from Boring B8 at depths of 9-11' and 14-16'.
- **B1B7 WET** was composited (including representative aliquots of) soil from Boring B1 at depths of 9-11' and 14-16'; and from Boring B7 at depths of 8-10', 10-12', and 14-16'.
- **B2 WET** was composited (included representative aliquots of) soil from Boring B2 at depths of 6-8', 9-11', and 14-16'.

PEER reviewed the textural and moisture conditions for each of the eight borings. PEER identified the following conditions in the subsurface soil:

- In general, soil from **Boring B1** consisted of material consisting of sand and gravel to at least 4 feet. The origin of this material (fill versus reworked native versus native) could be determined as the split spoon had no recovery for the 4-6' interval. However, soil from Boring B1 consisted of suspect native clayey silt to silty clay to clay from 6 feet to 11 feet, and suspect native sand and gravel to 19 feet, then suspect bedrock at 19 feet, and auger refusal at 19 feet. Groundwater indicators were observed at approximately between 8 feet and 9 feet.

- In general, soil from **Boring B2** consisted of suspect fill (sand) to 3 feet (with buried top soil observed at approximately 3 feet), then suspect native sand and gravel (with trace clay at depths) to 19.1 feet, then suspect bedrock at 19.1 feet, and auger refusal at 19.1 feet. Groundwater indicators were observed at approximately 6 feet.

- In general, soil from **Boring B3** consisted of suspect reworked native sand and gravel to 2 feet, then suspect native sand and gravel to 8 feet, then suspect bedrock at 9 feet, and auger refusal at 10.5 feet. Groundwater indicators were not observed.

- In general, soil from **Boring B4** consisted of suspect fill (sand) to 2.9 feet, then suspect native silty sand and a suspect weathered cobble to 9.7 feet, then suspect bedrock at 11 feet, and auger refusal at 11 feet. Remnant groundwater indicators (mottling) in a moist soil matrix were observed at approximately 6 feet.

- In general, soil from **Boring B5** consisted of suspect fill (sand) to 4 feet (with buried top soil observed at approximately 4 feet), then suspect native silty sand to 9 feet, then suspect bedrock at 9 feet, and auger refusal at 10 feet. Remnant groundwater indicators (mottling) in a moist soil matrix were observed at approximately 6 feet.

- In general, soil from **Boring B6** consisted of suspect fill (sand) to 2 feet, then suspect native sand and gravel to 19 feet, then suspect bedrock at 19 feet, and auger refusal at 19.7 feet. Groundwater indicators were observed at approximately 6.2 feet.

- In general, soil from **Boring B7** consisted of suspect fill (sand) to 4 feet (with buried organics observed between approximately 4 feet to 8 feet), then suspect native sand and gravel to 20.2 feet, then suspect bedrock at 20.2 feet, and auger refusal at 20.2 feet. Groundwater indicators were observed at approximately 8 feet.

- In general, soil from **Boring B8** consisted of suspect fill (sand) to 1 foot, then suspect native sand and gravel to 19.8 feet, and auger refusal at 19.8 feet. Groundwater indicators were observed at approximately between 8 feet and 9 feet.

PEER estimated and documented a global positioning system (GPS) point for each boring based on an open source electronic application; therefore, the location of each soil boring, as estimated in the below Google Earth image is considered approximate only.

Wildwood School @ North Intermediate School, Wilmington, MA
(North is Up)

PEER compared the laboratory analytical results to Massachusetts Department of Environmental Protection (MADEP) Policy # COMM-97-001, Reuse and Disposal of Contaminated Soil at Massachusetts Landfills, August 1997. PEER also compared the laboratory analytical results to 310 CMR 40.00, the Massachusetts Contingency Plan (MCP) reporting category RCS-1 and reporting category RCS-2. General chemistry laboratory results were separately compared with RCRA Characteristics under 40 CFR 261. Additional discussions pertaining to the comparison of soil analytical results may be found in the paragraphs below.

The following information provides a summary of the laboratory analytical results from soil samples collected by PEER on October 28, 2024 and October 29, 2024. Please refer to Attachment A for a summary of the detected analytes, in surface and subsurface soil. The samples were kept under chain of custody by PEER, and in a cooler with ice packs, until Phoenix Environmental Laboratories, Inc. (Phoenix), of Manchester, CT couriered the samples back to their office on October 30, 2024. PEER received the Analysis Report from Phoenix with the test results on November 6, 2024. PEER received an updated Analysis Report from Phoenix which also included the test results for arsenic in sample **B1B8 TS** on November 14, 2024. Please refer to Attachment B for the November 14, 2024 Phoenix Analysis Report.

VOCs

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, there were no detections of individual VOCs. In addition, there were no exceedances of the MCP RCS-1 Criteria for an individual VOC, and there were no exceedances of the MCP RCS-2 Criteria for an individual VOC. Furthermore, there were no exceedances of Total VOCs for acceptance at a lined landfill, and there were no exceedances of Total VOCs for acceptance at an unlined landfill. VOCs were not detected. VOCs were also not detected in the Trip Blanks for the day. **Refer to Table 1A** within Attachment A.

SVOCs

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, there were no detections of individual SVOCs. In addition, there were no exceedances of the MCP RCS-1 Criteria for an individual SVOC, and there were no exceedances of the MCP RCS-2 Criteria for an individual SVOC. Furthermore, there were no exceedances of Total SVOCs for acceptance at a lined landfill, and there were no exceedances of Total SVOCs for acceptance at an unlined landfill. SVOCs were not detected. **Refer to Table 1B** within Attachment A.

Metals

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; and B1B7 WET, there were neither exceedances of the MCP RCS-1 Criteria for individual Metals nor exceedances of the MCP RCS-2 Criteria for individual Metals. In addition, there were neither exceedances of Metals for acceptance at a lined landfill nor exceedances of Metals for acceptance at an unlined landfill.

Of the 14 metals analyzed for in Samples B3B4B5 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, only eight metals were detected. Nine of 14 metals were detected in Sample B1 DRY.

For Samples B8 DRY; B6B8 WET; and B2 WET, there was each one exceedance of the MCP RCS-1 Criteria for one individual metal (arsenic) and one exceedance of the MCP RCS-2 Criteria for one individual metal (arsenic). However, for Samples B8 DRY; B6B8 WET; and B2 WET, there were neither exceedances of Metals for acceptance at a lined landfill nor exceedances of Metals for acceptance at an unlined landfill.

For Samples B6 DRY; B6B8 WET; and B2 WET, there was each one exceedance of the MCP RCS-1 Criteria for one individual metal (arsenic) and one exceedance of the MCP RCS-2 Criteria for one individual metal (arsenic).

For Sample B6 DRY, there was one exceedance of the MCP RCS-1 Criteria for one individual metal (arsenic) and one exceedance of the MCP RCS-2 Criteria for one individual metal (arsenic). In addition, for Sample B6 DRY, there was one exceedance of a metal (arsenic) for acceptance at a lined landfill and one exceedance of a metal (arsenic) for acceptance at an unlined landfill.

Based on the above exceedances of arsenic, PEER requested that Phoenix analyze Sample B1B8 TS for arsenic. Arsenic was detected, however, for arsenic in this sample, there were neither exceedances of the MCP RCS-1 Criteria nor exceedances of the MCP RCS-2 Criteria. In addition, for arsenic in this sample, there were neither exceedances for acceptance at a lined landfill nor exceedances for acceptance at an unlined landfill. **Refer to Table 1C** within Attachment A.

PEER notes that spatially, borings B2, B8, and B6 are oriented in a linear shape from north to south across the Property, with one additional boring each (proposed, yet not completed as part of the Geotechnical program) to the east and west of this linear shape.

PEER notes that according to an abstract for the publication “Arsenic In Central Massachusetts Bedrock And Groundwater”, 2010, Authors: McTigue, DF, Stein, CL, Brandon, WC, Kopera, JP, Keskula, AJ, Koteas, CG, the authors cite the following:

> Across the New England "arsenic belt," groundwater arsenic (As) concentrations often exceed the EPA's 0.01-mg/L drinking water standard. In overburden groundwater at a site within this belt in north-central Massachusetts, As has been reported at levels up to 7.6 mg/L. Bedrock at the site consists of Silurian Central Maine Terrane metasediments intruded by the Devonian Ayer granodiorite and Chelmsford granite. Exchange of hydrothermal fluids between these lithologies during intrusion and later deformation, faulting, and metamorphism resulted in crystallization of arsenic-bearing minerals, including arsenopyrite. Quaternary deglaciation and unloading dilated joint systems in the bedrock, allowing increased exposure of the

> mineralogy to meteoric water. Several arsenopyrite alteration products (e.g., scorodite), of varying solubilities, precipitated on fracture surfaces and along grain boundaries between major phases. In the emerging conceptual model for this site, groundwater is recharged in bedrock uplands and moves downgradient through the fracture network, becoming increasingly reducing as it moves along a flow path. Arsenic dissolved from arsenopyrite and arsenic-bearing alteration phases in bedrock remains in solution until the groundwater discharges to lowland areas hydraulically downgradient. In these adjacent lowlands, glacial sand and gravel overburden lies above the bedrock. When the reducing water reaches more oxidizing conditions, As-sorbing hydrous ferric oxides (HFO) precipitate out on the aquifer solids, resulting in accumulation of As in the deep overburden aquifer. A large landfill at this site, now closed and capped, imposed reducing conditions, and As is mobilized into groundwater by reductive dissolution of the HFO. The presence of elevated As in groundwater is consistent with arsenic-bearing phases generated in granitoids at depth during regional metamorphism, which were subsequently altered, and are being solubilized at present by the circulation of shallow groundwater through varying redox environments. This scenario is supported by geochemical and petrographic studies of the granitoids and the occurrence of the highest groundwater and soil arsenic concentrations in the adjacent deep overburden.

PEER notes that the abstract references the term “site”; however, the abstract referenced “site” should not be confused with the Wildwood School at North Intermediate School project location. PEER also notes that the study referenced above is referred to as occurring in the “Primary Study Area”.

PEER further notes that according to the publication "Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts - Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps", by the United States Geological Service, prepared in cooperation with the Massachusetts Department of Environmental Protection and the Massachusetts Department of Public Health, and dated 2011, the authors cite the following:

> The study encompasses the east-central arsenic belt in Massachusetts, the location of nearly all contamination of bedrock wells in the State by arsenic from a natural source. Arsenic has long been known to be present in water from bedrock wells in east-central Massachusetts, and the State straddles an arsenic belt that extends from Connecticut to New Brunswick, Canada. The distribution of bedrock units of crystalline igneous and metamorphic rocks in the study area is complex. The study area is crossed by major faults that divide parts of three geologic terranes that include the Merrimack belt, the Nashoba zone and the Milford-Dedham zone. The Primary Study Area includes most of the Merrimack belt, which extends from the Connecticut Valley belt (indicated by the Merrimack belt western boundary) to the Clinton-Newbury fault, and the western half of the Nashoba zone, which extends from the Clinton-Newbury fault to the Bloody Bluff fault. The Secondary Study Area includes the remainder of the Nashoba zone and the western edge of the Milford-Dedham zone, which begins at the Bloody Bluff fault and extends to the east.

PEER also notes that the study referenced above is referred to as occurring both in the “Primary Study Area” and in the “Secondary Study Area”.

In addition, according to a Probability of Exceeding the Arsenic Drinking Water Standard in Private Drinking Water Wells in Massachusetts, a Map which accompanies / compliments the Publication above, Wilmington in general appears in the ORANGE highlighted Section, inferring that Wilmington has a 5-10% probability of exceeding the public drinking water standard (of 10 parts per billion) for Arsenic in its groundwater. Refer to Attachment C for a copy of this Map.

PEER notes that the slightly elevated concentration of arsenic occurred in two soil samples above the groundwater table and occurred in two soil samples within the groundwater, at locations associated with playing fields which also receive irrigation. PEER understands that Mr. Jamie Magaldi, Wilmington Public Works Director, has indicated that the irrigation system at the North Intermediate runs off of a deep bedrock well (and) the pump house is the brick building (along the western edge of the Property), with two irrigation well points, one near the pump house marked with an irrigation box, and the second along the northwestern edge of the Property, and suspected of being buried.

The presence of arsenic in soil (above the groundwater table), suspected of being formed (i.e., parent material) from the bedrock of the region; combined with the presence of arsenic in soil (above the groundwater table), suspected of being irrigated with groundwater from a deep bedrock well; combined with consideration of the proximity of the irrigation system sprinkler heads to the specific boring locations; and combined with the presence of arsenic in soil within the groundwater table – from this project site, which is located in Wilmington, (i.e., in an arsenic belt in east central Massachusetts), may lend itself to the rationale outlined in the two studies cited above.

Furthermore, the Natural Resource Conservation Service (NRCS) Web Soil Survey indicates that the soil series of Deerfield loamy fine sand, 0 to 3 percent slopes, from parent materials consisting of sandy outwash derived from granite, gneiss, and/or quartzite occurs near boring B2 and B6. The NRCS Web Soil Survey also indicates that the soil series of Udorthents, sandy, from parent materials consisting of loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till occurs near boring B6 and B8.

The Surficial Materials Map of the Wilmington Quadrangle, Massachusetts (2018) indicates that the surficial material at this project site consists of:

> "coarse deposits which consist of gravel deposits, sand and gravel deposits, and sand deposits, not differentiated in this report. Gravel deposits are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to post depositional collapse related to melting of ice. Sand and gravel deposits occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to post depositional collapse. Sand deposits are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay."

PCBs

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, there were neither exceedances of the MCP RCS-1 Criteria for individual Aroclors nor exceedances of the MCP RCS-2 Criteria for individual Aroclors. There were neither exceedances of Total PCBs for acceptance at a lined landfill nor exceedances of Total PCBs for acceptance at an unlined landfill. PCBs were not detected. **Refer to Table 1D** within Attachment A.

TPHs

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, there were neither exceedances of the MCP RCS-1 Criteria for TPH DRO nor exceedances of the MCP RCS-2 Criteria for TPH DRO. There were neither exceedances of TPH DRO for acceptance at a lined landfill nor exceedances of TPH DRO for acceptance at an unlined landfill. Individual DRO (such as Fuel Oil #2/Diesel Fuel, Fuel Oil #4, Fuel Oil #6, Kerosene, Motor Oil, Unidentified) were not detected. There are no comparison parameters for TPH GRO; however, TPH GRO was also not detected in the samples. **Refer to Table 1E** within Attachment A.

Pesticides

For Sample B1B8 TS, there were neither exceedances of the MCP RCS-1 Criteria for individual pesticides nor exceedances of the MCP RCS-2 Criteria for individual pesticides. COMM-97-001 does not provide regulatory criteria for pesticides. **Refer to Table 1F** within Attachment A.

Herbicides

For Sample B1B8 TS, there were neither exceedances of the MCP RCS-1 Criteria for individual herbicides nor exceedances of the MCP RCS-2 Criteria for individual herbicides. COMM-97-001 does not provide regulatory criteria for herbicides. **Refer to Table 1G** within Attachment A.

General Chemistry

For the following Samples: B3B4B5 DRY; B1 DRY; B2 DRY; B6 DRY; B6B8 WET; B1B7 WET; and B2 WET, there were neither exceedances of Conductivity for acceptance at a lined landfill nor exceedances of Conductivity for acceptance at an unlined landfill. There were no exceedances of RCRA Characteristics for flashpoint/ignitability. Flashpoint/ignitability passed. There were no exceedances of RCRA Characteristics for pH. There were no exceedances of RCRA Characteristics for reactivity. Reactivity was Negative. **Refer to Table 1H** within Attachment A.

The Massachusetts Contingency Plan: 310 CMR 40.00

According to 310 CMR 40.0317: Releases and Threats of Release Which Do Not Require Notification, PEER understands that notwithstanding the provisions of 310 CMR 40.0311 through 310 CMR 40.0315, the following releases and threats of release of oil and/or hazardous material are exempt from the notification requirements set forth in 310 CMR 40.0300:

(22) arsenic, beryllium or nickel in Boston Blue Clay or **arsenic in an area documented by the U.S. Geological Survey or in other scientific literature as an area of elevated arsenic measured in soil or groundwater** that -

(a) is consistently present in the environment at and in the vicinity of the sampling location;

(b) is solely attributable to natural geologic or ecologic conditions; and

(c) has not been mobilized or transferred to another environmental medium or increased in concentration in an environmental medium as a result of anthropogenic activities.

PEER understands that as of the date of this Memorandum, PEER is aware of a Fill Management Plan prepared by Parker Environmental Corporation on behalf of Lighthouse Environmental Management, LLC (LEM) in support of a **Fill Project** at the property located on Parcel 35-D 1.2-0 on Stafford Street in Leicester, Massachusetts.

PEER further understands that as of the date of this Memorandum, PEER is aware that anticipated sources of fill material for the **Fill Project** include large volumes of excess soil from excavation and construction projects in Massachusetts with elevated levels of naturally occurring arsenic. The intended fill materials include native and reworked sand, gravel, rock and clay with elevated levels of naturally occurring arsenic. It is anticipated that completion of the fill Project will involve importation of approximately 95,000 cubic yards of material, and take approximately 5 years to complete based on available sources of fill materials. Anticipated sources of fill material include large volumes of excess soil from excavation and construction projects in Massachusetts with elevated levels of naturally occurring arsenic.

Initial Recommendations

As described above, PEER shadowed the geotechnical contractor during the advancement of eight geotechnical soil borings located proximate to the location of the proposed Wildwood School at North Intermediate School, in Wilmington, MA, and collected geo-environmental soil samples concurrent with the geotechnical boring advancement. PEER understands that the eight borings which were advanced proximate to the location of the proposed Wildwood School at North Intermediate School may not necessarily be representative of other soil boring profiles which may be advanced at other locations on the project site during future phases of this proposed project.

Therefore, PEER recommends that additional pre-characterization sampling of the subsurface soil in borings and/or test pits be completed once the exact location of the proposed building is determined and/or once

the location of utility runs requiring excavation and soil management is determined, and/or once the depths and locations of any other excavations related to site infrastructure are known.

Furthermore, should it be determined that the existing North Intermediate School will be demolished as part of any future development of a new school, PEER recommends that additional pre-characterization sampling of the subsurface soil in borings and/or test pits be completed within the parking lot (and paved areas) associated with the building, and proximate to the existing footprint of the building nearest the boiler room, and beneath the current building.

In addition, as it relates to the potential need for project-based dewatering activities (based on the estimated groundwater elevation beneath the project site, and based on the observation of wetlands and waterways on and near the project site), should a construction general permit or a remediation general permit be required for this activity, PEER recommends considering the implementation of a sampling and analysis program for groundwater through the installation of temporary groundwater monitoring wells during any additional subsurface soil investigation, and prior to site redevelopment.

Please contact us directly at 781.238.8880, should you have any questions or require any clarification on this Limited Subsurface Soil Investigation Memorandum at the Wildwood School at North Intermediate School, in Wilmington, MA.

Sincerely,

PEER Consultants, P.C.

David Gorden, BCES
Environmental Science Program Manager

Attachment A

Table 1A - Volatile Organic Compounds
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
	Units	2024 MCP RCS-1	2024 MCP RCS-2	COMM-97-001 Lined Landfill	COMM-97-001 Unlined Landfill	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Volatiles By SW8260D																							
Total VOCs	ug/Kg	NL	NL	10,000	4,000	NS		--		--		--		--		--		--		--		NS	

-- = Analyte not detected in soil sample.
NS = VOCs were not sampled for in this sample.
NL = The MCP does not list a standard for this.
There were no detections of individual VOCs.
There were no exceedances of the MCP RCS-1 Criteria for an individual VOC.
There were no exceedances of the MCP RCS-2 Criteria for an individual VOC.
There were no exceedances of Total VOCs for acceptance at a lined landfill.
There were no exceedances of Total VOCs for acceptance at an unlined landfill.

Table 1B - Semivolatile Organic Compounds
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
	2024 MCP	2024 MCP	COMM-97-001 Lined	COMM-97-001 Unlined																			
Units	RCS-1	RCS-2	Landfill	Landfill		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Semivolatiles By SW8270E																							
Total SVOCs	ug/Kg	NL	NL	100,000	100,000	NS		--		--		--		--		--		--		--		--	

-- = Analyte not detected in soil sample.
NS = SVOCs were not sampled for in this sample.
NL = The MCP does not list a standard for this.
There were no detections of individual SVOCs.
There were no exceedances of the MCP RCS-1 Criteria for an individual SVOC.
There were no exceedances of the MCP RCS-2 Criteria for an individual SVOC.
There were no exceedances of Total SVOCs for acceptance at a lined landfill.
There were no exceedances of Total SVOCs for acceptance at an unlined landfill.

Table 1C - Metals
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
		2024 MCP	2024 MCP	COMM-97-001 Lined	COMM-97-001 Unlined																		
Units		RCS-1	RCS-2	Landfill	Landfill	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Metals, Total																							
Antimony	mg/Kg	20	40	NL	NL	NS		--		--		--		--		--		--		--		--	
Arsenic	mg/Kg	20	20	40	40	15	0.78	14.5	0.69	8.41	0.68	6.45	0.71	54.3	0.72	20.3	0.69	26.6	0.73	16.5	0.84	20.2	0.80
Barium	mg/Kg	1,000	3,000	NL	NL	NS		22.8	0.35	23.1	0.34	9.43	0.35	16.1	0.36	21.6	0.35	19.3	0.37	18.9	0.42	15	0.40
Beryllium	mg/Kg	100	200	NL	NL	NS		0.28	0.28	0.62	0.27	0.33	0.28	0.29	0.29	0.4	0.28	< 0.29	0.29	< 0.34	0.34	< 0.32	0.32
Cadmium	mg/Kg	80	80	80	30	NS		--		--		--		--		--		--		--		--	
Chromium	mg/Kg	100	200	1,000	1,000	NS		16.6	0.35	13.8	0.34	16.2	0.35	13.4	0.36	23.2	0.35	10.4	0.37	14.4	0.42	12.3	0.40
Lead	mg/Kg	200	600	2,000	1,000	NS		5.27	0.35	10.2	0.34	5.15	0.35	10.2	0.36	8.14	0.35	3.58	0.37	4.65	0.42	3.55	0.40
Mercury	mg/Kg	20	40	10	10	NS		--		0.05	0.03	--		--		--		--		--		--	
Nickel	mg/Kg	700	1,000	NL	NL	NS		6.85	0.35	7.47	0.34	8.6	0.35	6.48	0.36	9.35	0.35	8.74	0.37	9.23	0.42	8.57	0.40
Selenium	mg/Kg	400	800	NL	NL	NS		--		--		--		--		--		--		--		--	
Silver	mg/Kg	100	200	NL	NL	NS		--		--		--		--		--		--		--		--	
Thallium	mg/Kg	8	70	NL	NL	NS		--		--		--		--		--		--		--		--	
Vanadium	mg/Kg	500	800	NL	NL	NS		12.6	0.35	15.7	0.34	10.2	0.35	11.7	0.36	14.7	0.35	12.4	0.37	12.2	0.42	10.4	0.40
Zinc	mg/Kg	1,000	3,000	NL	NL	NS		15.1	0.7	25.1	0.7	13	0.7	11	0.7	16.2	0.7	17.1	0.7	14.7	0.8	17.4	0.8

-- = Analyte not detected in soil sample.
NS = Metals were not sampled for in this sample.
NL = COMM-97-001 does not list a standard for this metal.
There were four exceedances of the MCP RCS-1 Criteria for individual Metals (arsenic) and four exceedances of the MCP RCS-2 Criteria for individual Metals (arsenic).
There was one exceedance of a metal (arsenic) for acceptance at a lined landfill and one exceedance of a metal (arsenic) for acceptance at an unlined landfill.

According to the publication "Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts—Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps", by the United States Geological Service, Prepared in cooperation with the Massachusetts Department of Environmental Protection and the Massachusetts Department of Public Health, and dated 2011. The distribution of bedrock units of crystalline igneous and metamorphic rocks in the study area is complex. The study area is crossed by major faults that divide parts of three geologic terranes that include the Merrimack belt, the Nashoba zone and the Milford-Dedham zone. The primary study area includes most of the Merrimack belt, which extends from the Connecticut Valley belt (indicated by the Merrimack belt western boundary) to the Clinton-Newbury fault, and the western half of the Nashoba zone, which extends from the Clinton-Newbury fault to the Bloody Bluff fault. The secondary study area includes the remainder of the Nashoba zone and the western edge of the Milford-Dedham zone, which begins at the Bloody Bluff fault and extends to the east. According to a Probability of Exceeding the Arsenic Drinking Water Standard in Private Drinking Water Wells in Massachusetts, a Map which accompanies the Publication, Wilmington in general appears in the ORANGE highlighted Section, inferring that Wilmington has a 5-10% probability of exceeding the public drinking water standard (of 10 parts per billion) for Arsenic in its groundwater.

Table 1D - Polychlorinated Biphenyls
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
		2024 MCP	2024 MCP	COMM-97-001 Lined	COMM-97-001 Unlined																		
Units		RCS-1	RCS-2	Landfill	Landfill	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
PCBs By SW8082A																							
Total PCBs		NL	NL	<2,000	<2,000	NS		--		--		--		--		--		--		--		--	

-- = Analyte not detected in soil sample.
NS = PCBs were not sampled for in this sample.
NL = The MCP does not list a standard for this.
There were neither exceedances of the MCP RCS-1 Criteria for individual Aroclors nor exceedances of the MCP RCS-2 Criteria for individual Aroclors.
There were neither exceedances of Total PCBs for acceptance at a lined landfill nor exceedances of Total PCBs for acceptance at an unlined landfill.

Table 1E - Total Petroleum Hydrocarbons
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
	Units	2024 MCP RCS-1	2024 MCP RCS-2	COMM-97-001 Lined Landfill	COMM-97-001 Unlined Landfill	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
TPH By SW8015D DRO																							
Total TPH	mg/kg	1,000	3,000	5,000	2,000	NS		--		--		--		--		--		--		--		--	
Gasoline Range Hydrocarbons (C6-C10) By SW8015D GRO																							
GRO (C6-C10)	mg/Kg	NL	NL	NL	NL	NS		--		--		--		--		--		--		--		--	

-- = Analyte not detected in soil sample.
NS = TPHs were not sampled for in this sample.
NL = The MCP and COMM-97-001 do not list a standard for this.
TPH DRO included Fuel Oil #2/Diesel Fuel, Fuel Oil #4, Fuel Oil #6, Kerosene, Motor Oil, Unidentified
GRO included gasoline range organics (C6-C10).
There were neither exceedances of the MCP RCS-1 Criteria for Total TPH DRO nor exceedances of the MCP RCS-2 Criteria for Total TPH DRO.
There were neither exceedances of TPH DRO for acceptance at a lined landfill nor exceedances of TPH DRO for acceptance at an unlined landfill.

Table 1F - Pesticides
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
Units	2024 MCP RCS-1	2024 MCP RCS-2	COMM-97-001 Lined Landfill	COMM-97-001 Unlined Landfill		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Pesticides By SW8081B																							
	ug/Kg			NL	NL	--		NS		NS		NS		NS		NS		NS		NS		NS	

There were no detections of Pesticides for the soil sample (B1B8 TS) analyzed.
-- = Analyte not detected in soil sample.
There were neither exceedances of MCP RCS-1 criteria for individual pesticides nor exceedances of MCP RCS-2 criteria for individual pesticides.
COMM-97-001 does not provide regulatory criteria for pesticides.
NS = Pesticides were not sampled for in this sample.

Table 1G - Herbicides
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id						CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date						10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id						B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix						Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
	2024 MCP	2024 MCP	COMM-97-001 Lined	COMM-97-001 Unlined																			
Units	RCS-1	RCS-2	Landfill	Landfill		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Chlorinated Herbicides By SW8151A																							
	ug/Kg			NL	NL	--		NS		NS		NS		NS		NS		NS		NS		NS	

There were no detections of Herbicides for the soil sample (B1B8 TS) analyzed.
-- = Analyte not detected in soil sample.
There were neither exceedances of MCP RCS-1 criteria for individual herbicides nor exceedances of MCP RCS-2 criteria for individual herbicides.
COMM-97-001 does not provide regulatory criteria for herbicides.
NS = Herbicides were not sampled for in this sample.

Table 1H - General Chemistry
(Detected Analytes)
North Intermediate Elementary School
320 Salem Street
Wilmington, Massachusetts

Lab Sample Id							CR96234		CR96235		CR96236		CR96237		CR96238		CR96239		CR96240		CR96241		CR96242	
Collection Date							10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024		10/29/2024	
Client Id							B1B8 TS		B3B4B5 DRY		B1 DRY		B2 DRY		B6 DRY		B8 DRY		B6B8 WET		B1B7 WET		B2 WET	
Matrix							Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid		Solid	
	Units	2024 MCP RCS-1	2024 MCP RCS-2	RCRA Characteristics 40 CFR 261	COMM-97-001 Lined Landfill	COMM-97-001 Unlined Landfill	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Miscellaneous/Inorganics																								
Percent Solid	%	NL	NL	NL	NL	NL	89		94		94		93		97		94		90		80		89	
Conductivity - Soil Matrix	umhos/cm	NL	NL	NL	8,000	4,000	NS		25	5	31	5	27	5	24	5	33	5	34	5	27	5	30	5
Corrosivity	Pos/Neg	NL	NL	NL	NL	NL	NS		Negative		Negative		Negative		Negative		Negative		Negative		Negative		Negative	
Flash Point	Degree F	NL	NL	≤ 140	NL	NL	NS		>200	200	>200	200	>200	200	>200	200	>200	200	>200	200	>200	200	>200	200
Ignitability	degree F	NL	NL	≤ 140	NL	NL	NS		Passed	140	Passed	140	Passed	140	Passed	140	Passed	140	Passed	140	Passed	140	Passed	140
pH at 25C - Soil	pH Units	NL	NL	≤ 2 and ≥ 12.5	NL	NL	NS		7.58	1.00	6.37	1.00	5.67	1.00	6.71	1.00	6.77	1.00	7.08	1.00	6.6	1.00	6.77	1.00
Reactivity Cyanide	mg/Kg	NL	NL	40 CFR 261.23	NL	NL	NS		< 5	5	< 5	5	< 5	5	< 5	5	< 5	5	< 5	5	< 6	6	< 6	6
Reactivity Sulfide	mg/Kg	NL	NL	40 CFR 261.23	NL	NL	NS		< 20	20	< 20	20	< 20	20	< 20	20	< 20	20	< 20	20	< 20	20	< 20	20
Reactivity	Pos/Neg	NL	NL	40 CFR 261.23	NL	NL	NS		Negative		Negative		Negative		Negative		Negative		Negative		Negative		Negative	

NL = The MCP and COMM-97-001 do not list a standard for this constituent.
NS = Constituent was not sampled for in this sample.
There were neither exceedances of Conductivity for acceptance at a lined landfill nor exceedances of Conductivity for acceptance at an unlined landfill.
There were no exceedances of RCRA Characteristics for flashpoint/ignitability. Flashpoint/ignitability passed.
There were no exceedances of RCRA Characteristics for pH.
There were no exceedances of RCRA Characteristics for reactivity. Reactivity was Negative.

Attachment B

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	16:50
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96234

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B1B8 TS

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	15.0	0.78	mg/Kg	1	11/14/24	TH	SW6010D
Percent Solid	89		%		10/30/24	CV	SW846-%Solid
Soil Extraction for Herbicide	Completed				11/01/24	X/A/D	SW3546
Soil Extraction for Pesticide	Completed				10/31/24	J/T	SW3546
Total Metals Digest	Completed				11/13/24	P/AG	SW3050B
Chlorinated Herbicides							
2,4,5-T	ND	140	ug/Kg	10	11/05/24	JRB	SW8151A
2,4,5-TP (Silvex)	ND	140	ug/Kg	10	11/05/24	JRB	SW8151A
2,4-D	ND	280	ug/Kg	10	11/05/24	JRB	SW8151A
2,4-DB	ND	1400	ug/Kg	10	11/05/24	JRB	SW8151A
Dalapon	ND	140	ug/Kg	10	11/05/24	JRB	SW8151A
Dicamba	ND	140	ug/Kg	10	11/05/24	JRB	SW8151A
Dichloroprop	ND	210	ug/Kg	10	11/05/24	JRB	SW8151A
Dinoseb	ND	140	ug/Kg	10	11/05/24	JRB	SW8151A
MCPA	ND	42000	ug/Kg	10	11/05/24	JRB	SW8151A
MCPP	ND	42000	ug/Kg	10	11/05/24	JRB	SW8151A
QA/QC Surrogates							
% DCAA	136		%	10	11/05/24	JRB	30 - 150 %
% DCAA (Confirmation)	138		%	10	11/05/24	JRB	30 - 150 %
Pesticides							
4,4' -DDD	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
4,4' -DDE	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
4,4' -DDT	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
a-BHC	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Alachlor	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B1B8 TS

Phoenix I.D.: CR96234

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aldrin	ND	3.7	ug/Kg	2	11/04/24	AW	SW8081B
b-BHC	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Chlordane	ND	15	ug/Kg	2	11/04/24	AW	SW8081B
d-BHC	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Dieldrin	ND	3.7	ug/Kg	2	11/04/24	AW	SW8081B
Endosulfan I	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Endosulfan II	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Endosulfan sulfate	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Endrin	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Endrin aldehyde	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Endrin ketone	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
g-BHC	ND	1.5	ug/Kg	2	11/04/24	AW	SW8081B
Heptachlor	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Heptachlor epoxide	ND	7.3	ug/Kg	2	11/04/24	AW	SW8081B
Hexachlorobenzene	ND	3.7	ug/Kg	2	11/04/24	AW	SW8081B
Methoxychlor	ND	37	ug/Kg	2	11/04/24	AW	SW8081B
Toxaphene	ND	150	ug/Kg	2	11/04/24	AW	SW8081B
QA/QC Surrogates							
% DCBP	92		%	2	11/04/24	AW	30 - 150 %
% DCBP (Confirmation)	49		%	2	11/04/24	AW	30 - 150 %
% TCMX	71		%	2	11/04/24	AW	30 - 150 %
% TCMX (Confirmation)	65		%	2	11/04/24	AW	30 - 150 %

Massachusetts does not offer certification for Soil/Solid matrices.

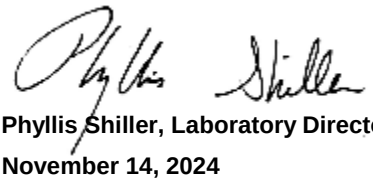
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Herbicide Comment:
Due to a matrix interference and/or the presence of a large amount of non-target material in the sample, a dilution was required resulting in an elevated RL.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	17:01
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96235

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B3B4B5 DRY

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	14.5	0.69	mg/Kg	1	11/01/24	TH	SW6010D
Barium	22.8	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	0.28	0.28	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	16.6	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	6.85	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Lead	5.27	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.5	3.5	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.4	1.4	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.1	3.1	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	12.6	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	15.1	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	94		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	25	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	7.58	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	H/T	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	J/T	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	5.6	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	96		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	80		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	79		%	2	11/01/24	SC	30 - 150 %
% TCMX	79		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	72		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	52	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	99		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	101		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.54	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B3B4B5 DRY

Phoenix I.D.: CR96235

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	27	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	27	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	270	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.3	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	33	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	95		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	97		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	91		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	110	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	5.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	550	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	690	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	76		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	77		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	66		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	67		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	66		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	71		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

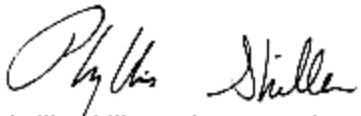
The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	17:22
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96236

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B1 DRY

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.34	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	8.41	0.68	mg/Kg	1	11/01/24	TH	SW6010D
Barium	23.1	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	0.62	0.27	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.34	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	13.8	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	0.05	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	7.47	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Lead	10.2	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.4	3.4	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.4	1.4	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.1	3.1	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	15.7	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	25.1	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	94		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	31	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	6.37	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	H/T	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	5.7	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	93		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	69	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	72		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	69		%	2	11/01/24	SC	30 - 150 %
% TCMX	71		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	65		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	52	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	85		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	87		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	4.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.71	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	36	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	36	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	360	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	4.3	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	43	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	14	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	14	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	14	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	14	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	14	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	96		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	93		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	91		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	140	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	7.1	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	550	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	690	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	65		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	51		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	50		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	49		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	47		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	49		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	17:51
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96237

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B2 DRY

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	6.45	0.71	mg/Kg	1	11/01/24	TH	SW6010D
Barium	9.43	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	0.33	0.28	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	16.2	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	8.60	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Lead	5.15	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.5	3.5	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.4	1.4	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.2	3.2	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	10.2	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	13.0	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	93		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	27	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	5.67	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	H/T	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	6.7	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	95		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	71	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	69		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	66		%	2	11/01/24	SC	30 - 150 %
% TCMX	66		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	60		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	53	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	94		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	94		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.66	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	33	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	33	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	330	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.9	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	39	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	13	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	13	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	13	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	13	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	13	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	95		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	94		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	92		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	130	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	6.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	560	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B2 DRY

Phoenix I.D.: CR96237

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	700	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	65		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	51		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	49		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	52		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	47		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	50		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	18:03
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96238

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B6 DRY

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.36	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	54.3	0.72	mg/Kg	1	11/01/24	TH	SW6010D
Barium	16.1	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	0.29	0.29	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.36	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	13.4	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	6.48	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Lead	10.2	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.6	3.6	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.4	1.4	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.2	3.2	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	11.7	0.36	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	11.0	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	97		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	24	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	6.71	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	R/H/X/	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	5.6	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	95		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	68	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	82		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	87		%	2	11/01/24	SC	30 - 150 %
% TCMX	82		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	79		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	51	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	120		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	105		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.5	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.59	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	29	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	29	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	290	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.5	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	35	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	12	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	12	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	96		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	97		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	97		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	92		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	120	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	5.9	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	540	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	680	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	240	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	340	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	59		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	48		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	47		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	49		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	45		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	48		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	18:19
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96239

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B8 DRY

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	20.3	0.69	mg/Kg	1	11/01/24	TH	SW6010D
Barium	21.6	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	0.40	0.28	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	23.2	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	9.35	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Lead	8.14	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.5	3.5	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.4	1.4	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.1	3.1	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	14.7	0.35	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	16.2	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	94		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	33	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	6.77	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	R/H/X/	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	5.7	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	95		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	70	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	72		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	71		%	2	11/01/24	SC	30 - 150 %
% TCMX	69		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	62		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	53	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	104		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	99		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.56	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	28	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	28	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	280	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.4	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	34	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	95		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	95		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	95		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	92		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	110	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	5.6	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	570	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	710	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	350	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	66		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	54		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	52		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	53		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	50		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	57		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	18:30
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96240

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B6B8 WET

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.37	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	26.6	0.73	mg/Kg	1	11/01/24	TH	SW6010D
Barium	19.3	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	< 0.29	0.29	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.37	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	10.4	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	8.74	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Lead	3.58	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 3.7	3.7	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.5	1.5	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.3	3.3	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	12.4	0.37	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	17.1	0.7	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	90		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	34	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	7.08	1.00	pH Units	1	10/30/24 22:09	MW	SW846 9045D
Reactivity Cyanide	< 5	5	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	R/H/X/	SW3546
Soil Extraction for PCB	Completed				10/31/24	H/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	4.9	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	96		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1221	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1232	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1242	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1248	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1254	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1260	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1262	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
PCB-1268	ND	73	ug/Kg	2	11/01/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	81		%	2	11/01/24	SC	30 - 150 %
% DCBP (Confirmation)	80		%	2	11/01/24	SC	30 - 150 %
% TCMX	80		%	2	11/01/24	SC	30 - 150 %
% TCMX (Confirmation)	73		%	2	11/01/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	55	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	96		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	92		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	2.6	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.44	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	22	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	22	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	220	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	2.6	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	26	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	8.8	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	8.8	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	8.8	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	8.8	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	8.8	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	95		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	96		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	92		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	88	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	4.4	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	580	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	720	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	65		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	52		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	54		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	54		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	49		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	54		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	18:44
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96241

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B1B7 WET

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.42	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	16.5	0.84	mg/Kg	1	11/01/24	TH	SW6010D
Barium	18.9	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	< 0.34	0.34	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.42	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	14.4	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	9.23	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Lead	4.65	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 4.2	4.2	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.7	1.7	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.8	3.8	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	12.2	0.42	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	14.7	0.8	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	80		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	27	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	6.60	1.00	pH Units	1	10/30/24 22:10	MW	SW846 9045D
Reactivity Cyanide	< 6	6	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Field Extraction	Completed				10/29/24		SW5035A
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	R/H/X/	SW3546
Soil Extraction for PCB	Completed				11/01/24	J/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	6.3	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	94		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1221	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1232	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1242	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1248	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1254	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1260	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1262	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
PCB-1268	ND	58	ug/Kg	1	11/05/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	63		%	1	11/05/24	SC	30 - 150 %
% DCBP (Confirmation)	71		%	1	11/05/24	SC	30 - 150 %
% TCMX	65		%	1	11/05/24	SC	30 - 150 %
% TCMX (Confirmation)	68		%	1	11/05/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	61	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	92		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	87		%	1	11/01/24	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.2	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.53	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,4-Dichlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	26	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
4-Chlorotoluene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	26	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	260	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.2	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	32	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Trichlorofluoromethane	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	11	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	11/01/24	JLI	70 - 130 %
% Bromofluorobenzene	94		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	92		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	92		%	1	11/01/24	JLI	70 - 130 %
Oxygenates & Dioxane							
1,4-Dioxane	ND	110	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	5.3	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitrophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	1400	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetophenone	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	1800	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	700	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Pentachlorophenol	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	620	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	880	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	72		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	56		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	53		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	52		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	51		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	59		%	1	11/01/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	19:02
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96242

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: B2 WET

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.40	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Arsenic	20.2	0.80	mg/Kg	1	11/01/24	TH	SW6010D
Barium	15.0	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Beryllium	< 0.32	0.32	mg/Kg	1	11/01/24	TH	SW6010D
Cadmium	< 0.40	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Chromium	12.3	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/31/24	AL1	SW7471B
Nickel	8.57	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Lead	3.55	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Antimony	< 4.0	4.0	mg/Kg	1	11/01/24	TH	SW6010D
Selenium	< 1.6	1.6	mg/Kg	1	11/01/24	TH	SW6010D
Thallium	< 3.6	3.6	mg/Kg	1	11/01/24	TH	SW6010D
Vanadium	10.4	0.40	mg/Kg	1	11/01/24	TH	SW6010D
Zinc	17.4	0.8	mg/Kg	1	11/01/24	TH	SW6010D
Percent Solid	89		%		10/30/24	CV	SW846-%Solid
Conductivity - Soil Matrix	30	5	umhos/cm	1	10/30/24	KG	SW9050A
Corrosivity	Negative		Pos/Neg	1	10/30/24	MW	SW846-Corr
Flash Point	>200	200	Degree F	1	11/04/24	G	SW1010B
Ignitability	Passed	140	degree F	1	11/04/24	G	SW846-Ignit
pH at 25C - Soil	6.77	1.00	pH Units	1	10/30/24 22:10	MW	SW846 9045D
Reactivity Cyanide	< 6	6	mg/Kg	1	11/04/24	E/N/G	SW846 7.3.3.1/90
Reactivity Sulfide	< 20	20	mg/Kg	1	11/04/24	EG/GD	SW846 CH7
Reactivity	Negative		Pos/Neg	1	11/04/24	EG/GD	SW846-React
Mercury Digestion	Completed				10/31/24	AC1/AC1	SW7471B
Extraction of ETPH	Completed				10/31/24	R/H/X/	SW3546
Soil Extraction for PCB	Completed				11/01/24	J/U	SW3546
Soil Extraction for SVOA	Completed				10/31/24	/U	SW3546

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Total Metals Digest	Completed				10/30/24	J/AG	SW3050B
Gasoline Range Hydrocarbons (C6-C10)							
GRO (C6-C10)	ND	5.3	mg/Kg	50	10/31/24	V	SW8015D GRO
QA/QC Surrogates							
% 2,5-Dibromotoluene (FID)	96		%	50	10/31/24	V	70 - 130 %
Polychlorinated Biphenyls							
PCB-1016	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1221	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1232	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1242	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1248	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1254	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1260	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1262	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
PCB-1268	ND	74	ug/Kg	2	11/05/24	SC	SW8082A
QA/QC Surrogates							
% DCBP	68		%	2	11/05/24	SC	30 - 150 %
% DCBP (Confirmation)	74		%	2	11/05/24	SC	30 - 150 %
% TCMX	59		%	2	11/05/24	SC	30 - 150 %
% TCMX (Confirmation)	61		%	2	11/05/24	SC	30 - 150 %
TPH DRO (C10-C28)							
Diesel Range Organics (C10-C28)	ND	55	mg/Kg	1	11/01/24	JRB	SW8015D DRO
QA/QC Surrogates							
% COD (surr)	97		%	1	11/01/24	JRB	50 - 150 %
% Terphenyl (surr)	92		%	1	11/01/24	JRB	50 - 150 %
Semivolatiles							
1,1-Biphenyl	ND	50	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4,5-Tetrachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2,4-Trichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,2-Diphenylhydrazine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
1,3-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
1,4-Dichlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,2'-Oxybis(1-Chloropropane)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,5-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4,6-Trichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dichlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dimethylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrophenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
2,4-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2,6-Dinitrotoluene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chloronaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Chlorophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylnaphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Methylphenol (o-cresol)	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
2-Nitroaniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
2-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3&4-Methylphenol (m&p-cresol)	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
3,3'-Dichlorobenzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
3-Nitroaniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4,6-Dinitro-2-methylphenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4-Bromophenyl phenyl ether	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloro-3-methylphenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chloroaniline	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Chlorophenyl phenyl ether	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitroaniline	ND	580	ug/Kg	1	11/01/24	MR	SW8270E
4-Nitrophenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acenaphthylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Acetophenone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Aniline	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benz(a)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzidine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(a)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(b)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(ghi)perylene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzo(k)fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Benzoic acid	ND	730	ug/Kg	1	11/01/24	MR	SW8270E
Benzyl butyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethoxy)methane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-chloroethyl)ether	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Bis(2-ethylhexyl)phthalate	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Carbazole	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Chrysene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dibenzofuran	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Diethyl phthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Dimethylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-butylphthalate	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Di-n-octylphthalate	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluoranthene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Fluorene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorobutadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachlorocyclopentadiene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Hexachloroethane	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Isophorone	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Naphthalene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Nitrobenzene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodimethylamine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodi-n-propylamine	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
N-Nitrosodiphenylamine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Pentachloronitrobenzene	ND	360	ug/Kg	1	11/01/24	MR	SW8270E

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Pentachlorophenol	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
Phenanthrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Phenol	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyrene	ND	250	ug/Kg	1	11/01/24	MR	SW8270E
Pyridine	ND	360	ug/Kg	1	11/01/24	MR	SW8270E
QA/QC Surrogates							
% 2,4,6-Tribromophenol	62		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorobiphenyl	50		%	1	11/01/24	MR	30 - 130 %
% 2-Fluorophenol	52		%	1	11/01/24	MR	30 - 130 %
% Nitrobenzene-d5	51		%	1	11/01/24	MR	30 - 130 %
% Phenol-d5	48		%	1	11/01/24	MR	30 - 130 %
% Terphenyl-d14	53		%	1	11/01/24	MR	30 - 130 %

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

The GRO (C6-C10) is quantitated using an gasoline standard.

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

The TPH (C10-C28) is quantitated using an alkane standard.

Corrosivity is based solely on the pH analysis performed above.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Cyanide. This method is no longer listed in the current version of SW-846.

The reactivity, reported above, is based only on the EPA Interim Guidance for Reactive Sulfide. This method is no longer listed in the current version of SW-846.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96243

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: TB102924 HI

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Field Extraction	Completed				10/29/24		SW5035A
Volatiles							
1,1,1,2-Tetrachloroethane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	50	ug/Kg	50	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
1,4-Dichlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
2-Hexanone	ND	1300	ug/Kg	50	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
4-Chlorotoluene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	400	ug/Kg	50	11/01/24	JLI	SW8260D
Acetone	ND	5000	ug/Kg	50	11/01/24	JLI	SW8260D
Acrylonitrile	ND	500	ug/Kg	50	11/01/24	JLI	SW8260D
Benzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Bromobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Bromochloromethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
Bromoform	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
Bromomethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Chlorobenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Chloroethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Chloroform	ND	200	ug/Kg	50	11/01/24	JLI	SW8260D
Chloromethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	25	ug/Kg	50	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	50	ug/Kg	50	11/01/24	JLI	SW8260D
Dibromomethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Ethylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
m&p-Xylene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	3000	ug/Kg	50	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
Methylene chloride	ND	100	ug/Kg	50	11/01/24	JLI	SW8260D
Naphthalene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
o-Xylene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Styrene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	500	ug/Kg	50	11/01/24	JLI	SW8260D
Toluene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Total Xylenes	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	25	ug/Kg	50	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	500	ug/Kg	50	11/01/24	JLI	SW8260D
Trichloroethene	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Trichlorofluoromethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
Vinyl chloride	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4 (50x)	97		%	50	11/01/24	JLI	70 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
% Bromofluorobenzene (50x)	95		%	50	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane (50x)	86		%	50	11/01/24	JLI	70 - 130 %
% Toluene-d8 (50x)	97		%	50	11/01/24	JLI	70 - 130 %

Oxygenates & Dioxane

1,4-Dioxane	ND	800	ug/Kg	50	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	250	ug/Kg	50	11/01/24	JLI	SW8260D (OXY)

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

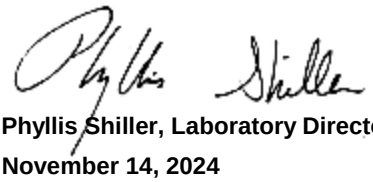
Comments:

TRIP BLANK INCLUDED.

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

Analysis Report

November 14, 2024

FOR: Attn: Mr Dave Gorden
PEER Consultants
25 Mall Road, Suite 206
Burlington, MA 01803

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		10/29/24	
Location Code:	PEER	Received by:	SR1	10/30/24	14:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	8593				

Laboratory Data

SDG ID: GCR96234
Phoenix ID: CR96244

Project ID: WILDWOOD @ NORTH INTERMED
Client ID: TB102924 LO

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Field Extraction	Completed				10/29/24		SW5035A
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,1-Trichloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2,2-Tetrachloroethane	ND	3.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1,2-Trichloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloroethene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,1-Dichloropropene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,3-Trichloropropane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trichlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2,4-Trimethylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dibromoethane	ND	0.50	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,2-Dichloropropane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,3,5-Trimethylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,3-Dichloropropane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
1,4-Dichlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
2,2-Dichloropropane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
2-Chlorotoluene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
2-Hexanone	ND	25	ug/Kg	1	11/01/24	JLI	SW8260D
2-Isopropyltoluene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
4-Chlorotoluene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
4-Methyl-2-pentanone	ND	25	ug/Kg	1	11/01/24	JLI	SW8260D
Acetone	ND	250	ug/Kg	1	11/01/24	JLI	SW8260D
Acrylonitrile	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Benzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Bromobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Bromochloromethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Bromodichloromethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Bromoform	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Bromomethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon Disulfide	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Carbon tetrachloride	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Chlorobenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Chloroform	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Chloromethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,2-Dichloroethene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
cis-1,3-Dichloropropene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromochloromethane	ND	3.0	ug/Kg	1	11/01/24	JLI	SW8260D
Dibromomethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Dichlorodifluoromethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Ethylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Hexachlorobutadiene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Isopropylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
m&p-Xylene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl Ethyl Ketone	ND	30	ug/Kg	1	11/01/24	JLI	SW8260D
Methyl t-butyl ether (MTBE)	ND	10	ug/Kg	1	11/01/24	JLI	SW8260D
Methylene chloride	ND	10	ug/Kg	1	11/01/24	JLI	SW8260D
Naphthalene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
n-Butylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
n-Propylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
o-Xylene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
p-Isopropyltoluene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
sec-Butylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Styrene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
tert-Butylbenzene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrachloroethene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Tetrahydrofuran (THF)	ND	10	ug/Kg	1	11/01/24	JLI	SW8260D
Toluene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Total Xylenes	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,2-Dichloroethene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,3-Dichloropropene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
trans-1,4-dichloro-2-butene	ND	10	ug/Kg	1	11/01/24	JLI	SW8260D
Trichloroethene	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorofluoromethane	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
Trichlorotrifluoroethane	ND	10	ug/Kg	1	11/01/24	JLI	SW8260D
Vinyl chloride	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	97		%	1	11/01/24	JLI	70 - 130 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
% Bromofluorobenzene	98		%	1	11/01/24	JLI	70 - 130 %
% Dibromofluoromethane	82		%	1	11/01/24	JLI	70 - 130 %
% Toluene-d8	98		%	1	11/01/24	JLI	70 - 130 %

Oxygenates & Dioxane

1,4-Dioxane	ND	100	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Diethyl ether	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Di-isopropyl ether	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
Ethyl tert-butyl ether	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)
tert-amyl methyl ether	ND	5.0	ug/Kg	1	11/01/24	JLI	SW8260D (OXY)

Massachusetts does not offer certification for Soil/Solid matrices.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

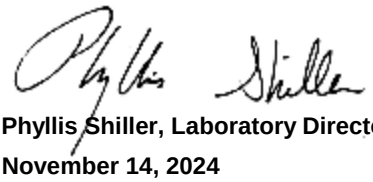
Comments:

TRIP BLANK INCLUDED.

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
November 14, 2024
Official Report Release To Follow

Sample Criteria Exceedances Report

GCR96234 - PEER

Criteria: MA: Com97-L, Com97-U, S1, S1G2, S2, S2G2

State: MA

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CR96238	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	54.3	0.72	20	20	mg/Kg
CR96238	AS-SM	Arsenic	MA / CMR 310.40.1600 / S2 (mg/kg)	54.3	0.72	20	20	mg/Kg
CR96238	AS-SM	Arsenic	MA / COMM 97 / Lined Landfills	54.3	0.72	40	40	mg/Kg
CR96238	AS-SM	Arsenic	MA / COMM 97 / Unlined Landfills	54.3	0.72	40	40	mg/Kg
CR96238	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	54.3	0.72	20	20	mg/Kg
CR96238	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	54.3	0.72	20	20	mg/Kg
CR96238	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	54.3	0.72	20	20	mg/Kg
CR96238	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	54.3	0.72	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	20.3	0.69	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / CMR 310.40.1600 / S2 (mg/kg)	20.3	0.69	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	20.3	0.69	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	20.3	0.69	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	20.3	0.69	20	20	mg/Kg
CR96239	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	20.3	0.69	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	26.6	0.73	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / CMR 310.40.1600 / S2 (mg/kg)	26.6	0.73	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	26.6	0.73	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	26.6	0.73	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	26.6	0.73	20	20	mg/Kg
CR96240	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	26.6	0.73	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	20.2	0.80	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / CMR 310.40.1600 / S2 (mg/kg)	20.2	0.80	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	20.2	0.80	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	20.2	0.80	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	20.2	0.80	20	20	mg/Kg
CR96242	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	20.2	0.80	20	20	mg/Kg
CR96243	$8260MER	cis-1,3-Dichloropropene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	25	10	10	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	50	5	5	ug/Kg
CR96243	$8260MER	trans-1,3-Dichloropropene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	25	10	10	ug/Kg
CR96243	$8260MER	Dibromochloromethane	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	50	5	5	ug/Kg
CR96243	$8260MER	Dibromochloromethane	MA / CMR 310.40.1600 / S2 (mg/kg)	ND	50	30	30	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / CMR 310.40.1600 / S2 (mg/kg)	ND	50	20	20	ug/Kg
CR96243	$8260MER	Dibromochloromethane	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	50	5	5	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	50	5	5	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	ND	50	20	20	ug/Kg
CR96243	$8260MER	Dibromochloromethane	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-2	ND	50	30	30	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	50	5	5	ug/Kg
CR96243	$8260MER	Dibromochloromethane	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	50	5	5	ug/Kg
CR96243	$8260MER	1,1,2,2-Tetrachloroethane	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	ND	50	20	20	ug/Kg

Sample Criteria Exceedances Report

GCR96234 - PEER

Criteria: MA: Com97-L, Com97-U, S1, S1G2, S2, S2G2

State: MA

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CR96243	$8260MER	Dibromochloromethane	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-2	ND	50	30	30	ug/Kg
CR96243	$MCPADD-SM	1,4-Dioxane	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	800	200	200	ug/Kg
CR96243	$MCPADD-SM	1,4-Dioxane	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	800	200	200	ug/Kg
CR96243	$MCPADD-SM	1,4-Dioxane	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	800	200	200	ug/Kg

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Cooler: Yes ☑ No ☐
Coolant: IPK ☑ ICE ☐ No ☐

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 1.3 °C Pg 1 of 1

Data Delivery/Contact Options:
☐ Fax:
☐ Phone:
☑ Email: gordon@peerepc.com

Customer: PEER Consultants
Address: 25 Mall Rd Suite 206
Burlington MA 01803
7812388880

Project: Wildwood@ North Intermed
Report to: d. gordon
Invoice to: d. gordon
QUOTE # Wilmington

Project P.O: 8593

This section MUST be completed with Bottle Quantities.

Sampler's Signature: _____ Date: 10/29/24

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe **OIL**=Oil
B=Bulk **L**=Liquid **X** = _____(Other)

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Hi level VOC	Lo level VOC	TPH GRO	Flashpt/Ignit	SVOC-TPH DRO, PCB (*)	Pest/Herb	TCLP 14 Metals (†)	MS/MSD*	GL Amber 8 oz. w/H3PO4	Soil VOA Vials [✓] methanol [✓] H2O	GL Soil container (8) oz amber	GL Soil container (4) oz	40 ml VOA Vial [ ] As is [ ] HCL	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
96234	B1B8 TS	SD	10/29	1650						✓						1								
96235	B3B4B5 Dry	SD	10/29	1701	✓	✓	✓	✓	✓		†				5	2	1							
96236	B1 [redacted] Dry	SD	10/29	1722	✓	✓	✓	✓	✓		⊙				5	1	1							
96237	B2 Dry	SD	10/29	1751	✓	✓	✓	✓	✓		†				5	2	1							
96238	B6 Dry	SD	10/29	1803	✓	✓	✓	✓	✓		†				5	2	1							
96239	B8 Dry	SD	10/29	1819	✓	✓	✓	✓	✓		†				5	2	1							
96240	B6B8 Wet	SD	10/29	1830	✓	✓	✓	✓	✓		†				5	2	1							
96241	B1B7 Wet	SD	10/29	1844	✓	✓	✓	✓	✓		†				4.	2	1							
96242	B2 Wet	SD	10/29	1902			✓	✓	✓		†				2.	2	1							
96243	TB102924Hi	L	10/22	–	✓										1									
96244	TB102924Lo	L	10/22	–		✓									2									

Relinquished by:	Accepted by:	Date:	Time:
		10/30/24	1145
		10/30/24	14:37

Comments, Special Requirements or Regulations: ● Missing lab BS
Ⓐ MCP 14 metals, pH, Corrosivity, Conductivity
Ⓣ only if exceeds 20x rule - call Reactive Client first to confirm
⊙ use any remaining soil from other

*MS/MSD are considered site samples and will be billed as such in accordance with the prices quoted.

Turnaround Time:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☑ Standard
☐ Other
* SURCHARGE APPLIES

RI
☐ (Residential) Direct Exposure
☐ (Comm/Industrial) Direct Exposure
☐ GA Leachability
☐ GB Leachability
☐ GA-GW Objectives
☐ GB-GW Objectives

CT
☐ RCP Cert
☐ GW Protection
☐ SW Protection
☐ GA Mobility
☐ GB Mobility
☐ Residential DEC
☐ I/C DEC
☐ Other

MA mcpcomm 97-001
☐ MCP Certification
☑ GW-1 ☐ MWRA eSMART
☑ GW-2 ☐ S-1 10% CALC
☐ GW-3
☑ S-1 GW-1 ☑ S-1 GW-2 ☐ S-1 GW-3
☑ S-2 GW-1 ☑ S-2 GW-2 ☐ S-2 GW-3
☐ S-3 GW-1 ☐ S-3 GW-2 ☐ S-3 GW-3
☐ SW Protection

State where samples were collected: MA

Data Format
☑ Excel
☑ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ Tier II Checklist
☐ Full Data Package*
☑ Phoenix Std Report
☐ Other

* SURCHARGE APPLIES

Sarah Bell

Subject: FW: GCR96234

From: Dave Gorden <GordenD@peercpc.com>
Sent: Wednesday, November 13, 2024 11:31 AM
To: Sarah Bell <sarah@phoenixlabs.com>
Cc: Krystal Houle <Khoule@phoenixlabs.com>
Subject: RE: GCR96234

Sarah.

Please proceed with running that sample for total Arsenic at 24 hr TAT.

Cheers...

David

From: Dave Gorden <GordenD@peercpc.com>
Sent: Wednesday, November 13, 2024 10:16 AM
To: Sarah Bell <sarah@phoenixlabs.com>
Cc: Krystal Houle <Khoule@phoenixlabs.com>
Subject: GCR96234

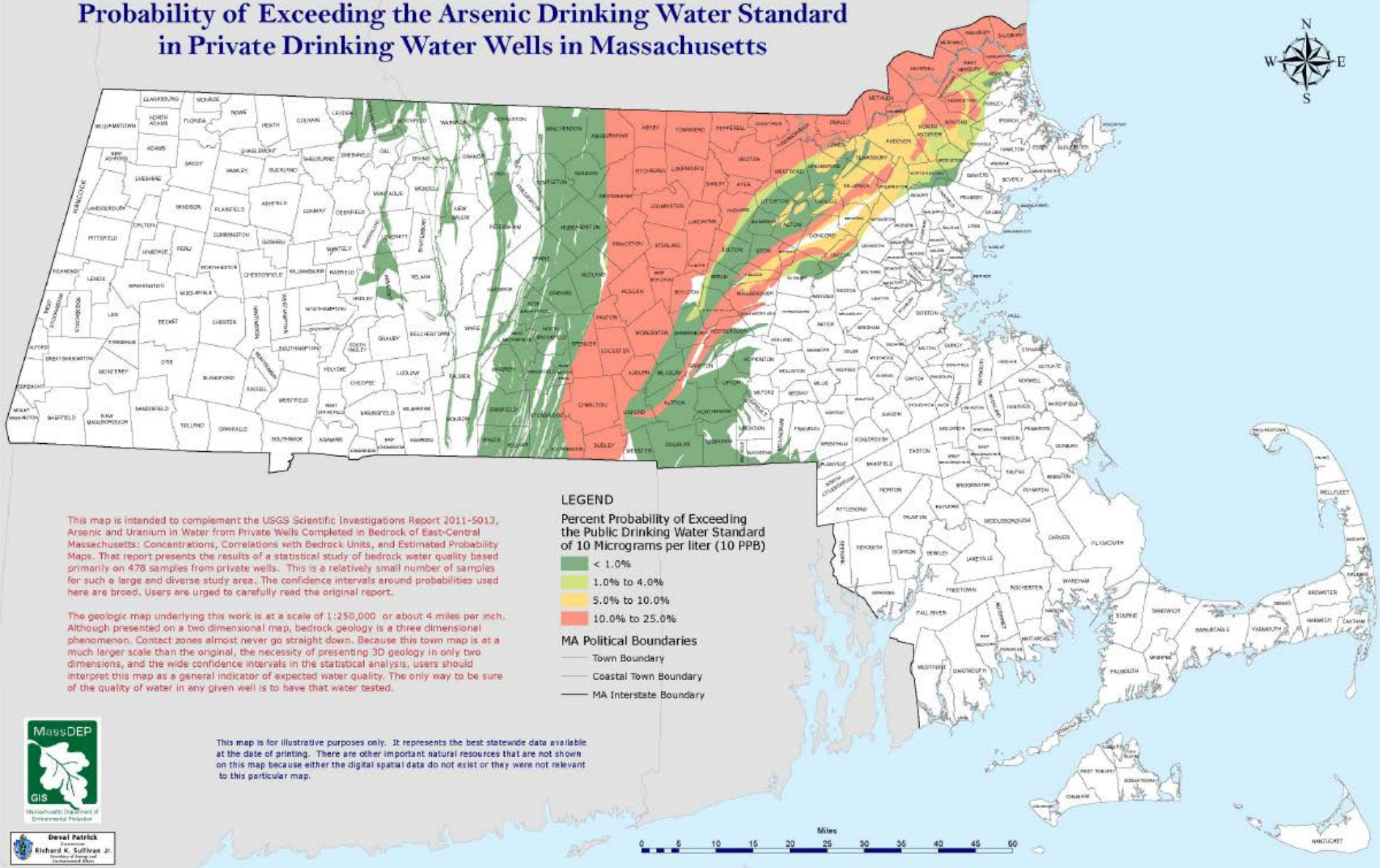
Sarah

For the B1B8 TS sample identifier (Lab ID CR96234), do you still have sufficient soil in this to run the metal arsenic?
If so, though I understand Standard TAT is running at 5 days, what would be the quickest TAT, and what would then be the cost?

Project ID:	WILDWOOD @ NORTH INTERMED
SDG ID:	GCR96234
Sample ID#s:	CR96234 - CR96244

Attachment C

Probability of Exceeding the Arsenic Drinking Water Standard in Private Drinking Water Wells in Massachusetts



This map is intended to complement the USGS Scientific Investigations Report 2011-5013, Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts: Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps. That report presents the results of a statistical study of bedrock water quality based primarily on 478 samples from private wells. This is a relatively small number of samples for such a large and diverse study area. The confidence intervals around probabilities used here are broad. Users are urged to carefully read the original report.

The geologic map underlying this work is at a scale of 1:250,000 or about 4 miles per inch. Although presented on a two dimensional map, bedrock geology is a three dimensional phenomenon. Contact zones almost never go straight down. Because this town map is at a much larger scale than the original, the necessity of presenting 3D geology in only two dimensions, and the wide confidence intervals in the statistical analysis, users should interpret this map as a general indicator of expected water quality. The only way to be sure of the quality of water in any given well is to have that water tested.

This map is for illustrative purposes only. It represents the best statewide data available at the date of printing. There are other important natural resources that are not shown on this map because either the digital spatial data do not exist or they were not relevant to this particular map.

MassDEP GIS
Massachusetts Department of Environmental Protection

Deval Patrick
Governor
Richard K. Sullivan Jr.
Secretary of Energy and Environmental Affairs

LGCI
Lahlaf Geotechnical Consulting, Inc.

December 10, 2024

Ms. Rani Philip
Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944
E-mail: rphilip@DoreandWhittier.com

Re: **Preliminary Geotechnical Report**
Proposed Wildwood Early Childhood Center
North Intermediate School – 320 Salem Street Site
Wilmington, MA
LGCI Project No. 2437

Dear Ms. Philip:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has completed a preliminary geotechnical study for the proposed Wildwood Early Childhood Center in Wilmington, Massachusetts. We are submitting our preliminary geotechnical report electronically. Please notify us if you need a hard copy.

The soil samples from our explorations are currently stored at LGCI for further analysis, if requested. Unless notified otherwise, we will dispose of the soil samples after three (3) months.

Thank you for choosing LGCI as your geotechnical engineer.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

LGCI
Lahlaf Geotechnical Consulting, Inc.

PRELIMINARY GEOTECHNICAL REPORT
PROPOSED WILDWOOD EARLY CHILDHOOD CENTER
NORTH INTERMEDIATE SCHOOL – 320 SALEM STREET SITE
WILMINGTON, MASSACHUSETTS

LGCI Project No. 2437
December 10, 2024

Prepared for:

Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944

PRELIMINARY GEOTECHNICAL REPORT
PROPOSED WILDWOOD EARLY CHILDHOOD CENTER
NORTH INTERMEDIATE SCHOOL – 320 SALEM STREET SITE
WILMINGTON, MASSACHUSETTS
LGCI Project No. 2437
December 10, 2024

Prepared for:

Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944

Prepared by:

LAHLAF GEOTECHNICAL CONSULTING, INC.
100 Chelmsford Road, Suite 2
Billerica, Massachusetts 01862
Phone: (978) 330-5912
Fax: (978) 330-5056

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

TABLE OF CONTENTS

1. PROJECT INFORMATION 2

1.1 Project Authorization 2
1.2 Purpose and Scope of Services 2
1.3 Site Description 2
1.4 Project Description 2
1.5 Elevation Datum 3

2. SITE AND SUBSURFACE CONDITIONS 4

2.1 Surficial Geology 4
2.2 LGCI's Explorations 4
2.2.1 General 4
2.2.2 LGCI's Soil Borings 5
2.2.3 LGCI's Test Pits 5
2.2.4 Exploration Logs and Locations 5
2.3 Subsurface Conditions 5
2.4 Groundwater 8
2.5 Laboratory Test Data 8
2.6 Double Ring Infiltrometer Tests 8

3. EVALUATION AND RECOMMENDATIONS 10

3.1.1 General 10
3.1.2 Topsoil, , Existing Fill Buried Organic Soil, Buried Subsoil, and Swamp Deposits 10
3.1.3 Additional Explorations 11
3.2 Foundation Recommendations 11
3.2.1 Footing Design 11
3.2.2 Settlement 12
3.3 Concrete Slab Considerations 12
3.4 Under-slab Drainage 13
3.5 Seismic Design Criteria 13
3.6 Lateral Pressures for Wall Design 14
3.6.1 Lateral Earth Pressures 14
3.6.2 Perimeter Drains 15
3.7 Pavement and Sidewalk Considerations 15
3.7.1 General 15
3.7.2 Pavement Sections 15
3.7.3 Sidewalks 16
3.8 Underground Utilities 16

4. CONSTRUCTION CONSIDERATIONS 18

4.1 Subgrade Preparation 18
4.2 Subgrade Protection 19
4.3 Fill Materials 19
4.3.1 Structural Fill 20
4.3.2 Ordinary Fill 20
4.4 Reuse of Onsite Materials 20
4.5 Groundwater Control Procedures 21
4.6 Temporary Excavations 21

5. RECOMMENDATIONS FOR FUTURE WORK 22

6. REPORT LIMITATIONS 23

7. REFERENCES 24

List of Tables and Figures

Table 1	Summary of LGCI's Borings
Table 2	Summary of LGCI's Test Pits
Figure 1	Site Location Map
Figure 2	Surficial Geologic Map
Figure 3A	Exploration Location Plan - South
Figure 3B	Exploration Location Plan - North

List of Appendices

Appendix A	LGCI's Boring Logs
Appendix B	LGCI's Test Pit Logs
Appendix C	Laboratory Test Results
Appendix D	Results of Double Ring Infiltrometer Tests

1. PROJECT INFORMATION

1.1 Project Authorization

This geotechnical report presents the results of the subsurface explorations and a geotechnical evaluation performed by Lahlaf Geotechnical Consulting, Inc. (LGCI) for the proposed Wildwood Early Childhood Center in Wilmington, Massachusetts. We performed our services in general accordance with our proposal No. 24084 dated August 9, 2024, and proposal No. 24107 dated October 15, 2024. Ms. Rani Philip of Dore and Whittier Architects, Inc. (Dore and Whittier) authorized our services by signing our proposals Nos. 24084 and 24107 on August 9, and October 15, 2024, respectively.

1.2 Purpose and Scope of Services

The purpose of our geotechnical services was to perform preliminary subsurface explorations at the site for the proposed Wildwood Early Childhood Center, and to provide preliminary foundation design and construction recommendations. LGCI performed the following services:

- Coordinated our exploration locations with Dore and Whittier and with school staff.
- Marked the exploration locations at the site and notified Dig Safe Systems Inc. (Dig Safe) and the Town of Wilmington for utility clearance.
- Engaged a drilling subcontractor for two (2) days to advance eight (8) soil borings at the site.
- Coordinated with Dore and Whittier who arranged with the Town of Wilmington's Department of Public Works (DPW) to perform five (5) test pits at the site, as requested by the civil engineer.
- Provided an LGCI geotechnical field representative at the site to coordinate and observe the borings and test pits, describe the soil samples, and prepare field logs. The LGCI representative performed four (4) double ring infiltrometer tests within test pits TP-1, TP-2, TP-3, and TP-4.
- Submitted six (6) soil samples for laboratory tests, including two (2) soil samples from the borings, and four (4) samples from the test pits where double ring infiltrometer tests were performed.
- Prepared this preliminary geotechnical report containing the results of our preliminary subsurface explorations and our preliminary recommendations for foundation design and construction.

Our scope does not include preparing specifications, reviewing contract documents, and providing construction services. LGCI would be pleased to perform these services when needed. Recommendations for stormwater management, erosion control, pavement design, slope stability analyses, site specific seismic and liquefaction analyses, pile analysis and design, FEMA 100-year flood elevation, historic uses of site, contaminated soil and groundwater treatment and disposal requirements and techniques, and cost or quantity estimates are not included in our scope of work.

LGCI's scope of services does not include an environmental assessment for the presence or absence of wetlands or analytical testing for hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site, or mold in the soil or in any structure at the site. Any statements regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client.

1.3 Site Description

Our understanding of the site is based on our field observations, our discussions with Dore and Wittier, and on the following document:

- Drawing EX-1 titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts," (Existing Conditions Plan) prepared by Nitsch Engineering, dated October 24, 2024, and provided to LGCI by Dore and Whittier via e-mail on November 11, 2024.

The North Intermediate School site is located at 320 Salem Street in Wilmington, Massachusetts as shown in Figure 1. The site is bordered by private residential properties and Salem Street on the southern side, by Ballardvale Street on the eastern side, and by private properties on the western and northern sides. The site is occupied by the existing school building, a drop off loop, a paved parking lot, a playground, a basketball court and tennis courts, and athletic fields, including a baseball field and a soccer field.

Based on the Existing Conditions Plan, the grades at the site generally range between El. 90 feet and El. 108 feet, generally rising in the north to south direction.

1.4 Project Description

Our understanding of the proposed construction is based on our discussions with Dore and Whittier and on the following drawing:

- "Site Base Condition, Wilmington Schools, North Intermediate- Wilmington, MA," (Site Base Conditions) prepared by Dore and Whittier, undated, and provided to LGCI by Dore and Whittier on October 11, 2024.

We understand that at this time, the size, layout, and location of the proposed school are preliminary. Based on the Site Base Conditions, the proposed school will have an irregular shape

and will have a footprint of about 80,500 square feet. The proposed building will be located in the area of the existing athletic fields north of the existing building. We understand that the existing building will be demolished to allow for the construction of the proposed athletic fields.

Information about the proposed building finished floor elevation (FFE) and the proposed grading are not available at the time of this report.

1.5 Elevation Datum

We understand that the elevations provided in the Existing Conditions Plan are referenced with respect to the North American Vertical Datum of 1988 (NAVD 1988).

2. SITE AND SUBSURFACE CONDITIONS

2.1 Surficial Geology

LGCI reviewed a surficial geologic map titled: "Surficial Materials Map of Wilmington Quadrangle, Massachusetts," prepared by Byron D. Stone, J.R. and DiGiacomo-Cohen, M.L., Scientific Investigation Map 3402, Quadrangle 113 – Wilmington, 2018.

The surficial geologic map of the site indicates that the natural soils in the general vicinity of the site consist of coarse deposits.

The coarse deposits consist of sand, sand and gravel, and gravel deposits as described below.

Sand Deposits – The sand deposits are comprised mostly of fine to coarse sand. Coarser layers may contain up to 25 percent gravel. Finer layers may contain fine sand, silt, and clay.

Sand and Gravel Deposits – The sand and gravel deposits occur as a mixture of gravel and sand within individual layers and as alternating layers of sand and gravel. The sand and gravel layers range between 25 to 50 percent gravel and 50 to75 percent sand.

Gravel Deposits – The gravel deposits are comprised of at least 50 percent gravel, cobbles, and boulders. Sand occurs within gravel beds and as separate layers within the gravel.

The surficial geologic map also shows swamp deposits not far from the site.

Swamp Deposits – the swamp deposits consist of organic muck and peat that contain minor amounts of sand, silt, and clay, are stratified and poorly sorted, and occur in swamps and freshwater marshes, in kettle depressions, or in poorly drained areas.

The Surficial Geologic Map is shown in Figure 2.

2.2 LGCI's Explorations

2.2.1 General

LGCI coordinated our exploration locations with Dore and Whittier and marked the exploration locations in the field. LGCI notified Dig Safe and the Town of Wilmington for utility clearance prior to starting our explorations at the site.

Unless notified otherwise, we will dispose of the soil samples obtained during our explorations after three (3) months.

2.2.2 LGCI's Soil Borings

LGCI engaged Soil X, Corp. (Soil X) of Leominster, Massachusetts to advance eight (8) soil borings (B-1 to B-8) at the site on October 28 and 29, 2024. The borings were advanced with a Diedrich D-70 Turbo ATV Drill Rig using hollow stem auger boring techniques with 4-1/4-inch inner diameter augers. The borings extended to depths ranging between 10.2 and 20.2 feet beneath the ground surface. Upon completion, the boreholes were backfilled with drill cuttings.

Soil X performed Standard Penetration Tests (SPT) and obtained split spoon samples with an automatic hammer at typical depth intervals of 2 feet or 5 feet as noted on the boring logs in general accordance with ASTM D-1586.

An LGCI geotechnical field representative observed and logged the borings in the field.

2.2.3 LGCI's Test Pits

Dore and Whittier coordinated with the Town of Wilmington DPW to perform five (5) test pits (TP-1, TP-2, TP-2A, TP-3, and TP-4) at the site on October 30 and 31, 2024. The purpose of the test pits was to perform double ring infiltrometer tests as described in Section 2.6. The test pits were excavated with a Volvo EWR150E excavator with a smooth-edge bucket. The test pits extended to depths ranging between 8.0 and 11.3 feet beneath the ground surface. Upon completion, the excavations were backfilled with excavated material in 12- to 18-inch lifts and tamped with the excavator bucket.

An LGCI geotechnical field representative observed and logged the test pits in the field.

2.2.4 Exploration Logs and Locations

The boring and test pit locations are shown in Figure 3A and Figure 3B. Appendices A and B contain LGCI's boring logs and test pits logs, respectively, and Tables 1 and 2 include summaries of LGCI's borings and test pits, respectively.

2.3 Subsurface Conditions

The subsurface description in this report is based on a limited number of explorations and is intended to highlight the major soil strata encountered during our explorations. The subsurface conditions are known only at the actual exploration locations. Variations may occur and should be expected between exploration locations. The exploration logs represent conditions that we observed at the time of our explorations and were edited, as appropriate, based on the results of the laboratory test data and inspection of the soil samples in the laboratory. Percentages of fines, sand, and gravel were estimated to the nearest 5 percent based on our field observations and laboratory inspection of the soil samples, except where a grain-size analysis was performed. The

strata boundaries shown in our exploration logs are based on our interpretations and the actual transitions may be gradual. Graphic soil symbols are for illustration only.

The soil strata encountered in LGCI's borings and test pits were as follows, starting at the ground surface.

Topsoil – A layer of surficial organic topsoil was encountered at the ground surface in borings B-1 to B-7, and in all test pits. The thickness of the topsoil ranged between 0.6 feet and 2.0 feet.

Fill – A layer of fill was encountered at the ground surface in boring B-8 and beneath the topsoil in all borings and test pits. The fill extended to depths ranging between 0.7 and 7.0 feet beneath the ground surface. The samples within this layer were mostly described as well graded sand, poorly graded sand, and silty sand. The fines content in the fill ranged between 0 and 30 percent, and the gravel content ranged between 0 and 25 percent. The fill contained traces of organic soil and roots. The fill contained 5 to 10 percent cobbles up to 12 inches in size in test pit TP-1.

The SPT N-values in this layer ranged between 7 blows per foot (bpf) and 54 bpf, with most values lower than 18 bpf, indicating mostly loose to medium dense material.

The excavation efforts within the fill layer ranged between easy, moderate, and difficult.

Buried Organic Soil – A layer of buried organic soil was encountered beneath the fill layer in borings B-2, B-5, and B-7 The buried organic soil extended to depths of 4.0, 4.4, and 8.0 feet beneath the ground surface in borings B-2, B-5, and B-7, respectively. The samples in this layer were described as silty sand. The fines content in the buried organic soil ranged between 25 and 45 percent. The buried organic soil contained traces of organic soil and roots.

The SPT N-values in this layer ranged between 16 bpf and 40 bpf, indicating medium dense to dense material.

Buried Subsoil – A layer of buried subsoil was encountered beneath the fill in boring B-8 and test pit TP-4. The subsoil extended to depths of 4.0 and 3.2 feet beneath the ground surface in boring B-8 and test pit TP-4, respectively. In boring B-8, the samples were described as silty sand. The fines content in the subsoil ranged between 15 and 35 percent, and the gravel content ranged between 0 and 15 percent. In test pit TP-4, the sample was described as poorly graded sand. The fines content ranged between 10 and 15 percent, and the gravel content ranged between 0 and 5 percent. The samples contained traces of organic soil and roots.

The SPT N-values in this layer ranged between 11 bpf and 14 bpf, indicating a medium dense material.

The excavation effort within the subsoil layer was easy, consistent with loose to medium dense material.

Silt – A layer of silt was encountered beneath the fill layer in boring B-1 and extended to a depth of 9.0 feet beneath the ground surface. The sample was described as silt and was slightly plastic. The sand content ranged between 5 and 10 percent.

The SPT N-value in this layer was 13 bpf, indicating stiff material.

Clay – A layer of clay was encountered beneath the layer of silt in boring B-1 between depths of 9.0 to 14.0 feet. The sample was described as lean clay and was slightly plastic. The sand content ranged between 15 and 20 percent.

The SPT N-value in this layer was 12 bpf, indicating stiff material.

Swamp Deposit – A layer of swamp deposits was encountered beneath the layer of fill in test pit TP-1 and extended to a depth of 10 feet beneath the ground surface. The sample was described as silty sand. The fines content ranged between 20 and 25 percent and the gravel content ranged between 10 and 15 percent. The swamp deposit had traces of organic soil, roots, and an organic odor.

The excavation effort within the swamp deposit layer was difficult possibly due to the presence of roots.

Sand – A layer of sand was encountered in test pit TP-1 and extended to a depth of 11.0 feet beneath the ground surface. The sand was described as poorly graded sand. The fines content ranged between 0 and 5 percent.

The excavation effort within the sand layer was difficult.

Sand and Gravel – A layer of sand and gravel was encountered in all borings and test pits, except in test pit TP-1, and extended to the termination depths of the borings and test pits, except for boring B-6 where the sand and gravel layer extended to the top of weathered rock. The samples in this layer were mostly described as well graded sand and silty sand. Five (5) samples were described as poorly graded sand. The fines content in this layer ranged between 0 and 25 percent, and the gravel content ranged between 0 and 40 percent.

The SPT N-values in this layer ranged between 15 bpf and refusal, with most values ranging between 20 bpf and 67 bpf, indicating dense to very dense material. Please note that the high SPT N-values in the sand and gravel may be due to obstructions such as cobbles and boulders in the sand and gravel and may not represent the true density of the sand and gravel.

Weathered Rock – A layer of weathered rock was encountered in boring B-6 and extended to the termination depth of 19.7 feet beneath the ground surface. The sample within this layer was described as silty sand. The fines content ranged between 15 and 20 percent, and the gravel content ranged between 35 and 40 percent.

2.4 Groundwater

Groundwater was encountered in all the borings, except for B-3, and in test pits TP-1 and TP-2A, at depths ranging between 9.0 and 14.0 feet beneath the ground surface, as shown in Tables 1 and 2, and in the boring and test pit logs.

The groundwater information reported herein is based on observations made during or shortly after the completion of drilling and excavation. The reported groundwater levels may not represent the actual groundwater conditions, as additional time may be required for the groundwater levels to stabilize. The groundwater information presented in this report only represents the conditions encountered at the time and location of the explorations. Seasonal fluctuation should be anticipated.

2.5 Laboratory Test Data

LGCI submitted six (6) soil samples collected from the borings for grain-size analysis. The results of the grain-size analyses are provided in the test data sheets included in Appendix C and are summarized in the table below.

Grain-Size Analysis Test Results

Exploration No.	Sample No.	Stratum	Sample Depth (ft.)	Percent Gravel	Percent Sand	Percent Fines
B-1	S2	Fill	2.0 – 4.0	36.5	43.5	20.0
B-4	S2	Sand and Gravel	2.0 – 4.0	36.9	42.6	20.5
TP-1	Infiltrometer	Fill	5.0	14.1	58.9	27.0
TP-2	Infiltrometer	Fill	4.0	6.8	77.3	15.9
TP-3	Infiltrometer	Sand and Gravel	4.0	31.4	67.1	1.5
TP-4	Infiltrometer	Sand and Gravel	4.6	30.4	58.6	11.0

2.6 Double Ring Infiltrometer Tests

LGCI provided a geotechnical field engineer to perform four (4) double ring infiltrometer tests in test pits TP-1 to TP-4 (one in each).

In each case, the excavation was first advanced to the test depth where the test pit bottom was leveled using the excavator bucket. After the infiltrometer rings were driven into the ground, the test was conducted by filling the rings with water. The test pit was advanced deeper after the completion of the test.

The test results are included in Appendix D and are summarized below.

The results include plots of the hydraulic conductivity for flow within the inner and outer rings. The stabilized portion of the plot for the inner ring indicates the permeability value. The results indicate the following approximate permeability, K, value:

Double Ring Infiltrometer Test Results

Test Pit	Stratum	Test Depth (ft.)	Permeability, K (cm/sec)
TP-1	Fill	5.0	1.00×10^{-3}
TP-2	Fill	4.0	4.06×10^{-3}
TP-3	Sand and Gravel	4.0	6.73×10^{-2}
TP-4	Sand and Gravel	4.5	8.95×10^{-2}

3. EVALUATION AND RECOMMENDATIONS

3.1 Foundation Recommendations

3.1.1 General

Based on the results of the borings and test pits, the subsurface conditions at the site are suitable to support the proposed building after the topsoil, existing fill, buried organic soil, buried subsoil, and swamp deposits are removed or improved as described below. There are a few issues that we would like to highlight for consideration and discussion.

3.1.2 Topsoil, , Existing Fill Buried Organic Soil, Buried Subsoil, and Swamp Deposits

- The topsoil should be removed from within the entire construction area, including the proposed building footprint and the proposed paved areas.

- The existing fill was observed to be variable in composition and density. The existing fill contained traces of organic soil and roots. In addition, the existing fill overlaid buried organic soil and buried subsoil. Existing fill that was not placed with strict moisture, density, and gradation control presents risk of unpredictable settlement that may result in poor performance of floor slabs and foundations. Due to these risks, the existing fill, the buried organic soil, and the buried subsoil should be entirely removed from within the proposed building's footprint and should be replaced with Structural Fill. We anticipate that the removal will extend up to depths ranging between 2 and 6 feet beneath the existing ground surface, and up to a depth of 8 feet beneath the ground surface near boring B-7. The removal may extend to greater depths at locations not explored by LGCI. Laterally, the removal should extend beyond the proposed building's footprint a distance equal to the distance between the bottom of the proposed footings and the top of the native sand and gravel, or 5 feet, whichever is greater.

- At test pit TP-1, performed outside of the proposed building footprint, swamp deposits were observed beneath the existing fill and extended to a depth of 10 feet beneath the ground surface. If encountered within the proposed building footprint, the swamp deposits should be removed and replaced with Structural Fill.

- After the topsoil, existing fill, buried organic soil, buried subsoil, and swamp deposits, if any, are removed from within the proposed building footprint and zone of influence of footings, as described above, the proposed building and other structures may be supported on shallow footings bearing in Structural Fill placed directly on top of the native sand and gravel or stiff silt and clay.

- As an alternative to the removing the existing fill, the buried organic soil, and the buried subsoil we considered the option of improving the ground using aggregate piers (APs) or

rigid inclusions (RIs). We dismissed this option due to the depth to the bottom of these layers being 6 feet or less in a few explorations. We will reconsider this option after additional explorations are performed at the site during future phases of the project.

- The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1.

- The proposed slab may be designed as a slab-on-grade bearing on Structural Fill placed directly on top of the native sand and gravel or stiff silt and clay.

- Within paved areas, the existing fill and the buried organic soil and buried subsoil should be removed to the top of the native sand and gravel or stiff silt and clay or to a depth of 18 inches beneath the bottom of the proposed pavement, whichever occurs first. Where soft organic soil is exposed, the organic soil should be removed. The existing fill and buried organic soil and buried subsoil deeper than 18 inches beneath the bottom of the proposed pavement can remain in place provided that these materials are firm and unyielding following proofrolling as described in Section 4.1.

3.1.3 Additional Explorations

We recommend advancing additional explorations at the site during the schematic design (SD) phase and/or the design development (DD) phase. The additional explorations should include soil borings and test pits. We recommend installing at least one (1) groundwater observation well as part of the additional explorations.

3.2 Foundation Recommendations

We recommend supporting the proposed building on shallow footings placed on Structural Fill placed directly the native sand and gravel layer or the stiff silt and clay. Shallow foundations and slabs-on-grade should be placed on a subgrade that is prepared in accordance with the recommendations in this report. Recommendations for footing design and our settlement estimates are presented in Sections 3.2.1 and 3.2.2, respectively.

3.2.1 Footing Design

- Footings should be founded on Structural Fill placed directly on the native sand and gravel or on the stiff silt and clay. A representative of LGCI should observe the subgrade during construction to confirm that it is consistent with the materials encountered in our borings.

- For footing design, we recommend using a net allowable bearing pressure of 4 kips per square foot (ksf).

- The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1.

- Foundations should be designed in accordance with The Commonwealth of Massachusetts State Building Code 780 CMR, Tenth Edition (MSBC 10th Edition).

- Exterior footings and footings in unheated areas should be placed at a minimum depth of 4.0 feet below the final exterior grade to provide adequate frost cover protection. Interior footings in heated areas may be designed and constructed at a minimum depth of 2 feet below finished floor grades.

- We recommend that wall footings have a minimum width of 2 feet, and that column footings have a minimum width of 3 feet. For foundations with a least lateral dimension smaller than 3 feet, the allowable bearing pressure should be reduced to 1/3 of the recommended allowable bearing pressure times the least dimension in feet.

- Wall footings should be designed and constructed with continuous, longitudinal steel reinforcement for greater bending strength to span across small areas of loose or soft soils that may go undetected during construction.

3.2.2 Settlement

Using the allowable bearing pressure of 4 ksf and the minimum footing sizes recommended above, we estimate for foundations constructed in accordance with the recommendations contained in this report that the total post-construction settlement will be less than about 1 inch and that the differential settlement will be 3/4 inch or less over a distance of 25 feet. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be assessed by the structural engineer.

3.3 Concrete Slab Considerations

- The proposed floor slab can be constructed as a slab-on-grade bearing on a minimum of 12 inches of Structural Fill placed directly on top of the native sand and gravel.

- To reduce the potential for dampness in the proposed floor slab, the project architect may consider placing a vapor barrier beneath the floor slab. The vapor barrier should be protected from puncture during construction of the slab.

- For the design of the floor slab bearing on the materials described above, we recommend using a modulus of subgrade reaction, k_{s1}, of 100 tons per cubic foot (tcf). Please note that the values of k_{s1} are for a 1 x 1 square foot area. These values should be adjusted for larger areas using the following expression:

$$Modulus\ of\ Subgrade\ \text{Re}action\ (k_s) = k_{s1} * \left(\frac{B+1}{2B}\right)^2$$

where:

k_s = Coefficient of vertical subgrade reaction for loaded area,
k_{s1} = Coefficient of vertical subgrade reaction for 1 x 1 square foot area, and
B = Width of area loaded, in feet.

Please note that cracking of slabs-on-grade can occur as a result of heaving or compression of the underlying soil, but also as a result of concrete curing stresses. To reduce the potential for cracking, the precautions listed below should be closely followed for construction of all slabs-on-grade:

- Construction joints should be provided between the floor slab and the walls and columns in accordance with the American Concrete Institute (ACI) requirements, or other applicable code.

- Backfill in interior and exterior utility trenches should be properly compacted.

- In order for the movement of exterior slabs not to be transmitted to the building foundation or superstructure, exterior slabs such as approach slabs and sidewalks, should be isolated from the building superstructure.

3.4 Under-slab Drainage

Based on the groundwater levels observed in our borings, we believe that an under-slab drainage system is not required beneath the slab.

3.5 Seismic Design Criteria

In accordance with Section 1613 of MSBC 10th Edition and based on the boring data, the seismic criteria are as follows:

- Site Class: D
- Spectral Response Acceleration at short period, S_s (Table 1604.11): 0.327g
- Spectral Response Acceleration at 1 sec., S_1 (Table 1604.11): 0.072g
- Site Coefficient, F_a (Table 1613.3.3(1)): 1.6
- Site Coefficient, F_v (Table 1613.3.3(2)): 2.4
- Adjusted spectral response S_{ms} (Equation 16-37): 0.523g
- Adjusted spectral responses S_{m1} (Equation 16-38): 0.173g

Based on the SPT data from the borings, we believe the site soils are not susceptible to liquefaction.

3.6 Lateral Pressures for Wall Design

3.6.1 Lateral Earth Pressures

Based on our understanding, the proposed construction will not include retaining walls or below-ground walls. Should the design change, the lateral earth pressures recommended shown below should be used to design proposed retaining walls.

Coefficient of Active Earth Pressure, K_A:	0.33
Coefficient of At-Rest Earth Pressure, K_o:	0.50
Coefficient of Passive Earth Pressure, K_p:	3.0
Total Unit Weight γ:	125 pcf

Note: The values in the table are based on a friction angle for the backfill of 30 degrees and neglecting friction between the backfill and the wall. The design active and passive coefficients are based on horizontal surfaces (non-sloping backfill) on both the active and passive sides, and a vertical wall face.

- Exterior walls of below-ground spaces and retaining walls braced at the top to restrain movement/rotation, should be designed using the "at-rest" pressure coefficient.

- We recommend placing free-draining material within the 3 feet immediately behind retaining walls. We recommend providing weep holes in site walls to promote drainage where possible; or a pipe should be placed at the base of the wall to collect the groundwater. Groundwater collected by the wall drains should be discharged in a lower area if gravity flow is possible.

- Passive earth pressures should only be used at the toe of the wall where special measures or provisions are taken to prevent disturbance or future removal of the soil on the passive side of the wall, or in areas where the wall design includes a key. In any case, the passive pressures should be neglected in the top 2 feet.

- Where a permanent vertical uniform load will be applied on the active side immediately adjacent to the wall, a horizontal surcharge load equal to half of the uniform vertical load should be applied over the height of the wall. At a minimum, a temporary construction surcharge of 100 psf should be applied uniformly over the height of the wall.

- We recommend using an ultimate friction factor of 0.5 between the native sand and gravel or Structural Fill and the bottom of the wall. Below-grade walls should be designed for minimum factors of safety of 1.5 for sliding and 2.0 for overturning. We recommend a factor of safety of 1.5 for global stability of walls.

3.6.2 Perimeter Drains

- Should the design change to include retaining walls, free-draining material should be placed within 3 feet of retaining walls and walls of below-grade spaces. To reduce the potential for dampness in below-ground spaces, if any, perimeter walls of the proposed below-ground spaces should be damp-proofed.

- We recommend that drains be provided behind the exterior of walls of below-ground spaces, if any, and behind site retaining walls, if any. The drains should consist of 6-inch perforated PVC pipes installed with the slots facing down. Perimeter drains should be installed at the bottom of the wall in 18 inches of crushed stone wrapped in a geotextile fabric for separation and filtration. Site retaining walls may be designed with weep holes discharging near the bottom of the face of the walls.

- Groundwater collected by the wall drains could be discharged in a lower area if gravity flow is possible. Alternatively, it should be discharged into the street drains. A permit would be required for discharge into street drains.

3.7 Pavement and Sidewalk Considerations

3.7.1 General

The subsurface conditions encountered at the site are generally suitable to support the proposed driveways, parking lots, and sidewalks after preparation of the subgrade as described in Section 4.1.

- We recommend entirely removing the topsoil and asphalt from within the footprint of the proposed driveways and parking lots.

- The existing fill should be improved within the proposed paved areas and under sidewalks in accordance with the recommendations in Sections 3.1.1 and 4.1.

Cobbles and boulders should be removed to at least 18 inches below the bottom of the pavement and sidewalks.

3.7.2 Pavement Sections

A typical, minimum, standard-duty pavement section that could be used for parking areas is as follows:

1.5" Asphalt "Top Course"
2.0" Asphalt "Base Course"
8" Processed Gravel for Sub-Base (MassDOT M1.03.1)

A typical, minimum, heavy-duty pavement section that could be used for areas of heavy truck traffic is as follows:

2.0" Asphalt "Top Course"
2.5" Asphalt "Base Course"
12" Processed Gravel for Sub-Base (MassDOT M1.03.1)

The pavement sections shown above represent minimum thicknesses representative of typical local construction practices for similar use. Periodic maintenance should be anticipated.

Pavement material types and construction procedures should conform to specifications of the "Standard Specifications for Highways and Bridges," prepared by the Commonwealth of Massachusetts Department of Transportation dated 2023.

Areas to receive relatively highly concentrated, sustained loads such as dumpsters, loading areas, and storage bins are typically installed over a rigid pavement section to distribute concentrated loads and reduce the possibility of high stress concentrations on the subgrade. Typical rigid pavement sections consist of 6 inches of concrete placed over a minimum of 12 inches of subbase material.

3.7.3 Sidewalks

- Sidewalks should be placed on a minimum of 12 inches of Structural Fill with less than 5 percent fines.

- To reduce the potential for heave caused by surface water penetrating under the sidewalk, the joints between sidewalk concrete sections should be sealed with a waterproof compound. The sidewalks should be sloped away from the building or other vertical surfaces to promote flow of water. To the extent possible, roof leaders should not discharge onto sidewalk surfaces.

3.8 Underground Utilities

Boulders at the bottom of utility trenches should be removed to at least 12 inches below the pipe invert and the resulting excavation should be backfilled with suitable backfill. Utilities should be placed on suitable bedding material in accordance with the manufacturer's recommendations. "Cushion" material should be placed, by hand, above the utility pipe in maximum 6-inch lifts. The lift should be compacted by hand to avoid damage to the utility. Where the bedding/cushion material consists of crushed stone, it should be wrapped in a geotextile fabric.

Before placing the bedding material, the bottom of utility trenches should be compacted to a firm and unyielding condition. Where soft or pumping material is encountered, it should be removed and replaced with Ordinary Fill.

Compaction of fill in utility trenches should be in accordance with our recommendations in Section 4.3. To reduce the potential for damage to utilities, placement and compaction of fill immediately above the utilities should be performed in accordance with the manufacturer's recommendations.

4. CONSTRUCTION CONSIDERATIONS

4.1 Subgrade Preparation

- Existing asphalt, topsoil, existing fill, buried organic soil, buried subsoil, swamp deposits, if any, organic materials, abandoned utilities, buried foundations, remnants of demolished buildings, and other below-ground structures should be entirely removed from within the footprint of the proposed building before the start of foundation work.

- Tree stumps, root balls, and roots larger than ½ inch in diameter should be removed and the cavities filled with suitable material and compacted per Section 4.3 of this report.

- Cobbles and boulders should be removed at least 6 inches from beneath footings and 18 inches beneath the bottom of slabs and paved areas. The resulting excavations should be backfilled with compacted Structural Fill under the building and with Ordinary Fill under the subbase of paved areas.

- We recommend removing the existing fill, buried organic soil, buried subsoil, and swamp deposits, if any, from within the proposed building footprint and within the zone of influence of footings. We recommend compacting the exposed subgrade in the native sand and gravel layer or in the deep existing fill to a firm and unyielding condition with at least six (6) passes of a heavy roller compactor imparting a minimum dynamic effort of 40 kips. Where organic soil is exposed or where the subgrade is soft during the compaction effort, the organic soil or soft material should be removed and replaced with Structural Fill. The subgrade in the stiff silt and clay should be cut with a smooth bladed bucket and compacted statically with no more than 2 passes of a roller compactor.

- After the surficial topsoil, buried organic soil, buried subsoil, and existing fill are removed to a depth of 18 inches below the bottom of the proposed pavement, the exposed existing fill, buried organic soil, and buried subsoil should be improved by compacting the exposed surface of the existing fill with at least six (6) passes of a vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft organic soil or other soft materials of soil are observed, the organic soil or other soft material should be removed, and the grade should be restored using Ordinary Fill to the bottom of the proposed subbase layer. If pumping of the existing fill or buried subsoil deeper than 18 inches beneath the bottom of the proposed pavement is observed, the soft and/or pumping material should be removed and replaced.

- The base of footing excavations should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing concrete.

- The subgrade of the proposed slab should be compacted with a dynamic vibratory compactor imparting a minimum of 10 kips of force to the subgrade before placing Structural Fill.

- To reduce the potential for disturbance of the footing subgrade, excavations should be extended an additional 12 inches and restored with Structural Fill or crushed stone to serve as a working mat.

- Fill placed within the footprint of the proposed building should meet the gradation and compaction requirements of Structural Fill shown in Section 4.3.1.

- Fill placed under the subbase of paved areas should meet the gradation and compaction requirements of Ordinary Fill shown in Section 4.3.2.

- Fill placed in the top 12 inches beneath sidewalks should consist of Structural Fill with less than 5 percent fines.

- An LGCI geotechnical representative should observe the exposed subgrades prior to fill and concrete placement to verify that the exposed bearing materials are suitable for the design soil bearing pressure.

- If soft or loose pockets are encountered in the footing excavations, the soft or loose materials should be removed, and the bottom of the footing should be placed at a lower elevation on firm soil, or the resulting excavation should be backfilled with Structural Fill or crushed stone wrapped in a geotextile filter fabric.

4.2 Subgrade Protection

The onsite sand and gravel is frost susceptible. If construction takes place during freezing weather, special measures should be taken to prevent the subgrade from freezing. Such measures should include the use of heat blankets or excavating the final 6 inches of soil just before pouring concrete. Footings should be backfilled as soon as possible after footing construction. Soil used as backfill should be free of frozen material, as should the ground on which it is placed. Earthwork operations should be suspended during freezing weather.

Materials with high fines content are typically difficult to handle when wet as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor should keep exposed subgrades properly drained and free of ponded water. Subgrades should be protected from machine and foot traffic to reduce disturbance.

4.3 Fill Materials

Fill placed within the footprint of the proposed building should meet the gradation and compaction requirements of Structural Fill. Fill placed outside the building footprint beneath any pavement subbase should meet the gradation and compaction requirements of Ordinary Fill.

Structural Fill and Ordinary Fill should consist of inert, hard, durable sand and gravel, free from organic matter, clay, surface coatings, and deleterious materials.

4.3.1 Structural Fill

The Structural Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
3 inches	100
1 ½ inch	80 - 100
½ inch	50 – 100
No. 4	30 – 85
No. 20	15 – 60
No. 60	5 – 35
No. 200*	0 – 10

* 0 – 5 Under sidewalks and exterior pads and slabs

4.3.2 Ordinary Fill

Ordinary Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
6 inches	100
1 inch	50 - 100
No. 4	20 – 100
No. 20	10 - 70
No. 60	5 – 45
No. 200	0 – 20

4.4 Reuse of Onsite Materials

Based on the laboratory tests, the granular portion of the existing fill free of organic soil may be used as Ordinary Fill. The onsite materials are not suitable for reuse as Structural Fill.

Soils with high fines content (higher than about 20 percent) are generally very sensitive to moisture content variations and are susceptible to frost. These soils are difficult to compact at

moisture contents that are much higher or much lower than the optimum moisture content determined from the laboratory compaction test. Therefore, strict moisture control should be implemented during stockpiling, placement, and compaction of the existing fill.

All materials to be used as fill should first be tested for compliance with the applicable gradation specifications. During earthwork operations, the contractor should avoid mixing the reusable soils with fine-grained and/or organic soils.

4.5 Groundwater Control Procedures

Based on the groundwater levels encountered in our explorations, we anticipate the need for groundwater control procedures during footing and utility excavations. We anticipate that filtered sump pumps installed in pits located at least 3 feet below the bottom of the excavation may be sufficient to handle surface runoff that may enter the excavation. The contractor should be prepared to use multiple sump pumps as needed.

The contractor should be permitted to employ whatever commonly accepted means and practices are necessary, including well points, if necessary, to maintain the groundwater level below the excavation, and to maintain a dry excavation during wet weather. Placement of reinforcing steel or concrete in standing water should not be permitted.

Groundwater levels should be maintained at a minimum of 1-foot below the bottom of excavations during construction.

To reduce the potential for sinkholes developing over sump pump pits after the sump pumps are removed, the crushed stone placed in the sump pump pits should be wrapped in a geotextile fabric. Alternatively, the crushed stone should be entirely removed after the sump pumps are no longer in use and the sump pump pits should be restored with suitable backfill.

4.6 Temporary Excavations

All excavations to receive human traffic, including utility trenches, basement or footing excavations, or others (i.e. underground storage tanks, etc.), should be constructed in accordance with the OSHA guidelines.

The site soils should generally be considered Type “C” and should have a maximum allowable slope of 1.5 Horizontal to 1 Vertical (1.5H:1V) for excavations less than 20 feet deep. Deeper excavations, if needed, should have a shoring designed by a professional engineer.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of the excavation sides and bottom.

5. RECOMMENDATIONS FOR FUTURE WORK

We recommend engaging LGCI to perform the following services:

- Perform additional explorations at the site and update our geotechnical report.
- Prepare Earth Moving Specifications and review the geotechnical aspect of contract drawings.
- Review contractor submittals and Request for Information (RFIs);
- Provide a field representative during construction to observe the removal of the unsuitable soil, and to observe the subgrade of footings and slabs.

6. REPORT LIMITATIONS

Our analyses and recommendations are based on project information provided to us at the time of this report. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations, and whether our recommendations have been properly implemented in the design.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminants in or around the site.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to 1) make site visits during construction to check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and 2) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our report has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Dore and Whittier Architects, Inc. for the proposed Wildwood Early Childhood Center at the North Intermediate School located at 320 Salem Street Site in Wilmington, Massachusetts as conceived at this time.

7. REFERENCES

In addition to the references included in the text of the report, we used the following references:

American Society of Civil Engineers, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," ASCE/SEI 7-16, 2017.

The Commonwealth of Massachusetts (2024), "The Massachusetts State Building Code, Ninth (10th) Edition."

The Department of Labor, Occupational Safety and Health Administration (1989), "Occupational Safety and Health Standards - Excavations; Final Rule," 20 CFR Part 1926, Subpart P.

USGS Wilmington, MA topographic map from http://mapserver.mytopo.com.

Table 1 - Summary of LGCI's Borings
Proposed Wildwood Early Childcare Center
Wilmington, MA
LGCI Project No. 2437

Boring No.	Ground Surface Elevation (ft.)[1]	Groundwater[2] Depth / **El.** (ft.)	Bottom of Topsoil Depth / **El.** (ft.)	Bottom of Fill Depth / **El.** (ft.)	Bottom of Buried Organic Soil / **Buried Subsoil** Depth / **El.** (ft.)	Bottom of Sand and Gravel Depth / **El.** (ft.)	Bottom of Weathered Rock Depth / **El.** (ft.)	Bottom of Boring Depth / **El.** (ft.)
B-1	93.0	9.0 / **84.0**	0.6 / **92.4**	6.0 [3]/ **87.0**	- / **-**	19.0 [4]/ **74.0**	- / **-**	19.0 / **74.0**
B-2	94.0	9.0 / **85.0**	0.8 / **93.2**	2.8 / **91.2**	4.0 / **90.0**	19.0 [4]/ **75.0**	- / **-**	19.0 / **75.0**
B-3	95.0	- / **-**	0.7 / **94.3**	2.0 / **93.0**	- / **-**	10.2 [4]/ **84.8**	- / **-**	10.2 / **84.8**
B-4	93.0	9.0 / **84.0**	0.6 / **92.4**	2.0 / **91.0**	- / **-**	11.0 [4]/ **82.0**	- / **-**	11.0 / **82.0**
B-5	94.0	9.0 / **85.0**	0.7 / **93.3**	4.0 / **90.0**	4.4 / **89.6**	10.5 [4]/ **83.5**	- / **-**	10.5 / **83.5**
B-6	94.0	14.0 / **80.0**	2.0 / **92.0**	6.0 / **88.0**	- / **-**	19.0 / **75.0**	19.7 [5]/ **74.3**	19.7 / **74.3**
B-7	92.0	10.0 / **82.0**	0.9 / **91.1**	6.0 / **86.0**	8.0 / **84.0**	20.2 [6]/ **71.8**	- / **-**	20.2 / **71.8**
B-8	94.0	9.0 / **85.0**	- / **-**	0.7 / **93.3**	**4.0** / **90.0**	19.8 [6]/ **74.2**	- / **-**	19.8 / **74.2**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled: “Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts,” prepared by Nitsch Engineering, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 8, 2024.
2. Groundwater was measured during drilling, at the end of drilling, after drilling, or based on sample moisture whichever is shallower.
3. A layer of silt was encountered beneath the fill in boring B-1, between depths of 6 to 9 feet, and a layer of clay was encountered beneath the silt between depths of 9 and 14 feet.
4. Boring terminated due to split spoon / auger refusal on possible boulder or rock in the sand and gravel layer.
5. Boring terminated in the weathered rock layer.
6. Boring terminated in the sand and gravel layer.
7. "-" means the groundwater or layer was not encountered.

Table 1 - Summary of LGCI's Test Pits
Proposed Wildwood Early Childcare Center
Wilmington, MA
LGCI Project No. 2437

Test Pit No.	Ground Surface Elevation (ft.)[1]	Groundwater[2] Depth / **El.** (ft.)	Bottom of Topsoil Depth / **El.** (ft.)	Bottom of Fill Depth / **El.** (ft.)	Bottom of Swamp Deposits / **Buried Subsoil** Depth / **El.** (ft.)	Bottom of Sand and Gravel Depth / **El.** (ft.)	Bottom of Sand Depth / **El.** (ft.)	Bottom of Boring Depth / **El.** (ft.)
TP-1	92.0	9.5 / **82.5**	1.5 / **90.5**	7.0 / **85.0**	10.0 / **82.0**	- / **-**	11.0 [4]/ **81.0**	11.0 / **81.0**
TP-2	94.0	- / **-**	0.7 / **93.3**	5.5 / **88.5**	- / **-**	9.0 [3]/ **85.0**	- / **-**	9.0 / **85.0**
TP-2A	94.0	9.5 / **84.5**	1.5 / **92.5**	7.0 / **87.0**	- / **-**	11.3 [3]/ **82.7**	- / **-**	11.3 / **82.7**
TP-3	94.0	- / **-**	0.8 / **93.2**	2.3 / **91.7**	- / **-**	8.0 [3]/ **86.0**	- / **-**	8.0 / **86.0**
TP-4	95.0	- / **-**	1.0 / **94.0**	2.0 / **93.0**	**3.2** / **91.8**	9.0 [3]/ **86.0**	- / **-**	9.0 / **86.0**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled: “Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts,” prepared by Nitsch Engineering, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 8, 2024.
2. Groundwater was measured during drilling, at the end of drilling, after drilling, or based on sample moisture whichever is shallower.
3. Test Pit terminated in the sand and gravel layer.
4. Test Pit terminated in the sand layer.
5. "**-**" means the groundwater or layer was not encountered.

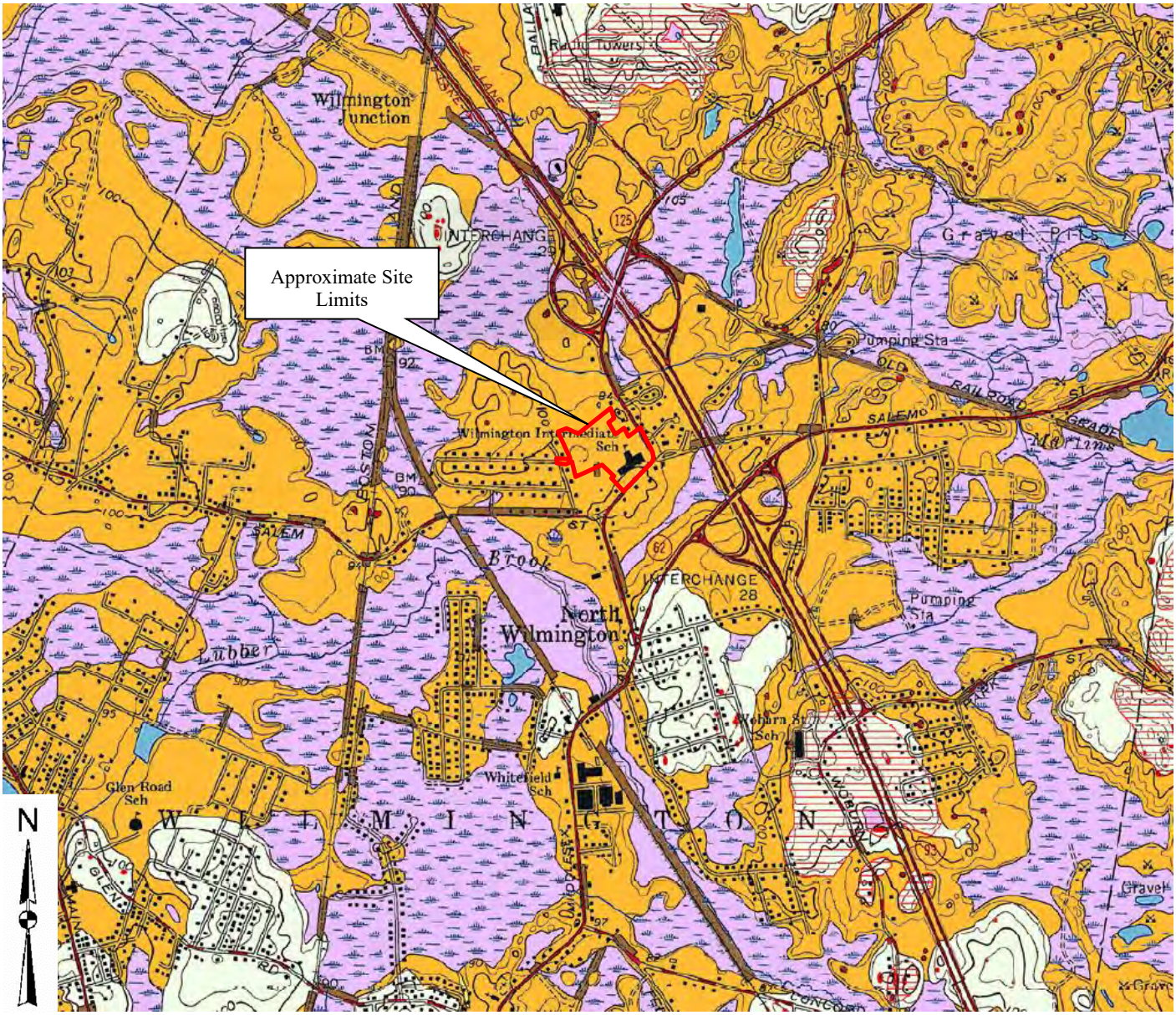
N

Contour Intervals: 10 feet

0.4 mi

Note: Figure based on USA Topo Maps of Wilmington, MA *ngmdb.usgs.gov/topoview/viewer*

Client:	Project:	Figure 1 – Site Location Map	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childhood Center		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Dec . 2024



Swamp deposits—Organic muck and peat that contain minor amounts of sand, silt, and clay, are stratified and poorly sorted, and occur in swamps and freshwater marshes, in kettle depressions, or in poorly drained areas. Unit is shown only where deposits are estimated to be at least 3 ft thick; most deposits are less than 10 ft thick. Swamp deposits overlie glacial deposits or bedrock. They locally overlie glacial till even where they occur within thin glacial meltwater deposits

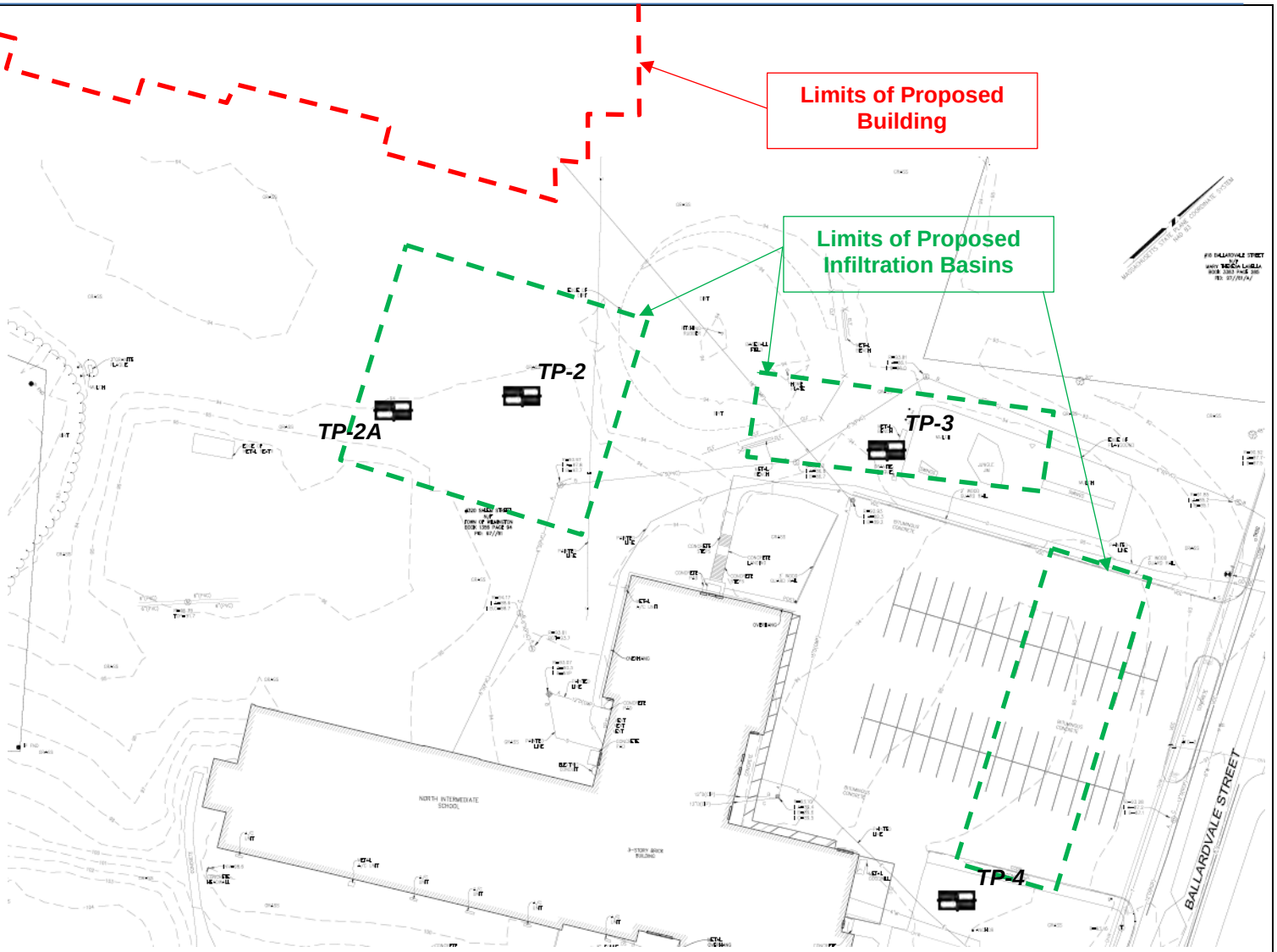
Coarse deposits consist of *gravel deposits*, *sand and gravel deposits*, and *sand deposits*, not differentiated in this report. *Gravel deposits* are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. *Sand and gravel deposits* occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. *Sand deposits* are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay

Note: Figure based on map titled: "Surficial Materials Map of Wilmington Quadrangle, Massachusetts," compiled by Byron D. Stone, Janet R. Stone, and Mary L. DiGiacomo-Cohen, Scientific Investigation Map 3402, Quadrangle 113 – Wilmington, 2018.

Client:	Project:	Figure 2 – Surficial Geologic Map	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childhood Center		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Dec. 2024

Legend

Approximate location of test pits advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 30, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).



Approximate Scale (ft.)

20 0 20 40 80

Note

Figure based on drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts", prepared by Nitsch Engineering, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 8, 2024.

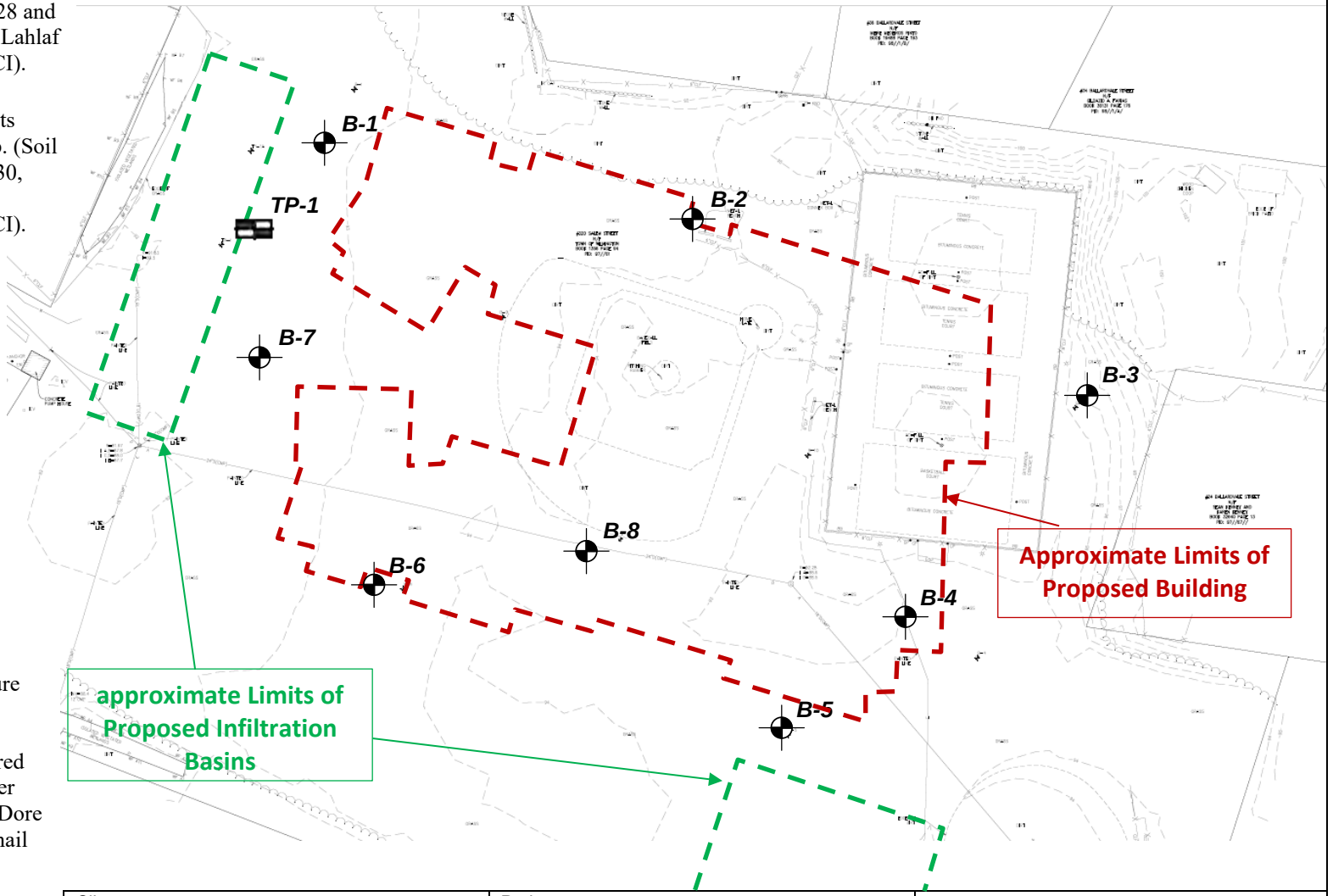
Limits of the proposed building and the infiltration basins are based on drawing titled: "Site Base Conditions, Wilmington Schools, North Intermediate, Wilmington, MA," prepared by Dore and Whittier, undated, and provided to LGCI by Dore and Whittier on October 11, 2024.

Client:	Project:	Figure 3A – Exploration Location Plan - South	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childcare Center		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Dec. 2024

Legend

Approximate location of borings advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 28 and October 29, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

Approximate location of test pits advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 30, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).



MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

Approximate Scale (ft.)

20 0 20 40 80

Note

Figure based on drawing titled: Figure based on drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts", prepared by Nitsch Engineering, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 8, 2024.

Limits of the proposed building and the infiltration basins are based on drawing titled: "Site Base Conditions, Wilmington Schools, North Intermediate, Wilmington, MA," prepared by Dore and Whittier, undated, and provided to LGCI by Dore and

Client:	Project:	Figure 3B – Exploration Location Plan - North	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childcare Center		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Dec. 2024

Appendix A – LGCI's Boring Logs

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-1
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near NW corner of prop. building
COORDINATES: NA
SURFACE El.: 93.0 ft. (see note 1) **TOTAL DEPTH:** 19 ft.
WEATHER: 60's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 84.0 ft. based on sample moisture
AT END OF DRILLING: 9.5 ft. / El. 83.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.6	S1 - Top 8": Topsoil
		0.6	S1 S1	3-8-15-38 (23)	24/17		Fill	92.4	S1 - Bot. 9": Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, 15-20% fine to coarse subangular gravel, brown, moist S2 - Silty SAND with Gravel (SM), fine to coarse, 20% fines, 36.5% fine to coarse subangular gravel, brown, moist (Sieve Performed)
	90.0	2	S2	42-28-26-18 (54)	24/12				
5		4	S3	21-13-10-4 (23)	24/0				S3 - No recovery
		6	S4	10-8-5-3 (13)	24/6		Silt	6.0 87.0	S4 - SILT (ML), slightly plastic, 5-10% fine sand, grey, moist
	85.0	8						9.0	
		9	S5	4-7-5-6 (12)	24/24		Clay	84.0	S5 - Lean CLAY (CL), slightly plastic, 15-20% fine to coarse sand, grey, wet
10		11							
	80.0							14.0	
		14	S6	6-11-10-9 (21)	24/12		Sand and Gravel	79.0	S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, 20-25% fine to coarse subangular gravel, brown, wet
15		16							
	75.0							19.0	
		19	S7	100/0"	0/0	1			REMARK 1: Split spoon and auger refused on possible large boulder or rock at a depth of 19.0 feet. S7 - No recovery Bottom of borehole at 19.0 feet. Backfilled borehole with drill cuttings.
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-2
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near NW side of prop. building
COORDINATES: NA
SURFACE El.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 19 ft.
WEATHER: 50's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 13.0 ft. / El. 81.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	4-7-9-10 (16)	24/15		Topsoil	0.8 / 93.2	S1 - Top 10": Topsoil Bot. 5": Silty SAND with Gravel (SM), fine to medium, trace coarse, 15-20% fines, 20-25% fine to coarse subangular gravel, trace of organic soil, trace of roots, brown, moist
		2	S2	9-8-8-4 (16)	24/13		Fill	2.8 / 91.2	S2 - Top 10": Silty SAND (SM), mostly fine to medium, ~15% fines, ~10% fine to coarse subangular gravel, trace of organic soil, light brown to brown, moist Bot. 3": Silty SAND (SM), fine, 40-45% fines, trace of roots, black, moist (mostly organic soil)
	90.0	4	S3	5-5-10-10 (15)	24/19		Buried Organic Soil	4.0 / 90.0	S3 - Poorly Graded SAND (SP), fine to medium, 0-5% fines, light brown, moist
5		6	S4	13-13-17-16 (30)	24/17				S4 - Similar to S3, grey to light brown
	85.0	8							
		9	S5	10-15-13-11 (28)	24/18				▽ S5 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 5-10% fines, 15-20% fine to coarse subangular gravel, brown to orange, wet
10		11					Sand and Gravel		
	80.0	14	S6	19-20-21-29 (41)	24/14				▼ S6 - Silty SAND (SM), fine to medium, ~25% fines, 5-10% fine subangular gravel, grey, wet
15		16							
	75.0	19	S7	100/0"	0/0	1		19.0	REMARK 1: Split spoon and auger refusal at depth of 19 feet on possible boulder or rock. S7 - No Recovery Bottom of borehole at 19.0 feet. Backfilled borehole with drill cuttings.
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-3
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near northern corner of prop. building
COORDINATES: NA
SURFACE El.: 95.0 ft. (see note 1) **TOTAL DEPTH:** 10.2 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: NE
AT END OF DRILLING: NE
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.7	S1 - Top 8": Topsoil
			S1	3-4-8-8 (12)	24/16		Fill	94.3	Bot. 8": Well Graded SAND (SW-SM), fine to coarse, 0-5% fines, ~5% fine subangular gravel, light brown to orange, moist
		2						2.0	
			S2	12-41-26-18 (67)	24/10			93.0	S2 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 30-35% fine to coarse subangular gravel, light brown, moist
		4							
5	90.0		S3	11-8-12-16 (20)	24/11				S3 - Silty SAND (SM), mostly fine to medium, 15-20% fines, ~10% fine to coarse subrounded gravel, light brown to orange, moist
		6				1	Sand and Gravel		REMARK 1: Auger chattering between depths of 6 to 9 feet.
			S4	26-20-22-80/2" (42)	20/0				S4 - No Recovery
		7.7							
		9							
10	85.0		S5	36-70-20/3" (90/9")	15/4				S5 - Silty SAND with Gravel (SM), mostly fine to medium, ~15% fines, 30-35% fine to coarse subangular gravel, grey, moist
		10.3				2		10.2	REMARK 2: Split spoon and auger refusal at depth of 10.2 feet on possible boulder or rock.
									Bottom of borehole at 10.2 feet. Backfilled borehole with drill cuttings.
15	80.0								
20	75.0								
25	70.0								

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-4
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SE corner of prop. building
COORDINATES: NA
SURFACE El.: 93.0 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 84.0 ft. based on sample moisture
AT END OF DRILLING: NE
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.6 / 92.4	S1 - Top 8": Topsoil
			S1	3-8-10-20 (18)	24/15		Fill		Bot. 7": Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subangular gravel, light brown to orange, moist
		2				1		2.0 / 91.0	REMARK 1: Drill chattering observed from depth of 2 feet on possible boulder.
	90.0		S2	29-26-33-70/3" (59)	21/11				S2 - Silty SAND with Gravel (SM), fine to coarse, 20.5% fines, 36.9% fine to coarse subangular gravel, light brown, moist (Sieve Performed)
		3.8							
5		4	S3	15-17-36-52 (53)	24/16				S3 - Similar to S2, 25-30% fine to coarse subangular gravel, light brown to grey
		6	S4	16-29-29-39 (58)	24/11		Sand and Gravel		S4 - Silty SAND with gravel (SM), fine to coarse, 20-25% fines, 15-20% fine to coarse subangular gravel, brown, moist
	85.0	8							
		9	S5	18-82/4" (82/4")	10/5				S5 - Similar to S4, wet
10		9.8							
						2		11.0	REMARK 2: Split spoon and auger refusal at depth of 11 feet on possible large boulder or rock.
									Bottom of borehole at 11.0 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-5
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SE corner of prop. building
COORDINATES: NA
SURFACE El.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 10.5 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 85.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	3-5-5-5 (10)	24/14		Topsoil	0.7	S1 - Top 9": Topsoil
		2	S2	4-4-3-3 (7)	24/3		Fill	93.3	Bot. 5": Well Graded SAND with Silt (SW-SM), fine to coarse, 10-15% fines, trace of organic soil, trace roots, dark brown, moist S2 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace roots, dark brown, moist
	90.0	4				1	Buried Organic Soil	4.0 90.0 4.4 89.6	REMARK 1: Split spoon bouncing at depth of 4 feet. Borehole offset 4 feet East.
5		6	S3	10-16-22-20 (38)	24/18				S3 - Top 4": Silty SAND (SM), fine to medium, 25-30% fines, trace of organic soil, trace roots, dark brown, moist
		8	S4	21-33-24-17 (57)	24/12	2	Sand and Gravel		Bot. 14": Silty SAND (SM), fine to coarse, 15-20% fines, 20-25% fine subangular gravel, brown, moist REMARK 2: Drill chattering observed on possible boulders from depth of 6 feet. S4 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 35-40% fine to coarse subangular gravel, brown to grey, moist
	85.0	9							
		9.2	S5	100/2"	2/1				S5 - Similar to S3 Bot. 14", wet, (little to no recovery)
10		10.5	S6	100/0"	0/0	3		10.5	REMARK 3: Auger and split spoon refusal on possible boulder or rock at depth of 10.5 feet. Due to time contraint boring was terminated. S6 - No recovery Bottom of borehole at 10.5 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-6
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near southern face of prop. building
COORDINATES: NA
SURFACE El.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 19.7 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 14.0 ft. / El. 80.0 ft. based on sample moisture
AT END OF DRILLING: 18.0 ft. / El. 76.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	2-2-6-11 (8)	24/16		Topsoil	2.0	S1 - Topsoil
		2						92.0	
			S2	12-9-12-17 (21)	24/14		Fill		S2 - Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, ~15% fine to coarse subangular gravel, orange to light brown, moist (possibly reworked)
	90.0	4							
5			S3	13-19-21-18 (40)	24/15				S3 - Similar to S2
		6						6.0	
			S4	15-13-22-23 (35)	24/17			88.0	S4 - Silty SAND (SM), fine to coarse, 15-20% fines, 0-5% fine to coarse subangular gravel, brown, moist
		8							
	85.0	9							
			S5	13-22-80/3" (102/9")	15/13	1			REMARK 1: Drill chattering observed on possible boulders at depth 9 feet. S5 - Similar to S4
10		10.3							
							Sand and Gravel		
	80.0	14							
			S6	14-17-26-35 (43)	24/21				S6 - Similar to S4, wet
15		16							
	75.0	19						19.0	
			S7	22-80/3" (80/3")	9/4		Weathered Rock	75.0 19.7	S7 - Silty SAND with Gravel (SM), fine to coarse, 15-20% fines, 35-40% fine to coarse subangular gravel, trace of weathered rock, black to brown, wet
20		19.8							Bottom of borehole at 19.7 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-7
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SW corner of prop. building
COORDINATES: NA
SURFACE El.: 92.0 ft. (see note 1) **TOTAL DEPTH:** 20.2 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 82.0 ft. based on sample moisture
AT END OF DRILLING: 10.5 ft. / El. 81.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	2-3-7-9 (10)	24/14		Topsoil	0.9	S1 - Top 11": Topsoil
	90.0	2	S2	8-7-10-10 (17)	24/0		Fill	91.1	Bot. 3": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, trace coarse, ~10% fines, 20-25% fine to coarse subangular gravel, brown, moist S2 - No recovery
5		4	S3	14-10-5-6 (15)	24/0				S3 - No recovery
	85.0	6	S4	17-17-23-24 (40)	24/4		Buried Organic Soil	6.0 86.0	S4 - Silty SAND (SM), fine to medium, 25-30% fines, 0-5% fine to coarse subangular gravel, trace of organic soil, dark brown to black, moist
		8	S5	11-11-12-11 (23)	24/16			8.0 84.0	S5 - Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, grey, moist
10		10	S6	7-10-15-15 (25)	24/15				S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 15-20% fine to coarse subangular gravel, brown, wet
	80.0	12							
		14	S7	9-14-12-43/3" (26)	21/12		Sand and Gravel		S7 - Similar to S6, 25-30% fine to coarse subangular gravel
15		15.8							
	75.0	19	S8	24-26-75/3" (101/9")	15/11				S8 - Silty SAND (SM), fine to coarse, 15-20% fines, ~5% fine subangular gravel, brown, wet
20		20.3						20.2	
	70.0								Bottom of borehole at 20.2 feet. Backfilled borehole with drill cuttings.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-8
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near center of prop. building
COORDINATES: NA
SURFACE El.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 19.8 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 16.5 ft. / El. 77.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	4-5-6-11 (11)	24/20		Fill	0.7 93.3	S1 - Top 9": Silty SAND (SM), fine, 25-30% fines, trace of roots, brown, moist Mid. 10": Silty SAND (SM), fine to medium, 30-35% fines, 0-5% fine subangular gravel, trace of organic soil, trace of roots, black, moist
		2	S2	8-6-8-8 (14)	24/16		Subsoil		Bot. 1": Silty SAND with Gravel (SM), fine to coarse, ~15% fines, ~15% fine to coarse subangular gravel, trace of organic soil, orange, moist S2 - Top 10": Silty SAND (SM), fine, 25-30% fines, ~5% fine subangular gravel, brown, moist
	90.0	4						4.0 90.0	Bot. 6": Silty SAND (SM), fine to coarse, 15-20% fines, 5-10% fine to coarse subangular gravel, light brown, moist
5			S3	12-18-25-24 (43)	24/15				S3 - Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, ~30% fine to coarse subangular gravel, light brown, moist
		6	S4	24-21-23-29 (44)	24/18				S4 - Similar to S3, ~15% fine subangular gravel
		8							
	85.0	9	S5	18-82	12/8				S5 - Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, 15-20% fine to coarse subangular gravel, grey to olive, wet
10		10					Sand and Gravel		
	80.0	14	S6	20-25-25-45 (50)	24/14				S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 25-30% fine to coarse subangular gravel, olive to grey, wet
15		16							
	75.0	19	S7	10-95/4" (95/4")	10/8				S7 - Similar to S6
20		19.8				1		19.8	REMARK 1: Split spoon refusal at depth of 19.8 feet on possible boulder or rock. Bottom of borehole at 19.8 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

Appendix B – LGCI's Test Pit Logs

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-1
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near western face of prop. school
COORDINATES: NA
SURFACE EL.: 92.0 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** NE
▼ **AT END OF EXCAVATION:** 9.5 ft. / El. 82.5 ft.

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 9' X 6'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth / El. (ft.)	Material Description
		E		Topsoil	1.5 / 90.5	0 ft. - 1.5 ft.: Topsoil
		M				
	90.0	M		Fill		1.5 ft. - 5 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 10-15% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace of roots, brown, moist (cobbles up to 12 inches make up 5-10% of stockpile)
2.5		D				
	87.5					
5.0			1			5 ft. - 7 ft.: Silty SAND with Gravel (SM), mostly fine to medium, 27% fines, 14.1% fine subangular gravel, brown, moist (Sieve Performed) REMARK 1: Double ring infiltrometer test performed at depth of 5 feet beneath the ground surface.
		D				
	85.0				7.0 / 85.0	
7.5		D		Swamp Deposits		7 ft. - 10 ft.: Silty SAND with Gravel (SM), fine to medium, 20-25% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace of roots, trace of organic odor, grey, moist to wet
	82.5					▼
10.0					10.0 / 82.0	
		D		Sand		10 ft. - 11 ft.: Poorly Graded SAND (SP), fine to medium, 0-5% fines, grey, wet
			2		11.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 11 feet on possible boulder or rock. Bottom of test pit at 11.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-2
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near southern face of proposed school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 9 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: NE
AT END OF EXCAVATION: NE

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 10' X 7'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.7	0 ft. - 0.7 ft.: Topsoil
	92.5	E		Fill	93.3	0.7 ft. - 4 ft.: Well Graded SAND (SW), fine to coarse, 5-10% fines, ~10% fine to coarse subangular gravel, trace of roots, trace of organic soil, brown to orange, moist
2.5						
	90.0		1			
		M	2			4 ft. - 5.5 ft.: Silty SAND (SM), mostly fine to medium, 15.9% fines, 6.8% mostly fine subangular gravel, brown to orange, moist (Sieve Performed) REMARK 1: Double ring infiltrometer test performed at depth of 4 feet beneath the ground surface. REMARK 2: Unmarked cast iron pipe encuntered near the southwestern corner of the test pit, excavator bucket pulled and bent pipe. Pipe does not appear to be broken. DPW indicated that they are not aware of utilties at this location.
5.0					5.5	
	87.5	M		Sand and Gravel	88.5	5.5 ft. - 9 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 10-15% fine to coarse subangular gravel, light brown, moist
7.5						
	85.0				9.0	Bottom of test pit at 9.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-2A
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near southern face of prop. school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 11.3 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: NE
AT END OF EXCAVATION: 9.5 ft. / El. 84.5 ft.

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 10' X 3'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
	92.5	E		Topsoil	1.5 92.5	0 ft. - 1.5 ft.: Topsoil
2.5		E		Fill		1.5 ft. - 7 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subangular gravel, trace of roots, trace of organic soil, brown to orange, moist
	90.0					
5.0		M				
	87.5				7.0 87.0	
7.5				Sand and Gravel		7 ft. - 11.3 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 10-15% fine to coarse subangular gravel, light brown, moist (wet after 9.5 feet)
	85.0	M				
10.0						
		V	1		11.3	REMARK 1: Test pit terminated due to excavator refusal at depth of 11.3 feet on possible boulder or rock.
						Bottom of test pit at 11.3 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

TEST PIT LOG

TP-3
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/31/24 **DATE COMPLETED:** 10/31/24
TEST PIT LOCATION: Near eastern face of prop. school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 8 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: NE
AT END OF EXCAVATION: NE

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 70's / Sunny
TEST PIT DIMENSIONS: 11' X 6'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.8	0 ft. - 0.8 ft.: Topsoil
		E		Fill	93.2	0.8 ft. - 1 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, light brown, moist 1 ft. - 2.3 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subangular gravel, trace of organic soil, trace of roots, dark brown, moist
	92.5	E				
2.5		E		Sand and Gravel	2.3 91.7	2.3 ft. - 4 ft.: Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, 20-25% fine to coarse subangular gravel, light brown to orange, moist
		M				
	90.0		1			4 ft. - 8 ft.: Poorly Graded SAND with Gravel (SP), mostly medium to coarse, 1.5% fines, 31.4% fine to coarse subangular gravel, light brown to orange, moist (Sieve Performed) REMARK 1: Double ring infiltrometer test performed at depth of 4 feet beneath the ground surface.
5.0		M				
	87.5	D				
7.5		V			8.0	
			2			REMARK 2: Test pit terminated due to excavator refusal at depth of 8 feet on possible boulder or rock. Bottom of test pit at 8.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-4

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/31/24 **DATE COMPLETED:** 10/31/24
TEST PIT LOCATION: Near eastern face of exisitng school
COORDINATES: NA
SURFACE EL.: 95.0 ft. (see note 1) **TOTAL DEPTH:** 9 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: NE
AT END OF EXCAVATION: NE

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 70's / Sunny
TEST PIT DIMENSIONS: 10' X 6'
LOGGED BY: BH **CHECKED BY:** JKW

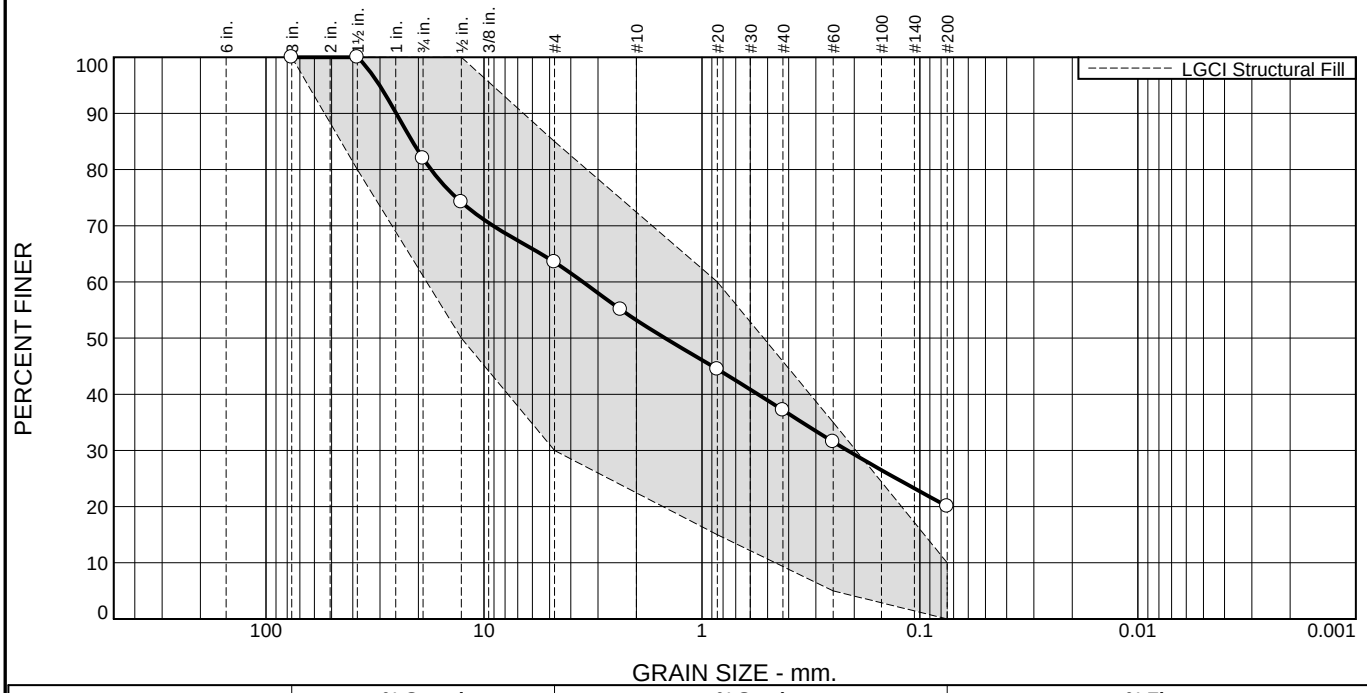
Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	1.0	0 ft. - 1 ft.: Topsoil
		E		Fill	94.0 2.0	1 ft. - 2 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 5-10% fines, 0-5% fine to coarse subangular gravel, light brown, moist
2.5	92.5	E		Subsoil	93.0 3.2	2 ft. - 3.2 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 0-5% fine to coarse subangular gravel, trace of organic soil, trace of roots, orange, moist
		E		Sand and Gravel	91.8	3.2 ft. - 4.6 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subangular gravel, light brown to orange, moist
		M	1			
5.0	90.0	M				4.6 ft. - 9 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 11% fines, 30.4% fine to coarse subangular gravel, brown to orange, moist (Sieve Performed) REMARK 1: Double ring infiltrometer test performed at depth of 4.6 feet beneath the ground surface.
		D				
7.5	87.5	V				
			2		9.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 9 feet on possible boulder or rock. Bottom of test pit at 9.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore AND Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

Appendix C – Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.0	18.5	10.3	16.0	17.2	20.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	82.0		
1/2"	74.2	50.0 - 100.0	
#4	63.5	30.0 - 85.0	
#8	55.1		
#20	44.5	15.0 - 60.0	
#40	37.2		
#60	31.5	5.0 - 35.0	
#200	20.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM) , fine to coarse, 20% fines, 36.5% fine to coarse subangular gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 25.2612 D_{85}= 21.2913 D_{60}= 3.5169
D_{50}= 1.4776 D_{30}= 0.2147 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.

Date Received: 10/28/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: JKW

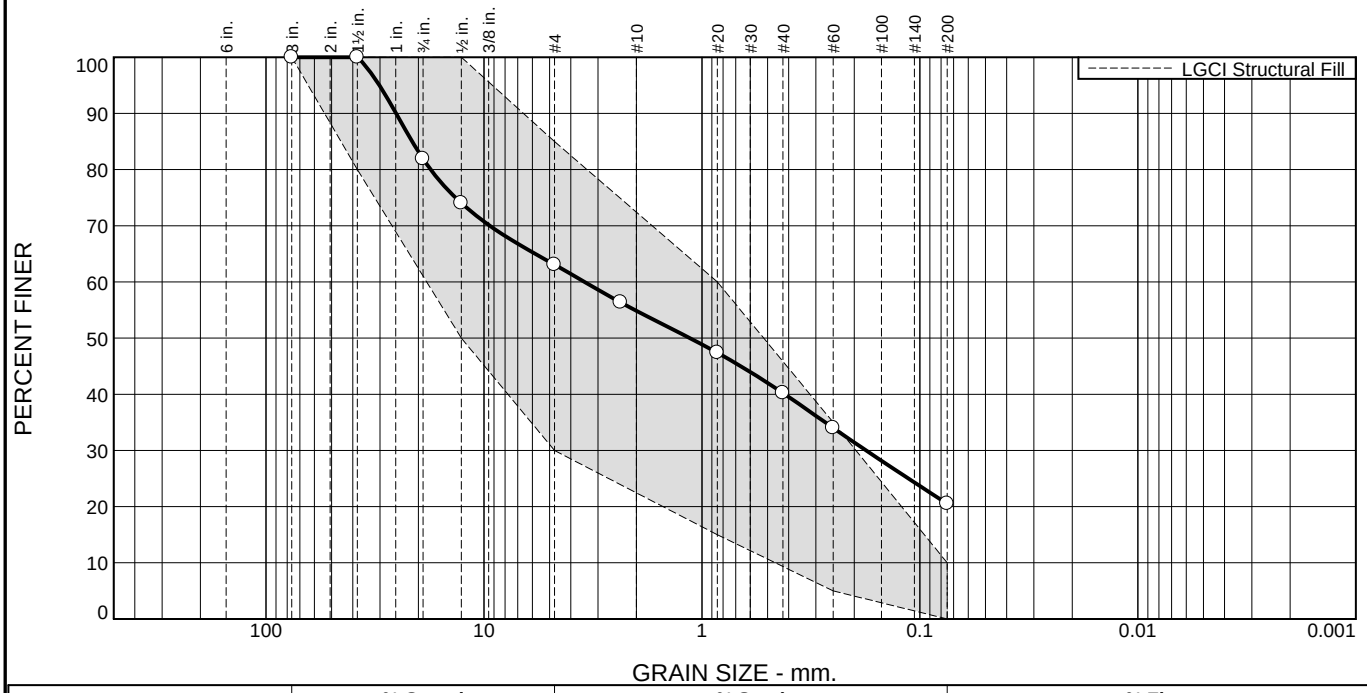
Location: B-1
Sample Number: S2 **Depth:** 2'-4'

Date Sampled: 10/28/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.1	18.8	8.2	14.7	19.7	20.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	81.9		
1/2"	74.0	50.0 - 100.0	
#4	63.1	30.0 - 85.0	
#8	56.4		
#20	47.4	15.0 - 60.0	
#40	40.2		
#60	34.0	5.0 - 35.0	
#200	20.5	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM) , fine to coarse, 20.5% fines, 36.9% fine to coarse subangular gravel, light brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 25.3090 D_{85}= 21.3513 D_{60}= 3.4571
D_{50}= 1.1367 D_{30}= 0.1765 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sand and Gravel Sample.

Date Received: 10/29/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: JKW

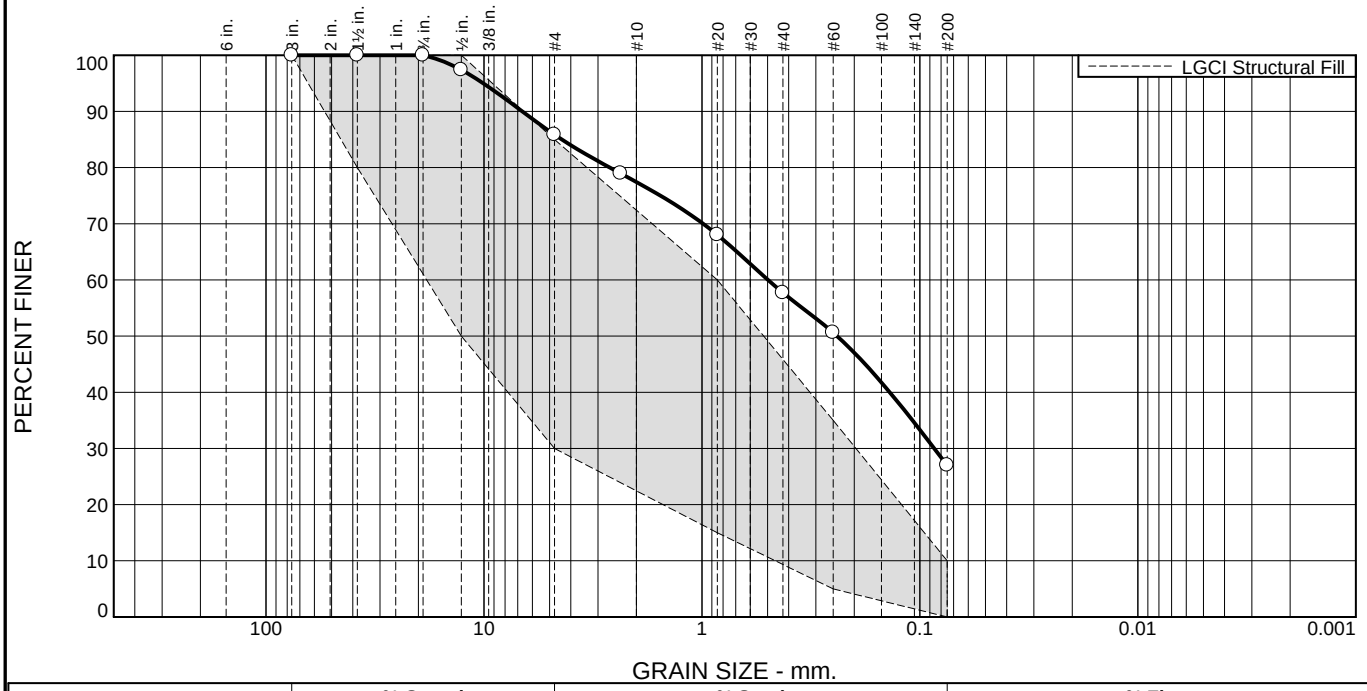
Location: B-4
Sample Number: S2 **Depth:** 2'-4'

Date Sampled: 10/29/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.1	8.5	19.7	30.7	27.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	100.0		
1/2"	97.4	50.0 - 100.0	
#4	85.9	30.0 - 85.0	X
#8	79.0		
#20	68.0	15.0 - 60.0	X
#40	57.7		
#60	50.6	5.0 - 35.0	X
#200	27.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Silt and Gravel (SM), mostly fine to medium, 27% fines, 14.1% fine subangular gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 6.6746 D_{85}= 4.3959 D_{60}= 0.4977
D_{50}= 0.2399 D_{30}= 0.0859 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.
Infiltrometer Test.

Date Received: 10/30/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

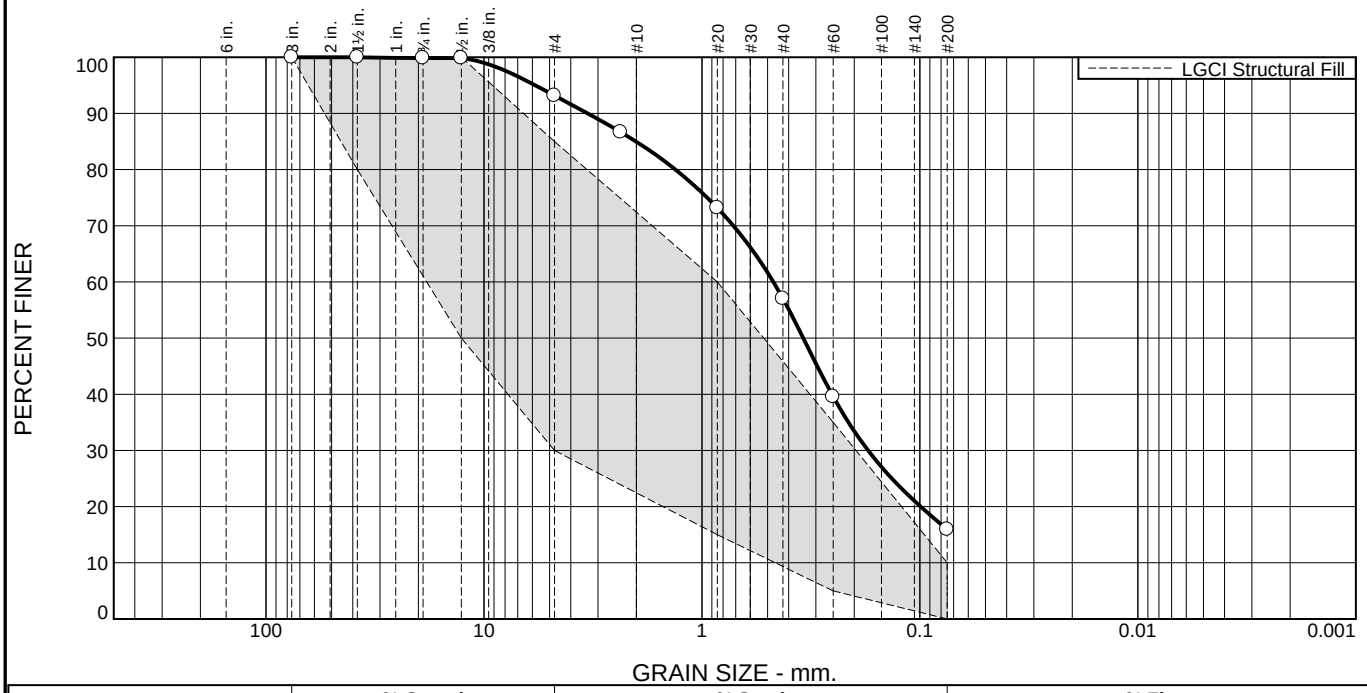
Location: TP-1
Sample Number: Infiltrometer **Depth:** 5'

Date Sampled: 10/30/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.2	6.6	8.2	28.0	41.1	15.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4'	99.8		
1/2"	99.8	50.0 - 100.0	
#4	93.2	30.0 - 85.0	X
#8	86.7		
#20	73.2	15.0 - 60.0	X
#40	57.0		
#60	39.6	5.0 - 35.0	X
#200	15.9	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND (SM), mostly fine to medium, 15.9% fines, 6.8% mostly fine subangular gravel, brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 3.3438 D_{85}= 2.0080 D_{60}= 0.4704
D_{50}= 0.3428 D_{30}= 0.1729 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.
Infiltrometer Test.

Date Received: 10/30/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

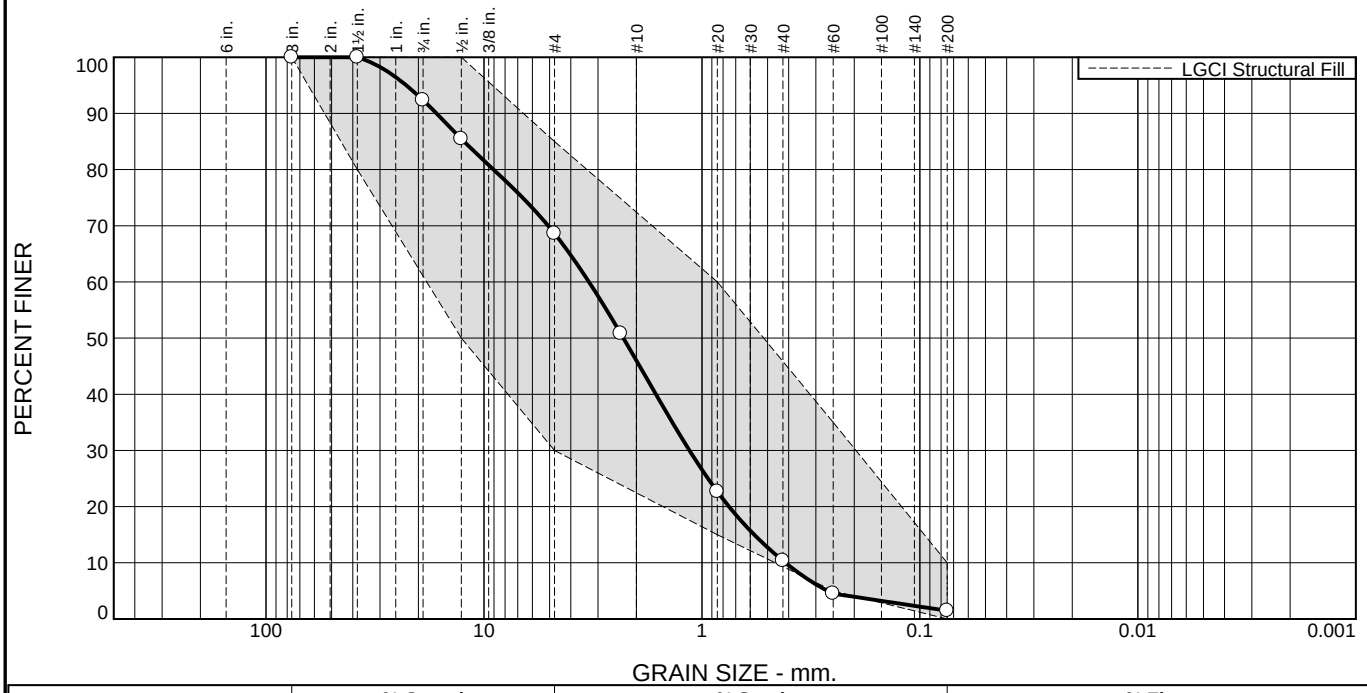
Location: TP-2
Sample Number: Infiltrometer **Depth:** 4'

Date Sampled: 10/30/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.6	23.8	22.6	35.6	8.9	1.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	92.4		
1/2"	85.5	50.0 - 100.0	
#4	68.6	30.0 - 85.0	
#8	50.8		
#20	22.7	15.0 - 60.0	
#40	10.4		
#60	4.5	5.0 - 35.0	X
#200	1.5	0.0 - 10.0	

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Gravel (SP), fine to coarse, 1.5% fines, 31.4% fine to coarse subangular gravel, light brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 16.5194 D_{85}= 12.3470 D_{60}= 3.2999
D_{50}= 2.2934 D_{30}= 1.1409 D_{15}= 0.5758
D_{10}= 0.4140 C_u= 7.97 C_c= 0.95

Remarks

Sand and Gravel Sample.
Infiltrometer Test.

Date Received: 10/31/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

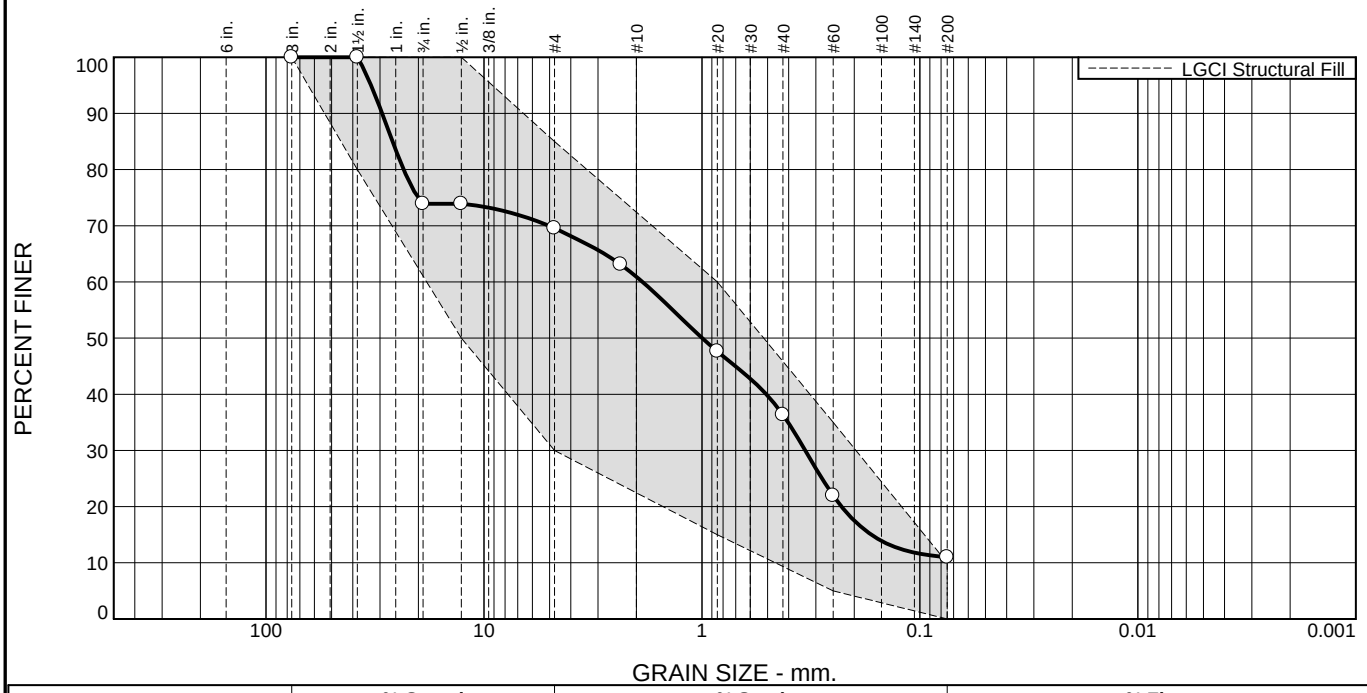
Location: TP-3
Sample Number: Infiltrometer **Depth:** 4'

Date Sampled: 10/31/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.1	4.3	8.7	24.6	25.3	11.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	73.9		
1/2"	73.9	50.0 - 100.0	
#4	69.6	30.0 - 85.0	
#8	63.1		
#20	47.6	15.0 - 60.0	
#40	36.3		
#60	22.0	5.0 - 35.0	
#200	11.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 11% fines, 30.4% fine to coarse subangular gravel, brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 29.3481 D_{85}= 26.2822 D_{60}= 1.8746
D_{50}= 0.9972 D_{30}= 0.3357 D_{15}= 0.1671
D_{10}= C_u= C_c=

Remarks

Sand and Gravel Sample.
Infiltrometer Test.

Date Received: 10/31/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

Location: TP-4
Sample Number: Infiltrometer **Depth:** 4.6'

Date Sampled: 10/31/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Appendix D – Results of Double Ring Infiltrometer Tests

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-1

Test Procedure: General accordance with ASTM D 3385

Test Date 10/30/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 5 feet

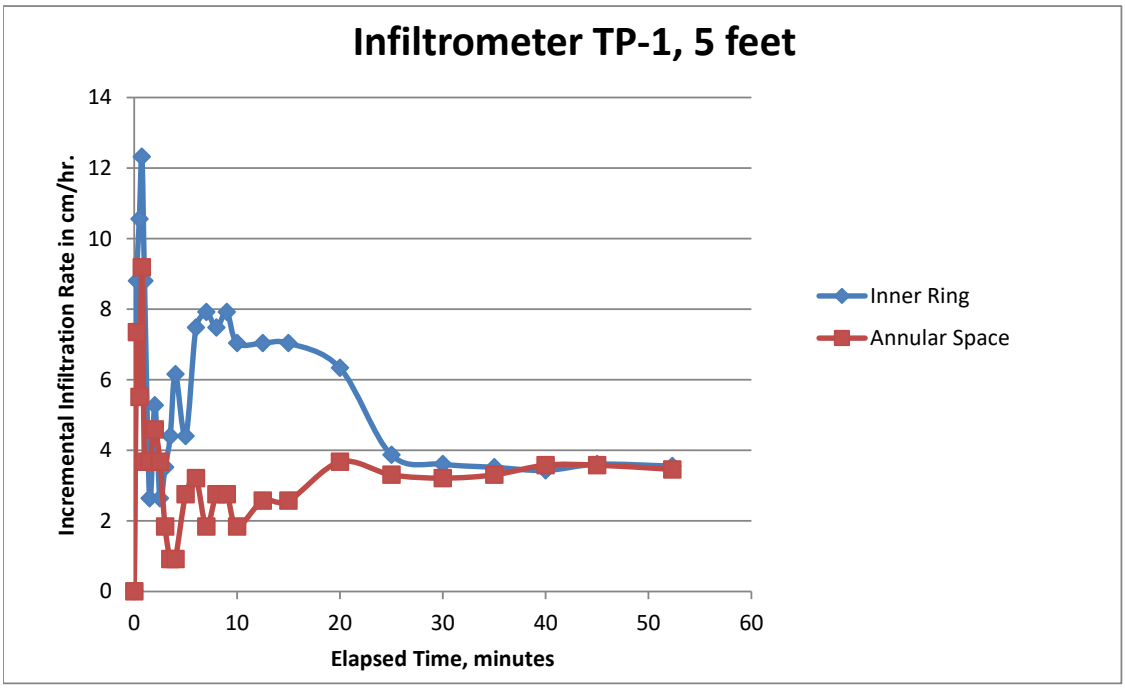
Groundwater Depth: 9.5 ft. / El. 82.5 ft. at the end of excavation

Soil Stratum: ASTM (D 2488) Classification: Silty SAND with Silt and Gravel (SM), mostly fine to medium, 27% fines, 14.1% fine gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	56.3	0	0	57.2	0	0
0.25	0.25	55.8	27	8.8	56.8	67	7.3
0.5	0.25	55.2	32	10.6	56.5	50	5.5
0.75	0.25	54.5	37	12.3	56.0	84	9.2
1	0.25	54.0	27	8.8	55.8	34	3.7
1.5	0.5	53.7	16	2.6	55.4	67	3.7
2	0.5	53.1	32	5.3	54.9	84	4.6
2.5	0.5	52.8	16	2.6	54.5	67	3.7
3	0.5	52.4	21	3.5	54.3	34	1.8
3.5	0.5	51.9	27	4.4	54.2	17	0.9
4	0.5	51.2	37	6.2	54.1	17	0.9
5	1	50.2	54	4.4	53.5	101	2.8
6	1	48.5	91	7.5	52.8	117	3.2
7	1	46.7	96	7.9	52.4	67	1.8
8	1	45.0	91	7.5	51.8	101	2.8
9	1	43.2	96	7.9	51.2	101	2.8
10	1	41.6	86	7.0	50.8	67	1.8
12.5	2.5	37.6	214	7.0	49.4	235	2.6
15	2.5	33.6	214	7.0	48.0	235	2.6
20	5	26.4	385	6.3	44.0	670	3.7
25	5	22.0	235	3.9	40.4	603	3.3
30	5	17.9	219	3.6	36.9	586	3.2
35	5	13.9	214	3.5	33.3	603	3.3
40	5	10.0	209	3.4	29.4	653	3.6
45	5	5.9	219	3.6	25.5	653	3.6
52.3	7.3	0.0	316	3.6	20.0	921	3.5

Notes:



Estimated K = 1.00E-03 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-2

Test Procedure: General accordance with ASTM D 3385

Test Date 10/30/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4 feet

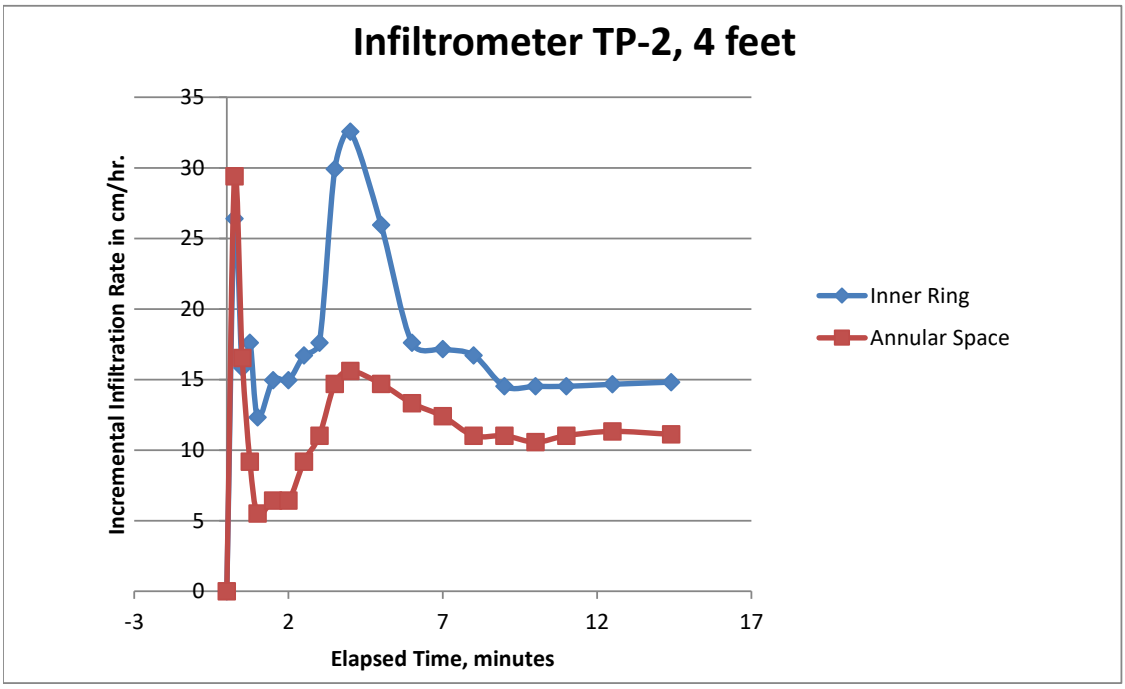
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Silty SAND (SM), moslty fine to medium, 15.9% fines, 6.8% mostly fine subangular gravel, brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.4	0	0	57.5	0	0
0.25	0.25	55.9	80	26.4	55.9	268	29.4
0.5	0.25	55.0	48	15.8	55.0	151	16.5
0.75	0.25	54.0	54	17.6	54.5	84	9.2
1	0.25	53.3	37	12.3	54.2	50	5.5
1.5	0.5	51.6	91	15.0	53.5	117	6.4
2	0.5	49.9	91	15.0	52.8	117	6.4
2.5	0.5	48.0	102	16.7	51.8	168	9.2
3	0.5	46.0	107	17.6	50.6	201	11.0
3.5	0.5	42.6	182	29.9	49.0	268	14.7
4	0.5	38.9	198	32.6	47.3	285	15.6
5	1	33.0	316	26.0	44.1	536	14.7
6	1	29.0	214	17.6	41.2	486	13.3
7	1	25.1	209	17.2	38.5	452	12.4
8	1	21.3	203	16.7	36.1	402	11.0
9	1	18.0	177	14.5	33.7	402	11.0
10	1	14.7	177	14.5	31.4	385	10.6
11	1	11.4	177	14.5	29.0	402	11.0
12.5	1.5	6.4	268	14.7	25.3	620	11.3
14.4	1.9	0.0	343	14.8	20.7	771	11.1

Notes:



Estimated K = 4.06E-03 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-3

Test Procedure: General accordance with ASTM D 3385

Test Date 10/31/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4 feet

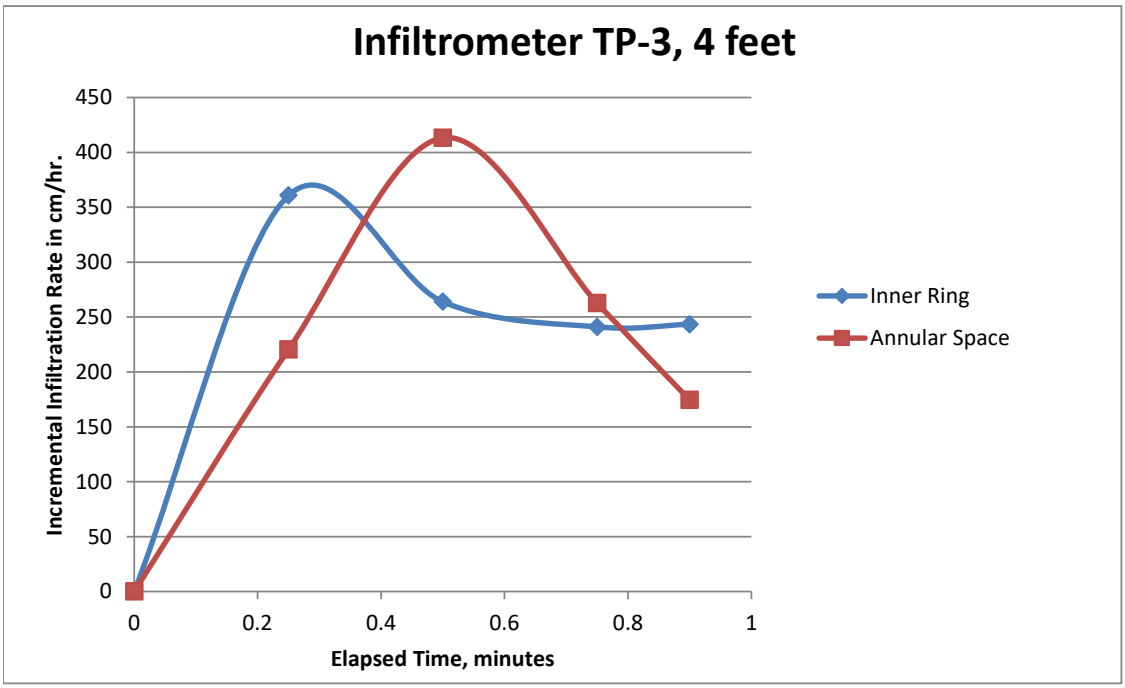
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Poorly Graded SAND with Gravel (SP), fine to coarse, 1.5% fines, 31.4% fine to coarse subangular gravel, light brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.5	0	0	57.5	0	0
0.25	0.25	37.0	1097	360.7	45.5	2010	220.4
0.5	0.25	22.0	803	263.9	23.0	3769	413.3
0.75	0.25	8.3	733	241.1	8.7	2396	262.7
0.9	0.15	0.0	444	243.4	3.0	955	174.5

Notes:



Estimated K 6.73E-02 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-4

Test Procedure: General accordance with ASTM D 3385

Test Date 10/31/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4.5 feet

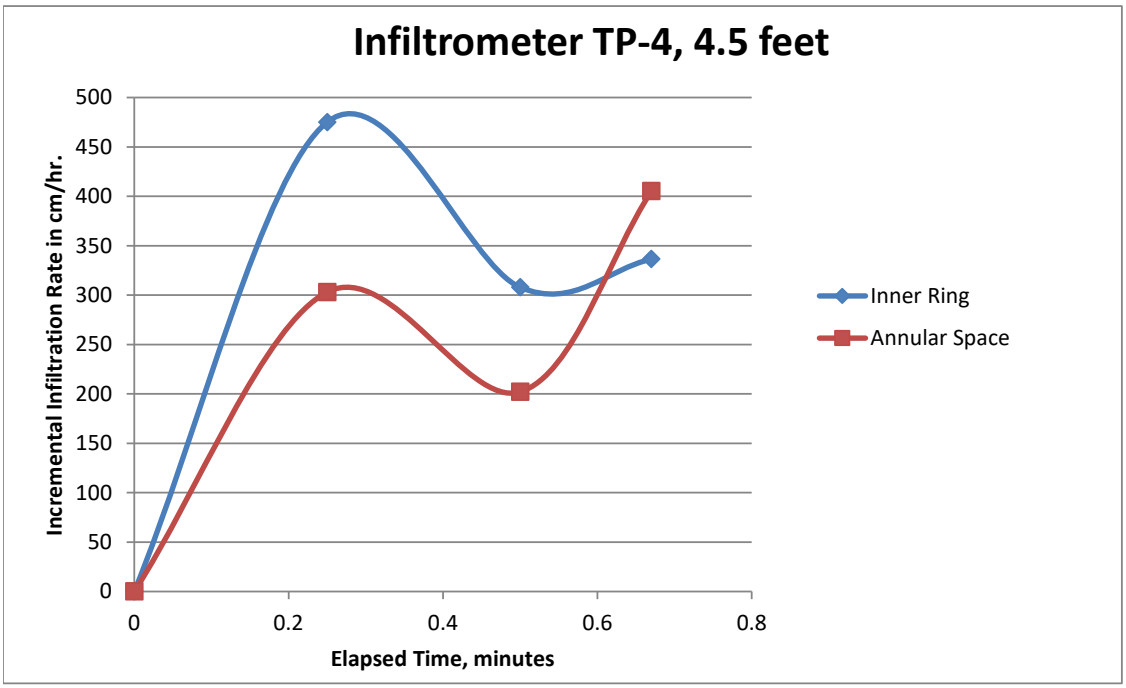
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 11% fines, 30.4% fine to coarse gravel, brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.5	0	0	57.5	0	0
0.25	0.25	30.5	1445	475.1	41.0	2764	303.1
0.5	0.25	13.0	937	307.9	30.0	1843	202.0
0.67	0.17	0.0	696	336.4	15.0	2513	405.2

Notes:



Estimated K* = 8.95E-02 cm/sec

* Value may not be reliable to short time to complete test

Engineering Economic Analysis
for
Wilmington Elementary School

Wilmington, MA

January 21, 2025

Prepared for:

WILMINGTON PUBLIC SCHOOLS

Prepared by:

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School
Engineering Economic Analysis

Table of Contents

Executive Summary 3

System Payback Summary Chart 11

System Payback Summary Chart Including Federal Tax Credit 12

LEED v4.0 Energy Savings Summary Chart 13

Life Cycle Analyses Outputs 14

Cost Estimates 27

Energy Profiles 34

Appendix: 2022 Geothermal Federal Tax Credit References 59

EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The Wilmington Elementary School is a new three-story school with an approximate gross area of 167,000 s.f. The building has been simulated with the school's anticipated hours of operation provided by the owner as follows:

It is anticipated that the typical student hours will occur from 6:30 am – 6:00 pm (Mon-Fri) while the building will be occupied between 6 pm – 9 pm (Mon-Fri) for limited community use, sports, and recreation programs. Limited summer programming shall occur throughout the building from 7:00 am – 3:30 pm (Mon-Fri) for special needs, summer camps, recreation, and sports practices. The Gym will also have limited community use on the weekends from 9:00 am – 9:00 pm.

The goal of the mechanical system lifecycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the greatest combined savings over a 50 year cycle to determine the most advantageous system considering anticipated hours of operation, electrical costs, maintenance costs, initial construction costs, and replacement costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year round temperature control and comfort at a possible marginal increase in capital cost.

Upon completion of the mechanical system lifecycle engineering economic analysis, the design building is simulated with the recommended mechanical system in comparison to an ASHRAE Standard 90.1-2010 baseline building to project the anticipated energy cost percentage savings for LEED V4 EAc2 – Optimize Energy Performance.

Section 1.1: Mechanical System Analysis

1.1.A: Baseline System Option – Mixed-Air Overhead Chilled/Hot Water Variable Air Volume (VAV) Air Handling Unit Systems with Air-Source Heat Pump (ASHP) Heat Recovery Chiller/Heater Plant

- Chilled/hot water VAV air handling units with energy recovery wheels and terminal VAV boxes with hot water reheat coils and energy recovery providing mixed-air over-head distribution the following areas:
    - RTU-A: 30,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 35,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 30,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-D: 10,000 CFM Gym
    - RTU-E: 5,000 CFM Media Center, Support, & Circulation Areas
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas
    - RTU-H: 6,000 CFM Administration, Support, & Circulation Areas
- 100% outside air chilled/hot water VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:
    - MAU-A: 4,500 CFM Kitchen Hood Make-Up
- Overhead fiberglass insulated supply and return air ductwork distribution system

- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- (15) 30 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 4 modules redundant)

  (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)

- Insulated chilled water, hot water, and condensate piping systems

- Chilled and hot water primary pumping with variable frequency drives

- Direct digital controls throughout

1.1.B: System Option One – VRF ASHP System with Supplemental Electric Heating Units

- 100% outside air ASHP heating/cooling VAV air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing ventilation to the terminal VRF units serving the following areas:

  - RTU-A: 14,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-B: 16,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-C: 13,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-E: 2,500 CFM Media Center, Support, & Circulation Areas
  - RTU-H: 3,000 CFM Administration, Support, & Circulation Areas

- Terminal VRF heat pump evaporator units serving the spaces indicated above

- Insulated refrigerant and condensate piping systems

- Air-source heat recovery VRF heat pump condensing units (240 ton total capacity)

- ASHP cooling/heating VAV air handling units with energy recovery wheels and demand control ventilation providing mixed-air over-head distribution the following areas:

  - RTU-D: 10,000 CFM Gym
  - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
  - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas

- 100% outside air ASHP cooling/heating VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:

  - MAU-A: 4,500 CFM Kitchen Hood Make-Up

- Overhead fiberglass insulated supply and return air ductwork distribution system

- Electric radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- Direct digital controls throughout

1.1.C: System Option Two – Geothermal Variable Refrigerant Flow (VRF) Ground-Source Heat Pump (GSHP) System with GSHP VAV Air Handling Units

- 100% outside air WSHP heating/cooling VAV air handling units with energy recovery heat exchangers and terminal variable air volume boxes with demand control ventilation providing ventilation to the terminal VRF units serving the following areas:
    - RTU-A: 14,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 16,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 13,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-E: 2,500 CFM Media Center, Support, & Circulation Areas
    - RTU-H: 3,000 CFM Administration, Support, & Circulation Areas
- Terminal VRF heat pump evaporator units serving the spaces indicated above
- Insulated refrigerant and condensate piping systems
- Water-source heat recovery VRF heat pump condensing units (240 ton total capacity)
- WSHP heating/cooling VAV air handling unit with energy recovery wheel and demand control ventilation providing mixed-air over-head distribution the following areas:
    - RTU-D: 10,000 CFM Gym
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas
- 100% outside air WSHP cooling/heating VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:
    - MAU-A: 4,500 CFM Kitchen Hood Make-Up
- Overhead fiberglass insulated supply and return air ductwork distribution system
- Electric radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.
- (80) 600’ closed-loop type ground source geothermal wells (4.25 tons each for 335 tons total capacity)
- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)
- Insulated condenser water, geothermal water, and condensate piping systems
- Condenser and geothermal well primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.D: System Option Three - Chilled/Hot Water VAV Air Handling Unit Displacement Ventilation Systems with ASHP Heat Recovery Chiller/Heater Plant

- 100% outside air hot water heating/chilled water cooling air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing displacement ventilation to the following areas:

    - RTU-A: 17,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 20,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 17,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-E: 3,000 CFM Media Center, Support, & Circulation Areas
    - RTU-H: 4,000 CFM Administration, Support, & Circulation Areas

- Passive chilled beam cooling/heating panels located along exterior walls of the above areas

- Hot water heating/chilled water cooling VAV air handling units with energy recovery wheels and demand control ventilation providing displacement ventilation to the following areas:

    - RTU-D: 10,000 CFM Gym
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas

- Hot water radiant heating panels located along exterior walls of the above areas

- 100% outside air chilled/hot water VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:

    - MAU-A: 4,500 CFM Kitchen Hood Make-Up

- Overhead fiberglass insulated supply and return air ductwork distribution system

- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- (15) 30 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 4 modules redundant)

- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)

- Chilled and hot water primary pumping with variable frequency drives

- Direct digital controls throughout

1.1.E: System Option Four – Chilled/Hot Water Cooling/Heating VAV Air Handling Unit Displacement Ventilation Systems with GSHP Heat Recovery Chiller/Heater Geothermal Plant

- This option is identical to Option 3 as outlined above but will utilize the following ground-source chilled/hot water plant equipment rather than the air-source heat pump chilled/hot water plant and wellfield outlined above:

    - (8) 50 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (400 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 2 modules redundant)

    - (80) 600’ closed-loop type ground source geothermal wells (4.25 tons each for 335 tons total capacity)

- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)
- Chilled, condenser, geothermal well, and hot water primary pumping with variable frequency drives

Section 1.2: Mechanical System Analysis Conclusion

The variable air volume air handling unit system is selected as the baseline system since it is similar to an ASHRAE 90.1/IECC baseline system but complies with the high-efficiency requirements of the MA Opt-In Stretch Energy Code. Unfortunately, the selection may result in overall ownership costs that in some cases are higher when compared to the alterative systems primarily relating to increased annual operating costs with potentially reduced thermal comfort conditions of the building. The option comparison of each alternative system to the baseline assesses the benefits of improved systems with potentially reduced combined operating costs and improved thermal comfort with the goal of selecting the system with the highest ownership savings over the 50 year study period.

Annual electrical consumption is calculated through the results of a thermal dynamic heat transfer analysis utilizing Department of Energy's (DOE) Energy Plus/Carrier Hourly Analysis Program (HAP) software with all architectural data provided by Dore & Whittier Architects.

The building envelope reflects Dore & Whittier Architects' high-efficiency design with effective insulation U-values in accordance with ASHRAE 90.1 Appendix A as follows:

- Roof: U-0.018
- Brick Veneer Walls: U-0.028
- MCM Panel Walls: U-0.025
- Windows: U-0.25, 0.30 SHGC
- Curtainwall: U-0.25, 0.30 SHGC

Utility cost data for electricity was obtained from utility bills provided by the owner as follows:

Reading Municipal Light Department (RMLD): Commercial Schedule C Rate

- Customer Charge: $13.00/month
- Distribution Demand: $13.11177/kW
- Distribution Energy: $0.02554/kWh
- Electrification Energy: $0.00500/kWh
- Fuel Charge: $0.05120/kWh
- Distributed Solar: $0.00402/kWh
- Purchase Power & Trans.: $0.04820/kWh

The "Building Life-Cycle" analysis was performed in BLCC v5.3-22 and includes future worth of each system option considered using the DOE rates for nominal discount (1.4%), escalation (for each utility type based on region), inflation (2.0%), and interest (2.0%). The analysis includes equipment replacement costs for major system components after 20, 30, and 40 years (varying per system option as indicated in the replacement cost estimate sheet).

Our observations of the Mechanical System Payback Summary suggest that Option 3, Displacement Ventilation with an Air-Source Heat Pump Plant, represents the lowest life cycle cost of the system options studied by yielding an approximate $5,680,330 savings over the 50 year study period with an instant payback by having a lower capital investment than the baseline system.

Section 1.3: Geothermal Federal Tax Credit

There are potentially significant federal tax credits available to the school for installing a geothermal heating system. Per the 2022 Inflation Reduction Act, the Federal Investment Tax Credit (§ 48) can range from 6% to 30% if Prevailing Wage and Apprenticeship (PWA) requirements are met. Additional tax credits may also be available for using Domestic Content (up to 10% of related domestic steel and iron material and manufactured product costs). For the purpose of this study, a 25.5% federal tax credit was factored at this time assuming PWA requirements would be met (accounting for a 15% deduction required by projects funded by tax exempt bonds to the 30% incentive). Please note that it is recommended that the Town consult with a financial tax advisor or attorney to complete the required IRS documentation if a Geothermal heating system is selected.

When accounting for the Federal Tax Credit, the Mechanical System Payback Summary suggests that System Option 4 represents the greatest total life cycle savings by yielding an approximate $8,710,034 savings over the 50 year study period with an instant payback.

The geothermal system additionally provides further benefits that should be considered such as providing the second lowest EUI of all options at 22.3 kBTU/s.f./yr. The system further provides system longevity, reduced maintenance, reduced downtime, and improved controllability of equipment. The geothermal design also does not require exterior mounted condensing equipment which will provide the best acoustics of all options studied.

For additional information please refer to the following references:

- ClimateMaster's IRA 2023 Commercial Geothermal Tax Guide, weblink @ lc028-climatemaster-commercial-federal-tax-incentives-brochure.pdf , and included in Appendix B
- IRS Clean Energy Tax Credit Information: Publication 5817-G (6-2023) (irs.gov), weblink @ https://www.irs.gov/pub/irs-pdf/p5817g.pdf, and included in Appendix B
- IRS & US Treasury Dept Notice 2023-44: Additional Guidance for the Qualifying Advanced Energy Project Credit Allocation Program under Section 48C(e) (irs.gov), weblink @ https://www.irs.gov/pub/irs-drop/n-23-44.pdf

Section 2.0: LEED Energy Savings Summary

To estimate the LEED V4 EAc2 – Optimize Energy Performance savings, energy model simulations have been performed comparing the design building to a baseline ASHRAE Standard 90.1-2010 building.

1. The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
  - Wall: U-0.064
  - Roof: U-0.048
  - Windows: 0.55 U-Value, 0.40 SHGC
  - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
  - System 8 - Electric heating/chilled water cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)
  - System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)
  - (2) high-efficiency water-cooled chillers with associated cooling tower

- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.99 w/s.f.

2. The design building is as follows:

- Envelope:
    - Roof: U-0.018
    - Brick Veneer Walls: U-0.028
    - MCM Panel Walls: U-0.025
    - Windows: U-0.25, 0.30 SHGC
    - Curtainwall: U-0.25, 0.30 SHGC
- Mechanical System:
    - (Refer to System Option descriptions)
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.5 w/s.f.

Section 2.1: LEED Energy Savings Analysis Conclusion

A comparison of the Design Building against the ASHRAE Standard 90.1-2010 Baseline Building results in the following energy cost savings for LEED V4 EAc2 – Optimize Energy Performance for each System Option as follows:

- System Option 1 – 27.1% cost for 11 total points
- System Option 2 – 44.1% cost for 16 total points
- System Option 3 – 42.8% cost for 16 total points
- System Option 4 – 48.6% cost for 16 total points

Note:

The values indicated above are based on energy modelling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School - Mechanical System Payback Summary

Baseline	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	1. Mixed-Air Overhead CHW/HHW VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils 2. High-Efficiency ASHP Chiller/Heater Plant	$15,838,440	1,738,354	$327,852	$1.96	**35.5**	$77,410	$1,620,000	$3,198,500	$1,620,000	$405,262	-	-	-

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Cafe/Stage and Gym areas 4. Supplemental Electric Resistance Heating Units	$14,007,900	1,443,027	$291,930	$1.75	**29.5**	$58,460	$1,943,500	$1,185,000	$3,167,000	$350,390	**$54,872**	**$4,025,486**	**Instant*****
2	1. VRF System w/ Water-Source Heat Pump (WSHP) Heat Recovery Condensing Units 2. WSHP VAV Dedicated Outdoor Air Systems (DOAS) w/ ERV & DCV with Terminal VAV Boxes 3. Supplemental Electric Heating 4. Geothermal Well Field and Distribution Plant	$19,358,100	1,183,958	$223,944	$1.34	**24.2**	$62,235	$0	$3,945,000	$0	$286,179	**$119,083**	**$2,446,273**	**23**
3	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant	$14,442,360	1,160,735	$229,174	$1.37	**23.7**	$74,000	$1,620,000	$2,289,500	$1,620,000	$303,174	**$102,088**	**$5,680,330**	**Instant*****
4	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant	$18,306,360	1,093,195	$205,748	$1.23	**22.3**	$75,675	$0	$3,379,500	$0	$281,423	**$123,839**	**$4,041,912**	**21**

* Capital Investment Costs based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. specialty exhaust, overhead and profit).
** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.
*** Total life-cycle savings is based on a 50 year study period.
**** Discounted payback years is based upon BLCC5 Life Cycle Analysis.
***** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School - Mechanical System Payback Summary
Including Federal Tax Credit

Baseline	System	Gross Capital Investment*	25.5% IRA Geothermal Federal Tax Credit***	Net Investment	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	**1. Mixed-Air Overhead CHW/HHW VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils 2. High-Efficiency ASHP Chiller/Heater Plant**	$15,838,440	$0	**$15,838,440**	1,738,354	$327,852	$1.96	**35.5**	$77,410	$1,620,000	$3,198,500	$1,620,000	$405,262	-	-	-

Option	System	Gross Capital Investment*	25.5% IRA Geothermal Federal Tax Credit***	Net Investment	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	**1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Cafe/Stage and Gym areas 4. Supplemental Electric Resistance Heating Units**	$14,007,900	$0	**$14,007,900**	1,443,027	$291,930	$1.75	**29.5**	$58,460	$1,943,500	$1,185,000	$3,167,000	$350,390	**$54,872**	**$4,025,486**	**Instant*****
2	**1. VRF System w/ Water-Source Heat Pump (WSHP) Heat Recovery Condensing Units 2. WSHP VAV Dedicated Outdoor Air Systems (DOAS) w/ ERV & DCV with Terminal VAV Boxes 3. Supplemental Electric Heating 4. Geothermal Well Field and Distribution Plant**	$19,358,100	$4,936,316	**$14,421,785**	1,183,958	$223,944	$1.34	**24.2**	$62,235	$0	$3,945,000	$0	$286,179	**$119,083**	**$7,382,588**	**Instant*****
3	**1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant**	$14,442,360	$0	**$14,442,360**	1,160,735	$229,174	$1.37	**23.7**	$74,000	$1,620,000	$2,289,500	$1,620,000	$303,174	**$102,088**	**$5,680,330**	**Instant*****
4	**1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant**	$18,306,360	$4,668,122	**$13,638,238**	1,093,195	$205,748	$1.23	**22.3**	$75,675	$0	$3,379,500	$0	$281,423	**$123,839**	**$8,710,034**	**Instant*****

* Capital Investment Costs based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. specialty exhaust, overhead and profit).

** Total payment costs indicated for these incentives need to be confirmed by the appropriate parties.

*** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

**** Total life-cycle savings is based on a 50 year study period.

***** Discounted payback years is based upon BLCC5 Life Cycle Analysis.

****** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School - LEED v4.0 Energy Savings Summary

Baseline	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings**	Energy Cost Savings Percentage**	Total LEED EAc2 Points
LEED Baseline	**1. ASHRAE 90.1-2010 Envelope 2. ASHRAE 90.1-2010 Mechanical Systems (System 8 - CHW VAV AHU's w/ Fan-Powered VAV Boxes w/ Electric Reheat) 3. ASHRAE 90.1-2010 Lighting System (0.99 w/s.f.) 4. ASHRAE 90.1-2010 Electric Domestic Hot Water Systems**	2,001,943	$400,661	$2.40	40.9	511,887.4	-	-	-

Option	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings**	Energy Cost Savings Percentage**	Total LEED EAc2 Points
1	**1. Design Envelope 2. Design Mechanical Systems (Air-Source VRF System) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,443,027	$291,930	$1.75	29.5	368,975.2	$108,731	**27.1%**	**11**
2	**1. Design Envelope 2. Design Mechanical Systems (Ground-Source VRF System) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,183,958	$223,944	$1.34	24.2	302,732.5	$176,717	**44.1%**	**16**
3	**1. Design Envelope 2. Design Mechanical Systems (Displacement Ventilation System with Air-Source Heat Recovery Heat Pump Chiller/Heater Plant) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,160,735	$229,174	$1.37	23.7	296,794.5	$171,487	**42.8%**	**16**
4	**1. Design Envelope 2. Design Mechanical Systems (Geothermal Displacement Ventilation System with Ground-Source Heat Recovery Heat Pump Chiller/Heater Plant) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,093,195	$205,748	$1.23	22.3	279,524.8	$194,913	**48.6%**	**16**

*Combined expense savings is the difference between the combined annual expense of the baseline and building in comparison.
**Energy cost/Greenhouse Gas (GHG) emissions savings percentage is the difference between the annual energy costs of the baseline and building in comparison.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

LIFE CYCLE ANALYSES

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 1 - ASHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:51:49 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$14,007,900	$1,830,540
Future Costs:			
Energy Consumption Costs	$8,347,407	$6,929,275	$1,418,131
Energy Demand Charges	$3,404,705	$3,535,184	-$130,479
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$6,160,732	$907,293
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$16,625,191	$2,194,946
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$30,633,091	$4,025,486

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$2,194,946
- Increased Total Investment	-$1,830,540

Net Savings	$4,025,486

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,443,027.0 kWh	295,327.0 kWh	14,765,945.7 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	4,923.8 MBtu	1,007.7 MBtu	50,383.5 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	476,250.04 kg	97,468.38 kg	4,873,285.33 kg
SO2	162.71 kg	135.07 kg	27.64 kg	1,382.13 kg
NOx	438.08 kg	363.65 kg	74.42 kg	3,721.12 kg
Total:				
CO2	573,718.42 kg	476,250.04 kg	97,468.38 kg	4,873,285.33 kg
SO2	162.71 kg	135.07 kg	27.64 kg	1,382.13 kg
NOx	438.08 kg	363.65 kg	74.42 kg	3,721.12 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 2 - GSHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:15 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$19,358,100	-$3,519,660
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,685,251	$2,662,156
Energy Demand Charges	$3,404,705	$2,342,200	$1,062,505
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,826,752	$2,241,273
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,854,203	$5,965,933
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$32,212,303	$2,446,273

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,965,933
- Increased Total Investment	$3,519,660

Net Savings	$2,446,273

Savings-to-Investment Ratio (SIR)

SIR = 1.70

Adjusted Internal Rate of Return

AIRR = 2.48%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	21
Discounted Payback occurs in year	23

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	1,738,354.0 kWh	1,183,958.0 kWh	554,396.0 kWh	27,719,041.1 kWh

Energy Savings Summary (in MBtu)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	5,931.5 MBtu	4,039.8 MBtu	1,891.7 MBtu	94,581.3 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg
Total:				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 3 - ASHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:29 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$15,379,680	$458,760
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,573,736	$2,773,670
Energy Demand Charges	$3,404,705	$2,641,190	$763,515
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$5,383,640	$1,684,385
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$13,598,566	$5,221,570
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$28,978,246	$5,680,330

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,221,570
- Increased Total Investment	-$458,760

Net Savings	$5,680,330

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	**Base Case**	**Alternative**	**Savings**	**Savings**
Electricity	1,738,354.0 kWh	1,160,735.0 kWh	577,619.0 kWh	28,880,159.3 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	**Base Case**	**Alternative**	**Savings**	**Savings**
Electricity	5,931.5 MBtu	3,960.6 MBtu	1,970.9 MBtu	98,543.2 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	383,083.68 kg	190,634.74 kg	9,531,475.96 kg
SO2	162.71 kg	108.65 kg	54.07 kg	2,703.26 kg
NOx	438.08 kg	292.51 kg	145.56 kg	7,278.00 kg
Total:				
CO2	573,718.42 kg	383,083.68 kg	190,634.74 kg	9,531,475.96 kg
SO2	162.71 kg	108.65 kg	54.07 kg	2,703.26 kg
NOx	438.08 kg	292.51 kg	145.56 kg	7,278.00 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 4 - GSHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:50 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$18,306,360	-$2,467,920
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,249,416	$3,097,991
Energy Demand Charges	$3,404,705	$2,125,799	$1,278,906
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,935,090	$2,132,935
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,310,305	$6,509,832
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$30,616,665	$4,041,912

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$6,509,832
- Increased Total Investment	$2,467,920

Net Savings	$4,041,912

Savings-to-Investment Ratio (SIR)

SIR = 2.64

Adjusted Internal Rate of Return

AIRR = 3.39%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	20
Discounted Payback occurs in year	21

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,093,195.0 kWh	645,159.0 kWh	32,257,066.8 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	3,730.1 MBtu	2,201.4 MBtu	110,065.7 MBtu

Emissions Reduction Summary

Energy	-----Average	Annual	Emissions-----	Life-Cycle
Type	Base Case	Alternative	Reduction	Reduction
Electricity				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg
Total:				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: IRA Rebate Option 2 - GSHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:53:19 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$14,421,785	$1,416,655
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,685,251	$2,662,156
Energy Demand Charges	$3,404,705	$2,342,200	$1,062,505
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,826,752	$2,241,273
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,854,203	$5,965,933
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$27,275,988	$7,382,588

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,965,933
- Increased Total Investment	-$1,416,655

Net Savings	$7,382,588

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,183,958.0 kWh	554,396.0 kWh	27,719,041.1 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	4,039.8 MBtu	1,891.7 MBtu	94,581.3 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg
Total:				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: IRA Rebate Option 4 - GSHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:54:21 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$13,638,238	$2,200,202
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,249,416	$3,097,991
Energy Demand Charges	$3,404,705	$2,125,799	$1,278,906
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,935,090	$2,132,935
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,310,305	$6,509,832
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$25,948,543	$8,710,034

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$6,509,832
- Increased Total Investment	-$2,200,202

Net Savings	$8,710,034

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average Annual Consumption-----		Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,093,195.0 kWh	645,159.0 kWh	32,257,066.8 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average Annual Consumption-----		Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	3,730.1 MBtu	2,201.4 MBtu	110,065.7 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg
Total:				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg

COST ESTIMATES

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School
JOB NO: 894 135 00
CLIENT: Dore & Whittier Architects
DATE: 1/13/2025 **BY:** KL

Baseline - Air-Source Heat Pump Plant VAV Systems (MA Opt-In Stretch Energy Code Compliant)

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
VAV Box with Hot Water Reheat Coils	150	$1,500			$ 225,000
RTU-A: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	30,000 CFM	$21/CFM			$ 630,000
RTU-B: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	35,000 CFM	$21/CFM			$ 735,000
RTU-C: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	30,000 CFM	$21/CFM			$ 630,000
RTU-D: Gym Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	5,000 CFM	$25/CFM			$ 125,000
RTU-F: Cafe/Stage Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	6,000 CFM	$23/CFM			$ 138,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood Controls	4,500 CFM	$23/CFM			$ 103,500
(15) 30 Ton High-Efficiency Air-Source Heat Recovery Heat Pump Chiller/Heater Plant (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	450 tons	$3,600/ton			$ 1,620,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Terminal Heating Units			167,000	$2.00	$ 334,000
Hot Water Piping & Ins. and Accessories			167,000	$6.50	$ 1,085,500
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$7.00	$ 1,169,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$25.00	$ 4,175,000
ATC/DDC Controls			167,000	$7.50	$ 1,252,500
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$13,198,700			$ 2,639,740
				TOTAL	$ 15,838,440
				TOTAL ($/FT²)	$ 94.84

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Air-Source Heat Pump replacement cost of $1,620,000 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** Rooftop Unit and Pump replacement cost of $3,198,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Air-Source Heat Pump replacement cost of $1,620,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Option 1 - Air-Source Heat Pump (ASHP) Variable Refrigerant Flow (VRF) Systems with ASHP Cooling/Heating Air Handling Units

PROJECT:	**Wilmington Elementary School**	
JOB NO:	**894 135 00**	
CLIENT:	**Dore & Whittier Architects**	
DATE:	**1/13/2025**	**BY: KL**

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Indoor VRF Evaporator Units	216	$4,500			$ 972,000
VRF Branch Controllers	14	$12,000			$ 168,000
Outdoor Air Cooled VRF Condensing Units (240 Ton Total Capacity)	240 tons	$3,000/ton			$ 720,000
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	14,000 CFM	$30/CFM			$ 420,000
RTU-B: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	16,000 CFM	$30/CFM			$ 480,000
RTU-C: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	13,000 CFM	$30/CFM			$ 390,000
RTU-D: Gym Overhead VAV ASHP w/ ERV & DCV	12,000 CFM	$30/CFM			$ 360,000
RTU-E: Media Center 100% O.A. ASHP DOAS w/ ERV & DCV	2,500 CFM	$35/CFM			$ 87,500
RTU-F: Cafe/Stage Overhead VAV ASHP w/ ERV & DCV	12,000 CFM	$30/CFM			$ 360,000
RTU-G: Kitchen/Custodial Overhead VAV ASHP w/ ERV & DCV	3,000 CFM	$35/CFM			$ 96,000
RTU-H: Admin. 100% O.A. ASHP DOAS w/ ERV & DCV	3,000 CFM	$35/CFM			$ 105,000
MAU-A: Kitchen 100% O.A. ASHP VAV MAU w/ Kitchen Hood Controls	4,500 CFM	$33/CFM			$ 148,500
Electric Terminal Heating Units			167,000	$3.50	$ 584,500
Electric Circuitry for VRF & Electric Terminal Heating Units			167,000	$3.00	$ 501,000
Refrigeration Piping & Insulation and Condensate Piping & Pumps			167,000	$10.00	$ 1,670,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls w/ Refrigerant Monitoring			167,000	$7.75	$ 1,294,250
Indoor VRF Evaporator Units (IDF, EMR, etc.)	10	$4,500			$ 45,000
Cabinet Electric Unit Heaters	16	$2,000			$ 32,000
Electric Unit Heaters	6	$1,000			$ 6,000
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$11,673,250			$ 2,334,650
				TOTAL	$ 14,007,900
				TOTAL ($/FT²)	$ 83.88

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Rooftop Unit Condenser & Air-Source VRF Condenser replacement cost of $1,943,450 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** VRF Evaporator Unit & Branch Controller replacement cost of $1,185,000 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Rooftop Unit & Air-Source VRF Condenser replacement cost of $3,167,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School

JOB NO: 894 135 00

CLIENT: Dore & Whittier Architects

DATE: 1/13/2025 **BY:** KL

Option 2 - Geothermal Ground-Source Heat Pump (GSHP) Variable Refrigerant Flow (VRF) Systems with GSHP Cooling/Heating Air Handling Units

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Indoor VRF Evaporator Units	216	$4,500			$ 972,000
VRF Branch Controllers	14	$12,000			$ 168,000
Indoor Water-Source VRF Condensing Units (240 Ton Total Capacity including Redundancy)	240 tons	$2,500/ton			$ 600,000
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	14,000 CFM	$24/CFM			$ 336,000
RTU-B: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	16,000 CFM	$24/CFM			$ 384,000
RTU-C: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	13,000 CFM	$24/CFM			$ 312,000
RTU-D: Gym Overhead VAV GSHP w/ ERV & DCV	12,000 CFM	$24/CFM			$ 288,000
RTU-E: Media Center 100% O.A. GSHP DOAS w/ ERV & DCV	2,500 CFM	$29/CFM			$ 72,500
RTU-F: Cafe/Stage Overhead VAV GSHP w/ ERV & DCV	12,000 CFM	$26/CFM			$ 312,000
RTU-G: Kitchen/Custodial Overhead VAV GSHP w/ ERV & DCV	3,000 CFM	$29/CFM			$ 87,000
RTU-H: Admin. 100% O.A. GSHP DOAS w/ ERV & DCV	3,000 CFM	$29/CFM			$ 87,000
MAU-A: Kitchen 100% O.A. GSHP VAV MAU w/ Kitchen Hood Controls	4,500 CFM	$27/CFM			$ 121,500
(80) 600' Deep Closed Loop Type Wells (4.25 tons/well; 335 Tons total capacity) including Underground Piping, Coring, Sleeves, Excavation, Dewatering, Oversight, etc.	80	$45,000			$ 3,600,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Ground/Condenser Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Geothermal Pumps and VFDs, Accessories	2	$45,000			$ 90,000
Geothermal CW Piping Mains + Added Glycol Fill					$ 120,000
Electric Terminal Heating Units			167,000	$3.50	$ 584,500
Electric Circuitry for VRF & Electric Terminal Heating Units			167,000	$3.00	$ 501,000
Refrigeration Piping & Insulation and Condensate Piping & Pumps			167,000	$10.00	$ 1,670,000
Condenser Water Piping & Insulation and Condensate Piping & Pumps			167,000	$6.00	$ 1,002,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls w/ Refrigerant Monitoring			167,000	$8.25	$ 1,377,750
Indoor VRF Evaporator Units (IDF, EMR, etc.)	10	$3,500			$ 35,000
Cabinet Electric Unit Heaters	16	$2,000			$ 32,000
Electric Unit Heaters	6	$1,000			$ 6,000
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$16,131,750			$ 3,226,350
				TOTAL	$ 19,358,100
				TOTAL ($/FT²)	$ 115.92

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* VRF Evaporator Unit & Branch Controller, Rooftop Unit, Water-Source Heat Pump, and Pump replacement cost of $3,945,000 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School

JOB NO: 894 135 00

CLIENT: Dore & Whittier Architects

DATE: 1/13/2025 **BY:** KL

Option 3 - Air-Source Heat Pump Plant Displacement Ventilation CHW/HHW Cooling/Heating VAV Systems w/ Terminal Chilled/Hot Water Radiation

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Displacement Diffuser Assemblies	170	$950			$ 161,500
Small Displacement Diffuser Assemblies (Admin.)	46	$850			$ 39,100
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-B: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	20,000 CFM	$21/CFM			$ 420,000
RTU-C: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-D: Gym Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-F: Cafe/Stage Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	4,000 CFM	$25/CFM			$ 100,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood	4,500 CFM	$23/CFM			$ 103,500
(15) 30 Ton High-Efficiency Air-Source Heat Recovery Heat Pump Chiller/Heater Plant (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	450 tons	$3,600/ton			$ 1,620,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Compensated Loop Pumps w/ VFD's, Accessories	2	$20,000			$ 40,000
Hot Water Terminal Heating/Cooling Units			167,000	$4.00	$ 668,000
Hot Water Piping & Ins. and Accessories			167,000	$6.50	$ 1,085,500
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$9.00	$ 1,503,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls			167,000	$8.00	$ 1,336,000
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$12,035,300			$ 2,407,060
				TOTAL	$ 14,442,360
				TOTAL ($/FT²)	$ 86.48

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Air-Source Heat Pump replacement cost of $1,620,000 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** Rooftop Unit and Pump replacement cost of $2,289,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Air-Source Heat Pump replacement cost of $1,620,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School
JOB NO: 894 135 00
CLIENT: Dore & Whittier Architects
DATE: 1/13/2025 **BY:** KL

Option 4 - Geothermal Heat Pump Plant Displacement Ventilation CHW/HHW Cooling/Heating VAV Systems w/ Terminal Chilled/Hot Water Radiation

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Displacement Diffuser Assemblies	170	$950			$ 161,500
Small Displacement Diffuser Assemblies (Admin.)	46	$850			$ 39,100
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-B: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	20,000 CFM	$21/CFM			$ 420,000
RTU-C: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-D: Gym Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-F: Cafe/Stage Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	4,000 CFM	$25/CFM			$ 100,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood	4,500 CFM	$23/CFM			$ 103,500
(8) 50 Ton High-Efficiency Water-Source Heat Recovery Geothermal Heat Pump Chiller/Heater Plant (400 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	400 tons	$2,500/ton			$ 1,000,000
(80) 600' Deep Closed Loop Type Wells (4.25 tons/well; 335 Tons total capacity) including Underground Piping, Coring, Sleeves, Excavation, Dewatering, Oversight, etc.	80	$45,000			$ 3,600,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Compensated Loop Pumps w/ VFD's, Accessories	2	$20,000			$ 40,000
Geothermal Pumps and VFDs, Accessories	2	$45,000			$ 90,000
Geothermal CW Piping Mains + Added Glycol Fill					$ 150,000
Hot Water Terminal Heating/Cooling Units			167,000	$4.00	$ 668,000
Hot Water Piping & Ins. and Accessories			167,000	$6.00	$ 1,002,000
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$9.00	$ 1,503,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls			167,000	$8.50	$ 1,419,500
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$15,255,300			$ 3,051,060
				TOTAL	$ 18,306,360
				TOTAL ($/FT²)	$ 109.62

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Rooftop Unit, Water-Source Heat Pump, and Pump replacement cost of $3,79,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School - Annual Maintenance Costs

Baseline - Air-Source Heat Pump Plant Overhead VAV

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box w/ Reheat Coil	150	$75	$11,250
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
Water Treatment	167,000	$0.10	$16,700
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	6	$2,000	$12,000
Small CHW AHU's (<6,000 CFM)	3	$1,500	$4,500
Fan Coil Units	10	$125	$1,250
Air-Source Heat Pump Plant	1	$10,000	$10,000
		TOTAL	**$77,410**

Option 1 - Air-Source VRF System

Unit Type	Quantity	Cost/Unit	Annual Cost
Indoor VRF Evaporators		$150	$0
Air-Cooled VRF Outdoor Units	1	$5,000	$5,000
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
ATC Controls	167,000	$0.10	$16,700
Large ASHP AHU's (>6,000 CFM)	5	$2,750	$13,750
Small ASHP AHU's (<6,000 CFM)	4	$2,250	$9,000
Indoor VRF Fan Coil Units	10	$150	$1,500
		TOTAL	**$58,460**

Option 2 - Geothermal VRF System

Unit Type	Quantity	Cost/Unit	Annual Cost
Indoor VRF Evaporators		$150	$0
VRF Ground Source Plant	1	$3,000	$3,000
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
Water Treatment	167,000	$0.075	$12,525
ATC Controls	167,000	$0.10	$16,700
Large WSHP AHU's (>6,000 CFM)	5	$2,000	$10,000
Small WSHP AHU's (<6,000 CFM)	4	$1,500	$6,000
Indoor VRF Fan Coil Units	10	$150	$1,500
		TOTAL	**$62,235**

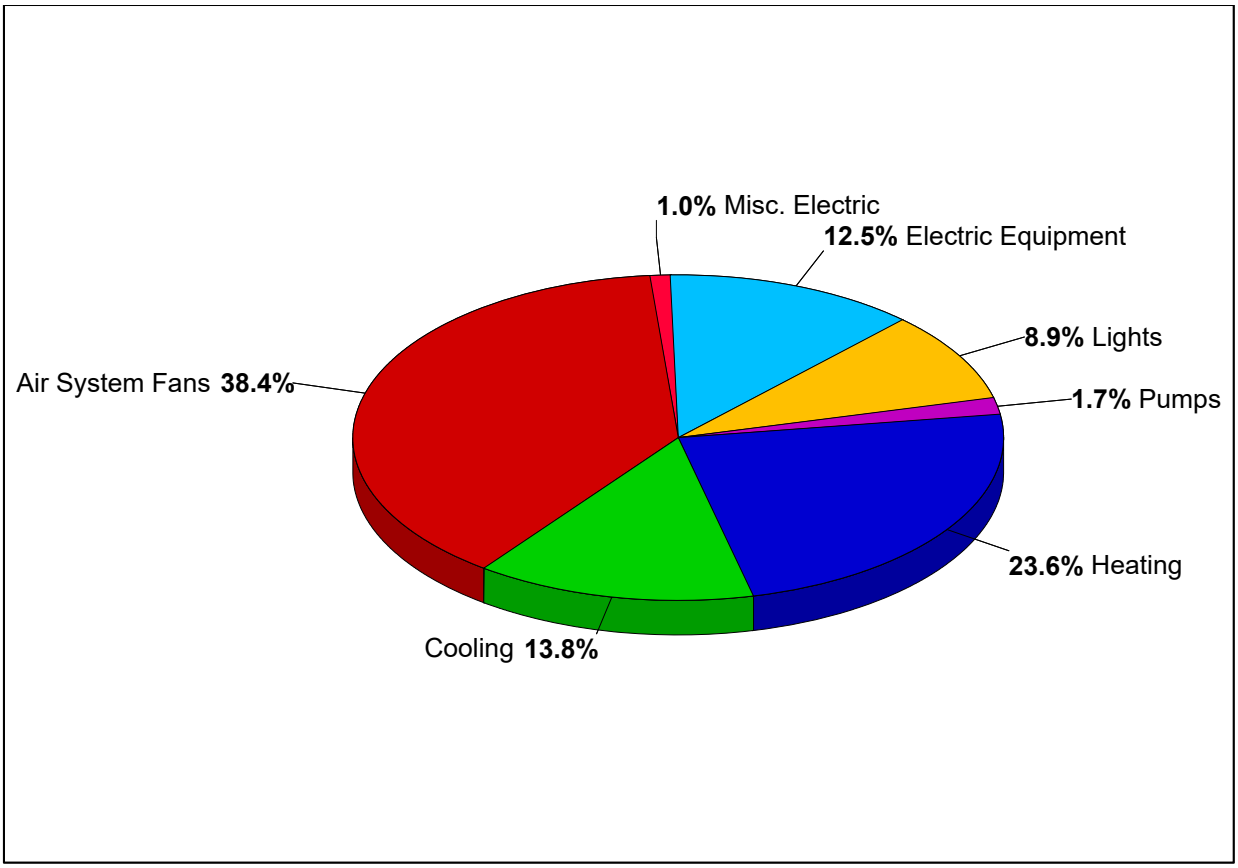
Option 3 - Air-Source Heat Pump Plant Displacement

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, RP's, etc.)	167,000	$0.05	$8,350
Water Treatment	167,000	$0.10	$16,700
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	5	$2,000	$10,000
Small CHW AHU's (<6,000 CFM)	4	$1,500	$6,000
Fan Coil Units	10	$125	$1,250
Air-Source Heat Pump Plant	1	$7,500	$7,500
		TOTAL	**$74,000**

Option 4 - Geothermal Heat Pump Plant Displacement

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, RP's, etc.)	167,000	$0.05	$8,350
Water Treatment	167,000	$0.125	$20,875
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	5	$2,000	$10,000
Small CHW AHU's (<6,000 CFM)	4	$1,500	$6,000
Fan Coil Units	10	$125	$1,250
Geothermal Plant	1	$5,000	$5,000
		TOTAL	**$75,675**

ENERGY MODEL OUTPUTS



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	125,958	0.753	38.4
Cooling	45,404	0.272	13.8
Heating	77,337	0.463	23.6
Pumps	5,483	0.033	1.7
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**254,182**	**1.520**	**77.5**
Lights	29,306	0.175	8.9
Electric Equipment	40,926	0.245	12.5
Misc. Electric	3,439	0.021	1.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,671**	**0.441**	**22.5**
Grand Total	**327,852**	**1.961**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	2,986,634	17.865
Heating Coil Loads	2,728,537	16.321
Grand Total	**5,715,171**	**34.186**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	2,286,775	13.679	8,167,054	48.852
Cooling	798,997	4.779	2,853,559	17.069
Heating	1,412,824	8.451	5,045,799	30.182
Pumps	99,188	0.593	354,241	2.119
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**4,597,783**	**27.502**	**16,420,653**	**98.221**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**5,931,486**	**35.480**	**21,183,880**	**126.713**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	27,842	12,481	13	0	40,337
Feb	23,777	6,981	13	0	30,771
Mar	23,212	10,510	13	0	33,735
Apr	16,197	6,267	13	0	22,477
May	18,174	7,428	13	0	25,614
Jun	19,785	8,533	13	0	28,331
Jul	13,620	7,005	13	0	20,638
Aug	14,993	7,441	13	0	22,447
Sep	20,035	7,872	13	0	27,920
Oct	16,362	7,576	13	0	23,952
Nov	17,314	6,224	13	0	23,551
Dec	21,558	6,506	13	0	28,077
Totals	232,870	94,826	156	0	327,852

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	40,337	207,842	0.1941
Feb	30,771	177,492	0.1734
Mar	33,735	173,277	0.1947
Apr	22,477	120,910	0.1859
May	25,614	135,665	0.1888
Jun	28,331	147,696	0.1918
Jul	20,638	101,669	0.2030
Aug	22,447	111,920	0.2006
Sep	27,920	149,559	0.1867
Oct	23,952	122,142	0.1961
Nov	23,551	129,250	0.1822
Dec	28,077	160,932	0.1745
Totals	327,852	1,738,354	0.1886

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	207,842
Feb	0	0	0	0	177,492
Mar	0	0	0	0	173,277
Apr	0	0	0	0	120,910
May	0	0	0	0	135,665
Jun	0	0	0	0	147,696
Jul	0	0	0	0	101,669
Aug	0	0	0	0	111,920
Sep	0	0	0	0	149,559
Oct	0	0	0	0	122,142
Nov	0	0	0	0	129,250
Dec	0	0	0	0	160,932
Totals	0	0	0	0	1,738,354

4. Billing Demands

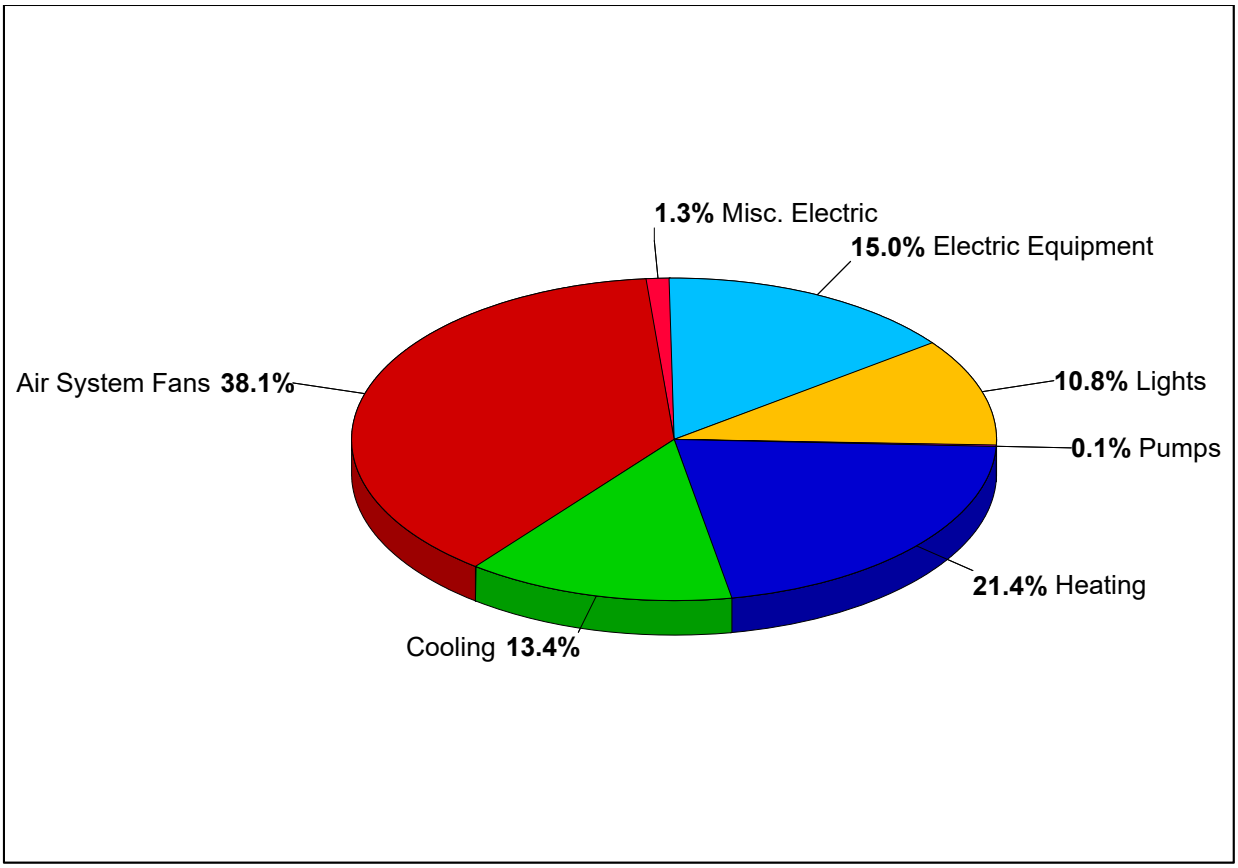
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	951.9
Feb	0.0	0.0	0.0	0.0	532.5
Mar	0.0	0.0	0.0	0.0	801.6
Apr	0.0	0.0	0.0	0.0	478.0
May	0.0	0.0	0.0	0.0	566.5
Jun	0.0	0.0	0.0	0.0	650.8
Jul	0.0	0.0	0.0	0.0	534.3
Aug	0.0	0.0	0.0	0.0	567.5
Sep	0.0	0.0	0.0	0.0	600.4
Oct	0.0	0.0	0.0	0.0	577.8
Nov	0.0	0.0	0.0	0.0	474.7
Dec	0.0	0.0	0.0	0.0	496.2

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	951.9
Feb	0.0	0.0	0.0	0.0	532.5
Mar	0.0	0.0	0.0	0.0	801.6
Apr	0.0	0.0	0.0	0.0	478.0
May	0.0	0.0	0.0	0.0	566.5
Jun	0.0	0.0	0.0	0.0	650.8
Jul	0.0	0.0	0.0	0.0	534.3
Aug	0.0	0.0	0.0	0.0	567.5
Sep	0.0	0.0	0.0	0.0	600.4
Oct	0.0	0.0	0.0	0.0	577.8
Nov	0.0	0.0	0.0	0.0	474.7
Dec	0.0	0.0	0.0	0.0	496.2

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/9 08:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/21 09:00
May	n/a	n/a	n/a	n/a	5/10 09:00
Jun	n/a	n/a	n/a	n/a	6/28 09:00
Jul	n/a	n/a	n/a	n/a	7/20 14:00
Aug	n/a	n/a	n/a	n/a	8/24 10:00
Sep	n/a	n/a	n/a	n/a	9/4 08:00
Oct	n/a	n/a	n/a	n/a	10/27 09:00
Nov	n/a	n/a	n/a	n/a	11/27 08:00
Dec	n/a	n/a	n/a	n/a	12/25 07:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	111,092	0.665	38.1
Cooling	39,034	0.234	13.4
Heating	62,582	0.374	21.4
Pumps	234	0.001	0.1
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**212,942**	**1.274**	**72.9**
Lights	31,424	0.188	10.8
Electric Equipment	43,874	0.262	15.0
Misc. Electric	3,687	0.022	1.3
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**78,985**	**0.473**	**27.1**
Grand Total	**291,927**	**1.746**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O1] ASHP VRF Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	3,964,639	23.715
Heating Coil Loads	1,748,837	10.461
Grand Total	**5,713,476**	**34.176**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,874,878	11.215	6,695,993	40.052
Cooling	649,569	3.885	2,319,889	13.877
Heating	1,061,620	6.350	3,791,500	22.679
Pumps	3,962	0.024	14,151	0.085
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**3,590,029**	**21.474**	**12,821,533**	**76.693**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,560	4.430	2,644,858	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,712**	**7.978**	**4,763,256**	**28.492**
Grand Total	**4,923,741**	**29.452**	**17,584,789**	**105.184**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	19,297	9,213	13	0	28,524
Feb	16,445	8,053	13	0	24,511
Mar	17,685	7,349	13	0	25,047
Apr	14,024	8,345	13	0	22,382
May	16,235	7,850	13	0	24,098
Jun	18,550	9,076	13	0	27,639
Jul	12,023	7,538	13	0	19,574
Aug	13,188	7,823	13	0	21,024
Sep	18,874	8,830	13	0	27,717
Oct	14,744	7,504	13	0	22,261
Nov	15,713	8,213	13	0	23,939
Dec	16,530	8,670	13	0	25,213
Totals	193,308	98,466	156	0	291,930

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	28,524	144,054	0.1980
Feb	24,511	122,761	0.1997
Mar	25,047	132,016	0.1897
Apr	22,382	104,688	0.2138
May	24,098	121,190	0.1988
Jun	27,639	138,477	0.1996
Jul	19,574	89,751	0.2181
Aug	21,024	98,448	0.2136
Sep	27,717	140,893	0.1967
Oct	22,261	110,062	0.2023
Nov	23,939	117,295	0.2041
Dec	25,213	123,392	0.2043
Totals	291,930	1,443,027	0.2023

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	144,054
Feb	0	0	0	0	122,761
Mar	0	0	0	0	132,016
Apr	0	0	0	0	104,688
May	0	0	0	0	121,190
Jun	0	0	0	0	138,477
Jul	0	0	0	0	89,751
Aug	0	0	0	0	98,448
Sep	0	0	0	0	140,893
Oct	0	0	0	0	110,062
Nov	0	0	0	0	117,295
Dec	0	0	0	0	123,392
Totals	0	0	0	0	1,443,027

4. Billing Demands

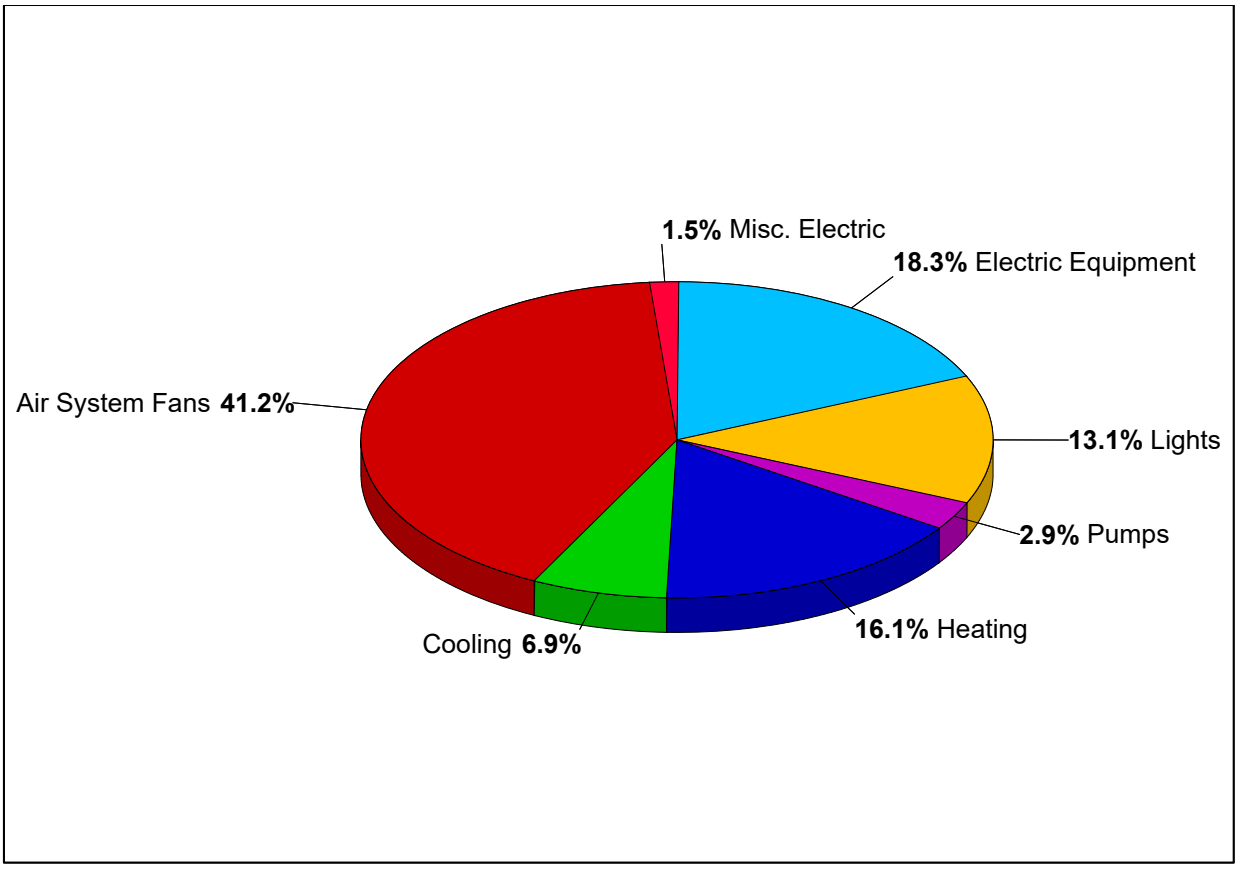
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	702.7
Feb	0.0	0.0	0.0	0.0	614.2
Mar	0.0	0.0	0.0	0.0	560.5
Apr	0.0	0.0	0.0	0.0	636.4
May	0.0	0.0	0.0	0.0	598.7
Jun	0.0	0.0	0.0	0.0	692.2
Jul	0.0	0.0	0.0	0.0	574.9
Aug	0.0	0.0	0.0	0.0	596.6
Sep	0.0	0.0	0.0	0.0	673.5
Oct	0.0	0.0	0.0	0.0	572.3
Nov	0.0	0.0	0.0	0.0	626.4
Dec	0.0	0.0	0.0	0.0	661.3

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	702.7
Feb	0.0	0.0	0.0	0.0	614.2
Mar	0.0	0.0	0.0	0.0	560.5
Apr	0.0	0.0	0.0	0.0	636.4
May	0.0	0.0	0.0	0.0	598.7
Jun	0.0	0.0	0.0	0.0	692.2
Jul	0.0	0.0	0.0	0.0	574.9
Aug	0.0	0.0	0.0	0.0	596.6
Sep	0.0	0.0	0.0	0.0	673.5
Oct	0.0	0.0	0.0	0.0	572.3
Nov	0.0	0.0	0.0	0.0	626.4
Dec	0.0	0.0	0.0	0.0	661.3

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/27 11:00
Mar	n/a	n/a	n/a	n/a	3/6 10:00
Apr	n/a	n/a	n/a	n/a	4/10 10:00
May	n/a	n/a	n/a	n/a	5/15 14:00
Jun	n/a	n/a	n/a	n/a	6/29 10:00
Jul	n/a	n/a	n/a	n/a	7/7 09:00
Aug	n/a	n/a	n/a	n/a	8/21 09:00
Sep	n/a	n/a	n/a	n/a	9/5 10:00
Oct	n/a	n/a	n/a	n/a	10/26 10:00
Nov	n/a	n/a	n/a	n/a	11/30 11:00
Dec	n/a	n/a	n/a	n/a	12/18 11:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	92,153	0.551	41.2
Cooling	15,519	0.093	6.9
Heating	35,945	0.215	16.1
Pumps	6,511	0.039	2.9
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**150,128**	**0.898**	**67.0**
Lights	29,371	0.176	13.1
Electric Equipment	41,000	0.245	18.3
Misc. Electric	3,443	0.021	1.5
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,815**	**0.442**	**33.0**
Grand Total	**223,943**	**1.339**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O2] Geo VRF Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	2,191,877	13.111
Heating Coil Loads	767,193	4.589
Grand Total	**2,959,070**	**17.700**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,664,212	9.955	5,943,614	35.552
Cooling	274,701	1.643	981,075	5.868
Heating	650,323	3.890	2,322,582	13.893
Pumps	116,843	0.699	417,296	2.496
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,706,078**	**16.187**	**9,664,566**	**57.809**
Lights	530,513	3.173	1,894,688	11.333
Electric Equipment	740,556	4.430	2,644,844	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,712**	**7.978**	**4,763,256**	**28.492**
Grand Total	**4,039,790**	**24.164**	**14,427,822**	**86.301**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	16,051	6,981	13	0	23,045
Feb	13,735	5,778	13	0	19,526
Mar	14,976	5,666	13	0	20,655
Apr	12,260	5,134	13	0	17,407
May	14,305	5,151	13	0	19,469
Jun	14,309	5,832	13	0	20,154
Jul	8,692	4,561	13	0	13,266
Aug	9,396	4,740	13	0	14,149
Sep	14,180	5,731	13	0	19,924
Oct	13,424	5,220	13	0	18,658
Nov	13,743	5,061	13	0	18,817
Dec	13,531	5,330	13	0	18,874
Totals	158,603	65,185	156	0	223,944

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	23,045	119,821	0.1923
Feb	19,526	102,529	0.1904
Mar	20,655	111,794	0.1848
Apr	17,407	91,518	0.1902
May	19,469	106,787	0.1823
Jun	20,154	106,813	0.1887
Jul	13,266	64,884	0.2045
Aug	14,149	70,143	0.2017
Sep	19,924	105,855	0.1882
Oct	18,658	100,212	0.1862
Nov	18,817	102,591	0.1834
Dec	18,874	101,011	0.1869
Totals	223,944	1,183,958	0.1891

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	119,821
Feb	0	0	0	0	102,529
Mar	0	0	0	0	111,794
Apr	0	0	0	0	91,518
May	0	0	0	0	106,787
Jun	0	0	0	0	106,813
Jul	0	0	0	0	64,884
Aug	0	0	0	0	70,143
Sep	0	0	0	0	105,855
Oct	0	0	0	0	100,212
Nov	0	0	0	0	102,591
Dec	0	0	0	0	101,011
Totals	0	0	0	0	1,183,958

4. Billing Demands

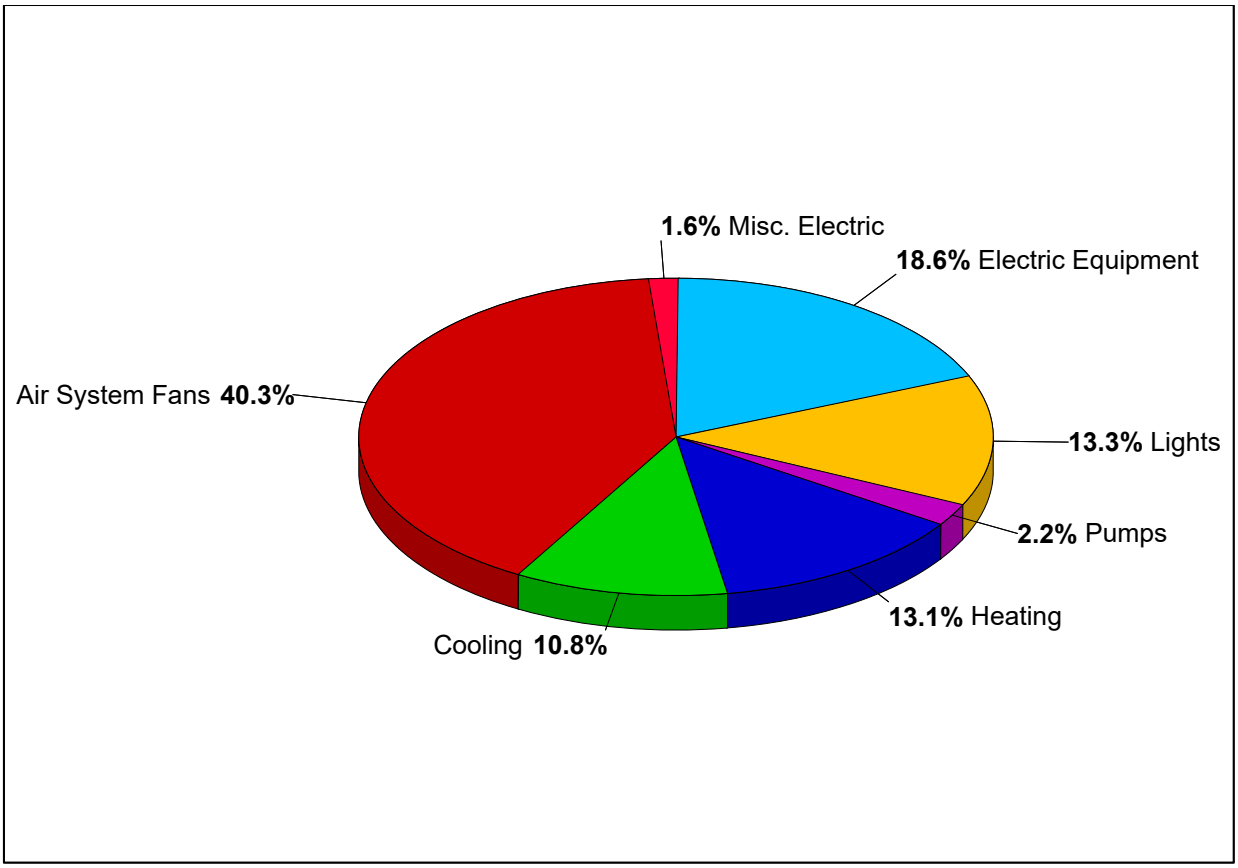
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	532.4
Feb	0.0	0.0	0.0	0.0	440.7
Mar	0.0	0.0	0.0	0.0	432.2
Apr	0.0	0.0	0.0	0.0	391.6
May	0.0	0.0	0.0	0.0	392.8
Jun	0.0	0.0	0.0	0.0	444.8
Jul	0.0	0.0	0.0	0.0	347.9
Aug	0.0	0.0	0.0	0.0	361.5
Sep	0.0	0.0	0.0	0.0	437.1
Oct	0.0	0.0	0.0	0.0	398.1
Nov	0.0	0.0	0.0	0.0	386.0
Dec	0.0	0.0	0.0	0.0	406.5

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	532.4
Feb	0.0	0.0	0.0	0.0	440.7
Mar	0.0	0.0	0.0	0.0	432.2
Apr	0.0	0.0	0.0	0.0	391.6
May	0.0	0.0	0.0	0.0	392.8
Jun	0.0	0.0	0.0	0.0	444.8
Jul	0.0	0.0	0.0	0.0	347.9
Aug	0.0	0.0	0.0	0.0	361.5
Sep	0.0	0.0	0.0	0.0	437.1
Oct	0.0	0.0	0.0	0.0	398.1
Nov	0.0	0.0	0.0	0.0	386.0
Dec	0.0	0.0	0.0	0.0	406.5

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/2 09:00
Feb	n/a	n/a	n/a	n/a	2/9 10:00
Mar	n/a	n/a	n/a	n/a	3/1 10:00
Apr	n/a	n/a	n/a	n/a	4/10 09:00
May	n/a	n/a	n/a	n/a	5/16 10:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/4 09:00
Oct	n/a	n/a	n/a	n/a	10/26 10:00
Nov	n/a	n/a	n/a	n/a	11/30 10:00
Dec	n/a	n/a	n/a	n/a	12/26 10:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	92,404	0.553	40.3
Cooling	24,818	0.148	10.8
Heating	30,125	0.180	13.1
Pumps	5,123	0.031	2.2
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**152,470**	**0.912**	**66.5**
Lights	30,523	0.183	13.3
Electric Equipment	42,602	0.255	18.6
Misc. Electric	3,577	0.021	1.6
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**76,702**	**0.459**	**33.5**
Grand Total	**229,172**	**1.371**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O3] ASHP Displacement Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	1,485,544	8.886
Heating Coil Loads	465,280	2.783
Grand Total	**1,950,824**	**11.669**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,602,666	9.586	5,723,809	34.237
Cooling	415,080	2.483	1,482,427	8.867
Heating	520,272	3.112	1,858,114	11.114
Pumps	88,818	0.531	317,206	1.897
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,626,835**	**15.713**	**9,381,555**	**56.116**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**3,960,539**	**23.690**	**14,144,782**	**84.608**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	15,620	9,551	13	0	25,185
Feb	13,023	5,332	13	0	18,368
Mar	13,937	6,542	13	0	20,492
Apr	11,164	4,743	13	0	15,920
May	13,070	5,397	13	0	18,479
Jun	15,117	7,374	13	0	22,504
Jul	10,515	6,185	13	0	16,713
Aug	11,477	6,532	13	0	18,023
Sep	14,394	6,942	13	0	21,349
Oct	12,153	5,258	13	0	17,424
Nov	12,525	4,655	13	0	17,193
Dec	12,497	5,014	13	0	17,523
Totals	155,492	73,526	156	0	229,174

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	25,185	116,604	0.2160
Feb	18,368	97,214	0.1889
Mar	20,492	104,039	0.1970
Apr	15,920	83,339	0.1910
May	18,479	97,564	0.1894
Jun	22,504	112,845	0.1994
Jul	16,713	78,496	0.2129
Aug	18,023	85,677	0.2104
Sep	21,349	107,452	0.1987
Oct	17,424	90,722	0.1921
Nov	17,193	93,497	0.1839
Dec	17,523	93,286	0.1878
Totals	229,174	1,160,735	0.1974

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	116,604
Feb	0	0	0	0	97,214
Mar	0	0	0	0	104,039
Apr	0	0	0	0	83,339
May	0	0	0	0	97,564
Jun	0	0	0	0	112,845
Jul	0	0	0	0	78,496
Aug	0	0	0	0	85,677
Sep	0	0	0	0	107,452
Oct	0	0	0	0	90,722
Nov	0	0	0	0	93,497
Dec	0	0	0	0	93,286
Totals	0	0	0	0	1,160,735

4. Billing Demands

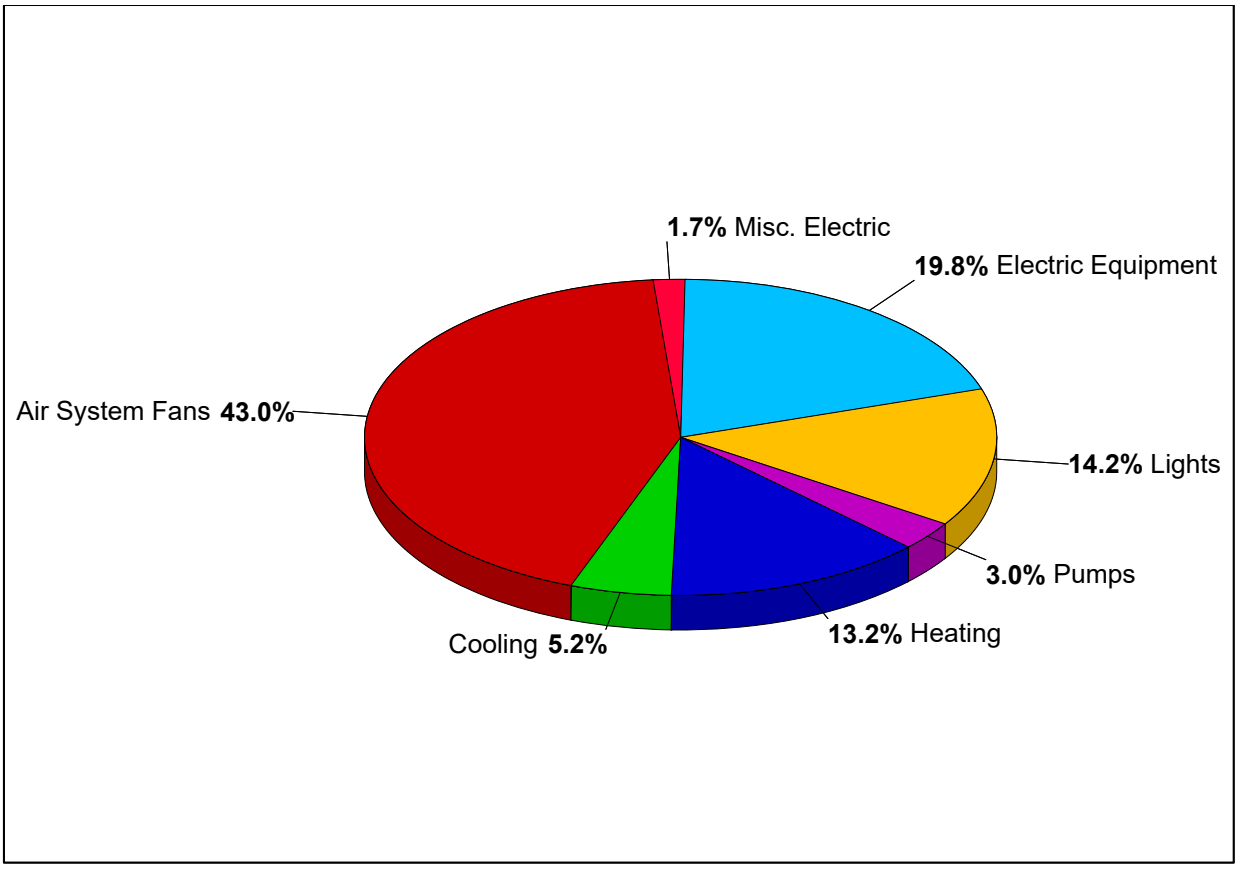
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	728.5
Feb	0.0	0.0	0.0	0.0	406.6
Mar	0.0	0.0	0.0	0.0	499.0
Apr	0.0	0.0	0.0	0.0	361.8
May	0.0	0.0	0.0	0.0	411.6
Jun	0.0	0.0	0.0	0.0	562.4
Jul	0.0	0.0	0.0	0.0	471.7
Aug	0.0	0.0	0.0	0.0	498.2
Sep	0.0	0.0	0.0	0.0	529.5
Oct	0.0	0.0	0.0	0.0	401.0
Nov	0.0	0.0	0.0	0.0	355.0
Dec	0.0	0.0	0.0	0.0	382.4

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	728.5
Feb	0.0	0.0	0.0	0.0	406.6
Mar	0.0	0.0	0.0	0.0	499.0
Apr	0.0	0.0	0.0	0.0	361.8
May	0.0	0.0	0.0	0.0	411.6
Jun	0.0	0.0	0.0	0.0	562.4
Jul	0.0	0.0	0.0	0.0	471.7
Aug	0.0	0.0	0.0	0.0	498.2
Sep	0.0	0.0	0.0	0.0	529.5
Oct	0.0	0.0	0.0	0.0	401.0
Nov	0.0	0.0	0.0	0.0	355.0
Dec	0.0	0.0	0.0	0.0	382.4

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/9 08:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/10 08:00
May	n/a	n/a	n/a	n/a	5/10 14:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/5 09:00
Oct	n/a	n/a	n/a	n/a	10/27 09:00
Nov	n/a	n/a	n/a	n/a	11/22 10:00
Dec	n/a	n/a	n/a	n/a	12/26 09:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	88,407	0.529	43.0
Cooling	10,639	0.064	5.2
Heating	27,214	0.163	13.2
Pumps	6,131	0.037	3.0
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**132,390**	**0.792**	**64.3**
Lights	29,184	0.175	14.2
Electric Equipment	40,755	0.244	19.8
Misc. Electric	3,417	0.020	1.7
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,357**	**0.439**	**35.7**
Grand Total	**205,747**	**1.231**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O4] Geo Displacement Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	1,485,544	8.886
Heating Coil Loads	465,280	2.783
Grand Total	**1,950,824**	**11.669**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,602,666	9.586	5,723,809	34.237
Cooling	185,027	1.107	660,811	3.953
Heating	498,224	2.980	1,779,370	10.643
Pumps	110,465	0.661	394,519	2.360
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,396,382**	**14.334**	**8,558,509**	**51.193**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**3,730,086**	**22.312**	**13,321,736**	**79.685**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	14,347	5,473	13	0	19,833
Feb	12,388	4,930	13	0	17,331
Mar	13,460	4,722	13	0	18,195
Apr	11,295	4,529	13	0	15,836
May	13,001	4,724	13	0	17,738
Jun	13,439	5,769	13	0	19,221
Jul	8,732	4,639	13	0	13,384
Aug	9,441	4,966	13	0	14,420
Sep	13,006	5,490	13	0	18,510
Oct	12,354	4,718	13	0	17,085
Nov	12,612	4,618	13	0	17,243
Dec	12,369	4,570	13	0	16,952
Totals	146,444	59,148	156	0	205,748

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	19,833	107,100	0.1852
Feb	17,331	92,478	0.1874
Mar	18,195	100,475	0.1811
Apr	15,836	84,313	0.1878
May	17,738	97,051	0.1828
Jun	19,221	100,319	0.1916
Jul	13,384	65,187	0.2053
Aug	14,420	70,477	0.2046
Sep	18,510	97,091	0.1906
Oct	17,085	92,222	0.1853
Nov	17,243	94,149	0.1832
Dec	16,952	92,332	0.1836
Totals	205,748	1,093,195	0.1882

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	107,100
Feb	0	0	0	0	92,478
Mar	0	0	0	0	100,475
Apr	0	0	0	0	84,313
May	0	0	0	0	97,051
Jun	0	0	0	0	100,319
Jul	0	0	0	0	65,187
Aug	0	0	0	0	70,477
Sep	0	0	0	0	97,091
Oct	0	0	0	0	92,222
Nov	0	0	0	0	94,149
Dec	0	0	0	0	92,332
Totals	0	0	0	0	1,093,195

4. Billing Demands

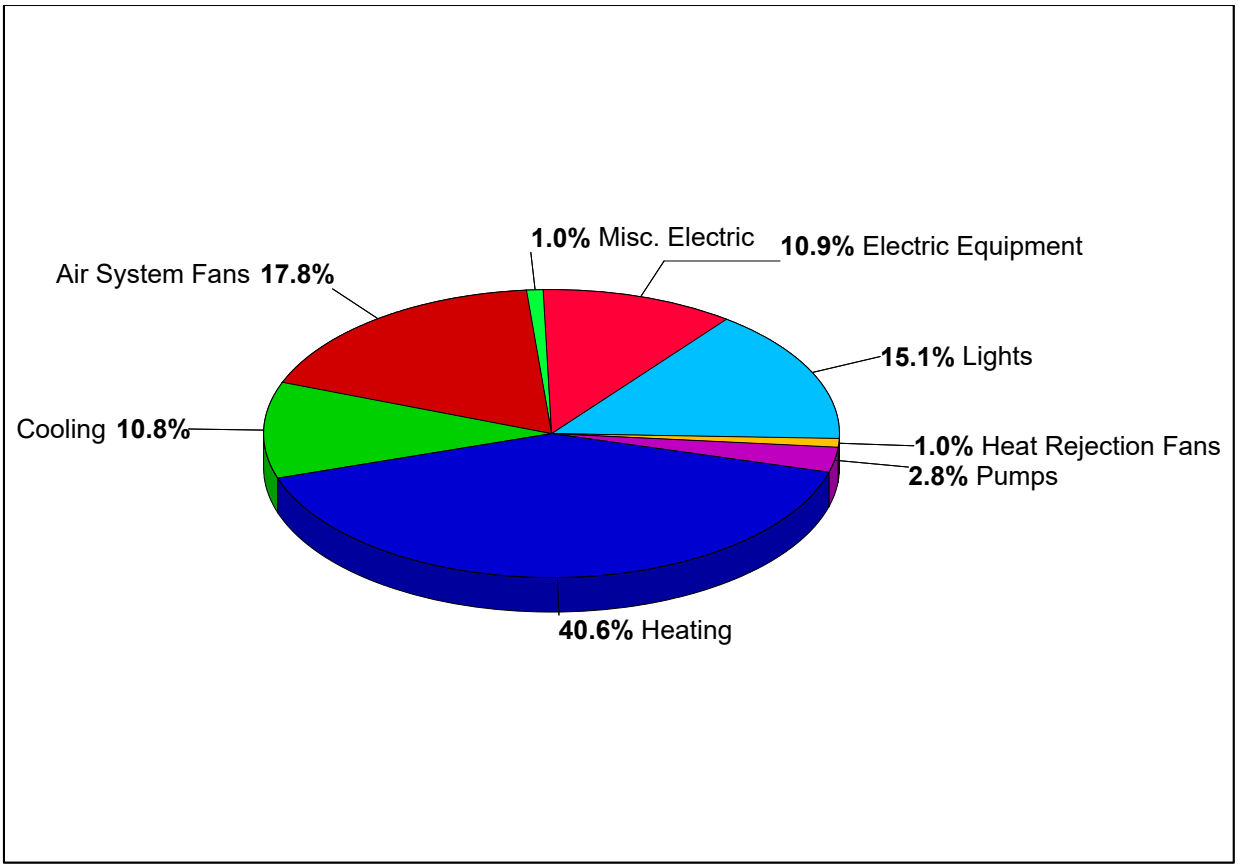
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	417.4
Feb	0.0	0.0	0.0	0.0	376.0
Mar	0.0	0.0	0.0	0.0	360.2
Apr	0.0	0.0	0.0	0.0	345.4
May	0.0	0.0	0.0	0.0	360.3
Jun	0.0	0.0	0.0	0.0	440.0
Jul	0.0	0.0	0.0	0.0	353.8
Aug	0.0	0.0	0.0	0.0	378.7
Sep	0.0	0.0	0.0	0.0	418.7
Oct	0.0	0.0	0.0	0.0	359.8
Nov	0.0	0.0	0.0	0.0	352.2
Dec	0.0	0.0	0.0	0.0	348.5

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	417.4
Feb	0.0	0.0	0.0	0.0	376.0
Mar	0.0	0.0	0.0	0.0	360.2
Apr	0.0	0.0	0.0	0.0	345.4
May	0.0	0.0	0.0	0.0	360.3
Jun	0.0	0.0	0.0	0.0	440.0
Jul	0.0	0.0	0.0	0.0	353.8
Aug	0.0	0.0	0.0	0.0	378.7
Sep	0.0	0.0	0.0	0.0	418.7
Oct	0.0	0.0	0.0	0.0	359.8
Nov	0.0	0.0	0.0	0.0	352.2
Dec	0.0	0.0	0.0	0.0	348.5

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/6 08:00
Mar	n/a	n/a	n/a	n/a	3/1 09:00
Apr	n/a	n/a	n/a	n/a	4/13 10:00
May	n/a	n/a	n/a	n/a	5/11 09:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/4 09:00
Oct	n/a	n/a	n/a	n/a	10/9 09:00
Nov	n/a	n/a	n/a	n/a	11/30 10:00
Dec	n/a	n/a	n/a	n/a	12/18 10:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	71,423	0.427	17.8
Cooling	43,219	0.259	10.8
Heating	162,854	0.974	40.6
Pumps	11,182	0.067	2.8
Heat Rejection Fans	3,908	0.023	1.0
HVAC Sub-Total	**292,585**	**1.750**	**73.0**
Lights	60,611	0.363	15.1
Electric Equipment	43,596	0.261	10.9
Misc. Electric	3,866	0.023	1.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**108,074**	**0.646**	**27.0**
Grand Total	**400,659**	**2.397**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.6** sqft
Modeled Floor Area ..... **167,180.6** sqft

Energy Budget by System Component - [L-B] LEED Baseline

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:26 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	4,050,710	24.230
Heating Coil Loads	3,052,593	18.259
Grand Total	**7,103,303**	**42.489**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,216,465	7.276	4,344,519	25.987
Cooling	732,592	4.382	2,616,399	15.650
Heating	2,790,328	16.691	9,965,459	59.609
Pumps	188,975	1.130	674,909	4.037
Heat Rejection Fans	65,945	0.395	235,516	1.409
HVAC Sub-Total	**4,994,304**	**29.874**	**17,836,802**	**106.692**
Lights	1,030,064	6.161	3,678,800	22.005
Electric Equipment	740,569	4.430	2,644,889	15.821
Misc. Electric	65,901	0.394	235,361	1.408
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,836,534**	**10.985**	**6,559,050**	**39.233**
Grand Total	**6,830,838**	**40.859**	**24,395,852**	**145.925**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.6** sqft
   Modeled Floor Area ..... **167180.6** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	33,464	15,354	13	0	48,831
Feb	28,257	12,664	13	0	40,934
Mar	26,890	12,869	13	0	39,772
Apr	17,452	11,158	13	0	28,622
May	17,687	8,553	13	0	26,253
Jun	21,973	10,185	13	0	32,171
Jul	16,813	9,588	13	0	26,413
Aug	18,031	9,623	13	0	27,667
Sep	23,993	10,743	13	0	34,749
Oct	16,442	8,968	13	0	25,424
Nov	20,842	10,777	13	0	31,632
Dec	26,337	11,843	13	0	38,193
Totals	268,180	132,324	156	0	400,661

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	48,831	249,808	0.1955
Feb	40,934	210,936	0.1941
Mar	39,772	200,732	0.1981
Apr	28,622	130,276	0.2197
May	26,253	132,028	0.1988
Jun	32,171	164,026	0.1961
Jul	26,413	125,505	0.2105
Aug	27,667	134,598	0.2056
Sep	34,749	179,103	0.1940
Oct	25,424	122,741	0.2071
Nov	31,632	155,586	0.2033
Dec	38,193	196,604	0.1943
Totals	400,661	2,001,943	0.2001

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	249,808
Feb	0	0	0	0	210,936
Mar	0	0	0	0	200,732
Apr	0	0	0	0	130,276
May	0	0	0	0	132,028
Jun	0	0	0	0	164,026
Jul	0	0	0	0	125,505
Aug	0	0	0	0	134,598
Sep	0	0	0	0	179,103
Oct	0	0	0	0	122,741
Nov	0	0	0	0	155,586
Dec	0	0	0	0	196,604
Totals	0	0	0	0	2,001,943

4. Billing Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1171.0
Feb	0.0	0.0	0.0	0.0	965.9
Mar	0.0	0.0	0.0	0.0	981.5
Apr	0.0	0.0	0.0	0.0	851.0
May	0.0	0.0	0.0	0.0	652.4
Jun	0.0	0.0	0.0	0.0	776.8
Jul	0.0	0.0	0.0	0.0	731.2
Aug	0.0	0.0	0.0	0.0	733.9
Sep	0.0	0.0	0.0	0.0	819.4
Oct	0.0	0.0	0.0	0.0	684.0
Nov	0.0	0.0	0.0	0.0	821.9
Dec	0.0	0.0	0.0	0.0	903.2

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1171.0
Feb	0.0	0.0	0.0	0.0	965.9
Mar	0.0	0.0	0.0	0.0	981.5
Apr	0.0	0.0	0.0	0.0	851.0
May	0.0	0.0	0.0	0.0	652.4
Jun	0.0	0.0	0.0	0.0	776.8
Jul	0.0	0.0	0.0	0.0	731.2
Aug	0.0	0.0	0.0	0.0	733.9
Sep	0.0	0.0	0.0	0.0	819.4
Oct	0.0	0.0	0.0	0.0	684.0
Nov	0.0	0.0	0.0	0.0	821.9
Dec	0.0	0.0	0.0	0.0	903.2

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/10 06:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/10 05:00
May	n/a	n/a	n/a	n/a	5/16 10:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/18 09:00
Sep	n/a	n/a	n/a	n/a	9/5 10:00
Oct	n/a	n/a	n/a	n/a	10/27 10:00
Nov	n/a	n/a	n/a	n/a	11/27 06:00
Dec	n/a	n/a	n/a	n/a	12/27 06:00

APPENDIX:
2022 GEOTHERMAL FEDERAL TAX CREDIT REFERENCES

CLIMATEMASTER
A NIBE GROUP MEMBER

IRA 2023

COMMERCIAL GEOTHERMAL

Tax Guide 2023

INFLATION REDUCTION ACT OF 2022 (IRA)

The Inflation Reduction Act of 2022 (IRA) substantially extends and enhances the federal income tax credits and incentives available for the installation of geothermal heat pump (GHP) energy property in commercial buildings, including the introduction of a new direct payment option for non-taxable entities. For taxable businesses, there are also new carryback and transfer provisions along with a continuation of the accelerated depreciation benefits. These new incentives are unfortunately more complex in structure. This guide is designed to provide a detailed review of the new tax and depreciation incentives available for commercial GHP energy property under the IRA.

Federal Income Tax Credits:

- Investment tax credit (ITC) up to 30% of system cost basis
- Domestic content bonus tax credit up to 10% of system cost basis
- Energy community bonus tax credit up to 10% of system cost basis
- Direct-pay option for non-taxable entities
- No cap on total credit amount
- Can be used to offset AMT tax
- Can be used in more than one year
- Can be carried back up to 3 years or transferred/sold to an unrelated party
- Can be combined with solar and other clean energy tax credits

Accelerated Depreciation:

- 5-year MACRS depreciation of system cost basis (less ½ of tax credit)
- Eligible for first-year bonus depreciation

Eligibility:

- Building located in U.S.
- Original use begins with taxpayer
- Construction commenced before 1/1/2035

Business Energy Investment Tax Credit

The business ITC for geothermal heat pump property was originally enacted in the Energy Improvement and Extension Act of 2008. This legislation added geothermal heat pumps to the definition of energy property under section 48(a) of the Internal Revenue Code with a 10% tax credit. This credit was extended by Bipartisan Budget Act of 2018 and most recently enhanced and further extended by the IRA of 2022. Effective 1/1/2023, there is now a 2-tier structure in place with a base credit rate of 6% and an increased rate of 30% if any one of the following criteria are met:

1. The maximum net output capacity of the GHP project is less than 1 megawatt (3.4 million Btu/h) of thermal energy. The Geothermal Exchange Organization (GEO) has submitted analysis that equates this to a total installed system capacity of 445 tons for distributed zone-level GHPs or 285 tons for central plant GHPs. The Department of Treasury is currently developing guidance.
2. The project is installed under specific prevailing wage and apprenticeship requirements. The IRS issued guidance for these requirements in Notice 2022-61 on 11-30-2022.
3. Construction of the project was commenced prior to 1-29-2023.

The ITC for GHP energy property is effective for projects that commence construction prior to 1/1/2035. In 2033 the base rate drops to 5.2% and the increased rate to 26%, while in 2034 they decline to 4.4% and 22% respectively.

Domestic Bonus Tax Credit

The domestic content bonus requires that any steel, iron, or manufactured product that is part of the GHP project at time of completion be produced in the United States. There is a 2-tier structure in place with a base credit rate of 2% and an increased rate of 10% that is based on the same criteria as for the ITC outlined above.

For purposes of this bonus, steel and iron used in the GHP project must be produced in the United States. This requirement applies to construction materials made primarily of steel or iron, but not to steel or iron used as components or sub-components of other manufactured products. Manufactured products are deemed to have been manufactured in the United States if at least 40% of the total cost of the incorporated components and subcomponents are mined, produced, or manufactured in the United States. The percentage of domestic content required for manufactured products increases to 45% for projects that begin construction in 2025, 50% for projects that begin construction in 2026, and 55% for projects that begin construction after 2026. GHP projects certainly appear to be able meet these requirements, however the Department of Treasury is developing necessary guidance.

The Domestic Content Bonus is not available for GHP projects completed before 1/1/2023

Direct Pay

Non-taxable entities have historically been unable to use the ITC. To address this, the IRA creates a new direct pay mechanism that, in effect, provides a refundable credit equal to the GHP project ITC with any domestic content bonus. Entities eligible include tax exempt organizations, a State or political subdivision thereof, the Tennessee Valley Authority, Indian tribal governments, Alaska Native Corporations, and rural electric cooperatives. Examples of these entities include charities, churches, foundations, state and local government buildings, schools, universities, and other nonprofits.

Direct pay is available for GHP projects that are placed in service after 12/31/2022.

Transfer or Sale of Tax Credit

Taxpayers may transfer the ITC including any domestic content bonus to an unrelated taxpayer. Consideration must be paid in cash, is not included in the income of the transferor, and is not deductible to the transferee. The transferee shall be treated as the taxpayer for all purposes with respect to the credit. For GHP energy projects held by a partnership, only the partnership can elect to transfer the eligible credits, not the individual partners. Direct pay is available for GHP projects that are placed in service after 12/31/2022.

Credit Carryback

The IRA extends the ITC carryback period to 3 years. The credit must originate in a tax year that begins after 12/31/2022. Any unused portion of the credit can also be carried forward.

Depreciation of Energy Property

Energy property is classified as a 5-year property in section 168(e) (3)(B)(vi) of the Internal Revenue Code, meaning the cost of the property can be deducted on an accelerated MACRS basis. For depreciation purposes, the system cost basis must be reduced by one half of the energy tax credit. In the example of a C-corporation in a 26% overall (federal plus state) tax bracket receiving a 40% ITC (includes the domestic content bonus), MACRS depreciation provides an additional tax savings equal to 20.8% of the energy property basis over the first 5 years, or optionally most within the first year. By comparison, conventional heating and cooling systems are generally depreciated on a 39-year straight line basis and would provide only 3.33% of the basis in tax savings over the first 5 years. The tax benefits for pass-through entities such as S-corporations could be much higher due to the higher marginal tax rates for individuals.

Energy property is eligible for first year bonus depreciation. The bonus allowance is 100% in 2022, 80% in 2023, 60% in 2024, 40% in 2025, 20% in 2026 and phases out in 2027. Refer to IRS Publication 946 for more information regarding how to depreciate property.

Eligible Geothermal Heat Pump Energy Property

The tax credit may be claimed for spending on equipment which uses the ground or ground water as a thermal energy source to heat a structure or as a thermal energy sink to cool a structure. The structure must be located in the United States. Spending includes costs of installation.

The credit cannot be claimed for spending on equipment used solely for a purpose other than heating or cooling a structure or on previously used equipment.

Construction Commenced Requirement

The credit can be claimed on spending for projects on which construction has commenced prior to January 1st, 2035. There is no time limit on when the construction must be completed for GHP energy projects. See IRS Notice 2018-59 for methods of establishing the commencement of construction.

System Cost Basis

The cost basis includes the direct costs associated with the purchase and installation of the energy property as well as any indirect costs that may be partly or fully allocable to its construction (including taxes). This includes equipment such as ground heat exchangers or wells, distribution piping and ductwork, pumps, GHPs and controls along with the associated installation labor and materials. The basis also generally includes those portions of the electrical, plumbing, design and GC fees that are specifically associated with the geothermal property. Utility rebates usually reduce the basis. See the uniform capitalization rules of IRS section 263A.

Dual Use Property Hybrid GHP Systems

If a GHP energy property contains a source of energy other than from the ground or ground water, portions of the system that carry both forms of energy may be considered dual use equipment. This would typically be equipment such as ductwork downstream of the GHP. The presence of an auxiliary energy source solely for emergency back-up purposes is not considered in this determination. Otherwise, if more than 25% of the annual energy (not peak energy) comes from the auxiliary source, any dual use equipment in the system may no longer be eligible for inclusion in the ITC cost basis. These comments are based on an interpretation of a 1979 code definition of energy property for direct use geothermal energy such as hot water for heating. There have been no further guidelines published by the IRS since that time. The IRS may not apply this language in this same way to GHP energy property and, as such, this interpretation is offered on a precautionary basis for those developing hybrid GHP energy projects. See 26 CFR 1.48-9 - Definition of energy property.

Energy Credit and AMT

The ITC can be used to offset both regular income taxes and alternative minimum taxes (AMT).

Ownership Considerations

Geothermal energy property ITC credits and depreciation deductions can only be claimed by the owner of the eligible property, including utilities that own energy property. At present, business models as used by the solar industry where a third-party owner (TPO) leases or sells energy from an energy property to a consumer are prohibited for GHP property due to IRS rules related to "limited use." The issue is the non-removable geothermal loop being dedicated to a single customer, in effect making the TPO a lender rather than a true owner. GEO is working with Treasury to develop a work around.

Energy Communities

The law includes an additional bonus credit of 10% (or 2% for projects over 1MW that don't meet prevailing wage/apprenticeship requirements) for Section 48 technologies that are installed in "energy communities." Energy communities are defined as:

- Census tract or adjoining tract with coal mine closed since 2000, or
- Census tract or adjoining tract with coal plant closed since 2010, or
- Defined as "a brownfield site" by the EPA, or
- a metropolitan or non-metropolitan statistical area where 0.17% or more direct employment, or at least 25% of local tax revenues, are related to extraction, processing, transport, or storage of coal, oil, or natural gas, and unemployment is at or above the national average in the previous year

Claiming the Credit

IRS Form 3468 is used to claim the Energy Credit. Visit www.irs.gov to download the latest tax form and instructions.

CLIMATEMASTER
A NIBE GROUP MEMBER

7300 S.W. 44th Street
Oklahoma City, OK 73179
Phone: 405-745-6000
Fax: 405-745-6058
climatemaster.com

Redistribution and copying of any portion of this guide is prohibited without the prior written consent of ClimateMaster, Inc. Although the information in the guide is intended to be current as of October 2018, ClimateMaster, Inc. makes no warranty or guarantee of any kind that it is current, complete, or accurate. This guide is only for general information. You should not rely upon or construe the information in this guide as legal advice, and you should not act or fail to act based upon this guide without first seeking professional counsel from a competent specialist. This guide is not an authority that can be cited in response to an enforcement action or in litigation. The Internal Revenue Service (IRS) may or may not provide additional or different clarification on the subject of this guide. Readers are strongly urged to obtain specific advice from a taxation specialist, as the US tax code is complex. Interpretations of tax law are frequently established based on the merits of individual cases that come before the IRS, as opposed to pre-conceived rules.

Please also note that, by providing this guide, ClimateMaster, Inc. is not providing, nor intending to provide, you or any other reader of this guide with legal or tax advice. To the extent you have questions concerning any legal or tax issues, you should consult a lawyer. Neither ClimateMaster, Inc. nor its affiliates or consultants shall be responsible for your use of this guide or for any damages resulting therefrom.

© ClimateMaster, Inc. All rights reserved 2011

Clean Energy Tax Incentives: Elective Pay Eligible Tax Credits

The Inflation Reduction Act of 2022 ("IRA") makes several clean energy tax credits available to businesses; tax-exempt organizations; state, local, and tribal governments; other entities; and individuals. The IRA also enables entities to take advantage of certain clean energy tax credits through its elective pay provision (also colloquially known as direct pay). Elective pay allows several types of entities, such as tax-exempts and governments, to treat the amount of certain credits as a payment against tax on their tax returns and as a result receive direct payments for certain clean energy tax credits.

	Tax Provision	Description
Energy Generation & Carbon Capture	**Production Tax Credit for Electricity from Renewables** (§ 45, pre-2025)	**For production of electricity from eligible renewable sources**, including wind, biomass, geothermal, solar, small irrigation, landfill and trash, hydropower, marine and hydrokinetic energy. **Credit Amount (for 2022):** 0.55 cents/kilowatt (kW); (1/2 rate for electricity produced from open loop biomass, landfill gas, and trash); 2.75 cents/kW if Prevailing Wage and Apprenticeship (PWA) rules are met [1,2,3,7]
	Clean Electricity Production Tax Credit (§ 45Y, 2025 onwards)	**Technology-neutral tax credit for production of clean electricity**. Replaces § 45 for facilities that begin construction and are placed in service after 2024. **Credit Amount:** Starts in 2025, consistent with credit amounts under section 45 [1,2,3,6,7]
	Investment Tax Credit for Energy Property (§ 48, pre-2025)	**For investment in renewable energy projects** including fuel cell, solar, geothermal, small wind, energy storage, biogas, microgrid controllers, and combined heat and power properties **Credit Amount:** 6% of qualified investment (basis); 30% if PWA requirements met [1,4,5,6,8]
	Clean Electricity Investment Tax Credit (§ 48E, 2025 onwards)	**Technology-neutral tax credit for investment in facilities that generate clean electricity** and qualified energy storage technologies. Replaces § 48 for facilities that begin construction and are placed in service after 2024 **Credit Amount:** 6% of qualified investment (basis); 30% if PWA requirements met [1,4,5,6]
	Low-Income Communities Bonus Credit (§ 48(e), 48E(h)) Application required	**Additional investment tax credit for small-scale solar and wind (§ 48(e)) or clean electricity (§48E(h)) facilities** (<5MW net output) on Indian land, federally subsidized housing, in low-income communities, and benefit low-income households. Allocated through an application process. **Credit Amount:** 10 or 20 percentage point increase on base investment tax credit [7]
	Credit for Carbon Oxide Sequestration (§ 45Q)	**Credit for carbon dioxide sequestration** coupled with permitted end uses in the United States. **Credit Amount:** $12-36 per metric ton of qualified carbon oxide captured and sequestered, used as a tertiary injectant, or used, depending on the specified end use; $60-$180 per metric ton if PWA requirements met.[1,7]
	Zero-Emission Nuclear Power Production Credit (§ 45U)	**For electricity from nuclear power facilities.** Facilities in operation prior to August 16, 2022. **Credit Amount (for 2023):** 0.3 cents/kWh (reduced rate for larger facilities); 1.5 cent/kWh if PW req's met [1,7]
Manufacturing	**Advanced Energy Project Credit** (§ 48C) Application required	**For investments in advanced energy projects.** A total of $10 billion will be allocated, not less than $4 billion of which will be allocated to projects in certain energy communities. **Credit Amount:** 6% of taxpayer's qualified investment; 30% if PWA requirements are met [1]
	Advanced Manufacturing Production Credit (§ 45X)	**Production tax credit for domestic clean energy manufacturing** of components including solar and wind energy, inverters, battery components, and critical materials. **Credit Amount:** Varies by component
Vehicles	**Credit for Qualified Commercial Clean Vehicles** (§ 45W)	**For purchasers of commercial clean vehicles**. Qualifying vehicles include passenger vehicles, buses, ambulances, and certain other vehicles for use on public streets, roads, and highways. **Credit Amount:** Up to $40,000 (max $7,500 for vehicles <14,000 lbs) [9]
	Alternative Fuel Vehicle Refueling Property Credit (§ 30C)	**For alternative fuel vehicle refueling and charging property**, located in low-income and non-urban areas. Qualified fuels include electricity, ethanol, natural gas, hydrogen, and biodiesel. **Credit Amount:** 6% of basis for businesses and can increase to 30% if PWA is met.
Fuels	**Clean Hydrogen Production Tax Credit** (§ 45V)	**For producing clean hydrogen** at a qualified, U.S.-based clean hydrogen production facility. **Credit Amount:** $0.60/kg multiplied by the applicable percentage (20% to 100%, depending on lifecycle greenhouse gas emissions), amount increases if PWA is met [1,7]
	Clean Fuel Production Credit (§ 45Z, 2025 onwards)	**Technology neutral tax credit for domestic production of clean transportation fuels**, including sustainable aviation fuels, beginning in 2025* **Credit Amount:** $0.20/gallon ($0.35/gal for aviation fuel) multiplied by CO2 "emissions factor"; $1.00/gallon ($1.75/gal for aviation fuel) multiplied by CO2 "emissions factor" if PWA is met [1,7]

Please see the notes on the next page or see IRS.gov/cleanenergy for more information.

Notes:

The information in this document may be subject to change as guidance is issued or finalized. For all IRA clean energy tax credits, please see **irs.gov/cleanenergy** for further details and eligibility requirements.

[1] Credit is increased by 5 times for projects that pay prevailing wages and use registered apprentices. Apprenticeship requirements do not apply for §§ 45L and 45U. Prevailing wage and apprenticeship requirements do not apply to certain projects, including certain projects of less than 1 megawatt or those that began construction prior to January 29, 2023.

[2] Credit is increased by 10% if the project meets certain domestic content requirements for steel or iron, and manufactured products.

[3] Credit is increased by 10% if located in an energy community.

[4] Credit is increased by up to 10 percentage points for projects meeting certain domestic content requirements for steel, iron, and manufactured products.

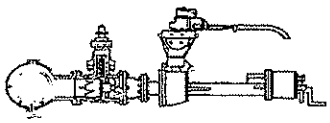
[5] Credit is increased by up to 10 percentage points if located in an energy community.

[6] Section 168(e) provides favorable depreciation treatment for facilities or property qualifying for this tax credit. These facilities or property will be treated as a 5-year property for purposes of cost recovery, leaving them with lower taxable income in the earlier years of a clean energy investment.

[7] Credit rate is adjusted annually for inflation.

[8] See section 48 for more detail and applicable exceptions to the credit rate.

[9] The entities eligible for elective pay of the commercial clean vehicle credit is a subset of the entities eligible for elective pay of other credits. In addition, starting January 1, 2024, the amount of a new clean vehicle or previously owned clean vehicle tax credit (but not a commercial clean vehicle credit) can be transferred to a dealer for an equivalent reduction in the eligible vehicle's sales price.



John Hoadley and Sons, Inc.

- Water Works Specialist-

672 Union Street
Rockland, MA. 02370
T: (781) 878-8098
F: (781) 878-5298

FLOW TEST REPORT

Town of: Wilmington

Name of Applicant: Akal Engineering Phone Number: 603-930-8895

Address: 44 Central St. Unit 4 City: Berlin State: MA

Date: 10/20/2025 Time of Test: 11:00 AM

Location of Test: 320 Salem Street, Wilmington, MA

Distance between Hydrant # 1 and Hydrant # 2 is 890 feet.

Elevation of Hydrant # 1 N/A Elevation of Hydrant # 2 N/A

Coefficient: N/A Size of Main : 10"

Hydrant # 1 Static: 82 PSI Residual: 78 PSI

Location: 453 Middlesex Avenue

Manufacture/ Type of Hydrant : Darling Size: 5 1/4 Year: 1989

Flow Hydrant # 2 Static: 84 PSI Residual: 42 PSI

Location: Glenwood Road behind school/next to field

Manufacture/ Type of Hydrant : U.S. Pipe Size: 5 1/4 Year: 2005

Pitot Tube Flow 1,070 GPM Time Flow: 3 Min.

Test Conducted by: Carl / Phil

Inspector or Witness of Flow Test : Signature on File

- Mailed 10/21/25
- This is our copy
- PAID!

LEC WETLANDS WILDLIFE WATERWAYS

December 1, 2025

Email [rphilip@DoreandWhittier.com]

Ms. Rani Philip
Dore + Whittier
212 Battery Street
Burlington, VT 05401

Re: Wetland Resource Area Analysis Report [LEC File #: DWA\24-488.04]
North Intermediate School
320 Salem Street
Wilmington, Massachusetts

Dear Ms. Philip:

LEC Environmental Consultants, Inc., (LEC) has prepared this *Wetland Resource Area Analysis* documenting our site evaluation of the North Intermediate School in Wilmington, Massachusetts. The site evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40; the *Act*) and its implementing *Regulations* (310 CMR 10.00; *Act Regulations*). The Town of Wilmington does not have a wetlands protection bylaw.

Two non-jurisdictional Isolated Vegetated Wetlands (IVW) were originally delineated and depicted on the *Existing Conditions Plans,* prepared by Nitsch Engineering, dated March 28, 2025. However, following the receipt of information from the Town of Wilmington regarding subsurface drainage connections and prior permitting with the Conservation Commission of an abutting property to the southwest, LEC determined that one of the delineated wetlands (the "A-series") was a jurisdictional Bordering Vegetated Wetland (BVW), which has an associated 100-foot Buffer Zone. The following report provides a general site description, wetland delineation methodology, a description of the delineated areas, and potential regulatory implications.

General Site Conditions

The project area is located west of Interstate 93 and northwest of State Route 62 (MA-62) in the northern-central portion of Wilmington (Attachment A, Figures 1 and 2). The property contains the North Intermediate School building and associated parking in the southeastern portions and athletic fields and recreational facilities to the west and north of the school.

Residential development immediately surrounds the project area, including single-family homes on all sides, as well as apartment buildings located to the north on Avalon Drive. Limited commercial development is located south of the project area along Middlesex Avenue and Route 62. An active railroad line is located west of the site beyond the abutting residential development. Undeveloped forested upland areas are located within and adjacent to the site primarily to the north, east, and south associated with Avalon Drive, Ballardvale Street, and Salem Street, respectively. A stormwater basin abuts the northeast corner of the site just beyond the property fence between Arlene Avenue to the west and Avalon Drive to the northeast.

Topography is generally very flat with gentle down-gradient slopes extending west and south at the edge of the school's baseball field. Forested upland areas are located on the northwestern and southern edges of the property. Vegetation in the uplands includes a moderately dense canopy of eastern white pine (*Pinus strobus)*, red oak (*Quercus rubra)*, white oak (*Quercus alba*), Norway maple (*Acer platanoides*), and red maple (*Acer rubrum)*. The sparse understory is populated with saplings from the canopy and scattered multiflora rose (*Rosa multiflora*). Ground cover is generally sparse in the forested uplands.

According to the Natural Resource Conservation Service (NRCS) Soil Survey (Web Soil Survey), Middlesex County, Massachusetts, Version 24, August 27, 2024, much of the northern portion of the site contains Deerfield loamy fine sand (0-3% slopes) and the southern portion is comprised of Udorthents, sandy.

Natural Heritage and Endangered Species Program Designation

According to the 15th Edition (August 1, 2021) of the Natural Heritage & Endangered Species Program (NHESP) Massachusetts Natural Heritage Atlas, the project area is not located within *Estimated Habitat of Rare Wildlife* or *Priority Habitats of Rare Species*. There are no Certified Vernal Pools (CVP) or Potential Vernal Pools (PVP) on or in the vicinity of the project area (Attachment A, Figures 1 and 2).

FEMA Flood Insurance Rate Map

According to the July 8, 2025 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Town of Wilmington (25017C0283G), the site is contained within Zone X (unshaded): *Areas outside the 0.2% annual chance floodplain*. As a result, no portion of the project area is located within the 100-year floodplain and Bordering Land Subject to Flooding (BLSF) is not present in the project area (Attachment A, Figure 3).

Wetland Boundary Determination Methodology

On November 5, 2024 and November 12, 2025, LEC conducted site evaluations to identify and characterize existing protectable Wetland Resource Areas located on or adjacent to the project area. The evaluation was performed in accordance with Massachusetts Department of Environmental Protection (MassDEP) handbook, *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands*

Protection Act (September 2022), the *Field Indicators for Identifying Hydric Soils in New England* (Version 4, June 2020, the Field Indicators Guide), and the criteria set forth in 310 CMR 10.55.

The boundary of BVW was demarcated in the field with blaze orange surveyor's flagging tape, embossed with the words "LEC Resource Area Boundary" in bold, black print. The BVW flags are numbered A-1 through A-11 (A-series). MassDEP Field Data Forms are included with this report (Attachment B).

Although the identified IVW was determined to be non-jurisdictional under the *Act*, LEC delineated the boundaries with blaze orange surveyor flagging labeled B1 through B11 (B-series).

Wetland Resource Areas

The jurisdictional Wetland Resource Areas associated with the site include Bordering Vegetated Wetlands (BVW). A brief description of the Wetland Resource Areas is provided below.

Bordering Vegetated Wetland (BVW)

BVW is defined at 310 CMR 10.55(2) as *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes. In these areas soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The boundary of BVW is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*

The A-series BVW is located in the southwestern corner of the property. It consists of a drainage ditch running parallel to the adjacent athletic field, and is fed by overland runoff from the fields to the north and east, and overflow from a ponded area offsite to the south (less than 10,000 square feet in extent) which discharges water during periods of extreme high water into a corrugated metal pipe (invert elevation 88.4 feet) drainage outfall with a concrete headwall located between BVW flags A4 and A5. According to engineering documents obtained from the Town of Wilmington, the pipe conveys water northward through an underground drainage system to a catch basin, that then flows west to Dorothy Avenue, south under Arlene Avenue, west under Catherine Avenue, south under Anthony Avenue, then southward under Salem Street where it joins a large wetland, thus rendering the A-series wetland hydrologically connected to and thus "bordering" a jurisdictional resource area. Vegetation within the onsite portions of the BVW include red maple (*Acer rubrum*) trees, glossy buckthorn (*Frangula alnus*), and silky dogwood (*Swida amomum*) shrubs, and herbaceous species including jewelweed (*Impatiens capensis*) and sensitive fern (*Onoclea sensibilis*).

LEC inspected soil conditions using a hand-held, Dutch-style soil auger within the BVW and observed a 6-inch-thick, sandy loam topsoil (A-Horizon) with a soil matrix color of 10YR 2/2. The topsoil is underlain by a 16+-inch thick, loamy sand depleted subsoil (B_g horizon) with a soil matrix color of 10YR 5/1. Redoximorphic concentrations of 10YR 3/6 were observed through the subsoil horizon. This soil profile is considered hydric according to the *Field Indicators Guide*, as it meets the indicator A11: Depleted Below Dark Surface.

The non-jurisdictional B-series IVW is located along the west-central property boundary, and is characterized as a wet meadow habitat type with a shrub-scrub border. The IVW occurs within a slight topographic depression between the athletic field and a six-foot-high chain-link fence. Vegetation is dominated by elderberry (*Sambucus racemosa*) shrubs, and herbaceous species including purple loosestrife (*Lythrum salicaria*), wrinkle leaf goldenrod (*Solidago rugosa*), American burnweed (*Erechtites hieraciifolia*), and purple-leaved willow-herb (*Epilobium coloratum*). The IVW was separated from a nearby catch basin 23 +/- feet to the southeast by maintained turf grass underlain by upland soils, and no indicators of a surface hydrological connection.

Summary

LEC identified and delineated the boundaries of BVW and a non-jurisdictional IVW. IVWs are not jurisdictional under the *Act* or *Act Regulations* as a Resource Area subject to protection, and accordingly do not have an associated buffer zone or performance standards for alteration.

If any proposed work activities occur within the BVW or its 100-foot Buffer Zone, a filing with the Wilmington Conservation Commission and the Massachusetts Department of Environmental Protection (MassDEP) will be required.

We appreciate the opportunity to provide you with this report. If you have any questions or require additional information, please do not hesitate to contact us at 781-245-2500.

Sincerely,

LEC Environmental Consultants, Inc.

Dan Wells
Senior Wildlife/Wetland Scientist

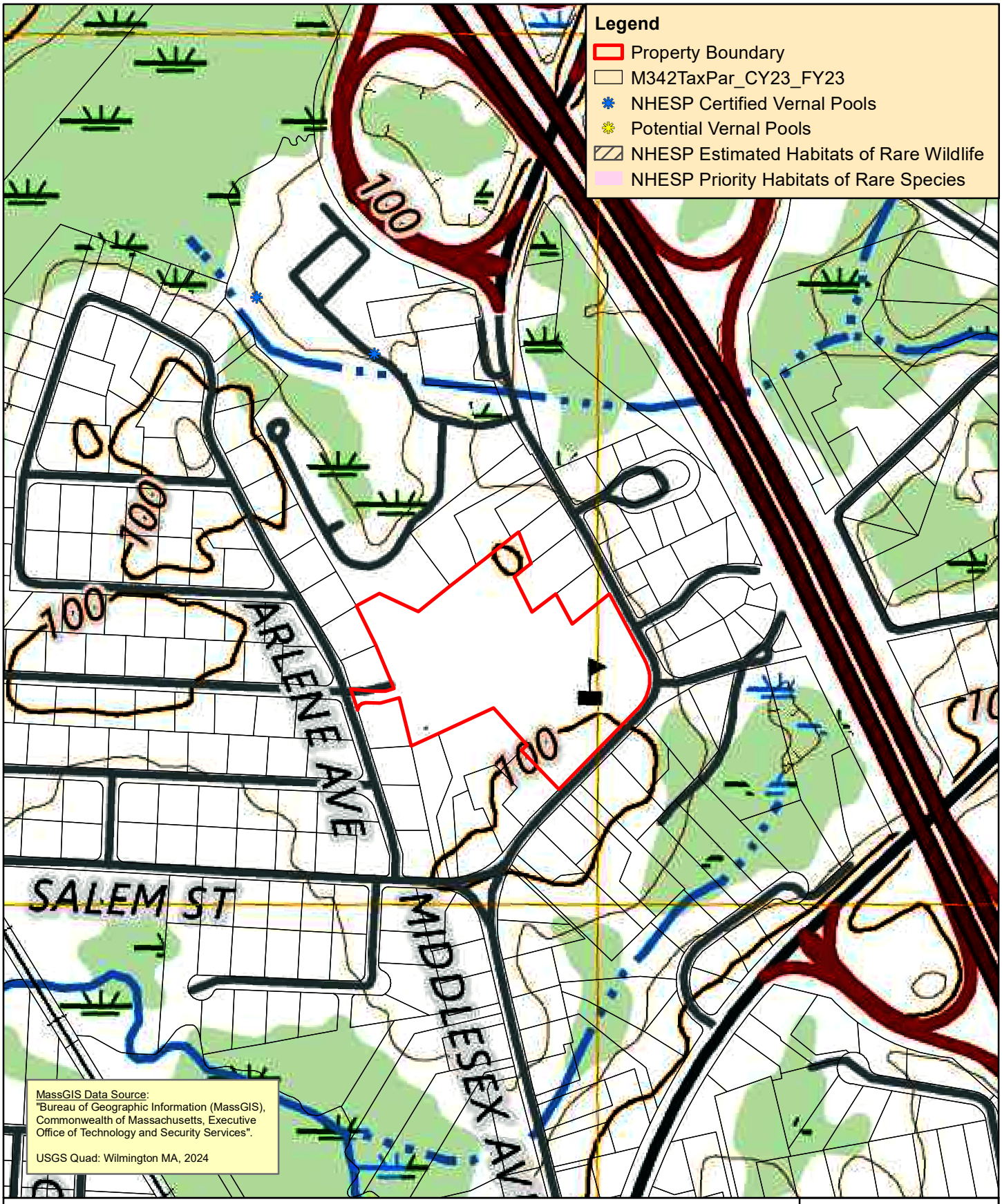
Trevor Nassar
Environmental Specialist

Attachment A

Figure 1: USGS Topographic Map

Figure 2: Orthophoto Map

Figure 3: FEMA FIRMette



LEC

LEC Environmental Consultants, Inc.
Wakefield, MA 781.245.2500
www.lecenvironmental.com

Figure 1
USGS Topographic Map

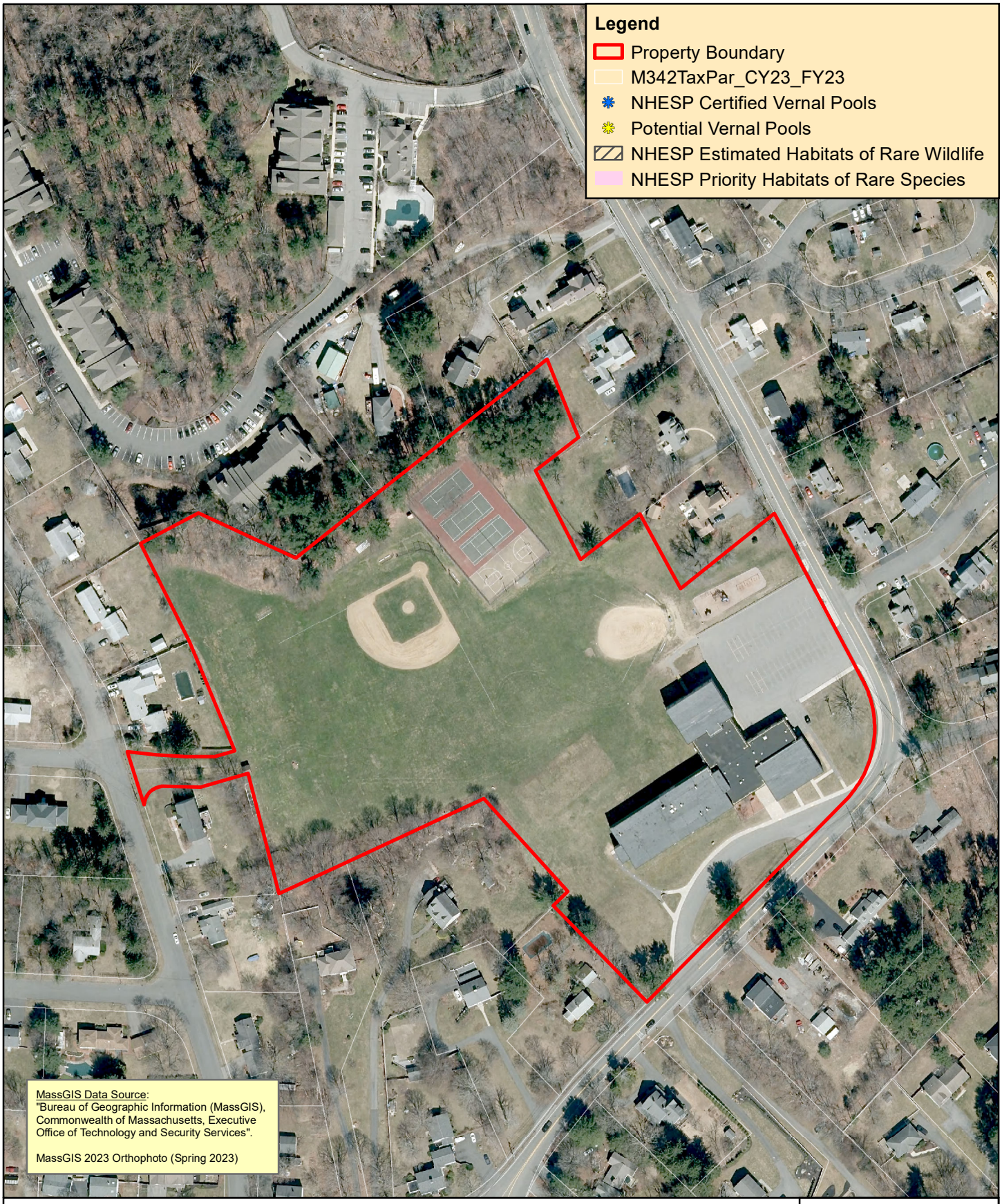
North Intermediate School
Wilmington, MA

Date: 1/10/2025

N

1 inch = 500 feet

0 125 250 500 Feet



LEC Environmental Consultants, Inc.
Wakefield, MA 781.245.2500
www.lecenvironmental.com

Figure 2
Orthophoto Map

North Intermediate School
Wilmington, MA

Date: 1/10/2025

N

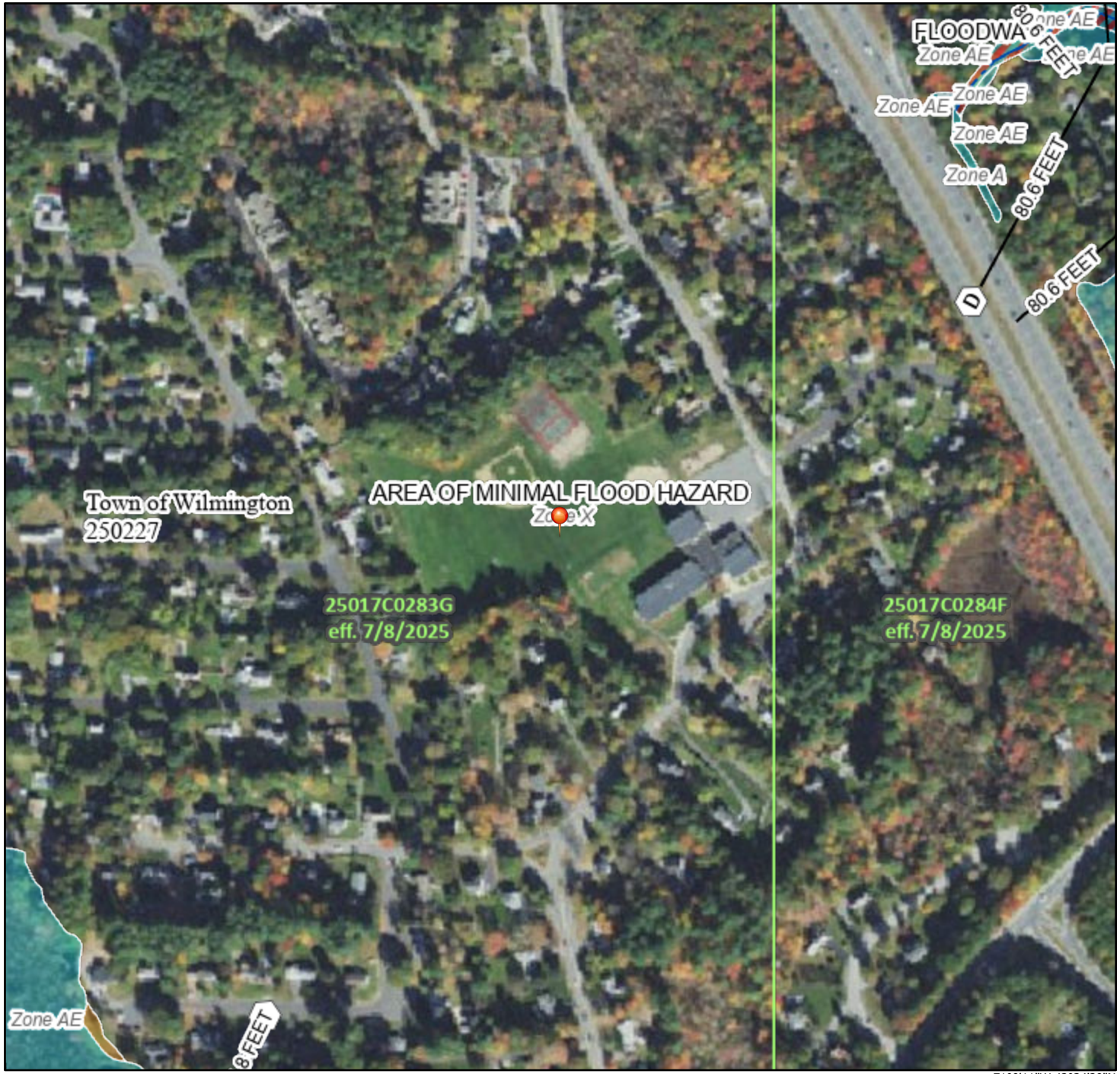
1 inch = 200 feet

0 50 100 200 Feet

National Flood Hazard Layer FIRMette

FEMA

71°9'48"W 42°34'56"N



71°9'11"W 42°34'29"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/1/2025 at 1:20 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Attachment B

MassDEP BVW Field Data Forms

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: North Intermediate School City/Town: Wilmington Sampling Date: 11/12/2025

Applicant/Owner: Town of Wilmington Sampling Point or Zone: 25' Upgradient of WF A-1

Investigator(s): Dan Wells Latitude / Longitude: not recorded

Soil Map Unit Name: Udorthents, sandy NWI or DEP Classification: n/a

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes [ ] No [✓]	**Is the Sampled Area within a Wetland?** Yes [ ] No [✓]
Hydric Soils criterion met?	Yes [ ] No [✓]	
Wetlands hydrology present?	Yes [ ] No [✓]	

Remarks, Photo Details, Flagging, etc.:

HYDROLOGY

Field Observations:			
Surface Water Present?	Yes [ ]	No [✓]	Depth (inches)_____
Water Table Present?	Yes [ ]	No [✓]	Depth (inches)_____
Saturation Present (including capillary fringe)?	Yes [ ]	No [✓]	Depth (inches)_____

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
[ ] Water-stained leaves	[ ] Hydrological records	[ ] Direct observation of inundation
[ ] Evidence of aquatic fauna	[ ] Free water in a soil test hole	[ ] Drainage patterns
[ ] Iron deposits	[ ] Saturated soil	[ ] Drift lines
[ ] Algal mats or crusts	[ ] Water marks	[ ] Scoured areas
[ ] Oxidized rhizospheres/pore linings	[ ] Moss trim lines	[ ] Sediment deposits
[ ] Thin muck surfaces	[ ] Presence of reduced iron	[ ] Surface soil cracks
[ ] Plants with air-filled tissue (aerenchyma)	[ ] Woody plants with adventitious roots	[ ] Sparsely vegetated concave surface
[ ] Plants with polymorphic leaves	[ ] Trees with shallow root systems	[ ] Microtopographic relief
[ ] Plants with floating leaves	[ ] Woody plants with enlarged lenticels	[ ] Geographic position (depression, toe of slope, fringing lowland
[ ] Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30 ft.

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Norway maple	Acer platanoides	UPL	10.5	Yes	No
2. Red oak	Quercus rubra	FACU	3.0	Yes	No
3.					
4.					
5.					
6.					
7.					
8.					
9.					

13.5 = Total Cover

Shrub/Sapling Stratum Plot size 15 feet

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. American basswood	Tilia americana	FACU	3.0	Yes	No
2. Multiflora roase	Rosa multiflora	FACU	3.0	Yes	No
3. Silky dogwood	Swida amomum	FACW	3.0	Yes	Yes
4.					
5.					
6.					
7.					
8.					
9.					

9.0 = Total Cover

Herb Stratum Plot size _____

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Canada goldenrod	Solidago canadensis	FACU	3.0	Yes	No
2. White-panicle aster	Symphotrichum lanceolatum	FACW	3.0	Yes	Yes
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

6.0 = Total Cover

VEGETATION – continued.

Woody Vine Stratum	Plot size absent				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1.					
2.					
3.					
4.					
			0.0 = Total Cover		

Rapid Test: Do all dominant species have an indicator status of OBL or FACW?				Yes ☐ No ☑
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up ≥ 50% of dominant plant species?
	7	2		Yes ☐ No ☑
Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A = 0.00		Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐
Wetland vegetation criterion met?		**Yes** ☐	**No** ☑	

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

Sampling Point 25' Upgradient of WF A-1

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-13	10YR 2/2	100.00					sandy loam	
13-18	10YR 4/6	100.00					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9)	☐ 5 cm Mucky Peat or Peat (S3)
☐ Black Histic (A3)	☐ Loamy Gleyed Matrix (F2)	☐ Iron-Manganese Masses (F12)
☐ Hydrogen Sulfide (A4)	☐ Depleted Matrix (F3)	☐ Mesic Spodic (A17)
☐ Stratified Layers (A5)	☐ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ Very Shallow Dark Surface (F22)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	
☐ Sandy Mucky Mineral (S1)		
☐ Sandy Gleyed Matrix (S4)		
☐ Sandy Redox (S5)		☐ Other (Include Explanation in Remarks)
☐ Stripped Matrix (S6)		
☐ Dark Surface (S7)		

Restrictive Layer (if observed) Type: _____ Depth (inches): _____

Remarks:

Hydric Soils criterion met? **Yes** ☐ **No** ☑

BORDERING VEGETATED WETLAND DETERMINATION FORM

Project/Site: North Intermediate School City/Town: Wilmington Sampling Date: 11/12/2025

Applicant/Owner: Town of Wilmington Sampling Point or Zone: 30' Downgradient of WF A-1

Investigator(s): Dan Wells Latitude / Longitude: not recorded

Soil Map Unit Name: Udorthents, sandy NWI or DEP Classification: Wooded Swamp Deciduous

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.

Wetland vegetation criterion met?	Yes [✓] No [ ]	**Is the Sampled Area within a Wetland?** **Yes [✓] No [ ]**
Hydric Soils criterion met?	Yes [✓] No [ ]	
Wetlands hydrology present?	Yes [✓] No [ ]	

Remarks, Photo Details, Flagging, etc.:

HYDROLOGY

Field Observations:			
Surface Water Present?	Yes [ ]	No [✓]	Depth (inches)_____
Water Table Present?	Yes [ ]	No [✓]	Depth (inches)_____
Saturation Present (including capillary fringe)?	Yes [ ]	No [✓]	Depth (inches)_____

Wetland Hydrology Indicators

Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
[✓] Water-stained leaves	[ ] Hydrological records	[ ] Direct observation of inundation
[ ] Evidence of aquatic fauna	[ ] Free water in a soil test hole	[✓] Drainage patterns
[ ] Iron deposits	[ ] Saturated soil	[ ] Drift lines
[ ] Algal mats or crusts	[ ] Water marks	[ ] Scoured areas
[ ] Oxidized rhizospheres/pore linings	[ ] Moss trim lines	[✓] Sediment deposits
[ ] Thin muck surfaces	[ ] Presence of reduced iron	[ ] Surface soil cracks
[ ] Plants with air-filled tissue (aerenchyma)	[ ] Woody plants with adventitious roots	[ ] Sparsely vegetated concave surface
[ ] Plants with polymorphic leaves	[ ] Trees with shallow root systems	[ ] Microtopographic relief
[ ] Plants with floating leaves	[ ] Woody plants with enlarged lenticels	[ ] Geographic position (depression, toe of slope, fringing lowland
[ ] Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

VEGETATION – Use both common and scientific names of plants.

Tree Stratum Plot size 30 ft.

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Red maple	Acer rubrum	FAC	63.0	Yes	Yes
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

63.0 = Total Cover

Shrub/Sapling Stratum Plot size 15 feet

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Glossy false buckthorn	Frangula alnus	FAC	3.0	Yes	Yes
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

3.0 = Total Cover

Herb Stratum Plot size

Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Jewelweed	Impatiens capensis	FACW	20.5	Yes	Yes
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

20.5 = Total Cover

VEGETATION – continued.

Woody Vine Stratum	Plot size absent				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1.					
2.					
3.					
4.					
			0.0 = Total Cover		

Rapid Test: Do all dominant species have an indicator status of OBL or FACW?				Yes ☐ No ☑
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes ☑ No ☐
	3	3		
Prevalence Index:		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A = 0.00		Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐
Wetland vegetation criterion met?		**Yes** ☑	**No** ☐	

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

Sampling Point 30' Downgradient of WF A-1

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Location[2]		
0-6	10YR 2/2	100.00					sandy loam	
6-12	10YR 5/1	100.00	10 YR 3/6	15.00	C	M	loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		**Indicators for Problematic Hydric Soils**
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9)	☐ 5 cm Mucky Peat or Peat (S3)
☐ Black Histic (A3)	☐ Loamy Gleyed Matrix (F2)	☐ Iron-Manganese Masses (F12)
☐ Hydrogen Sulfide (A4)	☐ Depleted Matrix (F3)	☐ Mesic Spodic (A17)
☐ Stratified Layers (A5)	☐ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☑ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ Very Shallow Dark Surface (F22)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	
☐ Sandy Mucky Mineral (S1)		
☐ Sandy Gleyed Matrix (S4)		
☐ Sandy Redox (S5)		☐ Other (Include Explanation in Remarks)
☐ Stripped Matrix (S6)		
☐ Dark Surface (S7)		

Restrictive Layer (if observed) Type: _____ Depth (inches): _____

Remarks:

Hydric Soils criterion met? **Yes** ☑ **No** ☐

LGCI
Lahlaf Geotechnical Consulting, Inc.

January 14, 2026

Ms. Rani Philip
Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944
E-mail: rphilip@DoreandWhittier.com

Re: **DD Phase Geotechnical Report**
Proposed Wildwood Early Childhood Center
North Intermediate School – 320 Salem Street Site
Wilmington, MA
LGCI Project No. 2437
Report No. 2437-DD-1.0

Dear Ms. Philip:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has completed a Design Development (DD) Phase geotechnical study for the proposed Wildwood Early Childhood Center in Wilmington, Massachusetts. We are submitting our DD Phase geotechnical report electronically. Please notify us if you need a hard copy.

The soil samples from our explorations are currently stored at LGCI for further analysis, if requested. Unless notified otherwise, we will dispose of the soil samples after three (3) months.

Thank you for choosing LGCI as your geotechnical engineer.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

LGCI
Lahlaf Geotechnical Consulting, Inc.

DD PHASE GEOTECHNICAL REPORT
PROPOSED WILDWOOD EARLY CHILDHOOD CENTER
NORTH INTERMEDIATE SCHOOL – 320 SALEM STREET SITE
WILMINGTON, MASSACHUSETTS

LGCI Project No. 2437
Report No. 2437-DD-1.0
January 14, 2026

Prepared for:

Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944

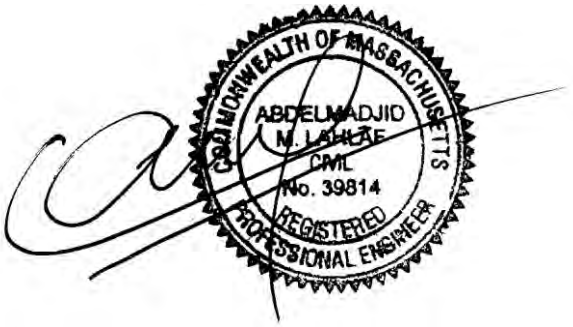
DD PHASE GEOTECHNICAL REPORT
PROPOSED WILDWOOD EARLY CHILDHOOD CENTER
NORTH INTERMEDIATE SCHOOL – 320 SALEM STREET SITE
WILMINGTON, MASSACHUSETTS
LGCI Project No. 2437
Report No. 2437-DD-1.0
January 14, 2026

Prepared for:

Dore and Whittier Architects, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950
Phone: (978) 778-5353
Fax: (978) 499-2944

Prepared by:

LAHLAF GEOTECHNICAL CONSULTING, INC.
100 Chelmsford Road, Suite 2
Billerica, Massachusetts 01862
Phone: (978) 330-5912
Fax: (978) 330-5056



Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

TABLE OF CONTENTS

1. PROJECT INFORMATION 2

1.1 Project Authorization 2
1.2 Purpose and Scope of Services 2
1.3 Site Description 3
1.4 Project Description 4
1.5 Elevation Datum 5

2. SITE AND SUBSURFACE CONDITIONS 6

2.1 Surficial Geology 6
2.2 LGCI's Explorations 6
2.2.1 General 6
2.2.2 LGCI's Soil Borings 7
2.2.3 LGCI's Test Pits 7
2.2.4 Exploration Logs and Locations 8
2.3 Subsurface Conditions 8
2.4 Groundwater 11
2.5 Laboratory Test Data 12
2.6 Double-ring Infiltrometer Tests 12

3. EVALUATION AND RECOMMENDATIONS 14

3.1.1 General 14
3.1.2 Topsoil, Asphalt, Fill, Buried Organic Soil, Buried Subsoil, and Swamp Deposits 14
3.1.3 Shallow Footings and Slabs-on-Grade 15
3.2 Foundation Recommendations 16
3.2.1 General 16
3.2.2 Option 1 - Remove and Replace Option 16
3.2.3 Option 2 - Ground Improvements by means of Aggregate Piers 16
3.2.4 Footing Design 17
3.2.5 Settlement 18
3.3 Concrete Slab Considerations 18
3.4 Under-slab Drainage 19
3.5 Seismic Design Criteria 19
3.6 Lateral Pressures for Wall Design 19
3.6.1 Lateral Earth Pressures 19
3.6.2 Seismic Pressures 20
3.6.3 Perimeter Drains 21
3.7 Pavement and Sidewalk Considerations 21
3.7.1 General 21
3.7.2 Pavement Sections 21
3.7.3 Sidewalks 22
3.8 Underground Utilities 22

4. CONSTRUCTION CONSIDERATIONS 24

4.1 Subgrade Preparation for the Remove and Replace Option 24
4.2 Subgrade Preparation for APs 25
4.3 Subgrade Preparation for Paved Areas, Sidewalks, and Exterior Pads 26
4.4 Subgrade Protection 26
4.5 Fill Materials 26
4.5.1 Structural Fill 27
4.5.2 Ordinary Fill 27
4.6 Reuse of Onsite Materials 27
4.7 Groundwater Control Procedures 28
4.8 Temporary Excavations 28

5. REPORT LIMITATIONS 30

6. REFERENCES..... 31

List of Tables and Figures

Table 1	Summary of LGCI's Borings
Table 2	Summary of LGCI's Test Pits
Figure 1	Site Location Map
Figure 2	Surficial Geologic Map
Figure 3A	Exploration Location Plan - North
Figure 3B	Exploration Location Plan - South

List of Appendices

Appendix A	LGCI's Boring Logs
Appendix B	LGCI's Test Pit Logs
Appendix C	Laboratory Test Results
Appendix D	Results of Double-ring Infiltrometer Tests

1. PROJECT INFORMATION

1.1 Project Authorization

This geotechnical report presents the results of the subsurface explorations and a geotechnical evaluation performed by Lahlaf Geotechnical Consulting, Inc. (LGCI) for the proposed Wildwood Early Childhood Center in Wilmington, Massachusetts. To date we have performed our services in two (2) phases as follows.

We performed our preliminary phase services in general accordance with our proposal No. 24084 dated August 9, 2024, and proposal No. 24107 dated October 15, 2024, and in accordance with the terms and conditions of the Standard Form of Agreement between Architect and Consultant (Agreement) dated October 17, 2024, and signed by Mr. Lee P. Dore of Dore and Whittier Architects, Inc. (Dore and Whittier).

We performed our DD phase services in general accordance with our proposal No. 25025 – Rev. 1 dated March 4, 2025, revised on September 22, 2025, and in general accordance with the terms and conditions located in the Amendment to the Consultant Services Agreement (Amendment) between LGCI and Dore and Whittier dated September 26, 2025. Mr. Donald M. Walter of Dore and Whittier authorized our DD phase services by signing the Agreement on October 21, 2025.

1.2 Purpose and Scope of Services

The purpose of our geotechnical services was to perform subsurface explorations at the site for the proposed Wildwood Early Childhood Center, and to provide foundation design and construction recommendations. LGCI performed the following services:

- Coordinated our exploration locations with Dore and Whittier and with school staff.

- Marked the exploration locations at the site and notified Dig Safe Systems Inc. (Dig Safe) and the Town of Wilmington for utility clearance.

- Engaged a drilling subcontractor for eight (8) days to advance thirty-four (34) soil borings at the site, including two (2) days to advance eight (8) soil borings as part of our preliminary phase services, and six (6) days to advance an additional twenty-six (26) soil borings as part of our DD phase services. Our drilling subcontractor installed four (4) groundwater observation wells in four (4) soil borings (one each) as part of our DD phase services.

- Coordinated with Dore and Whittier who arranged with the Town of Wilmington's Department of Public Works (DPW) to perform five (5) test pits as part of our preliminary phase services, as requested by the civil engineer. LGCI performed four (4) double-ring

infiltrometer tests in four (4) of the test pits (one each) as part of our preliminary phase services.

- Engaged an excavation subcontractor for four (4) days to advance an additional twelve (12) test pits at the site as part of our DD phase services, as requested by the civil engineer. LGCI performed an additional four (4) double-ring infiltrometer tests in four (4) of the test pits (one each) as part of our DD phase services.

- Provided an LGCI geotechnical field representative at the site to coordinate and observe the borings and test pits, perform the double-ring infiltrometer tests, collect and describe the soil samples, and prepare field logs.

- Submitted twelve (12) soil samples for laboratory tests, including two (2) soil samples from the borings, and four (4) samples from the test pits where double-ring infiltrometer tests were performed as part of our preliminary services; and an additional two (2) soil samples from the borings, and four (4) soil samples from the test pits where double-ring infiltrometer tests were performed as part of our DD phase services.

- Prepared this geotechnical report containing the results of our subsurface explorations and our recommendations for foundation design and construction.

Upon the completion of our preliminary phase services, LGCI submitted a preliminary geotechnical report dated December 10, 2024. This DD phase geotechnical report contains the results of our preliminary phase explorations and supersedes it.

Our scope includes preparing specifications, reviewing contract documents, and providing construction services. These services will be performed separately and are not included in this geotechnical report.

Recommendations for stormwater management, erosion control, pavement design, slope stability analyses, site specific seismic and liquefaction analyses, pile analysis and design, FEMA 100-year flood elevation, historic uses of site, contaminated soil and groundwater treatment and disposal requirements and techniques, and cost or quantity estimates are not included in our scope of work.

LGCI's scope of services does not include an environmental assessment for the presence or absence of wetlands or analytical testing for hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site, or mold in the soil or in any structure at the site. Any statements regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client.

1.3 Site Description

Our understanding of the site is based on our field observations, our discussions with Dore and Wittier, and on the following documents:

- Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier, dated April 24, 2025, and provided to LGCI by Dore and Whittier via e-mail on December 4, 2025.

- Drawings EX1.10 to EX1.12 titled: “Overall Plan – Existing, North Intermediate School, 320 Salem St., Wilmington, MA 01887,” (Existing School Architectural Drawings) prepared by Dore and Whittier, undated, and provided to LGCI by Dore and Whittier via e-mail on January 8, 2026.

The North Intermediate School site is located at 320 Salem Street in Wilmington, Massachusetts as shown in Figure 1. The site is bordered by private residential properties and Salem Street on the southern side, by Ballardvale Street on the eastern side, and by private properties on the western and northern sides. The site is occupied by the existing school building, a drop off loop, a paved parking lot, a playground, a basketball court and tennis courts, and athletic fields, including a baseball field and a soccer field. We understand that wetlands are located near the northwestern corner of the site.

Based on the Existing School Architectural Drawings and based on our conversations with Dore and Whittier, we understand that the existing school building consists of a one- to two-story building with a lower entrance located within the northern wing of the existing school. The existing lower entrance has a first finished floor elevation (FFE) at El. 94.92 feet, and the remainder of the existing school has an FFE ranging between El. 98.50 feet and El. 104.92 feet. Based on the drawings, the existing building does not have below-ground spaces. A crawl space is located within the southern wing of the existing school near the interface with the northern wing of the school. A boiler room is located near the southeastern corner of the existing building and several underground fuel tanks are located on the southern side of the existing building.

Based on the Existing Conditions Plan, the grades at the site generally range between El. 90 feet and El. 108 feet, generally rising in the north to south direction. The existing grades within the proposed athletic fields range between El. 91 feet and El. 96 feet. The existing grades around the perimeter of the existing school building range between El. 93 feet on the northern side of the building and El. 100 feet on the southern side of the building. The existing grades within the parking lot located to the east of the existing building range between El. 93 feet and El. 95 feet. The existing grades within the paved driveways and drop off loop on the southern side of the existing building range between El. 100 feet near the southern face of the existing building and El. 106 feet near Salem Street on the southern edge of the site.

1.4 Project Description

Our understanding of the proposed construction is based on our discussions with Dore and Whittier and on the following drawings:

- Schematic Design Drawing A1.30 titled: "Level 3 Overall Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Architectural Drawings), prepared by Dore and Whittier, dated April 24, 2025, and provided to LGCI by Dore and Whittier via e-mail on December 4, 2025.

- Schematic Design Drawing C3.00 titled: "Grading and Drainage Plan", Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Civil Drawings), prepared by Dore and Whittier, dated April 24, 2025, and provided to LGCI by Dore and Whittier via e-mail on December 4, 2025.

Based on the Architectural Drawings and the Civil Drawings, and our discussions with Dore and Whittier, we understand that the proposed school building will be three (3) stories high with a total gross floor area of approximately 165,000 square feet and will have an irregular footprint of about 80,500 square feet. The proposed building will be located within the existing athletic fields north of the existing school building. We understand that the proposed building will have a finished floor elevation (FFE) of El. 96.5 feet, requiring fills ranging between 2.5 and 4.5 feet to achieve the proposed FFE of the proposed building. We understand that the proposed building will not have a basement.

We understand that the proposed construction will include paved parking lots and driveways located to the south of the proposed building, in the area of the existing school building. A driveway is also proposed to loop around the perimeter of the proposed building and connect to the parking lots and driveways to the south. The parking lots and driveways will be accessible from Salem Street on the southern side of the site. We understand that the proposed grades within the proposed parking lots and driveways will range between El. 91 feet near the northwestern corner of the proposed building and El. 105 feet near Salem Street on the southern side of the site, requiring minor cuts and fills to achieve the proposed grades of the proposed parking lots and driveways.

We understand that the proposed construction will also include proposed athletic fields and basketball courts located to the south of the proposed building near the proposed parking lots and driveways. A proposed retaining wall approximately 4 feet high with a length of about 180 feet will separate the southern basketball court from the proposed parking lot located to its south. Grading information for the proposed retaining wall is not available at the time of this geotechnical report.

We understand that the existing building is slated for demolition to allow for the construction of the proposed parking lots, driveways, athletic fields, and retaining wall.

1.5 Elevation Datum

We understand that the elevations provided in the Existing Conditions Plan and Civil Drawings are referenced with respect to the North American Vertical Datum of 1988 (NAVD 1988).

2. SITE AND SUBSURFACE CONDITIONS

2.1 Surficial Geology

LGCI reviewed a surficial geologic map titled: "Surficial Materials Map of Wilmington Quadrangle, Massachusetts," prepared by Byron D. Stone, J.R. and DiGiacomo-Cohen, M.L., Scientific Investigation Map 3402, Quadrangle 113 – Wilmington, 2018.

The surficial geologic map of the site indicates that the natural soils in the general vicinity of the site consist of coarse deposits. The surficial geologic map also shows swamp deposits not far from the northeastern corner of the site.

Coarse Deposits – The coarse deposits consist of sand, sand and gravel, and gravel deposits as described below.

- Sand Deposits – The sand deposits are comprised mostly of fine to coarse sand. Coarser layers may contain up to 25 percent gravel. Finer layers may contain fine sand, silt, and clay.

- Sand and Gravel Deposits – The sand and gravel deposits occur as a mixture of gravel and sand within individual layers and as alternating layers of sand and gravel. The sand and gravel layers range between 25 to 50 percent gravel and 50 to 75 percent sand.

- Gravel Deposits – The gravel deposits are comprised of at least 50 percent gravel, cobbles, and boulders. Sand occurs within gravel beds and as separate layers within the gravel.

Swamp Deposits – The swamp deposits consist of organic muck and peat that contain minor amounts of sand, silt, and clay, are stratified and poorly sorted, and occur in swamps and freshwater marshes, in kettle depressions, or in poorly drained areas.

The Surficial Geologic Map is shown in Figure 2.

2.2 LGCI's Explorations

2.2.1 General

LGCI coordinated our exploration locations with Dore and Whittier and marked the exploration locations in the field. LGCI notified Dig Safe and the Town of Wilmington for utility clearance prior to starting our explorations at the site.

Unless notified otherwise, we will dispose of the soil samples and rock cores obtained during our explorations after three (3) months.

2.2.2 LGCI's Soil Borings

As part of our preliminary phase services, LGCI engaged Soil X, Corp. (Soil X) of Leominster, Massachusetts to advance eight (8) soil borings (B-1 to B-8) at the site on October 28 and 29, 2024. The borings were advanced with a Diedrich D-70 Turbo ATV Drill Rig using hollow stem auger boring techniques with 4-1/4-inch inner diameter augers. The borings extended to depths ranging between 10.2 and 20.2 feet beneath the ground surface. Upon completion, the boreholes were backfilled with drill cuttings.

As part of our DD phase services, LGCI engaged Soil X to advance an additional twenty-six (26) soil borings (B-101-OW to B-126) at the site between November 12 and 19, 2025. The borings were advanced with a Diedrich D-70 Turbo ATV Drill Rig using hollow stem auger boring techniques with 4-1/4-inch inner diameter augers or using drive and wash boring techniques with 3-inch and 4-inch casing. The borings extended to depths ranging between 8.5 and 22.0 feet beneath the ground surface. Upon completion, the boreholes were backfilled with drill cuttings. The ground surface was restored with cold patch asphalt in paved areas. Soil X installed four (4) groundwater observation wells in four (4) soil borings (one each).

Soil X performed Standard Penetration Tests (SPT) and obtained split spoon samples with an automatic hammer at typical depth intervals of 2 feet or 5 feet as noted on the boring logs in general accordance with ASTM D-1586. One (1) 5-foot rock core was obtained in boring B-B-104.

An LGCI geotechnical field representative observed and logged the borings in the field.

2.2.3 LGCI's Test Pits

As part of our preliminary services, Dore and Whittier coordinated with the Town of Wilmington DPW to perform five (5) test pits (TP-1, TP-2, TP-2A, TP-3, and TP-4) at the site on October 30 and 31, 2024. The purpose of the test pits was to perform double-ring infiltrometer tests as described in Section 2.6. The test pits were excavated with a Volvo EWR150E excavator with a smooth-edge bucket. The test pits extended to depths ranging between 8.0 and 11.3 feet beneath the ground surface. Upon completion, the excavations were backfilled with excavated material in 12- to 18-inch lifts and tamped with the excavator bucket.

As part of our DD phase services, LGCI engaged Saunders Construction of Reading, Massachusetts to perform an additional twelve (12) test pits (TP-101 to TP-112) at the site between December 23 and 24, 2025, and December 29 and 30, 2025. The purpose of the additional test pits was to perform double-ring infiltrometer tests as described in Section 2.6. The test pits were excavated with a Hitachi Zaxis 135 US excavator with a toothed bucket. The test pits extended to depths ranging between 5.0 and 12.0 feet beneath the ground surface. Upon completion, the excavations were backfilled with excavated material in 12- to

18-inch lifts and tamped with the excavator bucket. The ground surface in the athletic fields was restored by loaming, raking, and seeding the surface. The ground surface of the test pits located in paved areas was restored with compacted gravel and was paved by the Town of Wilmington personnel and equipment.

An LGCI geotechnical field representative observed and logged the test pits in the field.

2.2.4 Exploration Logs and Locations

The boring and test pit locations are shown in Figure 3A and Figure 3B. Appendices A and B contain LGCI's boring logs and test pits logs, respectively, and Tables 1 and 2 include summaries of LGCI's borings and test pits, respectively.

2.3 Subsurface Conditions

The subsurface description in this report is based on a limited number of explorations and is intended to highlight the major soil strata encountered during our explorations. The subsurface conditions are known only at the actual exploration locations. Variations may occur and should be expected between exploration locations. The exploration logs represent conditions that we observed at the time of our explorations and were edited, as appropriate, based on the results of the laboratory test data and inspection of the soil samples in the laboratory. The strata boundaries shown in our exploration logs are based on our interpretations and the actual transitions may be gradual. Graphic soil symbols are for illustration only.

The soil strata encountered in LGCI's borings and test pits were as follows, starting at the ground surface.

Topsoil – A layer of surficial organic topsoil was encountered at the ground surface in borings B-1 to B-7, B-101-OW to B-103, B-105, B-107 to B-126, and in all test pits except in test pits TP-104 to TP-106. The thickness of the topsoil ranged between 0.3 feet and 2.4 feet.

Asphalt – Asphalt was encountered at the ground surface in boring B-104 and in test pits TP-104 to TP-106. The thickness of the asphalt ranged between 0.3 feet and 0.7 feet.

Fill – A layer of fill was encountered at the ground surface in borings B-8 and B-106-OW, or beneath the topsoil or asphalt in all borings and test pits except in boring B-118. The fill generally extended to depths ranging between 0.7 and 6.0 feet beneath the ground surface, except near the northwestern portion of the site and near the northwestern corner of the proposed building, the fill extended up to 12.0 feet beneath the ground surface. The samples within this layer were mostly described as well graded sand, poorly graded sand, and silty sand. Two (2) samples were described as silt. The fines content in the fill ranged between 0 and 30 percent, and the gravel content ranged between 0 and 50 percent. When described as silt, the samples were described as slightly plastic. The fill contained traces of organic soil and roots and contained an

organic odor. One (1) sample contained traces of brick. The fill contained 5 to 10 percent cobbles up to 12 inches in size in test pit TP-1.

The SPT N-values in this layer ranged between 2 blows per foot (bpf) and 69 bpf, with most values ranging between 6 bpf and 27 bpf, indicating mostly loose to medium dense material. Please note that the high SPT N-values recorded in the fill may be due to obstructions such as cobbles and boulders present in the fill and may not represent the true density of the fill.

The excavation efforts within the fill layer ranged between easy, moderate, and difficult.

Buried Organic Soil – A layer of buried organic soil was encountered beneath the fill layer in borings B-2, B-5, B-7, B-106-OW, and in test pits TP-105 and TP-108 to TP-112. The buried organic soil extended to depths ranging between 2 feet and 8 feet beneath the ground surface. The samples in this layer were described as silty sand and poorly graded sand. The fines content in the buried organic soil ranged between 5 and 45 percent and the gravel content ranged between 0 and 20 percent. The buried organic soil contained traces of organic soil and roots.

The SPT N-values in this layer ranged between 8 bpf and 40 bpf, with most values ranging between 8 bpf and 16 bpf, indicating mostly loose to medium dense material. Please note that the high SPT N-values recorded in the buried organic soil may be due to obstructions such as cobbles and boulders present in the buried organic soil and may not represent the true density of the buried organic soil.

The excavation efforts within the buried organic soil layer ranged between easy and moderate.

Buried Subsoil – A layer of buried subsoil was encountered beneath the fill in boring B-8 and test pit TP-4 and extended to depths of 4.0 and 3.2 feet beneath the ground surface, respectively. In boring B-8, the samples were described as silty sand. In test pit TP-4, the sample was described as poorly graded sand. The fines content in this layer ranged between 10 and 35 percent, and the gravel content ranged between 0 and 15 percent. The samples contained traces of organic soil and roots.

The SPT N-values in this layer ranged between 11 bpf and 14 bpf, indicating a medium dense material.

The excavation effort within the buried subsoil layer was easy, consistent with loose material.

Swamp Deposits – A layer of swamp deposits was encountered beneath the layer of fill in test pit TP-1 and extended to a depth of 10.0 feet beneath the ground surface. The sample was described as silty sand. The fines content in this layer ranged between 20 and 25 percent and the gravel content ranged between 10 and 15 percent. The swamp deposit contained traces of organic soil, roots, and an organic odor. A trace of swamp deposits was also encountered in the silt layer in TP-110.

The excavation effort within the swamp deposit layer was difficult.

Silt – A layer of silt was encountered beneath the fill layer in borings B-1 and B-101-OW, and in test pit TP-110, and extended to depths of 9.0, 15.4, and 12.0 feet beneath the ground surface, respectively. A layer of silt was encountered within the sand and gravel layer in test pit TP-101 between depths of 7.0 to 8.0 feet beneath the ground surface. The silt extended to the termination depth in test pit TP-110. The samples were described as silt and were described as non-plastic to slightly plastic. The sand content in this layer ranged between 5 and 35 percent and the gravel content ranged between 0 and 5 percent. The silt sample contained traces of swamp deposits in TP-110.

The SPT N-values in this layer were 13 and 26 bpf, indicating medium stiff silt.

The excavation effort within the silt layer was described as easy.

Clay – A layer of clay was encountered beneath the layer of silt in boring B-1 between depths of 9.0 to 14.0 feet. The sample was described as lean clay and was slightly plastic. The sand content ranged between 15 and 20 percent.

The SPT N-value in this layer was 12 bpf, indicating stiff clay.

Sand – A layer of sand was encountered beneath the fill, buried organic soil, or swamp deposits in test pits TP-1, TP-106, TP-108, and TP-111 to TP-112 and extended to a depth of 11.0, 6.1, 7.5, 11.0, and 11.5 feet, respectively, beneath the ground surface. The sand extended to the termination depths in the test pits except in test pit TP-108 where the sand was overlying a layer of sand and gravel. The samples were described as poorly graded sand. The fines content ranged between 0 and 15 percent and the gravel content ranged between 0 and 5 percent.

The excavation effort within the sand layer ranged between easy and difficult, indicating loose to dense material.

Sand and Gravel – A layer of sand and gravel was encountered in all borings and test pits, except in test pits TP-1, TP-106, and TP-110 to TP-112, and extended to the termination depths of the borings and test pits, except for borings B-6, B-104, B-106-OW, B-110, and B-115 where the sand and gravel layer extended to the top of weathered rock or rock. The samples in this layer were mostly described as well graded sand, poorly graded sand, and silty sand. One (1) sample was described as silty gravel. The fines content in this layer ranged between 0 and 35 percent, and the gravel content ranged between 0 and 45 percent. When described as gravel, the sand content in this layer ranged between 20 and 25 percent. Seven (7) samples in this layer contained traces of weathered rock.

The SPT N-values in this layer ranged between 11 bpf and refusal, with most values ranging between 13 bpf and 44 bpf, indicating medium dense to dense material. Please note that the high

SPT N-values in the sand and gravel may be due to obstructions such as cobbles and boulders in the sand and gravel and may not represent the true density of the sand and gravel.

The excavation effort within the sand and gravel layer ranged between easy and difficult, indicating loose to dense material.

Weathered Rock – A layer of weathered rock was encountered beneath the sand and gravel in borings B-6, B-106-OW, B-110, and B-115 and extended to the termination depths of 19.7, 20.0, 21.0, and 20.7 feet beneath the ground surface, respectively. The samples within this layer were described as silty sand, poorly graded sand, and silty gravel. The fines content in this layer ranged between 5 and 20 percent, and the gravel content ranged between 15 and 40 percent. When described as gravel, the sand content in this layer ranged between 15 and 20 percent.
The SPT N-values in this layer were refusal, indicating very dense material.

Rock – Auger refusal was encountered on rock in boring B-104 at a depth of 8.0 feet beneath the ground surface.

To confirm and characterize the rock, rock was cored in boring B-104 between depths of 8.0 and 13.0 feet beneath the ground surface. The rock generally consisted of hard, slightly weathered, slightly fractured, medium-grained, gray, Granite. The rock core recovery was 100 percent, and the Rock Quality Designation (RQD) was 88.33 percent. The coring rate ranged between 3.0 and 4.0 minutes per foot.

2.4 Groundwater

Groundwater was encountered in all borings and test pits, except in borings B-3, B-104, B-117, B-119, B-124, and B-125, and in test pits TP-2, TP-3 to TP-4, TP-101 to TP-102, TP-104, and TP-106 at depths ranging between 5.0 and 18.0 feet beneath the ground surface, as shown in Tables 1 and 2, and in the boring and test pit logs.

The groundwater information reported herein is based on observations made during or shortly after the completion of drilling and excavation. The reported groundwater levels may not represent the actual groundwater conditions, as additional time may be required for the groundwater levels to stabilize. The groundwater information presented in this report only represents the conditions encountered at the time and location of the explorations. Seasonal fluctuation should be anticipated.

Two (2) groundwater level readings were obtained in groundwater observation wells B-101-OW, B-106-OW, and B-111-OW, and one (1) groundwater level reading was obtained in groundwater observation well B-108-OW between the dates of November 18 and 19, 2025. The groundwater level readings ranged between 6.5 and 8.5 feet beneath the ground surface, corresponding to elevations ranging between El. 85.0 feet and El. 86.5 feet, as shown in the table below.

	B-101-OW G.S. El. = 93.0 ft.	B-106-OW G.S. El. = 94.0 ft.	B-108-OW G.S. El. = 93.0 ft.	B-111-OW G.S. El. = 93.0 ft.
Date	**Depth / Elevation (ft.)**	**Depth / Elevation (ft.)**	**Depth / Elevation (ft.)**	**Depth / Elevation (ft.)**
11/18/2025	8.0 / 85.0	8.5 / 85.5	- / -	6.5 / 86.5
11/19/2025	8.0 / 85.0	8.2 / 85.8	8.0 / 85.0	6.5 / 86.5

2.5 Laboratory Test Data

LGCI submitted twelve (12) soil samples collected from the borings and test pits for grain-size analysis. The results of the grain-size analyses are provided in the test data sheets included in Appendix C and are summarized in the table below.

Grain-Size Analysis Test Results

Exploration No.	Sample No.	Stratum	Sample Depth (ft.)	Percent Gravel	Percent Sand	Percent Fines
B-1	S2	Fill	2.0 – 4.0	36.5	43.5	20.0
B-4	S2	Sand and Gravel	2.0 – 4.0	36.9	42.6	20.5
B-107	S2	Fill	2.0 – 4.0	48.0	48.2	3.8
B-110	S2	Fill	3.5 – 5.0	6.2	69.9	23.9
TP-1	Infiltrometer	Fill	5.0	14.1	58.9	27.0
TP-2	Infiltrometer	Fill	4.0	6.8	77.3	15.9
TP-3	Infiltrometer	Sand and Gravel	4.0	31.4	67.1	1.5
TP-4	Infiltrometer	Sand and Gravel	4.6	30.4	58.6	11.0
TP-101	Infiltrometer	Sand and Gravel	4.6	17.6	78.9	3.5
TP-105	Infiltrometer	Sand and Gravel	4.5	13.1	75.2	11.7
TP-108	Infiltrometer	Sand	6.0	0.2	86.4	13.4
TP-111	Infiltrometer	Sand and Gravel	3.3	20.1	61.5	18.4

2.6 Double-ring Infiltrometer Tests

As part of our preliminary phase services, LGCI provided a geotechnical field engineer to perform four (4) double-ring infiltrometer tests in test pits TP-1 to TP-4 (one in each).

As part of our DD phase services, LGCI provided a geotechnical field engineer to perform an additional four (4) double-ring infiltrometer tests in test pits TP-101, TP-105, TP-108, and TP-111 (one in each).

In each case, the excavation was first advanced to the test depth where the test pit bottom was leveled using the excavator bucket. After the infiltrometer rings were driven into the ground, the

test was conducted by filling the rings with water. The test pit was advanced deeper after the completion of the test.

The test results are included in Appendix D and are summarized below.

The results include plots of the hydraulic conductivity for flow within the inner and outer rings. The stabilized portion of the plot for the inner ring indicates the permeability value. The results indicate the following approximate permeability, K, value:

Double-ring Infiltrometer Test Results

Test Pit	Stratum	Test Depth (ft.)	Permeability, K (cm/sec)
TP-1	Fill	5.0	1.00×10^{-3}
TP-2	Fill	4.0	4.06×10^{-3}
TP-3	Sand and Gravel	4.0	6.73×10^{-2}
TP-4	Sand and Gravel	4.5	8.95×10^{-2}
TP-101	Sand and Gravel	4.6	1.67×10^{-2}
TP-105	Sand and Gravel	4.5	8.16×10^{-3}
TP-108	Sand	6.0	5.70×10^{-4}
TP-111	Sand and Gravel	3.3	3.67×10^{-5}

3. EVALUATION AND RECOMMENDATIONS

3.1 Foundation Recommendations

3.1.1 General

Based on the results of the borings and test pits, the subsurface conditions at the site are suitable to support the proposed building after the topsoil, asphalt, existing fill, buried organic soil, buried subsoil, and swamp deposits are removed or improved as described below. There are a few issues that we would like to highlight for consideration and discussion.

3.1.2 Topsoil, Asphalt, Fill, Buried Organic Soil, Buried Subsoil, and Swamp Deposits

- The asphalt and topsoil should be removed from within the entire construction area, including the proposed building footprint and the proposed paved areas.

- The existing fill was observed to be variable in composition and density. The existing fill contained traces of organic soil and roots. In addition, the existing fill overlaid buried organic soil, buried subsoil, and swamp deposits. Existing fill that was not placed with strict moisture, density, and gradation control presents risk of unpredictable settlement that may result in poor performance of floor slabs and foundations. Due to these risks, the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits should be entirely removed from within the proposed building's footprint and should be replaced with Structural Fill. We anticipate that the removal will extend up to depths ranging between 2 and 7 feet beneath the existing ground surface, and up to a depth of 10 feet beneath the ground surface near the northwestern corner of the proposed building. The removal may extend to greater depths at locations not explored by LGCI. Laterally, the removal should extend beyond the proposed building's footprint a distance equal to the distance between the bottom of the proposed footings and the top of the native sand/sand and gravel, stiff silt and clay, or 5 feet, whichever is greater.

- At test pit TP-1, performed outside of the proposed building footprint, swamp deposits were observed beneath the existing fill and extended to a depth of 10 feet beneath the ground surface. A trace of swamp deposits was also encountered near the top of the silt layer in TP-110. If encountered within the proposed building footprint, the swamp deposits should be removed and replaced with Structural Fill.

- After the asphalt, topsoil, existing fill, buried organic soil, buried subsoil, and swamp deposits, if any, are removed from within the proposed building footprint and zone of influence of footings, as described above, the proposed building and other structures may be supported on shallow footings bearing in Structural Fill placed directly on top of the native sand/sand and gravel or stiff silt and clay.

- As an alternative to removing the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any within the proposed building footprint, we considered the option of improving the ground using aggregate piers (APs). This option is applicable where the depth to the bottom of the unsuitable layers is 6 feet or more below the bottom of the proposed slab. Accordingly, if this option is selected, consideration should be given to placing the fill required to raise the grades as Ordinary Fill and installing the APs from a working platform at the top of the placed fill.

- The selection of the APs versus the conventional remove and replace option should be based on a cost benefit analysis that takes into account the depth of removal and replacement with Structural Fill and groundwater control required for the remove and replace option.

- The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1.

- The proposed slab may be designed as a slab-on-grade bearing on Structural Fill placed directly on top of the native sand/sand and gravel or stiff silt and clay.

- Within paved areas, the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any, should be removed to the top of the native sand/sand and gravel or stiff silt and clay or to a depth of 18 inches beneath the bottom of the proposed pavement, whichever occurs first. Where soft organic soil is exposed, the organic soil should be removed. The existing fill, buried organic soil, buried subsoil, and swamp deposits, if any, deeper than 18 inches beneath the bottom of the proposed pavement can remain in place provided that these materials are firm and unyielding following proofrolling as described in Section 4.1.

3.1.3 Shallow Footings and Slabs-on-Grade

Based on the results of the borings and test pits, the subsurface conditions are suitable to support shallow spread and continuous footings bearing on Structural Fill placed directly on top of the native sand/sand and gravel layer or the stiff silt and clay after entirely removing the asphalt, topsoil, the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any, or on ground improved with aggregate piers. The proposed slabs may be designed as slabs-on-grade placed on Structural Fill placed directly on the natural sand/sand and gravel layer or on Structural Fill placed on ground improved with APs. Our recommendations for the remove and replace options are presented in Section 3.2.2, and our recommendations for ground improvement using APs are presented in Section 3.2.3. Our recommendation for net allowable bearing capacity is presented in Section 3.2.4. Our recommendations for slabs-on-grade are presented in Section 3.3. Our recommendations for lateral pressures for retaining walls, if any, are presented in Section 3.6. Section 4.1 provides recommendations for preparation of subgrades.

3.2 Foundation Recommendations

3.2.1 General

We recommend supporting the proposed building on shallow footings placed on Structural Fill placed directly on the native sand/sand and gravel layer or the stiff silt and clay or on ground improved with APs. Shallow foundations and slabs-on-grade should be placed on a subgrade that is prepared in accordance with the recommendations in this report.

3.2.2 Option 1 - Remove and Replace Option

Under this option, we recommend entirely removing the topsoil, the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any, and restoring the grade with Structural Fill to the bottom of the footings and slabs.

3.2.3 Option 2 - Ground Improvements by means of Aggregate Piers

For this option, we recommend improving the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any using APs. The APs should be installed under the proposed footings and slabs.

APs are typically relatively short, stiff elements of compacted aggregate which improve the existing fill. These elements are typically installed by augering holes ranging from 20 inches to 36 inches in diameter. Aggregate (new crushed stone, recycled concrete, or other granular material) is then introduced into the hole and is generally compacted in one-foot lifts by repeated penetrations with the vibrator, which can be mounted to a crane or tracked carrier. The vibratory or ramming energy densifies the aggregate in the element; thus, producing high modulus aggregate piers. The installation of APs also densifies the surrounding soil depending on the type of soil. These high modulus elements reinforce the treatment zone and increase the composite friction angle and stiffness of the reinforced soil mass. The design of APs is typically verified with a modulus load test.

The work of the specialty contractor installing the APs should be coordinated with that of the site contractor who should perform pre-trenching for possible boulders, abandoned foundations, metal pipes, or other obstructions before the installation of the APs. Alternatively, the APs should be installed in pre-augered holes.

While the AP installation generates little spoils, where it is not desired to generate spoils during the improvement process, vertical displacement APs could be used. These are installed by driving a mandrel and hammer to the design depth, feeding the backfill material through the hollow mandrel, and compacting the backfill in 1-foot lifts using the hammer; thus, generating no spoils. Vertical displacement APs are typically installed with diameters ranging between 12 and 16 inches to typical depths ranging between 15 and 35 feet, and to depths of up to 60 feet where needed.

The length of the APs should be based on improvements that reduce the total and differential settlement to within the thresholds established for the project for both static and earthquake loads.

The ground improvement technologies are patented, and the design is performed by the specialty contractors. We recommend that the project plans and specifications for ground improvement be performance-based, allowing a variety of ground improvement contractors the opportunity to bid the work. Specifications should indicate the required allowable bearing pressure for footings and slabs, and the allowable total and differential settlements for the structure, including static and earthquake induced settlement. In addition, we recommend that the specifications require that the supporting design calculations be available for review by the design team. Ground improvement contractors should also be provided with grading plans and subsurface information associated with the proposed structure for use in preparing their bids.

For cost estimating purposes, we recommend assuming ground improvements extending to an average depth of 15 feet beneath the bottom of the proposed slab.

3.2.4 Footing Design

- Footings should be founded on Structural Fill placed directly on the native sand/sand and gravel or on the stiff silt and clay or on ground improved using APs. A representative of LGCI should observe the subgrade during construction to confirm that it is consistent with the materials encountered in our borings and test pits.

- For footing design, we recommend using a net allowable bearing pressure of 4 kips per square foot (ksf).

- The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1.

- Foundations should be designed in accordance with The Commonwealth of Massachusetts State Building Code 780 CMR, Tenth Edition (MSBC 10th Edition).

- Exterior footings and footings in unheated areas should be placed at a minimum depth of 4.0 feet below the final exterior grade to provide adequate frost cover protection. Interior footings in heated areas may be designed and constructed at a minimum depth of 2 feet below finished floor grades.

- We recommend that wall footings have a minimum width of 2 feet, and that column footings have a minimum width of 3 feet. For foundations with a least lateral dimension smaller than 3 feet, the allowable bearing pressure should be reduced to 1/3 of the recommended allowable bearing pressure times the least dimension in feet.

Wall footings should be designed and constructed with continuous, longitudinal steel reinforcement for greater bending strength to span across small areas of loose or soft soils that may go undetected during construction.

3.2.5 Settlement

Using the allowable bearing pressure of 4 ksf and the minimum footing sizes recommended above, we estimate for foundations constructed in accordance with the recommendations contained in this report that the total post-construction settlement will be less than about 1 inch and that the differential settlement will be 3/4 inch or less over a distance of 25 feet. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be assessed by the structural engineer.

3.3 Concrete Slab Considerations

- The proposed floor slabs can be constructed as slabs-on-grade bearing on a minimum of 12 inches of Structural Fill placed directly on top of the native sand/sand and gravel or stiff silt and clay or on ground improved with APs.

- To reduce the potential for dampness in the proposed floor slab, the project architect may consider placing a vapor barrier beneath the floor slab. The vapor barrier should be protected from puncture during construction of the slab.

- For the design of the floor slab bearing on the materials described above, we recommend using a modulus of subgrade reaction, k_{s1}, of 100 tons per cubic foot (tcf). Please note that the values of k_{s1} are for a 1 x 1 square foot area. These values should be adjusted for larger areas using the following expression:

$$Modulus of\ Subgrade\ \mathrm{Re}action(k_s) = k_{s1} * \left(\frac{B+1}{2B}\right)^2$$

where:

k_s = Coefficient of vertical subgrade reaction for loaded area,
k_{s1} = Coefficient of vertical subgrade reaction for 1 x 1 square foot area, and
B = Width of area loaded, in feet.

Please note that cracking of slabs-on-grade can occur as a result of heaving or compression of the underlying soil, but also as a result of concrete curing stresses. To reduce the potential for cracking, the precautions listed below should be closely followed for construction of all slabs-on-grade:

- Construction joints should be provided between the floor slab and the walls and columns in accordance with the American Concrete Institute (ACI) requirements, or other applicable code.

- Backfill in interior and exterior utility trenches should be properly compacted.

- In order for the movement of exterior slabs not to be transmitted to the building foundation or superstructure, exterior slabs such as approach slabs and sidewalks, should be isolated from the building superstructure.

3.4 Under-slab Drainage

Based on the groundwater levels observed in our borings and test pits, we believe that an under-slab drainage system is not required beneath the proposed slab.

Elevator pits or other structures that extend beneath the FFE should be designed to be waterproof.

3.5 Seismic Design Criteria

In accordance with Section 1604 of MSBC 10th Edition and International Building Code of 2021 (IBC 2021), and based on the SPT data from the borings, the seismic criteria for the site are as follows:

- Site Class (IBC 2021, Section 1613.2.2): D
- Spectral Response Acceleration at short period (Ss) (MSBC 10th Ed., Table 1604.11): 0.327g
- Spectral Response Acceleration at 1 sec. (S_1) (MSBC 10th Ed., Table 1604.11): 0.072g
- Site Coefficient Fa (IBC 2021, Table 1613.2.3(1)): 1.54
- Site Coefficient Fv (IBC 2021, Table 1613.2.3(2): 2.4
- Adjusted spectral response S_{MS} (IBC 2021, Equation 16-20): 0.503g
- Adjusted spectral response S_{M1} (IBC 2021, Equation 16-21): 0.173g

Based on the SPT data from the borings and in accordance with Section 1806.4 of MSBC 10th Edition, the site soils are not susceptible to liquefaction.

3.6 Lateral Pressures for Wall Design

3.6.1 Lateral Earth Pressures

The lateral earth pressures shown below should be used to design proposed retaining walls.

Coefficient of Active Earth Pressure, K_A:	0.31
Coefficient of At-Rest Earth Pressure, K_o:	0.47
Coefficient of Passive Earth Pressure, K_p:	3.3
Total Unit Weight γ:	125 pcf

Note: The values in the table are based on a friction angle for the backfill of 32 degrees and neglecting friction between the backfill and the wall. The design active and passive coefficients are based on horizontal surfaces (non-sloping backfill) on both the active and passive sides, and on a vertical wall face.

- Exterior walls of below-ground spaces and retaining walls braced at the top to restrain movement/rotation, should be designed using the "at-rest" pressure coefficient.

- We recommend placing free-draining material within the 3 feet immediately behind retaining walls. We recommend providing weep holes in site walls to promote drainage where possible; or a pipe should be placed at the base of the wall to collect the groundwater. Groundwater collected by the wall drains should be discharged in a lower area if gravity flow is possible.

- Passive earth pressures should only be used at the toe of the wall where special measures or provisions are taken to prevent disturbance or future removal of the soil on the passive side of the wall, or in areas where the wall design includes a key. In any case, the passive pressures should be neglected in the top 2 feet.

- Where a permanent vertical uniform load will be applied on the active side immediately adjacent to the wall, a horizontal surcharge load equal to half of the uniform vertical load should be applied over the height of the wall. At a minimum, a temporary construction surcharge of 100 psf should be applied uniformly over the height of the wall.

- We recommend using an ultimate friction factor of 0.5 between the native sand/sand and gravel or Structural Fill and the bottom of the wall. Below-grade walls should be designed for minimum factors of safety of 1.5 for sliding and 2.0 for overturning. We recommend a factor of safety of 1.5 for global stability of walls.

3.6.2 Seismic Pressures

In accordance with MSBC 10th Edition, Section 1610, a lateral earthquake force equal to $0.100*(S_s)*(F_a)*\gamma*H^2$ should be included in the design of the walls (for horizontal backfill), where S_s is the maximum considered earthquake spectral response acceleration (defined in Section 3.5), F_a is the site coefficient (defined in Section 3.5), γ is the total unit weight of the soil backfill, and H is the height of the wall.

The earthquake force should be distributed as an inverted triangle over the height of the wall. In accordance with MSBC 10th Edition, Section 1610.2, a load factor of 1.43 should be applied to the earthquake force for wall strength design.

Temporary surcharges should not be included when designing for earthquake loads. Surcharge loads applied for extended periods of time should be included in the total static

lateral soil pressure, and their earthquake lateral force should be computed and added to the force determined above.

3.6.3 Perimeter Drains

- Should the design change to include retaining walls, free-draining material should be placed within 3 feet of retaining walls and walls of below-grade spaces. To reduce the potential for dampness in below-ground spaces, if any, perimeter walls of the proposed below-ground spaces should be damp-proofed.

- We recommend that drains be provided behind the exterior of walls of below-ground spaces, if any, and behind site retaining walls, if any. The drains should consist of 6-inch perforated PVC pipes installed with the slots facing down. Perimeter drains should be installed at the bottom of the wall in 18 inches of crushed stone wrapped in a geotextile fabric for separation and filtration. Site retaining walls may be designed with weep holes discharging near the bottom of the face of the walls.

- Groundwater collected by the wall drains could be discharged in a lower area if gravity flow is possible. Alternatively, it should be discharged into the street drains. A permit would be required for discharge into street drains.

3.7 Pavement and Sidewalk Considerations

3.7.1 General

The subsurface conditions encountered at the site are generally suitable to support the proposed driveways, parking lots, and sidewalks after preparation of the subgrade as described in Section 4.1.

- We recommend entirely removing the topsoil and asphalt from within the footprint of the proposed driveways and parking lots.

- The existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any, should be improved within the proposed paved areas and under sidewalks in accordance with the recommendations in Sections 3.1.2 and 4.1.

Cobbles and boulders should be removed to at least 18 inches below the bottom of the pavement and sidewalks.

3.7.2 Pavement Sections

A typical, minimum, standard-duty pavement section that could be used for parking areas is as follows:

1.5" Asphalt "Top Course"
2.0" Asphalt "Base Course"
8" Processed Gravel for Sub-Base (MassDOT M1.03.1)

A typical, minimum, heavy-duty pavement section that could be used for areas of heavy truck traffic is as follows:

2.0" Asphalt "Top Course"
2.5" Asphalt "Base Course"
12" Processed Gravel for Sub-Base (MassDOT M1.03.1)

The pavement sections shown above represent minimum thicknesses representative of typical local construction practices for similar use. Periodic maintenance should be anticipated.

Pavement material types and construction procedures should conform to specifications of the "Standard Specifications for Highways and Bridges," prepared by the Commonwealth of Massachusetts Department of Transportation dated 2025.

Areas to receive relatively highly concentrated, sustained loads such as dumpsters, loading areas, and storage bins are typically installed over a rigid pavement section to distribute concentrated loads and reduce the possibility of high stress concentrations on the subgrade. Typical rigid pavement sections consist of 6 inches of concrete placed over a minimum of 12 inches of subbase material.

3.7.3 Sidewalks

- Sidewalks should be placed on a minimum of 12 inches of Structural Fill with less than 5 percent fines.

- To reduce the potential for heave caused by surface water penetrating under the sidewalk, the joints between sidewalk concrete sections should be sealed with a waterproof compound. The sidewalks should be sloped away from the building or other vertical surfaces to promote flow of water. To the extent possible, roof leaders should not discharge onto sidewalk surfaces.

3.8 Underground Utilities

Boulders at the bottom of utility trenches should be removed to at least 12 inches below the pipe invert and the resulting excavation should be backfilled with suitable backfill. Utilities should be placed on suitable bedding material in accordance with the manufacturer's recommendations. "Cushion" material should be placed, by hand, above the utility pipe in maximum 6-inch lifts. The lift should be compacted by hand to avoid damage to the utility. Where the bedding/cushion material consists of crushed stone, it should be wrapped in a geotextile fabric.

Before placing the bedding material, the bottom of utility trenches should be compacted to a firm and unyielding condition. Where soft or pumping material is encountered, it should be removed and replaced with Ordinary Fill.

Compaction of fill in utility trenches should be in accordance with our recommendations in Section 4.3. To reduce the potential for damage to utilities, placement and compaction of fill immediately above the utilities should be performed in accordance with the manufacturer's recommendations.

4. CONSTRUCTION CONSIDERATIONS

4.1 Subgrade Preparation for the Remove and Replace Option

- Existing asphalt, topsoil, existing fill, buried organic soil, buried subsoil, swamp deposits, if any, organic materials, abandoned utilities, buried foundations, remnants of demolished buildings, and other below-ground structures should be entirely removed from within the footprint of the proposed building before the start of foundation work.

- Tree stumps, root balls, and roots larger than ½ inch in diameter should be removed and the cavities filled with suitable material and compacted per Section 4.4 of this report.

- Cobbles and boulders should be removed at least 6 inches from beneath footings and 18 inches beneath the bottom of slabs and paved areas. The resulting excavations should be backfilled with compacted Structural Fill under the building and with Ordinary Fill under the subbase of paved areas.

- Excavation in the silt and clay layers should be performed with a smooth bladed bucket, and the subgrade should be compacted with statically.

- The base of footing excavations should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing concrete.

- The subgrade of the proposed slab should be compacted with a dynamic vibratory compactor imparting a minimum of 10 kips of force to the subgrade before placing Structural Fill.

- To reduce the potential for disturbance of the footing subgrade, excavations should be extended at least 12 inches beneath the bottom of the proposed footings and should be restored with Structural Fill or crushed stone to serve as a working mat.

- To reduce the potential of increasing lateral pressures on any retaining walls, fill placed within 3 feet of the walls, if any, should be compacted using a small plate compactor imparting a maximum dynamic effort of 4 kips. The fill within 3 feet of the walls should be placed in maximum 8-inch loose lifts.

- Fill placed within the footprint of the proposed building should meet the gradation and compaction requirements of Structural Fill shown in Section 4.5.1.

- Fill placed under the subbase of paved areas should meet the gradation and compaction requirements of Ordinary Fill shown in Section 4.5.2.

- Fill placed in the top 12 inches beneath sidewalks should consist of Structural Fill with less than 5 percent fines.

- An LGCI geotechnical representative should observe the exposed subgrades prior to fill and concrete placement to verify that the exposed bearing materials are suitable for the design soil bearing pressure.

- If soft or loose pockets are encountered in the footing excavations, the soft or loose materials should be removed, and the bottom of the footing should be placed at a lower elevation on firm soil, or the resulting excavation should be backfilled with Structural Fill or crushed stone wrapped in a geotextile filter fabric.

- When crushed stone is required in the drawings or it is used for the convenience of the contractor, it should be wrapped in a geotextile fabric for separation. The geotextile fabric should not be used under retaining walls as it promotes a plane of sliding.

4.2 Subgrade Preparation for APs

- The surficial asphalt, topsoil, and other surficial deleterious matter should be entirely removed from within the proposed building footprint before the start of foundation work.

- The base of the footing excavations on ground improved with APs should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade before placing the required 6 inches of Structural Fill.

- The subgrade of the proposed slab should be compacted dynamic vibratory compactor imparting a minimum of 10 kips of force.

- APs that are damaged as a result of excavation for footings should be repaired in accordance with the requirements of the specialty contractor installing the APs.

- The APs should be exposed during the excavation for footings, and the subgrade should be compacted to a firm and unyielding conditions.

- An LGCI geotechnical representative should observe the installation of the aggregate piers and the modulus test. An LGCI geotechnical representative should also observe the exposed subgrades prior to fill and concrete placement to verify that the aggregate piers are properly exposed.

4.3 Subgrade Preparation for Paved Areas, Sidewalks, and Exterior Pads

- The asphalt and topsoil should be entirely removed within the proposed paved areas.

- The topsoil, existing fill, buried organic soil, buried subsoil, and the swamp deposits, if any, should be removed in the top 18 inches beneath the bottom of the proposed asphalt from within the paved areas and under sidewalks.

- After the asphalt and topsoil are entirely removed, and the existing fill, buried organic soil, buried subsoil, and the swamp deposits, if any, are removed in the top 18 inches beneath the bottom of the proposed asphalt from within the proposed paved areas and under sidewalks in accordance with the recommendations in Section 3.1.1, the exposed topsoil, existing fill, buried organic soil, the buried subsoil, and the swamp deposits, if any, should be improved by compacting the exposed surface with at least six (6) overlapping passes of a vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft zones of soil are observed, the soft soil should be removed, and the grade should be restored using Ordinary Fill to the bottom of the proposed subbase layer.

- Fill placed under the subbase of paved areas and sidewalks should meet the gradation and compaction requirements of Ordinary Fill shown in Section 4.5.2.

- The subbase of paved areas should conform to the recommendations in Section 3.7.2 above.

- The subbase of sidewalks should consist of Structural Fill with less than 5 percent fines.

4.4 Subgrade Protection

The site soils are frost susceptible. If construction takes place during freezing weather, special measures should be taken to prevent the subgrade from freezing. Such measures should include the use of heat blankets or excavating the final 6 inches of soil just before pouring concrete. Footings should be backfilled as soon as possible after footing construction. Soil used as backfill should be free of frozen material, as should the ground on which it is placed. Earthwork operations should be suspended during freezing weather.

Materials with high fines content are typically difficult to handle when wet as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor should keep exposed subgrades properly drained and free of ponded water. Subgrades should be protected from machine and foot traffic to reduce disturbance.

4.5 Fill Materials

Fill placed within the footprint of the proposed building should meet the gradation and compaction requirements of Structural Fill. Fill placed outside the building footprint beneath

any pavement subbase should meet the gradation and compaction requirements of Ordinary Fill. Structural Fill and Ordinary Fill should consist of inert, hard, durable sand and gravel, free from organic matter, clay, surface coatings, and deleterious materials.

4.5.1 Structural Fill

The Structural Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
3 inches	100
1 ½ inch	80 - 100
½ inch	50 – 100
No. 4	30 – 85
No. 20	15 – 60
No. 60	5 – 35
No. 200*	0 – 10

* 0 – 5 for the top 12 inches under sidewalks; exterior slabs, pads, stairways, and walkways

4.5.2 Ordinary Fill

Ordinary Fill should have a plasticity index of less than 6 and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
6 inches	100
1 inch	50 - 100
No. 4	20 – 100
No. 20	10 - 70
No. 60	5 – 45
No. 200	0 – 20

4.6 Reuse of Onsite Materials

Based on the laboratory tests, the granular portion of the existing fill free of organic soil may be used as Ordinary Fill. The onsite materials are not suitable for reuse as Structural Fill.

Soils with high fines content (higher than about 20 percent) are generally very sensitive to moisture content variations and are susceptible to frost. These soils are difficult to compact at moisture contents that are much higher or much lower than the optimum moisture content determined from the laboratory compaction test. Therefore, strict moisture control should be implemented during stockpiling, placement, and compaction of the existing fill.

All materials to be used as fill should first be tested for compliance with the applicable gradation specifications. During earthwork operations, the contractor should avoid mixing the reusable soils with fine-grained and/or organic soils.

4.7 Groundwater Control Procedures

Based on the groundwater levels encountered in our explorations, we anticipate the need for groundwater control procedures during the removal of the existing fill, the buried organic soil, the buried subsoil, and the swamp deposits, if any, and during footing and utility excavations. We anticipate that filtered sump pumps installed in pits located at least 3 feet below the bottom of the excavation may be sufficient to handle surface runoff that may enter the excavation. The contractor should be prepared to use multiple sump pumps as needed.

The contractor should be permitted to employ whatever commonly accepted means and practices are necessary, including well points, if necessary, to maintain the groundwater level below the excavation, and to maintain a dry excavation during wet weather. Placement of reinforcing steel or concrete in standing water should not be permitted.

Groundwater levels should be maintained at a minimum of 1-foot below the bottom of excavations during construction.

To reduce the potential for sinkholes developing over sump pump pits after the sump pumps are removed, the crushed stone placed in the sump pump pits should be wrapped in a geotextile fabric. Alternatively, the crushed stone should be entirely removed after the sump pumps are no longer in use and the sump pump pits should be restored with suitable backfill.

4.8 Temporary Excavations

All excavations to receive human traffic, including utility trenches, basement or footing excavations, or others (i.e. underground storage tanks, etc.), should be constructed in accordance with the OSHA guidelines.

The site soils should generally be considered Type “C” and should have a maximum allowable slope of 1.5 Horizontal to 1 Vertical (1.5H:1V) for excavations less than 20 feet deep. Deeper excavations, if needed, should have a shoring designed by a professional engineer.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of the excavation sides and bottom.

5. REPORT LIMITATIONS

Our analyses and recommendations are based on project information provided to us at the time of this report. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations, and whether our recommendations have been properly implemented in the design.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminants in or around the site.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to 1) make site visits during construction to check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and 2) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our report has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Dore and Whittier Architects, Inc. for the proposed Wildwood Early Childhood Center at the North Intermediate School located at 320 Salem Street Site in Wilmington, Massachusetts as conceived at this time.

6. REFERENCES

In addition to the references included in the text of the report, we used the following references:

American Society of Civil Engineers, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," ASCE/SEI 7-16, 2017.

The Commonwealth of Massachusetts (2024), "The Massachusetts State Building Code, Ninth (10th) Edition."

The Department of Labor, Occupational Safety and Health Administration (1989), "Occupational Safety and Health Standards - Excavations; Final Rule," 20 CFR Part 1926, Subpart P.

USGS Wilmington, MA topographic map from http://mapserver.mytopo.com.

Table 1 - Summary of LGCI's Borings
Proposed Wildwood Early Childcare Center
Wilmington, MA
LGCI Project No. 2437

Boring No.	Ground Surface Elevation (ft.)[1]	Groundwater[2] Depth / **El.** (ft.)	Bottom of Topsoil/ **Asphalt** Depth / **El.** (ft.)	Bottom of Fill Depth / **El.** (ft.)	Bottom of Buried Organic Soil / **Buried Subsoil** Depth / **El.** (ft.)	Bottom of Sand and Gravel Depth / **El.** (ft.)	Bottom of Weathered Rock Depth / **El.** (ft.)	Top of Rock Depth / **El.** (ft.)	Bottom of Boring Depth / **El.** (ft.)
2024 Borings									
B-1	93.0	9.0 / **84.0**	0.6 / **92.4**	6.0 [3]/ **87.0**	- / **-**	19.0 [4]/ **74.0**	- / **-**	- / **-**	19.0 / **74.0**
B-2	94.0	9.0 / **85.0**	0.8 / **93.2**	2.8 / **91.2**	4.0 / **90.0**	19.0 [4]/ **75.0**	- / **-**	- / **-**	19.0 / **75.0**
B-3	95.0	- / **-**	0.7 / **94.3**	2.0 / **93.0**	- / **-**	10.3 [4]/ **84.7**	- / **-**	- / **-**	10.3 / **84.7**
B-4	93.0	9.0 / **84.0**	0.6 / **92.4**	2.0 / **91.0**	- / **-**	11.0 [4]/ **82.0**	- / **-**	- / **-**	11.0 / **82.0**
B-5	94.0	9.0 / **85.0**	0.7 / **93.3**	4.0 / **90.0**	4.4 / **89.6**	10.5 [4]/ **83.5**	- / **-**	- / **-**	10.5 / **83.5**
B-6	94.0	14.0 / **80.0**	2.0 / **92.0**	6.0 / **88.0**	- / **-**	19.0 / **75.0**	19.7 [5]/ **74.3**	- / **-**	19.7 / **74.3**
B-7	92.0	10.0 / **82.0**	0.9 / **91.1**	6.0 / **86.0**	8.0 / **84.0**	20.3 [6]/ **71.7**	- / **-**	- / **-**	20.3 / **71.7**
B-8	94.0	9.0 / **85.0**	- / **-**	0.7 / **93.3**	**4.0** / **90.0**	19.8 [6]/ **74.2**	- / **-**	- / **-**	19.8 / **74.2**
2025 Borings									
B-101-OW	93.0	5.0 / **88.0**	2.0 / **91.0**	9.0 [3]/ **84.0**	- / **-**	22.0 [6]/ **71.0**	- / **-**	- / **-**	22.0 / **71.0**
B-102	94.0	10.0 / **84.0**	1.0 / **93.0**	5.0 / **89.0**	- / **-**	18.5 [4]/ **75.5**	- / **-**	- / **-**	18.5 / **75.5**
B-103	94.0	9.0 / **85.0**	0.7 / **93.3**	2.4 / **91.6**	- / **-**	14.0 [4]/ **80.0**	- / **-**	- / **-**	14.0 / **80.0**
B-104	94.0	- / **-**	**0.7** / **93.3**	2.0 / **92.0**	- / **-**	8.0 [4]/ **86.0**	- / **-**	8.0 [7]/ **86.0**	13.0 / **81.0**
B-105	93.0	10.0 / **83.0**	1.0 / **92.0**	6.5 / **86.5**	- / **-**	22.0 [6]/ **71.0**	- / **-**	- / **-**	22.0 / **71.0**
B-106-OW	94.0	10.0 / **84.0**	- / **-**	0.7 / **93.3**	2.0 / **92.0**	19.0 / **75.0**	20.1 [5]/ **73.9**	- / **-**	20.1 / **73.9**
B-107	93.0	15.0 / **78.0**	2.0 / **91.0**	5.0 / **88.0**	- / **-**	20.1 [6]/ **72.9**	- / **-**	- / **-**	20.1 / **72.9**
B-108-OW	93.0	7.0 / **86.0**	1.1 / **91.9**	2.0 / **91.0**	- / **-**	17.0 [4]/ **76.0**	- / **-**	- / **-**	17.0 / **76.0**
B-109	92.0	7.0 / **85.0**	0.6 / **91.4**	5.0 / **87.0**	- / **-**	22.0 [6]/ **70.0**	- / **-**	- / **-**	22.0 / **70.0**
B-110	93.0	10.0 / **83.0**	1.8 / **91.2**	5.0 / **88.0**	- / **-**	20.0 / **73.0**	21.0 [5]/ **72.0**	- / **-**	21.0 / **72.0**
B-111-OW	93.0	9.0 / **84.0**	0.7 / **92.3**	3.1 / **89.9**	- / **-**	21.0 [6]/ **72.0**	- / **-**	- / **-**	21.0 / **72.0**
B-112	93.0	10.0 / **83.0**	0.8 / **92.2**	3.5 / **89.5**	- / **-**	12.5 [4]/ **80.5**	- / **-**	- / **-**	12.5 / **80.5**
B-113	94.0	10.0 / **84.0**	2.4 / **91.6**	2.7 [3]/ **91.3**	- / **-**	14.0 [6]/ **80.0**	- / **-**	- / **-**	14.0 / **80.0**
B-114	94.0	9.5 / **84.5**	0.8 / **93.2**	2.0 / **92.0**	- / **-**	10.5 [4]/ **83.5**	- / **-**	- / **-**	10.5 / **83.5**
B-115	93.0	10.0 / **83.0**	2.0 / **91.0**	6.0 / **87.0**	- / **-**	20.0 / **73.0**	20.7 [5]/ **72.3**	- / **-**	20.7 / **72.3**
B-116	93.0	9.0 / **84.0**	0.5 / **92.5**	12.0 / **81.0**	- / **-**	14.0 [6]/ **79.0**	- / **-**	- / **-**	14.0 / **79.0**
B-117	94.0	- / **-**	1.0 / **93.0**	2.0 / **92.0**	- / **-**	8.5 [4]/ **85.5**	- / **-**	- / **-**	8.5 / **85.5**
B-118	94.0	9.0 / **85.0**	2.0 / **92.0**	- / **-**	- / **-**	11.3 [4]/ **82.7**	- / **-**	- / **-**	11.3 / **82.7**
B-119	94.0	- / **-**	2.0 / **92.0**	4.0 / **90.0**	- / **-**	12.0 [6]/ **82.0**	- / **-**	- / **-**	12.0 / **82.0**
B-120	92.0	7.0 / **85.0**	2.0 / **90.0**	5.0 / **87.0**	- / **-**	12.0 [6]/ **80.0**	- / **-**	- / **-**	12.0 / **80.0**
B-121	93.0	9.0 / **84.0**	1.5 / **91.5**	5.0 / **88.0**	- / **-**	12.9 [6,8]/ **80.1**	- / **-**	- / **-**	12.9 / **80.1**
B-122	94.0	10.0 / **84.0**	2.0 / **92.0**	6.0 / **88.0**	- / **-**	12.0 [6]/ **82.0**	- / **-**	- / **-**	12.0 / **82.0**
B-123	95.0	10.0 / **85.0**	2.0 / **93.0**	7.8 / **87.2**	- / **-**	11.0 [6]/ **84.0**	- / **-**	- / **-**	11.0 / **84.0**
B-124	102.0	- / **-**	0.8 / **101.2**	2.0 / **100.0**	- / **-**	9.0 [4]/ **93.0**	- / **-**	- / **-**	9.0 / **93.0**
B-125	106.0	- / **-**	0.6 / **105.4**	4.8 / **101.2**	- / **-**	17.0 [6]/ **89.0**	- / **-**	- / **-**	17.0 / **89.0**
B-126	93.0	10.0 / **83.0**	2.0 / **91.0**	10.0 / **83.0**	- / **-**	12.0 [6]/ **81.0**	- / **-**	- / **-**	12.0 / **81.0**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.
2. Groundwater was measured during drilling, at the end of drilling, after drilling, or based on sample moisture whichever is shallower.
3. A layer of silt was encountered beneath the fill in boring B-1 and B-101-OW, between depths of 6 to 9 feet and 9 to 15.4 feet, respectively. In boring B-1, a layer of clay was encountered beneath the silt between depths of 9 and 14 feet.
4. Boring terminated due to split spoon / auger refusal on possible boulder or rock in the sand and gravel layer.
5. Boring terminated in the weathered rock.
6. Boring terminated in the sand and gravel layer.
7. Boring terminated in rock.
8. Traces of swamp deposits observed in the sand and gravel layer in boring B-121.
9. "-" means the groundwater or layer was not encountered.

Table 2 - Summary of LGCI's Test Pits
Proposed Wildwood Early Childcare Center
Wilmington, MA
LGCI Project No. 2437

Test Pit No.	Ground Surface Elevation (ft.)[1]	Groundwater[2] Depth / **El.** (ft.)	Bottom of Topsoil/ **Asphalt** Depth / **El.** (ft.)	Bottom of Fill Depth / **El.** (ft.)	Bottom of Swamp Deposits / **Buried Subsoil** Depth / **El.** (ft.)	Bottom of Buried Organic Soil Depth / **El.** (ft.)	Bottom of Sand and Gravel Depth / **El.** (ft.)	Bottom of Silt Depth / **El.** (ft.)	Bottom of Sand Depth / **El.** (ft.)	Bottom of Test Pit Depth / **El.** (ft.)
2024 Explorations										
TP-1	92.0	9.5 / **82.5**	1.5 / **90.5**	7.0 / **85.0**	10.0 / **82.0**	- / **-**	- / **-**	- / **-**	11.0 [5]/ **81.0**	11.0 / **81.0**
TP-2	94.0	- / **-**	0.7 / **93.3**	5.5 / **88.5**	- / **-**	- / **-**	9.0 [3]/ **85.0**	- / **-**	- / **-**	9.0 / **85.0**
TP-2A	94.0	9.5 / **84.5**	1.5 / **92.5**	7.0 / **87.0**	- / **-**	- / **-**	11.3 [3]/ **82.7**	- / **-**	- / **-**	11.3 / **82.7**
TP-3	94.0	- / **-**	0.8 / **93.2**	2.3 / **91.7**	- / **-**	- / **-**	8.0 [3]/ **86.0**	- / **-**	- / **-**	8.0 / **86.0**
TP-4	95.0	- / **-**	1.0 / **94.0**	2.0 / **93.0**	**3.2** / **91.8**	**-** / **-**	9.0 [3]/ **86.0**	- / **-**	- / **-**	9.0 / **86.0**
2025 Explorations										
TP-101	100.0	- / **-**	0.4 / 99.6	4.6 / **95.4**	- / **-**	- / **-**	9.8 [3, 6]/ **90.2**	- / **-**	- / **-**	9.8 / **90.2**
TP-102	100.0	- / **-**	0.3 / **99.7**	4.8 / **95.2**	- / **-**	- / **-**	10.0 [3]/ **90.0**	- / **-**	- / **-**	10.0 / **90.0**
TP-103	94.0	9.9 / **84.1**	1.3 / **92.7**	6.3 / **87.7**	- / **-**	- / **-**	10.1 [3]/ **83.9**	- / **-**	- / **-**	10.1 / **83.9**
TP-104	94.0	- / **-**	**0.3 / 93.7**	1.3 / **92.7**	- / **-**	- / **-**	5.0 [3]/ **89.0**	- / **-**	- / **-**	5.0 / **89.0**
TP-105	94.0	10.8 / **83.2**	**0.4 / 93.6**	2.1 / **91.9**	- / **-**	2.4 / **91.6**	11.0 [3]/ **83.0**	- / **-**	- / **-**	11.0 / **83.0**
TP-106	94.0	- / **-**	**0.3 / 93.7**	3.2 [7]/ **90.8**	- / **-**	- / **-**	- / **-**	- / **-**	6.1 [5]/ **87.9**	6.1 / **87.9**
TP-107	94.0	10.0 / **84.0**	0.6 / **93.4**	4.6 / **89.4**	- / **-**	- / **-**	10.5 [3]/ **83.5**	- / **-**	- / **-**	10.5 / **83.5**
TP-108	94.0	8.9 / **85.1**	0.8 / **93.2**	1.6 / **92.4**	- / **-**	2.1 / **91.9**	9.5 [3]/ **84.5**	- / **-**	7.5 [9]/ **86.5**	9.5 / **84.5**
TP-109	93.0	9.3 / **83.7**	0.5 / **92.5**	2.5 / **90.5**	- / **-**	2.9 / **90.1**	9.6 [3]/ **83.4**	- / **-**	- / **-**	9.6 / **83.4**
TP-110	92.0	8.0 / **84.0**	1.1 / **90.9**	5.0 / **87.0**	- [8]/ **-**	7.3 / **84.7**	- / **-**	12.0 [4]/ **80.0**	- / **-**	12.0 / **80.0**
TP-111	92.0	9.0 / **83.0**	1.1 / **90.9**	5.0 / **87.0**	- / **-**	7.0 / **85.0**	- / **-**	- / **-**	11.0 [5]/ **81.0**	11.0 / **81.0**
TP-112	93.0	5.8 / **87.2**	0.8 / **92.2**	4.5 / **88.5**	- / **-**	5.1 / **87.9**	- / **-**	- / **-**	11.5 [5]/ **81.5**	11.5 / **81.5**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.
2. Groundwater was measured during drilling, at the end of drilling, after drilling, or based on sample moisture whichever is shallower.
3. Test Pit terminated in the sand and gravel layer.
4. Test Pit terminated in the silt layer.
5. Test Pit terminated in the sand layer.
6. A layer of silt was encountered in the sand and gravel of TP-101 from a depth of 7.0 feet to 8.0 feet beneath ground surface.
7. A layer of subbase was encountered in TP-105 from a depth of 0.3 feet to 0.8 feet beneath ground surface.
8. Trace of swamp deposits encountered in the silt layer in TP-110.
9. The sand layer was encountered on top of the sand and gravel layer.
10. "-" means the groundwater or layer was not encountered.

N

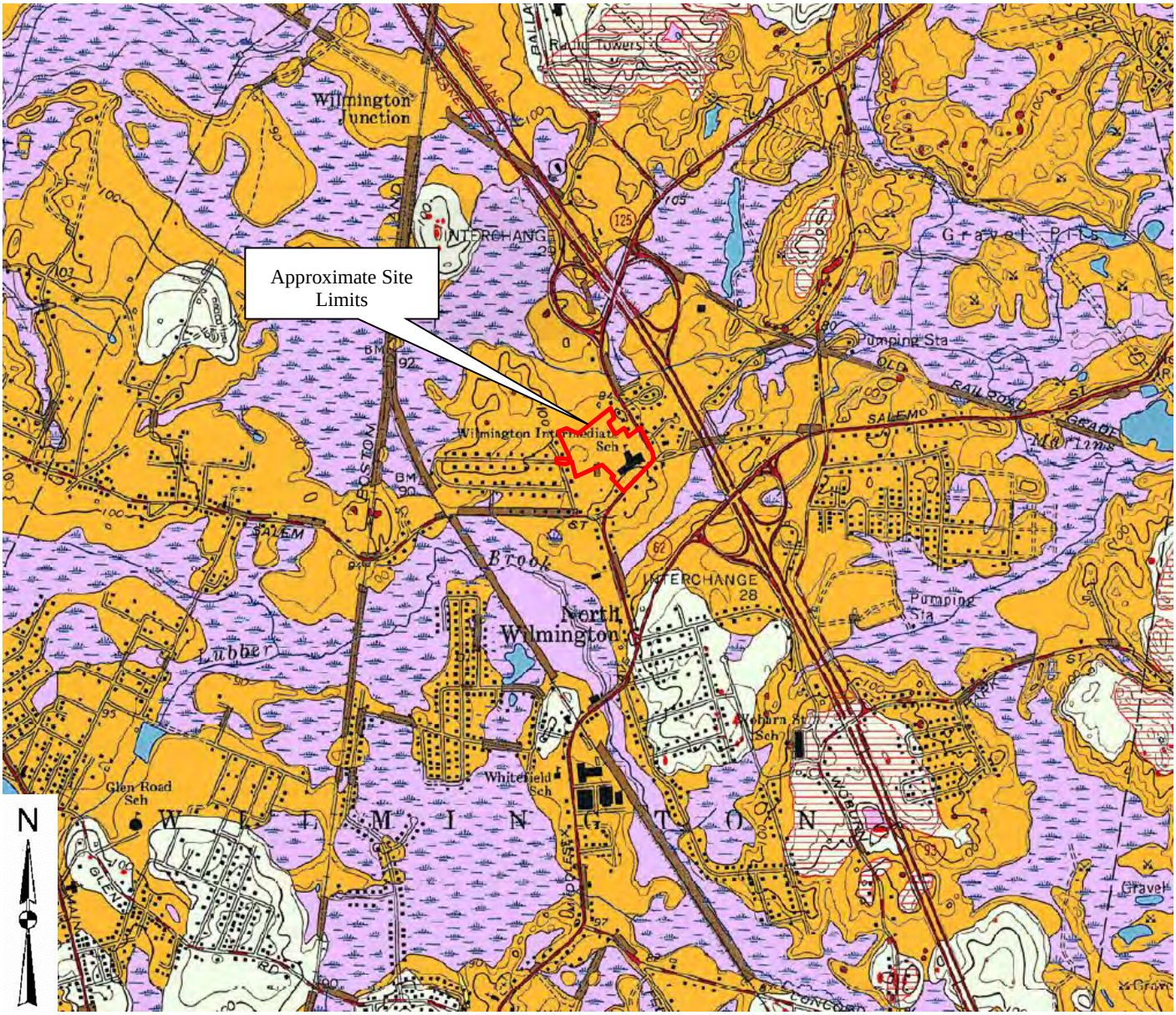
Contour Intervals: 10 feet

0.4 mi

Note: Figure based on USA Topo Maps of Wilmington, MA *ngmdb.usgs.gov/topoview/viewer*

Client:	Project:	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childhood Center	Figure 1 – Site Location Map

	Project Location:	LGCI Project No.:	Date:
LGCI Lahlaf Geotechnical Consulting, Inc.	Wilmington, MA	2437	Jan. 2026



Swamp deposits—Organic muck and peat that contain minor amounts of sand, silt, and clay, are stratified and poorly sorted, and occur in swamps and freshwater marshes, in kettle depressions, or in poorly drained areas. Unit is shown only where deposits are estimated to be at least 3 ft thick; most deposits are less than 10 ft thick. Swamp deposits overlie glacial deposits or bedrock. They locally overlie glacial till even where they occur within thin glacial meltwater deposits

Coarse deposits consist of *gravel deposits*, *sand and gravel deposits*, and *sand deposits*, not differentiated in this report. *Gravel deposits* are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. *Sand and gravel deposits* occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. *Sand deposits* are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay

Note: Figure based on map titled: "Surficial Materials Map of Wilmington Quadrangle, Massachusetts," compiled by Byron D. Stone, Janet R. Stone, and Mary L. DiGiacomo-Cohen, Scientific Investigation Map 3402, Quadrangle 113 – Wilmington, 2018.

Client:	Project:	Figure 2 – Surficial Geologic Map	
Dore and Whittier Architects, Inc.	Proposed Wildwood Early Childhood Center		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Jan. 2026

Legend

Approximate locations of the borings advanced by Soil X, Corp. of Leominster, MA, from November 12 to 19, 2025, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

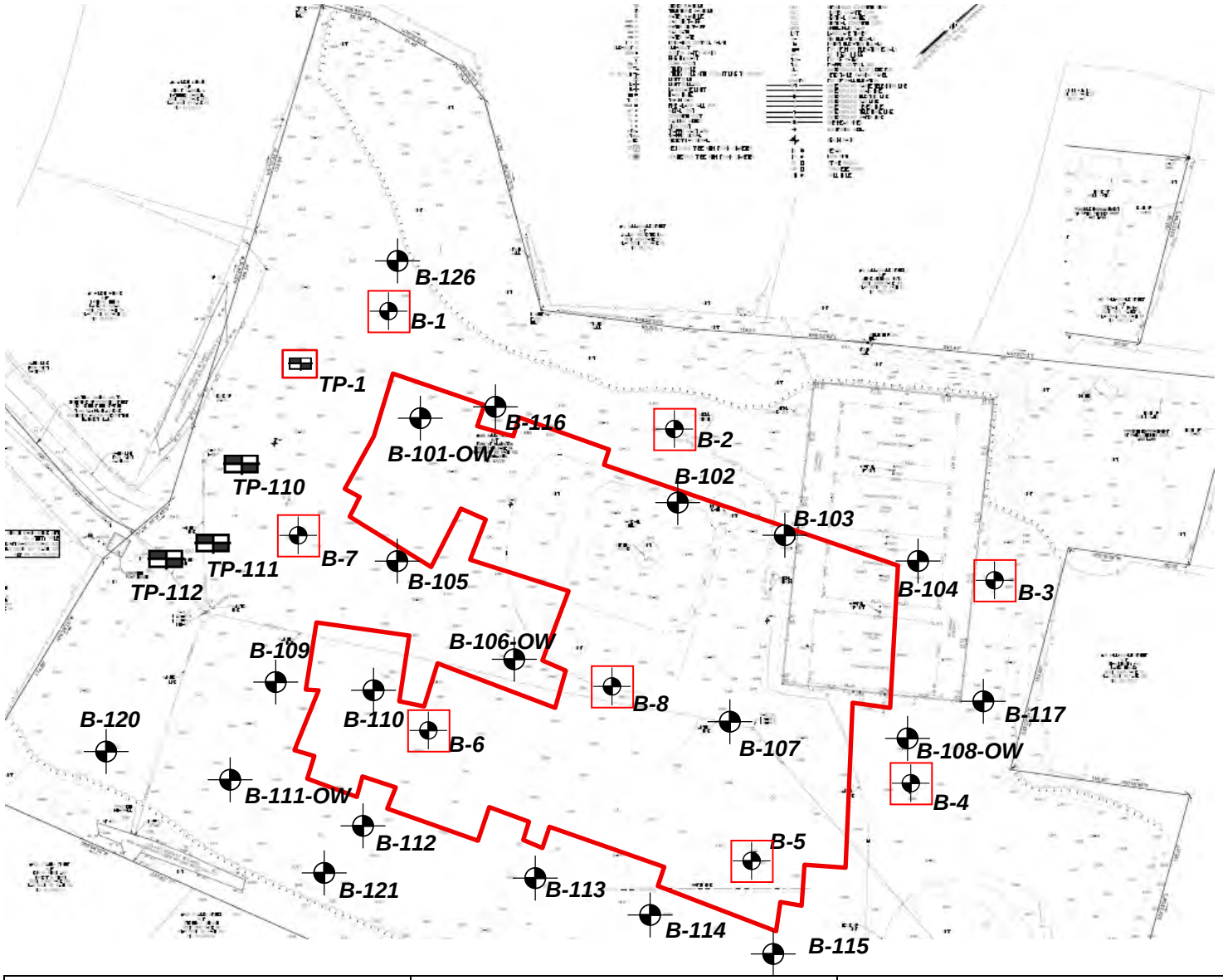
Approximate location of borings advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 28 and October 29, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

Approximate locations of the test pits advanced by Saunders Construction of Reading, MA, from December 29 to 30, 2025, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

Approximate location of test pits advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 30, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

Approximate Scale (ft.)

40 20 0 40 80 120



Note

Figure and proposed site limitations based on drawing C2.00 titled: "Layout and Materials Plan," prepared by Dore & Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore & Whittier Architects, Inc. via e-mail on December 4, 2025.

Client: Dore & Whittier Architects, Inc.	Project: Proposed Wildwood Early Childcare Center	Figure 3A – Exploration Location Plan - North	
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Jan. 2026

Legend

Approximate locations of the borings advanced by Soil X, Corp. of Leominster, MA, from November 12 to 19, 2025, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

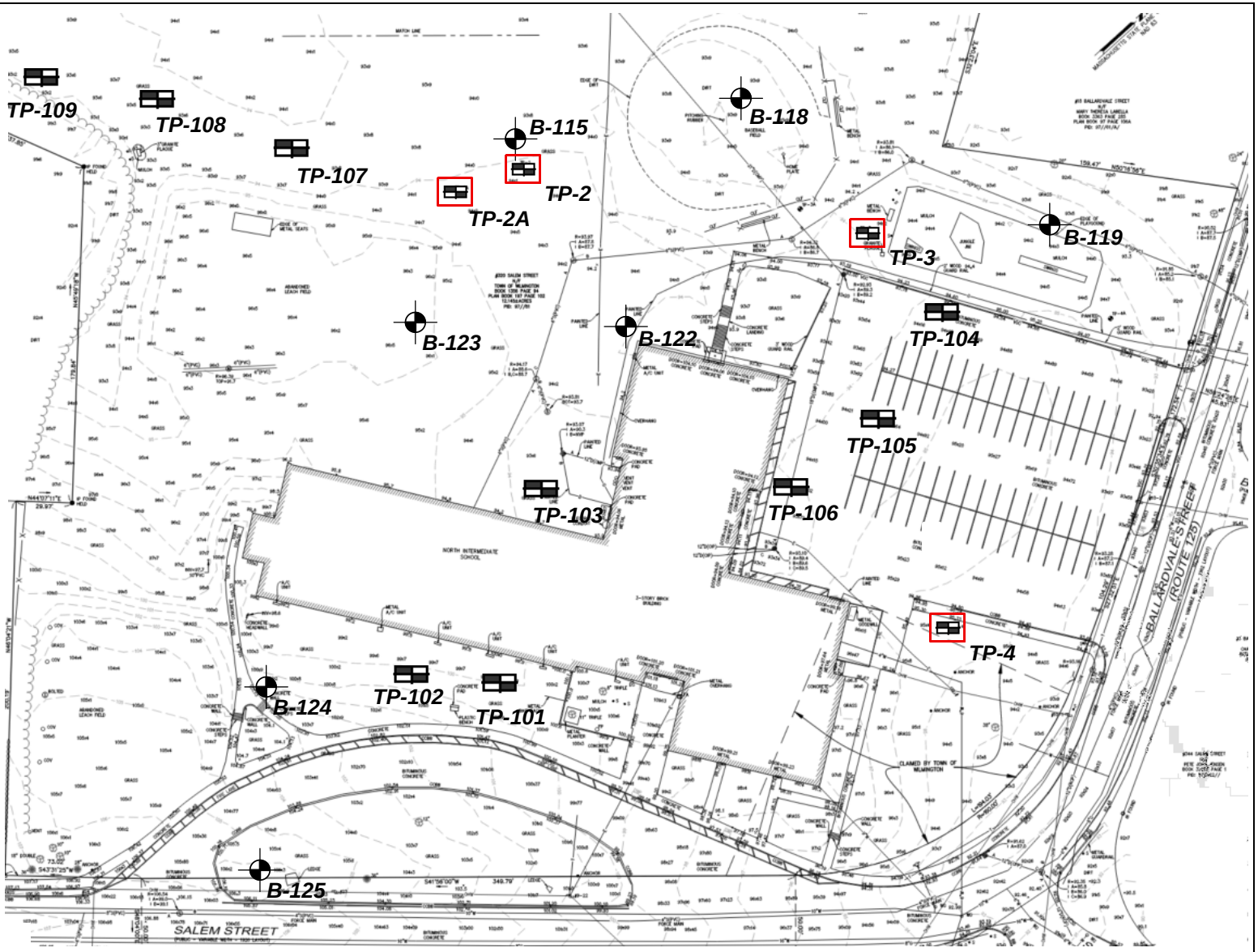
Approximate locations of the test pits advanced by Saunders Construction of Reading, MA, from December 23 to 30, 2025, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

Approximate location of test pits advanced by Soil Exploration, Corp. (Soil X) of Leominster, MA on October 30, 2024, and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

Approximate Scale (ft.)

20 0 20 40 80



Note

Figure based on drawing EX-1.1 titled: "Existing Conditions Plan," prepared by Dore & Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore & Whittier Architects, Inc. via e-mail on December 4, 2025.

Client: Dore & Whittier Architects, Inc.	Project: Proposed Wildwood Early Childcare Center	Figure 3B – Exploration Location Plan - South	
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wilmington, MA	LGCI Project No.: 2437	Date: Jan. 2026

Appendix A – LGCI's Boring Logs

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-1
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near NW corner of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 19 ft.
WEATHER: 60's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 9.5 ft. / El. 83.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.6 / 92.4	S1 - Top 8": Topsoil Bot. 9": Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, 15-20% fine to coarse subangular gravel, brown, moist
	90.0	2	S1	3-8-15-38 (23)	24/17		Fill		S2 - Silty SAND with Gravel (SM), fine to coarse, ~20% fines, 35-40% fine to coarse subangular gravel, brown, moist (sieve performed)
5		4	S2	42-28-26-18 (54)	24/12				S3 - No recovery
		6	S3	21-13-10-4 (23)	24/0			6.0 / 87.0	
	85.0	8	S4	10-8-5-3 (13)	24/6		Silt	9.0 / 84.0	S4 - SILT (ML), slightly plastic, 5-10% fine sand, gray, moist
10		9	S5	4-7-5-6 (12)	24/24		Clay		S5 - Lean CLAY with Sand (CL), slightly plastic, 15-20% fine to coarse sand, gray, wet
	80.0	11						14.0 / 79.0	
15		14	S6	6-11-10-9 (21)	24/12		Sand and Gravel		S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, 20-25% fine to coarse subangular gravel, brown, wet
	75.0	16							
		19	S7	100/0"	0/0	1		19.0	REMARK 1: Split spoon and auger refused on possible large boulder or rock at a depth of 19.0 feet. S7 - No recovery Bottom of borehole at 19.0 feet. Backfilled borehole with drill cuttings.
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-2
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near NW side of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 19 ft.
WEATHER: 50's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 13.0 ft. / El. 81.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	4-7-9-10 (16)	24/15		Topsoil	0.8 / 93.2	S1 - Top 10": Topsoil Bot. 5": Silty SAND with Gravel (SM), fine to medium, trace coarse, 15-20% fines, 20-25% fine to coarse subangular gravel, trace of organic soil, trace of roots, brown, moist
		2	S2	9-8-8-4 (16)	24/13		Fill	2.8 / 91.2	S2 - Top 10": Silty SAND (SM), mostly fine to medium, ~15% fines, ~10% fine to coarse subangular gravel, trace of organic soil, light brown to brown, moist
	90.0	4	S3	5-5-10-10 (15)	24/19		Buried Organic Soil	4.0 / 90.0	Bot. 3": Silty SAND (SM), fine, 40-45% fines, trace of roots, black, moist (mostly organic soil) S3 - Poorly Graded SAND (SP), fine to medium, 0-5% fines, light brown, moist
5		6	S4	13-13-17-16 (30)	24/17				S4 - Similar to S3, gray to light brown
	85.0	9	S5	10-15-13-11 (28)	24/18				▽ S5 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 5-10% fines, 15-20% fine to coarse subangular gravel, brown to orange, wet
10		11					Sand and Gravel		
	80.0	14	S6	19-20-21-29 (41)	24/14				▼ S6 - Silty SAND (SM), fine to medium, ~25% fines, 5-10% fine subangular gravel, gray, wet
15		16							
	75.0	19	S7	100/0"	0/0	1		19.0	REMARK 1: Split spoon and auger refusal at depth of 19 feet on possible boulder or rock. S7 - No recovery Bottom of borehole at 19.0 feet. Backfilled borehole with drill cuttings.
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-3
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near northern corner of prop. building
COORDINATES: NA
SURFACE El.: 95 ft. (see note 1) **TOTAL DEPTH:** 10.3 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.7	S1 - Top 8": Topsoil
			S1	3-4-8-8 (12)	24/16		Fill	94.3	Bot. 8": Well Graded SAND (SW), fine to coarse, 0-5% fines, ~5% fine subangular gravel, light brown to orange, moist
		2	S2	12-41-26-18 (67)	24/10			2.0 93.0	S2 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 30-35% fine to coarse subangular gravel, light brown, moist
		4	S3	11-8-12-16 (20)	24/11				S3 - Silty SAND (SM), mostly fine to medium, 15-20% fines, ~10% fine to coarse subrounded gravel, light brown to orange, moist
5	90.0	6	S4	26-20-22-80/2" (42)	20/0	1	Sand and Gravel		REMARK 1: Auger chattering between depths of 6.0 to 9.0 feet. S4 - No recovery
		7.7							
		9	S5	36-70-20/3" (90/9")	15/4				S5 - Silty SAND with Gravel (SM), mostly fine to medium, ~15% fines, 30-35% fine to coarse subangular gravel, gray, moist
10	85.0	10.3				2		10.3	REMARK 2: Split spoon and auger refusal encountered at depth of 10.3 feet on possible boulder or rock. Bottom of borehole at 10.3 feet. Backfilled borehole with drill cuttings.
15	80.0								
20	75.0								
25	70.0								

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-4
PAGE 1 OF 1

LGCI
Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SE corner of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.6 / 92.4	S1 - Top 8": Topsoil
			S1	3-8-10-20 (18)	24/15		Fill		Bot. 7": Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subangular gravel, light brown to orange, moist
		2				1		2.0 / 91.0	REMARK 1: Drill chattering observed from depth of 2.0 feet on possible boulder.
	90.0		S2	29-26-33-70/3" (59)	21/11				S2 - Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, 35-40% fine to coarse subangular gravel, light brown, moist (sieve performed)
		3.8							
5		4	S3	15-17-36-52 (53)	24/16				S3 - Similar to S2, 25-30% fine to coarse subangular gravel, light brown to gray
		6	S4	16-29-29-39 (58)	24/11		Sand and Gravel		S4 - Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, 15-20% fine to coarse subangular gravel, brown, moist
	85.0	8							
		9	S5	18-82/4" (82/4")	10/5				S5 - Similar to S4, wet
10		9.8							
						2		11.0	REMARK 2: Split spoon and auger refusal encountered at depth of 11.0 feet on possible large boulder or rock.
									Bottom of borehole at 11.0 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-5
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SE corner of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 10.5 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 85.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.7	S1 - Top 9": Topsoil
		2	S1	3-5-5-5 (10)	24/14		Fill	93.3	Bot. 5": Well Graded SAND with Silt (SW-SM), fine to coarse, 10-15% fines, trace of organic soil, trace of roots, dark brown, moist
			S2	4-4-3-3 (7)	24/3				S2 - Well Graded SAND with Silt (SW-SM), fine to coarse, 10-15% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace of roots, dark brown, moist
	90.0	4				1		4.0	REMARK 1: Split spoon bouncing at depth of 4.0 feet. Borehole offset 4.0 feet east.
5			S3	10-16-22-20 (38)	24/18		Buried Organic Soil	90.0 4.4 89.6	S3 - Top 4": Silty SAND (SM), fine to medium, 25-30% fines, trace of organic soil, trace of roots, dark brown, moist
		6				2			Bot. 14": Silty SAND (SM), fine to coarse, 15-20% fines, 20-25% fine subangular gravel, brown, moist
			S4	21-33-24-17 (57)	24/12		Sand and Gravel		REMARK 2: Drill chattering observed on possible boulders from depth of 6.0 feet.
		8							S4 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 35-40% fine to coarse subangular gravel, brown to gray, moist
	85.0	9							
		9.2	S5	100/2"	2/1				S5 - Silty SAND (SM), fine to coarse, 15-20% fines, 20-25% fine subangular gravel, brown, wet (little to no recovery)
10									
		10.5	S6	100/0"	0/0	3		10.5	REMARK 3: Auger and split spoon refusal on possible boulder or rock at depth of 10.5 feet. Due to time constraint boring was terminated.
									S6 - No recovery
									Bottom of borehole at 10.5 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-6
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near southern face of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 19.8 ft.
WEATHER: 60's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 14.0 ft. / El. 80.0 ft. Based on sample moisture
AT END OF DRILLING: 18.0 ft. / El. 76.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	2-2-6-11 (8)	24/16		Topsoil	2.0	S1 - Topsoil
		2						92.0	
			S2	12-9-12-17 (21)	24/14		Fill		S2 - Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, ~15% fine to coarse subangular gravel, orange to light brown, moist (possibly reworked)
	90.0	4							
5			S3	13-19-21-18 (40)	24/15				S3 - Similar to S2
		6						6.0	
			S4	15-13-22-23 (35)	24/17			88.0	S4 - Silty SAND (SM), fine to coarse, 15-20% fines, 0-5% fine to coarse subangular gravel, brown, moist
		8							
	85.0	9				1			REMARK 1: Drill chattering observed on possible boulders at depth of 9.0 feet.
10			S5	13-22-80/3" (102/9")	15/13				S5 - Similar to S4
		10.3					Sand and Gravel		
	80.0	14							▽
15			S6	14-17-26-35 (43)	24/21				S6 - Similar to S4, wet
		16							
									▼
	75.0	19						19.0	
			S7	22-80/3" (80/3")	9/4		Weathered Rock	75.0	S7 - Silty SAND with Gravel (SM), fine to coarse, 15-20% fines, 35-40% fine to coarse subangular gravel, trace of weathered rock, black to brown, wet
20		19.8						19.8	Bottom of borehole at 19.8 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

BORING LOG

B-7
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/29/24 **DATE COMPLETED:** 10/29/24
BORING LOCATION: Near SW corner of prop. building
COORDINATES: NA
SURFACE El.: 92 ft. (see note 1) **TOTAL DEPTH:** 20.3 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 82.0 ft. Based on sample moisture
AT END OF DRILLING: 10.5 ft. / El. 81.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	2-3-7-9 (10)	24/14		Topsoil	0.9	S1 - Top 11": Topsoil
	90.0	2	S2	8-7-10-10 (17)	24/0		Fill	91.1	Bot. 3": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, trace coarse, ~10% fines, 20-25% fine to coarse subangular gravel, brown, moist S2 - No recovery
		4	S3	14-10-5-6 (15)	24/0				S3 - No recovery
5		6	S4	17-17-23-24 (40)	24/4		Buried Organic Soil	6.0 86.0	S4 - Silty SAND (SM), fine to medium, 25-30% fines, 0-5% fine to coarse subangular gravel, trace of organic soil, dark brown to black, moist
	85.0	8	S5	11-11-12-11 (23)	24/16			8.0 84.0	S5 - Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, gray, moist
10		10	S6	7-10-15-15 (25)	24/15				S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 15-20% fine to coarse subangular gravel, brown, wet
	80.0	12					Sand and Gravel		
		14	S7	9-14-12-43/3" (26)	21/12				S7 - Similar to S6, 25-30% fine to coarse subangular gravel
15		15.8							
	75.0								
		19	S8	24-26-75/3" (101/9")	15/11				S8 - Silty SAND (SM), fine to coarse, 15-20% fines, ~5% fine subangular gravel, brown, wet
20		20.3						20.3	
									Bottom of borehole at 20.3 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-8
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/28/24 **DATE COMPLETED:** 10/28/24
BORING LOCATION: Near center of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 19.8 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 16.5 ft. / El. 77.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: BH **CHECKED BY:** SG

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	4-5-6-11 (11)	24/20		Fill	0.7 93.3	S1 - Top 9": Silty SAND (SM), fine, 25-30% fines, trace of roots, brown, moist Mid. 10": Silty SAND (SM), fine to medium, 30-35% fines, 0-5% fine subangular gravel, trace of organic soil, trace of roots, black, moist
		2	S2	8-6-8-8 (14)	24/16		Subsoil		Bot. 1": Silty SAND with Gravel (SM), fine to coarse, ~15% fines, ~15% fine to coarse subangular gravel, trace of organic soil, orange, moist S2 - Top 10": Silty SAND (SM), fine, 25-30% fines, ~5% fine subangular gravel, brown, moist
	90.0	4						4.0 90.0	Bot. 6": Silty SAND (SM), fine to coarse, 15-20% fines, 5-10% fine to coarse subangular gravel, light brown, moist
5			S3	12-18-25-24 (43)	24/15				S3 - Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, ~30% fine to coarse subangular gravel, light brown, moist
		6	S4	24-21-23-29 (44)	24/18				S4 - Similar to S3, ~15% fine subangular gravel
		8							
	85.0	9	S5	18-82	12/8				S5 - Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, 15-20% fine to coarse subangular gravel, gray to olive, wet
10		10					Sand and Gravel		
	80.0	14	S6	20-25-25-45 (50)	24/14				S6 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 25-30% fine to coarse subangular gravel, olive to gray, wet
15		16							
	75.0	19	S7	10-95/4" (95/4")	10/8				S7 - Similar to S6
20		19.8				1		19.8	REMARK 1: Split spoon refusal encountered at depth of 19.8 feet on possible boulder or rock. Bottom of borehole at 19.8 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-101-OW
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/14/25 **DATE COMPLETED:** 11/14/25
BORING LOCATION: Near NW corner of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 22 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 5.0 ft. / El. 88.0 ft. Based on sample moisture
AT END OF DRILLING: 5.0 ft. / El. 88.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil		S1 - Topsoil
		2	S1	1-4-9-11 (13)	24/12			2.0	
	90.0		S2	15-10-10-9 (20)	24/7		Fill	91.0	S2 - Silty SAND with Gravel (SM), fine to medium, ~20% fines, 20-25% fine to coarse subrounded gravel, trace of organic odor, brown, moist
		4				1			REMARK 1: Possible perched water encountered at depth of 4.0 feet.
5		5	S3	3-5-5-7 (10)	24/8				S3 - Silty SAND (SM), fine, 25-30% fines, trace of organic soil, trace of roots, brown, wet
		7	S4	11-11-10-12 (21)	24/5				S4 - Silty SAND (SM), fine, 25-30% fines, trace of organic soil, trace of roots, brown, wet
	85.0	9	S5	11-12-14-14 (26)	24/17			9.0	
10		11					Silt	84.0	S5 - SILT (ML), non plastic, gray, wet
	80.0								
15		15	S6	8-9-11-11 (20)	24/18			15.4	S6 - Top 5": SILT (ML), non plastic, gray, wet
		17					Sand and Gravel	77.6	Bot. 13": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 10-15% fine subrounded gravel, brown, wet
	75.0								
20		20	S7	6-12-15-16 (27)	24/15				S7 - Well Graded SAND with Silt, (SW-SM), fine to coarse, 10-15% fines, 10-15% fine to coarse subrounded gravel, brown, wet
		22						22.0	
	70.0								Bottom of borehole at 22.0 feet. Installed groundwater observation well.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-102
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/14/25 **DATE COMPLETED:** 11/14/25
BORING LOCATION: Near northern edge of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 18.5 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 11.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	1.0	S1 - Top 12": Topsoil
		2	S1	3-7-15-12 (22)	24/19		Fill	93.0	Bot. 7": Silty SAND (SM), fine, 15-20% fines, 5-10% fine to coarse subrounded gravel, trace of organic odor, brown, moist
			S2	11-10-10-9 (20)	24/6				S2 - Silty SAND (SM), fine, 15-20% fines, 5-10% fine to coarse subrounded gravel, trace of organic odor, brown, moist
	90.0	4							
5		5	S3	7-9-12-14 (21)	24/19			5.0	
		7					Sand and Gravel	89.0	S3 - Poorly Graded SAND with Silt and Gravel (SP-SM), 5-10% fines, 15-20% fine to coarse subrounded gravel, brown, moist
	85.0								
10		10	S4	5-11-14-18 (25)	24/17				S4 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 15-20% fine to coarse subrounded gravel, brown, wet
		12							
	80.0								
15		15	S5	13-13-11-22 (24)	24/13				S5 - Silty SAND with Gravel (SM), fine, 25-30% fines, 20-25% fine to coarse subangular gravel, gray, wet
		17							
	75.0					1		18.5	REMARK 1: Auger refusal encountered at depth of 18.5 feet on possible large boulder or rock. Boring terminated.
20									Bottom of borehole at 18.5 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-103
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/17/25 **DATE COMPLETED:** 11/17/25
BORING LOCATION: Near northern edge of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 14 ft.
WEATHER: 30's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 85.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.7 93.3	S1 - Top 7": Topsoil
		2	S1	3-4-10-13 (14)	24/13		Fill	2.4 91.6	Bot. 6": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic odor, brown, moist
	90.0	4	S2	11-13-17-11 (30)	24/22				S2 - Top 5": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15%fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic odor, brown, moist
5		5							Bot. 17": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 20-25% fine to coarse subrounded gravel, brown, moist
		7	S3	18-23-19-22 (42)	24/17		Sand and Gravel		S3 - Poorly Graded SAND with Gravel (SP), fine to medium, 0-5% fines, 25-30% fine to coarse subrounded gravel, orange-brown, moist
	85.0								
10		10	S4	27-35-42-41 (77)	24/14				S4 - Silty SAND with Gravel (SM), fine, 15-20% fines, 15-20% fine to coarse subrounded gravel, brown, wet
		12				1			REMARK 1: Drill rig chattering encountered between depths of 13.0 feet and 14.0 feet.
	80.0					2		14.0	REMARK 2: Auger refusal encountered at depth of 14.0 feet on possible large boulder or rock. Boring terminated.
15									Bottom of borehole at 14.0 feet. Backfilled borehole with drill cuttings.
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-104
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/17/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: Near NE corner of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 13 ft.
WEATHER: 30's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: HSA (4-1/4" I.D.) then 3-inch casing
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Asphalt	0.7	S1 - Top 8": Asphalt
		2	S1	12-14-14-17 (28)	24/16		Fill	93.3 / 2.0	Bot. 8": Poorly Graded SAND with Silt and Gravel (SP-SM), fine, 10-15% fines, 15-20% fine to coarse subrounded gravel, brown, moist
	90.0	4	S2	20-22-27-23 (49)	24/20		Sand and Gravel	92.0	S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 20-25% fine to coarse subrounded gravel, brown, moist
5		5	S3	21-27-20-15 (47)	24/17				S3 - Silty SAND with Gravel (SM), fine, 15-20% fines, 20-25% fine to coarse subrounded gravel, brown, moist
		7				1			REMARK 1: Drill rig chattering encountered between depths of 7.0 feet and 8.0 feet.
		8				2		8.0	REMARK 2: Auger refusal encountered at depth of 8.0 feet on rock. Cored rock between depths of 8.0 feet and 13.0 feet.
	85.0		C1		60/60		Rock	86.0	C1 - Min./ft.: 4.0, 4.0, 3.0, 3.5, 4.0 REC. = 60"/60" = 100.00% RQD = 53"/60" = 88.33% Hard, slightly weathered, slightly fractured, medium-grained, gray, GRANITE
10									
		13						13.0	
	80.0								Bottom of borehole at 13.0 feet. Backfilled borehole with drill cuttings.
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-105
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/13/25 **DATE COMPLETED:** 11/13/25
BORING LOCATION: Near western portion of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 22 ft.
WEATHER: 40's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 12.0 ft. / El. 81.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	1-3-13-27 (16)	24/14		Topsoil	1.0	S1 - Top 12": Topsoil
	90.0	2	S2	38-28-18-12 (46)	24/0		Fill	92.0	Bot. 2": Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine subrounded gravel, gray-brown, moist S2 - No recovery, auger cuttings indicate material similar to S1 Bot. 2"
5		4							
		5	S3	4-4-7-20 (11)	24/20				S3 - Top 18": Poorly Graded SAND with Silt (SP-SM), fine, 5-10% fines, gray-brown, moist
	85.0	7						6.5	
							Sand and Gravel	86.5	Bot. 2": Poorly Graded SAND with Gravel (SP), fine to medium, trace coarse, 0-5% fines, 15-20% fine subrounded gravel, orange-brown, moist
10		10	S4	8-8-7-9 (15)	24/16				S4 - Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, 0-5% fine subrounded gravel, orange-brown, wet
	80.0	12							
15		15	S5	8-10-14-50 (24)	24/15				S5 - Top 3": Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, 0-5% fine subrounded gravel, orange-brown, wet Bot. 12": Silty SAND (SM), fine to medium, 15-20% fines, 10-15% fine to coarse subangular gravel, gray, wet
	75.0	17							
20		20	S6	8-7-6-12 (13)	24/16				S6 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 10-15% fine subangular gravel, gray, wet
		22						22.0	
	70.0								Bottom of borehole at 22.0 feet. Backfilled borehole with drill cuttings.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

BORING LOG

B-106-OW
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/13/25 **DATE COMPLETED:** 11/13/25
BORING LOCATION: Near center of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 20.1 ft.
WEATHER: 50's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 11.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Fill	0.7 / 93.3	S1 - Top 8": Silty SAND (SM), fine, 15-20% fines, brown, moist Bot. 8": Silty SAND (SM), fine to medium, 25-30% fines, trace of organic soil, black, moist (buried organic soil)
		2	S1	2-4-4-12 (8)	24/16		Buried Organic Soil	2.0 / 92.0	
	90.0	4	S2	15-14-21-25 (35)	24/16				S2 - Poorly Graded SAND with Gravel (SP), fine to medium, trace coarse, 0-5% fines, 15-20% fine subrounded gravel, orange-brown, moist
5		5	S3	17-22-22-60 (44)	24/17				S3 - Similar to S2
		7				1			REMARK 1: Auger grinding encountered between depths of 7.0 feet and 10.0 feet.
	85.0								
10		10	S4	20-23-23-28 (46)	24/18		Sand and Gravel		S4 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine to coarse subangular gravel, gray-brown, wet
		12							
	80.0								
15		15	S5	11-10-12-14 (22)	24/17	2			REMARK 2: Auger grinding encountered between depths of 15.0 feet and 20.0 feet. S5 - Silty SAND (SM), fine to medium, trace coarse, 15-20% fines, 5-10% fine to coarse subangular gravel, brown, wet
		17							
	75.0							19.0 / 75.0	
						3	Weathered Rock		REMARK 3: Strata change assumed based on drilling effort.
20		20	S6	60/0"	0/0			20.1	S6 - No recovery, piece of what appears to be weathered rock stuck in tip of split spoon Bottom of borehole at 20.1 feet. Installed groundwater observation well.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-107
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/14/25 **DATE COMPLETED:** 11/14/25
BORING LOCATION: Near eastern portion of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 20.1 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 15.0 ft. / El. 78.0 ft. Based on sample moisture
AT END OF DRILLING: 16.0 ft. / El. 77.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
		2	S1	3-4-14-14 (18)	24/8		Topsoil	2.0	S1 - Topsoil
	90.0		S2	21-20-49-45 (69)	24/5		Fill	91.0	S2 - Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, 45-50% fine to coarse subrounded gravel, brown, moist (sieve performed)
5		4						5.0	
		5	S3	12-40-54-32 (94)	24/16			88.0	S3 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 20-25% fine to coarse subangular gravel, brown, moist
	85.0	7							
10		10	S4	6-8-14-13 (22)	24/13				S4 - Silty SAND (SM), fine, 20-25% fines, 10-15% fine to coarse subrounded gravel, brown, moist
	80.0	12					Sand and Gravel		
15		15	S5	22-11-26-15 (37)	24/12				S5 - Silty SAND with Gravel (SM), fine, 30-35% fines, 20-25% fine to coarse subrounded gravel, orange, wet
	75.0	17				1			REMARK 1: Auger grinding encountered at depth of 19.0 feet.
20		20	S6	60/0"	0/0			20.1	S6 - No recovery
	70.0								Bottom of borehole at 20.1 feet. Backfilled borehole with drill cuttings.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-108-OW
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/18/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: Near eastern edge of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 17 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 12.0 ft. / El. 81.0 ft. Based on sample moisture
AT END OF DRILLING: 7.0 ft. / El. 86.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	5-4-7-11 (11)	24/18		Topsoil	1.1	S1 - Top 13": Topsoil
							Fill	91.9	Bot. 5": Poorly Graded SAND with Silt (SP-SM), fine, 5-10% fines, trace of organic odor, brown, moist
		2	S2	18-20-20-19 (40)	24/19			2.0 / 91.0	S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 15-20% fine to coarse subrounded gravel, brown, moist
	90.0	4							
5		5	S3	14-24-80/5" (104/11")	17/11				S3 - Similar to S2
		6.4				1			REMARK 1: Drill rig chattering encountered between depths of 6.4 feet and 8.0 feet.
	85.0						Sand and Gravel		
10		10	S4	10-18-26-21 (44)	24/18				S4 - Silty SAND with Gravel (SM), fine, 20-25% fines, 30-35% fine to coarse subangular gravel, trace of weathered rock, brown, moist to wet
		12				2			REMARK 2: Drill rig chattering encountered between depths of 12.0 feet and 14.0 feet.
	80.0								
15		15	S5	20-21-20-50/0" (41)	18/18				S5 - Silty SAND with Gravel (SM), fine, 20-25% fines, 40-45% fine to coarse subrounded gravel, trace of weathered rock, brown, wet
		16.5				3		17.0	REMARK 3: Auger refusal encountered at depth of 17.0 feet on possible large boulder or rock. Boring terminated.
	75.0								Bottom of borehole at 17.0 feet. Installed groundwater observation well.
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-109
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/13/25 **DATE COMPLETED:** 11/13/25
BORING LOCATION: Near SW portion of prop. building
COORDINATES: NA
SURFACE El.: 92 ft. (see note 1) **TOTAL DEPTH:** 22 ft.
WEATHER: 40's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 7.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
						1	Topsoil	0.6 / 91.4	REMARK 1: Hand dug to depth of 1.0 foot to check for irrigation line.
	90.0	1	S1	2-11-16-20 (27)	24/20	2	Fill		S1 - Top 3": Poorly Graded SAND (SP), fine to medium, 0-5% fines, brown, moist Mid. 3": Silty SAND (SM), fine to medium, 25-30% fines, trace of organic soil, black, moist
		3	S2	16-16-16-18 (32)	24/0				REMARK 2: 1.5-inch diameter PVC pipe encountered at depth of 1.5 feet. Offset boring 2.0 feet and continued drilling. Bot. 14": Silty SAND (SM), fine to medium, trace coarse, 15-20% fines, 5-10% fine to coarse subangular gravel, brown to gray-brown, moist
5		5	S3	5-9-10-10 (19)	24/18			5.0 / 87.0	S2 - No recovery S3 - Poorly Graded SAND (SP), fine to medium, 0-5% fines, brown, moist
	85.0	7	S4	9-10-12-12 (22)	24/18				S4 - Similar to S3, wet
10		10	S5	7-9-16-18 (25)	24/15				S5 - Top 12": Poorly Graded SAND (SP), fine to medium, 0-5% fines, brown, wet Bot. 3": Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 5-10% fines, 15-20% fine to coarse subrounded gravel, orange-brown, wet
	80.0	12					Sand and Gravel		
15		15	S6	6-5-6-5 (11)	24/16				S6 - Poorly Graded SAND (SP), fine to medium, 0-5% fines, orange-brown to brown, wet
	75.0	17				3			REMARK 3: Augered through cobbles between depths of 17.5 feet and 20.0 feet.
20		20	S7	14-16-24-50 (40)	24/16				S7 - Silty SAND (SM), fine to medium, 15-20% fines, 10-15% fine to coarse subrounded gravel, brown to gray, wet
	70.0	22						22.0	Bottom of borehole at 22.0 feet. Backfilled borehole with drill cuttings.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-110
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/13/25 **DATE COMPLETED:** 11/13/25
BORING LOCATION: Near SW portion of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 21 ft.
WEATHER: 40's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 13.0 ft. / El. 80.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
						1	Topsoil	1.8	REMARK 1: Hand dug to depth of 2.0 feet to check for irrigation line.
	90.0	2	S1	14-17-30 (47)	18/17		Fill	91.2	S1 - Top 12": Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 5-10% fines, 5-10% fine subrounded gravel, brown, moist
		3.5	S2	27-23-16 (39)	18/15				Bot. 5": Silty SAND (SM), fine to medium, 15-20% fines, 5-10% fine subrounded gravel, gray, moist S2 - Silty SAND (SM), mostly fine to medium, 20-25% fines, 5-10% fine subrounded gravel, brown, moist (sieve performed)
5		5	S3	15-22-22-24 (44)	24/20			5.0	
	85.0	7						88.0	S3 - Poorly Graded SAND with Gravel (SP), fine to medium, trace coarse, 0-5% fines, 15-20% fine to coarse subangular gravel, orange-brown, moist
10		10	S4	12-16-15-18 (31)	24/22				S4 - Top 12": Similar to S3, wet Bot. 10": Silty SAND (SM), fine to medium, 15-20% fines, 10-15% fine to coarse subrounded gravel, gray-brown, wet
	80.0	12				2	Sand and Gravel		REMARK 2: Augered through cobbles between depths of 13.0 feet and 20.0 feet.
15		15	S5	10-11-18-14 (29)	24/17				S5 - Top 6": Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, 15-20% fine to coarse subrounded gravel, orange-brown, wet Bot. 11": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, trace coarse, 5-10% fines, 15-20% fine to coarse subrounded gravel, gray, wet
	75.0	17						20.0	
20		20	S6	28-100	12/12		Weathered Rock	73.0 21.0	S6 - Top 6": Similar to S5 Bot. 11", trace of weathered rock Bot. 6": Similar to S5 Bot. 11", trace of weathered rock
	70.0	21							Bottom of borehole at 21.0 feet. Backfilled borehole with drill cuttings.
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-111-OW
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/12/25 **DATE COMPLETED:** 11/12/25
BORING LOCATION: Near SW corner of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 21 ft.
WEATHER: 40's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 9.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Drive and wash with 4-inch casing
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.7 / 92.3	S1 - Top 8": Topsoil
			S1	2-3-7-14 (10)	24/19		Fill		Bot. 11": Silty SAND (SM), fine to medium, 15-20% fines, 0-5% fine subrounded gravel, gray-brown, moist
		2							S2 - Top 10": Similar to S1 Bot. 11"
	90.0		S2	28-30-15-14 (45)	24/20			3.1 / 89.9	Mid. 3": Silty SAND (SM), fine to medium, 25-30% fines, trace of organic soil, black, moist
		4							Bot. 7": Poorly Graded SAND (SP), fine to medium, 0-5% fines, brown, moist
5			S3	11-13-15-15 (28)	24/14				S3 - Similar to S2 Bot. 7", stratification visible
		6							
	85.0								
		9							S4 - Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, orange-brown, wet
10			S4	8-8-8-8 (16)	24/8				
		11					Sand and Gravel		
	80.0								
		14							S5 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine to coarse subangular gravel, brown, wet
15			S5	40-33-20-18 (53)	24/15				
		16							
	75.0								
		19							S6 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, trace coarse, 10-15% fines, 15-20% fine to coarse subangular gravel, gray, wet
20			S6	14-14-22-28 (36)	24/14				
		21						21.0	Bottom of borehole at 21.0 feet. Installed groundwater observation well.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-112
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/12/25 **DATE COMPLETED:** 11/12/25
BORING LOCATION: Near southern edge of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 12.5 ft.
WEATHER: 40's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	2-2-4-8 (6)	24/16		Topsoil	0.8 / 92.2	S1 - Top 9": Topsoil
	90.0	2	S2	14-15-15-16 (30)	24/20		Fill	3.5 / 89.5	Bot. 7": Silty SAND (SM), fine to medium, trace coarse, 15-20% fines, 0-5% fine subrounded gravel, gray-brown, moist S2 - Top 18": Similar to S1 Bot. 7" Bot. 2": Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, 0-5% fine subrounded gravel, orange-brown, moist
5		4 5	S3	15-17-17-16 (34)	24/20				S3 - Similar to S2 Bot. 2"
	85.0	7					Sand and Gravel		
10		10	S4	17-25-47-70 (72)	24/16				S4 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine to coarse subrounded gravel, gray-brown, wet
	80.0	12				1 2		12.5	REMARK 1: Auger grinding encountered between depths of 12.0 feet and 12.5 feet. REMARK 2: Auger refusal encountered at depth of 12.5 feet on possible large boulder or rock. Boring terminated. Bottom of borehole at 12.5 feet. Backfilled borehole with drill cuttings.
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-113
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/12/25 **DATE COMPLETED:** 11/12/25
BORING LOCATION: Near southern edge of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 14 ft.
WEATHER: 30's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 13.0 ft. / El. 81.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 84.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Material Description
		0	S1	1-2-3-4 (5)	24/17		Topsoil	S1 - Topsoil
		2	S2	5-7-16-16 (23)	24/14		Fill (2.4 / 91.6)	S2 - Top 5": Topsoil Mid. 4": Silty SAND (SM), fine, 15-20% fines, brown, moist
	90.0	4					(2.7 / 91.3)	Bot. 5": Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, brown, moist
5		5	S3	15-15-16-20 (31)	24/18			S3 - Similar to S2 Bot. 5", 0-5% fine subrounded gravel, orange-brown
		7						
		8	C1		60/36	1	Sand and Gravel	REMARK 1: Auger refusal encountered at depth of 8.0 feet on possible large boulder or rock. Started to core rock at depth of 8.0 feet. C1 - Cored through one (1) boulder about 14 inches in diameter, cobbles up to 5 inches in diameter, and coarse gravel
	85.0							▼
10								
		13	S4	35-60	12/5	2		REMARK 2: Cored through boulders and cobbles between depths of 8.0 feet and 13.0 feet. Obtained sample S4 at depth of 13.0 feet.
	80.0	14					(14.0)	S4 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine to coarse subangular gravel, gray-brown, wet Bottom of borehole at 14.0 feet. Backfilled borehole with drill cuttings.
15								
	75.0							
20								
	70.0							
25								

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

BORING LOG

B-114
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/12/25 **DATE COMPLETED:** 11/12/25
BORING LOCATION: Near SE portion of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 10.5 ft.
WEATHER: 30's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 9.5 ft. / El. 84.5 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: AS **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.8 / 93.2	S1 - Top 10": Topsoil
			S1	1-4-9-12 (13)	24/18		Fill	2.0 / 92.0	Bot. 8": Silty SAND (SM), fine to medium, 15-20% fines, 5-10% fine subrounded gravel, brown, moist
		2	S2	12-12-13-14 (25)	24/18				S2 - Poorly Graded SAND (SP), fine to medium, trace coarse, 0-5% fines, 0-5% fine subrounded gravel, brown, moist
	90.0	4							
5		5	S3	13-16-20-20 (36)	24/16		Sand and Gravel		S3 - Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subrounded gravel, orange-brown, moist
		7				1			REMARK 1: Auger grinding encountered between depths of 7.5 feet and 10.0 feet.
	85.0								
10		10	S4	60/0"	0/0	2		10.5	S4 - No recovery, wet auger cuttings REMARK 2: Auger refusal encountered at depth of 10.5 feet on possible large boulder or rock. Boring terminated. Bottom of borehole at 10.5 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-115
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/19/25 **DATE COMPLETED:** 11/19/25
BORING LOCATION: NW of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 20.7 ft.
WEATHER: 30's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	4-4-3-2 (7)	24/7		Topsoil	2.0	S1 - Topsoil
		2						91.0	
	90.0		S2	1-1-1-2 (2)	24/10		Fill		S2 - Silty SAND (SM), fine, 20-25% fines, 0-5% fine subrounded gravel, brown, moist
		4							
5			S3	2-1-2-7 (3)	24/16				S3 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, ~5% fine to coarse subrounded gravel, brown, moist
		6						6.0	
			S4	11-13-17-17 (30)	24/21			87.0	S4 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 30-35% fine to coarse subrounded gravel, brown, moist
	85.0	8							
10		10							
		10.3	S5	90/4"	4/4	1			S5 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 25-30% fine to coarse subrounded gravel, brown, wet
			S6	16-31-33-66/3" (64)	21/15				REMARK 1: Split spoon refusal encountered at depth of 10.3 feet on possible boulder. Offset borehole 4.0 feet east and continued drilling.
		12.1							S6 - Silty SAND with Gravel (SM), fine, 15-20% fines, 20-25% fine to coarse subrounded gravel, brown, wet
	80.0						Sand and Gravel		
15		15							
			S7	9-25-38-36 (63)	24/16				S7 - Silty GRAVEL with Sand (GM), fine to coarse, subangular, 15-20% fines, 20-25% fine sand, trace of weathered rock, brown, wet
		17							
	75.0							20.0	
20		20							
			S8	85-35/2" (35/2")	8/8		Weathered Rock	73.0	S8 - Silty GRAVEl with Sand (GM), fine to coarse, subangular, 15-20% fines, 15-20% fine sand, trace of weathered rock, brown, wet
		20.7						20.7	Bottom of borehole at 20.7 feet. Backfilled borehole with drill cuttings.
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-116
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/14/25 **DATE COMPLETED:** 11/14/25
BORING LOCATION: North of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 14 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 84.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	3-21-20-18 (41)	24/15		Topsoil	0.5 / 92.5	S1 - Top 6": Topsoil Bot. 9": Silty SAND (SM), fine, 15-20% fines, 10-15% fine to coarse subrounded gravel, trace of roots, trace of organic odor, dark brown, moist
	90.0	2	S2	11-13-17-17 (30)	24/24				S2 - Top 18": Similar to S1 Bot. 9" Bot. 6": Silty SAND with Gravel (SM), fine, 20-25% fines, 15-20% fine to coarse subrounded gravel, light brown, moist
5		4							
		5	S3	14-10-10-9 (20)	24/17		Fill		S3 - Top 10": Similar to S2 Bot. 6" Bot. 7": Similar to S2 Bot. 6", trace of organic soil
		7	S4	11-9-9-9 (18)	24/18				S4 - Top 9": Similar to S2 Bot. 6" Bot. 9": SILT (ML), slightly plastic, gray, moist
	85.0	9							
10		10	S5	4-1-5-8 (6)	24/18				S5 - Top 14": Similar to S4 Bot. 9", wet
		12	S6	9-8-8-10 (16)	24/22			12.0 / 81.0	Bot. 4": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 10-15% fine to coarse subrounded gravel, trace of organic soil, brown, wet
	80.0	14					Sand and Gravel	14.0	S6 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 20-25% fine to coarse subrounded gravel, brown, wet
15									Bottom of borehole at 14.0 feet. Backfilled borehole with drill cuttings.
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-117
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/18/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: East of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 8.5 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
0		0					Topsoil	1.0	S1 - Top 12": Topsoil
			S1	2-3-7-7 (10)	24/18		Fill	93.0	Bot. 6": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, ~15% fine to coarse subrounded gravel, brown, moist (appears reworked)
		2						2.0 92.0	
			S2	10-13-17-37 (30)	24/18				S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 20-25% fine to coarse subrounded gravel, brown, moist
	90.0	4							
5		5				1	Sand and Gravel		REMARK 1: Drill rig chattering encountered between depths of 5.0 feet and 8.5 feet.
			S3	18-80-38-32 (118)	24/15				S3 - Silty SAND with Gravel (SM), fine, ~15% fines, 40-45% fine to coarse subrounded gravel, trace of weathered rock, brown, moist
		7							
	85.0					2		8.5	REMARK 2: Auger refusal encountered at depth of 8.5 feet on possible large boulder or rock. Boring terminated.
10									Bottom of borehole at 8.5 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-118
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/18/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: SE of prop. building
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 11.3 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 85.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	5-6-8-8 (14)	24/17		Topsoil	2.0	S1 - Topsoil
		2						92.0	
			S2	7-10-10-11 (20)	24/20				S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, ~15% fine to coarse subrounded gravel, brown, moist
	90.0	4							
5		5							
			S3	18-19-19-18 (38)	24/16		Sand and Gravel		S3 - Similar to S2
		7							
	85.0								
10		10							
			S4	10-27-73/4" (100/10")	16/14				S4 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 30-35% fine to coarse subrounded gravel, trace of weathered rock, brown, wet
		11.3				1		11.3	REMARK 1: Split spoon refusal encountered at depth of 11.3 feet on possible large boulder or rock. Boring terminated.
									Bottom of borehole at 11.3 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-119
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/19/25 **DATE COMPLETED:** 11/19/25
BORING LOCATION: Near northern portion of existing parking lot
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 12 ft.
WEATHER: 30's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	5-9-7-4 (16)	24/9		Topsoil	2.0	S1 - Topsoil
		2	S2	6-5-5-6 (10)	24/14		Fill	92.0 4.0	S2 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, ~15% fine to coarse subrounded gravel, trace of organic soil, trace of organic odor, brown, moist
	90.0	4	S3	9-10-12-10 (22)	24/12		Sand and Gravel	90.0	S3 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 20-25% fine to coarse subrounded gravel, brown, moist
5		6	S4	11-12-12-12 (24)	24/22				S4 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine, 10-15% fines, 25-30% fine to coarse subrounded gravel, brown, moist
	85.0	8							
10		10	S5	15-19-16-26 (35)	24/17			12.0	S5 - Silty SAND (SM), fine, 20-25% fines, 10-15% fine to coarse subrounded gravel, brown, moist
		12							Bottom of borehole at 12.0 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-120
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/17/25 **DATE COMPLETED:** 11/17/25
BORING LOCATION: SW of prop. building
COORDINATES: NA
SURFACE El.: 92 ft. (see note 1) **TOTAL DEPTH:** 12 ft.
WEATHER: 30's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 7.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 8.0 ft. / El. 84.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
	90.0	2	S1	2-3-5-6 (8)	24/9		Topsoil	2.0	S1 - Topsoil
		4	S2	8-11-11-13 (22)	24/0		Fill	90.0	S2 - No recovery, rock stuck in tip of split spoon
5		5						5.0	
	85.0	7	S3	8-13-21-22 (34)	24/20		Sand and Gravel	87.0	S3 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, brown, moist to wet
10		10	S4	7-6-5-6 (11)	24/22			12.0	S4 - Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 5-10% fines, ~15% fine to coarse subrounded gravel, orange-brown, wet
	80.0	12							Bottom of borehole at 12.0 feet. Backfilled borehole with drill cuttings.
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-121
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/17/25 **DATE COMPLETED:** 11/17/25
BORING LOCATION: South of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 12.9 ft.
WEATHER: 30's / Cloudy
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 9.0 ft. / El. 84.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	3-3-5-13 (8)	24/21		Topsoil	1.5	S1 - Top 18": Topsoil
	90.0	2	S2	18-17-12-10 (29)	24/15		Fill	91.5	Bot. 3": Silty SAND (SM), fine to medium, 15-20% fines, 5-10% fine to coarse subrounded gravel, trace of roots, brown, moist S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, ~15% fine to coarse subrounded gravel, brown, moist
5		4						5.0	
		5	S3	15-17-17-15 (34)	24/6		Sand and Gravel	88.0	S3 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 0-5% coarse subrounded gravel, brown, moist
	85.0	7							
10		10	S4	10-15-14-10 (29)	24/5				S4 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic odor, dark brown, wet (swamp deposit)
		12	S5	11-89/5" (89/5")	11/11				S5 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 20-25% fine to coarse subrounded gravel, brown, wet
	80.0	12.9						12.9	Bottom of borehole at 12.9 feet. Backfilled borehole with drill cuttings.
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-122
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/18/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: Near northern edge of existing school
COORDINATES: NA
SURFACE El.: 94 ft. (see note 1) **TOTAL DEPTH:** 12 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 84.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 84.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	3-6-10-12 (16)	24/16		Topsoil	2.0	S1 - Topsoil
		2						92.0	
			S2	11-16-11-19 (27)	24/16		Fill		S2 - Silty SAND (SM), fine, 20-25% fines, 10-15% fine to coarse subrounded gravel, brown, moist (appears reworked)
	90.0	4							
5			S3	19-22-15-14 (37)	24/0				S3 - No recovery, rock stuck in tip of split spoon
		6						6.0	
			S4	20-21-20-21 (41)	24/22			88.0	S4 - Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines, light brown, moist
		8					Sand and Gravel		
	85.0								
10		10							
			S5	8-7-6-7 (13)	24/16				S5 - Well Graded SAND with Silt (SW-SM), fine to coarse, 5-10% fines, 5-10% fine subrounded gravel, brown, wet
		12						12.0	
									Bottom of borehole at 12.0 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-123
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/18/25 **DATE COMPLETED:** 11/18/25
BORING LOCATION: Near NW portion of existing school
COORDINATES: NA
SURFACE El.: 95 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 85.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 85.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0	S1	4-5-6-7 (11)	24/9		Topsoil	2.0	S1 - Topsoil
		2	S2	15-17-13-8 (30)	24/8		Fill	93.0	S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, brown, moist
		4							
5	90.0	5	S3	5-4-5-11 (9)	24/14				S3 - Silty SAND with Gravel (SM), fine to medium, 15-20% fines, 15-20% fine to coarse subrounded gravel, trace of organic soil, dark brown, moist
		7	S4	17-14-16-21 (30)	24/19			7.8	S4 - Top 9": Similar to S3
		9	S5	10-11-9-9 (20)	24/17		Sand and Gravel	87.2	Bot. 10": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines, 0-5% fine subrounded gravel, brown, moist
10	85.0								S5 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, brown, moist to wet
		11						11.0	Bottom of borehole at 11.0 feet. Backfilled borehole with drill cuttings.
15	80.0								
20	75.0								
25	70.0								

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

B-124
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/19/25 **DATE COMPLETED:** 11/19/25
BORING LOCATION: South of existing school
COORDINATES: NA
SURFACE El.: 102 ft. (see note 1) **TOTAL DEPTH:** 9 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0					Topsoil	0.8	S1 - Top 9": Topsoil
			S1	3-5-9-17 (14)	24/18		Fill	101.2	Bot. 9": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 5-10% fine to coarse subrounded gravel, trace of organic odor, trace of roots, orange-brown, moist
	100.0	2						2.0	
			S2	16-11-16-12 (27)	24/12			100.0	S2 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 25-30% fine to coarse subrounded gravel, brown, moist
		4							
5		5					Sand and Gravel		S3 - Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines, ~5% fine subrounded gravel, brown, moist
			S3	7-8-11-19 (19)	24/18				
	95.0	7							
						1			REMARK 1: Drill rig chattering encountered between depths of 8.0 feet and 9.0 feet.
						2		9.0	REMARK 2: Auger refusal encountered at depth of 9.0 feet on possible large boulder or rock. Boring terminated.
10									Bottom of borehole at 9.0 feet. Backfilled borehole with drill cuttings.
	90.0								
15									
	85.0								
20									
	80.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

BORING LOG

B-125
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/19/25 **DATE COMPLETED:** 11/19/25
BORING LOCATION: South of existing school
COORDINATES: NA
SURFACE El.: 106 ft. (see note 1) **TOTAL DEPTH:** 17 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: Not Encountered
AT END OF DRILLING: Not Encountered
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
	105.0	0					Topsoil	0.6	S1 - Top 7": Topsoil
		2	S1	3-4-7-6 (11)	24/12		Fill	105.4	Bot. 5": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic odor, brown, moist
		4	S2	6-4-5-4 (9)	24/15				S2 - Similar to S1 Bot. 5"
5		6	S3	7-10-11-15 (21)	24/21			4.8	S3 - Top 9": Silty SAND (SM), fine, 20-25% fines, brown, moist
	100.0						Sand and Gravel	101.2	Bot. 12": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 20-25% fine to coarse subrounded gravel, brown, moist
10		10	S4	26-40-23-39 (63)	24/20				S4 - Silty SAND with Gravel (SM), fine, 15-20% fines, 35-40% fine to coarse subrounded gravel, trace of weathered rock, brown, moist
	95.0	12							
15		15	S5	23-12-13-11 (25)	24/11				S5 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 40-45% fine to coarse subangular gravel, trace of weathered rock, brown, moist
	90.0	17						17.0	Bottom of borehole at 17.0 feet. Backfilled borehole with drill cuttings.
20									
	85.0								
25									

GENERAL NOTES:

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

BORING LOG

B-126
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 11/14/25 **DATE COMPLETED:** 11/14/25
BORING LOCATION: NW of prop. building
COORDINATES: NA
SURFACE El.: 93 ft. (see note 1) **TOTAL DEPTH:** 12 ft.
WEATHER: 40's / Sunny
GROUNDWATER LEVELS:
DURING DRILLING: 10.0 ft. / El. 83.0 ft. Based on sample moisture
AT END OF DRILLING: 10.0 ft. / El. 83.0 ft.
OTHER: -

DRILLING SUBCONTRACTOR: Soil X, Corp.
DRILLING FOREMAN: Edwin Fajardo
DRILLING METHOD: Hollow Stem Auger (4-1/4" I.D.)
DRILL RIG TYPE/MODEL: Diedrich D-70 Turbo ATV
HAMMER TYPE: Automatic
HAMMER WEIGHT: 140 lb. **HAMMER DROP:** 30 in.
SPLIT SPOON DIA.: 1.375 in. I.D., 2 in. O.D.
CORE BARREL SIZE: NA
LOGGED BY: JA **CHECKED BY:** NP

Depth (ft.)	El. (ft.)	Sample Interval (ft.)	Sample Number	Blow Counts (N Value)	Pen./Rec. (in.)	Remark	Strata	Depth El.(ft.)	Material Description
		0							
			S1	3-2-4-6 (6)	24/9		Topsoil	2.0	S1 - Topsoil
		2						91.0	
	90.0		S2	7-6-7-11 (13)	24/9		Fill		S2 - Silty SAND (SM), fine to medium, 15-20% fines, 5-10% fine subrounded gravel, trace of roots, brown, moist
		4							
5									
		5	S3	2-3-5-15 (8)	24/19				S3 - Silty SAND (SM), fine, 20-25% fines, 10-15% fine to coarse subrounded gravel, trace of organic soil, trace of organic odor, dark brown, moist
		7	S4	17-22-28-24 (50)	24/22				S4 - Similar to S3, 5-10% fine to coarse subrounded gravel
	85.0								
		9							
10								10.0 ▼	
		10	S5	8-8-7-6 (15)	24/11		Sand and Gravel	83.0	S5 - Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subrounded gravel, brown, wet
		12						12.0	Bottom of borehole at 12.0 feet. Backfilled borehole with drill cuttings.
	80.0								
15									
	75.0								
20									
	70.0								
25									

GENERAL NOTES:

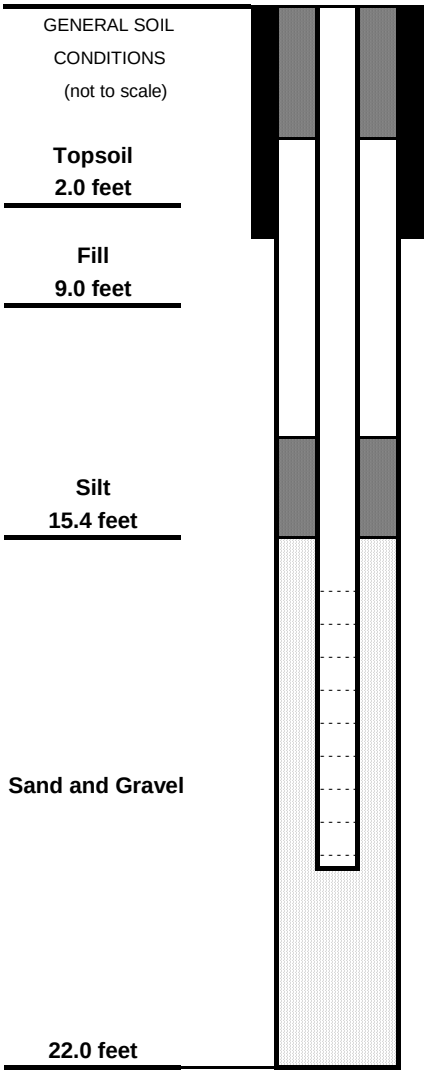
1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

Boring No. : **B-101-OW**

Project Name:	**Prop. Wildwood Early Childhood Center, Wilmington, MA**		
LGCI Project Number:	**2437**		
Client:	**Dore and Whittier Architects**		
Drilling Subcontractor:	Soil X, Corp.	Date Started:	11/14/25
Drilling Foreman:	Edwin Fajardo	Date Completed:	11/14/25
LGCI Engineer:	Jude Aladmawy	Location:	Near NW corner of prop. building
Ground Surface Elevation:	93.0 feet (see note 1)	Total Depth of Boring:	22.0 feet
Groundwater Depth:	5.0 feet (based on sample moisture)	Drill Rig Type:	Diedrich D-70 Tubro ATV
	5.0 feet at the end of drilling	Drilling Method:	Hollow Stem Auger (4-1/4" I.D.)



Riser Stickup ~0.0' above ground surface

THICKNESS OF SURFACE SEAL	0.5 foot
TYPE OF SURFACE SEAL	Concrete
TYPE OF SURFACE CASING	Roadway Box
ID OF SURFACE CASING	6 inch
DEPTH TO BOTTOM OF CASING	0.7 foot
ID OF RISER PIPE	2 inch
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Filter sand (Holliston sand)
DEPTH TO TOP OF SEAL	7.0 feet
TYPE OF SEAL	Bentonite Chips
DEPTH TO BOTTOM OF SEAL	9.0 feet
DEPTH TO TOP OF PERVIOUS SECTION	10.0 feet
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
DESCRIBE OPENINGS	0.01 inch slots
ID OF PERVIOUS SECTION	2 inch
TYPE OF BACKFILL AROUND PERVIOUS SECTION	Filter sand (Holliston sand)
DEPTH TO BOTTOM OF PERVIOUS SECTION	15.0 feet
DEPTH TO BOTTOM OF SAND COLUMN	22.0 feet
TYPE OF BACKFILL BELOW PERVIOUS SECTION	Filter sand (Holliston sand)
DIAMETER OF BOREHOLE	4 inch
DEPTH TO BOTTOM OF BOREHOLE	22.0 feet

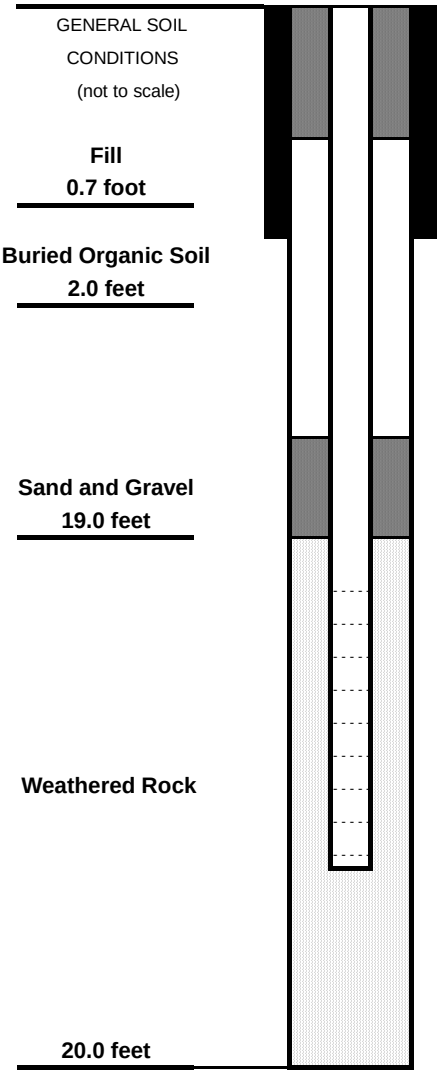
NOTES: The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts," prepared by Dore and Whittier Architects, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects via e-mail on November 8, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

Boring No. : **B-106-OW**

Project Name: **Prop. Wildwood Early Childhood Center, Wilmington, MA**	
LGCI Project Number: **2437**	
Client: **Dore and Whittier Architects**	
Drilling Subcontractor: Soil X, Corp.	Date Started: 11/13/25
Drilling Foreman: Edwin Fajardo	Date Completed: 11/13/25
LGCI Engineer: Alan Smith	Location: Near center of prop. building
Ground Surface Elevation: 94.0 feet (see note 1)	Total Depth of Boring: 20.0 feet
Groundwater Depth: 10.0 feet (based on sample moisture)	Drill Rig Type: Diedrich D-70 Tubro ATV
11.0 feet at the end of drilling	Drilling Method: Hollow Stem Auger (4-1/4" I.D.)



Riser Stickup ~0.0' above ground surface

THICKNESS OF SURFACE SEAL	0.5 foot
TYPE OF SURFACE SEAL	Concrete
TYPE OF SURFACE CASING	Roadway Box
ID OF SURFACE CASING	6 inch
DEPTH TO BOTTOM OF CASING	0.7 foot
ID OF RISER PIPE	2 inch
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Auger Cuttings
DEPTH TO TOP OF SEAL	6.0 feet
TYPE OF SEAL	Bentonite Chips
DEPTH TO BOTTOM OF SEAL	8.0 feet
DEPTH TO TOP OF PERVIOUS SECTION	9.0 feet
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
DESCRIBE OPENINGS	0.01 inch slots
ID OF PERVIOUS SECTION	2 inch
TYPE OF BACKFILL AROUND PERVIOUS SECTION	Filter sand (Holliston sand)
DEPTH TO BOTTOM OF PERVIOUS SECTION	19.0 feet
DEPTH TO BOTTOM OF SAND COLUMN	20.0 feet
TYPE OF BACKFILL BELOW PERVIOUS SECTION	Filter sand (Holliston sand)
DIAMETER OF BOREHOLE	10 inch
DEPTH TO BOTTOM OF BOREHOLE	20.0 feet

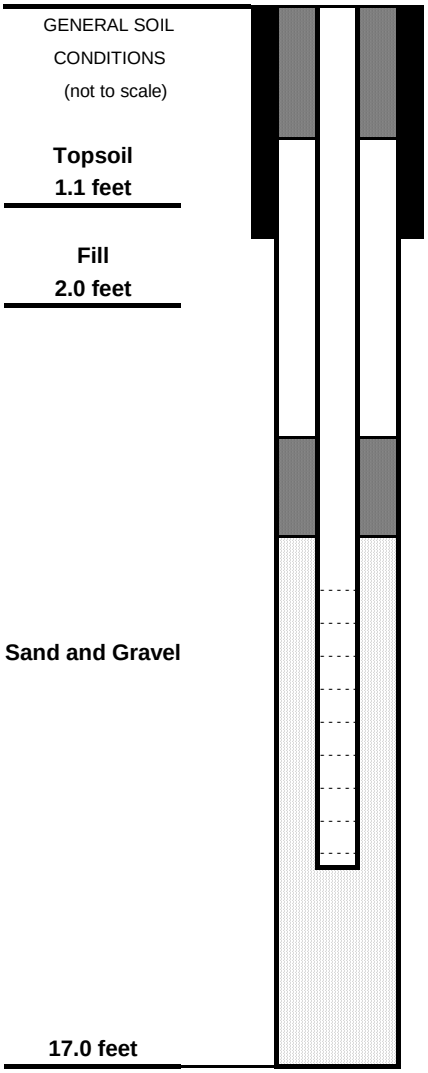
NOTES: The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts," prepared by Dore and Whittier Architects, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects via e-mail on November 8, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

Boring No. : **B-108-OW**

Project Name: **Prop. Wildwood Early Childhood Center, Wilmington, MA**	
LGCI Project Number: **2437**	
Client: **Dore and Whittier Architects**	
Drilling Subcontractor: Soil X, Corp.	Date Started: 11/18/25
Drilling Foreman: Edwin Fajardo	Date Completed: 11/18/25
LGCI Engineer: Jude Aladmawy	Location: Near eastern edge of prop. building
Ground Surface Elevation: 93.0 feet (see note 1)	Total Depth of Boring: 17.0 feet
Groundwater Depth: 12.0 feet (based on sample moisture)	Drill Rig Type: Diedrich D-70 Tubro ATV
7.0 feet at the end of drilling	Drilling Method: Hollow Stem Auger (4-1/4" I.D.)



Riser Stickup ~0.0' above ground surface

THICKNESS OF SURFACE SEAL	0.5 foot
TYPE OF SURFACE SEAL	Concrete
TYPE OF SURFACE CASING	Roadway Box
ID OF SURFACE CASING	6 inch
DEPTH TO BOTTOM OF CASING	0.7 foot
ID OF RISER PIPE	2 inch
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Filter sand (Holliston sand)
DEPTH TO TOP OF SEAL	4.0 feet
TYPE OF SEAL	Bentonite Chips
DEPTH TO BOTTOM OF SEAL	6.0 feet
DEPTH TO TOP OF PERVIOUS SECTION	7.0 feet
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
DESCRIBE OPENINGS	0.01 inch slots
ID OF PERVIOUS SECTION	2 inch
TYPE OF BACKFILL AROUND PERVIOUS SECTION	Filter sand (Holliston sand)
DEPTH TO BOTTOM OF PERVIOUS SECTION	17.0 feet
DEPTH TO BOTTOM OF SAND COLUMN	17.0 feet
TYPE OF BACKFILL BELOW PERVIOUS SECTION	Filter sand (Holliston sand)
DIAMETER OF BOREHOLE	4 inch
DEPTH TO BOTTOM OF BOREHOLE	17.0 feet

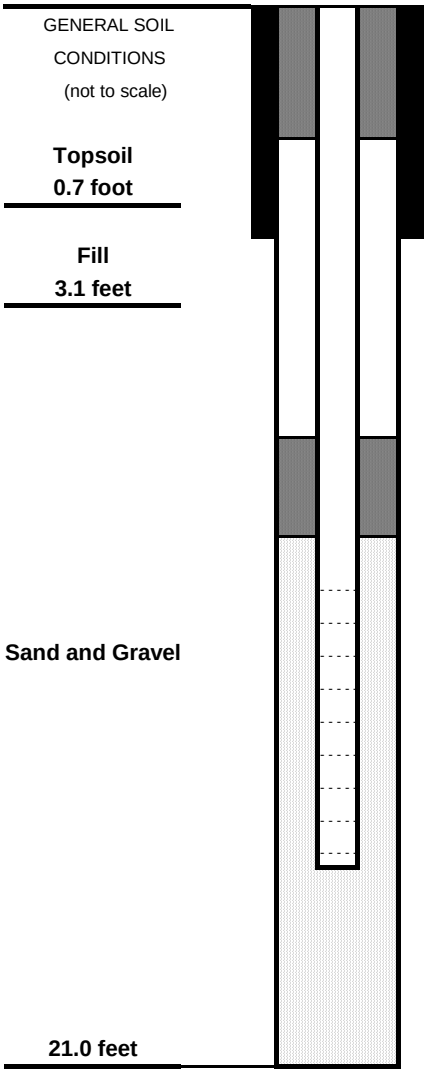
NOTES: The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts," prepared by Dore and Whittier Architects, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects via e-mail on November 8, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

Boring No. : **B-111-OW**

Project Name: **Prop. Wildwood Early Childhood Center, Wilmington, MA**	
LGCI Project Number: **2437**	
Client: **Dore and Whittier Architects**	
Drilling Subcontractor: Soil X, Corp.	Date Started: 11/12/25
Drilling Foreman: Edwin Fajardo	Date Completed: 11/12/25
LGCI Engineer: Alan Smith	Location: Near SW corner of prop. building
Ground Surface Elevation: 93.0 feet (see note 1)	Total Depth of Boring: 21.0 feet
Groundwater Depth: 9.0 feet (based on sample moisture)	Drill Rig Type: Diedrich D-70 Tubro ATV
10.0 feet at the end of drilling	Drilling Method: Drive and Wash with 4-inch Casing



Riser Stickup ~0.0' above ground surface

THICKNESS OF SURFACE SEAL	0.5 foot
TYPE OF SURFACE SEAL	Concrete
TYPE OF SURFACE CASING	Roadway Box
ID OF SURFACE CASING	6 inch
DEPTH TO BOTTOM OF CASING	0.7 foot
ID OF RISER PIPE	2 inch
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Drill Cuttings
DEPTH TO TOP OF SEAL	6.0 feet
TYPE OF SEAL	Bentonite Chips
DEPTH TO BOTTOM OF SEAL	8.0 feet
DEPTH TO TOP OF PERVIOUS SECTION	9.0 feet
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
DESCRIBE OPENINGS	0.01 inch slots
ID OF PERVIOUS SECTION	2 inch
TYPE OF BACKFILL AROUND PERVIOUS SECTION	Filter sand (Holliston sand)
DEPTH TO BOTTOM OF PERVIOUS SECTION	19.0 feet
DEPTH TO BOTTOM OF SAND COLUMN	21.0 feet
TYPE OF BACKFILL BELOW PERVIOUS SECTION	Filter sand (Holliston sand)
DIAMETER OF BOREHOLE	5 inch
DEPTH TO BOTTOM OF BOREHOLE	21.0 feet

NOTES: The ground surface elevation was interpolated to the nearest foot from drawing titled: "Existing Conditions Plan, 320 Salem Street, Wilmington, Massachusetts," prepared by Dore and Whittier Architects, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects via e-mail on November 8, 2024.

Appendix B – LGCI's Test Pit Logs

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-1
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near western face of prop. school
COORDINATES: NA
SURFACE EL.: 92.0 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 9.5 ft. / El. 82.5 ft.

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 9.0' X 6.0'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth / El. (ft.)	Material Description
		E		Topsoil	1.5 / 90.5	0 ft. - 1.5 ft.: Topsoil
		M				
	90.0	M		Fill		1.5 ft. - 5 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 10-15% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace of roots, brown, moist (cobbles up to 12 inches make up 5-10% of stockpile)
2.5		D				
	87.5					
5.0			1			5 ft. - 7 ft.: Silty SAND with Gravel (SM), mostly fine to medium, 25-30% fines, 10-15% fine subangular gravel, brown, moist (sieve performed) REMARK 1: Double ring infiltrometer test performed at depth of 5.0 feet.
		D				
	85.0				7.0 / 85.0	
7.5		D		Swamp Deposits		7 ft. - 10 ft.: Silty SAND (SM), fine to medium, 20-25% fines, 10-15% fine to coarse subangular gravel, trace of organic soil, trace of roots, trace of organic odor, gray, moist to wet
	82.5					▼
10.0					10.0 / 82.0	
		D		Sand		10 ft. - 11 ft.: Poorly Graded SAND (SP), fine to medium, 0-5% fines, gray, wet
			2		11.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 11.0 feet on possible boulder or rock.
						Bottom of test pit at 11.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-2
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near southern face of proposed school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 9 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 10.0' X 7.0'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.7 / 93.3	0 ft. - 0.7 ft.: Topsoil
	92.5					0.7 ft. - 4 ft.: Well Graded SAND with Silt (SW-SM), fine to coarse, 5-10% fines, ~10% fine to coarse subangular gravel, trace of roots, trace of organic soil, brown to orange, moist
2.5		E		Fill		
	90.0		1			4 ft. - 5.5 ft.: Silty SAND (SM), mostly fine to medium, 15-20% fines, 5-10% mostly fine subangular gravel, brown to orange, moist (sieve performed)
5.0		M	2			REMARK 1: Double ring infiltrometer test performed at depth of 4.0 feet. REMARK 2: Unmarked cast iron pipe encountered near the southwestern corner of the test pit. Excavator bucket pulled and bent pipe. Pipe does not appear to be broken. DPW indicated that they are not aware of utilities at this location.
					5.5 / 88.5	5.5 ft. - 9 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 10-15% fine to coarse subangular gravel, light brown, moist
	87.5					
7.5		M		Sand and Gravel		
	85.0				9.0	Bottom of test pit at 9.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-2A
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/30/24 **DATE COMPLETED:** 10/30/24
TEST PIT LOCATION: Near southern face of prop. school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 11.3 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 9.5 ft. / El. 84.5 ft.

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 60's / Cloudy
TEST PIT DIMENSIONS: 10.0' X 3.0'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
	92.5	E		Topsoil	1.5 92.5	0 ft. - 1.5 ft.: Topsoil
2.5		E		Fill		1.5 ft. - 7 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subangular gravel, trace of roots, trace of organic soil, brown to orange, moist
	90.0					
5.0		M				
	87.5				7.0 87.0	
7.5				Sand and Gravel		7 ft. - 11.3 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 10-15% fine to coarse subangular gravel, light brown, moist (wet after 9.5 feet)
	85.0	M			▼	
10.0						
		V	1		11.3	REMARK 1: Test pit terminated due to excavator refusal at depth of 11.3 feet on possible boulder or rock.
						Bottom of test pit at 11.3 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-3
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/31/24 **DATE COMPLETED:** 10/31/24
TEST PIT LOCATION: Near eastern face of prop. school
COORDINATES: NA
SURFACE EL.: 94.0 ft. (see note 1) **TOTAL DEPTH:** 8 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 70's / Sunny
TEST PIT DIMENSIONS: 11.0' X 6.0'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.8	0 ft. - 0.8 ft.: Topsoil
		E		Fill	93.2	0.8 ft. - 1 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, light brown, moist 1 ft. - 2.3 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% fine to coarse subangular gravel, trace of organic soil, trace of roots, dark brown, moist
	92.5	E				
2.5		E		Sand and Gravel	2.3 91.7	2.3 ft. - 4 ft.: Well Graded SAND with Gravel (SW), fine to coarse, 0-5% fines, 20-25% fine to coarse subangular gravel, light brown to orange, moist
		M				
	90.0		1			4 ft. - 8 ft.: Poorly Graded SAND with Gravel (SP), mostly medium to coarse, 0-5% fines, 30-35% fine to coarse subangular gravel, light brown to orange, moist (sieve performed) REMARK 1: Double ring infiltrometer test performed at depth of 4.0 feet.
5.0		M				
	87.5	D				
7.5		V	2		8.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 8.0 feet on possible boulder or rock. Bottom of test pit at 8.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-4
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 10/31/24 **DATE COMPLETED:** 10/31/24
TEST PIT LOCATION: Near eastern face of existing school
COORDINATES: NA
SURFACE EL.: 95.0 ft. (see note 1) **TOTAL DEPTH:** 9 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Wilmington DPW
EXCAVATION FOREMAN: Sean Moon
EXCAVATOR TYPE/MODEL: Volvo EWR150E
WEATHER: 70's / Sunny
TEST PIT DIMENSIONS: 10.0' X 6.0'
LOGGED BY: BH **CHECKED BY:** JKW

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	1.0 / 94.0	0 ft. - 1 ft.: Topsoil
		E		Fill	2.0 / 93.0	1 ft. - 2 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 5-10% fines, 0-5% fine to coarse subangular gravel, light brown, moist
2.5	92.5	E		Buried Subsoil	3.2 / 91.8	2 ft. - 3.2 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 0-5% fine to coarse subangular gravel, trace of organic soil, trace of roots, orange, moist
		E		Sand and Gravel		3.2 ft. - 4.6 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subangular gravel, light brown to orange, moist
		M	1			4.6 ft. - 9 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 10-15% fines, 30-35% fine to coarse subangular gravel, brown to orange, moist (sieve performed) REMARK 1: Double ring infiltrometer test performed at depth of 4.6 feet.
5.0	90.0	M				
		D				
7.5	87.5	V				
			2		9.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 9.0 feet on possible boulder or rock. Bottom of test pit at 9.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from drawing titled "Existing Conditions Plan 320 Salem Street Wilmington, Massachusetts," prepared by Dore and Whittier 212 Battery Street, Burlington, VT 05401, dated October 24, 2024, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on November 08, 2024.

TEST PIT LOG

TP-101
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/23/25 **DATE COMPLETED:** 12/23/25
TEST PIT LOCATION: South of existing building
COORDINATES: NA
SURFACE EL.: 100 ft. (see note 1) **TOTAL DEPTH:** 9.8 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 12.0' x 4.3'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.4 / 99.6	0 ft. - 0.4 ft.: Topsoil
		E		Fill		0.4 ft. - 1.8 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), medium to coarse, 5-10% fines, 15-20% fine subrounded gravel, trace of roots, brown, moist
2.5	97.5	E				1.8 ft. - 2.5 ft.: Well Graded SAND with Silt (SW-SM), 10-15% fines, 5-10% fine to coarse subrounded gravel, trace of organic soil, brown, moist (appears reworked)
		E				2.5 ft. - 4.6 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 5-10% fine to coarse subrounded gravel, brown, moist
5.0	95.0	E	1	Sand and Gravel	4.6 / 95.4	4.6 ft. - 7 ft.: Poorly Graded SAND with Gravel (SP), mostly medium, trace of fine and coarse, 0-5% fines, 15-20% fine to coarse subrounded gravel, brown (sieve performed) (possible fill)
						REMARK 1: Double ring infiltrometer test performed at depth of 4.6 feet.
7.5	92.5	E		Silt	7.0 / 93.0	7 ft. - 8 ft.: SILT with Sand (ML), non plastic, 25-30% fine sand, orange-brown (possible buried subsoil)
		E		Sand and Gravel	8.0 / 92.0	8 ft. - 9.8 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 5-10% fine to coarse subrounded gravel, trace of organic odor, brown-gray, moist
		M	2		9.8	REMARK 2: Test pit terminated due to excavator refusal at depth of 9.8 feet on possible boulder. Bottom of test pit at 9.8 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

TEST PIT LOG

TP-102
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/23/25 **DATE COMPLETED:** 12/23/25
TEST PIT LOCATION: South of existing building
COORDINATES: NA
SURFACE EL.: 100 ft. (see note 1) **TOTAL DEPTH:** 10 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 14.0' x 5.0'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.3 / 99.7	0 ft. - 0.3 ft.: Topsoil
		E		Fill		0.3 ft. - 1 ft.: Silty SAND with Gravel (SM), fine to coarse, 15-20% fines, 15-20% fine to coarse subrounded gravel, trace of organic soil, trace of brick, brown, moist
		E				1 ft. - 4.2 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, ~10% fine to coarse subrounded gravel, brown, moist
2.5	97.5	E				
		E			4.8 / 95.2	4.2 ft. - 4.8 ft.: Silty SAND (SM), fine, 25-30% fines, trace of organic soil, trace of roots, light brown, moist
5.0	95.0	E		Sand and Gravel		4.8 ft. - 10 ft.: Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, ~15% fine to coarse subrounded gravel, olive-brown, moist
7.5	92.5	M	1			REMARK 1: Cobbles ranging up to 12 inches in diameter encountered between depths of 8.0 feet to 10.0 feet.
		D				
10.0	90.0		2		10.0	REMARK 2: Test pit terminated due to excavator refusal at depth of 10.0 feet on possible boulder.
						Bottom of test pit at 10.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-103
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/30/25 **DATE COMPLETED:** 12/30/25
TEST PIT LOCATION: SW of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 10.1 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 9.9 ft. / El. 84.1 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Peter Papazoglou
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 20's / Cloudy
TEST PIT DIMENSIONS: 12.0' x 5.0'
LOGGED BY: OL **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	1.3	0 ft. - 1.3 ft.: Topsoil
		D				
	92.5				92.7	
2.5		D	1	Fill		1.3 ft. - 3.8 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine, 10-15% fines, 15-20% fine to coarse subrounded gravel, light brown, moist REMARK 1: Cobbles ranging up to 12 inches in diameter encountered at depth of 2.1 feet.
	90.0	D				3.8 ft. - 4 ft.: Poorly Graded SAND with Silt (SP-SM), fine, 5-10% fines, 0-5% fine subrounded gravel, trace of organic soil, light brown, moist (appears reworked)
		M				4 ft. - 4.2 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 0-5% fine subrounded gravel, dark brown, moist
5.0		M				4.2 ft. - 6.3 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 0-5% fine subrounded gravel, dark brown, moist
		E			6.3	
	87.5	E		Sand and Gravel	87.7	6.3 ft. - 10.1 ft.: Poorly Graded SAND with Gravel (SP), medium to coarse, 0-5% fines, 15-20% fine to coarse subrounded gravel, orange, moist
7.5		M				
	85.0					
10.0					10.1 ▼	
						Bottom of test pit at 10.1 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-104
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/24/25 **DATE COMPLETED:** 12/24/25
TEST PIT LOCATION: Parking lot north of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 5 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 11.0' x 8.0'
LOGGED BY: OL **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Asphalt	0.3 / 93.7	0 ft. - 0.3 ft.: Asphalt
		E		Fill		0.3 ft. - 0.5 ft.: Silty SAND with Gravel (SM), medium to coarse, ~15% fines, 20-30% fine to coarse subangular gravel, trace of asphalt, black, moist
		E				0.5 ft. - 1.3 ft.: Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, 25-30% fine subrounded gravel, dark brown, moist
	92.5				1.3 / 92.7	
		E		Sand and Gravel		1.3 ft. - 3.2 ft.: Poorly Graded SAND (SP), fine to medium, 0-5% fines, 5-10% fine to coarse subrounded gravel, brown, moist
2.5						
		M				3.2 ft. - 3.7 ft.: Silty SAND with Gravel (SM), fine to medium, 20-25% fines, 15-20% fine to coarse subrounded gravel, light brown, moist
		M				3.7 ft. - 5 ft.: Well Graded SAND with Silt (SW-SM), fine to coarse, 10-15% fines, 10-15% fine to coarse subrounded gravel, light brown, moist
	90.0	M	1			REMARK 1: Boulder ranging up to 2.0 feet in diameter encountered at a depth of 3.8 feet.
		V	2			REMARK 2: Cobbles ranging up to 9.0 inches in diameter encountered from between depths of 4.0 feet to 5.0 feet.
5.0			3		5.0	REMARK 3: Test pit terminated due to excavator refusal at depth of 5.0 feet on boulders.
						Bottom of test pit at 5.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-105
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/24/25 **DATE COMPLETED:** 12/24/25
TEST PIT LOCATION: Parking lot north of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 10.8 ft. / El. 83.2 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 13.0' x 15.0'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Asphalt	0.4	0 ft. - 0.4 ft.: Asphalt
		E		Fill	93.6	0.4 ft. - 1.1 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), medium to coarse, 10-15% fines, ~15% fine subangular gravel, trace of asphalt, black, moist
	92.5	E				1.1 ft. - 2.1 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine, 10-15% fines, 15-20% fine subrounded gravel, brown, moist
2.5		E		Buried Organic Soil	2.1 91.9 2.4	2.1 ft. - 2.4 ft.: Silty SAND (SM), fine, 15-20% fines, dark brown, moist
		E			91.6	2.4 ft. - 3.2 ft.: Silty SAND (SM), mostly fine, 15-20% fines, light brown, moist
	90.0	E	1			3.2 ft. - 4.5 ft.: Silty SAND (SM), fine to medium, 15-20% fines, 5-10% fine subrounded gravel, brown, moist
5.0		E				4.5 ft. - 6.5 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 10-15% fines, 10-15% fine to coarse subrounded gravel, brown (sieve performed) REMARK 1: Double ring infiltrometer test performed at depth of 4.5 feet.
	87.5	E		Sand and Gravel		6.5 ft. - 7.5 ft.: Silty SAND (SM), fine, 15-20% fines, ~5% fine subrounded gravel, gray, moist
7.5		E				7.5 ft. - 11 ft.: Well Graded SAND (SW), fine to coarse, 0-5% fines, 0-5% fine subrounded gravel, orange, moist
	85.0	E				
10.0		M	2			REMARK 2: Boulders and cobbles ranging up to 2.0 feet and 9.0 inches in diameter, respectively, encountered at a depth of 10.5 feet.
			3		11.0	REMARK 3: Test pit terminated at depth of 11.0 feet due to side walls of test pit collapsing. Bottom of test pit at 11.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

TEST PIT LOG

TP-106
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/23/25 **DATE COMPLETED:** 12/23/25
TEST PIT LOCATION: Parking lot north of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 6.1 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: Not Encountered

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 5.0' x 13.0'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		M		Asphalt	0.3 / 93.7	0 ft. - 0.3 ft.: Asphalt
		M		Subbase	0.8 / 93.2	0.3 ft. - 0.8 ft.: Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 15-20% fine to coarse subangular gravel, black, moist
		M				0.8 ft. - 1.4 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 0-5% fine to coarse subrounded gravel, dark brown, moist
	92.5	M	1	Fill		1.4 ft. - 3.2 ft.: Silty SAND (SM), fine, ~15% fines, 10-15% fine to coarse subrounded gravel, tan, moist
2.5		E				REMARK 1: Bricks encountered at a depth of 1.4 feet.
					3.2 / 90.8	3.2 ft. - 6.1 ft.: Poorly Graded SAND with Silt (SP-SM), fine, ~10% fines, orange, moist
	90.0	E		Sand		
5.0			2		6.1	REMARK 2: Test pit terminated due to hitting a drain line at depth of 6.1 feet.
						Bottom of test pit at 6.1 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-107
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/29/25 **DATE COMPLETED:** 12/29/25
TEST PIT LOCATION: SW of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 10.5 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 10.0 ft. / El. 84.0 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Peter Papazoglou
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 20.0' x 6.0'
LOGGED BY: OL **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.6 / 93.4	0 ft. - 0.6 ft.: Topsoil
		E		Fill		0.6 ft. - 1.5 ft.: Silty SAND with Gravel (SM), fine, 15-20% fines, ~15% fine subrounded gravel, trace of roots, black, moist
	92.5	M				
			1			1.5 ft. - 3.9 ft.: Silty SAND with Gravel (SM), fine to medium, 15-20% fines, ~25% fine to coarse subrounded gravel, tan, moist REMARK 1: Cobbles ranging up to 6.0 inches in diameter encountered at depth of 2.0 feet.
2.5		E				
	90.0	M				3.9 ft. - 4.5 ft.: Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, ~10% fines, ~15% fine to coarse subrounded gravel, orange, moist
		E				
		E			4.6 / 89.4	4.5 ft. - 4.6 ft.: Silty SAND (SM), fine to medium, 15-20% fines, 0-5% subrounded gravel, brown, moist
5.0		E				4.6 ft. - 6.9 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 0-5% fine subrounded gravel, tan, moist
	87.5					
7.5		E		Sand and Gravel		6.9 ft. - 10.5 ft.: Poorly Graded SAND (SP), medium to coarse, 0-5% fines, ~10% fine subrounded gravel, orange-red, moist
	85.0					
10.0		D	2		10.5	REMARK 2: Test pit terminated due to excavator refusal at depth of 10.5 feet on possible boulder or rock and side walls collapsing.
						Bottom of test pit at 10.5 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-108
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/24/25 **DATE COMPLETED:** 12/24/25
TEST PIT LOCATION: SW of existing building
COORDINATES: NA
SURFACE EL.: 94 ft. (see note 1) **TOTAL DEPTH:** 9.5 ft.
GROUNDWATER LEVELS:
▽ **DURING EXCAVATION:** Not Encountered
▼ **AT END OF EXCAVATION:** 8.9 ft. / El. 85.1 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 20.0' x 8.0'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	0.8	0 ft. - 0.8 ft.: Topsoil
	92.5	E		Fill	93.2 1.6	0.8 ft. - 1.6 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, ~15% fine to coarse subrounded gravel, brown, moist
		E		Buried Organic Soil	92.4 2.1	1.6 ft. - 2.1 ft.: Silty SAND (SM), fine, 15-20% fines, black, moist
2.5		E		Sand	91.9	2.1 ft. - 4.9 ft.: Poorly Graded SAND (SP), fine, 0-5% fines, tan, moist
	90.0					
5.0		E				4.9 ft. - 6 ft.: Poorly Graded SAND (SP), fine, 0-5% fines, light gray, moist
	87.5	E				6 ft. - 7.5 ft.: Poorly Graded SAND with Silt (SP-SM), mostly fine, trace medium to coarse, 10-15% fines, 0-5% fine subrounded gravel, brown (sieve performed)
7.5		E		Sand and Gravel	7.5 86.5	7.5 ft. - 9.5 ft.: Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 5-10% fines, ~15% fine to coarse subrounded gravel, red, moist
	85.0	M	1		9.5	REMARK 1: Test pit terminated at depth of 9.5 feet due to side walls of test pit collapsing.
						Bottom of test pit at 9.5 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

TEST PIT LOG

TP-109
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/24/25 **DATE COMPLETED:** 12/24/25
TEST PIT LOCATION: SW of existing building
COORDINATES: NA
SURFACE EL.: 93 ft. (see note 1) **TOTAL DEPTH:** 9.6 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: 9.3 ft. / El. 83.7 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Chris Saunders
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 5.0' x 17.0'
LOGGED BY: OL / HK **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
	92.5	E		Topsoil	0.5 92.5	0 ft. - 0.5 ft.: Topsoil
		E		Fill	2.5	0.5 ft. - 2.5 ft.: Poorly Graded SAND with Silt (SP-SM), mostly fine, ~10% fines, 10-15% fine to coarse subrounded gravel, light brown, moist
2.5		E		Buried Organic Soil	90.5 2.9	2.5 ft. - 2.9 ft.: Silty SAND (SM), fine, 15-20% fines, 0-5% fine subrounded gravel, black, moist
	90.0	E			90.1	2.9 ft. - 4.5 ft.: Poorly Graded SAND (SP), fine, 0-5% fines, tan, moist
5.0	87.5	E		Sand and Gravel		4.5 ft. - 7.5 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 0-5% fine subrounded gravel, orange-brown, moist
7.5	85.0	E				7.5 ft. - 9.6 ft.: Well Graded SAND with Silt (SW-SM), fine to coarse, 5-10% fines, 10-15% fine subrounded gravel, orange-brown, moist
		M	1		9.6	REMARK 1: Test pit terminated due to excavator refusal at depth of 9.6 feet on possible boulder.
						Bottom of test pit at 9.6 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

TEST PIT LOG

TP-110
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/29/25 **DATE COMPLETED:** 12/29/25
TEST PIT LOCATION: West side of grass field, SW of existing building
COORDINATES: NA
SURFACE EL.: 92 ft. (see note 1) **TOTAL DEPTH:** 12 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: 8.0 ft. / El. 84.0 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Peter Papazoglou
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 5.0' x 18.0'
LOGGED BY: OL **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	1.1	0 ft. - 1.1 ft.: Topsoil
	90.0	M	1	Fill	90.9	1.1 ft. - 2.8 ft.: Silty SAND with Gravel (SM), fine, 15-20% fines, 15-20% fine to coarse subangular gravel, light brown, moist REMARK 1: Cobbles ranging up to 12.0 inches in diameter encountered at depth of 2.0 feet.
2.5		M				2.8 ft. - 5 ft.: Silty SAND with Gravel (SM), fine, 15-20% fines, 15-20% fine to coarse subangular gravel, trace of roots, gray, moist
	87.5	D			5.0	
5.0		M		Buried Organic Soil	87.0	5 ft. - 7.3 ft.: Silty SAND (SM), fine to medium, 25-30% fines, 5-10% fine subrounded gravel, trace of roots, black, moist
	85.0	E			7.3	
7.5		E		Silt	84.7	7.3 ft. - 12 ft.: SILT (ML), slightly plastic, 10-15% fine sand, trace of swamp deposits, gray, moist
	82.5					
10.0						
	80.0		2		12.0	REMARK 2: Test pit terminated at depth of 12.0 feet due to side walls of test pit collapsing. Bottom of test pit at 12.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

TEST PIT LOG

TP-111
PAGE 1 OF 1

LGCI Lahlaf Geotechnical Consulting, Inc.

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/30/25 **DATE COMPLETED:** 12/30/25
TEST PIT LOCATION: West side of grass field, SW of existing building
COORDINATES: NA
SURFACE EL.: 92 ft. (see note 1) **TOTAL DEPTH:** 11 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: 9.0 ft. / El. 83.0 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Peter Papazoglou
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 20's / Cloudy
TEST PIT DIMENSIONS: 18.0' x 7.0'
LOGGED BY: OL **CHECKED BY:** JA

Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
		E		Topsoil	1.1	0 ft. - 1.1 ft.: Topsoil
	90.0	M	1		90.9	1.1 ft. - 3.3 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine, ~10% fines, 15-20% fine to coarse subrounded gravel, trace of organic soil, light brown, moist
2.5		D	2	Fill		REMARK 1: Cobbles ranging up to 9.0 inches in diameter encountered at depth of 2.0 feet. REMARK 2: Buried organic soil encountered on the west side of the excavation at depth of 2.0 feet.
		M	3			3.3 ft. - 5 ft.: Silty SAND with Gravel (SM), fine to medium, trace coarse, 15-20% fines, ~20% mostly fine subrounded gravel, brown (sieve performed) REMARK 3: Double ring infiltrometer test performed at depth of 3.3 feet.
	87.5	M			5.0	
5.0		E		Buried Organic Soil	87.0	5 ft. - 5.5 ft.: Silty SAND (SM), fine to medium, ~20% fines, 0-5% fine subrounded gravel, black, moist
		E				5.5 ft. - 7 ft.: Poorly Graded SAND with Silt and Gravel (SP-SM), fine, 10-15% fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic soil, gray, moist
	85.0				7.0	
7.5		E		Sand	85.0	7 ft. - 11 ft.: Poorly Graded SAND with Silt (SP-SM), fine, ~10% fines, 0-5% fine subrounded gravel, tan-light brown, moist
	82.5					
10.0					11.0	
						Bottom of test pit at 11.0 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

LGCI
Lahlaf Geotechnical Consulting, Inc.

TEST PIT LOG

TP-112
PAGE 1 OF 1

CLIENT: Dore and Whittier Architects, Inc.
PROJECT NAME: Proposed Wildwood Early Childhood Center
LGCI PROJECT NUMBER: 2437
PROJECT LOCATION: Wilmington, MA

DATE STARTED: 12/29/25 **DATE COMPLETED:** 12/29/25
TEST PIT LOCATION: West side of grass field, SW of existing building
COORDINATES: NA
SURFACE EL.: 93 ft. (see note 1) **TOTAL DEPTH:** 11.5 ft.
GROUNDWATER LEVELS:
DURING EXCAVATION: Not Encountered
AT END OF EXCAVATION: 5.8 ft. / El. 87.2 ft.

EXCAVATION SUBCONTRACTOR: Saunders Construction
EXCAVATION FOREMAN: Peter Papazoglou
EXCAVATOR TYPE/MODEL: Hitachi Zaxis 135 US
WEATHER: 30's / Cloudy
TEST PIT DIMENSIONS: 13.0' x 6.0'
LOGGED BY: OL **CHECKED BY:** JA

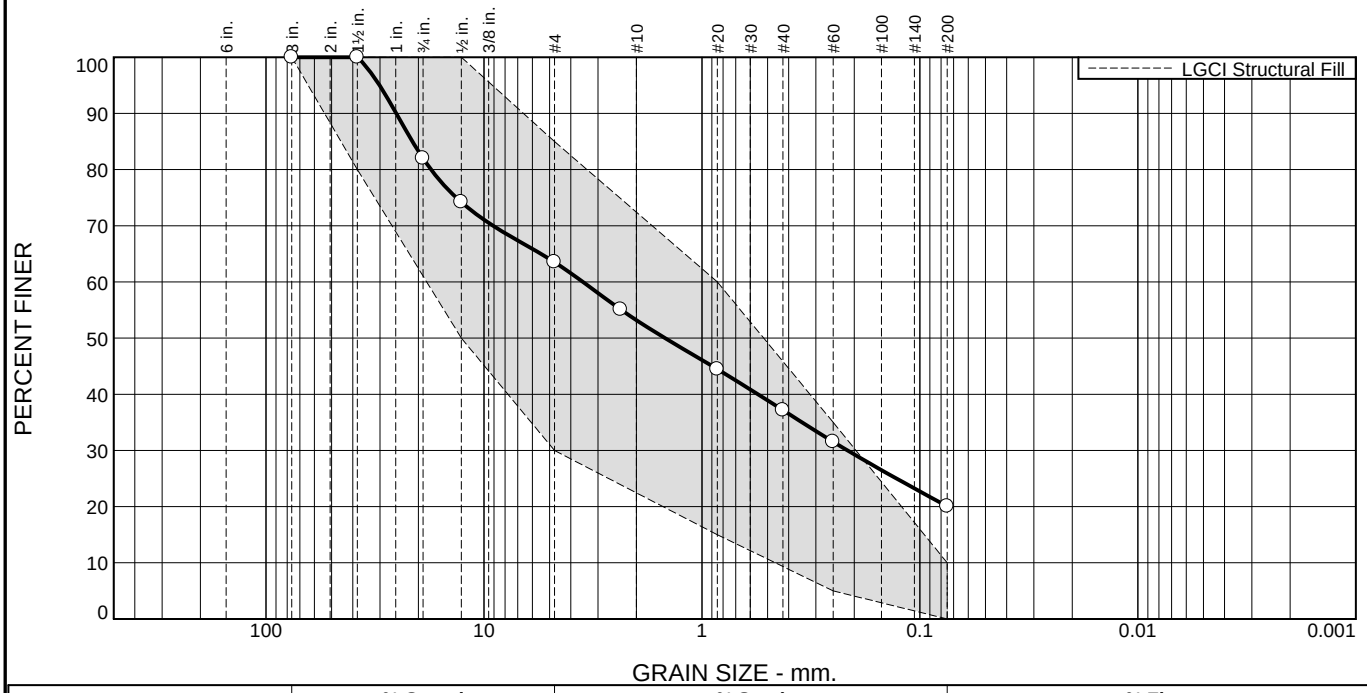
Depth (ft)	El. (ft)	Excavation Effort	Remark	Strata	Depth El.(ft.)	Material Description
	92.5	E		Topsoil	0.8	0 ft. - 0.8 ft.: Topsoil
		E		Fill	92.2	0.8 ft. - 2 ft.: Silty SAND with Gravel (SM), mostly fine, 15-20% fines, ~15% fine to coarse subrounded gravel, trace of roots, trace of organic soil, black, moist (appears reworked)
		M				
2.5		M				2 ft. - 2.5 ft.: Silty SAND with Gravel (SM), fine, 15-20% fines, 15-20% fine to coarse subrounded gravel, trace of roots, trace of organic soil, brown, moist
	90.0	M				2.5 ft. - 4.5 ft.: Silty SAND (SM), fine, 20-25% fines, 10-15% fine to coarse subrounded gravel, trace of roots, trace of organic soil, dark brown, moist
		D	1			REMARK 1: Cobbles ranging up to 9.0 inches in diameter encountered between depths of 3.5 feet to 5.0 feet.
		D		Buried Organic Soil	4.5 88.5	4.5 ft. - 4.9 ft.: Silty SAND with Gravel (SM), fine, 15-20% fines, 15-20% fine to coarse subrounded gravel, gray, moist
5.0					5.1	4.9 ft. - 7 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 0-5% fine subrounded gravel, light brown, moist
	87.5	E	2		87.9	REMARK 2: Boulder with diameter of 2.0 feet encountered at depth of 6.0 feet.
7.5				Sand		7 ft. - 11.5 ft.: Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 0-5% fine subrounded gravel, tan, moist
	85.0	E				
10.0						
	82.5		3		11.5	REMARK 3: Test pit terminated at depth of 11.5 feet due to side walls of test pit collapsing.
						Bottom of test pit at 11.5 feet. Backfilled test pit with excavated material in 12 inch lifts and tamped with excavator.

GENERAL COMMENTS: **E = Easy, M - Moderate, D = Difficult, V = Very Difficult**

1. The ground surface elevation was interpolated to the nearest foot from the Schematic Design Drawings EX-1.0 and EX-1.1 titled: "Existing Conditions Plan, Wilmington Elementary School, 320 Salem Street, Wilmington, MA 01887," (Existing Conditions Plan), prepared by Dore and Whittier Architects, Inc., dated April 24, 2025, and provided to LGCI by Dore and Whittier Architects, Inc. via e-mail on December 4, 2025.

Appendix C – Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.0	18.5	10.3	16.0	17.2	20.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	82.0		
1/2"	74.2	50.0 - 100.0	
#4	63.5	30.0 - 85.0	
#8	55.1		
#20	44.5	15.0 - 60.0	
#40	37.2		
#60	31.5	5.0 - 35.0	
#200	20.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM) , fine to coarse, 20% fines, 36.5% fine to coarse subangular gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 25.2612 D_{85}= 21.2913 D_{60}= 3.5169
D_{50}= 1.4776 D_{30}= 0.2147 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.

Date Received: 10/28/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: JKW

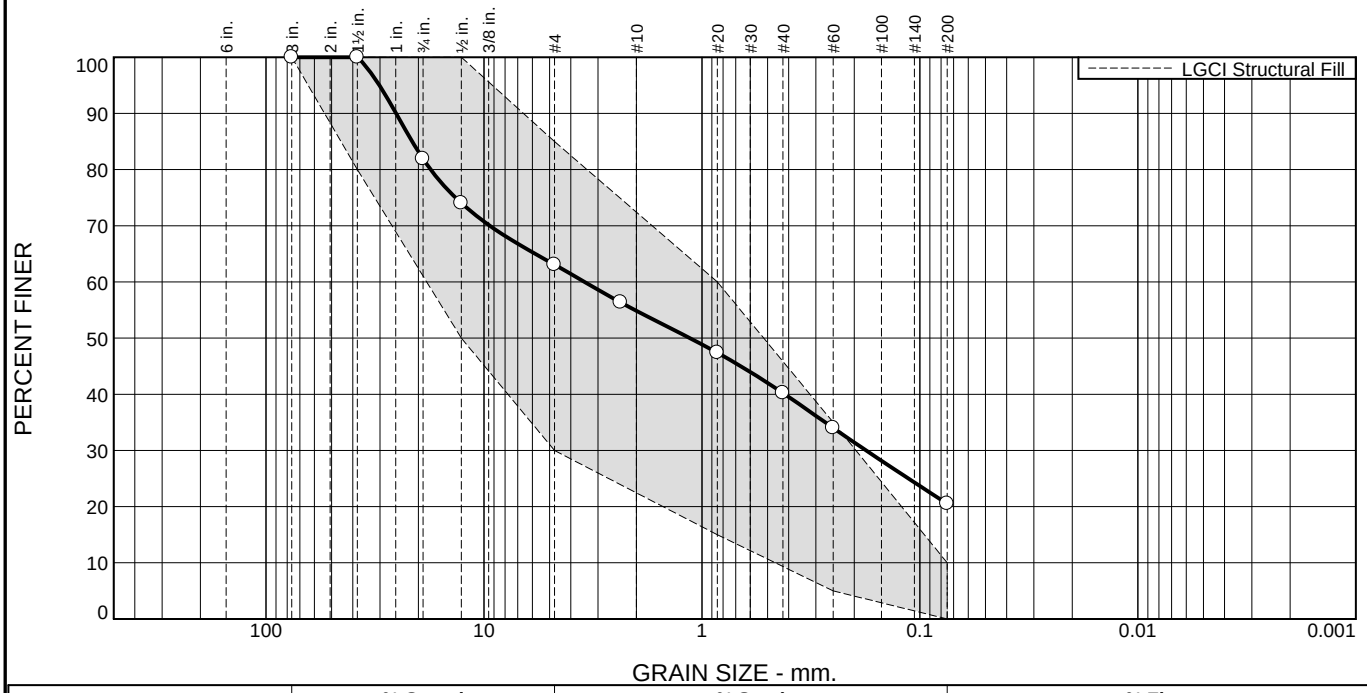
Location: B-1
Sample Number: S2 **Depth:** 2'-4'

Date Sampled: 10/28/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.1	18.8	8.2	14.7	19.7	20.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	81.9		
1/2"	74.0	50.0 - 100.0	
#4	63.1	30.0 - 85.0	
#8	56.4		
#20	47.4	15.0 - 60.0	
#40	40.2		
#60	34.0	5.0 - 35.0	
#200	20.5	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM) , fine to coarse, 20.5% fines, 36.9% fine to coarse subangular gravel, light brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 25.3090 D_{85}= 21.3513 D_{60}= 3.4571
D_{50}= 1.1367 D_{30}= 0.1765 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sand and Gravel Sample.

Date Received: 10/29/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: JKW

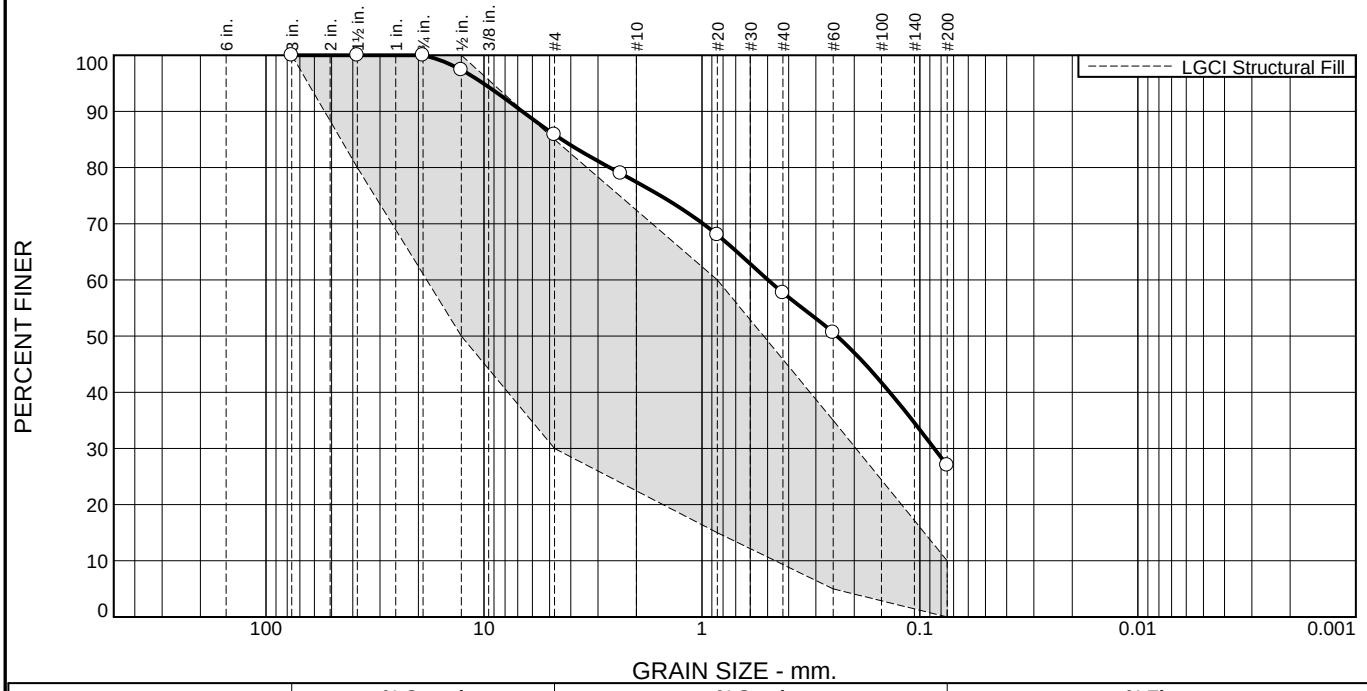
Location: B-4
Sample Number: S2 **Depth:** 2'-4'

Date Sampled: 10/29/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.1	8.5	19.7	30.7	27.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	100.0		
1/2"	97.4	50.0 - 100.0	
#4	85.9	30.0 - 85.0	X
#8	79.0		
#20	68.0	15.0 - 60.0	X
#40	57.7		
#60	50.6	5.0 - 35.0	X
#200	27.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Silt and Gravel (SM), mostly fine to medium, 27% fines, 14.1% fine subangular gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 6.6746 D_{85}= 4.3959 D_{60}= 0.4977
D_{50}= 0.2399 D_{30}= 0.0859 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.
Infiltrometer Test.

Date Received: 10/30/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

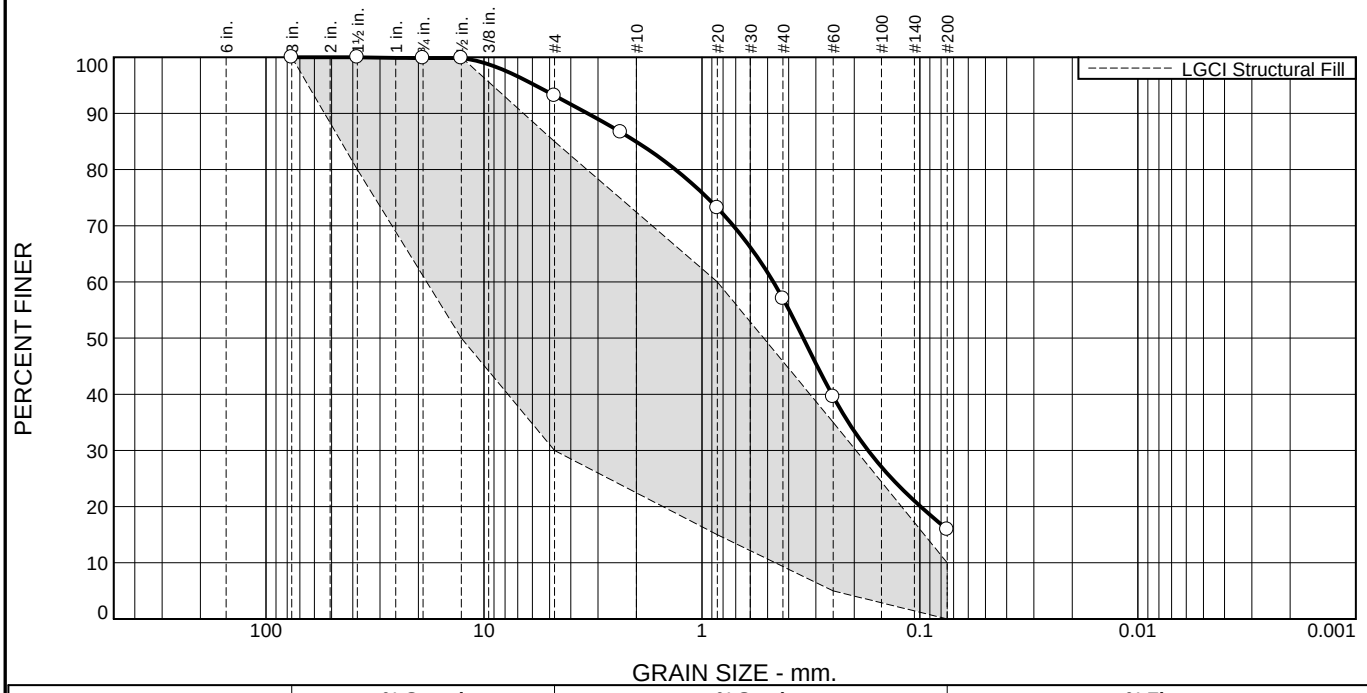
Location: TP-1
Sample Number: Infiltrometer **Depth:** 5'

Date Sampled: 10/30/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.2	6.6	8.2	28.0	41.1	15.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4'	99.8		
1/2"	99.8	50.0 - 100.0	
#4	93.2	30.0 - 85.0	X
#8	86.7		
#20	73.2	15.0 - 60.0	X
#40	57.0		
#60	39.6	5.0 - 35.0	X
#200	15.9	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND (SM), mostly fine to medium, 15.9% fines, 6.8% mostly fine subangular gravel, brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 3.3438 D_{85}= 2.0080 D_{60}= 0.4704
D_{50}= 0.3428 D_{30}= 0.1729 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill Sample.
Infiltrometer Test.

Date Received: 10/30/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

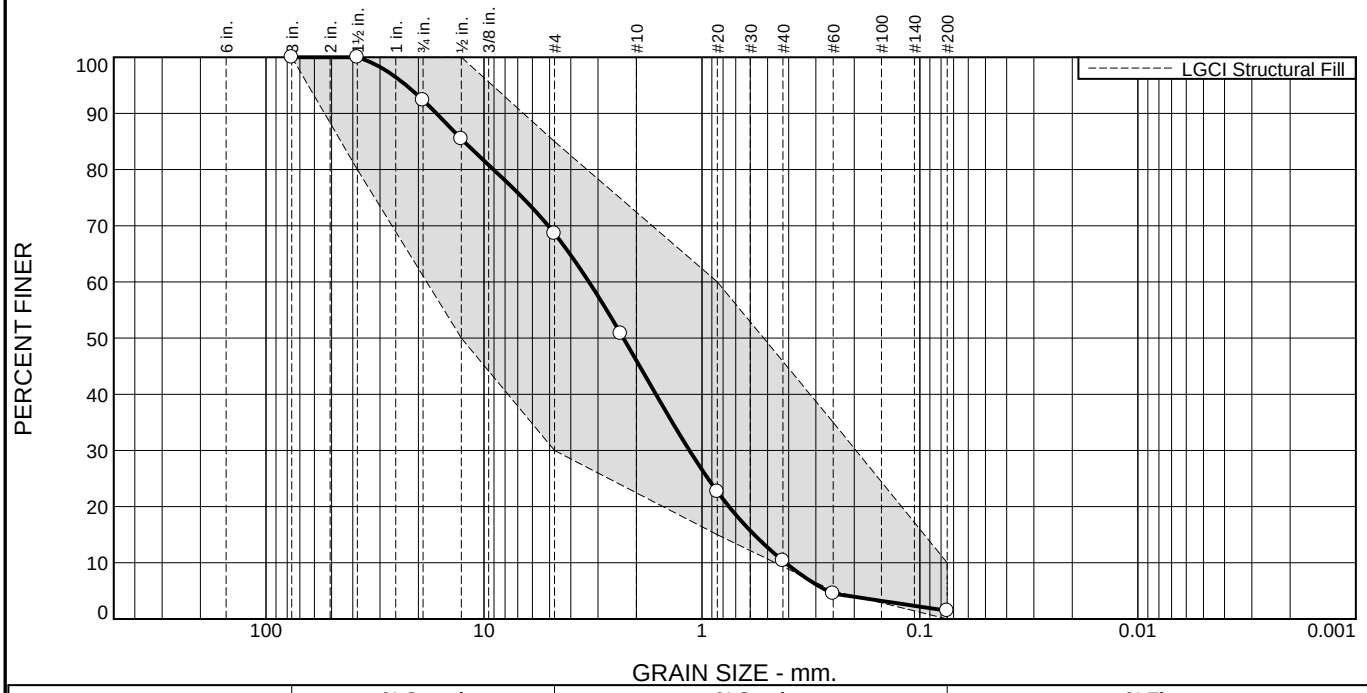
Location: TP-2
Sample Number: Infiltrometer **Depth:** 4'

Date Sampled: 10/30/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.6	23.8	22.6	35.6	8.9	1.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	92.4		
1/2"	85.5	50.0 - 100.0	
#4	68.6	30.0 - 85.0	
#8	50.8		
#20	22.7	15.0 - 60.0	
#40	10.4		
#60	4.5	5.0 - 35.0	X
#200	1.5	0.0 - 10.0	

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Gravel (SP), fine to coarse, 1.5% fines, 31.4% fine to coarse subangular gravel, light brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 16.5194 D_{85}= 12.3470 D_{60}= 3.2999
D_{50}= 2.2934 D_{30}= 1.1409 D_{15}= 0.5758
D_{10}= 0.4140 C_u= 7.97 C_c= 0.95

Remarks

Sand and Gravel Sample.
Infiltrometer Test.

Date Received: 10/31/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

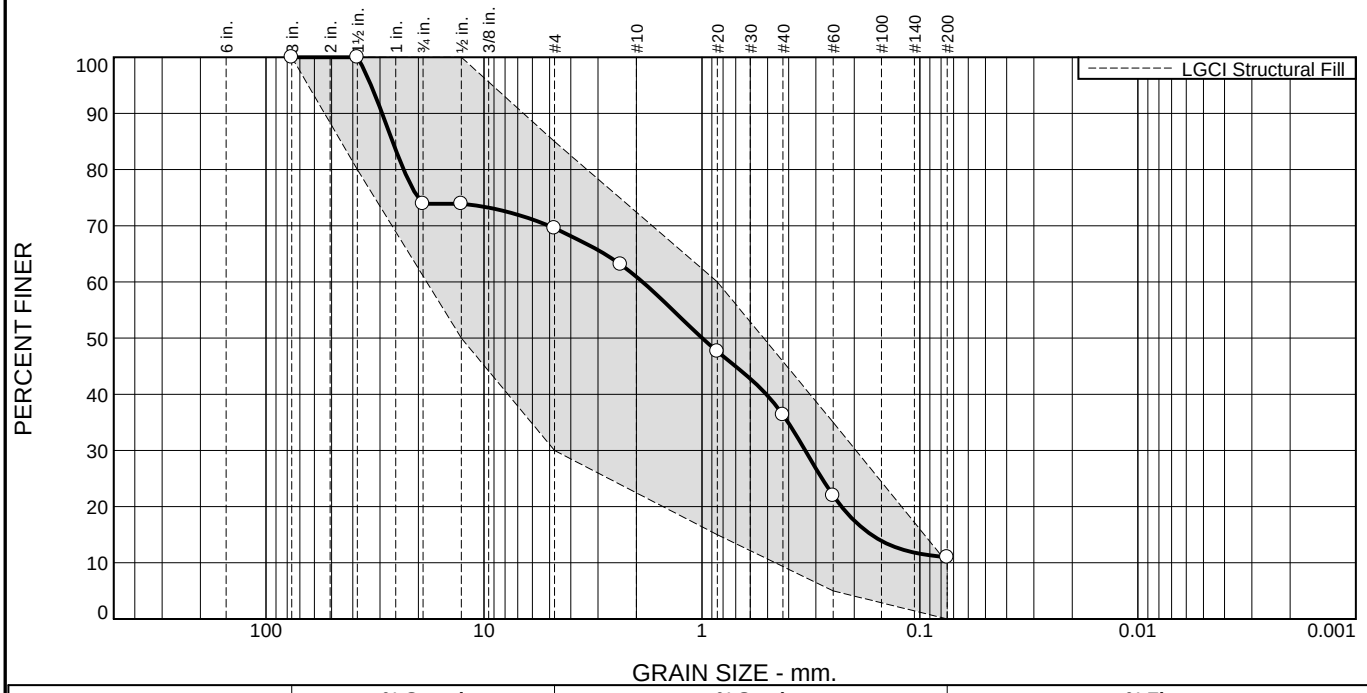
Location: TP-3
Sample Number: Infiltrometer **Depth:** 4'

Date Sampled: 10/31/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.1	4.3	8.7	24.6	25.3	11.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1 1/2"	100.0	80.0 - 100.0	
3/4"	73.9		
1/2"	73.9	50.0 - 100.0	
#4	69.6	30.0 - 85.0	
#8	63.1		
#20	47.6	15.0 - 60.0	
#40	36.3		
#60	22.0	5.0 - 35.0	
#200	11.0	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 11% fines, 30.4% fine to coarse subangular gravel, brown to orange

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 29.3481 D_{85}= 26.2822 D_{60}= 1.8746
D_{50}= 0.9972 D_{30}= 0.3357 D_{15}= 0.1671
D_{10}= C_u= C_c=

Remarks

Sand and Gravel Sample.
Infiltrometer Test.

Date Received: 10/31/24 **Date Tested:** 10/31/24

Tested By: LC

Checked By: SG

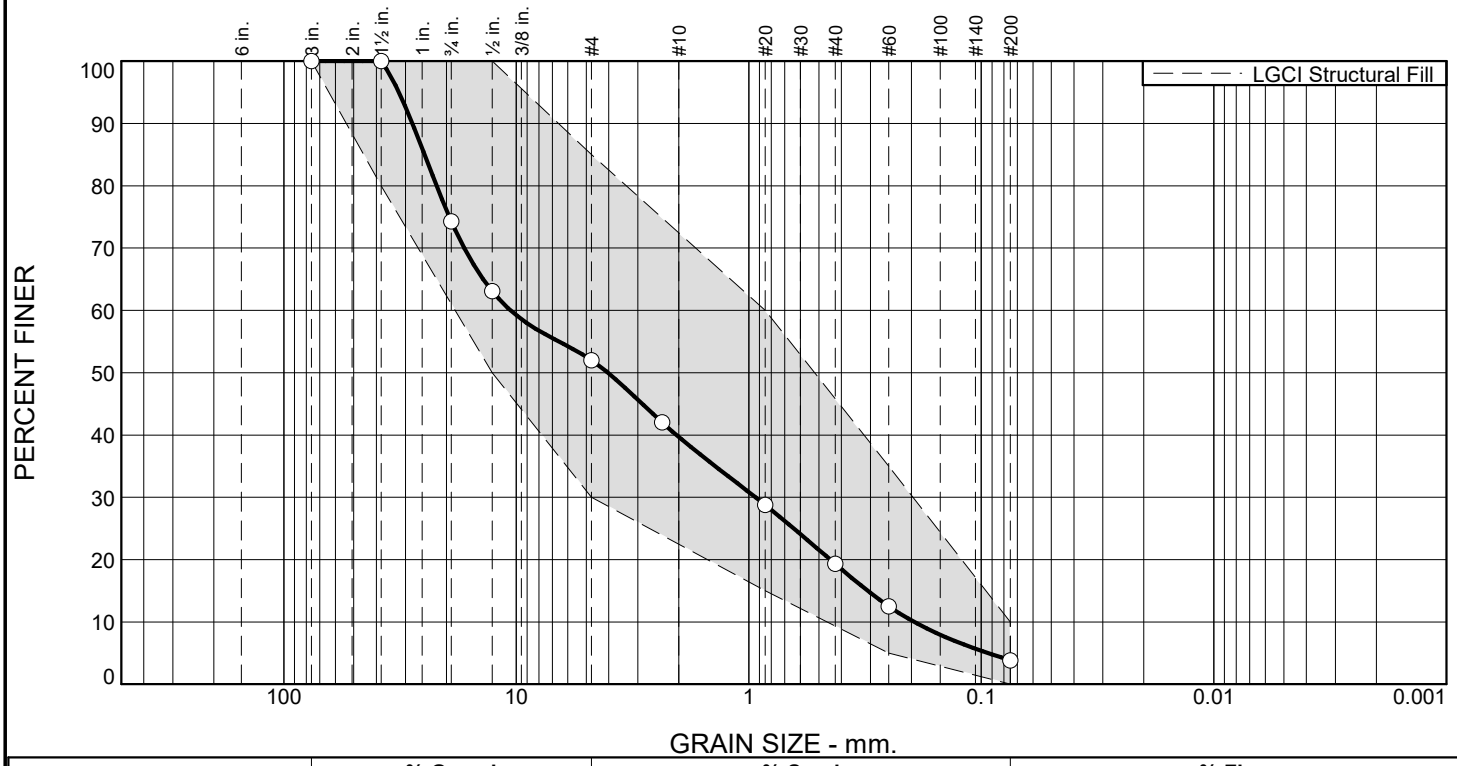
Location: TP-4
Sample Number: Infiltrometer **Depth:** 4.6'

Date Sampled: 10/31/24

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center
Wilmington, MA
Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	25.7	22.3	12.3	20.4	15.5	3.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	74.3		
0.5"	63.1	50.0 - 100.0	
#4	52.0	30.0 - 85.0	
#8	42.0		
#20	28.8	15.0 - 60.0	
#40	19.3		
#60	12.5	5.0 - 35.0	
#200	3.8	0.0 - 10.0	

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Well Graded SAND with Gravel (SW), fine to coarse, 3.8% fines, 48.0% fine to coarse subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 27.9804 D_{85}= 24.8028 D_{60}= 10.5705
D_{50}= 4.0417 D_{30}= 0.9352 D_{15}= 0.3078
D_{10}= 0.1939 C_u= 54.50 C_c= 0.43

Remarks

Fill sample.

Date Received: 11/14/25 **Date Tested:** 12/1/25

Tested By: NP

Checked By: AL

Location: Boring B-107
Sample Number: S2 **Depth:** 2.0'-4.0'

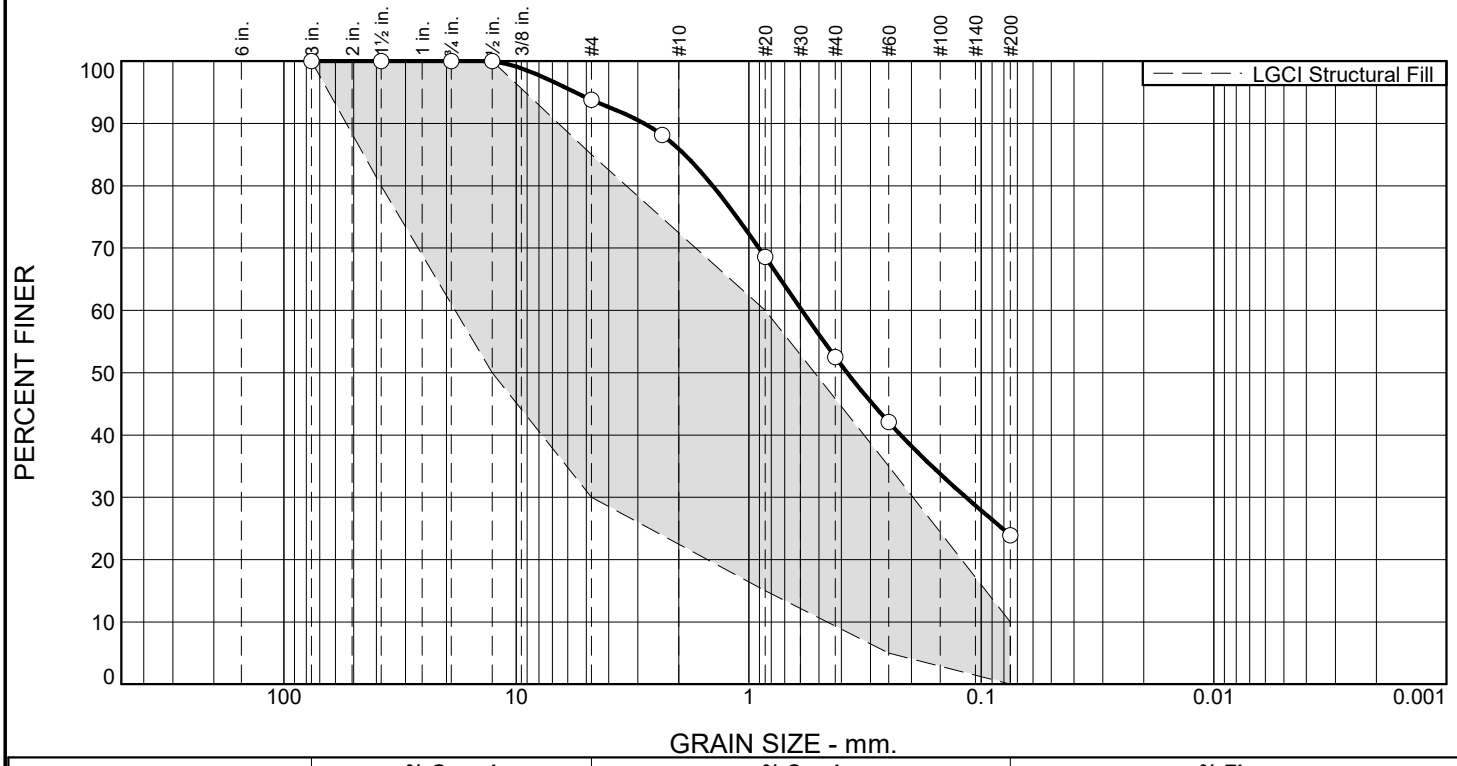
Date Sampled: 11/14/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.2	7.9	33.4	28.6	23.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	100.0		
0.5"	100.0	50.0 - 100.0	
#4	93.8	30.0 - 85.0	X
#8	88.2		
#20	68.6	15.0 - 60.0	X
#40	52.5		
#60	42.1	5.0 - 35.0	X
#200	23.9	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND (SM), mostly fine to medium, 23.9% fines, 6.2% fine subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 2.8128 D_{85}= 1.8859 D_{60}= 0.5910
D_{50}= 0.3773 D_{30}= 0.1162 D_{15}=
D_{10}= C_u= C_c=

Remarks

Fill sample.

Date Received: 11/13/25 **Date Tested:** 12/1/25

Tested By: NP

Checked By: AL

Location: Boring B-110
Sample Number: S2 **Depth:** 3.5'-5.0'

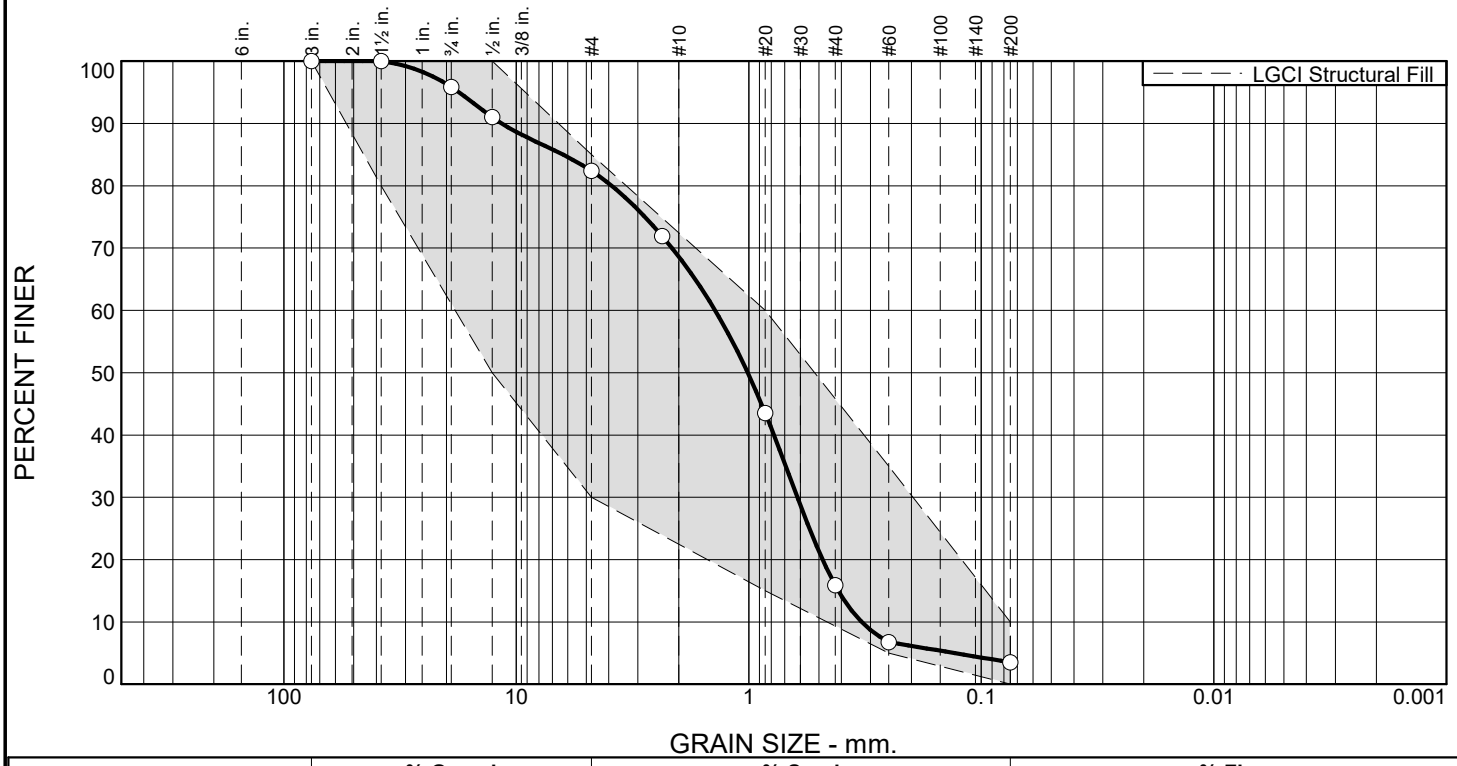
Date Sampled: 11/13/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.1	13.5	13.8	52.7	12.4	3.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	95.9		
0.5"	91.0	50.0 - 100.0	
#4	82.4	30.0 - 85.0	
#8	71.9		
#20	43.5	15.0 - 60.0	
#40	15.9		
#60	6.8	5.0 - 35.0	
#200	3.5	0.0 - 10.0	

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Gravel (SP), mostly medium, trace of fine and coarse, 3.5% fines, 17.6% fine to coarse subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 11.5419 D_{85}= 6.2933 D_{60}= 1.3953
D_{50}= 1.0101 D_{30}= 0.6182 D_{15}= 0.4119
D_{10}= 0.3265 C_u= 4.27 C_c= 0.84

Remarks

Infiltrometer test sample.

Date Received: 12/23/25 **Date Tested:** 12/29/25

Tested By: JA

Checked By: NP

Location: Test Pit TP-101
Sample Number: Infiltrometer **Depth:** 4.6'

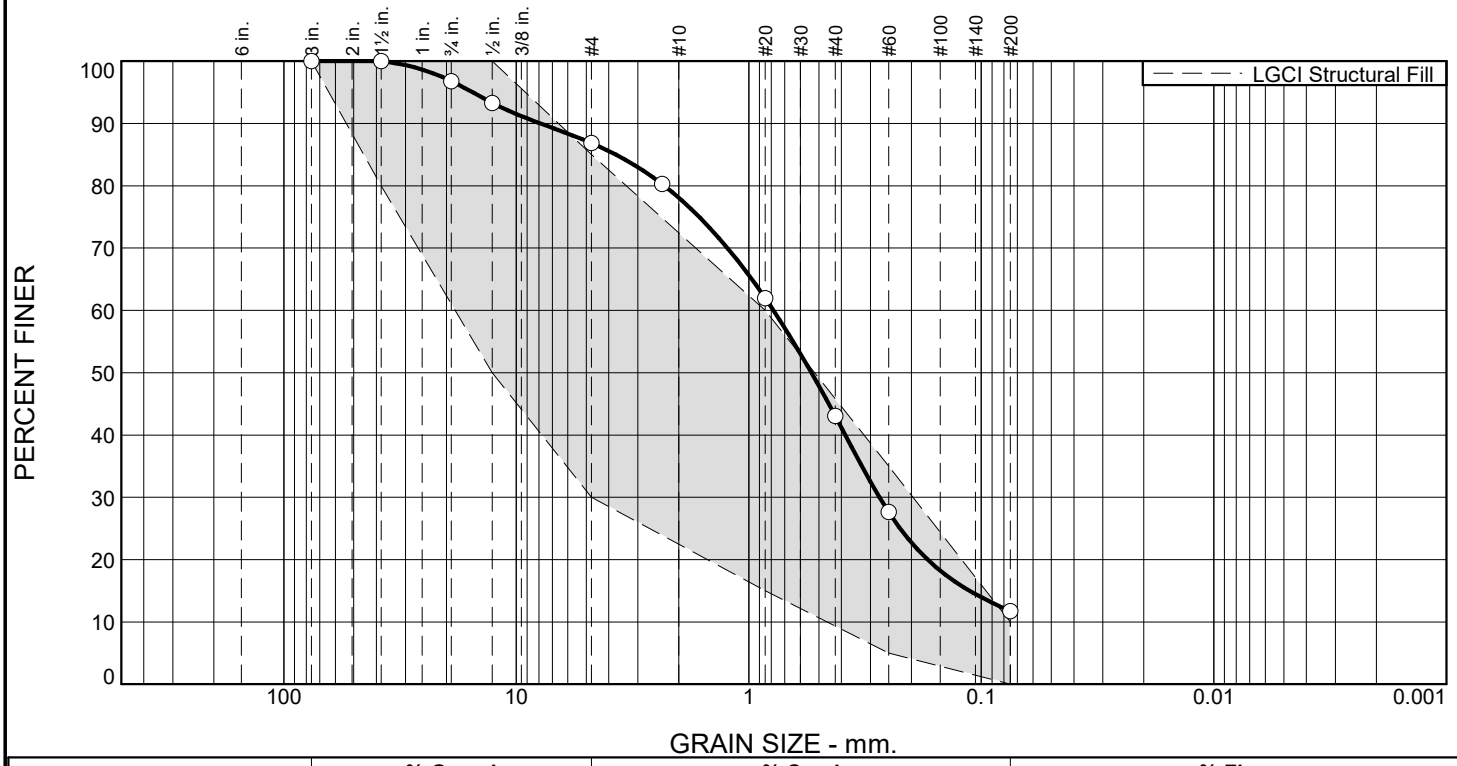
Date Sampled: 12/23/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	9.9	8.8	35.0	31.4	11.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	96.8		
0.5"	93.3	50.0 - 100.0	
#4	86.9	30.0 - 85.0	X
#8	80.3		
#20	62.0	15.0 - 60.0	X
#40	43.1		
#60	27.6	5.0 - 35.0	
#200	11.7	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace of coarse, 11.7% fines, 13.1% fine to coarse subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 7.8670 D_{85}= 3.7298 D_{60}= 0.7836
D_{50}= 0.5381 D_{30}= 0.2740 D_{15}= 0.1123
D_{10}= C_u= C_c=

Remarks

Infiltrometer test sample.

Date Received: 12/24/25 **Date Tested:** 12/29/25

Tested By: JA

Checked By: NP

Location: Test Pit TP-105
Sample Number: Infiltrometer **Depth:** 4.5'

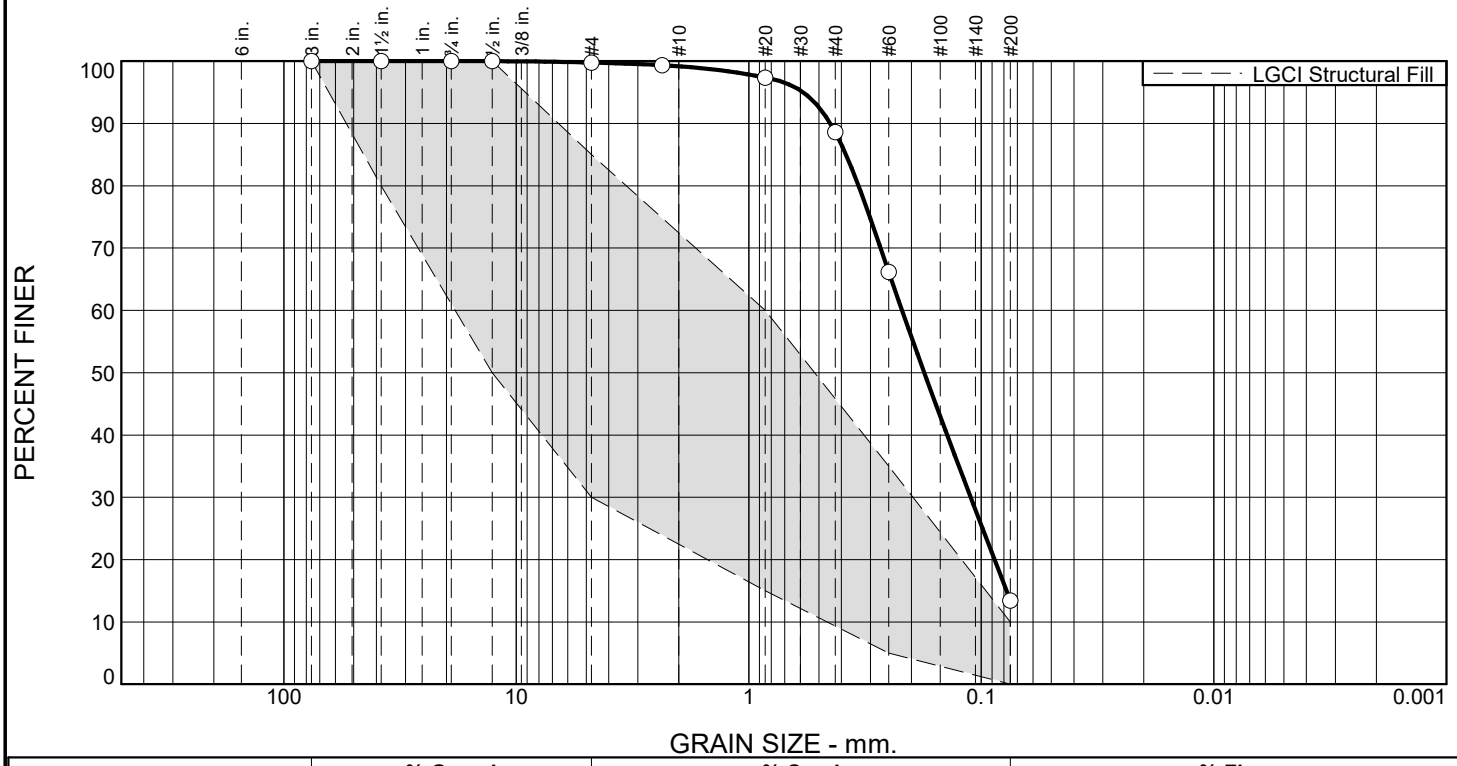
Date Sampled: 12/24/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.6	10.6	75.2	13.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	100.0		
0.5"	100.0	50.0 - 100.0	
#4	99.8	30.0 - 85.0	X
#8	99.4		
#20	97.4	15.0 - 60.0	X
#40	88.6		
#60	66.2	5.0 - 35.0	X
#200	13.4	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Poorly Graded SAND with Silt (SP-SM), mostly fine, trace medium to coarse, 13.4% fines, 0.2% fine subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.4459 D_{85}= 0.3815 D_{60}= 0.2190
D_{50}= 0.1757 D_{30}= 0.1110 D_{15}= 0.0778
D_{10}= C_u= C_c=

Remarks

Infiltrometer test sample.

Date Received: 12/24/25 **Date Tested:** 12/29/25

Tested By: JA

Checked By: NP

Location: Test Pit TP-108
Sample Number: Infiltrometer **Depth:** 6.0'

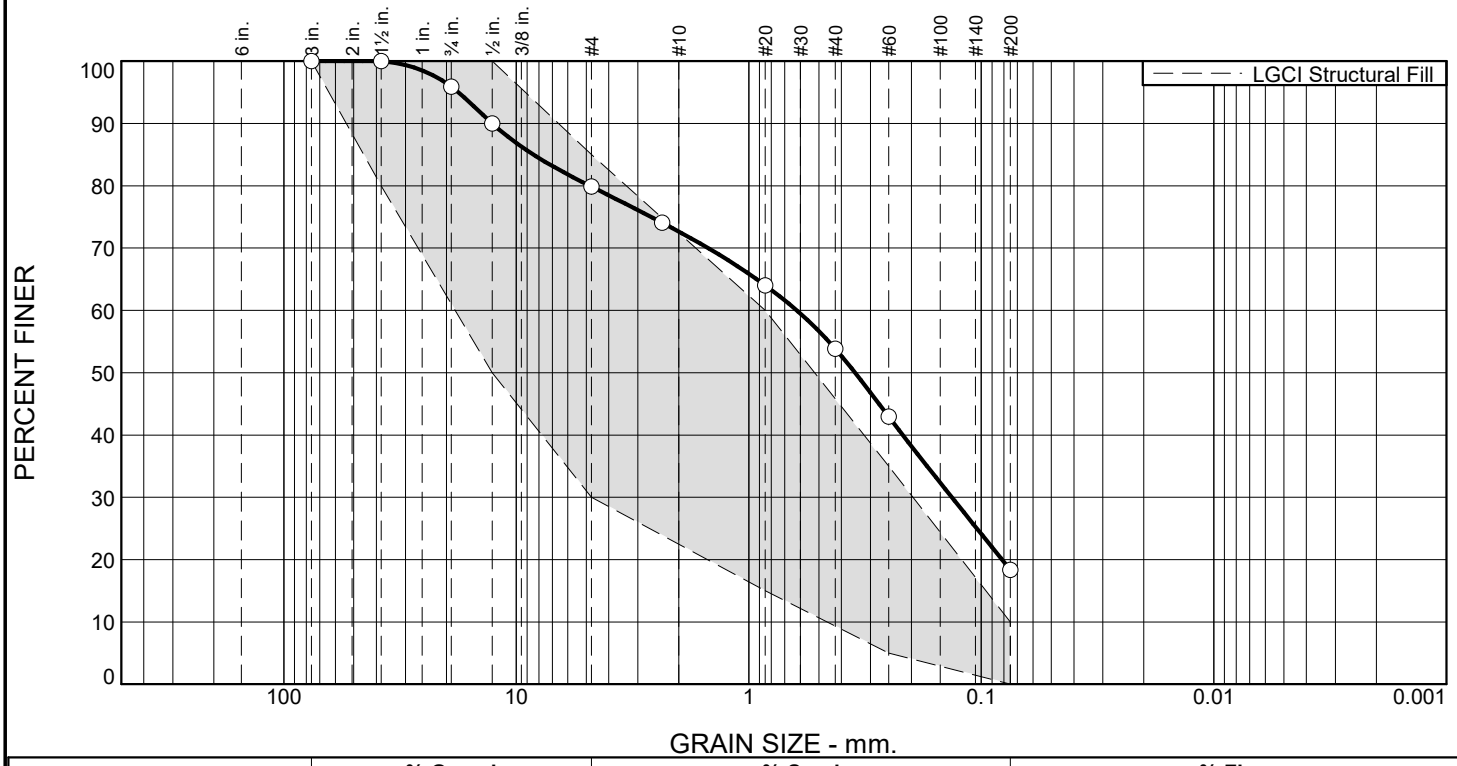
Date Sampled: 12/24/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.1	16.0	7.2	18.9	35.4	18.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0	100.0	
1.5"	100.0	80.0 - 100.0	
0.75"	95.9		
0.5"	90.0	50.0 - 100.0	
#4	79.9	30.0 - 85.0	
#8	74.1		
#20	64.0	15.0 - 60.0	X
#40	53.8		
#60	43.0	5.0 - 35.0	X
#200	18.4	0.0 - 10.0	X

* LGCI Structural Fill

Material Description

ASTM (D 2488) Classification: Silty SAND with Gravel (SM), fine to medium, trace coarse, 18.4% fines, 20.1% mostly fine subrounded gravel, brown

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 12.6878 D_{85}= 8.4304 D_{60}= 0.6225
D_{50}= 0.3488 D_{30}= 0.1338 D_{15}=
D_{10}= C_u= C_c=

Remarks

Infiltrometer test sample.

Date Received: 12/30/25 **Date Tested:** 1/2/26

Tested By: NP

Checked By: AL

Location: Test Pit TP-111
Sample Number: Infiltrometer **Depth:** 3.3'

Date Sampled: 12/30/25

LGCI
Lahlaf Geotechnical Consulting, Inc.

Client: Dore and Whittier Architects, Inc.
Project: Proposed Wildwood Early Childhood Center, Wilmington, MA

Project No: 2437 **Figure**

Appendix D – Results of Double-ring Infiltrometer Tests

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-1

Test Procedure: General accordance with ASTM D 3385

Test Date 10/30/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 5 feet

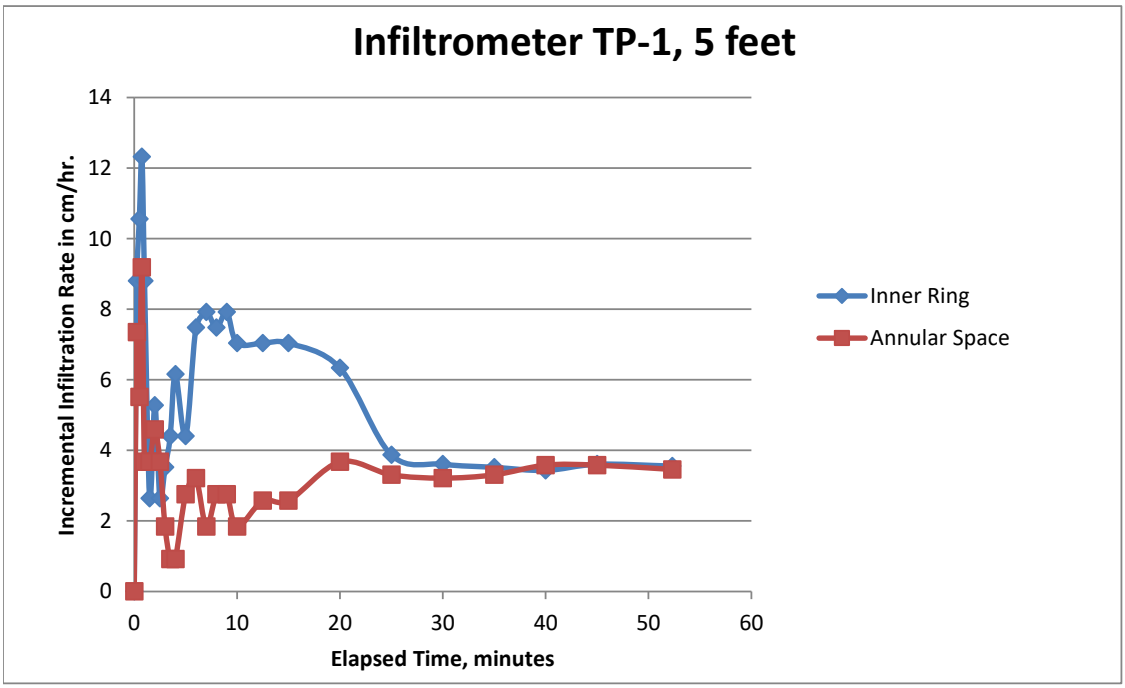
Groundwater Depth: 9.5 ft. / El. 82.5 ft. at the end of excavation

Soil Stratum: ASTM (D 2488) Classification: Silty SAND with Silt and Gravel (SM), mostly fine to medium, 27% fines, 14.1% fine gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	56.3	0	0	57.2	0	0
0.25	0.25	55.8	27	8.8	56.8	67	7.3
0.5	0.25	55.2	32	10.6	56.5	50	5.5
0.75	0.25	54.5	37	12.3	56.0	84	9.2
1	0.25	54.0	27	8.8	55.8	34	3.7
1.5	0.5	53.7	16	2.6	55.4	67	3.7
2	0.5	53.1	32	5.3	54.9	84	4.6
2.5	0.5	52.8	16	2.6	54.5	67	3.7
3	0.5	52.4	21	3.5	54.3	34	1.8
3.5	0.5	51.9	27	4.4	54.2	17	0.9
4	0.5	51.2	37	6.2	54.1	17	0.9
5	1	50.2	54	4.4	53.5	101	2.8
6	1	48.5	91	7.5	52.8	117	3.2
7	1	46.7	96	7.9	52.4	67	1.8
8	1	45.0	91	7.5	51.8	101	2.8
9	1	43.2	96	7.9	51.2	101	2.8
10	1	41.6	86	7.0	50.8	67	1.8
12.5	2.5	37.6	214	7.0	49.4	235	2.6
15	2.5	33.6	214	7.0	48.0	235	2.6
20	5	26.4	385	6.3	44.0	670	3.7
25	5	22.0	235	3.9	40.4	603	3.3
30	5	17.9	219	3.6	36.9	586	3.2
35	5	13.9	214	3.5	33.3	603	3.3
40	5	10.0	209	3.4	29.4	653	3.6
45	5	5.9	219	3.6	25.5	653	3.6
52.3	7.3	0.0	316	3.6	20.0	921	3.5

Notes:



Estimated K = 1.00E-03 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-2

Test Procedure: General accordance with ASTM D 3385

Test Date 10/30/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4 feet

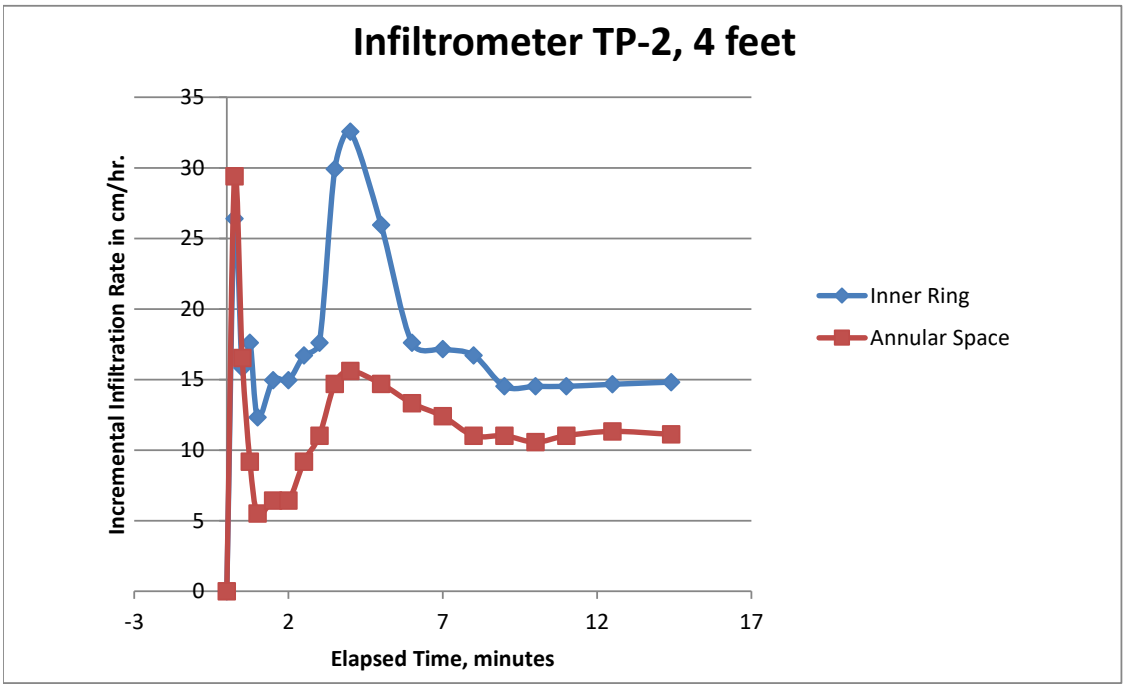
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Silty SAND (SM), moslty fine to medium, 15.9% fines, 6.8% mostly fine subangular gravel, brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.4	0	0	57.5	0	0
0.25	0.25	55.9	80	26.4	55.9	268	29.4
0.5	0.25	55.0	48	15.8	55.0	151	16.5
0.75	0.25	54.0	54	17.6	54.5	84	9.2
1	0.25	53.3	37	12.3	54.2	50	5.5
1.5	0.5	51.6	91	15.0	53.5	117	6.4
2	0.5	49.9	91	15.0	52.8	117	6.4
2.5	0.5	48.0	102	16.7	51.8	168	9.2
3	0.5	46.0	107	17.6	50.6	201	11.0
3.5	0.5	42.6	182	29.9	49.0	268	14.7
4	0.5	38.9	198	32.6	47.3	285	15.6
5	1	33.0	316	26.0	44.1	536	14.7
6	1	29.0	214	17.6	41.2	486	13.3
7	1	25.1	209	17.2	38.5	452	12.4
8	1	21.3	203	16.7	36.1	402	11.0
9	1	18.0	177	14.5	33.7	402	11.0
10	1	14.7	177	14.5	31.4	385	10.6
11	1	11.4	177	14.5	29.0	402	11.0
12.5	1.5	6.4	268	14.7	25.3	620	11.3
14.4	1.9	0.0	343	14.8	20.7	771	11.1

Notes:



Estimated K = 4.06E-03 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-3

Test Procedure: General accordance with ASTM D 3385

Test Date 10/31/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4 feet

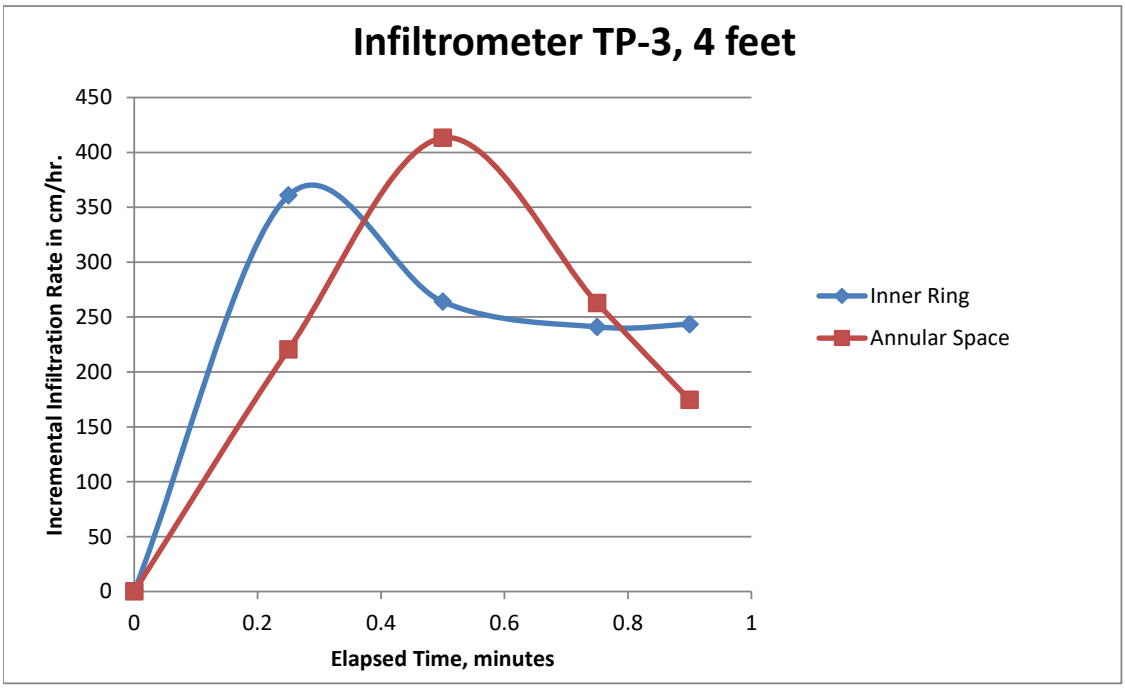
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Poorly Graded SAND with Gravel (SP), fine to coarse, 1.5% fines, 31.4% fine to coarse subangular gravel, light brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.5	0	0	57.5	0	0
0.25	0.25	37.0	1097	360.7	45.5	2010	220.4
0.5	0.25	22.0	803	263.9	23.0	3769	413.3
0.75	0.25	8.3	733	241.1	8.7	2396	262.7
0.9	0.15	0.0	444	243.4	3.0	955	174.5

Notes:



Estimated K 6.73E-02 cm/sec

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Proposed Wilmington School, 320 Salem Street
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: TP-4

Test Procedure: General accordance with ASTM D 3385

Test Date 10/31/2024

LGCI Representative: BH

Weather Conditions: 60's / Cloudy

Test Depth: 4.5 feet

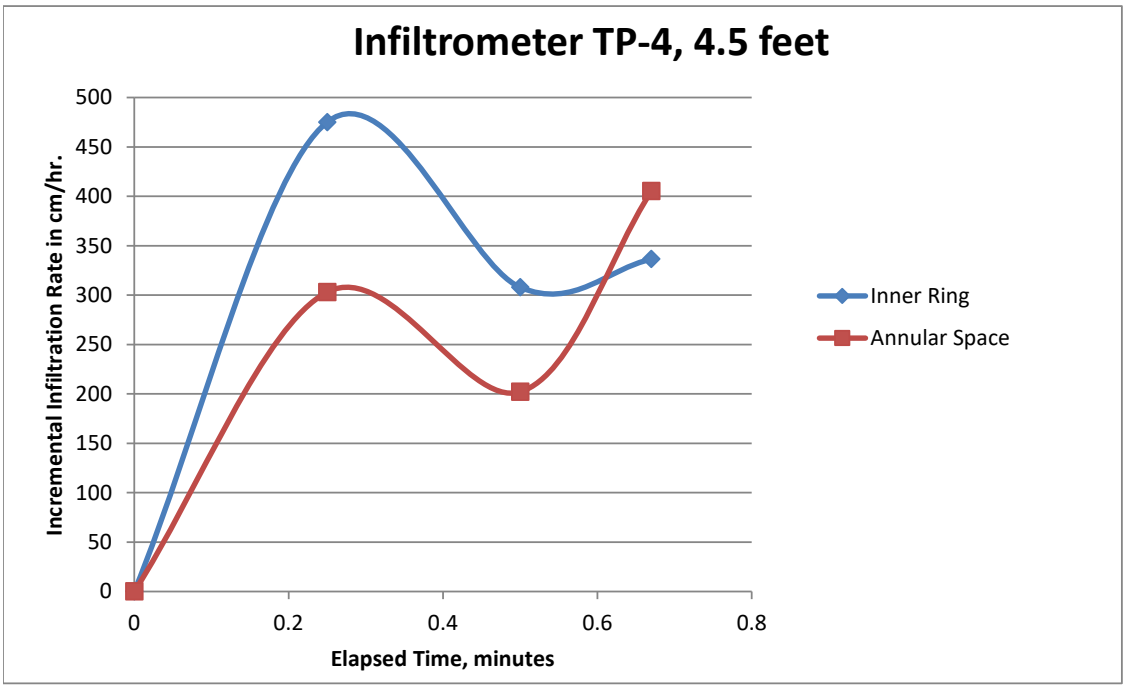
Groundwater Depth: Not Encountered

Soil Stratum: ASTM (D 2488) Classification: Poorly Graded SAND with Silt and Gravel (SP-SM), mostly fine to medium, 11% fines, 30.4% fine to coarse gravel, brown to orange

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	57.5	0	0	57.5	0	0
0.25	0.25	30.5	1445	475.1	41.0	2764	303.1
0.5	0.25	13.0	937	307.9	30.0	1843	202.0
0.67	0.17	0.0	696	336.4	15.0	2513	405.2

Notes:



Estimated K* = 8.95E-02 cm/sec

* Value may not be reliable to short time to complete test

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Prop. Wildwood Early Childhood Center
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: Test Pit TP-101

Test Procedure: General accordance with ASTM D 3385

Test Date 12/23/2025

LGCI Representative: OIL

Weather Conditions: 30's Cloudy

Test Depth: 4.6'

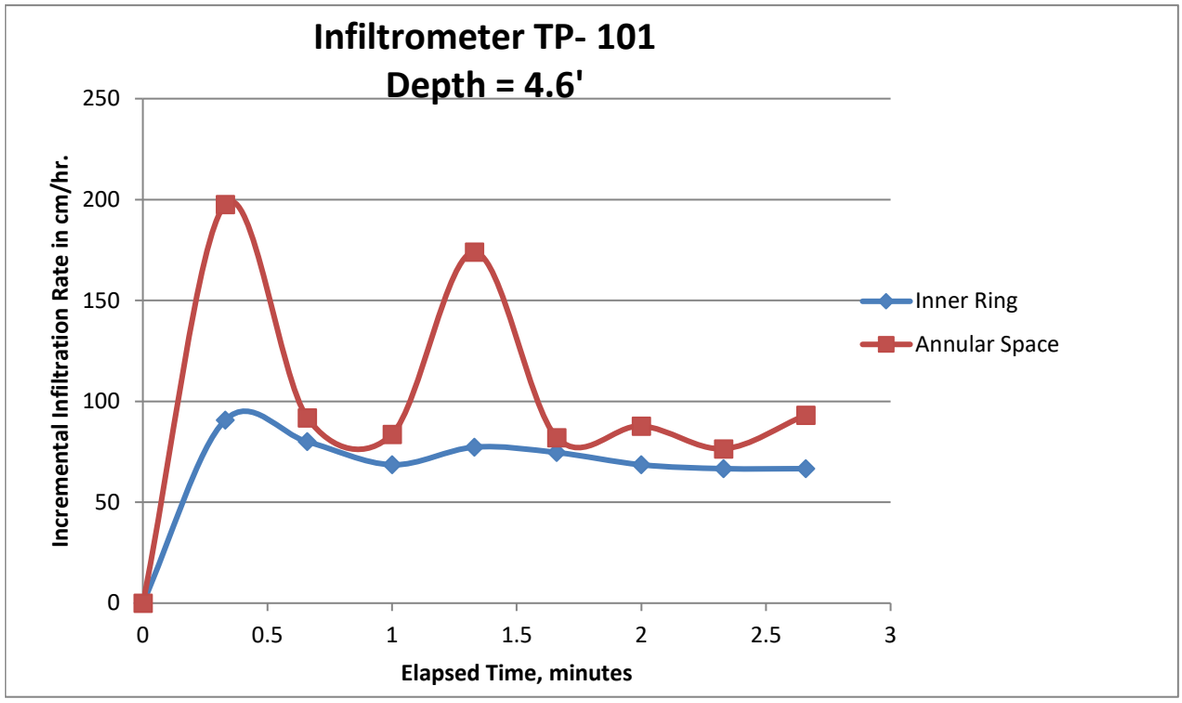
Groundwater Depth: NE

Soil Stratum: Poorly Graded SAND with Gravel (SP), mostly medium, trace of fine and coarse, 3.5% fines, 17.6% fine to coarse subrounded gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	58.3	0	0	58.2	0	0
0.33	0.33	51.5	364	90.6	44.0	2379	197.6
0.66	0.33	45.5	321	80.0	37.4	1106	91.8
1	0.34	40.2	284	68.6	31.2	1039	83.7
1.33	0.33	34.4	310	77.3	24.6	2094	173.9
1.66	0.33	28.8	300	74.6	18.7	988	82.1
2	0.34	23.5	284	68.6	12.2	1089	87.8
2.33	0.33	18.5	268	66.7	6.7	921	76.5
2.66	0.33	13.5	268	66.7	0.6	1122	93.2
3	0.34	9.9	193	46.6	0.0	101	8.1

Notes:



Estimated K = 1.67E-02 cm/sec.

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Prop. Wildwood Early Childhood Center
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: Test Pit TP-105

Test Procedure: General accordance with ASTM D 3385

Test Date 12/24/2025

LGCI Representative: OIL

Weather Conditions: 30's Cloudy

Test Depth: 4.5'

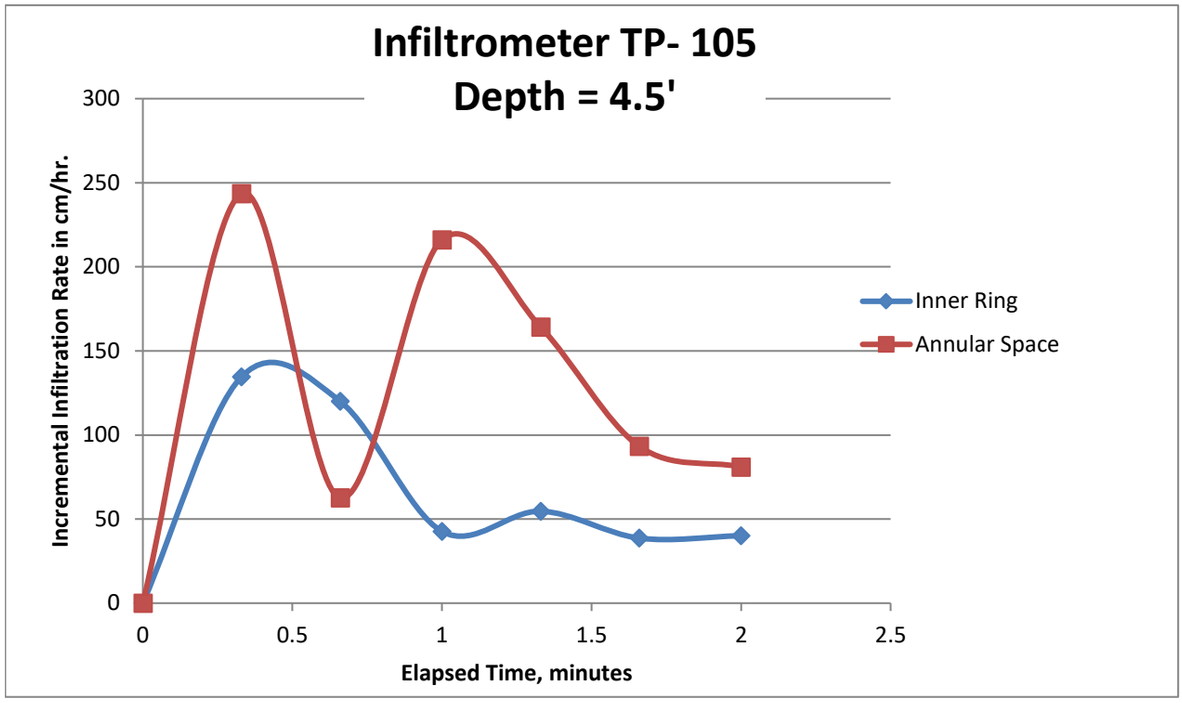
Groundwater Depth: 10.8

Soil Stratum: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace of coarse, 11.7% fines, 13.1% fine to coarse subrounded gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	58.3	0	0	58.3	0	0
0.33	0.33	48.2	541	134.6	40.8	2932	243.5
0.66	0.33	39.2	482	120.0	36.3	754	62.6
1	0.34	35.9	177	42.7	20.3	2680	216.1
1.33	0.33	31.8	219	54.7	15.2	1977	164.2
1.66	0.33	28.9	155	38.7	8.5	1122	93.2
2	0.34	25.8	166	40.1	2.5	1005	81.0
2.33	0.33	24.4	75	18.7	0.0	419	34.8

Notes:



Estimated K = 8.16E-03 cm/sec.

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Prop. Wildwood Early Childhood Center
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: Test Pit TP-108

Test Procedure: General accordance with ASTM D 3385

Test Date 12/24/2025

LGCI Representative: OIL

Weather Conditions: 30's Cloudy

Test Depth: 6.0'

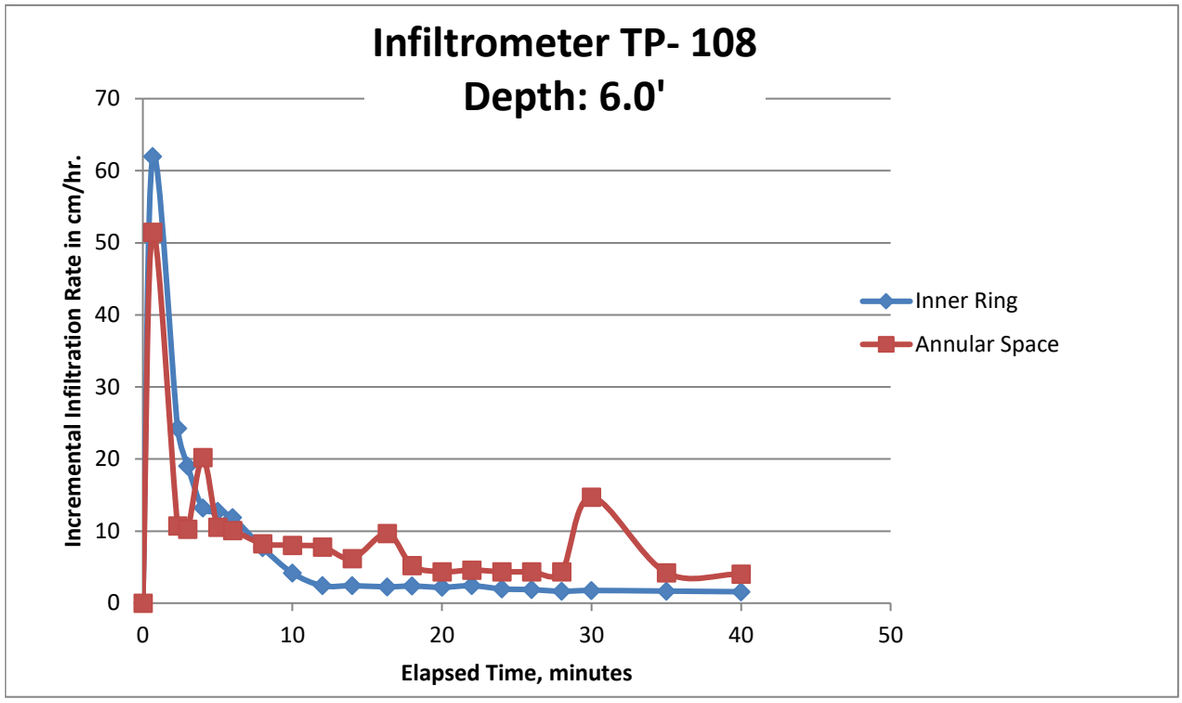
Groundwater Depth: 8.9

Soil Stratum: Poorly Graded SAND with Silt (SP-SM), mostly fine, trace medium to coarse, 13.4% fines, 0.2% fine subrounded gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	58.3	0	0	58.3	0	0
0.66	0.66	49.0	498	62.0	50.9	1240	51.5
2.33	1.67	39.8	492	24.2	47.0	653	10.7
3	0.67	36.9	155	19.0	45.5	251	10.3
4	1	33.9	161	13.2	43.4	737	20.2
5	1	31.0	155	12.8	41.1	385	10.6
6	1	28.3	145	11.9	38.9	369	10.1
8	2	24.8	187	7.7	35.3	603	8.3
10	2	22.9	102	4.2	31.8	586	8.0
12	2	21.8	59	2.4	28.4	570	7.8
14	2	20.7	59	2.4	25.7	452	6.2
16.33	2.33	19.5	64	2.3	22.7	821	9.7
18	1.67	18.6	48	2.4	20.8	318	5.2
20	2	17.6	54	2.2	18.9	318	4.4
22	2	16.5	59	2.4	16.9	335	4.6
24	2	15.6	48	2.0	15.0	318	4.4
26	2	14.8	45	1.9	13.1	318	4.4
28	2	14.0	40	1.6	11.2	318	4.4
30	2	13.2	43	1.8	9.4	1072	14.7
35	5	11.3	102	1.7	4.8	771	4.2
40	5	9.5	96	1.6	0.4	737	4.0

Notes:



Estimated K = 5.70E-04 cm/sec.

LGCI
Lahlaf Geotechnical Consulting, Inc.

Double Ring Infiltrometer Test

Project: Name: Prop. Wildwood Early Childhood Center
Location: Wilmington, MA
LGCI Project Number: 2437

Test Location: Test Pit TP-111

Test Procedure: General accordance with ASTM D 3385

Test Date 12/30/2025

LGCI Representative: OIL

Weather Conditions: 20's Cloudy

Test Depth: 3.3'

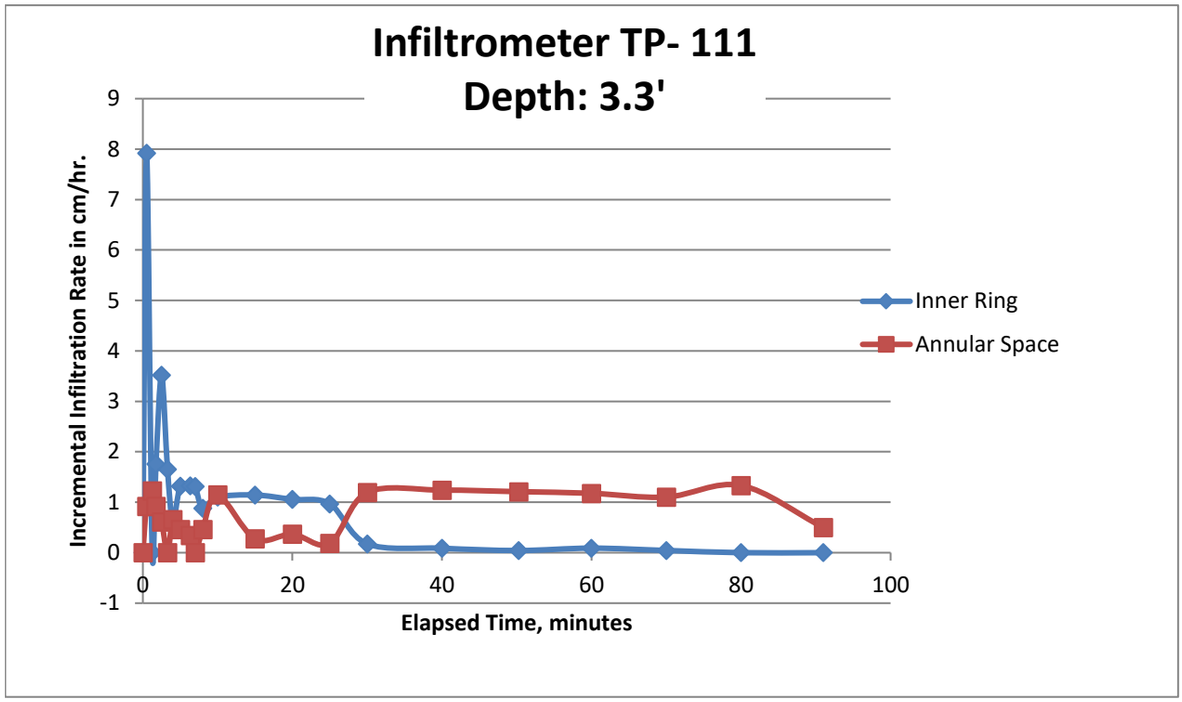
Groundwater Depth: NE

Soil Stratum: Silty SAND with Gravel (SM), fine to medium, trace coarse, 18.4% fines, 20.1% mostly fine subrounded gravel, brown

	Inner Ring	Annular Space
Area (sq. cm)	730	2189
Depth Driven (in)	3	3
Water Depth (in)	3	3
Mariotte tube (cc/div.)	53.52	167.53

Elapsed Time	Time Increment	Inner Ring			Annular Space		
		Reading	Volume	Infiltration Rate	Reading	Volume	Infiltration Rate
(min)	(min)	(div)	(cc)	(cm/hr.)	(div)	(cc)	(cm/hr.)
0	0	58.0	0	0	57.6	0	0
0.5	0.5	57.1	48	7.9	57.5	17	0.9
1.25	0.75	57.1	0	0.0	57.3	34	1.2
1.75	0.5	56.9	11	1.8	57.2	17	0.9
2.5	0.75	56.3	32	3.5	57.1	17	0.6
3.3	0.8	56.0	16	1.6	57.1	0	0.0
4	0.7	55.9	5	0.6	57.0	17	0.7
5	1	55.6	16	1.3	56.9	17	0.5
6.33	1.33	55.2	21	1.3	56.8	17	0.3
7	0.67	55.0	11	1.3	56.8	0	0.0
8	1	54.8	11	0.9	56.7	17	0.5
10	2	54.3	27	1.1	56.5	84	1.1
15	5	53.0	70	1.1	56.2	50	0.3
20	5	51.8	64	1.1	55.8	67	0.4
25	5	50.7	59	1.0	55.6	34	0.2
30	5	50.5	11	0.2	54.3	218	1.2
40	10	50.3	11	0.1	51.6	452	1.2
50.25	10.25	50.2	5	0.0	48.9	452	1.2
60	9.75	50.0	11	0.1	46.4	419	1.2
70	10	49.9	5	0.0	44.0	402	1.1
80	10	49.9	0	0.0	41.1	486	1.3
91	11	49.9	0	0.0	39.9	201	0.5

Notes:



Estimated K = 3.67E-05 cm/sec.

Note : Water froze in testing apparatus during the test. The test results may not be reliable.

UEC universal environmental consultants

January 22, 2026

Ms. Rani Philip
Dore & Whittier Architects
260 Merrimac Street
Newburyport, MA 01950

Reference: **Hazardous Material Inspection Services**
North Intermediate School, Wilmington, MA

Dear Ms. Philip:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Exterior destructive and roofing testing was performed On November 11, 2025, during Design Development at the North Intermediate School, Wilmington, MA.

No significant changes to the original report are found.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

_____

Ammar M. Dieb
President

UEC:\225 918.00\Inspection Letter.DOC

SECTION 00 41 01
FORM FOR TRADE CONTRACTOR BID

WILMINGTON ELEMENTARY SCHOOL REQUEST FOR BIDS (RFB) #23-0847

FROM: _____
(Name of Trade Bidder)

TO: Town of Wilmington, Wilmington Public Schools

A. BASE BID: The undersigned proposes to furnish all labor and materials required for completing all the work for the _____ Trade, for Wilmington Elementary School, located in Wilmington, Massachusetts, in accordance with the hereinafter described Contract Documents, including the Drawings and Specifications dated February 6, 2026, and addenda, all as prepared by Dore & Whittier Architects Inc. for Wilmington Elementary School in Wilmington, Massachusetts, for the Contract Price specified below, subject to the additions and deductions according to the terms of the Specifications.

ALTERNATE NO. 1: Add $_____ Deduct $_____

B. ADDENDA: This sub-bid includes addenda numbered _____, and _____.

C. IMPORTANT INFORMATION: Because this is a Construction Manager at Risk project, all Trade Contractors must include in their Bid price the cost of their providing payment and performance bonds in the full amount of their Bid, including all alternates. All Trade Contractors awarded contracts on this project are required by law to provide full payment and performance bonds at their own expense.

D. The undersigned agrees that, if selected as a Trade Contractor, the undersigned shall, within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a Trade Contract by the Construction Manager, execute such a Trade Contract in accordance with the terms of this Trade Bid, furnish a performance and payment bond of a surety company licensed to do business in the State of Massachusetts and acceptable to the Awarding Authority and the Construction Manager, in the sum of 100 percent of the Trade Contract price. If two sureties are used, the surety companies shall be jointly and severably liable. The Trade Contractor shall also furnish all required insurance certificates, and all other related documents as outlined in the Specifications.

E. SUB-SUB BID LISTING: The names of all persons, firms and corporations furnishing to the undersigned labor or labor and materials for the class or classes or part thereof of work for which the provisions of the section of the Specifications for this sub-trade require a listing in this paragraph, including the undersigned if customarily furnished by persons on its own payroll and in the absence of a contrary provision in the Specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

1. Do not give bid price for any class or part thereof furnished by undersigned.

2. See Section 00 21 13 - Instructions to Bidders TRADE BIDS Paragraph for additional instructions regarding Paragraph E Sub-Sub Bid requirements.

F. Cost of Performance and Payment Bonds (included in BASE BID Paragraph above):

$ _____

G. By submission of this Bid the Trade Contractor certifies that it has prequalified each of the sub-trade subcontractors listed above using criteria similar to the criteria for the prequalification of Trade Contractors.

H. The undersigned hereby certifies that the Trade Contractor will perform the complete trade contract work with employees on its own payroll, except for work listed and identified in SUB-SUB BID LISTING paragraph above.

I. The Undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the hereinbefore described plans, Specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if acceptable to the Awarding Authority and Construction Manager.

J. The Undersigned further agrees to be bound to the Construction Manager by the terms of the hereinbefore described in the Contract Documents, including plans and specifications, including all general conditions stated therein, and addenda, and to assume toward the Construction Manager all the obligations and responsibilities that the Construction Manager, by those documents, assumes toward the Owner.

K. The undersigned further certifies that it shall comply with the prevailing wage law set forth in M.G.L. c. 149, §§26 and 27 and pay wages no less than those set forth in the wage rate tables for the project. The undersigned further certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least ten hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that it will comply fully with all laws and regulations applicable to awards of subcontracts subject to Chapter 149A of the General Laws.

L. The undersigned further certifies under penalties of perjury that this Trade Bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned also certifies that the undersigned (or, if the undersigned is the authorized representative of a company, the company) is the only person interested in this bid; that it is made without any connection with any other person making any submission for the same work; that no person acting for, or employed by, the State of Massachusetts, the Town of Wilmington, Wilmington Public Schools, or the Owner, is directly or indirectly interested in this Bid or any subsequent proposal, or in any contract which may be made under it, or in expected profits to arise there from; that the undersigned Bidder has not influenced or attempted to influence any other person or corporation to file a Bid or subsequent proposal or to refrain from doing so or to influence the terms of the Bid or any subsequent proposal of any other person or corporation; and that this submission is made in good faith without collusion or connection with any other person applying for the same work.

M. The undersigned certifies that if awarded this work it shall comply with all federal and state laws, rules and regulations promoting fair employment practices or prohibiting employment discrimination and unfair labor practices and shall not discriminate in the hiring of any applicant for employment nor shall any qualified employee be demoted, discharged or otherwise subject to discrimination in the tenure, position, promotional opportunities, wages, benefits or terms and conditions of their employment because of race, color, national origin, ancestry, age, sex, religion, disability, handicap, sexual orientation or for exercising any rights afforded by law. The undersigned commits to purchasing supplies and services from certified

minority or women-owned businesses, small businesses or businesses owned by socially or economically disadvantaged persons or persons with disabilities.

N. The undersigned certifies that if awarded this work it shall not knowingly use undocumented workers in connection with the performance of Contracts; that, pursuant to federal requirements, it shall verify the immigration status of all workers assigned to the Contract without engaging in unlawful discrimination; and that it shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker. The Contractor understands and agrees that it must submit documentation of compliance with this requirement for acceptance by the Owner and that any breach of any of these terms during the period of a Contract may be regarded as a material breach, subjecting Contractor to sanctions, including but not limited to monetary penalties, withholding of payments, contract suspension or termination.

O. The undersigned further certifies pursuant to M.G.L. c. 62C, §49A, M.G.L. c. l49A, §8(g) 10, and M.G.L. c. 151A, § 19A, that Bidder has filed all state tax returns and paid all taxes as determined by law and has complied with all state laws pertaining to contributions to the unemployment compensation fund and to payments in lieu of contributions, and all laws relating to reporting of employees and contractors, and withholding and remitting child support.

P. The undersigned further certifies under penalties of perjury that the said undersigned is not presently debarred from doing public construction work in the State of Massachusetts under the provisions of Section 29 F of chapter 29 or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated there-under. The undersigned further certifies under pain and penalties of perjury that it is not presently debarred by the federal government from doing public work under any applicable federal law.

Q. Acknowledgement of Addenda: By signing below, the interested Trade Contractor acknowledges receipt of the addenda listed by Trade Contract bidder on Page 1 of this Form for Trade Contractor Bid.

R. Authorization to Sign: This form must be signed by an officer of the firm or an individual so authorized by an officer of the firm who has personal knowledge regarding the information contained herein.

Date: _____

Full Name of Sub-Bidder: _____
(Name of Person Signing Bid)

Title of Person Signing Sub-Bid: _____

Signature: _____

Business Address: _____

City, State, Zip: _____

Telephone Number: _____

S. The Bid must be accompanied by the following documents to be given consideration:

Completed Section 00 43 02 - Bid Bond Form and Bid Guarantee (Bid Bond or Certified Check.)

Certificate of Eligibility DCAMM Form CQ7.

Completed DCAMM Update Statement, Form CQ3.

Completed Section 00 43 03 - MBE-WBE-SD/VOBE Schedule of Participation.

Completed Section 00 43 04 - MBE-WBE-SD/VOBE Letter of Intent.

Completed Section 00 43 05 - Bidder's Certificate of Payment of Prevailing Wages.

Completed Section 00 43 06 - Bidder's Certificate of Non-Collusion.

Completed Section 00 43 07 - Bidder's Certificate of Labor Harmony.

Completed Section 00 43 08 - Bidder's Certificate of Tax Compliance.

Completed Section 00 43 22 - Unit Prices Form.

END OF SECTION

SECTION 00 43 01
BID FORM SUPPLEMENTS

PART 1 - GENERAL

1.01 FORMS TO BE SUBMITTED WITH BIDS

A. Pursuant to other Division 00 and Division 01 requirements of this Specification and M.G.L. Bidding requirements, the Construction Manager shall submit the following additional documentation with their bids.

B. The following forms shall be completed and submitted with the bids in accordance with the Instructions to Bidders:

1. Section 00 43 02 - Bid Bond Form.
2. Section 00 43 03 - MBE-WBE-SD/VOBE Schedule of Participation:
    a. To be submitted with Trade Bids.
3. Section 00 43 04 - MBE-WBE-SD/VOBE Letter of Intent:
    a. To be submitted with Trade Bids.
4. Section 00 43 05 - Bidder's Certificate of Payment of Prevailing Wages.
5. Section 00 43 06 - Bidder's Certificate of Non-Collusion.
6. Section 00 43 07 - Bidder's Certificate of Labor Harmony.
7. Section 00 43 08 - Bidder's Certificate of Tax Compliance.
8. Section 00 43 22 - Unit Prices Form.

C. Additional documents are required to be submitted with the bid, but are not provided in this Specification, and shall be provided by the bidder with their bids.

1. DCAMM Certificate of Eligibility.
2. Current DCAMM Update Statement.

1.02 FORMS TO BE SUBMITTED PRIOR TO CONTRACT EXECUTION

A. Additional documents are required to be submitted prior to contract execution, copies of which are provided in this Project Manual, and shall be submitted prior to execution of contract, in accordance with Massachusetts General Law:

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 00 43 02
BID BOND FORM

KNOW ALL PEOPLE BY THESE PRESENTS, THAT WE, THE UNDERSIGNED

_____ as Principal, and

_____ as Surety

are hereby held and firmly bound unto the Town of Wilmington, Wilmington Public Schools as Owner, in the penal sum of $_____.

for the payment for which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this_____day of_____ 20 ____ .

The Condition of the above obligation is such that whereas the Principal has submitted to the Owner, a certain Bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for construction of the Wilmington Elementary School, 320 Salem Street, Wilmington, Massachusetts.

NOW, THEREFORE,

If said Bid shall be rejected, or in the alternate,

If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all respects perform the Agreement created by acceptance of said Bid.

Then the Condition of this Obligation is such that if the aforesaid principal shall be awarded the contract the said Principal will, within the time required, enter into a formal contract and give a good sufficient bond to secure the performance of the terms and conditions of the contract, then this obligation to void; otherwise the Principal and Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and the amount for which the Obligee legally contracts with another party to perform the work if the later amount be in excess of the former, but in no event shall liability hereunder exceed the penal sum hereof.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

PRINCIPAL _____ **BY:** _____

SURETY SEAL _____ **BY:** _____

END OF SECTION

SECTION 00 43 03
MBE-WBE-SD/VOBE SCHEDULE OF PARTICIPATION

Schedule For Participation By Minority, Women, And Veteran / Service-Disabled Veteran Business Enterprises

Project Number	23-0847
Project Name:	Wilmington Elementary School
Project Location:	320 Salem Street Wilmington, Massachusetts, 01887

i. and Trade Bidders, utilizing MBE, WBE and/or VBE/SDVOBE firms, and MBE, WBE and/or VBE/SDVOBE sub-bidders, must attach this to their Trade Bid.

BIDDER CERTIFICATION

The Bidder agrees that if awarded the contract it will expend at least the amount of the contract set forth below for MBE, WBE, and VBE / SDVOBE participation, consistent with the goals established for this project. For purposes of this commitment, the MBE, WBE, and VBE / SDVOBE designation means that a business has been certified by the SDO as a MBE, WBE, and/or VBE / SDVOBE. The Bidder must indicate the MBE, WBE, and/or VBE / SDVOBE firms it intends to utilize on the project as follows (attach additional sheets if necessary):

Company Name and Address	MBE, WBE, and/or VBE / SDVOBE	Describe MBE, WBE, and/or VBE / SDVOBE Scopes of Work (clarify "Labor Only", "Material Only", or "Labor and Material")	If Supplier, indicate Total Value of Supplies (60 percent of Total counts toward Participation)	Total Dollar Value of Participation
1.				
2.				
3.				
4.				
5.				

MBE Goal [7]:	$	Total Dollar Value of MBE Commitment:	$
WBE Goal [8]:	$	Total Dollar Value of WBE Commitment:	$
VBE / SDVOBE Goal [9]:	$	Total Dollar Value of VBE / SDVOBE Commitment:	$

The undersigned hereby certifies that the undersigned has read the terms and conditions of the contract with regard to MBE, WBE and VBE/SDVOBE participation and is authorized to bind the Bidder to the commitment set forth above.

Name of Firm	
Business Address	
Authorized Signatory	
Printed Name	

[7] Established by the SDO in consultation with DCAMM.

[8] Established by the SDO in consultation with DCAMM.

[9] VBE/SDVOBE goal is 3 percent.

END OF SECTION

SECTION 00 43 04
MBE-WBE-SD/VOBE LETTER OF INTENT

Letter Of Intent Minority, Women and Veteran / Service-Disabled Veteran Business Enterprises Participation

To be completed by MBE, WBE, and/or VBE / SDVOBE and submitted by Trade Bidder with their bid.

Project Number:	23-0847
Project Name:	Wilmington Elementary School
Project Location:	320 Salem Street Wilmington, Massachusetts 01887
Name of Trade Bidder submitted to:	

Indicate SDO Certification (Check all that apply):

MBE ☐ WBE ☐ VBE ☐ SDVOBE ☐

1. This firm intends to perform work in connection with the above project.
2. This firm is currently certified by the SDO to perform the work identified below and has not changed its minority, women, and/or VBE / SDVOBE ownership, control, or management without notifying the SDO within 30 days of such a change.
3. This firm understands that if theTrade Bidder referenced above is awarded the contract, the Bidder intends to enter into an agreement with this firm to perform the activity described below for the prices indicated. This firm also understands that the above-referenced firm, asTrade Bidder, will make substitutions only as allowed by the terms of the Contract.
4. This firm understands that under the terms of the contract, only work actually performed by an MBE, WBE, and/or VBE / SDVOBE will be credited toward MBE, WBE, and/or VBE / SDVOBE participation goals, and this firm cannot assign or subcontract out any of its work without prior written approval of the Awarding Authority, and that any such assignment or subcontracting will not be credited toward MBE, WBE, and/or VBE / SDVOBE participation goals.

MBE, WBE, and VBE / SDVOBE PARTICIPATION

Section / Item Number (if applicable)	Describe MBE, WBE, and/or VBE / SDVOBE Scopes of Work (Clarify "Labor Only", "Material Only", or "Labor and Material")	If Supplier, indicate Total Value of Supplies (60 percent of Total counts toward Participation)	Dollar Value of Participation

Total Dollar Value: $ _____

Name of MBE / WBE / VBE / SDVOBE Firm	
Business Address	
Print Name	
Authorized Signature	
Title	
Telephone Number	
Fax Number	
Date Signed	

END OF SECTION

SECTION 00 43 05
BIDDER'S CERTIFICATE OF PAYMENT OF PREVAILING WAGES

WILMINGTON ELEMENTARY SCHOOL
320 SALEM STREET, WILMINGTON, MASSACHUSETTS

The undersigned bidder hereby certifies, under the pains and penalties of perjury, that the foregoing bid is based upon the payment to laborers to be employed on the project of wages in an amount no less than the applicable prevailing wage rates established for the project by the Massachusetts Department of Labor and Workforce Development. The undersigned bidder agrees to indemnify the Awarding Authority for, from and against any loss, expense, damages, actions or claims, including any expense incurred in connection with any delay or stoppage of the project work, arising out of or as a result of (1) the failure of the said bid to be based upon the payment of the said applicable prevailing wage rates or (2) the failure of the bidder, if selected as the Construction Manager or Trade Contractor, to pay laborers employed on the project the said applicable prevailing wage rates.

DATED: _____

NAME OF BIDDER: _____
(COMPANY NAME)

BY: _____
(OFFICER'S NAME AND TITLE)

SIGNATURE: _____

END OF SECTION

SECTION 00 43 06
BIDDER'S CERTIFICATE OF NON-COLLUSION

WILMINGTON ELEMENTARY SCHOOL
320 SALEM STREET, WILMINGTON, MASSACHUSETTS

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

DATED: _____

_____
NAME OF BIDDER: (COMPANY NAME)

BY: _____
(OFFICER'S NAME AND TITLE)

SIGNATURE: _____

END OF SECTION

SECTION 00 43 07
BIDDER'S CERTIFICATE OF LABOR HARMONY

WILMINGTON ELEMENTARY SCHOOL
320 SALEM STREET, WILMINGTON, MASSACHUSETTS

The undersigned hereby certifies that the undersigned is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least ten hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that the undersigned will comply fully with all laws and regulations applicable to awards made subject to Section 44E.

DATED: _____

NAME OF BIDDER: _____
(COMPANY NAME)

BY: _____
(OFFICER'S NAME)

SIGNATURE: _____

END OF SECTION

SECTION 00 43 08
BIDDER'S CERTIFICATE OF TAX COMPLIANCE

WILMINGTON ELEMENTARY SCHOOL
320 SALEM STREET, WILMINGTON, MASSACHUSETTS

This certification shall be prepared by a Certified Public Accountant responsible for accounting of the bidding firm.

Pursuant to M.G.L. Chapter 62C, sec. 49A, the undersigned certifies that, to the best of my knowledge and belief, Bidding firm has complied with all the laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

DATED: _____

NAME OF BIDDER: _____
(COMPANY NAME)

RESPONDENT CPA's COMPANY NAME: _____
(if different form Bidder) (CPA COMPANY NAME)

RESPONDENT CPA'S ADDRESS: _____
(if different from Bidder.) _____

_____

RESPONDENT CPA's PHONE NUMBER: _____

BY: _____
(RESPONDENT CPA's NAME)

RESPONDENT'S SIGNATURE: _____

END OF SECTION

SECTION 00 43 09
MASONRY BIDDER'S STATEMENT OF QUALIFICATIONS
SECTION ISSUED IN ADDENDUM NO. 3

A. A Masonry Bidder’s Statement of Qualifications shall be completed by each Masonry Trade Contractor and attached to their Bid Form.
B. All Masonry Trade Contractors must demonstrate past successful experience and work on at least three historic buildings (buildings listed on the State or National Register of Historic Places) within the last five years, with similar conditions to the Wilmington Elementary School project, and that feature the type of work specified in Section 00 11 13 - Invitation to Bid, and in Section 04 01 00 - Maintenance of Masonry.
C. For each past successful project, complete the form provided in this section, listing the property address, contact information for Designer and Owner, approximate value of the work, date of completion of work, and a brief description of the scope of work.
D. Complete a separate form for each past successful project.
E. Qualifications statements may be used by the Awarding Authority to evaluate bidder responsiveness.

MASONRY TRADE BIDDER'S STATEMENT OF QUALIFICATIONS

Bidders for the Masonry Trade Bid category shall complete a copy of this form for each of three restoration projects and attach to their bids.

1. Project Name and Address:

   _____

   _____

   _____

2. Value of Masonry Restoration Work: _____
3. Date of Completion: _____
4. Architect / Designer: (Name and Phone): _____
5. Owner (Name and Phone): _____
6. Brief Description of Masonry Restoration Work:

   _____

   _____

   _____

   _____

   _____

7. Indicate Historic Register Listing Type. Check all that apply:

   ☐ Local, State, or National Historic Landmark

   ☐ National Register Individual Listing

   ☐ National Register District (Contributing)

   ☐ Local Historic District (Contributing)

   ☐ National Register Multiple Resource Area

   ☐ Preservation Restriction (MHC Approved)

END OF SECTION

SECTION 00 43 22
UNIT PRICES FORM

Wilmington Elementary School

Architect's Project Number: 23-0847

The following is the list of Unit Prices referenced in the bid submitted:

BY (Name of Construction Manager or Trade Bidder): _____

TO (Awarding Authority / Owner): Town of Wilmington, Wilmington Public Schools

DATE: _____

UNIT PRICES SCHEDULE

The following are unit prices for specific portions of unforeseen work as listed, and are applicable to the authorized variations of scope or quantity of materials indicated in or readily interpreted from the Contract Documents:

ITEM	DESCRIPTION	ADD
Removal of Unsuitable Soil*	Removal of unsuitable soil shall be based on calculated in-place volume. A copy of the disposal agreement shall be provided to the Owner seven days in advance of the work. It is the Construction Manager's responsibility to verify in-place quantities in advance with the Owner's Project Manager. Price per cubic yard of material.	$_____
Demolition of Unforeseen (concealed) concrete within the indicated limits of building excavation *	Demolish and dispose of excavated concrete material. Volume of concrete to be measured as in-place quantities only. Concrete shall be assumed to contain steel reinforcing bars. Concrete foundations of existing buildings and related site improvements shall not be considered or classified as "unforeseen". Price per ton of material.	$_____
Mass Earth Excavation *	"Common Borrow" (unclassified, general). Price per cubic yard of material.	$_____
Trench Earth Excavation *	0 to 6 feet depth. Price per cubic yard of material.	$_____
Trench Earth Excavation *	Over 6 feet, to12 feet depth. Price per cubic yard of material.	$_____
Mass Rock Excavation *	Boulders between 2 cubic yards and 3 cubic yards in size. Price per cubic yard of material.	$_____
Mass Rock Excavation *	Between 1 cubic yard and 2 cubic yards in size. Price per cubic yard of material.	$_____

ITEM	DESCRIPTION	ADD
Trench Rock Excavation *	0 to 6 foot depth. Price per cubic yard of material.	$_____
Trench Rock Excavation*	Over 6 feet, to 12 feet depth. Price per cubic yard of material.	$_____
Removal of Petroleum-Contaminated Soil*	Price per ton of material.	$_____
Open Ledge Excavation *	Open demolition, excavation, loading, and hauling off-site for disposal. Boulders larger than 3 cubic yards, and solid masses of buried rock ledge. Price per cubic yard of material.	$_____
Vehicular Bituminous Concrete Paving	Two courses, with full gravel base, and base course, as described in the Contract Documents. Price per square yard of pavement area.	$_____
Approved Topsoil	Spread in-place. Price per cubic yard of material.	$_____
Fine Grading and Seed	Spread In-place Price per square yard of area.	$_____
Sod turf	Including soil preparation and fine grading, in-place. Price per square yard of area.	$_____
Structural Fill	Compacted, in-place. Price per cubic yard of material.	$_____
Ordinary Fill	Price per cubic yard of material.	$_____
Common Borrow	Price per cubic yard of material.	$_____
Graded Gravel Fill "Granular Fill"	Compacted, in-place. Price per cubic yard of material.	$_____
Bedding Material	Price per cubic yard of material.	$_____
Dense Graded Crushed Stone for Subbase	Price per cubic yard of material.	$_____
Crushed Washed Stone	3/4-inch. Price per cubic yard of material.	$_____
Crushed Washed Stone	1-1/2 inch. Price per cubic yard of material.	$_____

ITEM	DESCRIPTION	ADD
Pea Gravel	Price per cubic yard of material.	$_____
Filter Fabric	See Section 31 20 00 - Earthwork, FILTER FABRIC paragraph. Price per square yard of material, installed.	$_____
Geotextile Fabric No. 1	See Section 31 20 00 - Earthwork. Price per square yard of material, installed.	$_____
Geotextile Fabric No. 2	See Section 31 20 00 - Earthwork. Price per square yard of material, installed.	$_____
Geotextile Fabric No. 3	See Section 31 20 00 - Earthwork. Price per square yard of material, installed.	$_____
Additional electrical outlet with breaker	Furnish and Install one 20 amp duplex power outlet, and dedicated 20 amp breaker in distribution panel. Include junction box and up to 100 feet of conductor and required conduits. Price per each new outlet location not indicated in Construction Documents.	$_____
Additional electrical outlet	Furnish and Install one 20 amp duplex power outlet on circuit shared with other outlets. Include junction box and up to 25 feet of conductor and required conduits for extension of circuit wiring from nearby outlets. Price per each new outlet location not indicated in Construction Documents.	$_____
Additional single voice / data outlet	Furnish and Install one single voice / data drop. Include junction box, up to 200 feet of data cable as specified for data network in conduits as specified, and complete termination of wiring at patch panel and integration with data system. Price per unit per location not indicated in Construction Documents.	$_____
Additional dual voice / data outlet	Furnish and install one dual voice / data drop. Include junction box, up to 200 feet of data cable as specified for data network in conduits as specified, and complete termination of wiring at patch panel and integration with voice/data system. Price per unit per location not indicated in Construction Documents.	$_____
Structural Steel Beams, Angles, Columns, and Plates	Material cost, cost of detailing, fabrication, delivery and installation, for unit weight up to 15 pounds per linear foot.	$_____
Structural Steel Beams, Angles, Columns, and Plates	Material cost, cost of detailing, fabrication, delivery and installation, for unit weight of 15 to 30 pounds per linear foot.	$_____
Structural Steel Beams, Angles, Columns, and Plates	Material cost, cost of detailing, fabrication, delivery and installation, for unit weight of 30 to 60 pounds per linear foot.	$_____
Structural Steel Beams, Angles, Columns, and Plates	Material cost, cost of detailing, fabrication, delivery and installation, for unit weight over 60 pounds per linear foot.	$_____
Beam Penetrations	Reinforcement in the shop for penetrations for ducts and other utilities, per detail. Price per penetration.	$_____

ITEM	DESCRIPTION	ADD
Roof Openings	Provide frame for opening in roof, per detail of ____. Price per roof opening.	$_____
Roof Openings	Premium to provide frame for opening in roof per detail ____, after steel erection is complete. Price per roof opening.	$_____
Self-Leveling Underlayment	Self-Leveling Underlayment: Tile Trade Contractor, Resilient Flooring Trade Contractor, and Terrazzo Trade Contractor shall provide unit price for self-leveling underlayment at all concrete slabs to receive tile, resilient flooring, and terrazzo, respectively. Construction Manager shall provide unit price for self-leveling underlayment at types of flooring not assigned to a Trade Contractor Provide unit price as a basis for calculating deductions of self-leveling underlayment at areas where field conditions meet FF and FL tolerances and requirements of flooring manufacturer for flooring installation without application of self-leveling underlayment. See Section 03 54 00 - Concrete Toppings. Price per square foot.	$_____

NOTES

(1) Items marked with an asterisk (*) shall include completion of the excavation; formation and compaction of the sub-grade where required by the contract documents for the type of fill; loading, hauling, and disposal of surplus or unsuitable material, in accordance with the drawings and specifications or per direction of the Architect.

(2) Measurements which describe depth of excavation or structures shall mean depth below existing grades encountered prior to the start of an identified unit price scope of work.

(3) Submitted unit prices shall reflect the total cost for each unit item described, including overhead and profit. Deductions based on unit prices shall not include deductions in overhead and profit. Therefore, unit price deductions will be calculated as 90 percent of the submitted unit price.

(4) Where no value is indicated or "N/A" is stated, there is zero cost for the work described relative to this subcontractor's or Trade Contractor 's scope of work.

(5) See Section 02 28 20 - Asbestos Abatement for unit price values to be incuded for abatement and revoval of asbestos-containing materials.

BASE BID AMOUNTS TO BE CARRIED

The base bid includes all work within the limit of work lines as shown on the drawings and specified within this project manual. By submitting this form with the Bid, the Construction Manager or Trade Bidder certifies that any amounts of work provided for below relating to the scope of work of this Construction Manager or Trade Bidder scope of work, based on the stated specification sections, have been accounted for in the base bid amount. If such conditions are not found, a credit, to be calculated as a unit price deduction as described above, will be provided to the Owner without prejudice.

The base bid amount includes the following quantities of materials and work as described in the table above:

Section 26 00 10 - Electrical:

Section 26 00 10 - Electrical:

____ additional 20 amp duplex power outlets and dedicated 20 amp breakers in distribution panel. Include junction box and up to 100 feet of conductor and required conduits per each outlet location.

Ten additional 20 amp duplex power outlets and dedicated 20 amp breakers in distribution panel. Include junction box and up to 100 feet of conductor and required conduits per each outlet location.

Section 31 20 00 - Earthwork:

_____ cubic yards of Mass Rock Excavation - between 2 cubic yards and 3 cubic yards in size.

_____ cubic yards of Trench Rock Excavation, 0 to 6 foot depth.

_____ cubic yards of Trench Rock Excavation, over 6 foot, to 12 foot depth.

_____ cubic yards of Unsuitable Materials.

Bidder's Signature: _____

Date: _____

Trade Contract
or subcontract Category: _____

END OF SECTION

SECTION 00 43 25
SUBSTITUTION REQUEST FORM - DURING BIDDING

Wilmington Elementary School - # 23-0847

Date: _____

To: Bryce Taft, Dore & Whittier Architects Inc., BTaft@DoreandWhittier.com

Request Submitted By: _____

Specification Section / Paragraph Number: _____

Item Description per Specification: _____

Proposed Substitution Product Trade Name: _____

Manufacturer Name: _____

Manufacturer Address: _____

Product History: ☐ New Product ☐ 1 - 5 years ☐ 5 - 10 years ☐ 10+ years

Material or Performance Differences Between Specified and Proposed Products: Provide general description here, and provide point by point comparison of products including, but not limited to all specified requirements, product characteristics, performance features, warranties, and material and installation costs. **Substitution requests received without a thorough comparison will be rejected.**

Similar Installation References:

Project: _____

Address: _____

Owner's Representative: _____

Architect Name and Phone: _____

Date of Installation: _____

Proposed substitution affects other parts of work: ☐ No ☐ Yes, as follows:

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

Proposed substitution affects LEED for Schools v4/v4.1 requirements of work: ☐ No ☐ Yes

If "Yes", specifically identify the credit criteria impacted and demonstrate how the proposed substitution meets the same credit criteria: _____

The Undersigned Certifies:

I have reviewed this substitution request thoroughly, and certify the following by undersigning below:

1. Proposed substitution has been fully investigated by the undersigned and has been determined to be equal or superior in all respects to specified product.
2. At a minimum, a warranty equivalent to that available for the specified product or required by the specification shall be furnished for proposed substitution. Where the proposed substitution features a superior warranty, the superior warranty shall be conveyed to the Owner.
3. The same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed substitution shall have no adverse effect on other trades and shall not affect or delay progress schedule.
5. Proposed substitution does not affect dimensions and functional clearances. Any deviations from the construction documents required to accommodate this substitution are indicated on the attached sketches and drawings.

Signed by: _____

Company: _____

Attachments: _____

Unsigned / incomplete Substitution Request Forms will be rejected.

Architect's Review and Action

☐ Substitution accepted: Make submittals in accordance with Specification Section 01 25 00 - Substitution Procedures.

☐ Substitution conditionally accepted as noted below: Make submittals in accordance with the following:

Section 01 25 00 - Substitution Procedures.

Section 01 60 00 - Product Requirements.

☐ Substitution rejected: Use specified materials. The substitution has been reviewed and found not to be equivalent to the specified product in terms of quality, durability, performance, and/or appearance.

☐ Substitution Request not timely: Use specified materials.

Review Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Signed by (Print): _____ Date: _____

Signature: _____

END OF SECTION

SECTION 00 50 00.10
PERFORMANCE BOND

Bond No. _____

KNOWN ALL PEOPLE BY THESE PRESENTS:

That,_____ as Principal, herein called Principal,
(Here insert name and address, or legal title of Contractor)

and _____as Surety, hereinafter called Surety,
(Here insert name and address of Surety)

are held and firmly bound unto _____as Obligee, hereinafter called Obligee, in the amount of ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a contract with Obligee for _____ in accordance with Drawings and Specifications prepared by Dore & Whittier Architects Inc., which contract is by reference made a part hereof, and is hereinafter referred to as the contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully perform said contract, and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever Principal shall be, and be declared by Obligee to be in default under the contract, the Obligee having performed Obligee's obligations thereunder:

(1) Surety may promptly remedy the default subject to the provisions of Paragraph 3 herein or;

(2) Obligee after reasonable notice to Surety may, or Surety upon demand of Obligee may arrange for the performance of Principal's obligation under the contract subject to the provisions of Paragraph 3 herein;

(3) The balance of the contract price, as defined below, shall be credited against the reasonable cost of completing performance of the contract. If completed by the Obligee, and the reasonable cost exceeds the balance of the contract price the Surety shall pay to the Obligee such excess, but in no event shall the aggregate liability of the Surety exceed the amount of this bond. If the Surety arranges completion or remedies the default, that portion of the balance of the contract price as may be required to complete the contract or remedy the default and to reimburse the Surety for its outlays shall be paid to the Surety at the times and in the manner as said sums would have been payable to Principal had there been no default under the contract. The term "balance of the contract price," as used in this Paragraph, shall mean the total amount payable by Obligee to Principal under the contract and any amendments thereto, less the amounts heretofore properly paid by Obligee under the contract.

Any suit under this bond must be instituted before the expiration of (a) two years from the date on which final payment under the contract falls due; or (b) the applicable statute of limitations of the jurisdiction in which the bond is executed, whichever is later.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Obligees named herein or the heirs, executors, administrators or successors of the Obligees.

Signed and sealed this _____ day of _____, 20____ .

IN THIE PRESENCE OF:

_____
(Witness)

_____
(Witness)

_____
(Principal)

_____
(Title)

_____
(Surety)

_____
(Title)

Performance Bond: This bond is issued simultaneously with another bond in favor of the Obligee conditioned for the full and faithful performance of the contract.

END OF SECTION

SECTION 00 50 00.20
LABOR AND MATERIAL PAYMENT BOND

Bond No. _____

KNOWN ALL PEOPLE BY THESE PRESENTS:

That,_____ as Principal, herein called Principal,
(Here insert name and address, or legal title of Contractor)

and _____as Surety, hereinafter called Surety,
(Here insert name and address of Surety)

are held and firmly bound unto _____as Obligee, hereinafter called Obligee, in the amount of ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a contract with Obligee for _____ in accordance with Drawings and Specifications prepared by Dore & Whittier Architects Inc., which contract is by reference made a part hereof, and is hereinafter referred to as the contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Principal shall promptly make payments to all claimants as hereinafter defined, for all labor and materials used or reasonably required for use in the performance of the contract, and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or with a subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the contract. Labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service, rental of equipment, payroll taxes, contributions for unemployment insurance, old age pensions and annuities which are measured by wages and/or salaries directly applicable to the contract.

(2) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of 90 days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The Obligee shall not be liable for the payment of any costs or expenses of any such suit.

(3) No suit or action shall be commenced hereunder by any claimant,

(a) After the expiration of one year following the date on which Principal ceased work on said contract it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(b) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in United States District Court for the district in which the project or any part thereof, is situated, and not elsewhere.

(4) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder.

Signed and sealed this _____ day of _____, 20____ .

IN THIE PRESENCE OF:

_____
(Witness)

_____
(Witness)

_____
(Principal)

_____
(Title)

_____
(Surety)

_____
(Title)

Labor and Material Payment Bond: This bond is issued simultaneously with another bond in favor of the Obligee conditioned for the full and faithful performance of the contract.

END OF SECTION

SECTION 00 72 05
MBE-WBE-SD/VOBE PARTICIPATION GOALS PRE-BID ADJUSTMENT

A. MBE, WBE, AND VBE / SDVOBE PARTICIPATION

The Construction Manager's and Trade Contractors' compliance with the requirements of this section is a requirement for receiving the Award of the Contract.

B. PROCEDURE FOR PRE-BID ADJUSTMENT OF MBE, WBE, AND/OR VBE / SDVOBE PARTICIPATION GOALS

1. Criteria for Adjustment of Goals

Potential Bidders may request an adjustment of the goals listed above before bids are submitted. The Awarding Authority reserves the right to accept and review written requests but does not have the authority to grant such requests made by a Construction Manager to adjust the MBE, WBE, and/or VBE / SDVOBE design and construction participation goals established for this contract. Such written requests must demonstrate to the Awarding Authority's satisfaction that there is no feasible way for a non-MBE, non-WBE, or non-VBE / SDVOBE Construction Manager to meet the goals established for this contract and that a “Diligent Good Faith Effort” was made to comply. If this criterion is met, the Awarding Authority will submit the Construction Manager's request to the SDO. Factors that may be considered in granting an adjustment of the contract goals include any or all of the following:

- Actual availability of certified MBEs, WBEs, and/or VBEs / SDVOBEs.
- The geographic location of the project.
- The scope of work and opportunities for subcontracting the work.
- Other relevant factors including documented inability by the Construction Manager to obtain commitments from MBE, WBE, and/or VBE / SDVOBE subcontractors sufficient to meet the respective goals after having made a diligent, good faith effort to do so.

2. Process for Requesting Adjustment of Construction Goals

Deadlines and Documentation:

Requests from Construction Manager to adjust the MBE, WBE, and/or VBE / SDVOBE participation goals for this Contract must be received by the Awarding Authority no later than five working days after the list of Trade Bidders is distributed by the Awarding Authority to persons who have taken out plans for the Contract.

The Awarding Authority will not consider any request to adjust the MBE, WBE, and/or VBE / SDVOBE participation goals for this Contract that is received after the deadline.

Requests from Construction Managers to adjust the MBE, WBE, and/or VBE / SDVOBE participation goals for this Contract must be received by the Awarding Authority in a timely manner and must contain all documentation the Construction Manager relies upon for the request. Such documentation shall include, at a minimum, the following:

• A list of all items of work under the Contract that the Construction Manager made available for subcontracting to MBEs, WBEs, and/or VBEs / SDVOBEs. The Construction Manager shall identify all items of work, other than work to be performed by Trade Bidders, that the Construction Manager did not make available and shall state the reasons for not making such work available for subcontracting, for review by the Awarding Authority and ultimately the SDO. The Construction Manager shall also demonstrate that, where commercially reasonable, subcontracts were divided into scopes or tasks capable of being performed by MBEs, WBEs, and/or VBEs / SDVOBEs.

• Evidence that the Construction Manager sent written notices soliciting Bids or proposals to perform the items of work made available by the Construction Manager for subcontracting to all MBEs, WBEs, and/or VBEs / SDVOBEs qualified to perform such work. The Construction Manager shall identify (i) each MBE, WBE, and/or VBE / SDVOBE solicited, and (ii) each MBE, WBE, and/or VBE / SDVOBE listed in the SDO directory under the applicable trade category that was not solicited and reasons therefore that no qualified MBEs, WBEs, and/or VBEs / SDVOBEs are available, qualified MBEs, WBEs, and/or VBEs / SDVOBEs did not respond, lack of eligible MBEs, WBEs, and/or VBEs / SDVOBEs in the geographical region, or there are no certified MBEs, WBEs, and/or VBEs / SDVOBEs certified in the scope of work of the project including the opportunity for subcontracting. The Construction Manager shall also state the date that notices were mailed and provide a copy of the written notice(s) sent.

• Evidence that the Construction Manager made reasonable efforts to follow up on the written notices sent to MBEs, WBEs, and/or VBEs / SDVOBEs with telephone calls or personal visits in order to determine with certainty whether the MBEs, WBEs, and/or VBEs / SDVOBEs were interested in performing the work. Phone logs or other documentation must be submitted.

• A statement of the response received from each MBE, WBE, and/or VBE / SDVOBE solicited, including the reason for rejecting any MBE, WBE, and/or VBE / SDVOBE who submitted a bid or proposal.

• Evidence of reasonable efforts made, if any, to assist MBEs, WBEs, and/or VBEs / SDVOBEs that needed assistance in obtaining bonding or insurance, or lines of credit with suppliers if the inability of MBEs, WBEs, and/or VBEs / SDVOBEs to obtain bonding, insurance, or lines of credit is the reason given for the Construction Manager's inability to meet the MBE, WBE, and/or VBE / SDVOBE goals.

• The Construction Manager may also submit any other information supporting its request for an adjustment in the MBE, WBE, and/or VBE / SDVOBE participation goals, including without limitation

evidence that the Construction Manager placed advertisements in the Supplier Diversity Hub and in appropriate media and trade association publications announcing the Construction Manager's interest in obtaining bids or proposals from MBEs, WBEs, and/or VBEs / SDVOBEs and/or sent written notification to MBE, WBE, and/or VBE / SDVOBE economic development assistance agencies, trade groups and other organizations notifying them of the Contract and the work to be subcontracted by the Construction Manager to MBEs, WBEs, and/or VBEs / SDVOBEs. The Construction Manager shall also submit any other information reasonably requested by the Awarding Authority to show that the Construction Manager has taken all actions that could reasonably be expected to achieve the MBE, WBE, and/or VBE / SDVOBE participation goals.

Only good faith requests for goal adjustments will be granted.

Should the Awarding Authority determine that the request satisfies the criteria as described above, supported by sufficient documentation, the Awarding Authority will submit the request to Meghan Costa, the SDO's Construction Program Coordinator at meghan.costa@mass.gov, for review by the SDO Executive Director. **Any adjustment of the MBE, WBE, and/or VBE / SDVOBE participation goals approved for this Contract by the Awarding Authority and the SDO will be made by Awarding Authority in a written addendum mailed to all persons who have taken out plans for the project.**

C. REQUIREMENTS FOR CONSTRUCTION MANAGER

1. No later than five working days after the opening of Trade Bids, the Construction Manager shall submit the following documents to the Awarding Authority: (i) a completed Schedule for Participation by MBE, WBE, and VBE / SDVOBE ("Schedule for Participation") in the form provided by the Awarding Authority showing MBE, WBE, and VBE / SDVOBE participation in amounts equal to or exceeding the respective participation goals for this Contract, (ii) a completed Letter of Intent in the form provided by the Awarding Authority for each MBE, WBE, and VBE / SDVOBE listed in the Schedule for Participation, and (iii) an SDO most recent certification letter for each MBE, WBE, and VBE / SDVOBE listed in the Schedule of MBE, WBE, and VBE / SDVOBE Participation showing that the MBEs, WBEs, and VBEs / SDVOBEs are certified in the area of work for which it is listed on the Letter of Intent.

2. Each Letter of Intent shall identify and describe the work to be performed by the named MBE, WBE, and/or VBE / SDVOBE (the "MBE / WBE / VBE / SDVOBE Work") with enough specificity to permit the Awarding Authority to identify the items of contract work that the MBE, WBE, and/or VBE / SDVOBE will perform for MBE, WBE, and/or VBE / SDVOBE participation credit. The Awarding Authority reserves the right to reject any Letter of Intent if the price to be paid for the MBE, WBE, and/or VBE / SDVOBE Work does not bear a reasonable relationship to the value of such work under the Contract as determined by the Awarding Authority

3. Within five working days after receipt of the Schedule for MBE, WBE, and VBE / SDVOBE Participation, Letters of Intent, and most recent SDO certification letter or certificate, the Awarding Authority will review and either approve or disapprove the Construction Manager's submissions.

4. The Construction Manager's attention is called to the General Conditions of the Contract which require the selected Contractor to submit, within 30 days of the Contract Date, signed subcontracts with all subcontractors or a purchase order or invoice from each material supplier and/or manufacturer listed on the Schedule for MBE, WBE, and VBE / SDVOBE Participation.

5. A Trade Bidder is not required to submit a Schedule of MBE, WBE, and VBE / SDVOBE Participation with its Bid. A Trade Bidder may, at its option, submit a Letter of Intent with its Bid if it is an SDO certified MBE, WBE, and/or VBE / SDVOBE. If a Trade Bidder intends to sub-subcontract work to an SDO certified MBE, WBE, and/or VBE / SDVOBE, and the Awarding Authority permits limited sub-subcontracting for purposes of MBE, WBE, and/or VBE / SDVOBE participation, and the Trade Bidder wishes that sub-subcontract to be credited toward the participation goals for this Contract, the Trade Bidder should submit a Letter of Intent from that MBE, WBE, and/or VBE / SDVOBE with its Bid.

END OF SECTION

SECTION 00 73 00
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.01 GENERAL NOTES

A. Section includes general requirements and inclusions for all subcontractors, procedures and requirements for submission of bids, submittals, schedule, meetings, safety, payments & requisitions, change orders, housekeeping, hoisting, staging, unloading, logistics, mockups, closeout, and trade specific scope notes.

B. These Supplementary Instructions to Bidders are intended to assist bidders in establishing items of work required as part of performance of their scope of work and shall be considered by trade contractors and non-trade contractors alike in the preparation of bids.

C. The items listed in this section are not intended to represent a complete list of work items to be performed under the referenced subcontractor's scope of work, rather they are intended to supplement language already included in the specifications and provide additional information to assist subcontractors in the preparation of bids.

D. Should any subcontractor require further clarification prior to submission of a bid, forward a request for information to Fontaine Bros.

1.02 GENERAL REQUIREMENTS AND INCLUSIONS FOR ALL SUBCONTRACTORS

A. All components of these Supplementary Instructions to Bidders shall apply to all subcontractors. Provisions to comply with these conditions shall be included in bids.

B. In the Contract Documents, the word "Contractor", "General Contractor", "Trade Contractor" or "Subcontractor" shall mean and shall be interpreted as being the "Subcontractor" or "Trade Contractor" whose scope of work includes that portion of the work or specifications. In the event that work of a specification section is spread over several "scopes of work", each requirement shall apply to the subcontractor in regard to work being performed under their scope of work.

C. Subcontractors are responsible for complete and comprehensive review of contract drawings and specifications. Bid prices are assumed to include labor, materials, insurance, taxes, fees, and all other costs associated with delivering the complete scope of work in proper working order in accordance with the contract documents.

D. If a conflict exists between the drawings and specifications or within either document itself, the better quality or greater quantity of work shall be included in the subcontractor's bid. An RFI shall be submitted immediately upon discovery of any such conflict. If an RFI is not submitted and work is commenced, this is done at the subcontractor's risk.

E. Whenever the contract documents require a professional engineer's stamp, review or report, it shall be understood to mean a Professional Engineer licensed and registered in the Commonwealth of Massachusetts.

F. Subcontractors shall be responsible for all permits, including associated fees, to complete their work (except the General Building Permit) and shall be responsible for coordinating, scheduling, and completing the associated inspections within the time period allotted for construction of their trade on the project schedule. Inspections shall be coordinated and completed in advance of contract dates when possible and at no extra cost at the direction of Fontaine Bros. with the inspection walk throughs as required by the contract and as requested by the Construction Manager. Provide suitable access for inspectors to perform all tests or inspections. Contractor supplied temporary ladders and lifts to perform their work are to be available for the use of all parties.

G. Subcontractors shall be responsible for all local hot work permits, fire watch details, and police details as may be required for their own work. Welders to obtain Town of Wilmington Welding

Certificates. Subcontractors requiring a hot work permit must provide proof of completed training. Training shall be approved by the State Fire Marshal.

H. Project communications, during both the bid and construction stages, shall be directed to Fontaine Bros. Direct communication with the design team, owner, owner's project manager etc. is prohibited.

I. All employees on the worksite must have completed OSHA 10 Training.

J. Theft or vandalism of tools, equipment, materials, etc. are not the responsibility of Fontaine Bros.

K. Subcontractors shall provide offsite storage of all materials until installation, unless previously authorized by Fontaine Bros. to deliver and store materials on site. Materials brought to site must be palletized for ease of relocation at the direction of the CM to facilitate construction activities.

L. Subcontractors whose scope of work includes the installation of materials shall include ALL fasteners, adhesives, and other components necessary for the complete and functional installation of materials within their scope of work UNLESS any of these components are specifically designated to another scope of work.

M. All building envelope trades, including, but not necessarily limited to; roofing, masonry, metal wall panels, waterproofing, windows, storefront, and curtain wall are required to participate in full building envelope commissioning. This includes the coordination of job specific details through the shop drawing process.

N. CM to provide access to electronic documents, including CAD files after waiver is signed and returned. The design team is not responsible for updating CAD files to incorporate revisions to drawings after Final Bid Documents are issued.

O. Subcontractor shall be responsible for procurement/maintenance of hard copy and electronic drawings, specifications, and shops drawings. Record Drawings in Procore are updated as a convenience, are not guaranteed to be complete, and do not relieve the subcontractor from maintaining their own set of drawings and reviewing all project communication and documents available in Procore.

P. CM to provide access to Procore project site, subcontractor to monitor project information and communications to identify and respond to all information including changes affecting their scope of work.

Q. Subcontractors are responsible for layout and setting control for their work off of CM provided control points and benchmarks.

R. All cutting/patching in masonry is by Masonry Subcontractor. All cutting/patching in other surfaces is by the subcontractor requiring the surfaces to be cut. All holes through structural steel noted on the contract set shall be located by subcontractors as part of the coordination documents for fab/install by steel subcontractor.

S. All fire caulking, UL approved rated assemblies, and acoustical sealants at mechanical penetrations is by subcontractor requiring penetrations. All fire caulking and acoustical sealants not at mechanical penetrations is by drywall subcontractor. Mechanical subcontractors shall include Fire Protection, Plumbing, HVAC, Electrical subcontractors and their sub subcontractors. All fire caulking and UL approved rated assemblies at the top of CMU partitions and elevator shafts shall be the responsibility of the masonry subcontractor. All fire caulking and fire rated assemblies shall be installed by a certified installer. Proof of certification must be included in fire caulking submittal by each contractor.

T. All subcontractors shall coordinate hangers, clips, attachments, track, embeds, etc. with the fireproofing subcontractor. All items shall be installed prior to fireproofing. Should any items be installed after fire proofing, the installing contractor shall be responsible for removal and replacement/patching of fireproofing.

U. Subcontractor shall provide mock ups per specifications; subcontractor shall provide standalone mockups unless in place mockups are expressly permitted.

V. There will be a mockup classroom completed inside of the building. Construction of the mockup room will be completed out of sequence and will be used for quality review and standard for all future construction.

W. There will be a mockup classroom completed inside of the building. Construction of the mockup room will be completed out of sequence and will be used for quality review and standard for all future construction.

X. Subcontractors are responsible for provision of power for their equipment if equipment cannot be powered by available on-site sources. Electrical subcontractor responsible for hooking up all equipment including special equipment such as masonry saws, grinders, and temporary heat equipment.

Y. Subcontractors shall be responsible for any water required to operate their equipment that is not readily available on site. Temporary water may be used as available. Plumbing contractor shall own providing a temporary water service in the building as early as possible.

Z. Subcontractors shall be responsible for providing their employees with drinking water.

AA. All trades shall provide suspension systems/hangers/supports/seismic restraints as required for their respective equipment and work. Any engineering required for these systems shall be included.

BB. Subcontractors shall provide their own task lighting required to complete their scope of work. Temporary construction lighting/power meeting or exceeding OSHA standards and as dictated in the specifications shall be provided by the electrical subcontractor.

CC. Deliveries shall be coordinated with Fontaine Bros. site Superintendent a minimum of 48 hours in advance.

DD. Subcontractor work hours shall be between 7:00 AM and 3:30 PM, Monday through Friday. Work shall not begin prior to 7:00 or continue past 5:00 PM Monday through Saturday nor shall work be performed on Saturday or Sunday without previous permission from Fontaine Bros. and the Town of Wilmington. Work hours shall not be changed unless unusual circumstances require adjustment.

EE. Consideration will be given to all SOMWBA certified subcontractors, materials suppliers, fabricators, and service providers on this project.

FF. Review job conditions as soon as they become available and prior to commencing work. Advise Fontaine Bros. of any unacceptable conditions with adequate notice to make any required repairs prior to scheduled start of work; commencement of work indicates subcontractor accepts job conditions.

GG. Contractual warranties shall commence on the substantial completion date for the building or date of final acceptance of system by OWNER, whichever is later. Subcontractor shall provide all necessary extended warranties to account for the time period from the completion of their work through substantial completion. Site/ Landscape warranties will begin on substantial completion date of the site. It is understood that the substantial completion date of the building for phase 1 turnover for occupancy is not tied to site substantial completion date of phase 2.

HH. Subcontractor shall provide Construction Daily Reports detailing daily manpower, activities and locations for subcontractor’s work, and work of all employees and subcontractors for which this contractor is responsible. Reports shall be filled out and emailed to Fontaine Bros. daily.

II. The CM shall have the right to assemble subcontractor personnel for orientation, quality, daily site briefings, and safety related matters at no additional cost.

JJ. Each subcontractor shall keep a sign-in book for their workers. Each worker must sign in and out daily and copies of the daily logs must be submitted to Fontaine Bros. on a weekly basis.

KK. Subcontractor shall provide any power required to perform work outside of the building. Outside power will not be provided by the Owner/Construction Manager.

LL. Each subcontractor is required to adhere to, participate in, and provide all items as described in the Indoor Air Quality Management Plan. Strict adherence to this plan is required by each subcontractor. Subcontractors shall take date stamped photos documenting compliance with such measures such as protection of absorptive materials, protection of ductwork, and source separation.

MM. Each subcontractor is responsible for provision of, coordination of, and installation of sleeving/penetrations required for their work in foundation walls, decking, slabs, walls and the like. Subcontractors whose system requires sleeving/penetrations shall be responsible for any coring, cutting, patching required for installation of their work if sleeving is not coordinated with other subcontractors at appropriate time. Sleeving required in early release package installations that is required to be furnished/installed prior to procurement of appropriate trades shall be furnished/installed by early release subcontractor whose assembly requires sleeving/coring. Subcontractors must coordinate to sleeves/cores located by early release subcontractor or provide new sleeves/cores in an alternate location. Abandoned sleeves/cores must be repaired/patched by the subcontractor abandoning the penetration. Subcontractors are responsible for all coring associated with completing their scope of work. Holes greater than 4" shall not be cored without prior approval by CM. All sleeves, penetrations, holes, cores, cutting, patching, etc. shall be submitted to the design team for review and approval before work commences.

NN. Fontaine Bros. shall have discretion and authority to terminate subcontracts without recourse if, in the discretion of Fontaine Bros., the subcontractor in question is not fulfilling contract obligations including meeting schedule, manpower, material procurement or other goals/criteria.

OO. Costs for material escalation shall be included in bid proposals. Costs for material escalation including asphalt, drywall, etc. shall be at the risk of the subcontractor. The impacts of the COVID-19 pandemic including global supply chain issues and inflation should be considered by all contractors during the time of bid. There will be no consideration for delays and/or cost reimbursement related to these issues.

PP. All subcontractors shall take precautions against damaging the work of other trades including roofing. Protection shall be provided working on or near all finished surfaces by each trade. In the event that work is performed on the roof, subcontractors shall provide protection of the roof membrane to ensure that their work/material does not puncture the roof membrane. In the event that subcontractors fail to provide protection and damage the roofing membrane, costs for repairs shall be borne by the offending subcontractor(s).

QQ. All subcontractors shall make provisions to provide a working computer for their foreman on site. Computer shall have access to the internet and shall also provide access to BIM model in the event that subcontractors are of MEPFP trades. Subcontractors shall use computer to access shop drawings, submittals, etc. as necessary. Subcontractors shall provide and pay for their own internet access.

RR. Manufacturer, supplier, and or subcontractor requirements that must be met prior to material delivery, installation, or fabrication must be made available to CM for review prior to acceptance of subcontractor's bid. Requirements not spelled out in the contract documents that are brought to the attention of the CM at a later date will not be considered. These include requirements having to do with building climate, warrantees, and project specific conditions. If requirements are not brought to the CM's attention prior to material delivery, the installing contractor shall be required to meet all of the manufacturer's requirements.

SS. No person shall perform testing on site or related to the project without the prior direction and permission of the project team.

TT. There shall be no deliveries or vehicles entering or exiting the site during busy hours at the school. Subcontractors shall adhere to a "blackout period" between 7:00 am and 7:30 am and

between 1:40 pm and 2:10 pm while school is in session. CM has the discretion to modify the blackout hours as necessary to facilitate work.

UU. Subcontractors shall not park on Norris Road, or any streets adjacent to the project site. Offsite parking and shuttling, if required, shall be paid for and arranged by subcontractors.

VV. References to any project other than Wilmington Elementary School are understood to be errors. Subcontractor shall assume all references in specification apply to Wilmington Elementary School, located in Wilmington, MA.

WW. All subcontractor personal working on site will be required to complete a Criminal Offender Record Information (CORI) check. Employment on site is subject to results of the CORI check. All CORI applications shall be submitted two weeks prior to starting on site. CORI process has been established between the owner and Construction Manager, instructions will follow contract award. For more information bidders can contact the CM.

XX. All references in the contract documents to the Construction Manager/General Contractor as performing any field work or providing services in connection with any aspect of the work shall be understood to mean the subcontractor.

YY. All work claimed by either the carpenters union or laborers union, performed by non-trade contractors, shall be performed by signatory contractors using union personnel.

1.03 PROCEDURES AND REQUIREMENTS FOR SUBMISSION OF BIDS

A. Subcontractors shall submit bids for the project on the bid forms provided by Fontaine Bros. or the owner and in accordance with the instructions to bidders in the specifications. Bids shall include the complete scope of work included in each subcontractor bid package, exclusions shall not be considered.

B. By submitting a bid, subcontractor certifies that they have included provisions for complying with these supplementary instructions to bidders. Furthermore, subcontractor agrees to abide by these supplementary instructions to bidders. Subcontractor understands that execution of a contract certifies acceptance of these supplementary instructions to bidders.

C. Subcontractors submitting bids shall hold their bids for a minimum of 90 days.

1.04 SUBMITTALS

A. This project will utilize Procore for document distribution and processing. Subcontractors will be given access to Procore upon contract award, and shall be furnished either instructions for use or given access to online training sessions regarding operation of the Procore website. All project communications must be submitted through Procore. Subcontractors shall be given access to Procore and shall pay no fee for access.

B. It is the intent of the project team to process and distribute documents electronically to the fullest extent possible. Subcontractors shall provide shop drawings, submittals, product data sheets, MSDS sheets, etc. in electronic format acceptable to the project team. In the event that shop drawings are large format, such as structural steel, millwork, etc., subcontractor shall provide up to (4) hard copies of each submission at no additional cost to the project. Hard copies of approved/corrected shop drawings shall be provided upon request by the CM at no additional costs. Charts, physical samples, etc. shall be delivered with a transmittal and photo of each sample uploaded to Procore as a means to track the sample approval and/or color selection.

C. The Construction Manager shall maintain a database of electronic files available for access by subcontractors on the Procore website; subcontractors shall be responsible for reviewing electronic documents and taking appropriate action to ensure the incorporation of all project documents including RFI’s, ASI’s, etc. into their work. In addition, the construction manager may elect to utilize a Bluebeam Studio of electronic files available for access by subcontractors; subcontractors shall be responsible for reviewing electronic documents and taking appropriate action to ensure the incorporation of all project documents including RFI’s, PR’s, ASI’s, etc. into their work.

D. Within (14) days of written notice of intent, subcontractor shall provide via email to Fontaine Bros. a submittal schedule for their work. Submittal schedule shall be in the format provided by Fontaine Bros. Failure to provide submittal schedule within (14) days of notice of intent shall result in payments to subcontractor being held until satisfactory submittal schedule is provided.

E. Within (14) days of written notice of intent, subcontractor shall provide via email to Fontaine Bros. a list of Long Lead Items to be procured under the scope of the subcontractor. Long Lead Items shall be defined as any item that requires more than (30) days from the time the item is approved and ordered until the item is delivered on site. Failure to provide a list of Long Lead Items within (14) days of intent shall result in payments to subcontractor being held until satisfactory list of Long Lead Items is provided.

F. Submittals for all contractors shall be due no later than 4 weeks from the date of notice of intent to award subcontractor.

1. Submittals for roof top units, air handling units, and other equipment requiring coordination with the steel subcontractor, shall be due no later than 6 weeks from the date of notice of intent to award to subcontractor. Resubmittals for all subcontractors shall be due within 1 week after submittal is returned for revision.
2. All samples for finishes requiring color selection by the design team shall be submitted within 4 weeks of notice of intent to award. Physical samples shall include the full range of colors available for each product and as outlined in the construction documents. Samples must be labeled with specification section, color number, manufacturer, material, size, Procore submittal number, etc. A minimum of 3 sets of each physical sample are required. Sample sets will not be returned.

1.05 SCHEDULE

A. Time is of the essence on this project, and subcontractors shall provide adequate manpower necessary to complete their scope of work within schedule durations outlined on Fontaine Bros. construction schedule included within these bid documents. By submitting a bid, subcontractors acknowledge that they have reviewed the project schedule and included in their bids adequate manpower including overtime as may be necessary to achieve these durations.

B. Any overtime required to meet scheduled completion dates shall be provided at subcontractor’s expense.

C. Subcontractors shall provide three week look ahead schedules in advance of weekly foremen’s meeting on site. Subcontractors shall be responsible for reviewing schedules with Fontaine Bros. management and adhering to schedules. Subcontractors shall make adjustments to better schedules if possible and at the direction of Fontaine Bros. management. Three week look ahead schedules shall be formatted per CM requirements.

D. Subcontractor shall perform all work within their scope in full cooperation with other trades and coordinate the schedule and sequence of work with all other trades under the direction of Fontaine Bros. management team. When so directed, subcontractor shall temporarily omit, or perform certain portions of the work out of normal sequence, in order to accommodate schedule requirements. Claims for additional monies as a result of out of sequence work shall not be considered by Fontaine Bros.

E. All mobilizations necessary to complete the work are to be included as part of the subcontractor’s bid.

F. The subcontractor acknowledges that adjustments to the schedule may be required by all parties as construction progresses. Subcontractor agrees to accomplish adjustments at no increase in price.

G. It is understood that multiple crews will be required to perform concurrent work in different areas.

H. It is understood that utility shutdowns may have to be scheduled outside the normal work day. Any and all costs for this shall be included in bids.

I. No extension of time shall be granted because of seasonal or abnormal variations in temperature, humidity, or precipitation, which conditions shall be wholly at the risk of the subcontractor, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the contract sum on account of any additional costs of operations or conditions resulting there from.

J. In the event of inclement weather, subcontractors shall make a determination as to whether they will require their tradespeople to report to work. There will be no compensation for such lost work days, and, at no cost to the owner/CM, the subcontractor shall make up the lost time through overtime, additional crews, or by other means necessary.

1.06 MEETINGS

A. Fontaine Bros., at their discretion, may conduct multiple “kick-off” meetings including, but not limited to, a Green Building Kick-Off Meeting, a Project Schedule Kick-Off Meeting, a Safety Kick-Off Meeting, and others deemed appropriate. Subcontractors shall arrange for a representative of their firm authorized to make binding commitments to be present at these meetings. Subcontractors shall be notified a minimum of two days prior to these meetings, and attendance is required unless otherwise directed by the Construction Manager.

B. Fontaine Bros., at their discretion and in conjunction with the architect/OPM/ Cx etc., shall hold preconstruction meetings for individual trades/work items. Subcontractors notified of meetings shall be required to attend as a prerequisite to starting or in some cases continuing work. When requested, subcontractors shall arrange for a representative of their firm authorized to make binding commitments to be present at these meetings. Attendance at these meetings is mandatory.

C. Fontaine Bros. shall conduct weekly meetings to review schedule, safety, logistics, and other relevant construction issues. At least once per week, each subcontractor notified by Fontaine Bros. shall arrange for a project manager responsible for the subcontractor’s operations and able to make binding commitments to be present on site for a meeting. In addition to this project manager, subcontractor foreman shall attend this weekly meeting.

D. The subcontractor foreman shall attend a weekly subcontractor meeting while on site and, if not mobilized to the site, when requested by the CM.

E. In the event that a subcontractor is notified of their required attendance at an onsite meeting, and the subcontractor fails to provide a project manager or foreman as required, Fontaine Bros. shall issue a written notice of non-compliance. In the event that a subcontractor fails a second time, Fontaine Bros. shall issue a fine of $500. Fontaine Bros. shall issue a fine of $500 for each subsequent failure, and these fines shall not be subject to appeal.

1.07 SAFETY

A. Fontaine Bros. Site-Specific Safety Program shall be strictly enforced. Subcontractors are responsible for reviewing the Safety Program provided in these documents and complying with the plan and OSHA standards.

B. All workers shall review new employee orientation requirements and sign, date and return a completed new employee orientation form to Fontaine Bros. site superintendent prior to commencing work on site.

C. Subcontractors shall provide (3) copies of their written safety plan on site at all times. (1) copy shall be maintained in the Fontaine Bros. Field Office, (1) copy shall be maintained in the subcontractor field office, and (1) copy shall be kept on site/in the building for the foreman to reference as construction progresses. It is the responsibility of each subcontractor to provide their written safety plan before commencing work on site.

D. A fall protection system that meets or exceeds OSHA Regulations is to be provided and maintained by each subcontractor at all times. Details of the fall protection program must be included in the written safety plan. All components of fall protections systems for each trade

including anchors, lanyards, and harnesses are to be furnished, installed, maintained, and removed by each individual trade utilizing the fall protection system.

E. All subcontractors shall comply with 6' fall protection rules. All fall protection equipment, including tie off points, shall be furnished and installed by subcontractors and shall be supplied by each employer.

F. Subcontractors shall provide appropriate SDS sheets to Fontaine Bros. Superintendent whenever delivering materials to the site. A complete SDS book shall be kept on site at all times, containing SDS sheets for all materials that are stored or being used on site.

G. All tools & equipment powered by electricity used by subcontractors are required to have ground fault circuit interrupters, supplied and maintained by the respective subcontractors. When using permanent power supply, the GFCI protection must be supplied and maintained by respective subcontractors as necessary.

H. No radios will be allowed on site. No headphones/ear buds shall be worn on site. Hearing protection is acceptable for safety purposes only. Hearing protection shall be supplied by subcontractors for their employees.

I. All employees on site shall wear hard hats and high visibility clothing at all times. All employees shall wear safety glasses for task specific hazard protection.

J. Employees working inside and outside of the building shall wear reflective safety vests at all times.

K. Subcontractor shall supply their employees with all required safety material.

L. Subcontractors shall supply employees with personal protective equipment such as safety glasses, face shields, respirators, gloves, concrete boots, etc. to be worn when appropriate.

M. Subcontractor shall adhere to all applicable safety regulations and shall be responsible for complying with safety requirements as defined in Article IV of the General Conditions of the CM at Risk Contract as it relates to subcontractors' work on site.

N. Subcontractors shall furnish, install, maintain and remove tie downs and harnesses etc. for work that requires them. Roofer shall be responsible for patching holes in roof after tie downs are removed.

O. All workers shall check in at the CM trailer on their first day on site for orientation and issuance of ID sticker and orientation.

P. Unless otherwise directed or authorized, in writing, by the Contractor, all Subcontractors and all Sub-Subcontractors performing work on site shall utilize SkillSignal. Subcontractor's foreman and employees shall be responsible for downloading, registering and utilizing the SkillSignal Application while on site. There are no user fees or costs associated with the Subcontractor's use of SkillSignal. The Subcontractor shall include a similar provision in its sub-subcontracts

1.08 PAYMENTS AND REQUISITIONS

A. Subcontractors shall submit a schedule of values to Fontaine Bros. within (14) days of receipt of subcontract/purchase order. Schedule of values shall be broken down to separate labor and material costs and shall reference either work components (i.e. reception desk for millwork), or work areas (i.e. Brick Veneer, CL 1-3/5/A5.1). By rule of thumb, the work areas should be defined by wing/by floor (A,B,C and Floors 1,2,3, Roof) or by wing/by elevation for exterior façade scope (A,B,C and N,E,S,W).

B. In addition to labor and material, each subcontractor Schedule of Values shall include line items for the following

1. Shop Drawings
2. Submittals
3. Coordination Drawings (if applicable)
4. LEED Compliance

5. Safety (3% of contract sum)
6. Daily Clean Up (3% of contract sum)
7. Closeout
8. Commissioning for applicable trades

C. If a mobilization line item is included, a demobilization line item of equal value shall be required.

D. Unless otherwise directed or authorized, in writing, by the Contractor, all Applications for Payment and all supporting documents (including but not limited to lien waivers, sworn statements, statutory declarations and the like) for the Subcontractor and its Sub-Subcontractors and suppliers, shall be in electronic format and shall be submitted to the Contractor using the Oracle Textura Payment Management (TPM) system. The Subcontractor shall be responsible for the fees and costs associated with the Subcontractor's use of TPM. The Subcontractor shall include a similar provision in its sub-subcontracts and purchase orders. Fees to Subcontractors are calculated as 0.22% of contract value (plus applicable taxes), with a maximum fee of $5,000.00. For example, a contract value of $100,000 will incur a $220.00 fee (plus applicable taxes). Fees to Subcontractors' Sub-Subcontractors and suppliers are a fixed fee of $100 per Sub-Subcontractor or supplier contract.

E. Monthly Requisitions shall be submitted to Fontaine Bros. no later than 5:00 p.m. on the third Thursday of each month. Requisitions must also be emailed to AP@FontaineBros.com, as well as to the Project Manager's email address. Requisitions not received by the third Thursday of the month to both email addresses may not be included in that month's requisition.

F. Stored materials shall be billed and paid for in accordance with the requirements of the project specifications.

G. Retainage of 5% shall be held in accordance with project specifications.

H. Requisition review and payment procedures shall be governed by applicable Mass General Laws.

I. Requisitions will be reviewed by the project team and in the event that the design team/owner determines not to pay a requisition or line item to the full value it has been billed, Fontaine Bros. will give notice to the subcontractor. Subcontractor shall send a revised requisition reflecting the change in values within 24 hours. Requisition shall be paid based upon this revised application for pay.

J. All subcontractor requisitions shall be formatted in Fontaine Bros. standard format for this project. All submitted requisitions shall be a searchable, not scanned, pdf file. Files shall meet Fontaine Bros. naming convention.

1.09 CHANGE ORDERS

A. A change in the work may be initiated in one of three ways
   1. CM may send a request for quotation with accompanying drawings, sketches, or details.
   2. CM may receive formal notification from subcontractor via an RFI requesting CM and A/E review
   3. In response to an RFI response or other project document that the subcontractor feels constitutes extra work, subcontractor may submit a request for a change order to CM.

B. In the event that Fontaine Bros. issues a request for quotation or subcontractor feels that an RFI response or field condition will require extra work, subcontractor must submit to Fontaine Bros. a formal change order request within (7) days. In the event that no change order request is received within this time frame, subcontractor shall waive rights to any additional compensation.

C. Subcontractor shall submit change order requests in a format acceptable to Fontaine Bros. Breakdown shall include, at a minimum, direct labor costs, direct material costs, direct equipment costs, labor burden costs, bond costs, and any other significant cost associated with the work. Labor rates shall be as reflected in the prevailing wage rates included in this project

manual plus applicable burden, or at direct union rates as appropriate. Labor rates shall not include small tools, travel, or other non-labor related items. Subcontractors shall also include written back-up for all materials purchased in conjunction with change order work.

D. Change order requests may include a markup for overhead and profit as defined in the specifications.

E. Once a potential change order is identified and pending, affected contractors shall not proceed with the related contract work or change order work until the change order is either approved or rejected in writing. The contractor shall notify the CM if any pending change orders are affecting schedule. Subcontractors shall only proceed with change order work when directed by the CM.

1.10 HOUSEKEEPING

A. Subcontractors shall be responsible for daily cleanup to a central location as dictated by the CM if not signatory with labor. Trash hoppers or barrels will be provided in these locations for removal to dumpster by FBI. Trades that are signatory with laborers are responsible to remove all debris to the site dumpster on their own. Dumpsters for Roofing and Masonry shall be provided by those subcontractors. Dumpsters for all other contractors will be provided by Fontaine Bros. All costs related to daily cleanup, including hoisting, shall be carried by subcontractors.

B. Subcontractors are responsible for daily cleanup of all waste generated by their operations, including packing material, fasteners, razor blades, pallets, dunnage, cardboard boxes, paper products and food waste from breaks and lunch, snippets of wire, sheet metal waste, excess studs, sheetrock, sawdust etc. Packing and crating materials shall be broken down into smaller pieces before being placed in the dumpster to conserve space.

1. Subcontractors shall separate waste on site as much as possible, including separating metal, concrete, wood, and cardboard products for disposal into segregated dumpsters.
2. Subcontractors shall comply with Fontaine Bros. waste management plan and shall ensure that waste is separated on site into segregated dumpsters to the fullest extent possible. These segregated dumpsters include dumpsters for wood, metal, concrete, drywall, and general debris.
3. In the event that a subcontractor fails to complete daily cleanup to the satisfaction of Fontaine Bros. field personnel, Fontaine Bros. will issue a written notice to the subcontractor. Upon issuance of this written notice, said subcontractor shall have 24 hours to clean the area to the satisfaction of Fontaine Bros. field personnel.
4. In the event that said subcontractor fails to complete cleanup to the satisfaction of Fontaine Bros. field personnel within 24 hours of written notice, Fontaine Bros. shall have the right to
    a. Stop the subcontractor from working until cleanup is complete.
    b. Undertake the obligations of the subcontractor via use of other labor forces and process a back charge to the offending subcontractor’s account with no further notice to the subcontractor. Costs for cleaning will be deducted from the next requisition and will not be subject to appeal.

1.11 HOISTING, STAGING, UNLOADING

A. Subcontractors are responsible for provision of all hoisting, staging, bracing, scaffolding, and rigging required for completion of their work. Subcontractors shall comply with applicable laws and regulations regarding construction of staging, operation of lifts, and any other applicable requirements.

B. Subcontractors shall provide manpower and equipment necessary to accept delivery, unload, and store as directed by Fontaine Bros. At time of delivery. FBI will not be responsible to accept subcontractor deliveries or offload material. Subcontractors shall, protect, provide security, distribute, install in sequence directed by Fontaine Bros. and clean any materials, systems and equipment furnished and installed by the subcontractor. Subcontractor shall provide the same

except for the furnishing of materials to a common offloading point on site for any materials furnished by others and installed under the scope of work of subcontractor. Subcontractor shall document receipt of all materials, systems and equipment on forms acceptable to Fontaine Bros.

C. Subcontractors shall expect to leave out four areas on each floor to allow the load-in and load-out of materials. All work in this area will be performed out of sequence and near the completion of the project. Once the load-in areas are closed, subcontractors will be responsible for finding a suitable route to and from upper floors with materials. Elevators will not be made available. See loading plan provided.

D. Take note of building access and make provisions to ensure that equipment and materials will fit through permanent doorways and or structure. Any work required to create openings such as removal of doors/windows or walls in areas where equipment will not fit through openings shall be paid for by the contractor requiring the opening/access.

E. Any contractor requiring a crane on site must obtain an FAA permit if required. All cranes on site will require a crane plan submitted to CM 48hrs in advance of crane arrival and set up. This includes a crane location plan, rigging plan, 3rd party inspection and all pertinent licenses of operator.

1.12 LOGISTICS

A. Space constraints on site shall not allow for subcontractors to place storage trailers or job trailers on the site. Subcontractors shall store off site and hoist/handle materials at no extra cost. Site contractor shall construct limited laydown areas with stone as required at no extra cost.

1. Fontaine Bros. shall provide, at a minimum, guaranteed onsite parking for each subcontractor’s foreman only.Contractors shall provide their own shuttles to and from the jobsite. There shall be no storage of material or equipment at the off-site parking lot. Costs for offsite parking/transportation to and from offsite parking shall be paid by individual subcontractors and shall be included in bids.
2. Subcontractors shall NOT park on Norris Road, or any other surrounding street and shall not park on private property surrounding the project.
3. Space constraints on the site shall not allow for subcontractors to store raw material on the project site. Off-site storage shall be allotted for and provided as part of bids until the project is ready to accept the material and subcontractors are directed by Fontaine Bros. to deliver the material to the site.

B. Refer to FBI Appendix III: Site utilization plan for further details and logistics plans. Note that building loading zones located on upper levels will require comeback work from associated subcontractors. The site utilization plan has been updated to reflect the loading zone locations on building elevations.

1.13 MOCKUPS

A. Stand-alone exterior mockups shall be constructed for testing and inspection per specifications. No work may commence on site until mockup is reviewed, tested, and inspected by the CM, design team, and Owner.

B. One classroom will be designated as a “mockup” classroom. Work in this mockup classroom including all finishes will be performed out of sequence and ahead of all other finish work. Materials for this room must be delivered to the site and installed at the direction of the CM. No work may commence on site until mockup classroom is reviewed and inspected by the CM, design team, and Owner.

1.14 CLOSEOUT

A. Subcontractor shall provide all closeout documentation in a searchable PDF and CAD format, no later than 30 days after completion of subcontractors work or 60 days before scheduled substantial completion, whichever is sooner. Draft warranties shall also be provided at this time for review of form if not provided during the submittal process, final dates shall be changed as

appropriate. Hard copies of closeout documents shall be provided per project specifications and as coordinated through the CM.

B. Subcontractors shall maintain as-builts during construction for monthly review and provide as-builts in both electronic and hard copy format as requested. Monthly payment shall be contingent upon monthly as-built review. All as-builts shall be submitted in CAD format.
C. Subcontractors shall create their own punch list and complete remedial work prior to architect or CM creating and distributing a punch list.
D. Punchlist work shall be complete as soon as possible after punch list is issued, but no later than 14 days after punch list is issued.
E. All punch list work not completed prior to occupancy will be performed off-hours at the Sole discretion of the CM and Owner. No compensation will be provided for this work, and subcontractor may incur additional costs should CM or Owner expend labor supervising work.
F. Approximately 30 days prior to the warranty expiration period, the CM, along with the owner, will re-inspect the work to prepare a warranty repair list of items to be corrected by each subcontractor. This subcontractor shall make the repairs and/or replacements listed within 14 days of the issuance of this warranty repair list. Failure to do so will result in this work being performed by others at this subcontractor's expense.
G. At the completion of the project and as a prerequisite to release of retainage, subcontractor shall submit a letter of compliance. This compliance letter shall state that all work has been completed in accordance with the contract documents, that the installation has been performed in accordance with all applicable codes, and that all fire resistance characteristics, as required by the Fire Department, have been met. This letter must be signed by an officer of the company.
H. All subcontractors shall supply to the CM a complete list of attic stock for the work of their subcontract. Lists shall be aggregated and coordinated by the CM and subcontractors shall comply with specified process for delivery, receipt, and storage of material. All attic stock must be from the same production run as the materials applied on the project.
I. All subcontractors shall cooperate fully with commissioning agent and perform tasks required of their scope of work as directed by Fontaine Bros., the Cx, and other project team members.

PART 2 TRADE SPECIFIC SCOPES OF WORK

2.01 ABTEMENT AND DEMOLITION

A. Abatement/demolition contractor shall be responsible for all work required to complete scope including obtaining permits and approvals, exposing hazardous materials, and removing/disposing of materials in compliance with all applicable guidelines.
B. Subcontractor shall provide as part of their bid all temporary utilities (i.e.. Water, power, etc.) and protection required to complete their work.
C. Contractor shall comply with NFPA 241 and requirements of the Wilmington Fire Dept. to keep live any systems required during abatement.
D. Subcontractor shall coordinate with other trades as necessary and shall make all efforts necessary to be prudent in demolition of existing building.
E. Time is of the essence on this project for summer turnover of teacher parking. Provide adequate manpower necessary to complete this scope of work within schedule durations outlined on Fontaine Bros. construction schedule included within these bid documents. Provide adequate manpower including multiple shifts and overtime as may be necessary to achieve these durations. Any overtime required to meet scheduled completion dates shall be provided at subcontractor's expense.

2.02 SITEWORK

A. Sitework contractor shall prepare and submit a SWPPP plan within (10) days of notice of intent. Sitework contractor shall file or update all necessary notifications in a timely fashion to assure

that work is able to start no later than March, 31, 2023. In addition to SWPPP Plan specific to sitework activities, sitework contractor shall coordinate with SWPPP preparer to modify, maintain, and/or resubmit, at no additional cost to Fontaine Bros., a SWPPP for general construction activities. This SWPPP is in addition to the SWPPP provided solely for the site contractor and shall be prepared in conjunction with Fontaine Bros. and paid for by the site contractor.

B. Site contractor shall construct and maintain all entrances as shown on contract documents and laydown areas as shown on Fontaine Bros. logistics plan. In addition to areas shown on plan, site contractor shall construct additional laydown/staging areas as directed by Fontaine Bros. during the course of construction activities at no additional cost. Install and maintain tracking pads as required.
C. Sitework contractor shall clean Norris Road as necessary during construction period to ensure that dirt from construction operations is not tracked onto adjacent roads.
D. Sitework contractor shall notify and coordinate with DigSafe, Wilmington DPW, MA-DOT and all other relevant utility companies and regulatory agencies to identify and avoid existing utilities when performing this work. Expose utilities adjacent to work by hand before proceeding with any excavation.
E. Sitework contractor shall provide for snow removal for vehicle and pedestrian access and egress, parking areas, staging areas, and other areas within the construction fence as directed by Fontaine Bros. during entire construction period. This includes removal via machinery as well as hand shoveling at walks, entrances, trailers, offices, and other areas as directed by CM. Sitework contractor shall include any sanding required due to icing conditions in the allowance.
F. Sitework contractor shall pave areas as they become available and at the direction of Fontaine Bros. in order to provide a clean, safe work area. Sitework contractor shall not charge for additional mobilizations.
G. Sitework contractor shall excavate and backfill trenches for buried mechanical, plumbing, gas, fire protection and electrical utilities and pits for buried utility structures, inside and outside the building. Include all bedding and/or concrete slabs required.
H. Sitework contractor shall provide temporary pads constructed of crushed stone or any other acceptable material as directed by the CM for all temporary heating units. Please refer to Appendix VI: Project Temporary Heating Plan for further details.
I. Sitework contractor to include dewatering, shoring, sheeting, dust control as necessary. Sitework contractor shall provide source of temporary power and fuel for temporary power for their equipment when temporary power is not available.
J. Sitework contractor shall provide police details as necessary to ensure that traffic flow to and from Norris Road is not interrupted.
K. Sitework contractor shall provide and maintain the jersey barriers associated with the site fencing as indicated in specifications. The chain link fencing will be supplied and maintained by a separate fencing subcontractor. However, the sitework contractor shall coordinate and assist with rearranging fencing on jersey barriers as necessary to facilitate work at no additional cost.
L. Sitework contractor shall furnish and install erosion control barriers. Maintain erosion control barriers through completion of contract. Erosion control barriers shown on the drawings are diagrammatic in nature and may not constitute all erosion control required to comply with regulatory guidelines. Sitework contractor shall provide all necessary erosion control as part of this contract at no additional cost.
M. Sitework contractor shall investigate site prior to submitting a bid to familiarize themselves with current conditions and to provide a complete and accurate bid. Sitework contractor shall verify extent of work required such as tree clearing, removal of site components, etc. and shall include

in their bid price all labor and material necessary to complete these items of work as necessary to complete the project at no additional cost.

N. Protect inlets as shown, both inside and outside of limit of work lines shown on drawings. Clean silt sacks in all catch basins periodically and following every storm.

O. Fontaine Bros. shall coordinate and direct work related to roadway construction inside and outside of the project limits. Work on roadways shall be completed so as to not disturb ongoing operations within the Town and may have to be completed in a separate mobilization and/or off hours. Costs to complete this work as it is possible, and without disrupting traffic to the greatest extent possible, shall be included in this subcontractor's proposal. All traffic details and police costs shall be borne by this subcontractor.

P. Sitework contractor understands that this project is being procured in phases and that underground piping to be completed by this subcontractor and other trades, including mechanical and electrical, may need to be completed out of sequence as the procurement process allows. Sitework contractor shall carry costs as necessary to complete this work when possible and shall do so using small equipment and any other means necessary.

Q. Sitework contractor to provide E&B, filter fabric, compacted gravel, etc. for concrete sidewalks, school sign, benches, stone dust and other site amenities.

R. Sitework contractor shall provide all concrete work for material and equipment installed under this contract.

S. While blasting is not anticipated, Sitework contractor shall comply with all relevant regulations regarding blasting should it be required. No dynamite shall be stored on site. Sitework contractor shall be responsible for conducting pre-blast survey.

T. Sitework contractor shall comply with the Order of Conditions issued by the Town of Wilmington and shall report on and document compliance through completion.

U. Sitework contractor shall provide manpower, equipment, and materials necessary to respond to weather events prior to and while they are occurring including after hours and on weekends. Site contractor shall not abandon site until authorized to do so by CM.

V. At limits of work adjacent to streets/sidewalks, provide 2 layers of erosion and sedimentation control or more as required to ensure that there is absolutely no runoff from the construction site to roadways, sidewalks etc.

W. Construct temporary drainage, sedimentation and erosion controls as required to ensure that stormwater and sedimentation is controlled within site limits. No runoff to streets or sidewalks shall be acceptable. If runoff occurs, site contractor is to clean immediately and remediate at their expense.

X. Provide temporary platforms, mounding, ramps, and paving for such activities as soil support installation, crane picks, concrete placement for footings and pier, concrete pump trucks, etc. and to provide clean access to and from building.

Y. Protect existing features to remain including trees and monuments in such fashion as to prevent damage and decay. Engage the services of an arborist to certify that protection and maintenance of trees to remain is sufficient.

Z. Comply with MA-DOT Vehicular and Non-Vehicular access permit requirements.

AA. Site contractor shall salvage, store, and protect existing monuments. Including re-installation of monuments as shown on contract drawings and as directed by the CM including all foundation work required.

BB. Sitework contractor shall install light pole bases as part of base bid work. Subcontractor shall work in conjunction with electrical subcontractor to complete light pole bases as work becomes available and shall make no additional claims for compensation related to delays encountered in furnishing/installing light pole bases.

CC. Contractor shall designate and maintain a concrete washout area in accordance with environmental regulations. Coordinate washout location with Construction Manager. Remove and dispose of debris resulting from washing out of concrete trucks.

DD. Sitework contractor shall complete work to coordinate with planting season required to establish all plantings prior to school's occupancy in April 2025 for all occupied spaces.

EE. All available recharge systems shall be installed following steel erection and prior to roof installation. Site contractor shall protect recharge systems from construction activities including construction vehicles and lifts. Roof leaders shall be tied to the recharge system when roofing is complete. Site Contractor shall maintain recharge system during construction and clean system prior to building turn over to the owner.

FF. Sitework contractor shall provide all non-cast-in-place retaining walls. All site retaining walls shall be designed with a minimum factor of safety noted in the Geotechnical report.

GG. Provide excavation and backfill for exterior wall mockup foundations.

2.03 CONCRETE

A. Concrete subcontractor shall provide temporary power as necessary for completion of their work.

B. Concrete subcontractor shall provide a cold and hot weather concrete plans for review and approval prior to beginning work. Subcontractor shall adhere to these plans and provide labor, materials, equipment, and fuel for compliance with cold and hot weather concrete plans.

C. Concrete subcontractor shall not add water to concrete on site.

D. Provide all survey and layout required to complete this scope of work from control points established by others.

E. Provide a field verification as-built survey of all footings, foundations, slab edges, embeds, columns, slab elevations, shafts, floor openings, anchor bolts, etc. at the completion of each placement sequence.

F. Provide all slab depressions, pockets, slopes, box outs, etc. Refer to architectural structural, and MEP drawings. Where conflicts occur, the more expensive detail applies, unless directed otherwise by Fontaine Bros.

G. Provide grouting for base plates, leveling plates, and elevator sill pocket assemblies, and include box outs for these items as required. Provide concrete infill after installation.

H. Install embedded plates in concrete and masonry walls and grout for embedded plates. Provide concrete infill after installation.

I. Contractor to clean all debris off metal decking, regardless of who created them, prior to placing concrete slab on deck. Contractor is responsible for removal of rain water from decking prior to pour.

J. Provide concrete in fill for all steel stair pans and associated landings. Assume this will require separate mobilizations. Clean out all pans and landings prior to concrete placement. Seal seams prior to placement and/or clean any drips after placement. Clean concrete from steel at all stair risers, stringers, and the underside of stairs and landings no later than 24 hours after concrete placement. Request review with the Construction Manager upon completion of this activity.

K. Provide thickened slab at all steel stairs ahead of slab on grade.

L. Contractor shall clean up and dispose of all concrete drippings from overhead pours.

M. Contractor shall designate and maintain a washout area in accordance with environmental regulations. Coordinate washout location with Construction Manager and Site Contractor. Remove and dispose of debris resulting from washing out of concrete trucks. The washout area shall consist of a box lined with poly to prevent seepage.

N. Coordinate with Fontaine Bros. OPM, and Testing Agency during all concrete work. Provide multiple curing boxes for test cylinders. Control temperature as necessary. Ensure field cylinders are cured per ACI requirements.

O. Furnish, erect, maintain, and dismantle any staging required in the course of subcontractor's work.
P. Provide daily cleanup to dumpster provided by CM.
Q. Perform anchor bolt survey prior to steel erection. Submit survey results to the engineer of record. Submit for review, any required repairs of misaligned anchor bolts in sufficient time for approval and remedial work so steel erection schedule is not impacted.
R. Monitor materials testing reports (furnished by others) and verify that the concrete has reached 75% of its design strength prior to placement of structural steel.
S. Identify any modifications to the anchor bolts that have been submitted and approved by the structural engineer of record for the project. This letter of verification shall be provided to the Construction Manager at least one week prior to the commencement of steel erection. This contractor shall be responsible for any repairs due to misalignment.
T. Subcontractor shall be responsible for the flatness & levelness of finished slabs at time of finish floor application. Provide additional concrete and/or shoring as required to meet the slab flatness/levelness tolerance due to deflection. FF/FL tests performed per specifications do not relieve subcontractor of responsibility for flatness of slabs at time of finish floor application. Leveling, patching, grinding and flashing required to bring floors to within flooring manufacturers' required flatness tolerance shall be performed by this subcontractor as part of the work of this contract. This includes remediation of floors due to curling and settling that occurs after FF/FL testing and prior to finish floor application. This also includes work necessary to patch/grind/level at construction joints, control joints, box outs, and other discontinuous slab conditions. All work required to meet manufacturers' required tolerances shall be performed as part of this subcontract and shall be included in subcontractor's bid price.
U. Concrete work around safety stanchions shall be smooth and level. Finish by hand as required. Provide all patching and chipping required at safety stanchions after removal.
V. Subcontractor understands that foundations may be completed prior to mechanical coordination being completed in the building due to the early release of the concrete package. Subcontractor shall make box outs as necessary and furnish/install sleeving to allow for mechanical penetration when possible at no additional cost. Subcontractor shall return to infill boxouts following installation of pass through work and before backfill.
W. Subcontractor understands that under slab mechanical work cannot be guaranteed to be complete prior to steel erection and that slab work shall be performed at the convenience/discretion of Fontaine Bros. Concrete subcontractor shall make no claims for additional monies as a result of sequence of under slab mechanical work/steel erection/slab placement and shall pour slabs as areas become available. Subcontractor understands that slabs may be placed in more mobilizations than is ideal for productivity in order to accelerate schedule. Subcontractor shall carry all costs for pumping and working within erected steel structure as part of base bid.
X. Provide all housekeeping pads indicated in the contract documents. Refer to MEP drawings as well as all other drawings and specifications for pad locations/requirements. Submit shop drawings for approval of pad size and location.
Y. Provide all dowels and rebar required from concrete to masonry. Coordinate spacing and locations with the Masonry Contractor.
Z. Provide toe boards as required by OSHA at all perimeters and openings in elevated slabs immediately following placement of slab.
AA. Contractor shall be responsible for all concrete crack repair and out of tolerance floor prep.
BB. Provide temporary guardrails and toe boards as required by OSHA at all cast-in-place concrete walls where the top of the wall is more than four feet above grade. Remove and replace as

required to complete your work. Maintain rails for the duration of concrete work. Do not remove rails until hazard is eliminated.

CC. Provide concrete pad or foundation as specified for a building exterior wall mockup in a location and size determined by the Construction Manager.

DD. Furnish and install all horizontal and vertical insulation under slabs and at foundation walls as shown in contract documents.

EE. At all exterior horizontal concrete, furnish and install all admixtures in accordance with the specifications.

FF. Furnish and install all detectable warning tiles.

GG. All SOG and SOD shall be wet curried, no dissipating curing compounds will be allowed.

2.04 MASONRY

A. Furnish, erect, maintain, dismantle and remove scaffolding/lifts necessary to complete this scope of work in compliance with all OSHA requirements and Fontaine Bros. Safety Plan, whichever is more stringent.

B. Masonry contractor shall provide their own dumpster. Perform daily cleanup to the dumpster of all work areas.

C. Provide all layout to complete this scope of work. Provide layout of dowels from concrete to masonry where scheduled to be installed by concrete contractor. If layout is not provided, masonry subcontractor shall install dowels through method approved by the CM and Engineer of Record.

D. Patch and point any areas affected by anchorage of staging to building.

E. Temporary tarping, enclosure, and weather protection required to complete this scope of work shall be constructed, maintained, dismantled and removed by masonry contractor. Provide temporary heat and fuel within contained area. Provide carbon monoxide detectors.

F. Masonry subcontractor shall include a separate mobilization for the CMU partitions at the gymnasium. The construction details require the masonry walls to be in place in order to erect structural steel. Please refer to the CPM project schedule.

G. Masonry subcontractor must complete installing CMU within the gymnasium no later than September 27th, 2023. This means that all scaffolding and any ancillary materials/equipment must be cleared from the gymnasium area by the associated completion date. Should the masonry subcontractor require extended work hours or weekend work to meet this schedule, the costs associated with this premium time will be the responsibility of the mason. Please refer to the CPM schedule enclosed within these supplementary instructions.

H. Masonry subcontractor shall coordinate sequencing of CMU installation with all MEP-FP trades and any other in wall work that needs to happen simultaneously.

I. Masonry subcontractor shall own all top of wall fire stopping associated with CMU construction.

J. Masonry subcontractor shall provide all submittals in relation to the gymnasium scope within one week of contract award.

K. Heating of sand, mortar, or similar shall be the responsibility of the masonry subcontractor.

L. Assemble and maintain a washout area in accordance with environmental regulations. Coordinate washout location with Construction Manager. Remove and dispose of debris resulting from washing out.

M. Mason shall grout all HM frames, sidelights, borrowed lights etc. provided and set by others within CMU walls.

N. Furnish and install all weldable rebar and welded couplers. Welding shall be performed by a certified welder.

O. Receive, inventory, store, and install all loose lintels furnished by misc. metal contractor.

P. Receive, inventory, store, and install all inserts, sleeves, rails, anchors, hoist beams, etc. as provided by misc. metal contractor and elevator subcontractor.

Q. Furnish and install through wall flashing systems installed in masonry including any sealant required to tie flashing back into the AVB. Coordinate where necessary with roofer and AVB contractor for compatible material and correct assembly configuration.

R. Furnish and install all acoustical sealant and firestopping systems at the top and bottom of exterior and interior walls as indicated and required to achieve STC and/or fire rating.

S. Provide access to staging for work of other trades.

T. Mason shall provide complete washdown of installed work. Protect windows and glazing and all adjacent finishes. Take special care to protect precast from acid and avoid etching/damage to precast finish.

U. Provide boxouts for all items to be installed in masonry walls including, but not limited to, MEPFP items, miscellaneous metals/steel, rough-in boxes, piping, ductwork, door hardware, specialties items, etc. Patch all boxouts following work of other trades.

V. Provide special shapes where noted on the drawings. Do not field cut shapes unless directed by the Construction Manager.

W. Provide grout at structural steel beam pockets. Include grouting of base plates at these locations.

X. Mason should coordinate the installation of all seismic clips/bracing with the misc. metals subcontractor. Refer to contract details and follow proper sequencing of work.

Y. Include the cost of all labor and materials to assist the testing agency in performing the required masonry testing.

Z. Include dust control at silo's and mixing stations to adhere to OSHA silica regulations and protect site workers and the school population from wind driven dust clouds created by this operation.

2.05 STRUCTURAL STEEL, METAL DECKING

A. Provide an OSHA approved two-line safety cable system at all deck penetrations and along the perimeter of the building in all locations where fall protection is required. Maintain this system. Provide additional turnbuckles at locations required by the Construction Manager to allow access for material loading on floors by other contractors. At openings, provide stanchions and anchoring that will allow perimeter work by others to be installed with the cabling system remaining in place. Top cable must be flagged at 6' intervals with brightly colored flags. Stanchions must be installed at a maximum spacing of 8' o.c. Cables shall be properly tensioned to OSHA guidelines.

B. Provide preparation and steel primer in accordance with the specifications and compatible with finish coatings. Coordinate steel not to be painted as specified. Field touch up, by this subcontractor, is included in this scope of work.

C. Provide temporary power including fuel for all equipment necessary to complete this scope of work.

D. Provide all required shop testing and inspections. Field testing is by owner. Accommodate onsite testing of your work by the Owner's testing agency. This contractor shall be responsible for any costs associated with re-inspection or re-testing required due to this contactor's non-compliance. Include the use of lifts or whatever means necessary to accommodate the Owner's testing agency.

E. Provide framed openings in steel and metal deck to accommodate mechanical, electrical, plumbing, and fire protection penetrations. Provide reinforcement of steel where necessary. Provide closure plate at metal deck where necessary. Protect all openings made by this bid package. Openings for ductwork, curbs, hatches, etc. are to be decked over until such time that

the curbs, hatches, etc. are ready to be set. Include comeback operations to cut deck accordingly.

F. Provide all hoisting, staging, rigging, cranes required for this scope of work in compliance with all applicable OSHA regulations.

G. Comply with 6’ tie off for all workers.

H. Provide PPE for all workers including, but not limited to, hard hats, glasses, ear protection, harnesses, and vests.

I. Provide all temporary shoring and bracing as required. Remove temp bracing upon completion of shear walls, brace frames, and moment frames. Remobilize as required to complete this work.

J. Provide a separate detailing crew to work in conjunction with the erection crew to ensure building sections are turned over to the next trade to meet or better project schedule.

K. Provide engineered drawings and calculations and furnish and install the structural steel. Drawings and calculations shall be stamped by an engineer registered in the Commonwealth of Massachusetts.

L. Structural Steel Drawing and Misc. Metal Scope of Work Clarification: All work indicated on the Structural Drawings shall be furnished and installed by the Structural Steel Subcontractor unless specifically noted otherwise, for example but not limited too; Loose Lintels (per schedule), and all steel members inherently related to the Metal Stairs, Elevator Shaft L angles, C Channels, Area Grates, etc.

M. This contractor shall clean up all ferules and torqued bolt ends left behind from deck detailing.

N. This contractor shall comply with the site Hot Work protocols.

O. Contractor shall be responsible for setting structural items to design height off of control points/bench marks provided by the CM. Any surveying required to accomplish this is by this subcontractor.

2.06 MISCELLANEOUS METAL

A. Provide all miscellaneous metal not integral to structural steel.

B. Provide all staging, hoisting, rigging, lifts necessary to complete work of this subcontractor.

C. Provide temporary power including fuel for all equipment necessary to complete this scope of work.

D. Cost for any fire watches required to complete work will be the responsibility of misc. metal fabrications subcontractor. Hot work permits shall be per general requirements above.

E. Engineered, stamped shop drawings and calculations shall be submitted within 4 weeks of contract award.

F. Misc. Metals contractor shall participate in BIM coordination. Reference BIM specification for requirements for coordination files.

G. Coordinate with CM and subcontractors to complete scope of work.

H. Provide all required certificates and qualifications required per spec prior to starting any fabrication or installation.

I. Misc. metal subcontractor shall acquire necessary welding permits, shall coordinate and pay for required fire watches, and shall furnish install maintain and remove all required fire blankets.

J. Provide all exterior guardrails, handrails, ramp rails, and similar rails at other locations as required in the contract documents. Refer to architectural, civil, and landscape drawings for requirement. Provide a complete installation including sleeving, coring, grouting, etc.

K. Provide all bolted, slotted, hung, welded or otherwise adjustable support angles including but not limited to brick relieving angles. This contractor shall come back and align the hung lintels/relieving angles and complete welding during the erection of the masonry veneer. After the adjustment is complete, this contractor shall weld the item in place. Include remobilization to perform this work.

L. Protect all surrounding work. Removal of welding splatter, metal cuttings, shavings, and other debris from adjacent surfaces is the responsibility of this contractor.
M. Field measure for all items to be installed on or between existing surfaces prior to fabrication.
N. Furnish embedded items associated with this scope of work to the concrete and masonry contractors in sufficient time to allow casting in place. This contractor shall be responsible for the cost of remedial/corrective work required due to the late delivery of embedded items.
O. Provide closure plates on top of stair stringers to close the gap between the stair stringer and the wall. Installation of closure plate will be comeback work and will be performed out of sequence.
P. Following welding of stair pans to stringers, scrape, clean, bondo and re-prime the entire stringer as necessary for a clean installation and as determined by the CM.
Q. Misc. metals subcontractor is responsible for protecting any and all scope of work outlined under their purview. Ultimately, installation procedures fall under means and methods. However, Fontaine recommends that all handrails get installed as a separate mobilization from guard rail installation. Should the misc. metals subcontractor choose to install handrails at the same time, any damage that occur to these handrails shall be addressed at no additional cost.

2.07 ROUGH CARPENTRY

A. Include all new wood blocking at windows as shown/specified. Include fire retardant wood at all locations.
B. Furnish and install of the in-wall blocking shall be the responsibility of the drywall contractor. Coordinate all blocking with other trades.
C. Furnish and install all roof blocking including dimensional lumber, plywood etc. at exterior roof edge, parapet walls, mechanical curbs, roof drains, roof accessories and any other place that blocking appears as part of drywall package.
D. Coordinate with other trades on locations and thickness required for all blocking to be installed.
E. Provide, maintain, and remove temporary wood fillers in treads once the stair framing is complete. Provide and maintain temporary rails at all stairs.

2.08 FINISH CARPENTRY, ARCHITECTURAL WOODWORK, SOLID SURFACING FABRICATIONS

A. Millwork subcontractor shall provide shop drawings within 6 weeks after subcontract. Millwork subcontractor shall update and field verify dimensions as framing is completed, and shall produce millwork as soon as reasonably possible. Millwork subcontractor shall make as many visits to field dimension as deemed necessary by the millwork installer or CM. Areas shall be field dimensioned as they become available.
B. It is understood that millwork subcontractor shall store millwork off site at the direction of Fontaine Bros. until building is ready to accept installation of millwork. Millwork subcontractor shall include cost of offsite storage, in a climate-controlled space, until acceptance of millwork by Fontaine Bros.
C. Millwork shop shall maintain AWI Certification in order to provide millwork. Fontaine Bros. reserves the right to reject any millwork that does not represent a high-quality product.
D. Millwork shall be delivered in such a sequence as to facilitate a continuous installation, either in sequence from room to room or area by area. Millwork shop shall meet with Fontaine Bros. and millwork installer (finish carpentry subcontractor) to determine sequence and shall produce millwork in desired sequence at no extra cost.
E. Millwork subcontractor shall provide any steel supports integral to the millwork. Millwork subcontractor shall provide aluminum wall brackets for countertops in sufficient time for the brackets to be installed within drywall walls where required.
F. Provisions shall be made within millwork for all required electrical and data outlets. Allow access for electrical contractor to perform rough in on-site.

G. Finish carpentry subcontractor responsible for receiving, inventorying, unloading, distributing, protecting, and installing all millwork and finish carpentry materials not specifically included within casework scope of work.
H. Finish carpentry subcontractor is responsible for all layout necessary for installation.
I. Finish carpentry subcontractor responsible for receiving, inventorying along with supplier, unloading, distributing, protecting, and installing all hollow metal and wood doors, and finish hardware (except that provided by aluminum entrances trade contractor).
J. Wood blocking located within wall assemblies will be provided by the drywall contractor. All other blocking and blocking exterior to wall assemblies and required for the work of this bid package shall be provided by this contractor. If in wall blocking is required, provide detailed shop drawings identifying locations and type of blocking needed. Failure to identify needed in wall blocking and or late submittal of blocking information shall result in this bid package providing the needed blocking and associated wall repair. Millwork subcontractor shall be responsible for reviewing all in wall blocking to receive millwork prior to closure of walls.
K. Finish carpentry subcontractor shall provide and maintain temporary cardboard protection of all finished surfaces in a manner that keeps the protection in place until final cleaning.
L. Millwork subcontractor shall provide an inventory of finishes for field touch up including but not limited to stains, sealers, varnishes, etc.
M. Millwork subcontractor shall provide grommets for all millwork. Quantity and locations shall be per the owner's direction.
N. Millwork subcontractor shall be responsible for inventorying and turning over all keys associated with the millwork package. Coordinate keying with the owner prior to fabrication.

2.09 WATERPROOFING, DAMPROOFING AND CAULKING

A. Provide all lifts, staging, hoisting, rigging, etc. required to complete this scope of work.
B. Work in sequence with other trades and complete work as areas become available. Subcontractor understands that multiple mobilizations will be necessary to complete envelope as work is completed and that areas such as loading docks may be completed later than others.
C. Subcontractor shall provide labor, material, equipment etc. necessary to complete all work related to mock ups and as required to complete building envelope and window testing. Subcontractor shall complete remedial work required in the event that any testing fails at no additional cost. If retesting is necessary, costs for retesting shall be paid by this contractor.
D. Provide all tie offs, harnesses, and safety requirements necessary to complete this scope of work.
E. Subcontractor shall complete punch list work within 2 weeks of a punch list being issued for each area of work. In the event that multiple punch lists are issued at different times for different areas of the building, subcontractor shall remobilize to complete punch lists as they become available.
F. Assist Commissioning Agent with all activities related to building envelope commissioning including completion of installation checklists, providing photographs of work in process, providing access for inspections, etc.
G. Caulk all dissimilar materials whether shown or not shown, including but not limited to ceiling grid to walls, stair stringer to wall, etc. Please refer to the joint sealant matrix within the specifications.
H. WDC subcontractor to own stripping in any thru wall flashing, sill flashing, etc. installed by others unless indicated to be by others.
I. Subcontractor to review project schedule. If installation warrants cold weather procedures/products, those costs should be included within the bid.
J. Subcontractor owns any and all work incorporated with on site mockups including any standalone mock-ups. Whether drawn in the details or not, this contractor is to install all sealants and termination work associated with the mock-ups.

2.10 METAL WALL PANELS AND SIDING

A. Provide all lifts, staging, hoisting, rigging, etc. required to complete this scope of work.
B. Provide all layout required for this work. Coordinate location of all panel joints with openings and wall mounted items to allow for required panel sizes and edge distances.
C. Furnish and install system from outside of vapor barrier to finish, including rigid insulation, metal framing, and panels.
D. Work in sequence with other trades and complete work as areas become available.
E. Provide all tie offs, harnesses, and safety requirements necessary to complete this scope of work.
F. Provide off site storage for panels until they are required on site.
G. Provide all metal closures associated with the work of this bid package and between this bid package and adjacent construction.
H. Waterproof, seal, flash, any and all materials that pass through your wall system
I. Work will require several mobilizations.

2.11 FIREPROOFING

A. Protect all adjacent work prior to commencing work of this bid package. Remove protection and clean any over spray.
B. Immediately following installation of fire proofing, clean up overspray and fallout on the slabs. Remove all visible film from the slabs resulting from this work. Provide daily clean up and disposal to dumpsters provided by the CM of all surplus materials generated by this scope of work.
C. Provide all protection and/or tarping required to contain material within the building footprint during installation.
D. Properly control and contain the wash-out of all equipment so as not to allow run-off into adjacent areas.
E. This contractor shall advise the CM of any unacceptable substrate conditions prior to the start of work. The condition of the substrate shall be deemed acceptable once installation of work of this bid package commences. This contractor is responsible for the bond between the substrate and the fireproofing material.
F. Provide sprayed-on fireproofing of sufficient thickness and density so as to achieve the fire resistance ratings specified in the contract documents.
G. Coordinate application of spray fire proofing with other trade contractors to minimize the need for cutting and/or patching.
H. Remobilize as required to fireproof the seismic clip angles along the tops of CMU partitions and where fire proofing extends to the curtainwall system. This will be a comeback operation.
I. Provide exposed intumescent coating to achieve required fire ratings at exposed steel. Coordinate type of intumescent paint with steel primer to ensure compatibility. Intumescent coating with drips, slump, or excessive orange peal texture will not be acceptable.
J. Provide all sealers required for the work of this bid package.
K. Provide lath where required by UL and/or the manufacturer.
L. Provide patching at all areas where testing is performed by the Owner’s testing company.
M. Perimeter safety cabling system will be installed by others. This contractor shall patch all areas required when safety cabling is removed. This will be a comeback operation.
N. Apply spray fireproofing to any supplemental support steel needed for MEP penetrations. Depending on coordination time frames, this could be a comeback operation.

O. Include all winter weather conditions required for the work of this bid package including heat, heat containment, and weather protection to maintain the schedule. There will be no additional compensation for winter protection associated with work of this bid package.
P. This bid package shall provide their owner source of power to perform work.
Q. Temporary water is available from one hydrant on site adjacent to the North West corner of the existing school parking lot. Provide all supplementary water supply, connections, hoses, etc. which are required for the execution of this work.
R. Accommodate testing of your work by the Owner's independent testing laboratory. Provide testing agency all necessary ladders, lifts, and scaffolding necessary to perform inspections.
S. Protect work of other trades during installation of fireproofing.
T. Subcontractor shall provide all lifts, staging, hoisting, rigging, unloading, and distribution for this section. All material on site shall be palletized and moved at the CM's direction to accommodate other contractor's work.
U. Please include 30 additional patch "crew days" within the base bid and provide a daily crew rate.

2.12 ROOFING AND FLASHING

A. Comply with 6' tie off for all workers. In addition, install and maintain a fall protection system such as a flagging system per OSHA guidelines. Provide a minimum of 2000 feet of Garlock temporary railing or equivalent located at the discretion of the construction manager. Return to the site at the request of the construction manager to remove Garlock when all trades have completed their work.
B. Roofing contractor shall provide their own dumpster.
C. Install, maintain, and relocate as necessary a minimum of (3) loading/receiving areas comprised of ballasted guardrails or comparable system at roof edge to be utilized by trades.
D. All wood blocking including dimensional lumber, plywood etc. at exterior roof edge, parapet walls, mechanical curbs, roof drains, roof accessories and any other place that blocking appears on the roof shall be by the rough carpentry subcontractor. Roofing subcontractor shall exclude this from their bid proposal.
E. Furnish and install flat and tapered roofing insulation.
F. Roofing subcontractor shall furnish and install insulation within metal deck flutes in relation to any acoustic metal decking. Coordination with structural steel subcontractor is in terms of sequencing of work is the responsibility of the Roofing subcontractor.
G. Furnish and install complete roofing system including all components.
H. Furnish and install flashing, counter flashing, roof edge coping, parapet covers, sheet metal including gutters, downspouts, snow guards, aluminum flashing, cap flashing systems complete.
I. Roofing contractor to furnish and install all termination sealants related to roofing systems.
J. Snow removal for work of this bid package will be completed by this contractor through an owner allowance as directed by CM.
K. Furnish and install all roof specialties.
L. Furnish and install prefabricated elevator penthouse and louvers.
M. Install and flash mechanical equipment curbing provided by MEP/FP and Kitchen contractors.
N. Furnish and install roof expansion joints.
O. Furnish and install roofing, flashing and trim required for mockup per specifications and mock up drawing.
P. The roofing subcontractor shall be responsible for their own fall protection system complying with OSHA standards and 6' fall rule.
Q. Store roof material so as to protect roofing from damage and also from restricting access or egress.

R. Provide all lifts, hoisting, rigging, etc. required to complete this scope of work, except for setting of mechanical curbs via crane from truck on site.

S. Roofer must maintain a clean and safe work environment; daily cleanup of trash from roof to a dumpster provided by this contractor

T. If roofer fails to maintain a clean and safe work environment, Fontaine Bros. reserves the right to stop work until cleanup is completed, complete work against subcontractor's account, or hold payments to subcontractor.

U. Clean roof decks prior to installation of this work. Rough cleaning and removal of materials will be provided by trade working on the deck prior to your work.

V. Roofing subcontractor shall coordinate with all trades requiring roof penetrations and provide all material and labor required to seal any penetrations required by those trades.

W. Roofing subcontractor shall include provisions within base bid to install temporary roofing at areas that roof top curbs have been or are to be installed prior to delivery and installation of equipment. Roofer shall not delay overall scope of making building weather tight contingent upon roof top information. Roofer shall include labor and material required to create temporary structure on which to place temporary roof over curbs. Roofer shall include in base bid labor and materials to demolish and remove temporary materials prior to installation of roof top equipment. It is anticipated that separate mobilizations for the installation of roof top curbs and equipment may be needed and that roofing subcontractor shall include provisions for this work.

X. Roofer shall provide provisions to temporarily secure the edge of the roof membrane until roof edge metal is installed.

Y. Roofer shall take appropriate measures to protect roof during installation of system and after installation of system is complete including ensuring that foot traffic protection is provide in lieu of roof mats prior to installation of permanent roof mats.

Z. Roofer shall provide and maintain fall protection system throughout the course of the project.

AA. Roofer shall patch holes in roof created by installation of tie downs by other trades.

BB. Assist Commissioning Agent with all activities related to building envelope commissioning including completion of installation checklists, providing photographs of work in process, providing access for inspections, etc.

CC. Provide testing and inspection required by the specification. Provide inspections as required by the roofing manufacturer to achieve roof warranty.

DD. Provide tie off stanchions or carts at all loading zone for use by trades while on the roof or by the roof edges.

EE. Multiple mobilizations are required and shall be coordinated with the CM.

FF. Provide infrared and any Vector map testing on roof toward the end of the project.

GG. Temporary Roofing and Weather Protection

1. Provide all necessary management, planning, measures, temporary roofing and other provisions to prevent water infiltration through the roof for the full duration of any roof cutting, patching, removal or replacement operations. Special Note to Roofer to reference the MEP Drawings for coordination of Roofing and MEP Work.
2. This Trade Contractor shall install temporary protection pathways after the new roof has been installed and accepted, in order for other trades to walk and work on the roof without damaging the newly installed roof. Any damages and repairs will be the responsibility of this Trade Contractor. Base bid shall include 1,000'x6'.

2.13 FIRESTOPPING

A. All subcontractors shall complete firestopping and firesafing necessary to seal penetrations required within their scope of work. Subcontractors shall provide removable temporary firestopping and firesafing prior to final firestopping and firesafing.

B. There shall be one brand of firestop material for all firestopping work. The actual brand chosen shall be based upon a consensus of agreement between the successful bidders. The contractors will be required to provide fire stop systems as it applies to the individual scopes. The contractors shall also include fire stop/safe labeling and tagging each penetration or application with data including but not limited to installer, contractor, location, system used, and date. Also, the contractors shall provide data log entries for use in generating an as-built plan including location.

C. All trades shall ensure fire stopping in exposed areas is clean and neat to receive paint. It is at the discretion of the CM, architect, and/or owner to accept the final condition or have the fire stopping reinstalled until accepted.

2.14 HOLLOW METAL DOORS AND FRAMES, WOOD DOORS, FINISH HARDWARE

A. Provide submittals for scope of work within 2 weeks of subcontract award.

B. Wood doors to be UF Free and FSC Certified.

C. Wood and hollow metal doors to include all stops for glazing.

D. All HM frames shall be welded.

E. HM Doors, Frames, Wood Doors, Finish Hardware, shall be purchased furnish only in one complete package. Supplier shall be responsible for coordinating with installing contractors.

F. All hollow metal frames, steel, and wood doors shall be permanently marked with the door number location designation from the contract drawings. Apply markings in a non-visible, consistent location on all doors. Markings are to be applied to the bottom edge and hinge location on all frames.

G. HM frames within masonry shall be set by drywall subcontractor and grouted in by masonry subcontractor. Drywall contractor shall block out frame with insulation or foam for hardware and install intermediate spreaders prior to the start of Masonry. Drywall contractor shall check the frame for plumb and level as the masonry contractor is building the wall and correct as necessary. HM frames within drywall partitions shall be installed by drywall subcontractor.

H. Wood and hollow metal doors shall be installed by finish carpentry subcontractor.

I. Finish hardware shall be supplied by this contractor for all doors including aluminum doors. Hardware in wood and hollow metals doors shall be installed by finish carpentry subcontractor. Finish hardware in Aluminum doors shall be install by the aluminum curtainwall/storefront contractor.

J. Installing subcontractors shall be responsible for labor associated with unloading and distributing doors, frames, hardware.

K. Prepare all doors and frames including pre-drilling, pre-cutting, raceways and reinforcing as required to receive all hardware including any electrical and or security equipment scheduled.

L. Coordinate hardware schedule with architectural, electrical, and security drawings. Note any discrepancies prior to completion of submittals.

M. Hardware set and door opening numbers shall be marked on each individual box and on delivery slips. Provide hardware in original containers within individual hardware set boxes whenever possible. All hardware shall be prepared for proper door swing and handing. Hardware for aluminum doors shall be coordinated with and supplied to the installing contractor.

N. Supplier responsible for providing doors, frames, hardware shall be responsible for having a qualified representative on site to participate in inventorying doors, frames, and hardware as they arrive. Installing subcontractors shall take possession of materials and shall sign off on materials as they are delivered. Installing contractor shall make sure all doors are adjusted and hardware is working properly at the end of the project. Final acceptance shall be by the Owner.

O. Review schedule and coordinate all deliveries with the Construction Manager. Plan on phased deliveries by floor and/or area as directed by the CM. Masonry frames will be released early and ahead of other areas.

P. Cleanly cut, ground welds smooth, and remove and dispose of spreader at HM frames at direction of Fontaine Bros. Frames damaged during removal of spreader shall be replaced at no added cost by subcontractor responsible for damaging frames. Fix all damage to the door frames caused by this contractor or the owner's sub-contractors. Prepare the frames so that they are ready for the painter including patching, sanding, and priming where required. Wood frames will need to be repaired or replaced if damaged at the discretion of the CM or Owner.

Q. Provide fully tagged and labeled key cabinet set up for turnover to the owner. Provide a minimum of one full day of owner orientation training to the keying system.

2.15 METAL WINDOWS, ALUMINUM-FRAMED STOREFRONTS, GLAZED ALUMINUM CURTAIN WALLS, ALUMINUM WINDOWS, GLAZING

A. Provide all lifts, hoisting, staging, rigging, etc. required to complete this scope of work.

B. Subcontractor to install any and all hardware supplied by others to be installed within this scope of work.

C. Subcontractor to furnish and install all flashing, panning, sealants, minimally expanding foam, and exterior sealants required for complete weather tight installation of systems. Flashing that returns to the substrate needs to be tied into the vapor barrier with compatible materials and sealed to prevent leaks. Flashing shall be of the same material and color as the section to which it is being installed. Provide primary and secondary beads of sealant. Exposed sealant colors to be chose by the architect.

D. Include provisions for testing of windows in place and in mock up as indicated in specifications. This contractor shall provide their own water source for testing as well as any scaffolding or other means of access needed for their own testing and testing by a third-party agency. Subcontractor shall complete remedial work required in the event that any testing fails at no additional cost. If retesting is necessary, costs for retesting shall be paid by this contractor.

E. Subcontractor shall field verify all rough openings for metal windows, storefronts, and curtain walls upon completion of the metal framing as to bring any discrepancies to the CM's attention prior to the installation of windows blocking and AVB. Subcontractor to review specifications on allowable joint sealant parameters prior to field measuring to ensure the proper size window, storefront, or curtain wall is being ordered. Subcontractor shall provide CM with written approval of rough openings via a shop drawing submittal confirming they have verified all openings. Failure to do so shall deem this subcontractor responsible for any discrepancies.

F. Work in harmony with other trades responsible for wiring doors for security, providing light fixtures within systems, and all other work that requires coordination between trades.

G. Provide final cleaning of the exterior of all systems installed by this subcontractor at the completion of the project when directed by Fontaine Bros. Provide cleaning of interior panes of glass.

H. The requirements shall apply to all subcontractors performing work of these sections, regardless of how they are procured.

2.16 ACCESS DOORS AND PANELS

A. Access doors and panels shall be provided by subcontractor whose work requires them for access. Location of all access doors and panels shall be noted in the coordination drawings and submitted for approval by the design team.

B. Access doors and panels shall be installed by subcontractor whose finish work the panels rest in i.e. drywall subcontractor in gypsum board partitions and gyp board ceilings, mason within CMU walls, and ceiling contractor within ACT Ceilings.

C. Access panel supplier is responsible for providing sizes and locations for installing subcontractor within 4 weeks of contract award. Subcontractor shall email a list of panels with size and locations to CM for distribution. Costs associated with rework of framing due to failure to provide correct size and location shall be borne by the subcontractor responsible for providing the doors and panels.

D. Inside of access panels should be marked with the providing contractors name and location. A drawing shall be provided to the installing contractors field foreman with the installation location and size clearly marked at the time of installation. Subcontractor providing access panels shall be responsible for the access panels until installing contractor has framed for the panels and accepts delivery.

2.17 COILING COUNTER DOORS, OH COILING DOORS, OH COILING GRILLES, FOLDING DOORS

A. Subcontractor shall provide shop drawings, in electronic format, via Procore.

B. Subcontractor shall provide all lifts, staging, hoisting, rigging, unloading, and distribution for this section.

C. Subcontractor shall work in harmony with other trades providing components of complete system. Subcontractor shall provide shop drawings within 4 weeks of subcontract to allow for coordination with subcontractor providing blocking, electrician providing power and wiring, etc.

D. Electrical subcontractor shall furnish and install all line voltage and low voltage wiring for complete operation.

E. Provide access doors and panels as necessary to service motorized components. Coordinate location with the drywall and/or masonry contractor. Multiple mobilizations will be required for doors and access panels. Coordinate on site with all trades involved in the installation including electrical contractor and drywall contractor. Provide all misc. materials and labor required for a complete install including metal tube supports, plates, clips, anchors for various substrates, etc. Provide welding certificates if welding is required.

F. Coordinate steel support system with misc. metals contractor. Provide sufficient information for misc. metals contractor to fabricate and install support system prior to metal stud framing installation.

2.18 DRYWALL

A. Furnish/Install all wood blocking within the building as required for the project including but not limited to the items listed in the specifications. This blocking includes in wall blocking, roof blocking, MEP equipment blocking, window blocking, plywood backup for mounting and associated blocking, and other blocking as necessary. All blocking shall be coordinated with other trades and, at the roof, with tapered insulation shop drawings.

B. Comply with all LEED requirements including protection of absorptive materials; provide date stamped photos documenting compliance with these requirements.

C. Furnish and install ALL sheathing at exterior walls, including parapet sheathing.

D. Furnish and install ALL gypsum board assemblies, complete.

E. Coordinate and provide all framed openings in walls for all trades.

F. Subcontractor responsible for furnishing, delivering, unloading, dispersing, protecting, and installing all components of system within scope of work.

G. Subcontractor responsible for hoists, lifts, rigging, etc. required to complete scope of work.

H. Drywall subcontractor responsible for unloading, distributing, and installing HM frames within metal stud partitions. Install per manufacturer’s instructions. Drywall subcontractor is also responsible for checking Hollow Metal Frames to be Plumb and Level as walls are being built.

I. Patch holes in partitions created or left open for temp systems including electric, water, propane, etc.

J. Drywall subcontractor responsible for unloading, distributing, and setting HM frames within masonry wall. Masonry subcontractor responsible for final installation/grouting of frames. Provide Styrofoam within jambs as necessary to allow for mounting of hardware on door frames. Monitor door frames during masonry construction to confirm they are maintained plumb and level.

K. Remove and replace perimeter protection cable system as necessary to access your work. Provide additional protection as required by OSHA and the project safety plan during your operations. Chip all areas level for patching by others.

L. Upon completion of steel erection, maintain perimeter safety cable until cable is no longer needed. At that time, in coordination with the Construction Manager, this contractor shall remove and dispose of the safety cable stanchions and cables. Concrete shall be chipped as necessary by this contractor to allow stanchions to be cut below the level of the finished floor and so floor can be patched level after stanchion removal.

M. Provide all field engineering for layout from control points provided by the construction manager. This contractor shall permanently mark all floors with wall locations and all door openings within the walls prior to erection of walls to allow layout and rough in by other trades. Permanent markings shall be confined to areas that will be covered by the wall construction. No markings may extend into areas where the floor finish is sealed concrete or resilient flooring. Shall permanent markings extend to these areas, it will be the drywall subcontractor's responsibility to either properly remove the markings or pay another entity to do so.

N. Drywall subcontractor is responsible for all acoustical sealant to meet STC ratings. Provide acoustical sealing of all penetrations through gypsum walls. Include sealant at tops and bottoms of all walls.

O. Provide all firestopping and firesafing assemblies for this bid package at all walls noted as fire rated. Provide all head of wall firestopping, where required, at interior gypsum wall assemblies. Fire stopping within MEPFP sleeves/penetrations are by the trade whose work passes through the sleeve. Inspect and label all partitions with the appropriate UL label. Advise the construction manager of discrepancies found that would impact the rating of the system.

P. Installation of sheathing shall, at minimum, meet the requirements of the AVB manufacturer. Provide recesses as required for wall and soffit mounted items to maintain continuity of AVB.

Q. Screw pattern of the sheathing installation shall meet the standards outlined in the specifications and the manufacturer's literature and shall be per the building code.

R. Drywall contractor shall maintain labor on site to keep up with daily housekeeping requirements. Additional labor shall be brought in to offload material deliveries so as to not impact the cleanliness and housekeeping parameters that are required on site daily.

S. Furnish and install FR plywood backboards in electrical, telecom, and mechanical spaces as required by the Contract documents.

2.19 LOUVERS AND VENTS

A. Furnish and install work included in this section.

B. Subcontractors shall provide all lifts, staging, hoists, rigging, unloading, distribution for their work within this section.

C. Electrical subcontractor shall coordinate with louver supplier/installer to provide all necessary wiring and connections. Controls subcontractor shall furnish/install any required controls for mechanically operated louvers and vents.

2.20 TILE, CERAMIC TILE, QUARRY TILE

A. Provide shop drawings in electronic format via Procore. Clearly indicate areas where slab needs to be depressed and required slab depression.

B. Level, patch, clean, detail, or otherwise prepare substrate as necessary to ensure proper adhesion and finish prior to commencing installation. Fill and prepare slab shrinkage cracks and joints for floor finishes.
C. Subcontractor responsible for ensuring a smooth and level transition between various flooring types through flash-patching, reducers, transition strips, and/or any other means necessary.
D. Provide offsite storage for materials as necessary and directed by Fontaine Bros.
E. Coordinate with other subcontractors to ensure a neat and flush interface.
F. Adhere to temporary protection and cleaning instructions per specifications.
G. Protect and maintain protection of all finished work. Remove and dispose of floor protection after substantial completion or as directed by the CM.
H. Inspect substrate of floors and walls as soon as they become available and with sufficient time to allow for repair without impacting project schedule. Notify the CM of any discrepancies.
I. Work will be performed out of sequence. Multiple mobilizations will be required.
J. Perform moisture testing as required by the specifications and manufacturer's recommendations.

2.21 ACOUSTICAL CEILINGS

A. Subcontractor shall include provisions to install ceiling grid system prior to installation of tile. Subcontractor shall carry multiple mobilizations to complete cuts, device installation, and full tiles.
B. Subcontractor shall provide multiple crews if necessary to complete installation of grid and tiles in an expedient manner. Subcontractor understands that sequence of work for acoustical ceilings will not necessarily be contiguous and that compliance with project schedule will require multiple mobilizations and may require overtime.
C. Ceiling grid shall be seismically braced as indicated or required to meet or exceed specifications and code and shall hang independently from work of other trades.
D. Subcontractor to frame to and provide cutouts in the ceiling for other trades including lighting fixtures, mechanical equipment, projection screens, access panels, expansion joints, and more.
E. Adhere molding to the wall with sealant and provide caulk between ceiling grid and walls per specifications.
F. Provide touch up paint at cut ceiling tile edges exposed to view.
G. Contractor responsible for coordinating any wood slot or more permanent style ceilings with ceiling devices including access panels, light fixtures, fire alarm, security, etc.
H. As a result of the coordination process, reflected ceiling plans may vary from original contract documents (light fixtures, diffusers, etc.). Attend and participate in the overhead coordination meetings. Participation in these meetings includes sign off on MEP coordination drawings. Adjustments to the ceiling assemblies to address layout of overhead equipment will be at no additional cost to the project. Bring to the attention of the CM any discrepancies in height or layout not noted during coordination. Confirm ceiling height or layout changes through shop drawings or RFIs to the design team.

2.22 WOOD STRIP AND PLANK FLOORING, WOOD ATHLETIC FLOORING, STAGE FLOORING

A. Subcontractor shall level, patch, clean, detail or otherwise prepare substrate to achieve proper flatness and levelness required by flooring manufacturer prior to commencing installation.
B. Provide and maintain ventilation as required to complete your work.
C. Control humidity for floor installation including the use of humidifiers or dehumidifiers as required.
D. Route out all floor boxes so that the finish is flush with the floor.
E. Install all required sleeves.

F. Provide gym floor line striping plan with submittals. Mobilize early to layout all sleeves as soon as gym equipment is in place.
G. Coordinate with bleacher installer for any required blocking under bleachers. Furnish and install if required.
H. Provide, Install, and maintain temporary protection of all finished surfaces. Remove and dispose of temporary protection at substantial completion or as directed by the CM.
I. Install volleyball sleeves, furnished by others.

2.23 RESILIENT FLOORING, RESILIENT BASE AND ACCESSORIES

A. Provide resilient base at all areas indicated on contract documents.
B. Provide resilient flooring at areas indicated on contract documents and in patterns indicated in finish schedule/drawings. In the event of a conflict between drawings and finish schedule, subcontractor shall carry more expensive pattern/quantity.
C. Level, patch, clean, detail, or otherwise prepare substrate as necessary to ensure proper adhesion and finish prior to commencing installation. Inspect substrate as soon as it becomes available.
D. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing and installing flooring materials.
E. Subcontractor responsible for ensuring a smooth and level transition between various flooring types through flash-patching, reducers, transition strips, and/or any other means necessary.
F. Provide, Install, and maintain temporary protection of all finished surfaces. Adhere to cleaning instructions per specifications, damage incurred as a result of lack of protection will be the responsibility of flooring subcontractor. Remove and dispose of floor protection at substantial completion or as directed by the CM.

2.24 LINOLEUM FLOORING

A. Level, patch, clean, detail, or otherwise prepare substrate as necessary to ensure proper adhesion and finish prior to commencing installation.
B. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing, and installing flooring materials.
C. Subcontractor responsible for ensuring a smooth and level transition between various flooring types through flash-patching, reducers, transition strips, and/or any other means necessary.
D. Provide and maintain temporary protection of all finished surfaces. Adhere to cleaning instructions per specifications, damage incurred as a result of lack of protection will be the responsibility of flooring subcontractor. Remove and dispose of floor protection at substantial completion or at the direction of the CM.

2.25 CARPETING AND TILE CARPETING

A. Level, patch, clean, detail, or otherwise prepare substrate as necessary to ensure proper adhesion and finish prior to commencing installation.
B. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing and installing flooring materials.
C. Subcontractor responsible for ensuring a smooth and level transition between various flooring types through flash-patching, reducers, transition strips, and/or any other means necessary.
D. Provide and maintain temporary protection of all finished surfaces. Adhere to cleaning instructions per specifications, damage incurred as a result of lack of protection will be the responsibility of flooring subcontractor. Remove and dispose of floor protection at substantial completion or at the direction of the CM.

2.26 EPOXY FLOORING

A. Level, patch, clean, detail, or otherwise prepare substrate as necessary to ensure proper adhesion and finish prior to commencing installation. Include any preparation required of concrete slab prior to placement including but not limited to shot blasting, grinding, patching, etc.
B. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing and installing flooring materials.
C. Subcontractor responsible for ensuring a smooth and level transition between various flooring types through flash-patching, reducers, transition strips, and/or any other means necessary.
D. Provide and maintain temporary protection of all finished surfaces. Adhere to cleaning instructions per specifications, damage incurred as a result of lack of protection will be the responsibility of flooring subcontractor. Remove and dispose of floor protection at substantial completion or at the direction of the CM.

2.27 FBARIC WRAPPED PANELS, ACOUSTICAL PANELS

A. Subcontractor shall coordinate blocking with installing subcontractor. Subcontractor shall provide locations and size of in-wall blocking required on shop drawings. Blocking that is installed after wallboard is installed shall be furnished and installed by Fabric Wrapped Panels subcontractor. Any patching and painting required for blocking installation shall be charged to fabric wrapped panels subcontractor.
B. Subcontractor shall provide all cutouts in panels for wall mounted devices.
C. Field dimensions shall be completed as soon as areas become available to ensure timely installation.
D. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing and installing material.

2.28 ACOUSTICAL INSULATION

A. Comply with LEED requirements including protection of absorptive materials and acoustical requirements. Provide date stamped photo documentation showing absorptive materials protected.

2.29 PAINTING

A. Furnish and apply paint for interior and exterior surfaces.
B. Inspect and accept substrate prior to painting as soon as it becomes available. Notify the CM of any areas that do not meet specifications. Application of paint/primers constitutes acceptance of substrate.
C. Provide surface preparation prior to applying paint, including field primer if necessary.
D. Prepare areas of field welds, remove bubbles, sand, bondo, re-prime if necessary, so that the end result is not flashing and has a smooth finish acceptable to the project.
E. Ensure all hollow metal frame surfaces are smooth and free of dents, gouges, gaps, etc. prior to painting. Include bondo, sanding, and any other preparation required.
F. Seal tops and bottoms of wood doors as required.
G. Fire rated labels shall not be painted or covered.
H. Protect surfaces not scheduled to receive paint from paint, including overspray. Paint on surfaces not scheduled to receive paint shall be removed by this subcontractor, using methods that do not damage the intended finish of such surfaces, at no additional cost to the project. In areas with dryfall paint, remove protection, sweep/vacuum and clean dryfall immediately after completion so that material is not tracked through the jobsite.
I. Properly dispose of excess materials and containers. Materials and containers that cannot be disposed of in general debris dumpsters shall be disposed of by the painting subcontractor. Create and maintain an approved washout area.
J. Paint/touch up areas where holes were created by temporary systems including temp electricity, water, propane, etc.

K. Include provisions for touchup of finish painted surfaces just prior to occupancy as directed by Fontaine Bros.

L. Paint all access panels installed by other trades.

2.30 VISUAL DISPLAY BOARDS

A. Provide off site storage for markerboards until directed to install by Fontaine Bros.

B. Assume that separate mobilizations will be required to install mounting clips and to install markerboards.

C. Subcontractor responsible for furnishing, delivering, hoisting, unloading, inventorying, distributing and installing markerboards under this scope.

D. Provide shop drawings indicating location of any in-wall blocking required.

E. Coordinate marker board requirements with requirements of the projection system.

F. At substantial completion, return to the site to remove protective plastic and to clean boards per manufacturer's instructions.

2.31 TOILET COMPARTMENTS

A. Indicate on shop drawings all locations of in-wall blocking required for installation by others.

B. Field verify all dimensions when drywall is installed and prior to ordering material.

C. Include all fasteners, joint sealants, adhesives required to complete this work.

D. Do not damage tile or epoxy finishes in the process of installation. Damage caused by installing subcontractor shall be repaired at installing subcontractor's expense.

E. Subcontractor responsible for furnishing, delivering, hoisting, unloading, inventorying, distributing and installing markerboards under this scope.

F. Vacuum clean all areas that tile has been drilled for installation of partitions.

G. At substantial completion, return to the site to clean all toilet compartments.

2.32 METAL LOCKERS

A. Metal lockers subcontractor shall be responsible for furnishing, delivering, unloading, hoisting, inventorying, distributing, and installing metal lockers including fasteners, sloped tops, number tags, fillers, and hardware.

B. Metal lockers subcontractor is responsible for protecting metal lockers on site prior to installation. If necessary, store metal lockers offsite until just prior to installation. No claims shall be made for damage to metal lockers occurring prior to installation.

C. Provide all filler pieces and trim required to close any gaps greater than 1/4". Install lockers evenly in the openings.

D. Requirement for in-wall blocking shall be noted in shop drawings. This contractor shall provide blocking outside of the drywall behind the lockers as noted in the contract drawings. Ensure sloped top is fabricated to accommodate blocking.

E. Vacuum, clean, and wipe down lockers following installation. Provide protection of lockers. Remove and dispose of protection following substantial completion at the direction of the CM.

2.33 SIGNAGE

A. Determine all existing conditions which conflict or prevent the complete installation of the signage as indicated in the Contract Documents and provide the CM with the details in sufficient time to allow the removal or repair of conflicting items. Remobilization or additional charges shall not be paid for work resulting from the failure to request the removal of conflicting items. Inspect substrates prior to the start of work and advise the CM of any unacceptable conditions.

B. Provide layout required to complete work. All signs shall be installed to meet code and ADA requirements.

C. All blocking not shown on the contract drawings but required by this contractor must be provided by this contractor.

D. Store and protect any equipment or material as it arrives on site and maintain protection as required until acceptance by the owner.
E. Provide proper protection of adjacent finished materials to prevent damage or stains during the installation of the work of this bid package.
F. Coordinate with the CM for all inspections.

2.34 KITCHEN EQUIPMENT

A. Kitchen equipment subcontractor shall complete all required connections, testing, and work required to furnish and install a complete and operational system unless such work is explicitly specified as by others.
B. This contractor shall be responsible for checking electrical, plumbing, HVAC, Fire Protection, etc. to ensure that items provided are sufficient to run and maintain equipment.
C. Kitchen equipment subcontractor shall submit shop drawings through Procore. Shop drawings shall include “rough-in” drawings. Roughing-in contractors will not be responsible for interpreting catalog cuts to determine the rough-in requirements. Indicate on shop drawings all required in-wall blocking and all floor recesses for installation by others.
D. Submit shop drawings indicating slab preparation requirements for freezers/coolers.
E. Field measure for all critical fit custom fabricated items.
F. All equipment provided shall be installed by this Contractor. Provide all assembly of internal components to make kitchen equipment complete. Final utility connections only will be provided by others as outlined in the plans and specifications.
G. Check equipment sizes and take note to building access. Make provisions to ensure that equipment will fit through permanent doorways and/or structure.
H. Be advised that the MEPFP drawings along with the food service equipment specifications and drawings will be used as a reference for rough-in of waste, water, and electrical systems. Provide equipment to fit these requirements. Notify the Construction Manger in writing of any deviations at bid time.
I. Expedite submittal of shop drawings, fabrication, and shipment of all items to be cast in the slab or concealed within walls. Expedite hood shop drawings for HVAC/Electrical coordination.
J. Coordinate sink hoses/ wash down hoses with all above sink shelving so as not to interfere with intended use of hoses. Provide all backflow preventers required by health department whether shown or not.
K. Provide protection of equipment until final acceptance. Provide touchup painting of all finishes including factory finished equipment. Provide final cleaning of all materials and equipment. All equipment and material provided by this contractor shall be cleaned and sanitized by this contractor when directed by the CM.
L. Warranty periods for equipment of this bid package shall not start any earlier than the substantial completion date outlined in the CM schedule.
M. Participate in health department review, acceptance, and sign off.

2.35 GYM EQUIPMENT

A. Submit, receive, approve, and deliver equipment and material to maintain the project schedule and as directed by the Construction Manager. Provide equipment mounting locations as soon as possible for coordination with the steel contractor for joist bridging if required.
B. This contractor shall provide all switches, controllers, remote controllers, and necessary wiring from the controller/switch to the motors for the equipment. Power to controller/switch will be provided by the electrical contractor. Coordinate work with the electrical contractor.
C. Coordinate locations of all wall devices with the architectural drawings.

D. Provide all means of support and attachments for all equipment back to the structure. Provide all miscellaneous steel supports which are not shown on the drawings but are required to complete the work of this bid package. Include primer and touch-up paint on prefinished materials.
E. Submit complete coordination drawings in conjunction with BIM coordination indicating location of equipment in relation to MEPFP equipment, fixtures, and partition assemblies.
F. Provide and coordinate all required wall pad cut outs for wall mounted devices and signage.
G. Subcontractor responsible for furnishing, delivering, hoisting, unloading, distributing and installing material. Floor protection is the responsibility of this subcontractor.
H. Return to the site to clean all installed equipment after substantial completion.

2.36 THEATRICAL RIGGING

A. Submit, receive, approve, and deliver equipment and material so as to maintain the project schedule as directed by the Construction Manager. Coordinate with Catwalk and MEPFP trades and bring to the attention of the CM any discrepancies.
B. This contractor shall provide all switches, controllers, and necessary wiring from the controller/switch to the motors for the equipment. Power to controller/switch will be provided by the electrical contractor. Coordinate work with the electrical contractor.
C. Coordinate locations of all wall devices with the architectural drawings.
D. Provide all means of support and attachments for all equipment back to the structure. Provide all miscellaneous steel supports which are not shown on the drawings but are required to complete the work of this bid package. Include primer and touch-up paint on prefinished materials.
E. Submit complete coordination drawings in conjunction with BIM coordination indicating location of equipment in relation to MEPFP equipment, fixtures, and partition assemblies.
F. Highlight any areas that require blocking to mount your equipment. Failure to do this will result in this contractor paying for installation, patching, and painting for any remedial work required.

2.37 ELEVATOR

A. Subcontractor shall perform all activities related to elevator testing and commissioning as part of this scope of work at no extra charge. These activities include providing labor as required for alarm testing, elevator louver testing, and inspections. This work is to be part of the base bid of this contract.
B. Subcontractor shall include removal of all components not necessary for operation of elevator upon completion of installation including excess hydraulic oil if directed by the CM.
C. Subcontractor shall participate in and sign off on elevator room layout. Subcontractor shall make diligent efforts to avoid conflicts with other trades. Verify pit and shaft sizes prior to ordering elevator.
D. Include provisions for temporary power connections to operate cab during installation.
E. Subcontractor’s employees shall maintain the guardrail system put in place by others during performance of their work. Subcontractors shall remove guardrails only as necessary to provide access to cab/shaft and shall replace guardrails immediately when possible. Subcontractors employees who create a safety hazard at any time will be immediately dismissed from the project.
F. Subcontractor shall make all efforts necessary to complete installation and inspection of elevator as quickly as possible to allow for temporary and permanent operation. Subcontractor shall allow temporary use of elevator with operator as feasible and shall allow use of elevator immediately after inspection regardless of whether or not substantial completion has been reached.
G. Subcontractor shall make provisions to provide specified warranty period from date of certification of occupancy or acceptance of the building, whichever is later, including provisions to provide extended warranties if necessary.

H. Provide all drawings and documentation required for inspections in a timely manner so they can be reviewed and stamped by the design team prior to elevator inspection.

I. Provide all hoisting, offloading and distribution of materials.

J. It is the responsibility of this contractor to verify and monitor approval of elevator shop drawings, color selections, and submittals to ensure elevator is released to meet project schedule.

2.38 FIRE PROTECTION

A. Maintain as built drawings in the most recent version of AutoCAD, updated as-built drawings shall be a prerequisite to monthly payment.

B. Provide sleeves/coring as necessary for work of this subcontractor, provide firestopping through fire rated partitions. Provide acoustical sealant at all acoustical partitions. Provide link seal at foundation walls.

C. All bidders are directed to review all disciplines of the bid documents prior to submitting a price. The drawings and specifications are complimentary and bidders' prices shall reflect all Fire Protection work regardless of where it is shown in the documents.

D. Stamped shop drawings and building design shall be completed asap. Drawings shall be submitted to the building department for permit application with a copy provided to the fire department.

E. Furnish and install seismic bracing as required by codes and shown on drawings, whichever is more stringent.

F. Subcontractor shall complete all commissioning and start up procedures in accordance with the specifications and as directed by the project team.

G. Fire protection contractor shall arrange for all inspections and tests, including pressure tests as required by applicable codes and engineers. Fire protection contractor shall notify Fontaine Bros. in advance of any such test and shall provide written documentation of all test performed.

H. Subcontractor shall comply with Engineer's requirements in regards to raising of fire protection piping as far above ceiling as possible at no additional cost.

I. Fire protection subcontractor shall review all drawings related to their scope of work as outlined in the construction documents in efforts to determine what extend of water systems they own. For instance, if the construction documents specify that the exterior water systems, including fire hydrants and associated piping, are owned by the Fire Protection sub, they shall carry this scope of work in its entirety within their bid. At a minimum, the Fire Protection contractor owns the fire service to 10'-0" outside of the building foundation. Fire protection subcontractor is responsible for coordinating with local water department/company for all testing requirements and regulations.

J. Special Note with regards to sprinkler heads: The contract drawings are complementary and indicate the approximate amount of sprinkler heads required. The Fire Protection Trade Contractor shall review the drawings in depth, bid and install ALL of the necessary sprinkler heads for the project. No additional compensation will be provided to the Fire Protection Trade Bidder for missing sprinkler heads.

K. MEP Coordination utilizing 3D Modeling (BIM):

1. Provide 3D coordination models and related responsibilities. See Appendix V: BIM Requirements for additional information.
2. Provide appropriate BIM expertise and resources to meet the MEP coordination requirements defined in Appendix II: CPM Project Schedule.
3. All sections of the building will be modeled for MEP coordination at the same time. This contractor shall carry and make available the appropriate staff to allow for simultaneous multi-building area coordination. As a result of the coordination process, piping may be orientated in a way that will require additional pipe lengths, elbows, fittings, and low points

requiring drainage. This work is to be included in the base contract. No extras will be entertained due to coordination.

L. Special attention shall be taken by this Trade Contractor for review of RCP drawings. There are many instances of required layouts, layouts allowing concealed conditions, layout through access panels within decking.

M. Access Doors and Panels:
   1. The Fire Protection Trade Contractor shall furnish access doors and panels as required to allow access to fire protection valves, equipment and the like.
   2. Access doors and panels shall be installed by the trade responsible for the material into which the access door and panel is to be installed (for example, drywall, masonry, tile, acoustical ceiling.
   3. Access doors for MEP's shall be furnished from a single source vendor in order for them to be keyed alike. Coordinate with all other MEP's subcontractors at the appropriate time.
   4. Access panel coordination must be completed for Design Team review.
   5. Access panels must be labeled on the inside of the panel with the name of the contractor requiring the access panel.

2.39 PLUMBING

A. Maintain as built drawings in the most recent version of AutoCAD, updated as built drawings shall be a prerequisite to monthly payment.

B. Plumbing systems installed under this subcontract shall continue to 10 feet beyond the building perimeter.

C. Plumbing subcontractor shall include all drilling, coring, sleeving, and link seals required for this scope of work.

D. Subcontractor shall provide firestopping at all penetrations through fire rated systems and acoustical sealant at all acoustical systems.

E. Furnish and install seismic bracing as required by codes and shown on drawings, whichever is more stringent.

F. Provide detailed drawing showing all locations that require in wall blocking prior to the start of interior framing.

G. Subcontractor shall complete all commissioning and start up procedures in accordance with the specifications and as directed by the project team.

H. Plumbing contractor shall arrange for all inspections and tests, including line tests, as required by applicable codes and engineers. Plumbing subcontractor shall notify Fontaine Bros. in advance of any such test and shall provide written documentation of all tests performed.

I. Provide submittals for any materials on or penetrating the roof within 2 weeks of notice of intent. Provide roof drains and rain leaders asap to coordinate with roof install. Building shall be kept dry. Provide temporary piping to the exterior of the building to divert water out of the building until the site utilities are ready to receive water.

J. Pressure test all lines. All testing shall be witnessed by Fontaine Bros. and inspector. Provide written documentation of each test performed.

K. Protect floor drains and clean outs until building has been turned over to the owner. ALL damage to floor drains will be repaired by and at the cost of the plumbing subcontractor regardless of the cause. Remove and clean protection at the completion of the project and clean covers to look like new. Replace covers as necessary.

L. Provide temporary drainage system for roof drain water to get out of the building until such a time that the site drainage system is connected to the under slab plumbing system.

M. Provide protection of rain leaders after installation and prior to installation of spray fire proofing. Remove and dispose of protection after spray fireproofing is complete to make ready for insulation.
N. Plumbing contractor to own all interlock low voltage control wiring between water heaters and holding tanks.
O. Plumbing contractor to coordinate installation of fixtures with ALL ADA requirements. Any re-work as a result of toilets, urinals, water fountains, etc. being installed out of compliance will be the responsibility of the plumbing contractor.
P. Refer to Appendix VI – Project Temp. Heating Plan. Provide all labor, equipment, and material necessary to connect the temp heat units inside the building. Assume units will be piped to natural gas from within building for start of 2024 heating season. Include all hookups and disconnects as required. Include removal of all piping when temp heat units are no longer required. Coordinate exact pipe height and locations with Fontaine. Coordinate with local AHJs for permitting and sign-off.
Q. Furnish and install plumbing utility connections to food service equipment, including but not limited to LP, gas, sanitary waste and venting. Provide manpower to assist/work with Fontaine Bros. and Food Service equipment vendors and manufacturer's representatives to start up and commission all kitchen equipment as well as commission life safety systems.
R. Provide coring/sleeving for any work penetrating foundation walls and slabs after installation of foundation walls and slabs.
S. All bidders are directed to review all disciplines of the bid documents prior to submitting a price. The drawings and specifications are complimentary and bidders' prices shall reflect all plumbing work not explicitly included in another scope of work, regardless of where it is shown on the documents.
T. Cut metal deck penetrations at framed openings in coordination with Fontaine Bros. schedule.
U. MEP Coordination utilizing 3D Modeling (BIM):
    1. Provide 3D coordination models and related responsibilities. See Appendix V: BIM Requirements for additional information.
    2. Provide appropriate BIM expertise and resources to meet the MEP coordination requirements defined in Appendix II: CPM Project Schedule.
    3. Both sections of the building will be modeled for MEP coordination at the same time. This contractor shall carry and make available the appropriate staff to allow for simultaneous multi-building area coordination. As a result of the coordination process, piping may be orientated in a way that will require additional pipe lengths, elbows, fittings, and low points requiring drainage. This work is to be included in the base contract. No extras will be entertained due to coordination.
V. Plumbing Trade Contractor shall be responsible to be present during all slab on grade concrete placements to ensure underground rough-in piping does not move during the concrete pours. Contractor will be solely responsible for the final location of all plumbing rough-ins. Special care shall be taken at floor cleanouts, drains, and floor sinks to maintain proper elevations with concrete finishes. Any out of elevation fixtures will need to be chipped out, reset in place, and protected by this contractor.
W. Temporary Water – Install all necessary temporary water systems consisting of a connection to the buildings water service and a distribution system that provides for one hose bib connection at a central location on each floor of the project (both areas of the building). The Plumbing Trade Contractor shall:
    1. Maintain this system for the duration of the project.

2. Disconnect, dismantle, remove and dispose of the system when no longer required for temporary water (at discretion of Construction Manager).

X. Special attention shall be taken by this Trade Contractor for review of RCP drawings. There are many instances of required layouts, layouts allowing concealed conditions, layout through access panels within decking.

Y. Access Doors and Panels:
1. The Plumbing Trade Contractor shall furnish access doors and panels as required to allow access to plumbing valves, equipment and the like.
2. Access doors and panels shall be installed by the trade responsible for the material into which the access door and panel is to be installed (for example, drywall, masonry, tile, acoustical ceiling)
3. Access doors for MEP's shall be furnished from a single source vendor in order for them to be keyed alike. Coordinate with all other MEP's subcontractors at the appropriate time.
4. Access panel ceiling coordination must be completed for Design Team review.
5. Access panels shall be labeled with the name of the contractor providing the panel.

Z. Roof Drains shall be connected immediately (in coordination with the roofing trade bidder). Should the roofing trade bidder complete their drain work prior to the actual connection of the roof drains, the Plumbing Trade Bidder shall provide a temporary drainage system for roof drain water to get out of the building.

AA. Plumbing Contractor shall expedite submittals relating to below grade materials and roof drain system.

2.40 HVAC

A. Maintain as built drawings in the most recent version of AutoCAD, updated as built drawings shall be a prerequisite to monthly payment.

B. Furnish and install seismic bracing as required by codes and shown on drawings, whichever is more stringent.

C. Provide submittals for roof top units, air handlers, and other roof top units within 2 weeks of notice of intent. Provide resubmittals on this material within 1 week of returned submittal.

D. Mechanical equipment shall be procured as quickly as possible, and shall be stored off site if necessary, until required for installation.

E. Provide detailed drawing with sizing and locations all roof and floor penetrations prior to steel fabrication.

F. Provide Shop drawings with fire dampers flagged and showing locations of duct smoke detectors for coordination with electrical requirements.

G. Comply with IAQ Management Plan, protection of ductwork, and all other LEED requirements.

H. Provide for full building flush out per LEED requirements including filter change and documentation.

I. Include construction filters and media protection for use of mechanical system during construction including filter/media changes as required.

J. Subcontractor shall provide coring/drilling/sleeving and link seals for any work associated with HVAC scope.

K. Subcontractor shall complete all commissioning and start up procedures in accordance with the specifications and as directed by the project team.

L. Furnish access panels required to access work of HVAC subcontractor, install by installer within whose finish surface they rest.

M. Refer to Appendix VI – Project Temp. Heating Plan. Provide all labor, equipment, and material necessary to connect the temp heat units inside the building. Assume units will be piped to natural gas from within building for start of 2024 heating season. Include all hookups and

disconnects as required. Include removal of all piping when temp heat units are no longer required. Coordinate exact pipe height and locations with Fontaine. Coordinate with local AHJs for permitting and sign-off.

N. Subcontractor shall provide firestopping at all penetrations through fire rated systems and acoustical sealant at all acoustical systems.
O. Furnish and install all louvers on the project, including louvers connected to HVAC equipment, architectural louvers, elevator louvers, etc.
P. Provide all hoisting, staging, lifts, rigging, etc. required to complete this scope of work, including crane for setting of mechanical curbs and units on roof.
Q. All bidders are directed to review all disciplines of the bid documents prior to submitting a price. The drawings and specifications are complimentary and bidders' prices shall reflect all HVAC work not explicitly included in another scope of work, regardless of where it is shown on the documents.
R. HVAC subcontractor shall ensure that HVAC system is fully operational prior to installation of millwork and casework as dictated by project schedule. HVAC subcontractor shall include provisions necessary to operate system during construction and deliver a fully operational and cleaned out system for occupancy including necessary filter changes etc. HVAC subcontractor also responsible to carry full warranty duration as per contract documents starting from the date of substantial completion, even if system is used during construction. In the event that HVAC subcontractor fails to provide a fully operational system prior to installation of millwork and casework, HVAC subcontractor shall provide dehumidification, humidification, and temperature control to ensure that building environment meets standards within those specs.
S. Cut metal deck penetrations at framed openings in coordination with Fontaine schedule.
T. Provide all wall and floor flanges to close up openings of material that penetrates walls and floors.
U. Deliver roof top equipment over multiple mobilizations as required by schedule and as coordinated with the CM.
V. Provide signage on all units to meet Wilmington Fire Department Standards.
W. Provide custom color for all units as noted in specifications.
X. MEP Coordination utilizing 3D Modeling (BIM):
    1. Provide 3D coordination models and related responsibilities. See Appendix V: BIM Requirements for additional information.
    2. Provide appropriate BIM expertise and resources to meet the MEP coordination requirements defined in Appendix II: CPM Project Schedule.
    3. Both sections of the building will be modeled for MEP coordination at the same time. This contractor shall carry and make available the appropriate staff to allow for simultaneous multi-building area coordination. As a result of the coordination process, piping may be orientated in a way that will require additional pipe lengths, elbows, fittings, and low points requiring drainage. This work is to be included in the base contract. No extras will be entertained due to coordination.
Y. Access Doors and Panels:
    1. The HVAC Trade Contractor shall furnish access doors and panels as required to allow access to mechanical valves, equipment and the like.
    2. Access doors and panels shall be installed by the trade responsible for the material into which the access door and panel is to be installed (for example, drywall, masonry, tile, acoustical ceiling)
    3. Access doors for MEP's shall be furnished from a single source vendor in order for them to be keyed alike. Coordinate with all other MEP's subcontractors at the appropriate time.

4. Access panel ceiling coordination must be completed for Design Team review.
5. Access panels shall be labeled with the name of the contractor providing the panel.

Z. Special attention shall be taken by this Trade Contractor for review of RCP drawings. There are many instances of required layouts, layouts allowing concealed conditions, layout through access panels within decking.

AA. Special Attention is directed to Metering. The HVAC Trade Contractor shall furnish and install all required metering, cabling, programing, etc. for a complete monitored system. This Trade Contractor shall lead the coordination of this work and execution of the complete system.

BB. Louvers and Grills shall be furnished and installed by the HVAC Trade Contractor, unless specifically identified by others

2.41 ELECTRICAL

A. Maintain as-built drawings in the most recent version of AutoCAD, updated as built drawings shall be a prerequisite to monthly payment.

B. Furnish and install seismic bracing as required by codes and shown on drawings, whichever is more stringent.

C. Provide all submittals within four weeks of execution of subcontract

D. Subcontractor is responsible for furnishing all access panels required to access work of this subcontract. Access panels shall be installed by subcontractor within whose finished surface they rest.

E. Subcontractor shall provide temporary power

1. Subcontractor shall provide temporary power within building footprint and within 50 feet of perimeter of building footprint for all trades. Subcontractor shall provide power per OSHA standards within one week of notice of intent to award subcontract.
2. Subcontractor shall provide all pads, bollards, and other accessories required for temporary and permanent power provision. Subcontractor shall provide excavation, backfill, conduit, and concrete if necessary for encasement of temporary power.
3. This contractor shall maintain and relocate temporary power as necessary. It is understood that these facilities may be moved during the construction period, and that these relocations will be performed at no additional cost. Power provided to CM and Owner trailers/offices shall be sufficient to power everyday operations including operation of computers, copiers, printers, and heating and cooling equipment integral to trailers/offices.
4. Subcontractor shall provide temporary lighting and power system within the building per OSHA requirements or specification requirements, whichever is more significant. Subcontractor shall maintain system until directed to remove system by Fontaine Bros. and shall not remove temporary system until permanent systems are in place. Subcontractor shall include dismantling system safely and without further damage to installed finishes around system. Subcontractors whose system runs through shall include provisions for patching holes left by system, painter shall include painting patches. Temp lighting shall be provided for concrete slab placement.
5. Subcontractor shall provide wiring to temporary heating equipment provided by Fontaine Bros. including special connections, and disconnections, as part of base bid. Assume that there will be (6) temp heat units. Units will be installed and removed for the winter of 2026 heating season. Include hookups and disconnects as required for both heating seasons
6. Subcontractor shall provide temporary exterior lighting at parking locations as well as around the building for use during construction.

F. Subcontractor shall provide labor, material, and connections to provide power to all systems requiring power shown on plans, even if wiring is not specifically shown on the electrical plans.

G. Subcontractor shall furnish and install all conduits and power requirements required for window shades, gymnasium equipment, curtain and rigging, food service equipment, overhead doors and controls, and similar equipment furnished and installed by others.
H. All conduit and back boxes within the CMU at the gymnasium will be installed by others in order to accommodate the construction schedule and sequencing. Electrical contractor is to accept this work with no impact to their warranty.
I. Furnish and install site electrical, including, but not limited to feeders, conduit, supports, hand holds, and equipment. Excavation and backfill by others. Coordinate with sitework subcontractor.
J. Subcontractor responsible for all precast and prefabricated equipment pads related to Electrical work.
K. Schedule testing and inspections expeditiously and in advance of required contract dates. Coordinate with Fontaine Bros. field personnel.
L. Provide coring/drilling/sleeving and link seals at penetrations required for electrical work.
M. Subcontractor shall provide firestopping at all penetrations through fire rated systems and acoustical sealant at all acoustical systems.
N. Subcontractor shall complete all commissioning and start up procedures in accordance with the specifications and as directed by the project team.
O. Provide coring/sleeving for any work penetrating foundation walls and slabs after installation of foundation walls and slabs.
P. Subcontractor shall include in their bid provision of labor, material, and equipment necessary to make special connections for equipment requiring special power such as fire proofing equipment (pumps and sprayers), floor grinding machines, masonry saws, dehumidifiers, fans, etc. Equipment connections will need to be relocated as required.
Q. Refer to Appendix VI – Project Temp. Heating Plan. Provide labor, equipment, and material necessary for connection and operation of temporary heating systems during winter of 2024. Remove and dispose of materials when directed by Fontaine Bros.
R. All bidders are directed to review all disciplines of the bid documents prior to submitting a price. The drawings and specifications are complimentary and bidders' prices shall reflect all Electrical work not explicitly included in another scope of work, regardless of where it is shown on the documents.
S. Cut metal deck penetrations at framed openings in coordination with Fontaine Bros. schedule.
T. Commissioning and testing.
U. MEP Coordination utilizing 3D Modeling (BIM):
    1. Provide 3D coordination models and related responsibilities. See Appendix V: BIM Requirements for additional information.
    2. Provide appropriate BIM expertise and resources to meet the MEP coordination requirements defined in Appendix II: CPM Project Schedule.
    3. Both sections of the building will be modeled for MEP coordination at the same time. This contractor shall carry and make available the appropriate staff to allow for simultaneous multi-building area coordination. As a result of the coordination process, piping may be orientated in a way that will require additional pipe lengths, elbows, fittings, and low points requiring drainage. This work is to be included in the base contract. No extras will be entertained due to coordination.
V. Access Doors and Panels:
    1. The Electrical Trade Contractor shall furnish access doors and panels as required to allow access to plumbing valves, equipment and the like.

2. Access doors and panels shall be installed by the trade responsible for the material into which the access door and panel is to be installed (for example, drywall, masonry, tile, acoustical ceiling)
3. Access doors for MEP's shall be furnished from a single source vendor in order for them to be keyed alike. Coordinate with all other MEP's subcontractors at the appropriate time.
4. Access panel ceiling coordination must be completed for Design Team review.
5. Access panels shall be labeled with the name of the contractor providing the panel.

W. Special attention shall be taken by this Trade Contractor for review of RCP drawings. There are many instances of required layouts, layouts allowing concealed conditions, layout through access panels within decking.

X. Provide energized permanent light fixtures for final painting.

Y. Special Attention for items within Specification Divisions 10, 11 and 12 for Power requirements. Regardless of whether or not such power requirements are shown, they shall be furnished and installed by the Electrical Trade Contractor.

Z. Special attention for items within specification division 8, door hardware, for power requirements. All electrified door hardware components shall be wired by the Electrical Trade Contractor. This includes any and all connections between the hardware components and associated devices such as security devices.

AA. Poke Thru Devices and/or Floor Assemblies shall be furnished and install by the Electrical Trade Contractor, including all necessary coring, floor repair, patching, grouting, etc. for a complete installation.

BB. Under slab Excavation Responsibilities. Excavation and backfilling for under slab electrical will be provided by others only for underground electrical work shown on the electrical drawings. The Electrical Trade Contractor shall be responsible for excavation and backfill work for all under slab or underground electrical work not shown or explicitly depicted as under slab or underground work on the electrical drawings.

CC. One Classroom projector shall be installed in the mockup classroom as CM's request prior to release of all other projectors. Following review by the design team and the CM, project shall be removed, stored, and reinstalled along with all other MEP finishes.

2.42 LANDSCAPE

A. Furnish and install precast site benches including sonotube foundations, precast concrete, and precast steps.

B. Furnish and install irrigation system which meets the intent shown on contract drawings. Design irrigation system and provide all material and labor necessary for a complete irrigation system with full coverage of irrigated areas regardless of quantity of heads, joints, sleeves, length of piping, etc.

C. Provide all trenching required to complete work of this bid package.

D. Site contractor shall provide rough grading of loam. This contractor shall fine grade.

E. This contractor shall excavate for all plantings.

F. Provide as-built drawings, as hard copies and in CAD format, to match owner's requirements.

G. Complete seasonal shutdown and startup as noted in specifications. Shutdown and startup must be coordinated with the Owner.

H. Furnish and install all steel and plastic edging.

PART 3 APPENDICES

3.01 APPENDIX I – SITE SPECIFIC SAFETY PLAN

A. Reference "Appendix I – Site Specific Safety Plan" included within this specification section.

3.02 APPENDIX II – CPM PROJECT SCHEDULE

A. Reference “Appendix II – CPM Project Schedule” included within this specification section.

3.03 APPENDIX III – SITE UTILIZATION PLAN

A. Reference “Appendix III – Site Utilization Plan” included within this specification section.

3.04 APPENDIX IV – PROJECT PHASING PLAN

A. Reference “Appendix IV – Project Phasing Plan” included within this specification section.

3.05 APPENDIX V – BIM REQUIREMENTS

A. Reference :Appendix V – BIM Requirements” included within this specification section.

3.06 APPENDIX VI – PROJECT TEMPORARY HEATING PLAN

A. Reference “Appendix VI – Project Temporary Heating Plan” included within this specification section.

APPENDIX I – SITE SPECIFIC SAFETY PLAN

SITE SPECIFIC SAFETY PLAN

Wilmington Elementary School

Town of Wilmington

Wilmington, MA
Project #2633

FONTAINE BROS., INC. | T: 413.781.2020 | 12 E WORCESTER STREET WORCESTER, MA 01604 | 510 COTTAGE STREET SPRINGFIELD, MA 01104

FONTAINE BROS., INC.

EMERGENCY CONTACTS

Fontaine Bros., Inc.	
Superintendents	Alex Omar T: 617-594-6774 E: aomar@fontainebros.com
Project Manager	Chad L'Ecuyer T: (508) 340-2577 E: clecuyer@fontainebros.com
Safety Director	Mark Bisson T: (774) 217-2216 E: mbisson@fontainebros.com
Owners Representative	
Leftfield, LLC	David Saindon T: (617) 872-5180
Emergency Services	
Police	Wilmington Police Department 1 Adelaide Street, Wilmington MA 01887 T: (978) 658-5071
Fire	Wilmington Fire Department 1 Adelaide Street, Wilmington MA 01887 T: (978) 658-3346
Urgent Care Medical Facility	Winchester Hospital Urgent Care 500 Salem Street, Wilmington MA 01887 T: (978) 988-6000

EMERGENCY EVACUATION PLAN

In the event of an life threatening emergency the first call is to **9-1-1**

Contact the Project Superintendent:
Alex Omar
T: (617) 594-6774

In the event of emergency an **AIR HORN** will be sounded continuously to notify all personnel to evacuate the building/site immediately. ALL workers will gather at the designated **MUSTER POINT**, which is pictured below and will be reviewed with all personnel at orientation.

Once worker reaches the **MUSTER POINT** they are required to be accounted for by the project foreman to ensure all workers are accounted for. The project foreman will then provide an accurate head count to the project Superintendent.

Any workers not accounted for will be presumed to still be on site, and police and fire department will begin looking for anyone not accounted for. It is vital that all foreman and workers understand the importance of this evacuation plan and the consequences of not following the plan outlined.

MUSTER POINT

NEAREST MEDICAL FACILITY INFORMATION

Emergency Services	
Urgent Care Medical Facility	**Winchester Hospital Urgent Care** 500 Salem Street, Wilmington MA 01887 T: (978) 988-6000

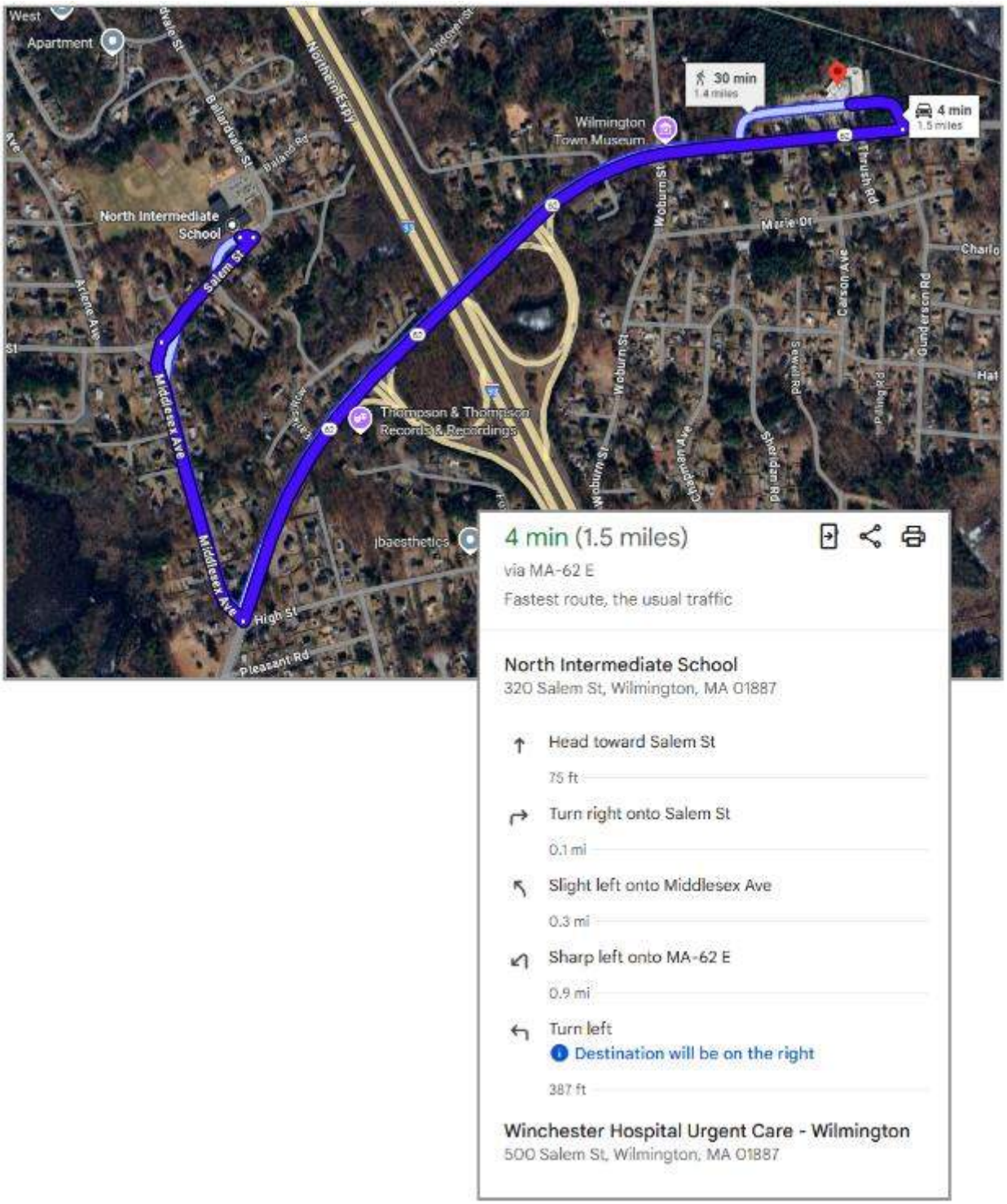


TABLE OF CONTENTS

Emergency Contacts	2
Evacuation Plan	3
Table of Contents	5
Introduction	7
Scope	7
Primary Requirement	7
Deliverables	8
Safety Vision and Guiding Principles	9
Safety Mission	10
Site Security	11
Code of Safe Work Practices	12
Training	13
Job Hazard Analysis (JHA)	14
Project Safety Orientation	14
Worker Orientation	15
Emergency Action Plan	16
Procedures for Incident Reporting and Investigation	18
Compliance and Enforcement	21
Weekly Site Safety Inspections	23
OSHA Inspections	24
Means of Egress	26
Housekeeping	27
Personal Protective Equipment (PPE)	28
Safety Requirements	29
Fall Protection	34
Scaffold Safety Highlights	36
Concrete and Masonry	37
Cast-In-Place Concrete	38
Motor Vehicles	40
Powered Industrial Equipment	41

TABLE OF CONTENTS

Aerial & Scissor Lifts	44
Respiratory Protection Program	45
Respirable Crystalline Silica Program	47
Requirements	50
Alternative Exposure Control Methods	55
Program Evaluation	62
Asbestos	63
Lead	64
Indoor Air Quality (IAQ) Management Program	65
Environmental	68
Health	70
Pictograms and Hazards	76
Worker Training	77
Demolition: Subpart T	78
Electrical Safety	79
Trenching and Excavation	81
Sloping and Benching	82
Confined Space Entry	86
Fire Prevention	90
Compressed Gas Cylinders	92
Hot Work Permit Procedure	94
Cranes, Derricks, Hoists and Lifts	95
Steel Erection: Subpart R	97
Water Damage Prevention Plan	101
Material Handling and Storage	103
Weather Conditions	106
Active Shooter	107
Fine Classification System For Unsafe Acts/Conditions	110
Monetary Classifications Chart	111
Appendix: Forms	120

This is a Smoke-Free Project per the Massachusetts Education Reform Act. This includes cigarettes, cigars, pipes and vaping.

" No Smoking" Signs will be posted throughout the project.

Introduction

Communication and training is an integral part of the program, and should be emphasized over the duration of the project. In order to facilitate the above, every worker on site shall follow the established policies and procedures, report hazardous conditions and mitigate "areas of concern" before an illness, injury, near miss or other incident is realized. Contractors as well as other persons on this site are obligated to follow the same rules and regulations that have been implemented for the contractors in accordance with the requirements of, but not limited to; the federal Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA) or other state and local agencies, such as CDC, USDOT and Owner and this safety program.

The goal of this program is to provide a healthy and safe working environment for everyone as well as to protect the site and the environment to the best of our ability.

Scope

The new Wilmington Elementary School project is a proposed roughly 165,000 square foot, three story facility designed to replace three aging schools – Wildwood Elementary, Woburn Street Elementary, and the North Intermediate School – with a state-of-the-art PreK-5 facility. The facility is designed for 755 students K-5 and 100 Pre-K students (855 total).

Primary Requirement

Fontaine shall make all workers on site, including sub-contractors aware of this site-specific safety plan, and emergency action plan(s), prior to initiation of work when practical. This notification shall include; site specific program content, special project concerns and hazards, owner modifications, the training requirements for the project, including the day and time of the "tool box" talks, the reporting of hazards, illnesses, injuries and "near-misses", any dangerous or out-of-service equipment, and the location of all the plans, manuals, SDS and JHA. All reports, including accidents, incidents, out-of-service equipment and other information related to this plan shall be submitted to the Project Manager/Site Superintendent for corrective action and distribution.

DELIVERABLES

- The Contractor shall deliver the following contact information:
  - Complete a Competent Person Designation Form
- The Competent Person must be onsite fulltime and may be a working foreman. The Competent Person's duties will include, without limitation, conducting a safety audit of the Contractor's work activities (including lower tier subcontractor's).
- If the contractors onsite rate of incident exceeds BLS industry average, the contractor is required to develop and execute a corrective action plan. This plan is to executed by an onsite Competent Person that has no other duties outside of health and safety management.
- The Contractor shall resolve all Predictive Solutions (PS) punch list items by the due date set by the CM. If the Contractor fails to resolve the matter by the due date, the CM will resolve the at-risk condition and prepare a back charge to offset any monies expended to bring the matter to closure.
- The Contractor shall deliver the following prior to the commencement of work:
  - An electronic copy of the written company SAFETY MANUAL (must meet OSHA Oct 2016 Recommended Practices for Safety & Health Programs for Construction), including any specific written program, as may be required by regulation (for example, a respiratory protection program, exposure control plan for Silica).
  - An electronic copy of the written company hazard communication program (must meet the requirements of OSHA 1910.1200).
  - An individual electronic .pdf copy of each project specific safety data sheet (SDS) for each listed material (including those to be utilized by lower tier subcontractors). The file name of the SDS shall be in the following format (product name – manufacturers name – contractors name). These materials shall be provided in an original electronic .pdf file. The Contractor shall provide a separate 3-ring binder with paper copies for use in the field by their workforce.
  - A listing (including company name, address, phone and fax numbers, and description of work to be completed) of each lower-tier subcontractor (hereinafter referred to as Contractor) that the Contractor will utilize, including a statement that the lower-tier Contractor will perform work in accordance with the Safety Program. This statement shall be signed by an officer of the entity.
  - Job Hazard Analysis (JHA) for each task performed (including those performed by lower-tier subcontractors) on the project.
  - Each Contractor shall establish and maintain a substance abuse program consistent with the DRUG FREE WORKPLACE ACT (DFW) of 1988.
  - Each Contractor shall maintain and disseminate a policy against sexual harassment, harrassment, discrimination and/or bullying.

***See appendices for the Competent Person Designation form.**

SAFETY VISION AND GUIDING PRINCIPLES

Fontaine is committed to working with you to provide a healthy and safe place in which to work. The prevention of accidents and injuries to workers is our prime objective. All personnel are expected to take an active and constant interest in the prevention of accidents. We call upon all workers to use good common sense in all their actions, take a second to think of the consequences to your fellow workers. We cannot overemphasize that all workers must do their part to minimize accidents. Pre-planning all activities and communication with the Fontaine project team is vital to providing a healthy and safe work place. Fontaine is family owned and operated company and we consider all workers a part of our family. Together we are all building a safer future.

Please show your support by demonstrating the following:

1. Observing Company safety policies
2. Pre-plan all activities with your company's designated competent person
3. Keeping Work Areas Free of Unsafe Conditions
4. Avoiding and Elimination Unsafe Acts
5. Promptly Reporting Unsafe Acts and Conditions
6. Reporting All Accidents Immediately

Fontaine realizes that accidents cause suffering and pain. We value each of you as individuals and hope you will cooperate with us in this important endeavor. Any constructive criticism or suggestions toward improving safety on any of our jobs will be given prompt and careful consideration.

David Fontaine, Sr.
President of Fontaine Bros., Inc.

David Fontaine, Jr.
Chief Executive Officer of Fontaine Bros., Inc.

SAFETY MISSION

A primary goal of Fontaine is to develop and promote a safety culture and climate that engages and empowers each worker to realize a safety, productive and quality driven outcome every day they are on the project.

In order to do so, we must adhere to the following guidelines:

- Safety and Health are a shared responsibility. Everyone from the top management to supervisors to each and every worker must take ownership of their own safety and that of their co-workers.
- Pre-plan all activities. Plan the work, work the plan.
- Conduct weekly safety meetings with workers.
- Maintaining a safe and healthful work environment is not just an idea, it is top priority.
- It is everyone's job to identify hazards and to correct them or report them in a timely manner.
- Where hazards cannot be completely eliminated, they must be reduced through engineering and/or administrative controls or, as a final precaution, through the proper use of personnel protective equipment.
- Every worker will be trained to perform work safely. Should an worker feel inadequately trained to perform certain tasks, they shall immediately discuss the problem with the foreman.
- As a condition of entry to the project, each worker must consistently work in a safe manner.
- Any act or threat of physical violence will be grounds for immediate dismissal from the project.
- Harassment, intimidation or other threatening disruptive behavior that occurs at the project is to be reported to the Fontaine superintendent immediately.

SITE SECURITY

Pedestrian, Personnel and Vehicle Protection

- It is the responsibility of each contractor to, when necessary, meet with and address any issues that may fall under the jurisdiction of the local fire and police departments.
- Contractors, coordinating with Fontaine shall take steps necessary to protect the public and maintain work areas that meet or adjoin public ways, sidewalks, building entrances (aisles, corridors, lobbies and other common areas), stairways and roads.
    - The contractor shall erect, install and maintain the appropriate barricades, barriers, fences, guardrails, overhead protection, partitions, signs, shields, and/or other interim controls protect the health, safety and well-being of the general public.
        - Warning signs must be conspicuously posted and adequate in number for protection of the general public.
        - When signs used for exits must be temporarily blocked or obstructed, the signs shall be covered or otherwise blanked to prevent use.
- Temporary exits shall be identified from the former exits with new signage with directional arrows to permit safe egress of the public and workforce.
- The Exit signs shall be red or green in color, with each letter at least 6” in height with a ¾” stroke (width).
- Work shall only be performed during appropriate hours, subject to the requirements of the city or town, and as specified by contract.
- All guardrails to protect the general public and workforce from the potential of fall shall be of adequate strength, and shall be able to withstand a down and outward pressure of 200lbs, in accordance with OSHA

Smoking

Smoking is not allowed on school grounds!

CODE OF SAFE WORK PRACTICES

Personal Protective Equipment and Project Safety Requirements:

1. Hard hats are required at all times.
2. Safety glasses are required at all times.
3. Face shields required any time when cutting metal.
4. Class 2 High Visibility Clothing required at all times per latest version of ANSI 107.
5. Work pants are required.
6. Work boots are required.

Supervisors and foremans play a key role in the prevention of accidents on the job. They have direct contact with the workers and know the safety requirements for various activities being performed. If they feel the activity is being performed in an unsafe manner, they have the ability to shut down the activity until the hazards are addressed.

Safety responsibilities for these workers include:

1. Enforce all safety rules in the Code of Safe Practices and ensure safe work procedures.
2. Pre-plan all activities.
3. Verifying corrective action has been taken regarding safety hazards and accident investigations.
4. Conducting periodic documented inspections of the work sites to identify and correct unsafe actions and conditions that could cause accidents
5. To act as a leader in company safety policy and setting a good example by following all safety rules
6. Becoming familiar with local, state, and federal safety regulations. The Safety Director is available for assistance
7. Train all new and existing workers in proper safety procedures and the hazards of the job
8. Instruct all workers, under their supervision, in safe work practices and job safety requirements
9. Hold weekly safety meetings with workers
10. Ensure worker proficiency when assigning work requiring specific knowledge, special operations or equipment
11. Ascertain that all machinery, equipment, and workstations are maintained in safe working condition and operate properly.
12. Correct unsafe acts and conditions that could cause accidents
13. Communicate with all workers about safety and accident prevention activities
14. Correct the cause of any accident as soon as possible
15. Ascertain that proper first aid and firefighting equipment is maintained and used when conditions warrant its use
16. Maintain good housekeeping conditions at all times
17. Investigate all injuries and accidents to determine their cause and potential corrective action
18. Ascertain that all injuries involving our workers that require medical attention are properly treated and promptly reported to the office

Every worker is responsible for working safely, both for self-protection and for protection of fellow workers. Workers must also support all company safety efforts. Specific worker safety responsibilities include:

1. If you are unsure how to do any task safely, ask your supervisor.
2. Read and abide by all requirements of the Safety Manual.
3. Know and follow the Code of Safe Practices and all company safety policies and rules.
4. Wear all required personal protective equipment.
5. Report all near misses, accidents and injuries, no matter how minor, to your supervisor immediately.
6. Do not operate any equipment you have not been trained and authorized to use.
7. Report any safety hazards or defective equipment immediately to your supervisor.
8. Do not remove, tamper with or defeat any guard, safety device or interlock.
9. Never use any equipment with inoperative or missing guards, safety devices or interlocks.
10. Never possess, or be under the influence of, alcohol or controlled substances while on the premises.
11. Never engage in horseplay or fighting.
12. Participate in, and actively support, the company safety program.

TRAINING

Training must be provided by competent person/qualified person and documented or "certified" as required. Training must be provided for all personnel, specific to the types of work being performed by same.

- Training must be provided and documented for, but shall not be limited to; Fall Protection, Fork Lifts (Powered Industrial Truck Standard), Lockout/Tag out, Personnel Lifts, Respiratory Protection, welding certifications, scaffolding, silica, rigger and signal person, First Aid/CPR/AED/Naloxone, etc.
- All workers must have proof of OSHA 10-Hour Training
- All persons must complete New Worker Orientation prior to the start of work or as practical.

Some training can be provided through "Tool Box" talks, training or similar. Contractors must have proof of training, which can include, but is not limited to:

- Sign-in sheets
- Quizzes
- Training can also be provided by an outside agency or company with special knowledge on the topic being covered.
- Trainer must be competent in the subject material
- Sign in sheets or quizzes can be used for record of attendance
- Trainer providing the information shall provide a copy of training documentation, including information covered

A copy of the training documentation and the accompanying rosters should be maintained by Fontaine.

The Tool Box / Training Sessions for this project or site shall be held once a week at a minimum

JOB HAZARD ANALYSIS (JHA)

A JHA shall be developed for all activities, as well as for major construction operations. The analysis shall be performed by a competent person and identify the steps, hazards and controls to be implemented and shall be appropriately documented. JHA is to be used as a well thought out evaluation of the activity being performed, and shall be made available for review and training for personnel performing the identified work.

A copy of the JHA shall be provided to Fontaine for review five (5) days prior to beginning work.

***See appendices for the JHA form.**

PROJECT SAFETY ORIENTATION

All new workers shall receive safety orientation. Each worker will receive a New Worker Orientation provided by the Construction Management Team. The orientation session will include a summary of the key aspects of the Fontaine Policy and identification of hazards of the site. **Orientation attendance shall be documented.**

Program Enforcement

Each Subcontractor:

- Shall assume responsibility for the safety programs enforcement by their foreman
- Shall see that all accidents or losses are properly investigated and the information passed on to the construction manager in a timely manner
- Shall see that all new workers receive proper safety training
- Shall provide all proper (PPE) including hard hat, level A4 cut resistant gloves, safety glasses, and vest for each worker
- Shall enforce proper use of PPE
- Shall hold weekly Safety Meetings and return signed attendance sheets to the construction manager
- Shall assist with accident investigation to insure proper reporting and documentation, using the information to prevent future loss incidents from occurring.
- During job progress audits, the foreman should be alert for hazardous conditions which could cause a lost time injury or property damage and unnecessary costs to the company
- Shall have the conditions corrected immediately or remove workers from exposure
- Contact the construction manager and communicate the hazard, identify the hazard and its specific locations so that formal contact can be made.
- Shall ensure all workers have been CORI checked, if required.

WORKER ORIENTATION

Each worker being hired to work at this jobsite will be required to attend a 60-minute Worker Orientation session prior to beginning employment. The goal of the worker orientation session is to familiarize each worker with the policies and procedures of the work site.

The following is an outline of the items to be reviewed at each session:

- Review the Emergency Evacuation Plan
- General Site Safety Practices
- Safety and Loss Control Policy
- Review of Safety Manual/Procedures
- Make copies of safety certifications

At the conclusion of the orientation, the workers will be given the Fontaine Safety verification form to fill out. At this time the worker will provide certification of training such as, OSHA 10/30, Hoisting License, etc. The company representative should review the completed Safety and Health Information for any potential work limitations and advise the project manager/foreman accordingly. The worker then proceeds to the jobsite, and reports to the project foreman for employment.

***See appendices for the orientation packet and verification form.**

EMERGENCY ACTION PLAN

Fire Alarms/Air Horn

All workers and visitors are required to evacuate the building or site in the event of a fire alarm or airhorn, regardless of cause or time.

1. For reasons of muster, Fontaine shall, before any work is initiated, identify specific muster paint area for each contractor, trade or manageable group.
2. Muster areas shall be > 50' from the building.
3. The Muster Area for this project will be outside the Fontaine Field Office Trailers unless otherwise directed by the superintendent or safety director.
    - It is the responsibility of the individual group, (by contractor, trade etc.), to determine whether or not all of their personnel evacuated the building, and if not, to report the names of the missing (or unaccounted person(s)) to the Fontaine Superintendent or fire department incident commander, the local police/security department, and the project superintendent.

Fire

In the event of an actual fire or smoke condition, follow these procedures:

- Notify all persons in the immediate area of the fire to initiate evacuation.
- Close the door to the fire area/room to contain the fire and/or smoke condition after everyone has left area.
- Activate Alarm (fire alarm, air horn or other suitable warning device) to initiate building evacuation.
- Evacuate the building
- Phone Police (911)

Medical Emergency

Emergencies (which include significant lacerations, amputations, head, neck or back injuries, loss of consciousness, allergic reactions, diabetic emergencies, seizures, difficulty breathing, stroke and unknown illness or injuries) shall require the response of an ambulance. 911 or the local emergency number; Unless required for reasons of personal safety (such as explosion, fire, structural failure etc.), no person needing emergency first aid shall be relocated, as this may compromise their health, safety and well-being.

- A designated person shall be identified to meet the ambulance at a pre-determined location, and direct the ambulance crew into the area or building where the incident has occurred.

First-Aid

Every work site shall have access to at least one first-aid kit in a weatherproof container. The first-aid kit will be inspected regularly to ensure that it is well stocked, in sanitary condition, and any used items are promptly replaced. The contents of the first-aid kit shall be arranged to be quickly found and remain sanitary. First-aid dressings shall be sterile and in individually sealed packages.

Drugs, antiseptics, inhalants, medicines, or proprietary preparations shall not be included in first-aid kits unless specifically approved, in writing, by an employer-authorized, licensed physician.

Other supplies and equipment, if provided, shall be in accordance with the documented recommendations of an employer-authorized licensed physician upon consideration of the extent and type of emergency care to be given based upon the anticipated incidence and nature of injuries and illnesses and availability of transportation to medical care.

Each project will have a Blood-Borne Pathogens Kit for the safe cleaning of surfaces contaminated by blood or other bodily fluids.

Proper equipment for the prompt transportation of the injured or ill person to a physician or hospital where emergency care is provided, or an effective communication system for contacting hospitals or other emergency medical facilities, physicians, ambulance and fire services, shall also be provided.

The emergency contact numbers and directions to following emergency services in the area shall be posted in the Fontaine Field Office trailer.

1. A company authorized physician or medical clinic, and at least one alternate ifavailable.
2. Hospitals
3. Police services
4. Fire-protection services

Prior to the commencement of work at any site, the Supervisor or Manager shall locate the nearest preferred medical facility and establish that transportation or communication methods are available in the event of an worker injury.

Each worker shall be informed of the procedures to follow in case of injury or illness through our worker orientation program, Code of Safe Practices, and safety meetings. Where the eyes or body of any person may be exposed to injurious or corrosive materials, suitable facilities for drenching the body or flushing the eyes with clean water shall be conspicuously and readily accessible.

Injury Reporting

All injuries and illness shall be reported to both of the following person(s) immediately:

1. Employers foreman competent person
2. Fontaine representative

PROCEDURES FOR INCIDENT REPORTING AND INVESTIGATION

Purpose: To establish a standard procedure for incident response, investigation, reporting and processing.

Objective: Establish means for loss reporting, tracking, and trending for analysis purposes.

Contacts:

- All Injuries must be reported to the Safety Director immediately: Mark Bisson @ 774-217-2216
- Any injuries to Fontaine Bros./Thunderbird workers contact: Charlene Metcalf @ 413-781-2020

DEFINITIONS

First Aid Cases: First Aid Cases are considered "non-recordable" as defined by OSHA and can be defined as one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, which do not ordinarily require medical care, even though provided by a physician or registered professional personnel.

Reportable Cases: All other injuries that do not fall under the non-recordable description should be considered as recordable and reported as such.

- Any injury involving lost time (in addition to the day of the incident)
- Any injury involving restricted duty
- Medical only cases (stitches, strains, etc.)

Serious Incidents: Serious incidents are those that can be classified under any of the following:

- Occupational death(s), regardless of the time between injury and death, or the length of the illness
- Occupational illness or illnesses resulting in permanent or significant disabilities
- Project accidents that involve property damage greater than $1000.

REPORTING PROCEDURES

Emergencies: In the event of a catastrophe or major accident occurring on a project, the Safety Director must be notified as soon as physically possible. Every assistance will be rendered in completing and filing the appropriate reports with the insurance carrier and other agencies.

In the event of a serious bodily injury occurring:

1. Call Ambulance
2. Administer First Aid
3. Secure the Accident Scene
4. Contact Owner/Client representative
5. Complete an Incident Investigation Form
6. Call OSHA within 8 hours for any job related fatality or hospitalization of admittance of one worker from one incident
7. Call OSHA within 24 hours of any amputation or loss of an eye or hospitalization of admittance of one worker from one incident

Injury to Fontaine/Thunderbird Worker:

Immediately notify the main office, Charlene Metcalf @ 413-781-2020 and the Safety Director Mark Bisson @ 774-217-2216. The superintendent shall conduct the investigation and fill out the Fontaine Incident Investigation Report". The Safety Director will complete the first report of injury report, required for the state where the project is located, and file same, with any other pertinent information to the insurance carrier.

Injury to Subcontractors Worker:

Fontaine's Superintendent must be verbally notified by the subcontractor's foreman immediately that an accident has taken place and that one or more of his workers has been injured. Any injury, even minor in nature, requiring a visit to an outpatient medical clinic for treatment, must be reported to the Superintendent, and a Fontaine "Incident Investigation Report" will be filled out. The appropriate state form, usually referred to as "First Notice of Injury Report", must be filed by the worker's employer, if the injured worker requires anything more than first aid.

The Superintendent must then obtain the aforementioned "First Report" from the Subcontractor, and attach it to the Fontaine Incident Investigation Report, along with any other pertinent information, then submit a copy of all items to the Safety Director.

Damage to Property:

Any property damage accident, whether project property or non-project property, must also be reported on the Fontaine Incident Investigation Report Form" as well.

The Fontaine Superintendent must verbally notify the Safety Director of any damage to property as soon as possible and submit the aforementioned written investigation reports within 24 hours. Maintain a copy of all accident reports on file at the jobsite.

Injuryto Public:

Follow investigatory procedures listed below in section C. Immediately complete the Incident Investigation Report and forward to the Safety Director.

Damage to Company Vehicles:

Any company owned vehicle accident, involving personal injury, must be verbally reported immediately to Fontaine's Safety Director. The accident must be recorded using an Incident Investigation Report Form and sent to the main office along with police reports, witness statements, photographs, etc. within 24 hours of the accident.

Any instances of fire, major theft or vandalism to a company vehicle shall be verbally reported to the Safety Director as soon as possible.

OSHA Record Keeping:

Every job site office shall have the OSHA 300 form posted on the wall to record any injuries to Fontaine workers that may occur at that site during the current calendar year.

Each January federal OSHA laws require accidents and illnesses of company workers be summarized for the previous year and posted in the project site offices from February 1 thru April 30th (OSHA 300A Form).

***See appendices for the incident report form.**

The OSHA 300A "Summary of Work Related Injuries and Illnesses" for all years with copies of Fontaine worker accident reports will be kept in the Safety Department files indefinitely.

Fontaine Record Keeping:

All incidents will be logged in the company's "Incident Log" and a separate file kept for each incident, to include, General Liability, Workers Compensation, and property related incident.

1. All occurrences shall be investigated thoroughly. Superintendents shall utilize the **Fontaine Incident Investigation Report Form** for investigation of all incidents.
2. The following activities shall be conducted by the Fontaine Superintendent in the Accident Investigation process:
3. The Project Superintendent shall investigate and provide a written report of all accidents.
4. Investigate the accident. Find out WHO, WHAT, WHEN, WHERE, and HOW. Have a tape measure available to measure any distance information necessary to the investigation.
5. Follow emergency procedure until the accident situation is stabilized. The Superintendent shall take photographs of the accident scene and the surrounding area. Indicate on the back of photographs the date photograph was taken, date of incident, what the photograph depicts, and who took it.
6. Contractors, who have an automobile accident on jobsite property, must provide Fontaine's Superintendent with a completed automobile accident report within 24 hours of the accident. State Motor Vehicle procedures for reporting automobile accidents will be complied by the Sub-contractors.
7. Draw diagrams, mark-up drawings.
8. Identify, assess, and secure any and all evidence to preserve for future reference
9. Record status of construction at the scene at the time of accident. Indicate what work was in place and what work was going on.
10. Determine how many subcontractors were working in the area, with how many workers each, and what activity they were performing.
11. Identify witnesses and attempt to obtain telephone numbers. Record their names and employers. Try to interview them in private regarding accident description and cause. Ask them to sign a statement of description and cause.
12. Obtain copies of reports by others (police, fire department, subcontractors, doctors, etc.).
13. Immediately identify and outline any and all corrective actions taken to prevent re-occurrence. Ensure the corrective action taken is written in the Fontaine Incident Report Form.
14. Provide written report as described to the Safety Director.
15. A copy of all reports including hospital, fire, police etc., must be forwarded to the Safety Director within twenty-four (24) hours of occurrence.

***See appendices for the incident report form.**

COMPLIANCE AND ENFORCEMENT

The compliance of all workers with our Safety Manual is mandatory and shall be considered a condition of employment. Fontaine reserves the right to immediately remove any worker from any of our projects. The following programs will be utilized to ensure worker compliance with the safety program and all safety rules:

- Training Programs/Verbal Warning
- Retraining/Written Warning
- Disciplinary action/Immediate removal from the project

Training Programs

The importance of safe work practices and the consequences of failing to abide by safety rules will be covered in the Worker Safety Orientation and safety meetings. This will help ensure that all workers understand and abide by company safety policies.

Retraining

Workers that are observed performing unsafe acts or not following proper procedures or rules will be retrained by their supervisor. A Safety Contact Report may be completed by the supervisor to document the training. If multiple workers are involved, additional safety meetings will be held.

Disciplinary Action

The failure of an worker to adhere to safety policies and procedures can have a serious impact on everyone concerned. An unsafe act can threaten not only the health and well-being of the worker committing the unsafe act but can also affect the safety of his/her coworkers and customers. Accordingly, any worker who violates any of the company's safety policies will be subject to disciplinary action, including immediate removal. As the controlling contractor, Fontaine reserves the right to immediately remove any worker from any of our projects.

- Any act or threat of physical violence will be grounds for immediate dismissal from the project.

Note: Failure to promptly report any on-the-job accident or injury, on the same day as occurrence, is considered a serious violation of the Company's Code of Safe Practices. Any worker who fails to immediately report a work-related accident or injury, no matter how minor shall be subject to disciplinary action.

Workers will be disciplined for infractions of safety rules and unsafe work practices that are observed, not just those that result in an injury. Often, when an injury occurs, the accident investigation will reveal that the injury was caused because the worker violated an established safety rule and/or safe work practice(s). In any disciplinary action, the supervisor should be cautious that discipline is given to the worker for safety violations, and not because the worker was injured on the job or filed a Workers' Compensation claim.

Violations of safety rules and the Code of Safe Practices are to be considered equal to violations of other company policy. Discipline for safety violations will be administered in a manner that is consistent with the company's system of progressive discipline. If, after training, violations occur, disciplinary action will be taken as follows:

1. Verbal warning *Possible monetary fine
2. Written Warning with 3 day suspension * Possible monetary fine
3. Termination from the project *Possible monetary fine

As in all disciplinary actions, each situation is to be carefully evaluated and investigated. The particular step taken in the disciplinary process will depend on the severity of the violation, worker history, and regard to safety. Managers and supervisors should consult with the office if there is any question about whether or not disciplinary action is justified. Workers may be terminated immediately for willful or extremely serious violations. Union or contract workers are entitled to the grievance process specified by their contract.
*Note: Monetary Fine Classification System is located at the end of this document.

WEEKLY SITE SAFETY INSPECTIONS

Predictive Solution Site Inspection Reports:

The Fontaine Safety Director shall visit the projects on a weekly basis to conduct safety audits to assure compliance with the Fontaine Health and Safety Program and all OSHA regulations. Fontaine has contracted with Predictive Solutions (Safety Auditing Software) in order to document deficiencies and score the project on a 0%- 100% basis. The Predictive Solutions system produces a report that is forwarded to the Project Superintendent and project team as a record to assure that deficiencies are corrected. An "open issues" e-mail is generated and sent to superintendents until the open item (s) are closed by the superintendent.

From either the initial report, or a recurring "open issues report", the method of close out is the same. On the far right hand side of the report, it will say "edit". To close out the item, click on edit. Another box will pop up with only the information from that observation. Approximately halfway down the page, one of the items will say "corrected". As the item is open, it will default to no. To close that item out, under "corrected", click the button from "no" to "yes". Once that is done, underneath "corrected", choose from the drop down menus the appropriate response for "corrected by" and "action taken". Once that is completed, enter the completed date and time. Under the time, complete the section "updated by" by entering the name of the person updating the item. Once the "updated by" section is completed, enter as needed, any comments in the box labeled "Recommendation Comments". Once all of the information is entered, click on "save and close" at the bottom of the box. The item will now be closed in the database. Note that the report will not change. There is no need to repeat closing the same item. If the item is closed from an inspection report, then no open issues report will come out the following morning. If the item is closed from an open issues report, then it will be dropped from the report the following day. If it was the only item on an open issues report, then no report will come out the following morning.

Superintendents: It is the superintendent's responsibility to close out any construction safety or monthly management open issues. Supers are set up to get each inspection report as well as daily open issues reports for the inspection types noted above.

Contractors are required to conduct daily inspections of their equipment, storage and work locations. These inspections must be documented refer to attached Contractor Weekly Inspection.

Electrical contractor to provide a weekly inspection of temporary lighting and electrical systems.

Contractors are required to immediately correct any unhealthy or unsafe condition or work practice.

OSHA INSPECTIONS

The Occupational Safety and Health Administration is part of the U. S. Department of Labor. The OSH Act was promulgated to insure every working man and woman in the nation a safe and healthful working environment and to preserve our human resources. This said, it falls upon all of us to make sure we meet this requirement in our work places.

Our first, best line of defense is the Field Foreman, the person responsible for the day-to-day operation of a construction project. This worker is also known as the "Competent Person", meaning he is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to workers, AND has the authorization to take prompt corrective measure to eliminate them. The Competent Person is so designated by the employer.

The best practice for an inspection is preparedness. Following the guidelines in the manual will assist you. Here is a brief guide to the steps in an inspection. There may be some variations depending on the Compliance Officer.

NOTE: Discuss if you have questions but NEVER ARGUE with the C.O.

The Compliance Officer arrives on site and presents his credentials to the General Contractor (Prime or Construction Manager). (Now is the time for you to notify the office and call your Safety Director). He will review the G.C.'s site specific written program as well as the method by which safety is managed on site. If certain criteria are met, he may conduct a "focused inspection". This is a short form inspection and it is often dealt with quickly.

Typically, a General, Comprehensive Inspection follows this pattern:

1. Show you their credentials, if they do not have a business card write down all of their information.
2. Hold a Pre-inspection Meeting. At this time they will state the reason for the inspection; A formal complaint, or they witnessed a violation, and they will state if they are opening the project to a full or partial inspection. If they are opening the project to a full inspection he will call in all subcontractors foreman and union representatives to participate in the Pre-inspection meeting.
3. Site Inspection. During the site inspection bring a tape measure and a camera and take pictures of everything that they are sighting as a violation during the walk.
4. Post site inspection meeting. Request this meeting at the pre-inspection meeting. During the post site inspection meeting the OSHA representative will outline all violations they will be issuing from the walk. This is important to ensure that we are able to immediately correct any violations outlined and also that the OSHA representative cannot add on any further violations after the fact.

Typical Serious Hazard Definitions

1. Hot Work/Fire hazards
2. Lack of fall protection
3. Objects falling from above which could strike and injure an worker working below
4. Open-sided floors and unprotected floor openings where a fall would result in serious injury or death
5. Trenching and excavations which are not protected from cave-in or slide
6. Unprotected energized electrical systems/parts which would result in electrocution
7. Lack of grounding of temporary wiring, flexible cords, electrical tools, etc. or ground fault circuit interrupters which could cause electrical shock or electrocution
8. Environmental hazards such as toxic fumes, toxic mists, or dusts, etc.
9. Lack of life safety, fire extinguishers, exit signage, etc.

***See appendices for the safety violation notice.**

***Refer to the attached OSHA Inspection Checklist.**

MEANS OF EGRESS

All means of egress within the area or building shall be properly maintained for health and safety reasons.

- Personnel must be able to enter and exit the area, building or facility without hazard.
- All corridors and other walk / work surfaces shall be free of accumulated dust(s) and waste.
- Boxes, cardboard and other combustible material shall be kept to a minimum to reduce the risk of fire.
- Cords and other potential trip hazards shall be run along the base of the wall or overhead.
  - Cords run overhead shall not be run above ceilings, ceiling grids or through walls.
  - Cords run overhead should be hung by non-metallic means such as rope, string or tape.
- Corridors shall not be used for the storage or placement of gases.
  - Combustible storage should be placed in a separate area or room, in case of fire.
  - Equipment should be properly stored to prevent trip and fall, and for ease of retrieval.
- Flammable Gas and Liquid storage shall be kept to a minimum, and shall be stored in a manner acceptable to the owner and the local fire department.
  - Flammable gases and liquids shall not be placed or otherwise stored in a “means of egress”, such as a corridor or exit.
  - Flammable and combustible liquids shall be placed in approved metal (self-closing) cans and Flammable Storage Cabinets.
- If a stairwell must be removed, or temporarily made inaccessible, it shall be the responsibility of the contractor to coordinate with Fontaine to create another means of emergency egress, which could include, but is not limited to;
- Ladders to lower floor or ground
- Access to scaffold/staging
  - Whenever an Exit is temporarily closed or relocated, the contractor shall make the following site modifications;
    - Cover or remove any reference to the existing signage
    - Post exit signage at the new location and
    - Direct workers and visitors to the new or temporary exit, as required

All means of egress must be properly identified, as required by the building official and OSHA. At a minimum the EXIT sign must be;

- Green or Red in color and be at a minimum of 6 inches in size
- At least 2’ above the floor
- Easily recognizable
- All **EXIT** signs that no longer serve an actual exit, must:
  - be covered to prevent confusion
  - shall have alternative exit signage (with arrows) in place to re-direct occupants to the new exit.
- Lighting is the responsibility of the electrical contractor. Adequate illumination must be maintained at all times for reasons of safety.
- Emergency lighting is required in areas where work may be necessary at night, or in locations below grade, in cases of power failure
- All temporary lighting must have the appropriate guards, as required
- The wattage of the light bulbs shall not exceed the manufacturers specifications for the light fixture
- Contractors to provide task lighting for their workers

HOUSEKEEPING

- Contractors are responsible for the overall housekeeping practices on the site.
- In the event contractors do not comply, the service will be subcontracted to others and the responsible contractor/ subcontractor may be back-charged.
- As a minimum, the aisles, exits and other parts of the means of egress shall be properly maintained and free of unnecessary storage and waste.
- Sawdust and other combustible materials such as cardboard and paper shall be removed daily to reduce the risk of injury and fire.
- Trip and fall hazards shall be removed as soon as possible, especially in areas considered to be walk / work surfaces
- Dumpsters > 6 cubic yards in size, located on a construction site require a permit from the fire department.
    - The dumpster shall not be placed up against the building under construction, unless approved by the local fire department.
    - The dumpster, in accordance with the requirements of the building code shall be immediately emptied, when full.

Housekeeping practices on this project is extremely important. In order to reduce the risk of fire, prevent injuries and reduce the risk of a regulatory inspection, housekeeping must be maintained.

- Waste shall be discarded in a suitable container.
- Sawdust and rags should be placed in a metal (approved) container with tight (proper-fitting) lid.
- All waste containers (inside the building) shall be emptied at least daily.
- Corridors and other walk / work areas shall not be used for storage.

PERSONAL PROTECTIVE EQUIPMENT

Eye Protection

Contractors shall be responsible for workers wearing the appropriate personal protective equipment on the construction site, if there is an exposure to a hazardous condition, or if regulations require the use of specified equipment to reduce the hazards on site.

- Safety glasses shall be worn when working on site.
- Prescription safety glasses (that meet Z87 ANSI Rating) shall have side shields in place, if being used as safety glasses.
- Goggles shall be worn whenever chemicals are used, or there is a splash potential.
- Face Shields are secondary protection and are required when cutting metal; (chopsaw, grinder and gas cut off saw). They must be worn over safety glasses.

Fall Protection

- Fall protection is required at 6 feet for all workers working on site.
- Lifelines shall be rated for leading edge exposure
- Shall be supplied and maintained by the employer.
- All contractors are responsible for the proper use of fall protection on site.
- All fall protection equipment shall be properly inspected before use, and shall be maintained in accordance with the requirements of the manufacturer
- Fall protection shall be kept clean and stored in appropriate containers (when not in use) to protect it from environmental conditions and other damage

Foot Protection

- Appropriate footwear is required. No sneakers, sandals, etc.
- Foot protection shall be work-type specific (i.e. EH – Electrical Hazards, Metatarsal, Etc.)

Hand Protection

- Hand protection shall be used when required by the activities

Hearing Protection

All workers shall be provided with hearing protection to reduce the dB levels in accordance with OSHA requirements.

- The contractors shall make the following hearing protection available:
  - Ear Plugs
  - Ear Muffs
  - Other Engineering Control

Head Protection

- Hard Hats shall be worn at all times

High VisibilityClothing

- High visibility ANSI Class 2 or greater outerwear is required on this project at all times.

SAFETY REQUIREMENTS

Stairways and Ladders

- Read and follow the manufacturer's instruction label affixed to the ladder.
- Only Type 1AA, Type 1A, fiberglass ladders shall be used on this project. Do not exceed the rated load capacity.
- All ladders shall be inspected before use, and shall be removed from service if broken, damaged or unsafe
    - Do not use ladders that have loose rungs, cracked, or split side rails, missing rubber footpads, or are otherwise visibly damaged.
    - The above referenced ladder must be tagged "Do Not Use" and reported to the supervisor by the person performing the inspection
    - Ladders shall not be painted or covered in any manner that will hide cracks and other defects
    - Ladders shall have all of the appropriate warning and danger labels in place, maintained in legible condition
- Ladders must be utilized in a manner specified by the manufacturer
- Allow only one person on the ladder at a time.
- The contractor shall determine the type of fall protection that shall be used when working with a ladder on the job site. For example, personal fall arrest when ladders are used with "x" feet of the edge of a floor or hole. "x" equals the height of the ladder.
- Tying the ladder off, or having a person "spot" the ladder are possibilities
- The ladder must be the appropriate size and type for the work being performed
- Do not stand on tables, chairs, boxes or other improvised climbing devices to reach high places. Use the ladder or stepstool.

Extension or Straight Ladders shall:

- Be pitched at the required 4:1 ratio
- Be tied or otherwise secured to the structure or elevated surface to prevent tipping or falling. Do not use the rope designed for adjusting the ladders height to secure the ladder.
- Be extended at least 3 feet above the elevated surface to be accessed
    - The top 3 rungs of the extension, or straight ladder shall not be used as a step

Fixed Ladders shall:

- Be made and installed for the environment it is intended to serve
- Be manufactured and installed in accordance with the ANSI Standard for Fixed Ladders
    - Construction
    - Elevations
    - Fall protection
    - Spacing from walls (> 7" from wall to rung)
- Both permanent and temporary fixed ladders
- Be inspected by a "competent person" for structural integrity and general safety

Job Made Ladders shall:

- Be constructed in accordance with the requirements of OSHA and ANSI A14.4-1992

Step Ladders:

- Be opened completely with spreaders locked in place
- Not be used as straight ladders
- Be tall enough to perform the necessary work
- Do not stand on the top two rungs of any ladder
- Do not carry items in your hands while climbing up or down a ladder.

Lifting Procedures

1. Plan the move before lifting; ensure that you have an unobstructed pathway.
2. Test the weight of the load before lifting by pushing the load along its resting surface.
3. If the load is too heavy or bulky, use lifting and carrying aids such as hand trucks, dollies, pallet jacks and carts, or get assistance from a co-worker.
4. If assistance is required to perform a lift, coordinate and communicate your movements with those of your co-worker.
5. Position your feet 6 to 12 inches apart with one foot slightly in front of the other.
6. Face the load.
7. Bend at the knees, not at the back.
8. Keep your back straight.
9. Get a firm grip on the object using your hands and fingers. Use handles when they are present.
10. Hold the object as close to your body as possible.
11. While keeping the weight of the load in your legs, stand to an erect position.
12. Perform lifting movements smoothly and gradually; do not jerk the load.
13. If you must change direction while lifting or carrying the load, pivot your feet and turn your entire body. Do not twist at the waist.
14. Set down objects in the same manner as you picked them up, except in reverse.
15. Do not lift an object from the floor to a level above your waist in one motion. Set the load down on a table or bench and then adjust your grip before lifting it higher.
16. Never lift anything if your hands are greasy or wet.
17. Wear protective gloves when lifting objects that have sharp corners/jagged edges.

Power Tools

- All hand and power tools shall be maintained in safe condition.
    - Electrical cords shall be without damage or splice.
        - Badly twisted primary and extension cords shall be removed from service
    - On all construction sites, the use of Ground Fault Circuit Interrupters (GFCI) is required.
        - When the electrical service has been completed, inspected and approved for the site, and the temporary service has been removed or is no longer in use, the use of GFCI (including pigtails and fixed) is still required.

- Guards shall be used on all equipment with exposed and moving parts that have the potential to place workers at risk.
  - Guards shall have openings small enough to prevent accidental finger access/exposure
  - Guards removed for maintenance and repair shall be replaced immediately after the work is performed
  - If the guard(s) must be removed, the power to the equipment, machine or power tool shall be unplugged or de-energized by circuit breaker or disconnect.
    - See Lock-Out / Tag-Out requirements in the Electrical section
- Blade guards are required for all table saws. Note: Guard may be removed temporarily to perform a dado or rabbit cut.
  - Push-sticks shall be located next to, and shall be used for work on table saws, as required.
- Air compressors used for pneumatic equipment shall not be used for removing dust or other particulates from clothing or equipment / tools unless the pressure has been regulated down to below 15 psi.
- Any and all tools found to be damaged or defective shall be removed from service, and tagged “Do Not Use” to prevent accidental use. Damaged or defective equipment and tools shall include, but not be limited to;
  - missing ground (pin)
  - equipment and tools from which a shock was received
  - equipment, tools and cords that have been taped to cover physical damage
- Contractors using tools in hazardous areas shall verify that the equipment or tools can be used in that type of environment.
  - Flammable and Combustible Liquids - Intrinsically Safe Equipment
  - Wet Areas - Ground Fault Circuit Interrupters

Saws

- Any automatic cutoff saw that strokes continuously without the operator being able to control each stroke shall not be used.
- Saw frames or tables shall be constructed with lugs cast on the frame or with an equivalent means to limit the size of the saw blade that can be mounted, to avoid over-speed caused by mounting a saw larger than intended.
- A mechanical or electrical power control shall be provided on each machine to make it possible for the operator to cut off the power from each machine without leaving his position at the point of operation.
- All portions of the saw blade shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table. Band saw wheels shall be fully encased. The outside periphery of the enclosure shall be solid. The front and back of the band wheels shall be either enclosed by solid material or by wire mesh or perforated metal. Such mesh or perforated metal shall be not less than 0.037 inch (U.S. Gage No. 20), and the openings shall be not greater than 3/8“. Solid material used for this purpose shall be of an equivalent strength and firmness. The guard for the portion of the blade between the sliding guide and the upper-saw-wheel guard shall protect the saw blade at the front and outer side. This portion of the guard shall be self-adjusting to raise and lower with the guide. The upper-wheel guard shall be made to conform to the travel of the saw on the wheel.

- Hand-fed circular ripsaws and hand-fed circular crosscut table saws. Unless fixed or manually adjustable enclosures or guarding provides equivalent protection, hand-fed circular ripsaws and hand-fed circular crosscut table saws shall be guarded as follows to keep workers clear of any danger zones.
- All cracked saws shall be removed from service.
- All table saws must be equipped with a magnetic disconnect switch. This device prevents automatic re-start of the saws motor after a power outage.

Equipment Guarding

- Machine guarding shall meet the requirements of OSHA
- All exposed blades shall be guarded to prevent accidental injury
- All belts and pulley's will be protected with a suitable guard to prevent accidental contact
- All table saws shall have the appropriate blade guards, anti-kickback devices and push sticks
- Contractors shall be responsible for maintaining and providing guards, and the appropriate guard for the equipment or machine.
    - Guards shall be used and installed in accordance with manufacturers specification and OSHA

Hand Tools

1. Inspect all hand tools daily
2. Use tool lanyards to keep tools from falling off scaffolds and other elevated work platforms.
3. Carry all sharp tools in sheaths or holsters.
4. Tag worn, damaged, or defective tools "Out of Service" and do not use them.
5. When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.
6. Do not carry sharp or pointed hand tools such as screwdrivers, scribes, aviation snips, scrapers, chisels or files in your pocket unless the tool or pocket is sheathed.
7. Do not perform "make-shift" repairs to tools.
8. Do not use "cheaters" on load binders or "boomers."
9. Do not carry tools in your hand when climbing. Carry tools in tool belts or hoist the tools to the work area with a hand line.
10. Do not throw tools from one location to another, from one worker to another, from scaffolds or other elevated platforms.

Lasers

- The contractors "competent Person(s)" is responsible for the use of Lasers on the job Site
- Lasers are regulated by their hazards. The laser(s) being used on his site are;
- Class I
- Class II
- Class IIIa
- Class IIIb
- Class IV
- Class II and IIIa lasers are often found on construction sites for the purpose of aligning and leveling.

- When the laser is not being actively used (breaks, lunch, or other extended periods of > 10 minutes) the laser shall be shut-off.
- The competent person must insure that all entrances to the work area where lasers are being used shall be labeled with the appropriate approved DANGER or WARNING signs that indicate that a Class II or IIIa laser is in use
    - Lasers must have appropriate labels, stickers and warnings affixed, which shall be maintained in good condition
    - Reflective surfaces, including mirrors shall not be located in areas where lasers are in use.
    - Specialized protective eyewear may be required

Knives/Sharp instruments

1. When handling knife blades and other cutting tools, direct sharp points and edges away from you.
2. Store knives in knife blocks or in sheaths after use.
3. Carry knives with their tips pointed towards the floor.

Pneumatic Tools

1. Do not point a compressed air hose at bystanders or use it to clean your clothing.
2. Do not use compressors if their belt guards are missing. Replace belt guards before use.
3. Turn the tool “off” and let it come to a complete stop before leaving it unattended.
4. Disconnect the tool from the airline and de-energize before making any adjustments or repairs to the tool.
5. Engage positive locks on hoses and attachments before use.
6. Shut off pressure valve and disconnect airline when not in use.
7. Tag damaged or defective pneumatic tools “Out of Service” to prevent usage of the tool by other workers.

Powder Actuated Tools

1. Only employer-authorized personnel, with a valid certification card may operate powder-actuated tools.
2. Wear safety glasses, goggles, or face shields when operating powder actuated tools.
3. Wear earplugs or earmuffs when making fastenings.
4. Do not permit bystanders in the area when using a powder-actuated tool.
5. Do not load tool until ready to make a fastening.
6. Keep tool pointed in a safe direction (away from personnel).
7. After use, lock powder actuated tools and powder loads in a container and store in a safe place.

FALL PROTECTION

In accordance with the requirements of OSHA 29 CFR 1926.subpart M, all employers are required to provide fall protection equipment and training to their workers when working at elevations is 6' or more, above a lower level, which includes but is not limited to the ground, platforms, roof or dangerous equipment. Each subcontractor on this project is responsible for their workers, as well as to be sure the sub-contractor has a written fall protection program and a competent person, and shall have a "competent person" on-site at all times.

For this project, the following work activities and fall protection height requirements are;

- General Fall Protection 6'
- Excavations 6'
- Scaffolding / Staging 6'
- Roof Work 6'

For work on the roof, the contractor will utilize the following safety practices; ***(Circle any or all that apply)***

- Personal Fall Protection Equipment
- Guardrails
- Non-conforming guardrail system (NCGS) Warning Lines

Guardrails shall be at least 42" in height (+/- 3") with mid rails and toe boards in place. If materials are placed on the elevated surfaces, higher than the level of the toe board, a protective measure shall be attached to the elevated surface (guardrail system) to prevent the storage from being displaced, over the edge of the toe boards If the protective measure used is netting/screening or similar attached to the guardrail system is used on the exterior scaffold / staging, it's use must be approved of by a "competent person" for the scaffolding / staging company and the local fire department for fire rating.

All wall openings, including windows with elevation differences >6' shall be properly protected with suitable guardrails or other recognized fall protection systems. When holes or openings are used for the passage of materials, such as through a window or elevated level of scaffolding/staging, the opening must be guarded on at least 3 sides when being used for the transfer of materials, and the 4th side, when not being used should be protected with a suitable (removable) guardrail or gate as specified by the competent person. Guardrails are required around points of access, such as a ladder-way. The open side of the opening shall have a gate, or be off-set to prevent person(s) from falling through or into the opening. When the use of ladders or stilts are required that places the user above the level of fall protection, the competent person

shall select an appropriate means of fall protection to cover the increase in height.
Options include the use of harness and lifelines, extending the guardrail system up, or placing the workers in a guardrail system in an elevated platform. When using NCGS warning lines for fall protection, in place of guardrail systems, the NCGS warning lines must be;

- 15' from the leading edge
- Rigged and supported to a height of 34" –39"
- Be flagged every 6' with a tensile strength of 500 lbs
- Be able to withstand a force of 16 lbs applied at the stanchions
- No person, unless actually performing work between the warning lines and the roofs edge is permitted outside of the warning line and must be tied off with a PFAS.

Fall Protection Equipment including, but not limited to harnesses, lanyards, deceleration devices, anchors, straps and other fall protection equipment shall be:

- Inspected by a competent person before each use for damage and deficiencies
- Any fall protection equipment that has been damaged, must be removed from service and labeled out-of-service.
- Kept clean and placed in suitable containers to prevent exposure to abuse, damage and adverse environmental conditions.
- Holes > 2" (inches) in diameter in a walk or work area must be covered to prevent items, materials and tools from falling through. All covers must be able to handle 2x the intended load.
- The hole cover must be labeled "HOLE"
- All covers must be secured to prevent displacement.
- All ramps, stairs and walkways, including those that are temporary are required to have hand / guard rails on both sides if there are > 3 steps, or a drop of > 6'.

Roof Work

- All roof work which is greater than 6' above a lower level is required to have fall protection, including flat and low-slope roofs.
- A competent person must identify the appropriate means of fall protection to be used for the work being performed.
- The use of roof monitors is not permitted unless specifically noted in the contract documents.

For this project, the roof slopes are | No Slope (Flat):
< 4:12
> 4:12, < 6:12
> 6:12, < 8:12
> 8:12

The use of the following types of fall protection will be required:

- Guardrails
- Scaffold/Staging
- Non-conforming guardrail system (NCGS) Warning Lines
- Net

SCAFFOLD SAFETY HIGHLIGHTS

1. Only qualified persons should design, build or inspect scaffolds. Each application must be planned to ensure that the scaffolding conforms to all specified assembly requirements.
2. Lean to scaffolds and makeshift platforms are prohibited.
3. Only materials currently being used should be stored on scaffolds. Materials are to be placed over cross members at all times. All materials should be removed from the scaffold nightly.
4. All scaffolds should be designed to carry four times the maximum intended load. At no time, should the scaffold be overloaded. Unstable objects such as barrels, boxes, and loose bricks should not be used to support scaffolds.
5. All scaffolds over ten feet high are required to have load footprints and limits that can be obtained from the scaffold manufacturer. A copy of all load footprints and limits should be given to any supplier stocking material on the scaffold.
6. All scaffolds must be maintained in safe condition and scaffolds damaged or weakened must be replaced immediately.
7. Scaffolds more than six feet above the ground must have standard guardrails and toe boards attached.
8. Scaffolds should be braced and tied horizontally and vertically at intervals according to specified regulations (20' vertically, 30' horizontally).
9. Mobile scaffolds should be equipped with guardrails, midrails, toe boards, and outriggers at two times the base.
10. All casters should be locked. Mobile scaffolds should not be used if there is a change in the floor level elevation.
11. Scaffold tags should be completed and attached to each scaffold prior to it being used.
12. Safe access must be available to each working level at all times. Workers should never climb a scaffold's cross bracing. Both hands should be free of tools/materials when ascending or descending a scaffold. Workers should not propel themselves while working on scaffolds.
13. At the start of each shift, a competent person should inspect each scaffold for requirements of the standard and as needed.
14. Adjusting or leveling screw jacks must not be extended more than 12 inches of thread.
15. Swinging stages boatswain chains, floats and needle beams require special approval by a safety representative before use plus require independent life lines and required training.
16. All scaffold components must be inspected prior to installation.
17. Scaffold that is enclosed with fabric, or configured in a manner that is not consistent with the manufacturer or OSHA must be engineered.

CONCRETE AND MASONRY

Scope and Application

The standard, Subpart Q, prescribes performance-oriented requirements designed to help protect all construction workers from the hazards associated with concrete and masonry construction operations at construction, demolition, alteration or repair worksites. Other relevant provisions construction standards (29 CFR Part 1926) also apply to these operations.

General Requirements

- Cleaning of masonry: No cleaning agents that contain acid shall be used.
- If cleaning agents require acid per specification, the contractor shall protect adjacent materials, coordinate work with Fontaine and provide PPE and 15-minute eye wash for their workers.

Construction Loads

Employers must not place construction loads on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the intended loads.

Reinforcing Steel

- All protruding reinforcing steel, onto and into which workers could fall, must be guarded to eliminate the hazard of impalement with a rebor cap
- The installing contractors are to provide and maintain rebar caps. Additionally, the concrete contractor is to provide 200 additional caps to Fontaine.

Working Under Loads

Workers must not be permitted to work under concrete buckets while the buckets are being elevated or lowered into position.

To the extent practicable, elevated concrete buckets must be routed so that no worker or the fewest workers possible are exposed to the hazards associated with falling concrete buckets.

Personal Protective Equipment

Workers must not be permitted to apply a cement, sand, and water mixture through a pneumatic hose unless they are wearing protective head and face equipment.

Workers must not be permitted to place or tie reinforcing steel more than 6 feet above any adjacent working surfaces unless they are protected by the use of a safety belt or equivalent fall protection meeting the criteria in OSHA standards on Personal Protective and Life Saving Equipment (29 CFR 1926 Subpart E).

Equipment and Tools

The standard also includes requirements for the following equipment and operations:

- Bulk cement storage
- Concrete mixers

- Power concrete trowels
- Concrete buggies
- Concrete pumping systems
- Concrete buckets
- Tremies
- Bull floats
- Masonry saws
- Lockout/tagout procedures

CAST-IN-PLACE CONCRETE

General Requirements for Formwork

Formwork must be designed, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting without failure all vertical and lateral loads that might be applied to the formwork. As indicated in the Appendix to the standard, formwork that is designed, fabricated, erected, supported, braced and maintained in conformance with Sections 6 and 7 of the American National Standard for Construction and Demolition Operations- Concrete and Masonry Work (ANSI A10.9-1983) also meets the requirements of this paragraph.

Drawings or Plans

Drawings and plans, including all revisions for the jack layout, formwork (including shoring equipment), working decks and scaffolds, must be available at the jobsite.

Shoring and Reshoring

All shoring equipment (including equipment used in reshoring operations) must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings. Damaged shoring equipment must not be used for shoring. Erected shoring equipment must be inspected immediately prior to, during, and immediately after concrete placement. Shoring equipment that is found to be damaged or weakened after erection must be immediately reinforced.

- Designed by a qualified designer and the erected shoring must be inspected by an engineer qualified in structural design,
- Vertically aligned,
- Spliced to prevent misalignment, and
- Adequately braced in two mutually perpendicular directions at the splice level. Each tier also must be diagonally braced in the same two directions.

Adjustment of single-post shores to raise formwork must not be made after the placement of concrete.

Reshoring must be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity.

Reinforcing Steel

Reinforcing steel for walls, piers, columns, and similar vertical structures must be adequately supported to prevent overturning and collapse.

Employers must take measures to prevent unrolled wire mesh from recoiling. Such measures may include, but are not limited to, securing each end of the roll or turning over the roll.

Removal ofFormwork

- The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have been followed, or
- The concrete has been properly tested with an appropriate American Society for Testing and Materials (ASTM) standard test method designed to indicate the concrete compressive strength, and the test results indicate that the concrete has gained sufficient strength to support its weight and superimposed loads.

Reshoring must not be removed until the concrete being supported has attained adequate strength to support its weight and all loads in place upon it.

Limited Access Zone is Required;

- Workers not allowed under concrete buckets when being elevated or lowered.
- Workers must wear protective head, face, and eye equipment when placing concrete with a pneumatic hose.
- Manually guided concrete troweling machine must be equipped with automatic controls to shut off power when hands are removed.
- Compressed air hoses must be provided with positive fail-safe joint connectors.
- Concrete buckets must have positive safety features or similar devices to prevent accidental dumping.
- Tremie Sections must be secured with wire rope (or equivalent materials) in addition to regular couplings or connections.
- Drawing or plans for the jack layout, framework, working decks, and scaffolds must be available on site.
- Shoring and Reshoring
    - Inspected prior to erection
    - Damaged equipment shall not be used
    - Inspected immediately prior to swing and immediately after concrete placement
    - Damaged equipment immediately removed from service
- No adjustments to single post shores to raise formwork made after placement of concrete
- Reshoring must be erected as original forms are removed

MOTOR VEHICLES

All vehicles, regardless of size shall be operated by a competent, licensed operator in accordance with the requirements of the appropriate state, Department of Transportation (DOT) and Registry of Motor Vehicles (RMV).

Any vehicle greater than 26,000lbs shall have operators who are evaluated randomly, or as needed for alcohol and drugs as specified by the Department of Transportation.

- Any operator, believed to be under the influence of alcohols, drugs or other medication (including over-the-counter) cough/cold and/or sleep medications shall be removed from vehicle operation, tested in accordance with the DOT and, if determined to be under the influence, shall be driven home by a means other than by themselves in their respective vehicle.
- Any vehicle greater than 10,000 lbs. or higher shall have USDOT qualified drivers.
- Vehicles shall be inspected, repaired or serviced by qualified mechanics / personnel.
- All vehicles shall be inspected before each shift by the operator / competent person. All safety issues shall be immediately repaired, or the vehicle removed from service and labeled as out-of-service to prevent unauthorized operation or use.
- Vehicle operators shall not, while driving, utilize cell phones or consume food and/or beverages.
- Vehicle operators shall not operate vehicles unless seat belts are in use
- Vehicles used for the transport of materials shall have the materials properly secured and/or covered.
- Dump trucks shall utilize covers or tarps when transporting any material over a public way
- Gas cylinders shall be transported in the upright position, and shall be secured by chain or strap
- Vehicles in tow shall be attached by solid bar, not by chain
- All construction vehicles shall be equipped with the appropriate, charged, inspected and conspicuously placed fire extinguisher
- All passengers in a vehicle shall be seated and shall wear seat belts.
- Personnel shall not be permitted to ride in the cargo area or pick-up body regardless of length of trip.
- Vehicles not in use shall have the keys removed from the ignition, and placed in a safe location to prevent unauthorized use.
- Riding within the bed of pickup trucks is prohibited.

Vehicle Loading

1. Plan the move before loading; ensure that you have an unobstructed pathway and that the vehicle is parked as close to the equipment or material as possible.
2. Keep bumpers/tailgates free of grease, water, etc.; remove buildup of material such as dirt, mud, etc.
3. Use lifting aids such as dollies, pallet jack, and Lull or get assistance from a co-worker to place dock plate resting between loading dock and truck surface.
4. If equipment or material that is to be loaded into truck is too heavy or bulky, use lifting aids such as hand trucks, dollies, pallet jacks and carts, or get assistance from co-workers.
5. Secure all equipment and material within the truck to eliminate or reduce movement.

POWERED INDUSTRIAL EQUIPMENT

Powered Industrial Trucks (including Lulls) shall be operated in accordance with the requirements of OSHA 29 CFR 1910.178 and 1926.602 and manufacturers instructions. This includes Certification of Training on the OSHA Powered Industrial Truck Standard.
The operator, must at a minimum, must be evaluated every 3 years.

Contractors/subcontractors are responsible for the safe operation of the powered industrial trucks and shall insure that the following requirements are met;

- The operator is capable of operating the Lull.
- The operator has a current Massachusetts hydraulic license. (Department of Public Safety)
- The operator has proof of training, and documentation to prove successful completion of a class, such as a certification card.
- The powered industrial trucks used on this job site have been inspected by an authorized representative of the manufacturer within the last year.
- All manuals, tags, labels and warnings are in place on the truck, and are legible.
- The powered industrial truck has been evaluated for operation within the building.
- Only attachment authorized by the manufacturer shall be utilized

Lifts used inside shall have carbon monoxide scrubbing systems or be properly exhausted to prevent carbon monoxide accumulation.

Heavy Equipment Operators

Site Safety

1. Do not start work until barricades, fill or other protection have been installed to isolate the work area from local traffic.
2. Do not work outdoors during lightning storms.
3. Drink plenty of clear liquids during your breaks.
4. Take breaks in shaded areas.

Lulls Pre-Use Inspection

Do not use Lull if any of the following conditions exist:

1. The mast has broken or cracked weld-points.
2. The roller tracks are not greased or the chains are not free to travel.
3. Forks are unequally spaced or cracks exist along the blade or at the heels.
4. Hydraulic fluid levels are low.
5. Hydraulic line and fitting have excessive wear or are crimped.
6. Fluid is leaking from the lift or the tilt cylinders.
7. The hardware on the cylinders is loose.
8. Tires are excessively worn, split, or have missing tire material.
9. Air filled tires are not filled to the operating pressure indicated on the tire.
10. Batteries have cracks or holes, uncapped cells, frayed cables, broken cable insulation, loose connections, or clogged vent caps.

Starting the Lull

1. Apply the foot brake and shift gears to neutral before turning the key.

Picking Up a Load

1. Square up on the center of the load and approach it straight on with the forks in the travel position.
2. Stop when the tips of your forks are about a foot from the load.
3. Level the forks and slowly drive forward until the load is resting against the backrest of the mast.
4. Lift the load high enough to clear whatever is under it.
5. Back up about one foot, and then slowly and evenly tilt the mast backwards to stabilize the load.

Putting a Load Down

1. Square up and stop about one foot from desired location.
2. Level the forks and drive to the loading spot.
3. Slowly lower the load to the floor.
4. Tilt the forks slightly forward so that you do not hook the load.
5. When the path behind you is clear of obstructions, back straight out until the forks have cleared the pallet.

Stacking One Load on Top of Another

1. Stop about one foot away from the loading area and lift the mast high enough to clear the top of the stack.
2. Slowly move forward until the load is squarely over the top of the stack.
3. Level the forks and lower the mast until the load is no longer supported by the forks.
4. Look over both shoulders for obstructions and back straight out if the path is clear.

Lull Safety Rules

1. Do not exceed the lift capacity of the Lull. Read the lift capacity plate on the Lull if you are unsure.
2. Follow the manufacturer's guidelines concerning changes in the lift capacity before adding attachments, such as wedges, to a Lull.
3. Lift the load an inch or two to test for stability: If the rear wheels are not in firm contact with the floor, take a lighter load or use a Lull with a higher lift capacity.
4. Do not raise or lower a load while you are en-route. Wait until you are in the loading area and have stopped before raising or lowering the load.
5. After picking up a load, adjust the forks so that the load is tilted slightly backward for added stability.
6. Drive with the load at a ground clearance height of 4-6 inches at the tips and 2 inches at the heels in order to clear most uneven surfaces and debris.
7. Approach angle railroad tracks at a 45
8. Do not drive over objects in your pathway.
9. Do not drive into an area with a ceiling height that is lower than the height of the mast/overhead guard.
10. Steer wide when making turns.
11. Do not drive up to anyone standing or working in front of a fixed object such as a wall.

12. Do not drive along the edge of an unguarded elevated surface such as a loading dock or staging platform.
13. Obey all traffic rules and signs.
14. Sound horn when approaching blind corners, doorways, or aisles to alert other operators and pedestrians.
15. Do not exceed a safe working speed of five miles per hour. Slowdown in congested areas.
16. Drive in reverse and use a signal person when your vision is blocked by the load.
17. Look in the direction that you are driving; proceed when you have a clear path.
18. Do not use bare forks as a man-lift platform.
19. Do not drive the Lull while people are on the attached man-lift platform.
20. Drive loaded Lulls forward up ramps.
21. Raise the forks an additional two inches to avoid hitting/scraping the ramp surface as you approach it.
22. Drive loaded Lulls in reverse when driving down a ramp.
23. Drive unloaded Lulls in reverse going up a ramp and forward going down a ramp.
24. Do not attempt to turn around on a ramp.
25. Lower the mast completely, turn off the engine, and set the parking brake before leaving your Lull.

***See appendices for heavy equipment inspection form.**

Power HoistSafety

1. Use manufacturer approved counter weights to secure the hoist. Do not use roofing materials such as rolls of felt or bundles of shingles,
2. Do not exceed the manufacturer's recommended load capacity limits.
3. Only trained personnel, approved by the employer, are allowed to operate a power hoist.
4. Use the power hoist in an area that permits the operator to stand clear of the load at all times.
5. Use safety hooks or shackles to attach the load whenever possible.
6. Use 'tag lines' to control the load when necessary.
7. Keep your fingers and clothing clear of hoist machinery.
8. Do not attempt adjustments while the hoist is running.

AERIAL & SCISSOR LIFTS

- Personnel lifts such as articulating booms, single person upright lifts (i.e. Genie, JLG and Uprights) and scissors lifts shall be used in a manner specified by the manufacturer, in accordance with the requirements of OSHA 29 CFR subpart L.
- All articulating booms, including and truck mounted articulating booms are required to have personal fall protection equipment, consisting of approved full body harness and self-retracting or restraint lanyards.
- Any person using a personnel lift must be properly trained, in accordance with manufacturer's specifications and OSHA
- All lifts shall bear the following manuals and warnings, in legible condition;
    - The operators manual shall be located on the lift at all times, for ease of reference
    - All danger and warning stickers shall be attached to the lift and shall be in legible condition
- Personnel lifts shall be inspected before each use, and must be removed from service if a deficiency is noted
    - All safety devices and related equipment shall be tested as part of the inspection for proper operation.
    - The lift, if damaged or otherwise impaired shall be tagged "Do Not Use" to prevent use, until repaired.
        - Lifts shall only be repaired or altered by a service technician approved by the manufacturer.
- Whenever a lift is utilized (exterior or interior), the area / site shall be inspected for hazards, which include, but are not limited to;
    - Overhead concerns (i.e. beams and columns, lights, sprinklers, etc.)
    - Flooring and ground abnormalities (i.e. holes, unstable / soft ground, floor vents and grates)
- Area below aerial or scissor lifts must be protected from worker access due to the hazards associated from overhead work.
- Contractors shall submit the wheel loads to the engineer of record to ensure that concrete decks can support the loads.

***See appendices for aerial & scissor lift inspection form.**

RESPIRATORY PROTECTION PROGRAM

RESPIRATOR REQUIREMENTS | Appendix D to Sec. 1910.134 (Mandatory) Information for Workers Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator. [63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

Policy Statement

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic substance). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used.

Written Program

Effective implementation of this program requires support from all levels of management within Fontaine. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

Medical Evaluations

All contractors shall provide a medical evaluation to determine the worker's ability to use a respirator. Contractors shall identify a physician or other licensed health care professional to perform medical

evaluations using a medical questionnaire and an initial medical examination.

Contractors and Worker Responsibility

Contractor's Responsibility

- Respirators shall be provided by the respective employer when they are necessary to protect worker's health.
- The respirator provided shall be suitable for the intended use,
- Each contractor shall be responsible for establishing and maintaining a respiratory program whenever respirators are used.

Worker's Responsibility

- The worker shall use the respiratory protection in accordance with instructions and training received or contracted by their employer.
- The worker shall guard against damage to the respirator, and immediately replace suspect respirators.
- The worker shall report any trouble with or malfunction of the respirator to his/her Foreman.

Respirators

Respirators shall be provided by the respective contractor when such equipment is necessary to protect the health of the workers:

Contractors shall:

- Provide the respirators, which are applicable and suitable for the purpose intended.
- Be responsible for the establishment and maintenance of a written respiratory protection program.
- The worker shall use the provided respiratory protection in accordance with instructions and training received.
- Respirators shall be selected on the basis of hazards to which the worker is exposed.
- The user shall be instructed and trained in the proper use of respirators and their limitations.
- Respirators shall be regularly cleaned and disinfected. Those worn by more than one worker shall be thoroughly cleaned and disinfected after each use.
- Respirators shall be stored in a convenient, clean, and sanitary location.
- Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of worker exposure or stress shall be maintained.
- There shall be regular inspection and evaluation to determine the continued effectiveness of the program.
- Workers will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician shall determine what health and physical conditions are pertinent. The respirators user's medical status will be reviewed on a periodic basis.
- NIOSH approved or accepted respirators shall be used when they are available. The respirator furnished

RESPIRABLE CRYSTALLINE SILICA PROGRAM

Purpose

This Respirable Crystalline Silica Program was developed to prevent worker exposure to hazardous levels of Respirable Crystalline Silica that could result through construction activities or nearby construction activities occurring on worksites. Respirable Crystalline Silica exposure at hazardous levels can lead to lung cancer, silicosis, chronic obstructive pulmonary disease, and kidney disease. It is intended to meet the requirements of the Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153) established by the Occupational Safety and Health Administration (OSHA).

All work involving chipping, cutting, drilling, grinding, or similar activities on materials containing Crystalline Silica can lead to the release of respirable-sized particles of Crystalline Silica (i.e. Respirable Crystalline Silica). Crystalline Silica is a basic component of soil, sand, granite and many other minerals. Quartz is the most common form of Crystalline Silica. Many materials found on constructions sites include Crystalline Silica; including but not limited to – cement, concrete, asphalt, pre-formed structures (inlets, pipe, etc.) and others. Consequently, this program has been developed to address and control these potential exposures to prevent our workers from experiencing the effects of occupational illnesses related to Respirable Crystalline Silica exposure.

Scope

This Respirable Crystalline Silica Program applies to all workers who have the potential to be exposed to Respirable Crystalline Silica when covered by the OSHA Standard. The OSHA Respirable Crystalline Silica Construction Standard applies to all occupational exposures to Respirable Crystalline Silica in construction work, except where worker exposure will remain below 25 micrograms of Respirable Crystalline Silica per cubic meter of air (25 µg/m3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

Responsibilities

Fontaine firmly believes protecting the health and safety of our workers is everyone's responsibility. This responsibility begins with upper management providing the necessary support to properly implement this program. However, all levels of the organization assume some level of responsibility for this program including the following positions.

Contractor Safety Department

- Conduct job site assessments for Silica containing materials and perform worker Respirable Crystalline Silica hazard assessments in order to determine if an worker's exposure will be above 25 µg/m3 as an 8-hour TWA under any foreseeable conditions.
- Select and implement into the project's ECP the appropriate control measures in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1; and potentially including (but not limited to)- a written Exposure Control Plan (ECP), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.

NOTE: OSHA's Construction Standard Table 1 is a list of 18 common construction tasks along with acceptable

exposure control methods and work practices that limit exposure for those tasks.

- Ensure that the materials, tools, equipment, personal protective equipment (PPE), and other resources (such as worker training) required to fully implement and maintain this Respirable Crystalline Silica Program are in place and readily available if needed.
- Ensure that Project Managers, Site Managers, Competent Persons, and workers are educated in the hazards of Silica exposure and trained to work safely with Silica in accordance with OSHA's Respirable Crystalline Silica Construction Standard and OSHA's Hazard Communication Standard. Managers and Competent Persons may receive more advanced training than other workers.
- Maintain written records of training (for example, proper use of respirators), ECPs, inspections (for equipment, PPE, and work methods/practices), medical surveillance (under lock and key), respirator medical clearances (under lock and key) and fit-test results.
- Conduct an annual review (or more often if conditions change) of the effectiveness of this program and any active project ECP's that extend beyond a year. This includes a review of available dust control technologies to ensure these are selected and used when practical.
- Coordinate work with other employers/contractors to ensure a safe work environment relative to Silica exposure.

Contractor Project Manager

Ensure all applicable elements of this Respirable Crystalline Silica Program are implemented on the project including the selection of a Competent Person.

- Assist the Safety Department in conduct job site assessments for Silica containing materials and perform worker Respirable Crystalline Silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.
- Assist in the selection and implementation of the appropriate control measures in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1; and potentially including (but not limited to)- a written Exposure Control Plan (ECP), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.
- Ensure that workers using respirators have been properly trained, medically cleared, and fit-tested in accordance with the company's Respiratory Protection Program. This process will be documented.
- Ensure that work is conducted in a manner that minimizes and adequately controls the risk to workers and others. This includes ensuring that workers use appropriate engineering controls, work practices, and wear the necessary PPE.
- Where there is risk of exposure to Silica dust, verify workers are properly trained on the applicable contents of this program, the project-specific ECP, and the applicable OSHA Standards (such as Hazard Communication). Ensure workers are provided appropriate PPE when conducting such work.

Contractor Competent Person and/or Site Manager (Superintendent, Foreman, etc.)

- Make frequent and regular inspections of job sites, materials, and equipment to implement the written ECP.
- Identify existing and foreseeable Respirable Crystalline Silica hazards in the workplace and take prompt corrective measures to eliminate or minimize them.
- Notify the Project Manager and/or Safety Department of any deficiencies identified during inspections in

order to coordinate and facilitate prompt corrective action.

- Assist the Project Manager and Safety Department in conducting job site assessments for Silica containing materials and perform worker Respirable Crystalline Silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.

Workers

- Follow recognized work procedures (such as the Construction Tasks identified in OSHA's Construction Standard Table 1) as established in the project's ECP and this program.
- Use the assigned PPE in an effective and safe manner.
- Participate in Respirable Crystalline Silica exposure monitoring and the medical surveillance program.
- Report any unsafe conditions or acts to the Site Manager and/or Competent Person.
- Report any exposure incidents or any signs or symptoms of Silica illness.

Definitions

If a definition is not listed in this section, please contact your supervisor. If your supervisor is unaware of what the term means, please contact the Competent Person or your Safety Department.

- Action Level means a concentration of airborne Respirable Crystalline Silica of 25 µg/m3, calculated as an 8-hour TWA.
- Competent Person means an worker who is capable of identifying existing and foreseeable Respirable Crystalline Silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.
- Worker Exposure means the exposure to airborne Respirable Crystalline Silica that would occur if the worker were not using a respirator.
- High-Efficiency Particulate Air (HEPA) Filter means a filter that is at least 99.97 percent efficient in removing monodispersed particles of 0.3 micrometers in diameter.
- Objective Data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating worker exposure to Respirable Crystalline Silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.
- Permissible Exposure Limit (PEL) means the employer shall ensure that no worker is exposed to an airborne concentration of Respirable Crystalline Silica in excess of 50 µg/m3, calculated as an 8-hour TWA.
- Physician or Other Licensed Health Care Professional (PLHCP) means an worker whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by the Medical Surveillance Section of the OSHA Respirable Crystalline Silica Standard.
- Respirable Crystalline Silica means Quartz, Cristobalite, and/or Tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size- selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.
- Specialist means an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

REQUIREMENTS

Specified Exposure Control Methods

When possible and applicable, Contractors will conduct activities involving potential Silica exposure to be consistent with OSHA's Construction Standard Table 1. Supervisors will ensure each worker under their supervision and engaged in a task identified on OSHA's Construction Standard Table 1 have fully and properly implemented the engineering controls, work practices, and respiratory protection specified for the task on Table 1 (unless Contractors has assessed and limited the exposure of the worker to Respirable Crystalline Silica in accordance with the Alternative Exposure Control Methods Section of this program).

SITE SPECIFIC SAFETY PLAN

Table 1: Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
1	Stationary masonry saws	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
2a	Handheld power saws (any blade diameter) when used outdoors	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
2b	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
3	Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less) for tasks performed outdoors only	▪ Use saw equipped with commercially available dust collection system. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None
4a	Walk-behind saws when used outdoors	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
4b	Walk-behind saws when used indoors or in an enclosed area	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
5	Drivable saws for tasks performed outdoors only	▪ Use saw equipped with integrated water delivery system that continuously feeds water to the blade. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
6	Rig-mounted core saws or drills	▪ Use tool equipped with integrated water delivery system that supplies water to cutting surface. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
7	Handheld and stand-mounted drills (including impact and rotary hammer drills)	▪ Use drill equipped with commercially available shroud or cowling with dust collection system.	None	None

SITE SPECIFIC SAFETY PLAN

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
		▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. ▪ Use a HEPA-filtered vacuum when cleaning holes.		
8	Diesel drilling rigs for concrete for tools performed outdoors only	▪ Use shroud around drill bit with a dust collection system. ▪ Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism. ▪ Use a HEPA-filtered vacuum when cleaning holes.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
9a	Vehicle-mounted drilling rigs for rock and concrete	▪ Use dust collection systems with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.	None	None
9b	Vehicle-mounted drilling rigs for rock and concrete	▪ Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None
10a	Jackhammers and handheld powered chipping tools when used outdoors	▪ Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10b	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	▪ Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10c	Jackhammers and handheld powered chipping tools when used outdoors	▪ Use tool equipped with commercially available shroud and dust collection system. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10d	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	▪ Use tool equipped with commercially available shroud and dust collection system. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
11	Handheld grinders for mortar removal (i.e., tuckpointing)	▪ Use grinder equipped with commercially available shroud and dust collection system.	N95 (or Greater Efficiency) Filtering	Powered Air-Purifying Respirator

SITE SPECIFIC SAFETY PLAN

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
		▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	Facepiece or Half Mask	PAPR with P100 Filters
12a	Handheld grinders for uses other than mortar removal for tasks performed outdoors only	▪ Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
12b	Handheld grinders for uses other than mortar removal when used outdoors	▪ Use grinder equipped with commercially available shroud and dust collection system. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	None
12c	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	▪ Use grinder equipped with commercially available shroud and dust collection system. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
13a	Walk-behind milling machines and floor grinders	▪ Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
13b	Walk-behind milling machines and floor grinders	▪ Use machine equipped with dust collection system recommended by the manufacturer. ▪ Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. ▪ Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. ▪ When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None

SITE SPECIFIC SAFETY PLAN

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
14	Small drivable milling machines (less than half-lane)	▪ Use a machine equipped with supplemental water sprays designed to suppress dust. ▪ Water must be combined with a surfactant. ▪ Operate and maintain machine to minimize dust emissions.	None	None
15a	Large drivable milling machines (half-lane and larger) for cuts of any depth on asphalt only	▪ Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. ▪ Operate and maintain machine to minimize dust emissions.	None	None
15b	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	▪ Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. ▪ Operate and maintain machine to minimize dust emissions.	None	None
15c	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	▪ Use a machine equipped with supplemental water spray designed to suppress dust. ▪ Water must be combined with a surfactant. ▪ Operate and maintain machine to minimize dust emissions.	None	None
16	Crushing machines	▪ Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyors, sieves/sizing or vibrating components, and discharge points). ▪ Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. ▪ Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.	None	None
17a	Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., haul-running, rock ripping) or used during demolition activities involving silica-containing materials	▪ Operate equipment from within an enclosed cab.	None	None
17b	Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., haul-running, rock ripping) or used during demolition activities involving silica-containing materials	▪ When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
18a	Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing	▪ Apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None

SITE SPECIFIC SAFETY PLAN

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
	silica-containing materials			
1lb	Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	• When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

When implementing the control measures specified in Table 1, Contractors shall:

- For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
- For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:
  - Is maintained as free as practicable from settled dust;
  - Has door seals and closing mechanisms that work properly;
  - Has gaskets and seals that are in good condition and working properly;
  - Is under positive pressure maintained through continuous delivery of fresh air;
  - Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV-16 or better); and
  - Has heating and cooling capabilities.
- Where an worker performs more than one task included on OSHA's Construction Standard Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

ALTERNATIVE EXPOSURE CONTROL METHODS

Alternative Exposure Control Methods apply for tasks not listed in OSHA's Construction Standard Table 1, or where Fontaine cannot not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1.

First, Contractors will assess the exposure of each worker who is or may reasonably be expected to be exposed to Respirable Crystalline Silica at or above the Action Level in accordance with either the Performance Option or the Scheduled Monitoring Option.

- Performance Option
  - Contractors will assess the 8-hour TWA exposure for each worker on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize worker exposures to Respirable Crystalline Silica.
- Scheduled Monitoring Option
  - Contractors will perform initial monitoring to assess the 8-hour TWA exposure for each worker on the basis of one or more personal breathing zone air samples that reflect the exposures of workers on each shift, for each job classification, and in each work area. Where several workers perform the same tasks on the same shift and in the same work area, Fontaine will plan to monitor a representative fraction of these workers. When using representative monitoring, Contractors will sample the worker(s) who are expected to have the highest exposure to Respirable Crystalline Silica.
  - If initial monitoring indicates that worker exposures are below the Action Level, Fontaine will probably discontinue monitoring for those workers whose exposures are represented by such monitoring.
  - Where the most recent exposure monitoring indicates that worker exposures are at or above the Action Level but at or below the PEL, Fontaine will repeat such monitoring within six months of the most recent monitoring.
  - Where the most recent exposure monitoring indicates that worker exposures are above the PEL, Contractors will repeat such monitoring within three months of the most recent monitoring.
  - Where the most recent (non-initial) exposure monitoring indicates that worker exposures are below the Action Level, Contractors will repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the Action Level, at which time Contractors will probably discontinue monitoring for those workers whose exposures are represented by such monitoring, except when a reassessment is required. Contractors will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the Action Level, or when Contractors has any reason to believe that new or additional exposures at or above the Action Level have occurred.

Contractors will ensure that all Respirable Crystalline Silica samples taken to satisfy the monitoring requirements of this program and OSHA are collected by a qualified worker (i.e. a Certified Industrial Hygienist) and the samples are evaluated by a qualified laboratory (i.e. accredited to ANS/ISO/IEC Standard 17025:2005 with respect to Crystalline Silica analyses by a body that is compliant with ISO/IEC Standard 17011:2004 for implementation of quality assessment programs).

Within five working days after completing an exposure assessment, Contractors will individually notify each affected worker in writing of the results of that assessment or post the results in an appropriate location accessible to all affected workers.
Whenever an exposure assessment indicates that worker exposure is above the PEL, Contractors will describe in the written notification the corrective action being taken to reduce worker exposure to or below the PEL.

Where air monitoring is performed, Contractors will provide affected workers or their designated representatives an opportunity to observe any monitoring of worker exposure to Respirable Crystalline Silica. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, Contractors will provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.

Once air monitoring has been performed, Contractors will determine its method of compliance based on the monitoring data and the hierarchy of controls. Contractors will use engineering and work practice controls to reduce and maintain worker exposure to Respirable Crystalline Silica to or below the PEL, unless Contractors can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce worker exposure to or below the PEL, Contractors will nonetheless use them to reduce worker exposure to the lowest feasible level and shall supplement them with the use of respiratory protection.

In addition to the requirements of this program, Contractors will comply with other programs and OSHA standards (such as 29 CFR 1926.57 [Ventilation]), when applicable where abrasive blasting is conducted using Crystalline Silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain Crystalline Silica.

Control Methods

Contractors will provide control methods that are either consistent with Table 1 or otherwise minimize worker exposures to Silica. These exposure control methods can include engineering controls, work practices, and respiratory protection. Listed below are control methods to be used when Table 1 is not followed:

List Control Methods

Respiratory Protection

Where respiratory protection is required by this program, Contractors will provide each worker an appropriate respirator that complies with the requirements of the company's Respiratory Protection Program and the OSHA Respiratory Protection Standard (29 CFR 1910.134).

Respiratory protection is required where specified by the OSHA Construction Standard Table 1, for tasks not listed in Table 1, or where the company has not fully and properly implemented the engineering controls, work practices, and respiratory protection described in Table 1. Situations requiring respiratory protection include:

- Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
- Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
- During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.

Housekeeping

Fontaine does not allow dry sweeping or dry brushing where such activity could contribute to worker exposure to Respirable Crystalline Silica unless wet sweeping, green sweep (no sand) HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure are not feasible.

Fontaine does not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to worker exposure to Respirable Crystalline Silica unless:

- The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
- No alternative method is feasible.

Written Exposure Control Plan

When worker exposure on a construction project is expected to be at or above the Action Level, a Written Exposure Control Plan (ECP) will be established and implemented. This ECP will contain at least the following elements:

- A description of the tasks in the workplace that involve exposure to Respirable Crystalline Silica;
- A description of the engineering controls, work practices, and respiratory protection used to limit worker exposure to Respirable Crystalline Silica for each task;
- A description of the housekeeping measures used to limit worker exposure to Respirable Crystalline Silica; and
- A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of workers exposed to Respirable Crystalline Silica and their level of exposure, including exposures generated by other employers or sole proprietors.

The written ECP will designate a Competent Person to make frequent and regular inspections of job sites, materials, and equipment to ensure the ECP is implemented. The written ECP will be reviewed at least annually to evaluate the effectiveness of it and update it as necessary. Having said this, ECP's are project specific and most project durations do not exceed a year. The written ECP will be readily available for examination and copying, upon request, to each worker covered by this program and/or ECP, their designated representatives, and OSHA.

Medical Surveillance

Medical surveillance will be made available for each worker who will be required to use a respirator for 30 or more days per year due to their Respirable Crystalline Silica exposure. Medical surveillance (i.e. medical examinations and procedures) will be performed by a PLHCP and provided at no cost to the worker at a reasonable time and place.

Contractors will make available an initial (baseline) medical examination within 30 days after initial assignment, unless the worker has received a medical examination that meets the requirements of the OSHA Respirable Crystalline Silica Construction Standard within the last three years. The examination shall consist of:

- A medical and work history, with emphasis on past, present, and anticipated exposure to Respirable Crystalline Silica, dust, and other agents affecting the respiratory system in addition to any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing), history of tuberculosis, and smoking status and history;
- A physical examination with special emphasis on the respiratory system;
- A chest X-ray (a single postero-anterior radiographic projection or radiograph of the chest at full inspiration recorded on either film [no less than 14 x 17 inches and no more than 16 x 17 inches] or digital radiography systems) interpreted and classified according to the International Labor Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader;
- A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
- Testing for latent tuberculosis infection; and any other tests deemed appropriate by the PLHCP.

Contractors will make available medical examinations that include the aforementioned procedures (except testing for latent tuberculosis infection) at least every three years. If recommended by the PLHCP, periodic examinations can be more frequently than every three years.

Contractors will ensure that the examining PLHCP has a copy of the OSHA Respirable Crystalline Silica Construction Standard, this program, and the following information:

- A description of the worker's former, current, and anticipated duties as they relate to the worker's occupational exposure to Respirable Crystalline Silica;
- The worker's former, current, and anticipated levels of occupational exposure to Respirable Crystalline Silica;
- A description of any personal protective equipment (PPE) used or to be used by the worker, including when and for how long the worker has used or will use that equipment; and
- Information from records of employment-related medical examinations previously provided to the worker and currently within the control of Fontaine

Contractors will ensure that the PLHCP explains to the worker the results of the medical examination and provides each worker with a written medical report within 30 days of each medical examination performed. The written report shall contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the worker at increased risk of material impairment to health from exposure to Respirable Crystalline Silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the worker's use of respirators;
- Any recommended limitations on the worker's exposure to Respirable Crystalline Silica; and;
- A statement that the worker should be examined by a Specialist if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a Specialist is otherwise deemed appropriate by the PLHCP.

Contractors will also obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following in order to protect the worker's privacy:

- The date of the examination;
- A statement that the examination has met the requirements of the OSHA Respirable Crystalline Silica Construction Standard; and
- Any recommended limitations on the worker's use of respirators.
- If the worker provides written authorization, the written opinion shall also contain either or both of the following:
- Any recommended limitations on the worker's exposure to Respirable Crystalline Silica; and/or
- A statement that the worker should be examined by a Specialist if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a Specialist is otherwise deemed appropriate by the PLHCP.

If the PLHCP's written medical opinion indicates that an worker should be examined by a Specialist, Contractors will make available a medical examination by a Specialist within 30 days after receiving the PLHCP's written opinion. Fontaine will ensure that the examining Specialist is provided with all of the information that the employer is obligated to provide to the PLHCP.

Contractors will ensure that the Specialist explains to the worker the results of the medical examination and provides each worker with a written medical report within 30 days of the examination. The written report will contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the worker at increased risk of material impairment to health from exposure to Respirable Crystalline Silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the worker's use of respirators; and
- Any recommended limitations on the worker's exposure to respirable crystalline Silica.

In addition, Contractors will obtain a written opinion from the Specialist within 30 days of the medical examination. The written opinion shall contain the following:

- The date of the examination;
- Any recommended limitations on the worker's use of respirators; and
- If the worker provides written authorization, the written opinion shall also contain any recommended limitations on the worker's exposure to Respirable Crystalline Silica.

Hazard Communication

Contractors will include Respirable Crystalline Silica in the company's Hazard Communication Program established to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Contractors will ensure that each worker has access to labels on containers of Crystalline Silica and those containers respective Safety Data Sheets (SDS's). All workers will be trained in accordance with the provisions of the OSHA Hazard Communication Standard and the Training Section of this program. This training will cover concerns relating to cancer, lung effects, immune system effects, and kidney effects.

Contractors will ensure that each worker with the potential to be exposed at or above the Action Level for Respirable Crystalline Silica can demonstrate knowledge and understanding of at least the following:

- The health hazards associated with exposure to Respirable Crystalline Silica;
- Specific tasks in the workplace that could result in exposure to Respirable Crystalline Silica;
- Specific measures Fontaine has implemented to protect workers from exposure to Respirable Crystalline Silica, including engineering controls, work practices, and respirators to be used;
- The contents of the OSHA Respirable Crystalline Silica Construction Standard;
- The identity of the Competent Person designated by Fontaine; and
- The purpose and a description of the company's Medical Surveillance Program.
- Fontaine will make a copy of the OSHA Respirable Crystalline Silica Construction Standard readily available without cost to any worker who requests it.

Recordkeeping

Contractors will make and maintain an accurate record of all exposure measurements taken to assess worker exposure to Respirable Crystalline Silica. This record will include at least the following information:

- The date of measurement for each sample taken;
- The task monitored;
- Sampling and analytical methods used;
- Number, duration, and results of samples taken;
- Identity of the laboratory that performed the analysis;
- Type of personal protective equipment (PPE), such as respirators, worn by the workers monitored; and
- Name, social security number, and job classification of all workers represented by the monitoring, indicating which workers were actually monitored.

Contractors will ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020. Exposure records will be kept for at least 30 years.

The employer shall make and maintain an accurate record of all objective data relied upon to comply with the requirements of the OSHA Respirable Crystalline Silica Construction Standard. This record shall include at least the following information:

- The Crystalline Silica-containing material in question;
- The source of the objective data;
- The testing protocol and results of testing;
- A description of the process, task, or activity on which the objective data were based; and
- Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

Contractors will ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020. Objective data records will be kept for at least 30 years.

Fontaine will make and maintain an accurate record for each worker enrolled in the Medical Surveillance portion of this program. The record shall include the following information about the worker:

- Name and social security number;
- A copy of the PLHCPs' and/or Specialists' written medical opinions; and
- A copy of the information provided to the PLHCPs and Specialists.

Contractors will ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020. Medical records will be kept under lock and key for at least the duration of employment plus 30 years. It is necessary to keep these records for extended periods because Silica-related diseases such as cancer often cannot be detected until several decades after exposure. However, if an worker works for an employer for less than one year, the employer does not have to keep the medical records after employment ends, as long as the employer gives those records to the worker.

PROGRAM EVALUATION

This program will be reviewed and evaluated on an annual basis unless changes to operations, the OSHA Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153), or another applicable OSHA Standard require an immediate re-validation of this program.

ASBESTOS

It is the responsibility of each contractor and sub-contractor to determine the presence of hazardous materials and invoke safe work practices meeting all federal, state, and local mandates regarding disturbing, handling, removing, storage, and disposing of same.

Based on information available, it has been determined that this site has; *(Circle any or all that apply)*

- Asbestos
- No Asbestos
- Possibility of Asbestos

Asbestos may be found in the following locations on this project; *(Circle any or all that apply)*

- Boilers and Heating Systems
- Ceiling tiles
- Floor tile(s)
- Glue daubs
- Window caulking and glazing
- Linoleum and cove base
    - Pipe insulation
    - Plaster
    - Roofing adhesives, flashing and membranes
    - Sheetrock and joint compound

Although some materials can be identified as non-asbestos by touch (such as fiberglass), the only way to confirm whether or not the material is non-asbestos is to test it.

All material that has not been tested, but has the possibility of being asbestos must be treated as “presumed asbestos containing material” or PACM

Review any survey that has been done by the facility for the project. If there is any substance or material found during any on site activity that is unknown or presumed to be asbestos, stop all work activities immediately and contact the Fontaine representative. Please refer to emergency contacts on page 2 of the site specific manual.

***See appendices for abatement checklist form and asbestos training package.**

LEAD

Lead contaminated materials, including glazed blocks and tiles, paints, plumbing and stains may be present on site. The following materials are commonly found to have lead. See Hazardous Materials Report.

- Wood
- Glazed Block
- Glazed Tile
- Paint
- Steel

Lead containing materials shall be properly removed and disposed of using lead safe work practices.

Lead contaminated wastes shall not be discarded into a construction dumpster, as the level of lead may exceed a TCLP (Toxicity Characteristic Leaching Procedure) test, rendering the dumpster contaminated and unable to be disposed of, except at an approved lead landfill, with appropriate documentation.

The demolition contractor, with the permission of the owner or owner's representative, is responsible for the safe removal and disposal of all lead containing materials.

For this project, the contact person for lead safe work practices and disposal requirements is listed on the emergency contacts page and/or contact Fontaine's on site representative.

Review any survey that has been done by the facility for the project. If there is any substance or material found during any on site activity that is unknown or presumed to be lead, stop all work activities immediately and contact the Fontaine representative. Please refer to emergency contacts on page 2 of the site specific manual.

***See appendices for lead training package.**

INDOOR AIR QUALITY (IAQ) MANAGEMENT PROGRAM

Incorporate indoor air quality goals into the construction process. Ensure that all members of the construction project team are knowledgeable about indoor quality issues and have defined responsibilities for implementation of good indoor air quality practices.

Require the development and use of this indoor air quality management plan. The purpose of the management plan is to prevent residual problems with indoor air quality in the completed building and protect workers on the site from undue health risks during construction. The plan should identify specific measures to address:

- Problem substances, including: construction dust, chemical fumes, off-gassing materials, and moisture. The plan should ensure that these problems are not introduced during construction, or, if they must be, eliminates or reduces their impact.
- Areas of planning, including: product substitutions and materials storage, safe installation, proper sequencing, regular monitoring, and safe and thorough cleanup.

Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection and ventilation rate. Conduct safety meetings, develop signage, and establish subcontractor agreements that communicate the goals of the construction indoor air quality plan. The indoor air quality construction plan is also a good opportunity to proscribe behaviors unacceptable to the owner that represent a potentially negative impact on long term indoor air quality such as smoking, using chew tobacco, or wearing contaminated work clothes.

Require contractors to provide information on product substitutions sufficient to enable operations and maintenance staff to properly maintain and repair materials in place.

Construction Practices

During construction, there are several simple actions contractors can perform that will minimize the potential for indoor air quality problems. Trades that need to be especially careful include: flooring, roofing, painting, drywall, HVAC, insulators, and the clean-up crew.

Keep building materials dry. Building materials, especially those with moisture absorbing properties like wood, insulation, paper, and fabric, should be kept dry to prevent the growth of mold and bacteria. If moisture is present, mold will grow on any virtually any material. Some building materials such as wood may arrive at the construction site with a high- moisture content or may have been wetted before arrival or during the transport process. Wet materials need to be allowed to dry as much as possible as weather permits. Cover dry materials with plastic to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.

Dry water damaged materials quickly. Water damaged materials should be dried within 24 hours. Due to the possibility of mold growth, materials that are damp or wet for more than 72 hours may need to be discarded.

Clean spills immediately. If solvents, cleaners, gasoline, or other odorous or potentially toxic liquids are spilled onto the floor, they should be cleaned up immediately. If a spill occurs on an easily replaced building material, it may be safest to discard it and replace it with new material. Odors from significant spills can linger sometimes for years, causing comfort and health problems for the future occupants of the building.

Seal unnecessary openings. Seal all unnecessary openings in walls, floors, and ceilings that separate conditioned space (heated or cooled) from unconditioned space. For example, it is common to punch large holes in the floor to allow pipes and wires to run between the rooms above and the crawlspaces or tunnels below. These oversized openings can cause two significant indoor air quality problems. Air that is contaminated with mold, radon, moisture, and pesticides can easily enter the rooms; and pests such as roaches or rodents can enter the rooms, leaving behind odors and allergens.

Temporarily seal duct-work. As duct-work is being installed, all return and supply air vents and any open duct-work should be temporarily sealed to prevent the duct-work and air handling units from being contaminated with construction debris or dust.

Ventilate when needed. Some construction activities can release large amounts of VOCs into the building, and if the building is already enclosed with walls, windows, and doors, outdoor air can no longer easily flow through the building and remove the VOCs. In addition to affecting the health of the construction workers, these VOCs can also be adsorbed onto other building materials and be re-released into the air later when the building is occupied by children and staff. During certain construction activities, temporary ventilation systems should be installed to quickly remove the gases.

Ventilation is generally needed when “wet” building materials are in use, when using materials that give off an odor, or when using materials that carry a manufacturer’s warning regarding the need for ventilation. Odors from building materials are the result of chemicals being released from the materials into the air, so if there is an odor present, it is safest to provide ventilation that will quickly remove those odors from the building. Examples of potentially problematic construction activities include painting (even with no- or low-VOC paints), spreading of floor adhesives, and use of large amounts of caulk, sealants, and cleaning agents. Additionally, the installation of large amounts of building materials, such as carpet or vinyl-based flooring products and composite wood cabinets and shelves, can require extra ventilation if the material has not been carefully selected or aired-out before being unrolled or unpackaged within the building.

During installation of carpet, paints, furnishings, and other VOC-emitting products, provide supplemental (spot) ventilation for at least 72 hours after work is completed.
It is important that an exhaust fan be used to pull the polluted air out of the building, not to push outdoor air into the building. Simply opening windows or doors is not enough to effectively exhaust contaminants in most cases. The fan should be placed in a window or exterior door as close to the work area as possible, and any openings in the window or door around the fan be temporarily sealed with plastic or cardboard.

Then open a window or exterior door at the opposite end of the room or building, so that fresher outdoor air will flow across the work area and sweep polluted air out through the exhaust fan. The size of exhaust fan needed will increase as the size of the room increases, and as the amount of gases being released into the air increases. The fan should provide about 5 air changes per hour (5 ACH). Divide the volume of the room in cubic feet by 12 to get the minimum amount of cubic feet per minute (CFM) that the fan must be able to exhaust. For example, a room with a volume of 9000 cubic feet (1000 square feet of floor area with 9 foot ceilings) divided by 12 results in a fan of 750 CFM. A 21 inch box fan may be sufficient for a single room if the materials are not too strong a source of gases, but would certainly not be sufficient for a wing or a whole building. As a rule of thumb, there may be enough airflow if odors do not spread out of the immediate area where the work is being performed, if dust or smoke released into the air can be seen to be drawn towards the exhaust fan. As long as the odors or air pollutants are present, the temporary exhaust ventilation must continue to be operated, even during nights and weekends if necessary. Ventilation should continue for a minimum of 24 hours after completion, or until there are no longer any noticeable odors.

Barriers are to be installed to prevent dust mitigation into occupied areas. The barriers will be made from 6mil poly held into place with tensioners or high quality duct-tape. A negative pressure will be created in the work zone using one or more negative pressure ventilation machines. The filter media on each machine will be inspected and replaced at regular intervals.

Reduce construction dust. Minimize the amount of dust in the air and on surfaces. Examples include use of vacuum assisted drywall sanding equipment, and use of vacuums instead of brooms to clean construction dust from floors. Use wet sanding for gypsum board assemblies when possible.

Exception: Dry sanding is acceptable if the following measures are taken:

- Full isolation of space under finishing
- Vacuum systems are used
- Plastic protection sheeting is installed to provide air sealing during the sanding
- Closure of all air system devices and ductwork
- Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust
- Worker protection is provided. Use safety meetings, signage, and subcontractor agreements to communicate the goals of the construction indoor air quality plan.

Avoid use of combustion equipment indoors. Engines and heaters that run on gasoline, diesel, kerosene, or other fossil fuels should not be operated indoors unless absolutely necessary, and only when large quantities of exhaust ventilation are provided to remove combustion pollutants such as carbon monoxide and moisture.

Store liquids outdoors. To reduce the possibility of spills during storage, transfer, or mixing, store all odorous or toxic liquids outside the building and protect against freezing.

Smoking is prohibited on school property.

ENVIRONMENTAL

Hazardous Materials

- Fontaine shall make the owner or the owner's designee/representative aware of any hazardous materials found on site that were not previously addressed or identified at the beginning of the project.
- Contractors shall notify Fontaine's designee/representative about any hazardous material incidents on site, regardless of size or quantity.
    - Leaks, spills or other types of contamination to air, soil or water which include chemicals, gasoline, hydraulic fluids and oils must be reported immediately
        - If the leak or spill is a "reportable quantity" of a chemical, gas or oil greater than 10 gallons (may be less depending on material), spilled directly to water regardless of quantity, or spilled to a direct pathway to water (i.e. storm drain), the owner or the owner's designee/representative must be notified, the local fire department and/or the Massachusetts Department of Environmental Protection shall be notified.
    - Hazardous materials shall be contained and labeled in a manner acceptable to the authority having jurisdiction.
    - Hazardous materials shall be properly labeled, as referenced in the Hazard Communications section of this program.

Hazardous materials including chemicals, cleaning agents, including those used for power washing of buildings and oil shall not be discharged or disposed of; to driveway, ground, road, sewer, storm drain or trash/waste receptacle or any other non-approved manner.

- The facility (owner) shall identify, with appropriate environmental assistance, the most appropriate manner in which to properly discard the hazardous material or waste, in accordance with the requirements of the state and federal environmental protection requirements.
    - For additional information and regulatory requirements, see the following sections;
        - Hazardous Waste
        - Solid Waste and Recycling
        - Storm Water
        - Universal Waste

Hazardous Waste

Each contractor and sub-contractor is ultimately responsible for the identification, disposal and record keeping requirements of hazardous waste generated from the site and processes, such as lead based paint, asbestos, contaminated materials, and chemicals present at the facility. Contractors and sub-contractors are responsible for any waste they create on the site that is unrelated to the owner, including but not limited to; cutting oil, and concrete cleaners, cleaning compounds, solvents etc.

Storm Water

- As part of this requirement, this project shall have a storm water pollution protection plan (SWPPP) to limit the discharge of construction materials, waste, including chemicals, cleaning materials, mud and sand into a storm drain and other "navigable" waterways.

    - The SWPPP, because it applies to ground water and water run-off must take into consideration all potential wastes leaving the construction site.
        - Acid or power washing of buildings must be controlled in a manner acceptable to the DEP / EPA
        - Areas for the washing of vehicles and concrete equipment must be controlled.
        - Oil must be stored in a manner to prevent the release in the case of a spill. Fontaine must check with the Owner to determine if SPCC regulations apply. If so, Fontaine must supply a list of all oil being stored in 55 gallons or larger to the owner, and must abide by the SWPPP.
- The responsible contractor shall control run-off with appropriate measures that may include, but are not limited to;
    - Catch basin filters
    - Soil retaining measures
    - Street sweeping (frequent)
- Fontaine, the sub-contractor and the Owner shall meet and discuss all options available to decide on the best management practices for the control of run-off.

HEALTH

General Health and Sanitation

- Housekeeping practices are reflective of the site health and sanitation program
- Contractors shall be responsible for providing their workers with adequate potable water and disposable cups for the purpose of worker hydration.
- Fontaine shall provide the appropriate sanitary restroom facilities, unless otherwise negotiated with the owner.
- All restroom facilities shall have, as a minimum alcohol-based hand cleaners and disposable toilet paper.

HAZARD COMMUNICATION- Global Harmonized System (GHS) SAFETY PLAN DEFINITIONS: For purposes of HAZARD COMMUNICATION (GHS) SAFETY PLAN, the following will apply:

1. "Article" means a manufactured item other than a fluid or particle that is formed to a specific shape or design during manufacture, and has use function(s) dependent in whole or in part upon its shape or design during end use; and under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a Hazard chemical and does not pose a physical hazard or health risk to workers.
2. "Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.
3. "Chemical" means any substance, or mixture of substances.
4. "Chemical Manufacturer" means a manufacturer with a workplace where chemical(s) are produced for use or distribution.
5. "Chemical Name" means the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name that will clearly identify the chemical for the purpose of conducting a hazard classification.
6. "Classification" means to identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as Hazard according to the definition of a Hazard chemical. In addition, classification for health and physical hazards includes the determination of the degree of hazard by comparing the data with the criteria for health and physical hazards.
7. "Commercial Account" means an arrangement where a retail distributor sells Hazard chemicals to a company, generally in large quantities over time and/or at costs that are below the regular retail price.
8. "Common Name" means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.
9. "Container" means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a Hazard chemical. Pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.
10. "Designated Representative" means any individual or organization that our worker gives written authorization to exercise such worker's rights. A recognized or certified collective bargaining agent will be treated automatically as a designated representative without regard to written worker authorization.
11. "Director" means the Director, National Institute for Occupational Safety and Health, U.S. Department of

Health and Human Services, or designee.

12. "Distributor" means a business, other than a chemical manufacturer or importer that supplies Hazard chemicals to other distributors or to employers.
13. "Worker" means worker who may be exposed to Hazard chemicals under normal operating conditions or in foreseeable emergencies. Workers who encounter Hazard chemicals only in non-routine, isolated instances are not covered.
14. "Employer" means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.
15. "Exposure or Exposed" means that an worker is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
16. "Foreseeable Emergency" means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that could result in an uncontrolled release of a Hazard chemical into the workplace.
17. "Hazard Category" means the division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.
18. "Hazard Class" means the nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.
19. "Hazard Not Otherwise Classified (HNOC)" means an adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this section. This does not extend coverage to adverse physical and health effects for that there is a hazard class but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA.
20. "Hazard Statement" means a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including the degree of the hazard.
21. "Hazard Chemical" means any chemical that is classified as a physical hazard or a health hazard, a simple combustible dust, pyrophoric gas, or hazard not otherwise classified.
22. "Hazard Classification" means chemical manufacturers and importers will evaluate chemicals produced in their workplaces or imported by them to classify the chemicals in accordance with this section. For each chemical, the chemical manufacturer or importer will determine the hazard classes, and where appropriate, the category of each class that apply to the chemical being classified. The company is not required to classify chemicals unless they choose not to rely on the classification performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.
23. "Health Hazard" means a chemical that is classified as posing one of the following Hazard effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard.
24. "Immediate Use" means that the Hazard chemical will be under the control of and used only by the

person who transfers it from a labeled container and only within the work shift where it is transferred.

25. "Importer" means the first business with workers within the Customs Territory of the United States that receives Hazard chemicals produced in other countries for the purpose of supplying them to distributors or other employers within the United States.
26. "Label" means an appropriate group of written, printed or graphic information elements concerning a Hazard chemical that is affixed to, printed on, or attached to the immediate container of a Hazard chemical, or to the outside packaging.
27. "Label Elements" means the specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.
28. "Mixture" means a combination or a solution composed of two or more substances in that they do not react.
29. "Physical Hazard" means a chemical that is classified as posing one of the following Hazard effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas.
30. "Pictogram" means a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.
31. "Precautionary Statement" means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a Hazard chemical or improper storage or handling.
32. "Product Identifier" means the name or number used for a Hazard chemical on a label or in the SDS. It provides a unique means so that the user can identify the chemical. The product identifier used will permit cross-references to be made among the list of Hazard chemicals required in the written hazard communication program, the label and the SDS.
33. "Produce" means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.
34. "Pyrophoric Gas" means a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.
35. Responsible Party" means someone who can provide additional information on the Hazard chemical and appropriate emergency procedures, if necessary.
36. "Safety Data Sheet (SDS)" means written or printed material concerning a Hazard chemical that is prepared in accordance with the Hazard Communication regulations.
37. "Signal Word" means a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for the less severe.
38. "Simple Asphyxiate" means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
39. "Specific Chemical Identity" means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.
40. "Substance" means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any

impurities deriving from the process used, but excluding any solvent that may be separated without affecting the stability of the substance or changing its composition.

41. "Trade Secret" means any confidential formula, pattern, process, device, information or compilation of information that is used in business, and that gives the business an opportunity to obtain an advantage over competitors who do not know or use it.
42. "Use" means to package, handle, react, emit, extract, generate as a byproduct, or transfer.
43. "Work Area" means a room or defined space in a workplace where Hazard chemicals are produced or used, and where workers are present.
44. "Workplace" means an establishment, job site, or project, at one geographical location containing one or more work areas.

Global Harmonized System Outline

1. Hazard Classification: Chemical manufacturers and importers are required to determine the hazards of the chemicals they produce or import. Hazard classification under the new, updated standard provides specific criteria to address health and physical hazards as well as classification of chemical mixtures.
2. Labels: Chemical manufacturers and importers must provide a label that requires the use of a safety data sheet format and provides detailed information regarding the chemical. This includes a signal word, pictogram, hazard statement, and precautionary statement for each hazard class and category.
3. Safety Data Sheets: The new format requires 16 specific sections that will provide consistency in presentation of important protection information.
4. Information and Training: To facilitate understanding of the new system, the new standard requires that workers be trained on the new label elements and safety data sheet format, in addition to the current training requirements.

Labeling Requirements

1. Chemical manufacturers and importers must provide a label that requires the use of a safety data sheet format and provides detailed information regarding the chemical. This includes a signal word, pictogram, hazard statement, and precautionary statement for each hazard class, category and mixed chemicals.
2. The HCS now requires the following label elements on labels of Hazard chemicals:

- Name, Address and Telephone Number of the chemical manufacturer, importer or other responsible party.
- Product Identifier is how the Hazard chemical is identified. This can be (buy) is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in section 1 of the SDS.
- Signal Words are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the

signal word “Warning,” then only “Danger” should appear on the label.

- Hazard Statements describe the nature of the hazard(s) of a chemical, including where appropriate, the degree of hazard. For example: “Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin.” All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards no matter what the chemical is or who produces it.
- Precautionary Statements describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the Hazard chemical or improper storage or handling. There are four types of precautionary statements: prevention (to minimize exposure); response (in case of accidental spillage or exposure emergency response, and first-aid); storage; and disposal. For example, a chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: “Do not breathe dust, fumes, gas, mist, vapors, and/or spray.

3. Precautionary Statements may be combined on the label to save on space and improve readability. When a chemical is classified for a number of hazards and the precautionary statements are similar, the most stringent statements must be included on the label. In this case, the chemical manufacturer, importer, or distributor may impose an order of precedence where phrases concerning response require rapid action to ensure the health and safety of the exposed person. In the self-reactive hazard category.
4. To develop labels under the revised HCS regulations, the manufacturers, importers and distributors must first identify and classify the chemical hazard(s) by including Pictogram(s) on the label. After classifying the Hazard chemicals, the manufacturer, importer or distributor then determines the appropriate pictogram(s) signal words, and hazard and precautionary statement(s), for the chemical label. Once this information has been identified and gathered, then a label may be created. In most cases, the precautionary statements are independent; however, OSHA does allow flexibility for applying precautionary statements to the label, such as combining statements, using an order of precedence or eliminating an inappropriate statement.
5. The label producer may provide supplementary Information and additional instructions or information that it deems helpful. It may also list any hazards not otherwise classified under this portion of the label. This section must also identify the percentage of ingredient(s) of unknown acute toxicity when it is present in a concentration of ≥1% (and the classification is not based on testing the mixture as a whole). If the company decides to include additional information regarding the chemical that is above and beyond what the standard requires, it may list this information under what is considered “supplementary information.” There is also no required format for how a workplace label must look and no particular format the company has to use; however, it cannot contradict or detract from the required information.
6. An example of an item that may be considered supplementary is the personal protective equipment (PPE) pictogram indicating what workers handling the chemical may need to wear to protect them. For example, the Hazard Materials Information System (HMIS) pictogram of a person wearing goggles may be listed. Other supplementary information may include directions of use, expiration date, or fill date, all of that may provide additional information specific to the process in that the chemical is used.
7. Pictograms are graphic symbols used to communicate specific information about the hazards of

a chemical. On Hazard chemicals being shipped or transported from a manufacturer, importer or distributor, the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. The pictograms OSHA has adopted improve worker safety and health, conform to the GHS, and are used worldwide. While the GHS uses a total of nine pictograms, OSHA will only enforce the use of eight. The environmental pictogram is not mandatory but may be used to provide additional information. Workers may see the ninth symbol on a label because label preparers may choose to add the environment pictogram as supplementary information.

8. It is important to note that the OSHA pictograms do not replace the diamond shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks or other containers. Those labels must be on the external part of a shipped container and must meet the DOT requirements set forth in 49 CFR 172, While the DOT diamond label is required for all Hazard chemicals on the outside shipping containers, chemicals in smaller containers inside the larger shipped container do not require the DOT diamond but do require the OSHA pictograms.
9. The company is responsible for maintaining the labels on the containers, including, tanks, totes, and drums. This means that labels must be maintained on chemicals in a manner that continues to be legible and the pertinent information does not get defaced (i.e., fade, get washed off) or removed in any way.

PICTOGRAMS AND HAZARDS

Health Hazard

» Carcinogen
» Mutagenicity
» Reproductive Toxicity
» Respiratory Sensitizer
» Target Organ Toxicity
» Apiration Toxicity

Flame

» Flammables
» Pyrophorics
» Self-Heating
» Emits Flammable Gas
» Self-Reactives
» Organic Peroxides

Exclamation Mark

» Irritant (skin and eye)
» Skin Sensitizer
» Acute Toxicity (harmful)
» Narcotic Effects
» Respiratory Tract Irritant
» Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder

» Gases Under Pressure

Corrosion

» Skin Corrosion/Burns
» Eye Damage
» Corrosive to Metals

Exploding Bomb

» Explosives
» Self-Reactives
» Organic Peroxides

Flame Over Circle

» Oxidizers

Environment

» Aquatic Toxicity

Skull & Crossbones

» Acute Toxicity (fatal or toxic)

WORKER TRAINING

The 16 sections of a Safety Data Sheet (SDS):

1. Identification
2. Hazard identification
3. Composition/Information on ingredients
4. First-aid Measures
5. Fire Fighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/ PPE
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information

DEMOLITION: SUBPART T

A **written demolition plan** must be submitted and approved prior to building demolition. All demolition work, which creates dust (regardless of type), shall incorporate the use of dust control methods, such as a water spray, or other engineering controls to limit dust migration. The use of HEPA Vacuums will be used in conjunction with 6mil poly barriers to control airborne dust concentrations as needed. The written plan shall be prepared by a structural engineer registered within the Commonwealth of Massachusetts.

Demolition Safety Tips

Demolition work involves many of the same hazards that arise during other construction activities. However, demolition also involves additional hazards due to a variety of other factors. Some of these include: lead-based paint, sharp or protruding objects and asbestos-containing material.

Preventing Falls

- Brace or shore up the walls and floors of structures which have been damaged and which workers must enter.
- Inspect personal protective equipment (PPE) before use.
- Select, wear and use appropriate PPE for the task.
- Inspect all stairs, passageways, and ladders; illuminate all stairways.
- Shut off or cap all electric, gas, water, steam, sewer, and other service lines; notify appropriate utility companies.
- Guard wall openings to a height of 42 inches; cover and secure floor openings with material able to withstand the loads likely to be imposed.
- Floor openings used for material disposal must not be more than 25% of the total floor area.
- Use enclosed chutes with gates on the discharge end to drop demolition material to the ground or into debris containers.
- Demolition of exterior walls and floors must begin at the top of the structure and proceed downward.
- Structural or load-supporting members on any floor must not be cut or removed until all stories above that floor have been removed.
- All roof cornices or other ornamental stonework must be removed prior to pulling walls down.
- Workers must not be permitted to work where structural collapse hazards exist until they are corrected by shoring, bracing, or other effective means.

ELECTRICAL SAFETY

The Hazardous Energy Control Policy must include all known and potential energy sources, including but not limited to;

- Electrical
- Pneumatic
- Plumbing and steam

All electrical power is considered to be energized until the responsible electrician or appropriate competent person has verified and tested the system to make sure that it has been de-energized. No work will be permitted on live electrical per NFPA 70E.

The electrical safety program for this project shall include the effective management of the following;

Electrical Cords

- Must be protected from physical damage
  - Flexible cords must be free of damage, splices and taps
  - Flexible cords shall be properly maintained and stored
  - Twisted cords shall be removed from service and destroyed to prevent future use
  - Free of splices
  - Flexible cords should not be so placed that they are considered a trip and fall hazard
  - Flexible cords shall have the appropriate grounding pins, or shall be double-insulate

Lighting

- Shall be adequate for the job site and per specifications and OSHA.
- Lighting shall be of the appropriate wattage, and placed in fixtures, including temporary in a manner specified by the lighting manufacturer
- Emergency lighting is required if work on the project will extend to after daylight hours
- Emergency lighting is required for below grade areas of the project and other areas where natural lighting is not available, in the event of a power failure.
- All temp services shall be installed with non-conductive materials.

Power Tools

- Portable electrical equipment and tools must be grounded or double insulated
- The tools shall be free of damage, and if not removed from service
- Any power tool removed from service, because of damage, shall be labeled “Do Not Use.”

Ground Fault Circuit Interrupters (GFCI)

- GFCI protected equipment and tools can be accomplished by one of the following;
- A GFCI outlet
- An outlet protected by a GFCI breaker, or
- A portable GFCI pigtail

- GFCI protection for all power tools and flexible cords is required for the duration of the project.
- When permanent wiring for the building / project or site has been completed, GFCI protection shall still be required. All contractors on site shall either;
- Obtain power from a permanently wired GFCI protected outlet, or
- Utilize a GFCI adapter / pigtail between the power supply and the flexible cord or tool being used

Lock-Out / Tag-Out

- As part of the Hazardous Energy Control Policy, each contractor must have a written Lockout / Tag out program on site.
- The Lockout / Tag out program shall take all types of hazardous energy into consideration.
- For this project, the following systems will need to be part of the Lockout:
  - Chemical
  - Electrical
  - HVAC
  - Plumbing
  - Pneumatic
  - Steam
  - Other(s)

Each Contractor must identify the Lockout/Tagout program that will be used on site. This program, typically the most stringent shall be used by all of the contractors working on site, and shall incorporate the owners Hazardous Energy Program, as the owner will most likely be part of a hazardous energy control / shutdown.

TRENCHING AND EXCAVATION

General Requirements

Protection of workers is required against cave-ins except when the excavation is in stable rock or less than five (5) feet deep and where examination by a competent person provides no evidence that a cave-in should be expected; and against falling rock, soil or other material, by use of scaling to remove loose rock or soil

Material or equipment must be kept at least two feet from the edge of the trench.

Daily inspection of excavations and adjacent areas by a competent person, and removal of exposed workers if evidence of possible cave-ins, failure of protective systems, hazardous atmospheres or other hazardous conditions, until necessary precautions have been taken.

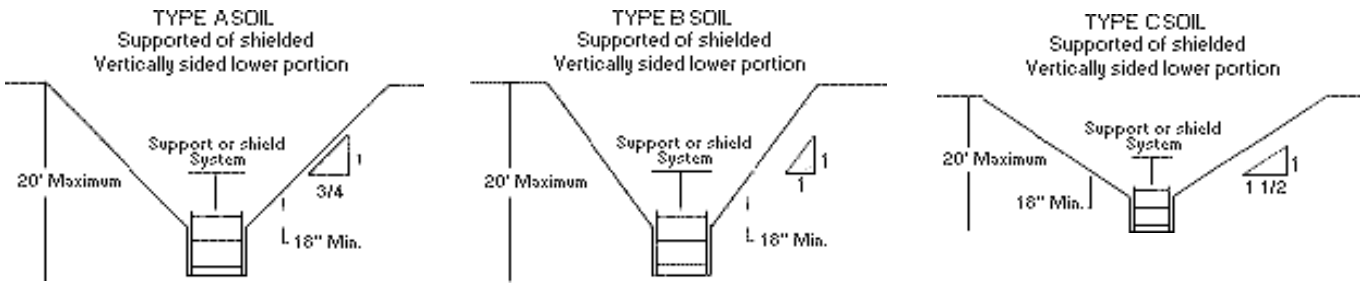
A competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary or dangerous to workers and, and who has the authority to take immediate corrective action or measures to eliminate them

- Ramps, runways, ladders or stairs as a means of access or egress must be within 25 feet of an worker work area if a trench is four feet deep or more

Support systems such as shoring, bracing, or underpinning to ensure the stability of adjacent structures such as buildings, walls or sidewalks

- The standard allows an employer to use a trench box or shield that is either designed or approved by a registered professional engineer (R.P.E.) or is based on tabulated data by an R.P.E
- The standard does not allows construction workers to remain inside trench shields that are being repositioned.

FIGURE V:2-12. SLOPE AND SHIELD CONFIGURATIONS.



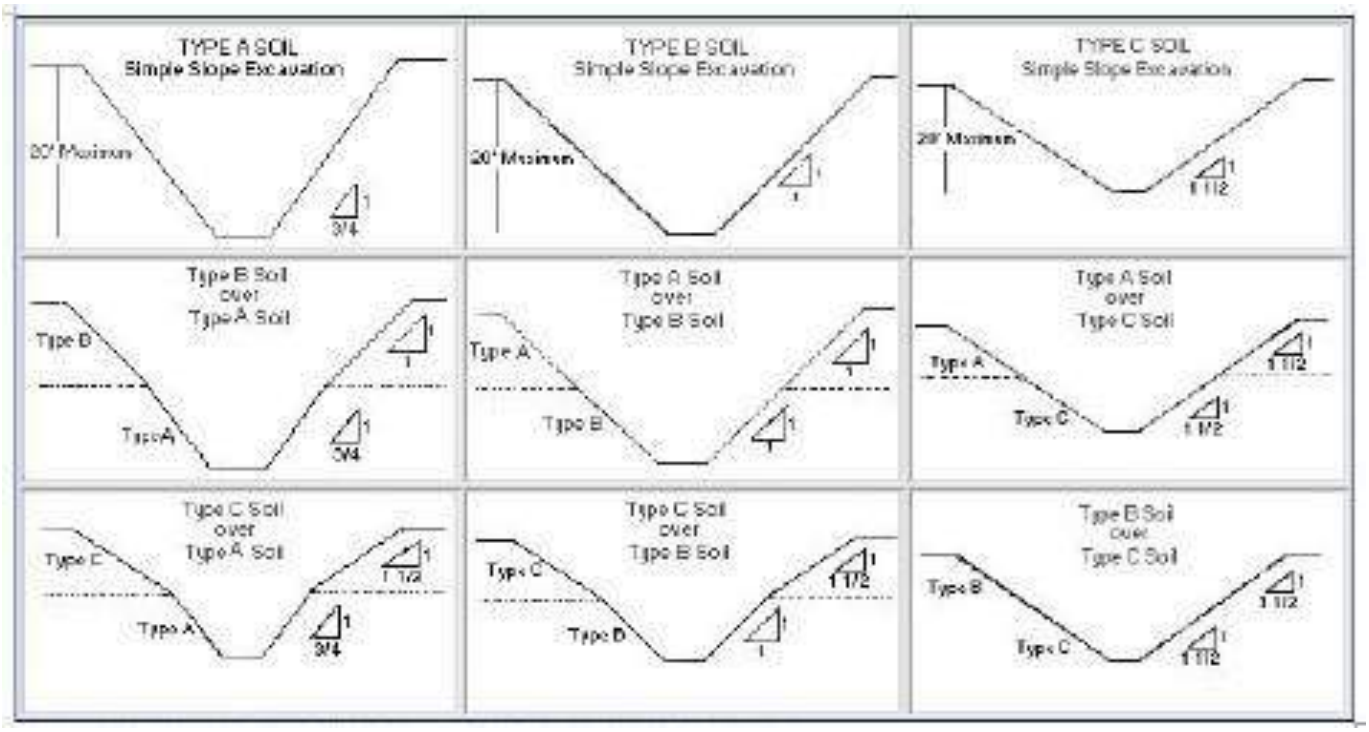
SLOPING AND BENCHING

A. Sloping. Maximum allowable slopes for excavations less than 20 ft (6.09 m) based on soil type and angle to the horizontal are as follows:

TABLE V:2-1. ALLOWABLE SLOPES

Soil type	height/Depth ratio	Slope angle
Stable Rock	Vertical	90°

TABLE V:2-13. SLOPE CONFIGURATIONS: EXCAVATIONS AND LAYERED SOILS



Special Health and Safety Considerations

» Competent Person: The designated competent person should have and be able to demonstrate the following:

- Training, experience, and knowledge of:
  - Soil analysis;
  - Use of protective systems; and
  - Requirements of 29 CFR Part 1926 Subpart P.
- Ability to detect:
  - Conditions that could result in cave-ins;
  - Failures in protective systems;
  - Hazardous atmospheres; and
  - Other hazards including those associated with confined spaces.
- Authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.

» Surface Crossing of Trenches: Surface crossing of trenches should be discouraged; however, if trenches must be crossed, such crossings are permitted only under the following conditions:

- Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.
- Walkways or bridges must be provided for foot traffic. These structures shall:
  - Have a safety factor of 4;
  - Have a minimum clear width of 20 in (0.51 m);
  - Be fitted with standard rails; and
  - Extend a minimum of 24 in (.61 m) past the surface edge of the trench.

» Ingress and Egress: Access to and exit from the trench require the following conditions:

- Trenches 4 ft or more in depth should be provided with a fixed means of egress.
- Spacing between ladders or other means of egress must be such that a worker will not have to travel more than 25 ft laterally to the nearest means of egress.
- Ladders must be secured and extend a minimum of 36 in (0.9 m) above the landing.
- Metal ladders should be used with caution, particularly when electric utilities are present.

» Exposure to Vehicles: Procedures to protect workers from being injured/killed by vehicle traffic include:

- Providing workers with and requiring them to wear warning vests or other suitable garments marked with or made of reflectorized or high-visibility materials.
- Requiring a designated, trained flagperson along with signs, signals, and barricades when necessary.

» Exposure to Falling Loads: Workers must be protected from loads or objects falling from lifting or digging equipment. Procedures designed to ensure their protection include:

- Workers are not permitted to work under raised loads.
- Workers are required to stand away from equipment that is being loaded or unloaded.

- Equipment operators or truck drivers may stay in their equipment during loading and unloading if the equipment is properly equipped with a cab shield or adequate canopy.

» Warning Systems for Mobile Equipment: The following steps should be taken to prevent vehicles from accidentally falling into the trench:

- Barricades must be installed where necessary.
- Hand or mechanical signals must be used as required.
- Stop logs must be installed if there is a danger of vehicles falling into the trench.
- Soil should be graded away from the excavation; this will assist in vehicle control and channeling of run-off water.

» Hazardous Atmospheres and Confined Spaces: Workers shall not be permitted to work in hazardous and/or toxic atmospheres. Such atmospheres include those with:

- Less than 19.5% or more than 23.5% oxygen;
- A combustible gas concentration greater than 20% of the lower flammable limit; and
- Concentrations of hazardous substances that exceed those specified in the Threshold Limit Values for Airborne Contaminants established by the ACGIH (American Conference of Governmental Industrial Hygienists).

All operations involving such atmospheres must be conducted in accordance with OSHA requirements for occupational health and environmental controls (see Subpart D of 29 CPR 1926) for personal protective equipment and for lifesaving equipment (see Subpart E of 29 CFR 1926). Engineering controls (e.g., ventilation) and respiratory protection may be required.

When testing for atmospheric contaminants, the following should be considered:

- Testing should be conducted before workers enter the trench and should be done regularly to ensure that the trench remains safe.
- The frequency of testing should be increased if equipment is operating in the trench.
- Testing frequency should also be increased if welding, cutting, or burning is done in the trench.

Workers required to wear respiratory protection must be trained, fit-tested, and enrolled in a respiratory protection program. Some trenches qualify as confined spaces. When this occurs, compliance with the Confined Space Standard is also required.

» Emergency Rescue Equipment: Emergency rescue equipment is required when a hazardous atmosphere exists or can reasonably be expected to exist. Requirements are as follows:

- Respirators must be of the type suitable for the exposure. Workers must be trained in their use and a respirator program must be instituted.
- Attended (at all times) lifelines must be provided when workers enter bell-bottom pier holes, deep confined spaces, or other similar hazards.
- Workers who enter confined spaces must be trained.

» Standing Water and Water Accumulation: Methods for controlling standing water and water accumulation must be provided and should consist of the following if workers are permitted to work in the excavation:

- Use of special support or shield systems approved by a registered professional engineer.
- Water removal equipment, i.e. well pointing, used and monitored by a competent person.
- Safety harnesses and lifelines used in conformance with 29 CFR 1926.104.
- Surface water diverted away from the trench.
- Workers removed from the trench during rainstorms.
- Trenches carefully inspected by a competent person after each rain and before workers are permitted to re-enter the trench.

» Inspections: Inspections shall be made by a competent person and should be documented. The following guide specifies the frequency and conditions requiring inspections:

- Daily and before the start of each shift;
- As dictated by the work being done in the trench;
- After every rainstorm;
- After other events that could increase hazards, e.g. snowstorm, windstorm, thaw, earthquake, etc.;
- When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur;
- When there is a change in the size, location, or placement of the spoil pile; and
- When there is any indication of change or movement in adjacent structures.

CONFINED SPACE ENTRY

Assignment ofResponsibility

Typically, while performing work on a construction site, the Contractor may serve in the role of an Entry Contractor or as the Host Employer or Controlling Contractor, as defined herein. The following outlines the Assignment of Responsibilities as well as guidance and recommendations pertaining to each of these roles.

> **Company Policy:** When the scale of the project is such that Host Employer does not possess confined space entry resources and the requirements of the OSHA regulation are beyond the capability of the Contractor, contracting the confined space entry work to a qualified entity that has this capability is highly recommended to ensure the health and safety of the Contractor's workers is protected.

The effectiveness of this program depends on proactive engagement and communication of construction site management and workers. Before work begins at a construction site, each employer must ensure that a competent person identifies all confined spaces in which one or more of the workers it directs may work and identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.

If any Contractor conducting work on a construction site decides that workers it directs will enter a permit space, that Contractor (Entry Contractor) must have a written permit space program implemented at the construction site. A written program, as outlined here, must be made available prior to and during entry operations for inspection by workers and their authorized representatives.

Interaction and information sharing with client facility representatives, general contractors and all related trade contractors is critical to this construction confined space process since hazards may be part of the jobs, tasks, and processes being completed by these multi-employer work environments. Clients may have confined spaces in their facilities or on active construction sites and it is important the Company work closely with these related organizations to identify these areas and take proper precautions.

This program (and the OSHA standard) is dependent upon the Controlling Contractor, rather than the Host Employer or Entry Employer, be the primary point of contact for information about permit spaces at the work site. The Host Employer must provide information it has about permit spaces at the work site to the Controlling Contractor, who then passes it on to the Contractor whose workers will enter the spaces (deemed "Entry Contractors").

Likewise, Entry Contractor must give the Controlling Contractor information about their entry program and hazards they encounter in the space and the Controlling Contractor passes that information on to other Entry Contractors and back to the Host Employer.

The Controlling Contractor is also responsible for making sure Contractors outside a space know not to create hazards in the space and that Entry Contractor working in a space at the same time do not create hazards for one another's workers.

Note: If there is no Controlling Contractor, the Host Employer or another Contractor will perform these duties; or if the Controlling Contractor owns or manages the property, then it is both a Controlling Contractor also serves as the Host Employer.

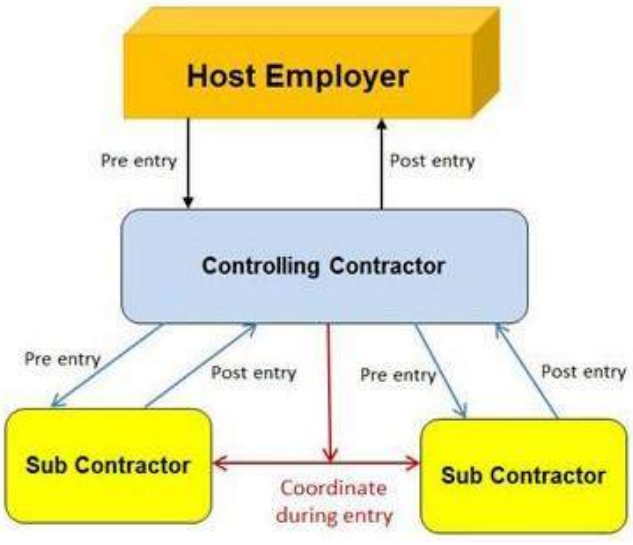
Before entry operations begin, the Controlling Contractor must:

- Obtain the Host Employer's information about the permit space hazards and previous entry operations;
- Provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could result in a hazard in the permit space:
  - The information received from the Host Employer;
  - Any additional information the Controlling Contractor has about the subjects the Host Employer is responsible for listed above; and
  - The precautions that the Host Employer, Controlling Contractor, or other Entry Employers implemented for the protection of workers in the permit spaces.

If the workplace contains one or more permit spaces, the Host Employer responsibilities include:

- Before entry operations begin, the Host Employer must provide the following information to the Controlling Contractor if available:
  - The location of each known permit space and inform exposed workers by posting signs reading "DANGER – PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER" providing sufficient notification of the existence and location of, and danger posed by each permit space.
  - Inform, in a timely manner and in a manner other than posting, its workers' authorized representatives and Controlling Contractor of the existence and location of, and the danger posed by, each permit space.
  - The hazards or potential hazards in each space or the reason it is a permit space; and
  - Any precautions that the Host Employer or any previous Controlling Contractor or Entry Contractor implemented for the protection of workers in the permit space.

The diagram to the right should help to illustrate this flow of communication requirements, their assigned responsibilities within this program and the critical relationships between these key roles.



The Contractor is responsible for:

- Providing oversight and technical support,
- Securing the resources necessary to implement this program;
- Ensuring that routine safety checks of work operations are performed;
- Conducting an annual review of this program;
- Updates (as needed) to ensure the effectiveness of the program; and,
- Ensuring that proper reporting and record keeping is executed.

The Entry Supervisor is the Contractor qualified person (such as the site supervisor, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this standard. Note: An entry supervisor may also serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this standard for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Specifically, the Entry Supervisor is responsible for:

- Assessing the space prior to entry to determine if the space meets the characteristics of a permit-required confined space;
- Knowing space hazards including information on the mode of exposure, signs, or symptoms and consequences of exposure;
- Verifying emergency plans and specified entry conditions such as permits, tests, procedures, equipment, and availability of rescue services before allowing entry;
- Terminating entry and canceling permits when entry operations are complete or if a new condition exists;
- Taking appropriate measures to remove unauthorized entrants; and,
- Ensuring that entry operations remain consistent with the entry permit and acceptable entry conditions are maintained.

The Authorized Entrant is the properly trained worker who has been authorized by the Entry Supervisor to enter a permit space. Specifically, the Authorized Entrant is responsible for:

- Knowing the hazards that may be faced during entry, including information on the mode, signs, or symptoms, and consequences of the exposure;
- Properly using equipment as required;
- Communicating with the Attendant during the entry so that the Attendant can monitor the status of the entry;
- Exiting from the permit space as soon as possible when ordered by the Attendant, when the entrant recognizes the warning signs or symptoms of exposure exists, when a prohibited condition exists, or when an automatic alarm is activated; and,
- Alert the Attendant immediately when a prohibited condition exists or when warning signs or symptoms of exposure exist.

The Attendant is an individual stationed outside one or more permit spaces who assesses the status of authorized entrants and who must perform the following duties:

- Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- Continuously maintains and ensures an accurate count of Authorized Entrants in the permit space;
- Remains outside the permit space during entry operations until relieved by another attendant; Note: Once an Attendant has been relieved by another Attendant, the relieved attendant may enter a permit space to attempt a rescue when the employer's permit space program allows attendant entry for rescue and the Attendant has been trained and equipped for rescue operations.
- Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space;
- Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space and orders the Authorized Entrants to evacuate the permit space immediately under any of the following conditions:
  - If there is a prohibited condition;
  - If the behavioral effects of hazard exposure are apparent in an authorized entrant;
  - If there is a situation outside the space that could endanger the authorized entrants; or
  - If the Attendant cannot effectively and safely perform all the duties as required under this standard;
- Summons rescue and other emergency services as soon as the Attendant determines that authorized entrants may need assistance to escape from permit space hazards;
- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
  - Warns the unauthorized persons that they must stay away from the permit space;
  - Advises the unauthorized persons that they must exit immediately if they have entered the permit space; and
  - Informs the Authorized Entrants and the entry supervisor if unauthorized persons have entered the permit space;
- Performs non-entry rescues as specified by the employer's rescue procedure; and
  - Performs no duties that might interfere with the Attendant's primary duty to assess and protect the Authorized Entrants.

***See appendices for the required confined space entry form.**

FIRE PREVENTION

Whenever the fire detection system must be altered, shut-down or removed from service, the local fire department shall be notified in advance.

Fontaine shall also notify the owner and verify notification of the owner's insurance company.
In the event of a fire alarm, all persons within the building are required to evacuate as referenced in the Emergency Action Program section referenced at the beginning of the site specific environmental health and safety program.

Fire Extinguishers

Extinguishers shall be conspicuously placed in appropriate areas of the construction or project site. As a minimum, a suitable (code compliant) extinguisher must be placed at;

- Each EXIT door on all floors
- Within 25' of all hot work activities and operations, as well as on each welding cart
- No greater than 100 feet between units

Fire Extinguishers on site shall have the following;

- Annual (in date) inspection tag
- A gauge indicating fully charged, and
- Pin with security seal

Fire extinguishers shall only be used by personnel who have been trained to use this equipment
Persons without training shall evacuate the building. In the event of a fire emergency, regardless of size, the following shall occur;

- Notify person(s) within the immediate vicinity of the fire, and request that they evacuate.
- Leave the area or room, and if possible close the door to the room
- Activate the closest fire alarm pull station, which is typically located next to the stairs or exit door.
- From a safe location, such as outside by cell phone, dial the local emergency number or 911 and report the emergency.
- If the above requirements have been completed, you are trained, and you are comfortable with the size of the fire and the use of the extinguisher, then attempt to extinguish the fire, but do not place yourself at risk.
- Report all fires, and complete the appropriate incident reports. Return any damaged, defective, discharged or outdated extinguisher to the project superintendent for replacement.

Fire Suppression

The fire suppression systems (sprinkler, standpipe or other specialized system) shall be installed and maintained in accordance with the requirements of the Massachusetts State Building Code, 780 CMR 9.

- For alterations and renovations, existing sprinklers and/or standpipes must remain in place and operational until it is absolutely necessary to remove parts there-of.

- Whenever the fire suppression system must be altered, shut-down or removed from service, the local fire department shall be notified in advance.

Flammable / Combustible Liquids

- Shall be placed in appropriate containers and cabinets.
- The cabinets and containers shall be NFPA compliant, as required by the local building and fire departments.
- Shall not be located in a means of egress or exit.
- Shall be labeled properly (without abbreviation). The name of the chemical and the appropriate hazard must appear on the "appropriate" container.

Heating Equipment

- Heating equipment used on site shall meet the requirements of OSHA 29 CFR 1926.53; 1926.154 and the local and state fire prevention regulations.
    - Permits are required for the use of salamanders and other heating equipment that utilize natural gas and/or propane.
        - Propane gas tanks and cylinders require;
            - Permits for the storage and use of gas
            - A suitable base
            - Gas cylinders require a chain or strap to secure
            - A licensed worker is required to manage the propane tanks
    - No flammable or combustible gases or liquids, or open flames can be located near any means of egress on a construction site. If heaters are located in close proximity to a door, the fuel supplying same shall be a minimum of 25' from the door.
    - When heating devices are utilized on site, which require combustible fuels, including coal, fuels, gases and wood, an approved carbon monoxide detector shall be used to verify that levels are carbon monoxide do not exceed 30ppm.
    - L.P.G. Cylinders must be protected by contact with motorized vehicles.
    - Non-vented open flame heaters will not be used.
    - No propane-type heating units will be used in an enclosed building.

COMPRESSED GAS CYLINDERS

Storage and Handling

1. When not in use compressed gas cylinders must be capped, secured, and separated by 20 feet.
2. Store all cylinders in the upright position and secured.
3. Place valve protection caps on gas cylinders that are in storage or not in use.
4. Do not lift cylinders by the valve protection cap.
5. Do not store compressed gas cylinders in areas where they can come in contact with chemicals labeled "Corrosive."
6. Place cylinders on a cradle, sling board, pallet or cylinder basket to hoist them.
7. Do not place cylinders against electrical panels or live electrical cords where the cylinder can become part of the circuit.
8. Do not use a flame to check for propane cylinder leak, use a leak or monitor detector.
9. Use of Cylinders
10. Do not use dented, cracked, or other visually damaged cylinders.
11. Use only an open ended or adjustable wrench when connecting or disconnecting regulators and fittings.
12. Do not transport cylinders without first removing regulators and replacing the valve protection caps.
13. Close the cylinder valve when work is finished, when the cylinder is empty or at any time, the cylinder is moved.
14. Do not store oxygen cylinders near fuel gas cylinders such as propane or acetylene or near combustible material such as oil or grease.
15. Stand to the side of the regulator when opening the valve.
16. If a cylinder is leaking around a valve or a fuse plug, move it to an outside area away from where work is performed and tag it to indicate the defect.
17. Do not hoist or transport cylinders by means of magnets or choker slings.
18. Do not use compressed gas to clean the work area, equipment, or yourself.
19. Do not remove the valve wrench from acetylene cylinders while the cylinder is in use.
20. Open compressed gas cylinder valves slowly. Open fully when in use to eliminate possible leakage around the cylinder valve stem.
21. Purge oxygen valves, regulators, and lines before use.

Torch on Applications

1. "Blow Out" hoses before attaching the torch.
2. Inspect hoses and torches before use. Replace damaged, burned, worn, or leaking parts.
3. Use a pressure gauge on every regulator. Do not use an adjustable regulator with a higher-pressure range than the original regulator that came with the torch.
4. Never face the gauge while opening the cylinder valve.
5. Before lighting a torch, purge the hose, adjust the working pressures, then use a friction lighter to ignite the gases. Do not use matches or a cigarette lighter.
6. Do not use oil, grease or other lubricants on the regulator.
7. When shutting off the torch, close the gas cylinder valve first and let the remaining gas burn out of the hose before closing off the torch valve.

8. Never overfill a gas cylinder. It could explode.
9. Use only hoses listed for liquid petroleum (LP) gas.
10. Use soap solution to test for gas leaks before lighting.
11. Visually check and ensure that the flow of gas through the regulator is flowing in the proper direction. Directional flow is stamped on the regulator.
12. To keep 'frosting' from occurring, increase the size of the bottle or cylinder.
13. Secure propane tanks in an upright position and place them at least 10 feet from the open flame.
14. Keep non-applicators at least 10 feet from the flame.
15. Keep vent in pressure regulator clear at all times.
16. When shutting off the torch, close the propane cylinder valve first and let the remaining gas burn out of the hose.
17. Do not leave a lighted torch unattended.
18. Do not heat a cylinder to increase pressure.
19. Place a fire extinguisher near you, but away from the torch and other parts of LP gas equipment, when performing torch on operations.
20. Do not lay an operating torch over the edge of a roof.
21. Flash arrestors required at gauges to protect the tanks.
22. Do not lay an operating torch to rest on a gas cylinder. If there is a gas leak in the cylinder area, there could be a fire.

Portable Welding Equipment

1. Hardhats must be maintained at all times during welding operations.
2. Do not use personal or worker-owned power tools and portable appliance while at work.
3. Do not perform welding tasks while wearing wet cotton gloves or wet leather gloves.
4. Insulated work gloves are required for all welders when using welding equipment.
5. Do not use welding apparatus if power plug is cut, frayed, split or otherwise visibly damaged or modified.
6. When replacing power plugs and cords of welding apparatus, always check to ensure that the ground wire is connected and the power plug prongs are not worn off, allowing the plug to be inserted backward.

HOT WORK PERMIT PROCEDURE

Purpose: To outline the procedure and conditions under which Hot Work Permits will be issued.

Objective: The Hot Work Permit process is intended to assure that adequate operations and communication controls are in place when work is performed that could lead to ignition of flammable or combustible materials.

DEFINITION

Hot work is defined as any work activity that involves cutting, welding, burning, heating or related operations which involve the use of an open flame or electric arc or any work activity involving the use of spark producing tools or equipment. Anyone involved in any of the aforementioned activities shall be adequately trained in the hot work procedures contained herein. Re-training will be required of anyone not conforming to established project hot work procedures.

HOT WORK PROCEDURE

Not all situations that arise will be completely covered by this procedure. However, those situations or questions arising from interpretation should be referred to the Fontaine Safety Director. The Hot Work Permit shall be required of all subcontractors performing defined hot work around combustibles that cannot be relocated. The Fontaine superintendents shall determine if/when hot work permits are required, or the safety director deems them necessary. If a particular subcontractor is going to be working in a consistent area with consistent exposures and operations then a “Blanket Permit” can be issued if the Superintendent feels that the control is adequate. (A blanket permit will be limited to 5 consecutive working days.)

HOT WORK PERMIT & DAILY LOG

1. Evaluate if hot work can be avoided. If not the Hot Work Permit must be completed along with the Daily Hot Work Log by subcontractors Competent person and distributed to the location of the Hot Work activities. Post the Hot Work Permit on the fire extinguisher where the Hot Work is taking place.
2. After completing the necessary information the recommended Precautions checklist must be completed as directed by the permit. The following checks must be managed toassure adequate protection:

- Available Sprinklers, hose streams, fire extinguishers (and training in there use) are available and in use
- Assure listed requirements are in place for work within 35 feet of combustibles, explosive atmospheres, flammable liquids, floor and wall openings, and combustible materials that cannot be moved or relocated
- For combustibles that cannot be removed fire blankets shall be used to capture any welding slag or sparks created
- For any work on walls and ceilings
- For any work on enclosed equipment
- Fire watches and work area monitoring are in place and remain so for a minimum of 60 minutes after the work has been completed

***See appendices for the hot work log. Safety Department to provide permit.**

CRANES, DERRICKS, HOISTS AND LIFTS

All subcontractors performing crane activities shall submit to the Fontaine Project Team a pick plan to be reviewed prior to any crane activities on site and also comply with the requirements of OSHA Final Rule effective date November 8, 2010 (Subpart CC.)

- Fontaine, and the contractor working with the crane operator shall insure that a "competent" person has been appointed to act as the person-in-charge for all lifts involving cranes, regardless of size and/or weight capacity.

The competent person will use the pick plan for regulatory and safety reasons. The plan must include, but is not limited to the following requirements;

- The operators proof of certification, annual inspection for the crane, as well as the signaler name and verification of training
- Area survey to ensure that the work site is stable and appropriate for the weight and work activities of the crane
- Description, type and rated capacity of the crane being used for the lift
- The list of the equipment or material being lifted, including weight, dimensions and other applicable information
- Appropriate sketches or blueprints of how the material will be lifted.
- Boom and swing angles, crane orientations, lifting points, methods of attachment and rated capacity.
- A pre-lift meeting with all personnel that will be involved with the lift, or in close proximity to same.

The contractor or their designee is required to barricade or provide warnings to alert persons in close proximity about the overhead work. This shall include, but is not limited to;

- Protection of doorways and exits, which might include redirection to an alternative entrance / exit
- Tape off hazardous areas, including swing zones and areas where overhead hazards are likely to fall
- Inspections of cranes, derricks and associated attachments shall be made by a competent person prior to each use

Crane Operators are responsible for operations under their direct control. They shall:

- Not engage in any practice that will divert their attention while operating the hoisting equipment
- Not operate the lift if their operation is/might be impaired (mentally or physically)
- Perform an equipment assessment (walk around inspection) to verify personnel, equipment and site safety
- Place appropriate barriers or warning lines around the superstructure to prevent unauthorized entry into the site/area of swing
- Test all controls and emergency stops
    - Improperly functioning / working controls must be adjusted/repaired before the equipment is used.
    - If not repairable, the unit must be removed from service and locked and/or tagged "Out Of Service Do Not Use".

- Respond appropriately to any signals from a trained "signal person", or by radio or phone contact (hands-free).
- Be responsible for anyone working under their direct control, and shall stop any unsafe or potential unsafe operation until corrections can be made
- Secure and make safe any unattended hoisting equipment
- Not permit any person to work under the boom or suspended load

A competent, authorized and properly trained person shall inspect cranes, derricks and associated equipment, as specified by the manufacturer, prior to each use.

- Crane operators are responsible for their cranes and derricks before, during and after any lift.
  - If the safety of the personnel, equipment or facility is in question, the competent person shall;
    - Stop all hoist activities
    - Refuse to handle or lift non-conforming loads

Hoisting workers on a personal platform of cranes and derricks, when steel erection is being conducted is permitted, provided that all provisions of OSHA 29 CFR subpart CC and R are met.

- Headache balls cannot be used to transport personnel
- Safety latches on crane hooks (regardless of hook capacity and size) shall not be deactivated, removed or disabled
- Crane Inspections shall;
  - Be performed by a competent person and shall include all aspects, as specified by the manufacturer of the crane.
  - A qualified rigger must be used during all rigging and hoisting operations

Use of cranes, including lifting procedures, assembling and disassembling shall be done in accordance with manufactures specifications.

A crane plan shall be submitted by no later than 48-hours prior to the scheduled activity. Refer to the back end of this safety plan for a copy of the plan.

NOTE: Contractors that utilize cranes are required to provide all support material that is necessary to distribute the reaction load, so that it does not exceed the ground bearing pressure capacity. Contractors are required to review documents and or engage an engineer to determine ground bearing pressure capacity.

STEEL ERECTION: SUBPART R

Requirements

In accordance with the requirements of OSHA, all employers are required to provide fall protection, equipment and training to their workers when working at elevations above a lower level, which includes but is not limited to the ground, platforms, structural steel members, roofs or dangerous equipment. Steel erectors on this project are responsible for their steel erection. Contractor and any subcontractor must have a written fall protection program and a competent person. A "competent person" must be on-site at all times.

Fall Protection Review

Permanent floors shall be installed as soon as practical following the erection of structural members. At no time shall there be more than four floors or 48 feet of unfinished bolting or welding above the foundation or uppermost secured floor.

Temporary Flooring

The erection floor shall be solidly planked or decked over its entire surface except for access openings. Planking shall be not less than 2 inches thick, full size, undressed, and shall be laid tight and secured against movement.

Perimeter Protection

A safety railing of one-half inch diameter wire rope shall be installed and maintained approximately 42 inches (+/- 3"), around the periphery of all decked floors following the completion of structural steel erection on that floor. The distance between stanchions should not exceed 12 feet. Wire rope must not deflect more than 3 inches under a downward force of 200 pounds. All corner stanchions must have 3/4 kickers. Wire rope clamps must be installed 4 inches apart. Turn buckles must be installed at the end of each run, not to exceed more than 100 feet.

***See appendices for the deck turnover form.**

Erection Plan

An erection plan consisting of the following items will be prepared and reviewed with the Project Manager prior to start of work.

Crane

(Controlling Entity) Initial responsibility:

1. Provide firm, drained, and graded ground conditions sufficient to support equipment to manufacturer's specification for support and degree of level.
2. Locate and inform the user of equipment of the location of underground hazards (voids, tanks, utilities)

- Identify crane set up locations
- Contact dig-safe
- Review all available as-builts and project drawings

Prior to Operation:

Assembly/Disassembly "Director": Need letter from crane company on their official letterhead identifying Assembly/Disassembly Director as competent and qualified, for lattice Boom Cranes.
Operators: Current Operators License/Rigging & Signalman/ Medical Evaluation Certifications (Mass.) **NCCCO Certification that demonstrates the proficiency and experience level of the operator.

Annual Inspection: Third Party Certification of Crane

a. Mobile Hydraulic – Need third party certification within last year
b. Lattice Boom Crane – Needs third party certification post assembly and the Assembly/ Disassembly Director must be on site during the erection of the Lattice Boom cranes completion.

Pick Plan:

a. Diagram of crane set-up location
b. Radius of all picks to be made
c. Weights of pick at given radius – Determination of any "critical picks" (anything over 75% of capacity).
d. Completion of Critical Pick Plan for any picks over 75% of capacity.
e. Refer to the crane section for additional information

Overhead Electrical Exposure: (anything within 20 feet) **Contact Fontaine Safety Director

Operators Daily Inspection: Written (to include all wire rope and all associated rigging)

Appointment of "Qualified Signalman": Need to identifying Qualified Signal Person as competent and qualified for any crane signaling necessary due to obstructed views or site specific safety concerns to be conducted on site

Appointment of "Qualified Rigger": Need to identifying Qualified Rigger as competent and qualified for any person:

a. Engaged in hooking, unhooking or guiding the load
b. Involved in rigging a suspended load that flies over any and all "Fall Zones"

General Requirements

A qualified person shall approve all changes in the safety erection plan.
A copy of the erection plan with all approved changes shall be maintained at the jobsite.
The implementation of the erection plan shall be under the supervision of a competent person.

Fall Protection

Each worker engaged in a steel erection activity that is on a walking/working surface with an unprotected side or edge 6 feet or greater above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems.

Bundles of sheets or small material shall be so secured as to prevent them from falling. When setting structural steel, each piece shall be secured with not less than two bolts at each connection and drawn up wrench tight before the load is released. Material shall not be hoisted to a structure unless it is ready to be put into place and secured. When loads are being hoisted, all personnel are to be prevented from walking under the lift. No one shall be permitted to ride the load for any reason under any circumstances whatsoever. A tag line shall be used to control ALL loads. For the protection of other crafts on the project, signs shall be posted in the erection area marked, “DANGER- MEN WORKING OVERHEAD.” “Christmas Tree” rigging, or the lifting of more than one member at one time shall conform to the requirements of Subpart R.

Scope

1926.750

(a)This subpart sets forth requirements to protect workers from the hazards associated with steel erection activities involved in the construction, alteration, and/or repair of single and multi-story buildings, bridges, and other structures where steel erection occurs. The requirements of this subpart apply to employers engaged in steel erection unless otherwise specified. This subpart does not cover electrical transmission towers, communication and broadcast towers, or tanks.

Note to paragraph (a): Examples of structures where steel erection may occur include but are not limited to the following: Single and multi-story buildings; systems-engineered metal buildings; lift slab/tilt-up structures; energy exploration structures; energy production, transfer and storage structures and facilities; auditoriums; malls; amphitheaters; stadiums; power plants; mills; chemical process structures; bridges; trestles; overpasses; underpasses; viaducts; aqueducts; aerospace facilities and structures; radar and communication structures; light towers; signage; billboards; scoreboards; conveyor systems; conveyor supports and related framing; stairways; stair towers; fire escapes; draft curtains; fire containment structures; monorails; aerial ways; catwalks; curtain walls; window walls; store fronts; elevator fronts; entrances; skylights; metal roofs; industrial structures; hi-bay structures; rail, marine and other transportation structures; sound barriers; water process and water containment structures; air and cable supported structures; space frames; geodesic domes; canopies; racks and rack support structures and frames; platforms; walkways; balconies; atriums; penthouses; car dumpers; stackers/ reclaimers; cranes and craneways; bins; hoppers; ovens; furnaces; stacks; amusement park structures and rides; and artistic and monumental structures.

(b)(1) Steel erection activities include hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point-to-point while performing these activities.

(2) The following activities are covered by this subpart when they occur during and are a part of steel erection activities: rigging, hoisting, laying out, placing, connecting, guying, bracing, dismantling, burning, welding, bolting, grinding, sealing, caulking, and all related activities for construction, alteration and/or repair of materials and assemblies such as structural steel; ferrous metals and alloys; non-ferrous metals and alloys; glass; plastics and synthetic composite materials; structural metal framing and related bracing and assemblies; anchoring devices; structural cabling; cable stays; permanent and temporary bents and towers; false work for temporary supports of permanent steel members; stone and other non- precast concrete architectural materials mounted on steel frames; safety systems for steel erection; steel and metal joists; metal decking and raceway systems and accessories; metal roofing and accessories; metal siding; bridge flooring; cold formed steel framing; elevator beams; grillage; shelf racks; multi-purpose supports; crane rails and accessories; miscellaneous, architectural and ornamental metals and metal work; ladders; railings; handrails; fences and gates; gratings; trench covers; floor plates; castings; sheet metal fabrications; metal panels and panel wall systems; louvers; column covers; enclosures and pockets; stairs; perforated metals; ornamental iron work, expansion control including bridge expansion joint assemblies; slide bearings; hydraulic structures; fascia's; soffit panels; penthouse enclosures; skylights; joint fillers; gaskets; sealants and seals; doors; windows; hardware; detention/security equipment and doors, windows and hardware; conveying systems; building specialties; building equipment; machinery and plant equipment, furnishings and special construction.

For this project, the following work activities and fall protection height requirements are;

- General Fall Protection 6 Feet
- Connectors / Deck Installers 6 Feet

Guardrails shall be at least 42" in height (+/- 3") with mid rails and toe boards in place. If materials are placed on the elevated surfaces, higher than the level of the toe board, a protective measure shall be attached to the elevated surface (guardrail system) to prevent the storage from being displaced, over the edge of the toe boards.

All wall openings, including windows with elevation differences >6' shall be properly protected with suitable guardrails or other recognized fall protection systems. When holes or openings are used for the passage of materials, such as through a window or elevated level of scaffolding/staging, the opening must be guarded on at least 3 sides when being used for the transfer of materials, and the 4th side, when not being used should be protected with a suitable (removable) guardrail or gate as specified by the competent person. Guardrails are required around points of access, such as a ladder-way. The open side of the opening shall be no greater than 18" or be off-set to prevent person(s) from falling through or into the opening. When the use of ladders or stilts are required that places the user above the level of fall protection, the competent person shall select an appropriate means of fall protection to cover the increase in height.

WATER DAMAGE PREVENTION PLAN

Purpose

The purpose of these Standard Operating Procedures is to establish a program for Water Damage Prevention Plan. This document describes the program parts, establishes program procedures and assigns roles and responsibilities for implementing and maintaining the program.

In the event of water infiltration immediately call Safety Director, Mark Bisson and also Garrett Oldfield for immediate cleanup response.

Garrett Oldfield | Owner | SOS Corp T: 774.462.7005 | E: garrett@soscorp.net

Program Parts

The program consists of the following parts:

- Become familiar with entire project – both physically, mechanically/electrically.
- Identify where sensor technology (water, temperature and/or humidity) is needed and will be placed. Provide a map of such once sensor technology in place.
- Consolidate a complete and current set of plans, shop drawings, equipment specs, shut off valve map, sensor technology map and as built drawings.
- Collect maintenance manual and parts list on all domestic, hot, chillers, condenser, fire, pool, sumps and ejector pumps for the project.
- Setup maintenance program for all the above pumps.
- Establish emergency notifications and security procedures.
- Make a contact list of all emergency service companies and subcontractors on site.
- Prepare simple list with locations off all primary isolation valves: gas, water and sprinkler system
- Set dates and times for training of the Water Damage Prevention Plan.

Records

Records will be kept with the appropriate MEP Subcontractor. Record information will contain:

- Manufacturer and model name of the pumps
- Manufacturer's identification number
- Month and year of manufacture
- A list of trained personnel and proof of training documents.
- Valve shut off (gas, water, gas, etc.) map.
- Sensor technology map.

Procedures

- All primary isolation valves: e.g: gas, domestic hot/cold, chilled/heat/condenser, pool water and sprinkler system shall be shown to all associates of the project.
- Retraining on the location of the above valves is done on the monthly bases.
- Emergency contacts are updated with all vendors and their emergency contact numbers

- Emergency equipment such as water extractor, wet vacs, etc. are located on site.
- Emergency sprinkler shut off valve chart is located on site.

General Inspection

The purpose of inspection is to determine that all water pipes, valves and pumps functioning properly. Refer to the Appendix for the inspection checklist.

Routine Inspection

- Routine inspection is the responsibility of the appropriate MEP Subcontractor
- Performing a visual inspection before the start of each day is performed by the appropriate MEP Subcontractor
- Daily inspection of is performed by the appropriate MEP Subcontractor of the following:
    - wall openings (doors, windows) are sealed and inspected for potential water penetration and leakage
    - jobsite material storage to prevent water damage
    - heating in areas of wet pipes
    - insulated water lines
    - utility channels free of leaks
    - sprinkler heads protected from cold and accidental damage
    - areas above drop ceilings or below roof that are exposed to water or waste lines to ensure adequate heating
    - leak watch in place after hydro testing of plumbing and fire sprinkler testing
    - roof
    - storm drains
    - exterior landscaping, etc.
    - parking lot

Advanced Inspection

Advanced inspections will be conducted at a minimum of every 12 months, or whenever routine inspections indicate that a problem exists. A complete inspection will be performed along with the advanced inspection on pumps and valves.

Designated personnel have been trained to provide advanced inspection. Annual advanced inspections will be coordinated by the appropriate MEP Subcontractor.

General Repairs

The purpose of repair is to correct damage to ensure that pumps, pipes and valves are working properly. Repair must be done by licensed specialist. The appropriate MEP Subcontractor is responsible for coordinating all repairs.

***See appendices for the water damage prevention plan checklist.**

MATERIAL HANDLING AND STORAGE

General

- When storing materials, do not leave materials in aisles, walkways, stairways, roads or other points of entry or exit. All materials should be elevated off of the floors to prevent damage in the event of water infiltration. When moving or lifting materials by hand, avoid stress or strain.
- Flammable liquids and grease shall be stored in a "No Smoking" area and properly separated from other stored material.
- Each container will be identified as to its contents.
- "Hitching a ride" on tractors, cranes, Lulls or other vehicles is dangerous. Ride in cab of truck or where seat is provided. Jumping on/off moving vehicle is prohibited.

Stacking

- Materials should be segregated as to kind, size and length, and placed in neat and orderly stacks that are racked, blocked or interlocked to prevent falling, collapsing or tripping hazards.
- Stacks of materials will be arranged to allow passageways between them and be well marked and visible at night.

Rigging

- Good rigging is essential for moving construction materials and equipment and at the same time keep them under control.
- Never swing loads over the heads of workers in the area.
- Only qualified flagmen and signalmen are to direct operation, using hand signals established as standard for the industry.
    - Use the correct lifting technique and utilize hoisting equipment or engage the help of a fellow worker whenever heavy or unwieldy objects are to be moved.
- Use softeners where slings pass over sharp edges or corners.
- Tag lines must be used to control loads and keep workers away.
- Do not overload any part of your rigging. Check loads just off the ground for stability before hoisting. Insure that the center of gravity is directly below the hook.
- Never leave a suspended load unattended until safely landed.
- Never allow loads, booms, or rigging to approach within twenty (20) feet for cranes and ten (10) feet of energized electrical lines rated 50 KV or lower unless the lines are de-energized. For lines rated greater than 50 KV or for moving loads, refer to O.S.H.A. Standards.
- Always operate cranes on firm, level ground or use mats, particularly for near-capacity lifts without-riggers.
- Rope off or barricade a space 360 degree around all cranes operating on your jobsite to the extent of the swing radius of the rear of the rotating structure.

Rigging and Sling Safety

1. Load Angle Factor- Choosing Slings

To determine the safe working load:

- Length of leg (sling) divided by Height to Hook = Load Angle Factor
- Load Angle Factor multiplied by Weight of Load = Stress
- OR: 10 ft. ÷ 8 ft. to hook = 1.25 Load Angle Factor
- 1.25 x 2000 = 2500 lbs... each leg- Safe Working Load Rating for your slings

2. Wire Rope

- Made from preformed strands
- Better load distribution
- Prevents unraveling when cut
- More flexible
- Many uses
- Less susceptible to corrosion, overtension, wear and crushing

3. Wire Rope Construction

- Lay: Direction of winding of wires in strands and strands in rope. Usually, 2 basic lays, Regular Lay and Lang Lay
- Regular Lay- Wires are laid in one direction, strands are laid in opposite, Strong, withstands crushing and distortion due to short length of exposed wires
- Lang Lay – Wires and strands are laid in same direction. Used in multiple sling hoisting as it has a tendency to untwist

4. Synthetic Slings

- Available in nylon or polyester
- Nylon is resistant to many alkalis
- Polyester is resistant to many acids
- Polyester stretches only half as much as nylon
- Advantages to Synthetic Slings
- Width and texture prevent scratches
- Very flexible, mold to the shape of the load
- Not affected by moisture, no corrosion, non sparking
- Can absorb heavier shocks than other materials
- Available in a number of configurations

5. Slings

- Inspect daily for excessive wear
- Look for
- Colored threads,
- Cuts, crushes, abrasions, melts
- Burns, chemical or heat
- Knots
- Dispose of all slings which show signs of wear. Do not keep them with usable slings.

6. Rigging Hardware – Hooks: carbon steel, alloy steel, bronze,

- Quenched and tempered
- Rated capacity permanently displayed

- Anchor Shackles: Screw pin, round pin, safety pin
- Chain Shackles: Screw pin, round pin, safety pin
- Turnbuckles, Eye Bolts, Clips, Load Binders, Chain Falls

7. Weight Determinations

- Use drawings, catalogs, bills of lading
- Use information on the load, paint, plate, tagged
- Weigh the load, scale, dynamometer, crane load scale
- Calculate the weight

8. Center of Gravity –

- It's directly under the Hook
- The point at which the object will balance
- Locate CG, hook should be directly above it
- If a load tilts when it is lifted, weight on one leg will increase, other will decrease
- Points of attachment should lie above the CG

WEATHER CONDITIONS

1. Spring

- Thawing – ground that was once frozen may now be subject to thawing action. Care must be taken when placing heavy loads on ground level that may shift due to thawing action.

2. Summer

- Heat Related Illnesses – the Emergency Action Plan must be kept up to date in order to handle heat related illnesses such as heat exhaustion and heat stroke which may arise in the summer months.
- First Aid – members of the Emergency Action Plan must be properly trained in order to handle such heat related illnesses.
- Drinking Water – adequate potable drinking water must be provided on site so that the workers can drink ample fluids throughout the day.

3. Autumn

- Housekeeping – fallen leaves, branches, limbs, etc… that may create a housekeeping situation on must be cleaned up before it creates a slip/fall hazard.

4. Winter

- Clothing – adequate layers of clothing must be worn so that the workers are adequately protected from frigid conditions.
- Snow and Ice – all outside work areas, walkways, sidewalks, etc… must be properly cleared, sanded/ salted and maintained to prevent a possible slip hazard.
- Cold Related Illnesses – the Emergency Action Plan must be kept up to date in order to handle cold related illnesses such as frost bite and hypothermia, which could arise during the winter months.
- First Aid – members of the Emergency Action Plan must be properly trained in order to handle cold related illnesses.
- Building Access – if permanent elements of the building design are missing during construction (i.e. snow guards, gutters, canopies, etc…), and then attention should be given to those accessible areas around the building perimeter in order to deal with the elements such as rain and snow.

ACTIVE SHOOTER

An Active Shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s) and there is no pattern or method to their selection of victims.

Active shooter situations are unpredictable and evolve quickly. Typically, the immediate deployment of law enforcement is required to stop the shooting and mitigate harm to victims.

Because active shooter situations are often over within 10 to 15 minutes, before law enforcement arrives on the scene, individuals must be prepared both mentally and physically to deal with an active shooter situation.

Good practices for coping with an active shooter situation:

- Be aware of your environment and any possible dangers
- Take note of the two nearest exits in any facility you visit
- If you are in an office, stay there and secure the door
- If you are in a hallway, get into a room and secure the door
- As a last resort, attempt to take the active shooter down. When the shooter is at close range and you cannot flee, your chance of survival is much greater if you try to incapacitate him/her.
- CALL 911 WHEN IT IS SAFE TO DO SO!

How to respond when an active shooter is in your vicinity

Quickly determine the most reasonable way to protect your own life.

1. Evacuate. If there is an accessible escape path, attempt to evacuate the premises. Be sure to:

- Have an escape route and plan in mind
- Evacuate regardless of whether others agree to follow
- Leave your belongings behind
- Help others escape, if possible
- Prevent individuals from entering an area where the active shooter may be
- Keep your hands visible
- Follow the instructions of any police officers
- Do not attempt to move wounded people
- Call 911 when you are safe

2. Hide out. If evacuation is not possible, find a place to hide where the active shooter is less likely to find you. Your hiding place should:

- Be out of the active shooter's view
- Provide protection if shots are fired in your direction (i.e., an office with a closed and locked door)
- Do not trap yourself or restrict your options for movement
- To prevent an active shooter from entering your hiding place:
  - Lock the door
  - Blockade the door with heavy furniture

If the active shooter is nearby:

- Lock the door
- Silence your cell phone and/or pager
- Turn off any source of noise (i.e., radios, televisions)
- Hide behind large items (i.e., cabinets, desks)
- Remain quiet

If evacuation and hiding out are not possible:

- Remain calm
- Dial 911, if possible, to alert police to the active shooter's location
- If you cannot speak, leave the line open and allow the dispatcher to listen

3. Take action against the active shooter. As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter by:

- Acting as aggressively as possible against him/her
- Throwing items and improvising weapons
- Yelling
- Committing to your actions

How to respond when law enforcement arrives

Law enforcement's purpose is to stop the active shooter as soon as possible. Officers will proceed directly to the area in which the last shots were heard.

- Officers usually arrive in teams of four (4)
- Officers may wear regular patrol uniforms or external bulletproof vests, Kevlar helmets, and other tactical equipment
- Officers may be armed with rifles, shotguns, handguns
- Officers may use pepper spray or tear gas to control the situation
- Officers may shout commands, and may push individuals to the ground for their safety.
- Remain calm and follow officers' instructions
- Put down any items in your hands (i.e., bags, jackets)
- Immediately raise hands and spread fingers
- Keep hands visible at all times
- Avoid making quick movements toward officers such as holding on to them for safety
- Avoid pointing, screaming and/or yelling
- Do not stop to ask officers for help or direction when evacuating, just proceed in the direction from which officers are entering the premises

Information to provide to law enforcement or 911 operator

- Location of the active shooter
- Number of shooters, if more than one
- Physical description of shooter/s
- Number and type of weapons held by the shooter/s
- Number of potential victims at the location

Notes: The first officers to arrive to the scene will not stop to help injured persons. Expect rescue teams comprised of additional officers and emergency medical personnel to follow the initial officers. These rescue teams will treat and remove any injured persons. They may also call upon able-bodied individuals to assist in removing the wounded from the premises.

Once you have reached a safe location or an assembly point, you will likely be held in that area by law enforcement until the situation is under control, and all witnesses have been identified and questioned. Do not leave until law enforcement authorities have instructed you to do so.

FINE CLASSIFICATION SYSTEM FOR UNSAFE ACTS/CONDITIONS

This document outlines Fontaine's program to fine companies, not individuals, whose workers are uncooperative in maintaining a safe site as part of the Projects Disciplinary Action Program. The subcontractor agrees to adhere to the fine schedule for violations about which they were notified by Fontaine.

The subcontractor agrees to have these fines withheld from monies due him/her. Any violation of this agreement will be cause for suspension of operations until the agreement is fully complied with. All monetary amounts outlined may be doubled for a second offense.

At the conclusion of the project, all funds collected will be donated on the behalf of the contractors employed on the project to a local charity.

MONETARY CLASSIFICATIONS CHART

Fine	Item #	Description
Project Management		
$500	A1	Any action or in-action which could result in permanent injury or death will be fined with no warning. This may result in dismissal of worker and immediate fore-man.
$250	A2	Workers did not receive safety training.
$250	A3	New worker did not attend safety orientation.
$250	A4	All workers did not attend and sign a weekly safety meeting.
$250	A5	Appropriate first-aid supplies were not available on project.
Hazard Communication		
$250	B1	Written Haz-Com program is not immediately available.
$250	B2	Reliable procedure is not established for hazard communication.
$250	B3	All workers have not received Haz-com training.
$250	B4	Containers are not properly labeled.
$250	B5	Complete SDS Index not available on project.
Electrical		
$250	C1	Approved GFCI is not in use on all 120 volt, single-phase, 15 & 20 ampere receptacle outlets which are not part of the permanent structural wiring.
$250	C2	Daily visual inspection of cords, plugs, tools, equipment, etc. not conducted.
Fire Protection		
$250	D1	Workers have not been trained in evacuation, emergency firefighting response and equipment use.
$250	D2	Adequate number of fire extinguishers is not available.
$250	D3	“Hot Work” permit not obtained.
Construction Area		
$250	E1	General Duty Clause Violation
$250	E2	Defective tools and equipment are not tagged to prevent use.
$250	E3	Electrical cords are not routed away from stairways, walkways and driveways.

Fine	Item #	Description
$250	E4	Flammable and combustibles are not stored properly.
$250	E5	Fire extinguishers are not fully charged, inspected and tags current.
Housekeeping		
$250	F1	Debris not removed on regular basis.
$250	F2	F2 Building exits obstructed.
$250	F3	F3 Snow, ice, water not removed as necessary.
$250	F4	F4 Material staging area not reasonably organized
$250	F5	F5 Nails not removed from lumber.
Flammable and Combustible Liquids		
$250	G1	Storage and handling containers not approved and labeled.
$250	G2	Inside storage not in compliance with regulations.
$250	G3	Required firefighting equipment not properly located and fully operational.
$250	G4	Outside storage not in compliance with regulations.
$250	G5	Flammable and combustible liquids stored in passage ways, stairways and exits.
$250	G6	“Danger, no smoking” signs not posted.
$250	G7	Storage location not at required distance from buildings.
$250	G8	Storage cabinets not available where required.
Compressed Gas Cylinders		
$250	H1	Cylinder hoisting not performed properly.
$250	H2	Cylinder valves not closed with caps in place.
$250	H3	Oxygen and gas cylinders not separated by a fire-resistant partition or required distance.
$250	H4	Cylinders not upright and secured.
Temporary Electrical		
$250	I1	Extension cords not 3-wired and rated for hard or extra hard usage.
$250	I2	Temporary lighting not properly supported, protected and adequate.

Fine	Item #	Description
$250	I3	Circuits not properly labeled, grounded and inspected.
$250	I4	Breakers not adequately labeled.
Signs and Barricades		
$250	J1	Proper fences, barricades and signs not properly installed to warn persons of a potential hazard
Site Cleaning		
$250	K1	Dig Safe not contacted.
$250	K2	Overhead or adjacent utilities, encumbrances, structures, etc. not identified and protected.
$250	K3	Dig Safe numbers not current.
Trenching and Excavation		
$500	L1	Workers not protected from cave-ins, sliding, falling, or rolling loads, hazardous atmospheres or water accumulation.
$500	L2	Excavation in excess of 20 feet deep, protective system not designed by a qualified person(s).
$250	L3	Safe access not provided for workers.
$500	L4	Protective systems defective, damaged or improperly installed
$500	L5	Proper slopes or benching not maintained, spoil piles not 2 feet or more from edge of bank.
$250	L6	A trained competent person not available to monitor all excavation procedures.
$250	L7	Soil not tested by a competent person to determine soil type
$250	L8	Excavations not properly barricaded.
$250	L9	Excavations not inspected as required.
Ladders and Stairways		
$250	M1	Workers not trained in ladder and stairway safety by a competent person.
$250	M2	Ladders not inspected regularly.
$250	M3	Stair rails, hand rails, and guard rails missing.
$250	M4	Ladders not tagged to indicate type and capacity.
$250	M5	Job-made ladders not constructed as required.
$250	M6	Worker using a ladder in an unsafe manner.

Fine	Item #	Description
Scaffolding		
$250	N1	Guard rails with toe boards not installed as required.
$250	N2	Scaffold not erected plumb, level and secured.
$250	N3	Safe access not provided for scaffolds.
$250	N4	Scaffold components and accessories not defect free.
$250	N5	Scaffolding not designed, erected, dismantled, moved or altered under the supervision of a trained, competent person.
$250	N6	Scaffold overloading.
$250	N7	Improper scaffold access.
Personal Protective Equipment		
$250	O1	Fall protection/full arrest equipment not used when and where they are required.
$250	O2	Approved hard hats not worn by all workers.
$250	O3	Required eye protection not used.
$250	O4	Required reflective vest/clothing not used.
$250	O5	Proper respiratory protection not provided
Fall Protection		
$250	P1	Floor, wall and roof openings not protected with standard guards rails or solid covers.
$250	P2	Open sides of roofs, floors, platforms, bridges, decks, etc. Not properly protected.
$250	P3	Guard rails not maintained and in compliance.
$250	P4	Personal fall arrest not used or is not used correctly.
Power Tools		
$250	Q1	Tools are not properly grounded.
$250	Q2	Workers not trained to use power tools safely.
$250	Q3	Required guards not in place and operational.
Concrete		
$250	S1	Protruding reinforcing steel onto or into which any workers could fall not guarded to eliminate the hazard of impalement.

Fine	Item #	Description
$250	S2	Workers not trained to avoid the hazards of concrete burns and inhalation of dust.
$250	S3	Personal protective equipment such as gloves, boots, hard hats eye and face protection not used.
$250	S4	Form work has not been designed, fabricated, erected, supported, braced and maintained to support vertical and lateral loads without failure.
$250	S5	Safe shoring and form removal procedures not established.
$250	S6	Required distances not maintained between overhead electrical power lines and concrete placement equipment.
Masonry		
$250	T1	Walls not properly supported.
$250	T2	Controlled access zone not established as required.
$250	T3	Planking not scaffold grade.
$250	T4	Respiratory protection not used during sawing, mortar mixing or other silica dust generating activities.
$250	T5	Masonry saws not properly grounded.
Structural Steel		
$250	U1	Workers not using the required fall protection, arrest equipment.
$250	U2	The area beneath the steel erection not designated off limits to unauthorized workers.
$250	U3	Hoisting equipment and accessories not inspected as required.
$250	U4	Tag lines not used to control loads.
$250	U5	Proper erection bolting and bracing procedures not followed.
$250	U6	Floor and roof openings not protected.
Welding		
$250	V1	Not fallowing hot work procedures/ No hot work permit.
$250	V2	Flash screens not used where required.
$250	V3	Fire extinguisher not provided near hot-work locations.
$250	V4	Torches, hoses, gauges, regulators, etc. not free of defects.
$250	V5	Compressed gas cylinders are not stored and used properly, secured upright, caps on when not in use, segregated from electrical and heat hazards.

Fine	Item #	Description
Motor Vehicles		
$250	W1	Operators not properly trained and licensed.
$250	W2	Vehicles not inspected daily before use.
$250	W3	Driver and all passengers not using provided seat restraints.
Heavy Equipment		
$250	X1	Workers “riding” on heavy equipment.
$250	X2	Inspection and maintenance not performed as required.
$250	X3	Operators not properly trained and or authorized.
$250	X4	Audible reverse warning is not operational.
$250	X5	ROPS protection not provided.
$250	X6	Equipment does not have seat belts.
$250	X7	Cab glass must be free of defect/damage.
$250	X8	Access roads not properly maintained.
$250	X9	Fire extinguishers not provided in equipment.
Cranes		
$500	Y1	Overhead power lines not de-energized, removed or protected.
$500	Y2	Required distance not maintained from live wires.
$250	Y3	Load capacity and hand signal charts not posted and legible.
$500	Y4	Crane not used as intended by manufacturer.
$500	Y5	Operator not authorized for equipment use.
$250	Y6	Annual inspection certificate missing.
$250	Y7	Inspection and maintenance records not properly logged.
$250	Y8	Glass not free of defects and distortion.
$250	Y9	Trained signal person not used as required.
$250	Y10	Swing radius of counterweight not properly barricaded.
$250	Y11	Crane not positioned on solid level ground.

Fine	Item #	Description
$250	Y12	Outriggers not used as required.
$250	Y13	Material handling equipment and accessories not inspected prior to use.
$250	Y14	Qualified rigger not available as required.
Aerial Lifts		
$250	Z1	Workers using aerial lifts not trained and authorized.
$250	Z2	Manufacturer's operation and safety rules not followed.
$250	Z3	Lift safety not inspected and all controls not tested prior to each day's use.
$250	Z4	Lift not positioned on solid, level ground
$250	Z5	Load limits exceeding manufacturer's specifications.
$250	Z6	Workers in the lift basket not standing firmly on the floor.
$250	Z7	Workers not using required fall protection/arrest system.
Demolition		
$250	AA1	Not following the demolition plan.
$250	AA2	Dust control inadequate.
$250	AA3	Safety meetings not conducted to keep workers apprised of changing, dangerous or hazardous conditions.
Crystalline Silica		
$250	BB1	Worker have not been properly trained to recognize and avoid the potential hazards.
$250	BB2	Adequate ventilation, vacuum system or wet methods not provided.
$250	BB3	A written exposure control plan not developed.
$250	BB4	Controls based on Table 1 to minimize silica exposure are not in place.
Confined Space Entry		
$250	CC1	Fire extinguishers not readily available.
$250	CC2	Worker not properly trained.
$500	CC3	A comprehensive hazard assessment has not been conducted.
$500	CC4	Required safety equipment not available.

Fine	Item #	Description
$250	CC5	Entry permit system not completed.
$500	CC6	Atmospheric testing not conducted as required.
$250	CC7	Confined space not adequately ventilated.
$500	CC8	All affected persons not trained to understand the hazards, precautions, use of required personal protection.
$250	CC9	Properly trained rescue personnel with essential rescue equipment not immediately available.
$250	CC10	Company safety policy not available.
$500	CC11	Workers have not received safety training.

APPENDIX

APPENDIX FORMS

Please refer to the following pages for the forms listed below.

1. Job Hazard Analysis
2. Fontaine Orientation Form
3. Incident Report Form
4. Safety Violation Notice
5. Heavy Equipment Inspection
6. Aerial Lift
7. Scissor Lift
8. Abatement Checklist
9. Confined Space Entry Form
10. Hot Work Log
11. Deck Turnover Form
12. WDPP Checklist
13. Competent Person Designation
14. Steel Erection Approval
15. Winter Conditions Logistics Plan
16. Crane Lift Plan
17. Pre-Mobilization Checklist

JOB HAZARD ANALYSIS (JHA)

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

PROJECT INFORMATION

Project Name:	Date:
Job/Activity Name:	JHA No:
Location:	Subcontractor:
Other Information:	

REQUIRED PERSONAL PROTECTIVE EQUIPMENT FOR ENTIRE JOB

Safety Glasses ☐	Respirator ☐	Cut Resistant Gloves ☐	High Visibility ☐
Hard Hat ☐	Hearing Protection ☐	Face Shield ☐	Fall Protection ☐

REQUIRED PERMITS

Hotwork Permit ☐	Confined Space ☐	Excavation ☐

JHA INFORMATION

Basic Steps	Potential Hazards	Controls
Access		
Materials Handling		
Hand & Power Tools		
Equipment		
Fall Protection		

JOB HAZARD ANALYSIS (JHA)

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

I understand & will adhere to the steps, hazards & controls as described in this JHA.
I understand I have the authority and responsibility to stop work I believe to be unsafe.

Worker Name (Print)	Signature	Date

SAFETY ORIENTATION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

All workers on the project shall receive a safety orientation.

- The orientation session will include, the reading of the site-specific safety package and a summary of the key safety aspects of this project by a Fontaine representative.
- During the orientation process each worker must submit their certifications at the very least an OSHA10.
- Each worker will get a numbered Project Orientation Sticker that must be affixed to the hard hat. This along with the safety orientation will be documented and recorded in the "Project Orientation Log".

**Review Evacuation Plan as part of the Orientation. **Review Hazardous Materials Report for all locations that contain hazardous materials like asbestos and or lead.*

» EMERGENCY EVACUATION PLAN

The warning to Evacuate the Project will be: ***An Air Horn will be sounded by Fontaine personnel.***

- All personnel will use the closest safe means of exit available, for evacuation of the project/building.
- Once Evacuation begins all workers are to assemble at the designated "Muster point" and must be accounted for by their foreman.
- Foreman will then relay their manpower count to a Fontaine Representative, to ensure all workers are out of the project/building.

» PROGRAM ENFORCEMENT

1. Each Subcontractor will be responsible for his/her foremen/competent person to properly plan each activity being performed on site.
2. A Job Hazard Analysis (JHA) shall be reviewed initially and then weekly with all personnel performing that particular task. Signatures of all personnel including supervisors involved will be required.
3. Ensure all accidents or losses are properly investigated and the information passed on to the Construction Management in a timely manner
4. Provide proper personal protection equipment (PPE) including hard hat and safety glasses and high visibility outerwear for each worker and will be responsible for enforcement of their employees.
5. All subcontractors must notify Fontaine immediately if any accident occurs on site and will be required to fill out the Fontaine Superintendents Incident Report. An accident investigation is to be performed by the subcontractor and submitted to Fontaine to ensure proper reporting and documentation.
6. Each week a Site Safety Inspection will be conducted, the crew leader/Competent Person will be notified immediately of any hazardous conditions and be responsible for the conditions immediate correction or remove employees from exposure until the condition is made safe.
7. Private cell phone use shall be limited to break time. At no time will cell phone use be allowed when workers are performing task, such as working with tools and or around equipment/vehicular traffic or hazards.
8. The use of any tobacco products on site is prohibited.
9. No radios, I-pods, I-phones, portable CD players or headphones will be worn while on site.
10. Normal working Hours will between 7am until 3:30pm Monday through Friday, any overtime will need to be approved by the Fontaine Superintendent.

» HARASSMENT

1. All individuals are committed to maintaining an environment in which employees and visitors are not subjected to different treatments because of legally protected characteristics Such as;
   - Race
   - Disability
   - Sex
   - Nationality
   - Religion

» WORKPLACE VIOLENCE

1. Any act or threat of physical violence will be grounds for immediate dismissal from the project.
2. Harassment, intimidation, or other threatening disruptive behavior that occurs at the project is to be reported to the Fontaine Project Superintendent immediately.
3. Call to be made to Fontaine's Safety Director and VP of Operations
4. A Fontaine incident report will be filled out to document the event.

» SUBSTANCE ABUSE

1. The use, possession, promotion, or sale of any of any illegal substances will be grounds for disciplinary action, including termination from employment on said project.
   - Alcoholic beverages
   - Marijuana and other illegal drugs
   - Drug paraphernalia

» HOUSEKEEPING

1. Each Sub-contractor is to assure that their respective area is cleaned daily. There are more than enough trashcans and disposal units so that debris should not be found anywhere on this job site or surrounding areas.
2. If additional trash barrels or buggies are required ask your foreman or Fontaine representative.
3. Construction debris is the sole responsibility of each Sub-Contractor. Dumpsters are provided by Fontaine for the use of all trades.
4. When it comes to housekeeping Fontaine would prefer that we all work as a team and strive together to keep this project clean and safe.
5. Slips, trips, falls on stairs and falls from elevations are the most common work site injuries. We can stop these injuries by keeping well maintained and clean walking and working areas.

» FLAMMABLE GAS CYLINDERS

1. All cylinders must be marked with the company's name for easy identification.
2. All cylinders must be clearly marked indicating their contents.
3. All cylinders must be stored in an upright position and secured from accidental displacement. No more than a day's supply shall be stored in any building.
4. All Oxygen/acetylene set-ups must have the regulators removed and protective caps replaced at the end of the working day. All set-ups shall be kept in hand carts during work hours and separated by 20 feet at the end of the working day.
5. LPG (Propane gas) cylinders are not permitted to be stored anywhere within the building

6. Cylinders, whether full or empty must be kept in an enclosure outside the building. This enclosure should be a chain link fence a door that can be locked. No smoking signs shall be posted on the fence and a fire extinguisher located nearby.

» FIRE SAFETY/HOT WORK

1. Any open flame work such as cutting, brazing, soldering, welding, etc., creates an opportunity for a fire. An internal "Hot Work Permit" shall be obtained from the Fontaine Superintendent. A ten-pound ABC fire extinguisher will be kept close at hand for each set-up. If necessary, a fire watch may be necessary.
2. All hot work must terminate at least 30 minutes before quitting time.
3. Temporary heating devices should not be installed or used by anyone on the job until authorized by the Project Superintendent and cleared with the local Fire Department.
4. When tarpaulins or canvas coverings are used on the project, they must be a U.L. listed material made of a fire-resistant material.
5. Welding shields shall be utilized for all welding operations in which peripheral workers are exposed. Hard hats will always be worn during welding.
6. Welding fumes shall be controlled through ventilation/ smoke heaters when done indoors.

» CRANES AND RIGGING

1. All crane operators, riggers and signalman must produce their certification/qualification papers and maintenance records to Fontaine Superintendent prior to any work taking place. Inspection records must have been produced by an independent inspector. All lattice boom and tower cranes shall have an independent 3rd party certification during set up and upon completion of assembly.
2. All rigging and hoisting components must have rated capacities affixed to them and be free of all defects. Any wire rope slings found to be defective must be removed from the site.
3. Only properly licensed operators shall be allowed to operate hoisting equipment. Apprentice operators shall not be allowed to perform lifts they are not qualified to perform.

» HEAVY EQUIPMENT, ARIEL AND SCISSOR LIFTS

- All workers must be trained in that specific piece of equipment per OSHA
- All workers, when required by individual states, shall produce those licenses to the Fontaine at orientation.
- Operators manual and extinguishers must always be with the equipment
- Load chart must always be posted in the cab
- Loads shall never be suspended from forks, undercarriage hooks or hoist jibs must be used
- Aerial lifts always require the use of safety harnesses. All Aerial lifts shall be inspected daily. This review must be documented and submitted to Fontaine Superintendent daily or the operation will be stopped until said document is submitted. All operators shall be trained in the use of the lift that they are using. This training must be documented and submitted to Fontaine Superintendent at orientation. All areas below aerial lifts shall be cordoned off to disallow anyone from working or passing below area where overhead work is being conducted.

» SCAFFOLDS, STAGING, AND MAST CLIMBERS

1. Scaffolds are to be erected on base plates and/or mud sills only.
2. FRAMEWORK - All scaffold components must be of the same manufacturer. Mismatching of components will not be allowed.
3. GUARDRAILS - All scaffolds except for Tubular Welded Frame scaffolds shall require fall protection when platform height is six feet or more above the working surface.
4. Baker/mobile scaffolding will be required to be equipped with guardrails when the fall exposure is greater than 6 feet or per manufacturer requirements. Outriggers will be required when the working level has a height to base width ratio greater than two to one'.
5. Form Bracket scaffolds, Wall Bracket scaffolds will be equipped with guardrails when the fall exposure is 6 feet or more.
6. Rolling and Mobile scaffolding are not to be moved while workers are on the platform. (No riding on scaffold by workers). Casters must be in the locked position.
7. All scaffold planking shall be scaffold grade. Dry rot or large cracks deem the planks to be unacceptable and shall be removed accordingly. Unacceptable planking can be used for concrete forms, mud sills or toe boards. All scaffold platforms are to be clean and clear of debris. Additionally, all scaffold work platforms/planks shall always be kept clear of ice and snow and prior to anyone walking or working on said planks or platforms.
8. A "Competent Person" (one who is able to identify hazards associated with the work he/she is supervising and have the authority to stop work whenever he/she determines that an operation is proceeding in an unsafe manner) must inspect the scaffolding before work begins or if any change is made in the scaffolding and coincide with the initialing of the color coded (red, yellow, and green) "Scaffold tag".

» WORKER ATTIRE

1. It is the subcontractor's responsibility to have ALL PPE supplies available for their employees.
2. Hardhats: Hard hats shall always be worn while on this job site. Including during welding activities.
3. Identification Badging/hardhat emblems: All workers on this project will be given a hardhat emblem
4. Clothing: Work shoes and/or work boots shall always be worn. Shorts, sneakers, cut-off T-shirts and tank style shirts are prohibited. High visibility vests/T-shirts shall always be worn when exposed to vehicular traffic of heavy equipment.
5. Safety Glasses: Shall be worn when working on site. All Safety glasses shall meet ANSI Z 87 requirement. Face shields shall be used when there is a potential for facial injury, such as, grinders, gas cutoff saws and chop saws.
6. Hearing Protection: Hearing protection will be worn when appropriate for the work being performed, such as, saw cutting, operating of powder actuated tools, etc.
7. Gloves shall be worn when handling sharp/abrasive materials.

» LADDERS

1. Ladders must be in good repair with no cracked rungs or rails
2. Ladders must be tied-off or otherwise secured against accidental displacement
3. Extension ladders must extend at least three feet above the working surface

4. Step ladders are not to be used in the closed position to access an upper elevation
5. The top two steps of any step ladder are not to be used for standing

» FALL PROTECTION

1. All workers exposed to a fall 6 feet or greater shall be protected by guardrails, safety nets or personal fall arrest systems. This includes, steel erection, roofing, scaffold erection and dismantling, overhand bricklaying and precast concrete related work.
2. Access to Roof Decks, Loading, and Controlled Access Zones, or any areas that do not have permanently affixed guardrails where a fall exposure exists and where personal fall arrest systems will be required must be designated, blocked off and signage designating it a Controlled Access Zone (CAZ)
3. Tying off when working in an Articulating Boom Lift is always required.
4. Where a wall opening or edge, whether exterior or interior is protected by the placement of studs and the spacing of the studs does not exceed 18 inches, and if metal studs used are no less than 22 gauge, then no additional fall protection is required.
5. All areas located below work area shall be cordoned off to prevent any unauthorized access. (Red Danger Tape)
6. All entrances/emergency egress located directly below any type of work task shall remain free of construction debris and material and be provide with overhead protection.

» FLOOR OPENINGS

1. Floor openings (2 inches or greater) shall be protected by the installation of standard guardrails or covered with materials that will carry 2x the weight (4x for equipment). Covers shall be secured and painted with the word “Hole”.
2. No hole shall be left unprotected or unattended.

» EXCAVATIONS

1. Any Sub-Contractor involved with excavation work shall always have a competent person on site while excavation work is taking place.
2. A “Competent Person” is one who can identify hazards associated with the work he/she is supervising. Further, a “Competent Person” must have the authority to stop work whenever he/she determines that an operation is proceeding in an unsafe manner.
3. All soils will be classified as Type “C” unless field-testing conducted by a competent person determines otherwise.
4. Type “C” soils mean that the walls or banks of a trench must be sloped back at a rate of 1 ½ to 1 once the depth of the excavation exceeds 5 feet.
5. Any trench greater than 5 feet in depth requires completion of an “Excavation Checklist”
6. Ramps or ladders must be located so that an employee is not required to walk more than twenty-five feet before reaching such ladder or ramp.
7. A “Competent Person” must inspect any excavation that remains open overnight, after any weather event or any time before any work commences after a break in work.

» ELECTRICAL

1. All electrical tools, cords and equipment must be in good working order. All electrical tools and components must be visually checked daily. Any damaged tools or cords must be taken out of service immediately until repaired or replaced.
2. All electrical outlets must be of the Ground Fault Circuit Interrupter type (GFCI). These receptacles should be checked daily by simply pressing the test button and then the reset button. The on-site electrician should conduct monthly tests of each GFCI and keep a log of his findings.
3. All cords must be equipped with a ground pin.
4. All tools must have a ground pin on the plug unless the tool is manufactured as a double insulated tool. Double insulated tools have an identifying mark on the case, usually a square within a square.
5. No work shall be conducted on live electrical.
6. All temporary lights must be protected on all sides; all temp electric components must be secured/ support by a non-conductive material.

» CONFINED SPACE ENTRY

1. A confined space is defined as an area which
   - Is not meant for continuous use.
   - Has limited means of access and egress
   - Is not designed for extended employee occupation
2. Before any work is commenced in a confined space, an atmosphere test of the confined space must be conducted, and the results noted. If any contaminant is found, mechanically blown fresh air is always required. The employee entering the space must wear a safety harness with a lanyard. A second person is required outside the space to monitor the worker. If the person in the space is out of view of the monitor, then a radio may be required. In some cases, a tripod with a rescue line attached to the worker's body harness may be required.
3. Before entry is made into any manhole, duct, vessel or any other confined space, as defined by the OSHA 1926 standard, Fontaine confined space entry permit shall be completed by the trade contractor's supervisor/competent person and a copy shall be submitted to Fontaine Superintendent.

» ACCIDENT REPORTING AND FIRST AID

1. It is the subcontractor's responsibility to have First Aid supplies available for their employees.
2. Any employee injured on this job site will report the incident to their supervisor immediately. The employee's supervisor will in turn immediately report the incident to Fontaine's Project Superintendent.
3. The supervisor will fill out the Fontaine Incident report, as well as the subcontractor's own company incident/injury report and shall be submitted to Fontaine Superintendent whenever a Sub-contractor employee is injured. These forms need to be completed by end of the workday of that accident.
4. Any accident involving damage to property shall be reported to Fontaine Superintendent immediately.

» HAZARD COMMUNICATION

1. All Contractors' on site are required to submit a copy of their HAZCOM Program and a company safety manual to Fontaine as a submittal.
2. All HAZCOM programs will be kept on Pro-Core for everyone's convenience.

3. Any time a Contractor brings a new product onto this site they will insure a MSDS/SDS is placed in their program.
4. All HAZCOM Programs will have an index of MSDS/SDS sheets to facilitate finding the data relating to the product being checked.
5. Only MSDS/SDS for products on site will be kept in each Contractor's book.
6. Any questions regarding products should be first addressed with the affected employee's supervisor.
7. MSDS/SDS sheets are designed to alert employers and employees to any precautions that may be required when using a product.

» ENVIRONMENTAL EXPOSURES (LEAD)

1. The paint on all exterior painted surfaces as well as both exterior and interior of the building will be presumed to contain lead paint unless otherwise noted in Haz Mat report which will be in the field office and available for review.
2. All subcontractors will be required to perform exposure assessments for any planned tasks on all painted surfaces, disturbing the soil or working in an excavation.
3. Workers who contact potential lead paint or other contaminated surfaces should use proper hand and face washing procedures prior to eating, drinking, smoking, chewing tobacco, chewing gum or applying cosmetics. A hand wash station will be established and maintained for the project duration.

» ASBESTOS

All asbestos abatement if needed will be performed by a licensed Asbestos removal/abatement contractor.

1. Prior to the start of any asbestos abatement the Fontaine Abatement checklist will be filled out.
2. Hazardous Materials report has been prepared by the building owner and is available for review at any time.
3. Any asbestos removal will be done under the supervision of qualified personnel.
4. The asbestos removal plan (if needed) and Haz Mat report will be available for review. **It is the responsibility of all subcontractor foremen to share this report with their respective workers.**
5. All removal will be completed, prior to anyone accessing said areas.
6. At no time shall a worker disturb or move a material he/she cannot readily identify, if they discover such a material, they must notify the Fontaine Superintendent immediately.

SAFETY ORIENTATION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

Fontaine SAFETY ORIENTATION VERIFICATION FORM

	1.	Verify OSHA 10 Hour or 30 Hour Training
	2.	Emergency Evacuation Plan
	3.	Driving Safety Rules and Parking.
	4.	Safety rule enforcement procedures.
	5.	The necessity of reporting ALL injuries/Incidents, and an Incident report fill out.
	6.	Hazard Communication; SDS Locations and Training verification
	7.	Proper work clothing & required Personal Protective Equipment (PPE).
	8.	Prohibition of the use/ possession of drugs alcohol or weapons on the premises.

I have read and agree to abide by all company safety polices and the Code of Safe Practices. I also understand that failure to do so may result in disciplinary action and removal from the project.

Name:		Signature:
Date:		Company:
HH Sticker #:	CORI:	Trade:

INCIDENT REPORT

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

INSTRUCTIONS:
» Complete all applicable sections.
» Form to be completed by injured person's Supervisor.
» Copy to Safety Department within 24 hours of the incident (unless earlier submission is required by Safety Provisions).

Incident No.

PROJECT INFORMATION

Project Name | Number:	Date of Report:
Date of Incident:	Time of Incident:
Person Who Reported:	Reported to:
Date Reported:	Time Reported:

TYPE OF INCIDENT (Check All That Apply)

Injury	Property Damage	Vehicle Incident	Other

PERSON INJURED

Name:	Date of Birth:
Employer Name:	SSN: XXX-XX-
Address:	Phone Number:
Date of Hire:	Occupation:
Supervisor Name:	
Place of Injury | Bldg/Area:	
Type of Injury | Affected Area:	

Job Related Injury?	YES	NO	UNKNOWN

RECORDING INFORMATION (Check All That Apply)

First Aid Only	OSHA Recordable	Non-Recordable
Restricted Work	Lost Work Days	

INCIDENT INFORMATION

Brief Description of Incident:

INCIDENT REPORT

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

DESCRIPTION OF PROPERTY DAMAGE

Description of Property Damage:

Value of Property Damage:	Owner of Property/Material:
Location of Damaged Property/Material:	
Witness(s):	

CAUSE FACTORS

Weather Conditions:	Water	Wind	Sun	
Details:				
Site Conditions:	Mud	Dust	Lightning	Unprotected Hazard
Details:				
Housekeeping:	Debris	Cords/Hoses	Building Materials	
Details:				
Rules/Regulations:	Violation	Not Trained	Disregarded	
Details:				
Equipment:	Wrong Type	Defective	Not Trained	Missing Guard
Details:				
PPE:	Not Wearing	Wearing Improperly	Defective	
Details:				

CORRECTIVE ACTION

Has corrective action been taken?	**YES**	**NO**

If yes, what actions have been or are planned to prevent recurrence of this or similar incidents?

Report Prepared By (Print):	Signature:
Project Superintendent (Signature):	Date:

INCIDENT REPORT

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

INJURED EMPLOYEE'S STATEMENT

Date of Report:	
Name:	Date/Time of Incident:
Last:	First: MI:
Title:	Supervisor's Name:
SSN: XXX-XX-	Years of Experience in this Trade:
Date of Birth:	Age:
Hire Date:	Permanent Address:
Witness:	Phone Number:
Location at Time of Incident (Aldg, Area, Level, etc.):	
Describe to the best of your knowledge, how the accident happened. Include a description of your job assignment:	

Signature:	Date:

INCIDENT REPORT

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

WITNESS STATEMENT

» Complete form as necessary for incident.

» Have each witness complete separate statement. Page_____of _____

Date of Incident:	Time of Incident:
Name of Individuals Involved:	
Title:	Supervisor's Name:
Describe to the best of your knowledge, exactly what you observed. Describe where and when the accident occurred:	

Print Name:	Phone Number:
Signature:	Date:

SAFETY VIOLATION NOTICE

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

Date:	Project:	
Person Issuing Violation:		
Subcontractor:		
Subcontractor Supervisor:		
Location of Violation:		
Description of Violation:		
Violation needs to be corrected by (Date/Time):		
Actions taken for violation:		
Date violation was corrected:		
Repeat Violation: Yes No	Fine Issued: Yes No Warning	Amount: $
Subcontractor Signature:		Date:

Please be advised that this notice is only intended to notify the Contractor of observed instances in which he is not in compliance with the Safety program. The Contractor is, via this noncompliance notice, reminded of his obligation to comply with the safety program, including the law ordinances, and regulations referenced therein. This and all future notices are not intended to be an all inclusive listing of safety conditions of your project.

Violations not corrected by the date/time given will be corrected by Fontaine and a back- charge will be issued for full cost associated with rectifying the violation.

*Copy to be sent to Subcontractor Project Manager, filed on project and entered in the Violation Log.

HEAVY EQUIPMENT INSPECTION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

INSPECTION INFORMATION

Make & Model:	Company:
Operator:	Date:

CHECKLIST

Checklist Item	MON	TUES	WED	THURS	FRI	SAT
Back-up Alarm						
Fire Extinguisher						
Owner's Manual						
Parking Brake						
Horn Operational						
No Cracks/Defects in Glass						
Hoses and Connections no Cracks/Dry Rot/Leaks						
Crankcase						
Transmission						
Hydraulic Fluid						
Battery						
Boom & Hoist						
Carriage						
Steering						

*Follow all manufacturer's/ANSI/OSHA Regulations. If any part of the inspection fails remove from service.

AERIAL LIFT INSPECTION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

INSPECTION INFORMATION

Lift Make & Model:	Company:
Operator:	Date:

CHECKLIST

Checklist Item	MON	TUES	WED	THURS	FRI	SAT
Operating controls functioning						
Safety devices functioning						
Personal protective devices/fall protection						
Air, hydraulic, fuel system leaks						
Cable and wiring harnesses Insp.						
Loose and missing parts						
Placards and warning labels legible						
Tires and wheels						
Operator's manual						
Outriggers or other structures functioning						
Guardrails/gate						
Emergency shutoff working						

*Follow all manufacturer's/ANSI/OSHA Regulations. If any part of the inspection fails remove lift from service.

List any malfunctions or damages below:

SCISSOR LIFT INSPECTION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

INSPECTION INFORMATION

Lift Make & Model:	Company:
Operator:	Date:

CHECKLIST

Checklist Item	MON	TUES	WED	THURS	FRI	SAT
Owner's Manual						
Horn functioning						
Check upper and lower controls						
Check the lift and surrounding area for leaks						
Check tires and wheel mounts						
Check battery and fluids						
Hole protection works properly						
Control wires inspected for tears and exposure						
Emergency shutoff works						
Alarm functions						
Lift is clean from debris in and under basket						
Block off area below from pedestrian foot traffic						

*Follow all manufacturer's/ANSI/OSHA Regulations. If any part of the inspection fails remove lift from service.

List any malfunctions or damages below:

ASBESTOS ABATEMENT CHECKLIST

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

ASBESTOS ABATEMENT MANAGEMENT CHECKLIST

The following documents must be submitted to the project team:

- » Asbestos Contractors DEP Notification Form (ANF-001) Submitted to Mass DEP
- » Asbestos Abatement Work Plan Completed Licensed Abatement Contractor
- » All Clearance Tests

The project team must verify the following:

- Facility Name and Address is Correct
- The exact locations in the facility where asbestos abatement is to occur is listed
- All abatement contractor information is listed and correct, including:
  - » Name:
  - » Address:
  - » DLS License #:

The abatement contractor's "On Site Supervisor" is listed, including:

- » DLS License #:

The Project Monitor is listed, including:

- » Name:
- » DSL License #:

The asbestos abatement methodology is listed and accurate, for example:

- » Containment:
- » Glove Bag:
- » Encapsulation:
- » Exact Amounts (Sq. Ft/Linear FT) / Location are noted and accurate

The above information must be accurately listed and highlighted in both the Asbestos Contractors DEP Notification (ANF-001) and the Asbestos Abatement Work Plan.

If the project team has any issues with the paperwork or the work in the field, immediately stop the operation and contact the Corporate Health and Safety Director.

Subcontractor Representative:_____ **Date:** _____

Fontaine Representative:_____ **Date:** _____

CONFINED SPACE ENTRY PERMIT

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

Location:	Date:	Time:
Description:		Foreman:

PROTECTIVE EQUIPMENT	YES	NO	PRECAUTIONS	YES	NO
Safety Harness & Lifeline			Lockout/De-energize		
Self-Contained Breathing Apparatus			Lines Blocked/Broken		
Half-face Respirator			Vessel Emptied/Cleaned		
Air Mover			Purge/Flush/Ventilation		
Protective Clothing			Hot Work Permit		
Other:			Other:		
Other:			Other:		

Any special requirements for RESCUE?

ATMOSPHERIC TESTING

Instrument Used:		Date of last calibration:	
Oxygen Level: %	Explosible Gas Level: %	CO Level: %	H2S Level: %

ADDITIONAL ATMOSPHERIC CONSIDERATIONS

Communication:	Visual ☐	Voice ☐	Radio ☐

AUTHORIZED EMPLOYEES

Qualified Person (Print):	
Qualified Person (Signature):	
Attendant (Print):	
Attendant (Signature):	
Authorized Entrants (Print):	
Authorized Entrants (Signature):	

Upon permit termination, all entrants have safely exited the confined space listed above.		Entrants witnessing air monitoring and calibration
Attendant:		
Print Name:		
Signature:		

PROJECT NAME: _____

CONSTRUCTION FIRE SAFETY PROGRAM
DAILY HOT WORK LOG

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

DATE	SIGNED HOT WORK PERMIT #	SUBCONTRACTOR	TYPE(S) OF HOT WORK & LOCATION	PERSON PERFORMING HOTWORK & NFPA CERT #	DEDICATED FIRE WATCH & NFPA CERT #	FIRE WATCH SIGNATURE (SIGN AT END)
Fontaine FPPM:				Contact:		

DECK TURNOVER FORM

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

PROJECT INFORMATION

Project Name:	Date:
Inspection Floor/Are:	Job No:

The fall protection installed by the steel erector in the location noted above have been inspected for the following items listed below and will not be turned over until all items are complete.

Items Inspected	Complete	Incomplete
1. Top rail installed at 42” +-3” from finished floor		
2. Mid rail installed at 21” from finished floor		
3. Cable Rails have less than 3” of deflection		
4. Intermediate stanchion installed every 12 ft.		
5. Corner stanchions have ¾ kickers installed		
6. Turn buckles installed at the end of 90-degree corner/break		
7. Pour stop installed		
8. Remove excess cable or secure		
9. Ladder access with opening no greater than 18”		
10. Flagging installed every 6 ft.		

If there are any items that require corrective action or are incomplete from the list above, please identify the areas and locations for the steel erector to make corrections in accordance with OSHA regulations. NO other trade will be allowed access until all corrections are made and re-inspected by a Fontaine representative and the steel erector.

WDPP CHECKLIST

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

PRE-PLANNING

Pre-Planning:	Yes	No	Comments
Locating mechanical and electrical equipment away from areas where water may collect.			
Building plans should locate water lines in heated areas, away from crawl spaces or closets, soffits, and above ceiling areas with no air circulation, to avoid frozen water lines.			
Common areas and all electrical and mechanical rooms need to be heated.			
Site development to divert water away from the construction area.			
Connections to permanent sewer and storm water systems should be made before building construction begins			
Assuring that installation of moisture and air infiltration barriers or retarders are affected to allow water to exit the exterior wall systems and ensure external walls have appropriate drainage planes behind them.			
Building plans should include waterproofing designs to all roofs, foundations, windows, doors, gutters and drainage systems and specify the types of flashing, waterproofing components, moisture barriers and retarders to be used.			

JOB RESPONSIBILITIES

Job Responsibilities:	Yes	No	Comments
Includes clearly defined responsibilities for supervisors, employees and subcontractors.			
Identifies personnel responsible for monitoring weather forecasts and properly securing the site in expectation of inclement weather.			
Identifies personnel having the authority to shut down, delay installation, or stop construction in anticipation of a natural event such as heavy rainfall, windstorm, flooding or hurricane.			
Includes personnel responsible for work scheduling, material deliveries and storage, worksite inspections, and employee training designed to minimize water damage loss.			
Has an approval process for scheduling water pressure testing of sprinkler or plumbing lines prior to the installation of interior walls and ceilings.			

DELIVERIES AND STORAGE

Deliveries and Storage:	Yes	No	Comments
The WDPP should identify moisture sensitive building materials, specify when they are to be received and where they are to be stored prior to installation.			
Materials should be stored on pallets (off the floor) to minimize water damage loss potential while in storage.			

INSPECTIONS AND SURVEILLANCE

Inspections and Surveillance:	Yes	No	Comments
The WDPP should identify personnel to monitor the site during the workday and to ensure the building is weather tight at the end of each work shift.			
The WDPP should address protection during the night and on weekends.			
Security should be responsible for detecting and responding to water intrusion incidents or inadequately heated locations in the same manner as a potential security threat.			

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

COMMON CAUSES OF WATER DAMAGE

Common Causes of Water Damage:	Yes	No	Comments
Improper installation of weatherproofing, waterproofing and moisture barrier systems on the exterior of the building.			
Poorly glued connections on plastic pipe or improperly sweated copper pipe.			
Improperly installed sprinkler piping (failure to properly align mechanical fittings and piping).			
Pipe freeze.			

WORKSITE INSPECTIONS

Worksite Inspections Should Verify:	Yes	No	Comments
Water accumulations from rain and groundwater are not migrating into the building.			
All door and window openings are covered at the end of each work shift and prior to inclement weather.			
Water lines and mechanical equipment are protected from freezing.			
Sprinkler or plumbing lines that are pressure tested with water are drained immediately following the test.			
Standpipe valves are closed.			
Roof drains are not blocked with leaves or debris.			
Sink drains are not clogged.			
Storage areas are dry and well ventilated.			
Materials are raised off the floor by pallets for storage.			

WDPP CONTROL MEASURES

Water Damage Prevention Plan Control Measures	Yes	No	Comments
Administrative policy to shut off the domestic water supply during off-hours. • Make sure no trades are working off-hours • Make sure that the domestic lines are not feeding mechanical or production equipment that requires constant water source.			
Providing secondary power source when using sump pumps or other pumping systems.			
Performing air pressure testing before charging with water.			
Sealing leading edges of roofing materials at the end of each day to prevent storm water from getting under and incomplete roofing membrane.			
Providing heat during the winter in buildings with fluid in piping.			
Leave a gap of ½ between the drywall and the floor to minimize water contact in the event floors become wet.			

COMPETENT PERSON DESIGNATION

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

The following person/persons will represent _____

as the competent person as defined by OSHA 29 CFR 1926.32 ™

COMPETENT PERSON DESIGNATION FORM

Detail	Printed Name	Printed Name (alternate)
Aerial Lifts:		
Steel Erection:		
Asbestos:		
Concrete:		
Lead:		
Fall Protection:		
Confined Space:		
Scaffold Erection:		
Cranes/Derricks:		
Electrical:		
Demolition:		
Excavation:		
Lull/Forklift:		
First Aid/CPR:		
Ladder:		
Rigging:		
Crane Signaling:		
Material Handling:		
Welding:		

By completing this form, I state that the individuals listed above are capable of identifying existing and predictable hazards in the surroundings or working conditions which are considered hazardous, or dangerous to employees/workers and who have the authority to take prompt corrective actions to eliminate them.

Name:		**Date:**	

STEEL ERECTION APPROVAL

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

STEEL ERECTION APPROVAL FORM

Project Name:		Job Number:	
Date:		Time (AM/PM):	
Prepared By:		Signature:	

Has the steel erector submitted to Fontaine a site specific steel erection plan with all crane related information? (This needs to be written by a qualified person)	Yes ☐	No ☐
Comments:		

Is the concrete in footings, piers, walls, and/or mortar in masonry piers and walls in accordance with ASTM standard test method and has reached 75% of its intended minimum compression design strength pursuant to the attached test results or sufficient strength to support the loads intended during steel erection?	Yes ☐	No ☐
Comments:		

ANCHORAGE BOLTS

All repairs, replacements, or field modifications to the anchor bolts were conducted in accordance with 29 CFR 1926.755(b)?	Yes ☐	No ☐
Comments:		

All repairs, replacements, or field modification to the anchor bolts have been approved by the structural engineer of record?	Yes ☐	No ☐
Comments:		
The following columns have had anchor bolts repaired, replaced or have been field modified:		

WINTER CONDITIONS LOGISTICS PLAN

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

On Site Responsible Party Emergency Contact List:

Name:	Contractor:	Contact Number:

Emergency Contractor Contact List:

Name:	Contractor:	Contact Number:

Area:	Hazard:	Responsible Party:	Control:
Public Walkways			
Project Walkways includes fence line, gate access, walking paths, fire hydrants, FDC, etc.			

Area:	Hazard:	Responsible Party:	Control:
Trailers, connex boxes, portable bathrooms, break area, handwashing area, etc.			
Temporary Heating Units			

WINTER CONDITIONS LOGISTICS PLAN

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

Area:	Hazard:	Responsible Party:	Control:
Building Access (Egress) Points			
Site			
Building Interior			
Roof(s)			
Area			
Area			

Area:	Hazard:	Responsible Party:	Control:
Storage areas and fuel storage areas			
Cranes			
Excavations			
Contractor Parking Lot			
Area			
Area			

FONTAINE BROS., INC.

Crane Lift Plan

Form No. 5.068 A

Instructions

1. The Crane Use Planning Process has two parts:
   - ✓ **Crane Lift Plan**
   - ✓ **Crane Daily Safety Review**

2. A Crane Lift Plan is required for every crane lift on the project - see OSHA Subpart CC for definition of crane.
3. Critical crane lifts, if authorized, may have to be reviewed by a professional engineer {the contractor shall budget for the PE review) - see page 2, section 2 of the Crane Lift Plan for a list of critical lifts.
4. Crane Lift Plans must.be submitted at least 48 hours (2 business days) prior to crane mobilization - 5 days for critical and helicopter lifts.
5. Crane Lift Plans must be based on worst case % of capacity (i.e. gross deductions / chart capacity) for each specific crane configuration and location and activity (for example: unload a delivery truck is a separate activity from erecting steel).
6. The Crane Lift Plan may be valid for more than one day, as long as the configuration, location, and parameters used for developing "worst case" condition have not changed. Use multiple lift plans for multiple locations.
7. All rigging devices *MUST* bear the name of the manufacturer and identify WLL and be certified as to their capacity. Custom-fabricated devices (lifting beams, spreader bars, etc) may be acceptable with proper PE stamp or proof testing as required by applicable standards. Capacities shall be marked and legible on all such devices.
8. Work that is not anticipated in the Crane Lift Plan, but may arise due to site conditions (moving equipment, loading materials onto floors, etc) must be reviewed with the CM in advance. Changes affecting crane configuration and / or location may require the Crane Lift Plan to be amended.
9. The subcontractor is responsible to visit the site prior to the lift date to review crane setup location and documentary information pertaining to the site, which is maintained by the CM. This information is also provided as part of the constructionclocuments. The subcontractor is responsible {determining adequacy, supplying and installing) for all supporting material (as defined within 29 CFR 1926.1402) necessary for the crane lift.
10. The Subcontractor is responsible to obtain all information that is necessary to develop a power line safety plan.
11. The Subcontractor is responsible to train all personnel involved in the use of the crane, for example: Rigging, Signaling, Crane Operation and Assembly / Disassembly.
12. **The Subcontractor must provide the following information along with the Crane Lift Plan:**
    - □ Competent person designation forms for Rigger, Signal Person
    - □ Rigger and Signal Person training certification, OSHA 10 cards.
    - □ Jurisdictional Registration, for example: FAA permit,
    - □ JHA for truck load /unload, boom conflicts, public protection, Etc.
    - □ JHA for power line encroachment
    - □ Logistics plan
    - □ Weight of material - bill of lading, calculation, manufacturers product data sh'eet, etc.
    - □ Rigging plan
13. **The Crane Company must provide the following information as a supplement to the Crane Lift Plan:**
    - □ Competent / qualified person designation forms for operator and AID supervisor
    - □ Worker credentials - license, medical certification, OSHA 10 cards
    - □ Load chart (complete with notes)
    - □ Range chart
    - □ Dimension illustration and specifications for crane
    - □ Lightning and wind restrictions (from operators manual)
    - □ Crane dimensions and area (quadrant) of operation diagram
    - □ Provide copy of annual 3rd party inspection certification and report - see Crane Lift Plan for requirements (Note: The inspector shall be certified with the CCAA - see www.CCAAweb.net local resources)
    - □ Scaled site plan and elevation drawings
    - □ JHA for Assembly/Disassembly of crane and severe weather
    - □ Jurisdictional Registration, for example: State of CT Fire Marshal Annual Registration
14. The crane activity shall comply with the Site Specific Safety & Loss Control Program (SSS&LCP).

No warranty or certification of the suitability of this plan is provided by Fontai ne. It is the responsibility of the Subcontractor and Crane Contractor to ensure that they and their employees are qualified. competent, properly equipped and properly trained to perform the activities outlined in this plan. Further, to ensure that the equipment (i.e. crane and rigging) is inspected and utilized in accordance with this plan and in a manner that complies with OSHA and the manufacturer operator's manual, for example.

FONTAINE BROS., INC.

Crane Lift Plan

Form No. 5.068 A

1. Lift Plan Responsible Persons

Project Name:	Date of Lift:	Lift Location:	
Subcontractor's Name:			
Contact Name:	Contact Number:	Rigger ID:	Signal Person ID:
Crane Company's Name:			
Contact Name:	Contact Number:	Operator ID:	A/D Supervisor ID:

2. Crane Information

Make:	Model:	S/N:	Capacity (tons):

Date Manufactured:

Does lift involve (if any **box** is checked, lift is critical)?
- O 75% chart capacity
- O Dual crane
- O Personnel basket
- ☐ Two hooks
- 0 Traveling with Load
- D Other (refer scope)
- O Over public space
- O Tripping load

Carrier Information
- D Truck
- 0 Rough Terrain
- 0 All Terrain
- O Crawler Block
- 0 Other

Boom Information
- D Telescoping D Lattice
- Block capacity (tons)
- # of Parts Line:
- Line Pull (lbs)
- Working Boom Length (ft):

Jib Information
- Jib deployed? D No D Yes – is it D Fixed or Luffing
- Block capacity (tons)
- # of Parts Line:
- Line pull (lbs):
- Jib length (ft):

Offset: 0

Boom and Jib Combined Length (ft):

Power Line Encroachment Review

Max working radius (ft):

plus ½ length of load (ft):

Will max working radius (plus ½ length of load) be within 20' of an overhead power line? ☐ No ☐ Yes

If yes, provide power line voltage:

If yes, provide power line safety JHA – see OS subpart CC ---I current annual 3rd party inspection.

W ☐ No ☐ Yes A ☐ No ☐ Yes

FAA Permit Review

Max working boom tip elevation (as assembled) in ft:

Will max vertical boom elevation exceed 200' above existing site elevation? ☐ No ☐ Yes

If yes, provide FAA permit no.:

3. Itemization of Crane Chart and Load Deductions

Outrigger Configuration / Distributed Load
- ☐ Fully Extended
- D Fully Retracted
- D Intermediate
- 0 Rubber (PSI)?

Crane cribbing dimensions?

Distributed Ground Bearing Pressure (PSF)?

Crane Condition

Was crane idle >3 months since annual inspection?

Is crane a lattice boom?

Note regarding 3rd party inspection: If crane has been idle for longer than 3 months since last 3rd party annual inspection (inspection), or if crane being A/D is a lattice boom a new inspection certification and report must be provided post A/D). Exception: hydraulic crane with stowed jib that was included in the Inspector must be certified with CCAA (www.CCAAweb.net).

Weight of heaviest Load (lbs):		Comment:
Rigging (lbs):		Comment:
Jib (lbs):		Comment:
Jib Hook (lbs):		Comment:
Hook Block Qbs):		Comment:
Load Line (lbs):		Comment:
Other (lbs):		Comment:
Gross Deductions (lbs):		Comment:

4. Lift Summary

Max Working Radius	Boom Angle	Gross Deductions	Chart Capacity	% of Capacity (Gross Deductions / Chart Capacity)

FONTAINE BROS., INC.

Crane Lift Plan

Form No. 5.068 A

5. Load Characteristics

Will this crane lift plan cover multiple picks? ☐ No ☐ Yes - explain:

Description of load(s) creating highest% of capacity (i.e. worst case load):

Dimensions of load(s) creating highest% of capacity (height x width x length):

D Other dimensions, as follows:

Weight of load creating highest% of capacity (lbs)?

D Calculation provided with rigging diagram D Manufacturer product data sheet provided

How will the Center of Gravity (COG) of the load be determined?

D Manufacturer data sheet - see attached O Calculation - see attached D In Field - explain below:

Will any load be upended? D No D Yes (If yes, provide stability evaluation from manufacturer or PE)

6. Rigging Information

List rigging components - be specific: manufacturer, number of pieces, description, size, length, capacity and component weight (NOTE: Job built equipment must be engineered and proof tested per OSHA 29 CFR 1926.2Sl(a)(4)).

Identify the minimum capacity component:	Capacity (lbs)?
Rigging diagram	O see attached

7. Crane Location/Clearances

a. Provide a to-scale plot plan showing crane location, adjacent buildings, pipe racks, and other significant obstructions within load swing radius. Indicate direction and span of swing	Osee attached
b. Provide a to-scale elevation plan depicting crane, adjacent structures, and load	D see attached
c. What is the horizontal distance from the crane center pin to the nearest structure?	ft.
d. What is the minimum clearance from boom to highest point of structure during a pick?	ft.
e. What is the minimum clearance from load to highest point of structure during a pick?	ft.
f. What is the minimum distance from boom to load during a pick?	ft.

g. Has site been reviewed (actual and documentary information) as part of the development of this crane lift?
D Yes (and, no further information required)
D Yes (and, the following add'l information requested):

h. Will the crane setup (or load) area be within zone of influence of foundation or underground facility?
☐ No D Yes - explain what additional measures will be taken to establish proper support for crane:

❖ j. Describe signaling method:

8. Communication

☐ Voice D Voice with hands free radio for operator O Other - explain:

❖ Non-compliance w□th any part of this Crane Lift Plan will be grounds for immediate cessation of work and possible permanent removal from the site.

Signatures

Crane Company Responsible Person	Subcontractor Responsible Person
Signature:	Signature:

Submit this Completed form to your Fontaine Representative 48 hours (5 days for critical lift) prior to any crane mobilization.

PRE-MOBILIZATION CHECKLIST

FONTAINE BROS., INC.
CONSTRUCTION MANAGERS
GENERAL CONTRACTORS

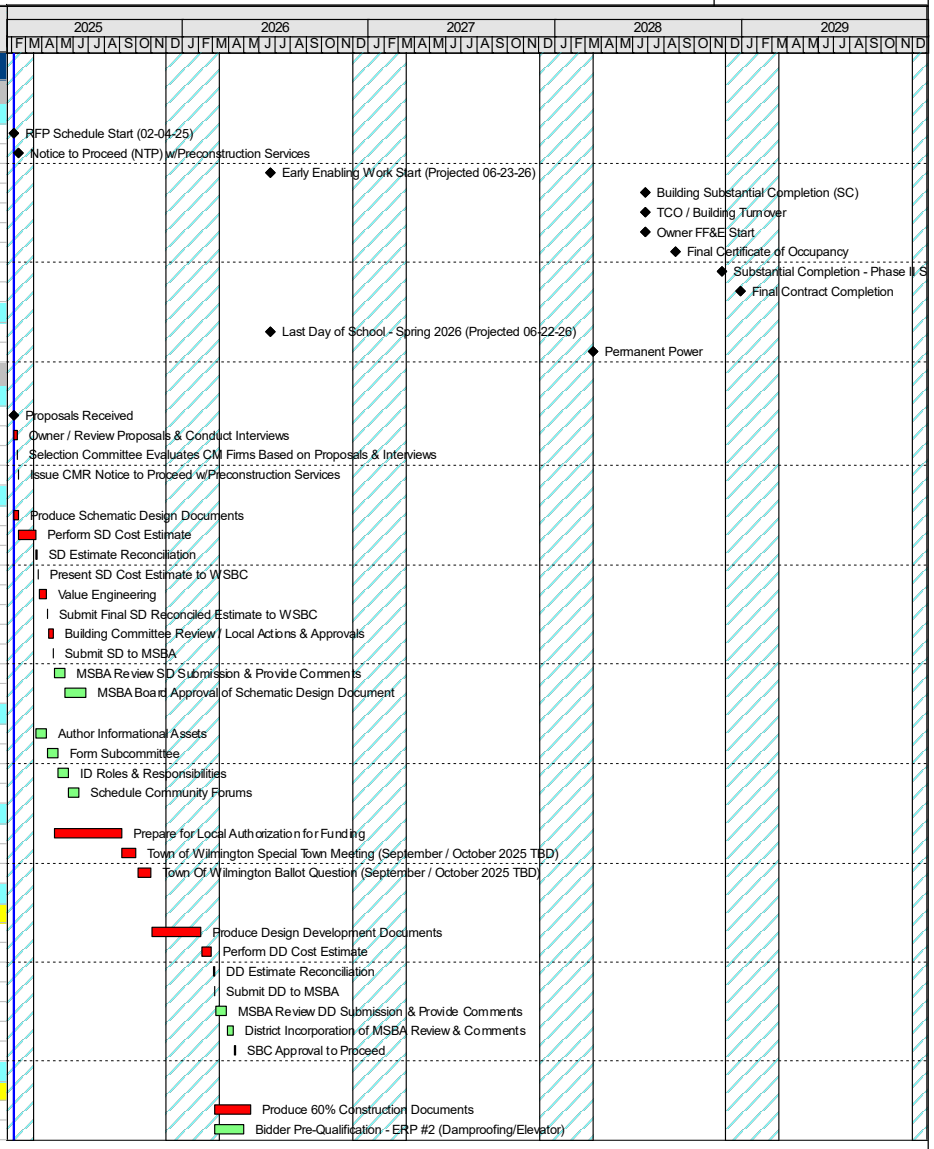
Pre-Mobilization Requirements	
☐	Signed Contract in place
☐	Insurance in place
☐	Competent person ID
☐	Site Specific on file
☐	SDS Sheets
☐	Emergency Contacts/Numbers
☐	Project start date?
☐	Number of Workers?
☐	Required to attend Foreman's Meetings
☐	Hot Work/Fuel Storage/Demolition Permits Acquired from the Fire Department
☐	Special Permits for activities on-site
☐	Traffic Control Plan
☐	Safety Violation/Fine Policy
☐	Crane Pick Plan/Operator's Certifications/Cranes Annual Inspection/Designated Hoisting and Rigging personnel

APPENDIX II – CPM PROJECT SCHEDULE

Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
Wilmington Elementary School: Proposal Schedule Rev03						
Milestones						
Contract Milestones						
CMS-1000	RFP Schedule Start (02-04-25)	0	0	2/4/2025*		7D - No Hol (MS Cal)
CMS-1060	Notice to Proceed (NTP) w/Preconstruction Services	0	1	2/13/2025		7D - No Hol (MS Cal)
CMS-1100	Early Enabling Work Start (Projected 06-23-26)	0	3	6/23/2026		7D - No Hol (MS Cal)
CMS-1010	Building Substantial Completion (SC)	0	0		6/26/2028*	7D - No Hol (MS Cal)
CMS-1070	TCO / Building Turnover	0	0		6/26/2028*	7D - No Hol (MS Cal)
CMS-1130	Owner FF&E Start	0	107	6/27/2028		5D - Hol
CMS-1110	Final Certificate of Occupancy	0	86		8/23/2028	5D - Hol
CMS-1050	Substantial Completion - Phase II Sitework	0	37		11/22/2028	7D - No Hol (MS Cal)
CMS-1090	Final Contract Completion	0	0		12/29/2028	7D - No Hol (MS Cal)
Misc. Milestones						
CMS-1150	Last Day of School - Spring 2026 (Projected 06-22-26)	0	3		6/22/2026*	5D - Hol
CMS-1080	Permanent Power	0	0		3/15/2028	7D - No Hol (MS Cal)
Preconstruction Estimate / Early Release Packages						
Construction Manager Procurement						
PST-1260	Proposals Received	0	0	2/4/2025		5D - Hol
PST-1270	Owner / Review Proposals & Conduct Interviews	6	0	2/4/2025	2/11/2025	5D - Hol
PST-1280	Selection Committee Evaluates CM Firms Based on Proposals & Interviews	1	0	2/12/2025	2/12/2025	5D - Hol
PST-1380	Issue CMR Notice to Proceed w/Preconstruction Services	1	0	2/13/2025	2/13/2025	5D - Hol
Schematic Design Phase (SD)						
PST-1670	Produce Schematic Design Documents	8	0	2/4/2025	2/13/2025	5D - Hol
PST-1680	Perform SD Cost Estimate	25	0	2/14/2025	3/20/2025	5D - Hol
PST-1700	SD Estimate Reconciliation	1	0	3/21/2025	3/21/2025	5D - Hol
PST-1790	Present SD Cost Estimate to WSBC	1	0	3/25/2025	3/25/2025	5D - Hol
PST-1740	Value Engineering	12	0	3/26/2025	4/10/2025	5D - Hol
PST-1710	Submit Final SD Reconciled Estimate to WSBC	1	0	4/11/2025	4/11/2025	5D - Hol
PST-1690	Building Committee Review / Local Actions & Approvals	8	0	4/14/2025	4/23/2025	5D - Hol
PST-1720	Submit SD to MSBA	1	0	4/24/2025	4/24/2025	5D - Hol
PST-1730	MSBA Review SD Submission & Provide Comments	21	73	4/25/2025	5/15/2025	7D - No Hol (MS Cal)
PST-1750	MSBA Board Approval of Schematic Design Document	28	49	5/16/2025	6/25/2025	5D - Hol
Design & Implement Community Information Campaign						
PST-1860	Author Informational Assets	15	78	3/21/2025	4/10/2025	5D - Hol
PST-1830	Form Subcommittee	15	78	4/11/2025	5/1/2025	5D - Hol
PST-1840	ID Roles & Responsibilities	15	78	5/2/2025	5/22/2025	5D - Hol
PST-1850	Schedule Community Forums	15	78	5/23/2025	6/13/2025	5D - Hol
Local Authorization						
PST-1760	Prepare for Local Authorization for Funding	92	0	4/25/2025	9/4/2025	5D - Hol
PST-1820	Town of Wilmington Special Town Meeting (September / October 2025 TBD)	20	0	9/5/2025	10/2/2025	5D - Hol
PST-1810	Town Of Wilmington Ballot Question (September / October 2025 TBD)	20	0	10/6/2025	10/31/2025	5D - Hol
Design Development Phase (DD)						
Design Development Documents						
PST-1390	Produce Design Development Documents	65	0	11/3/2025	2/6/2026	5D - Hol
PST-1400	Perform DD Cost Estimate	15	0	2/9/2026	2/27/2026	5D - Hol
PST-1410	DD Estimate Reconciliation	4	0	3/2/2026	3/5/2026	5D - Hol
PST-1770	Submit DD to MSBA	1	23	3/6/2026	3/6/2026	5D - Hol
PST-1780	MSBA Review DD Submission & Provide Comments	21	33	3/7/2026	3/27/2026	7D - No Hol (MS Cal)
PST-1800	District Incorporation of MSBA Review & Comments	10	23	3/30/2026	4/10/2026	5D - Hol
PST-1960	SBC Approval to Proceed	2	23	4/13/2026	4/14/2026	5D - Hol
Construction Document Design Phase (CD)						
60% Construction Documents						
PST-1000	Produce 60% Construction Documents	51	0	3/6/2026	5/15/2026	5D - Hol
PST-1900	Bidder Pre-Qualification - ERP #2 (Dampproofing/Elevator)	40	77	3/6/2026	4/30/2026	5D - Hol



Actual Work
Remaining Work
Critical Remaining Work
Milestone

Wilmington Elementary School: Proposal Schedule Rev03
Fontaine Bros., Inc

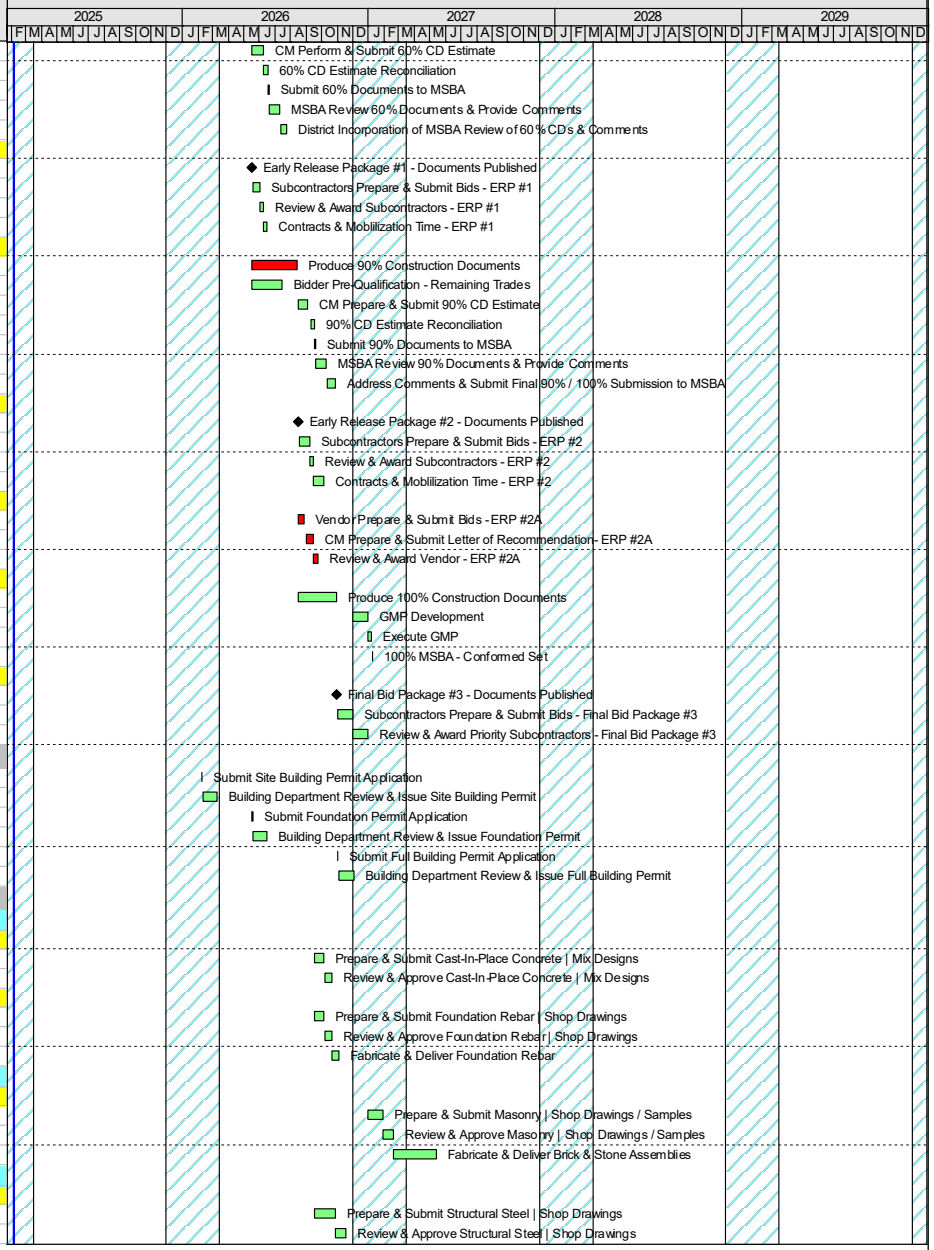
Layout: Fontaine - All Activities_Wilmington
TASK filter: All Activities

Print Date: 9/24/2025

FONTAINE BROS., INC.

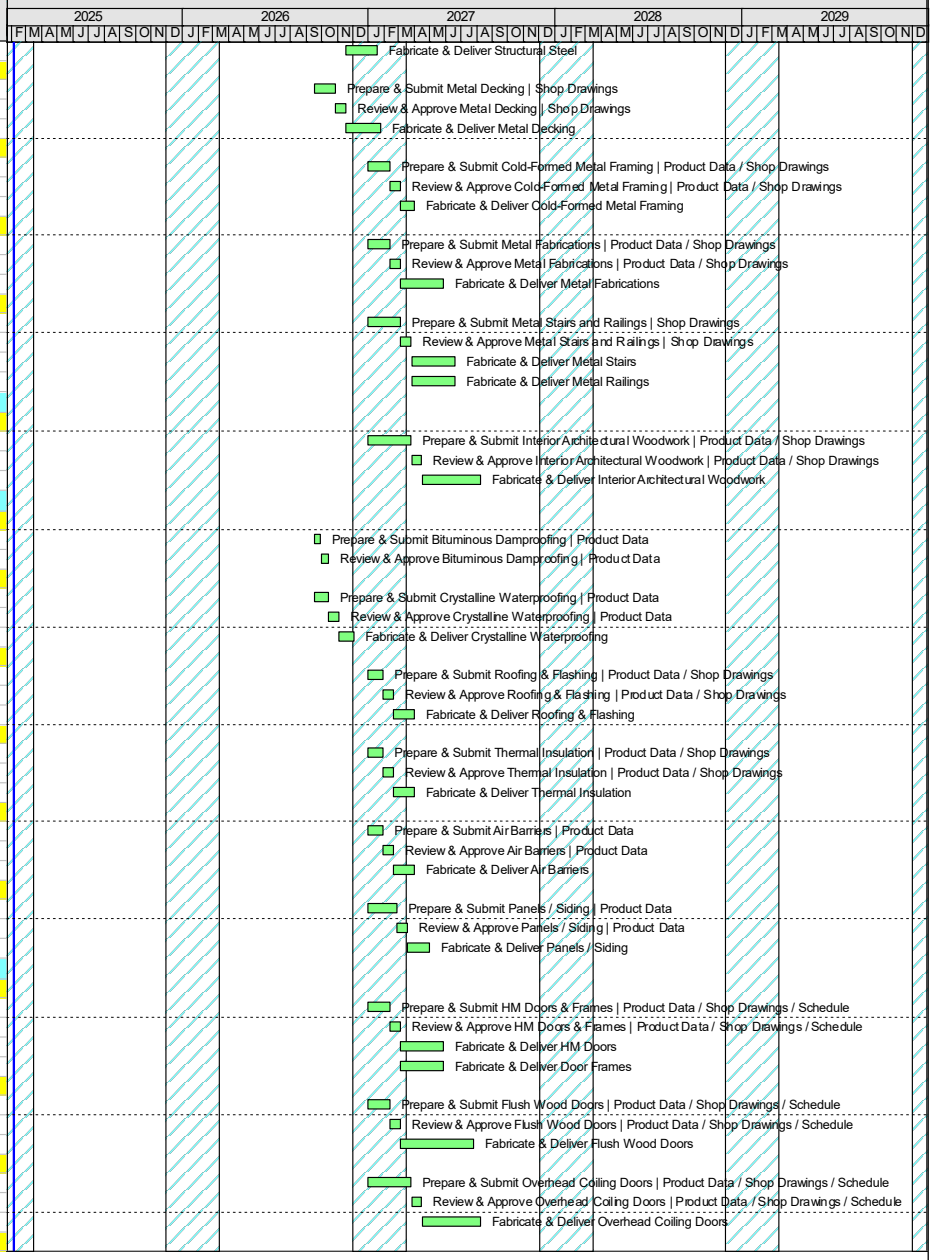
Wilmington Elementary School: Proposal Schedule Rev03

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
PST-1020	CM Perform & Submit 60% CD Estimate	15	66	5/18/2026	6/8/2026	5D - Hol
PST-1180	60% CD Estimate Reconciliation	8	66	6/9/2026	6/18/2026	5D - Hol
PST-1150	Submit 60% Documents to MSBA	1	66	6/19/2026	6/19/2026	5D - Hol
PST-1060	MSBA Review 60% Documents & Provide Comments	21	96	6/20/2026	7/10/2026	7D - No Hol (MS Cal)
PST-1870	District Incorporation of MSBA Review of 60% CDs & Comments	10	67	7/13/2026	7/24/2026	5D - Hol
Early Release Package #1 - Site						
PST-2070	Early Release Package #1 - Documents Published	0	7	5/18/2026		5D - Hol
PST-2050	Subcontractors Prepare & Submit Bids - ERP #1	10	7	5/19/2026	6/2/2026	5D - Hol
PST-2060	Review & Award Subcontractors - ERP #1	5	7	6/3/2026	6/9/2026	5D - Hol
PST-2040	Contracts & Mobilization Time - ERP #1	6	7	6/9/2026	6/16/2026	5D - Hol
90% Construction Documents						
PST-1050	Produce 90% Construction Documents	63	0	5/18/2026	8/14/2026	5D - Hol
PST-1910	Bidder Pre-Qualification - Remaining Trades	40	103	5/18/2026	7/14/2026	5D - Hol
PST-1070	CM Prepare & Submit 90% CD Estimate	15	29	8/17/2026	9/4/2026	5D - Hol
PST-1220	90% CD Estimate Reconciliation	6	29	9/10/2026	9/17/2026	5D - Hol
PST-1890	Submit 90% Documents to MSBA	1	29	9/18/2026	9/18/2026	5D - Hol
PST-1090	MSBA Review 90% Documents & Provide Comments	21	41	9/19/2026	10/9/2026	7D - No Hol (MS Cal)
PST-1880	Address Comments & Submit Final 90% / 100% Submission to MSBA	12	29	10/12/2026	10/27/2026	5D - Hol
Early Release Package #2 - Concrete, Dampproofing, Steel, & Elev.						
PST-1920	Early Release Package #2 - Documents Published	0	0	8/17/2026		5D - Hol
PST-1930	Subcontractors Prepare & Submit Bids - ERP #2	15	2	8/18/2026	9/8/2026	5D - Hol
PST-1940	Review & Award Subcontractors - ERP #2	5	2	9/9/2026	9/15/2026	5D - Hol
PST-1950	Contracts & Mobilization Time - ERP #2	15	33	9/15/2026	10/5/2026	5D - Hol
Early Release Package #2A - Long Lead Electrical						
PST-1620	Vendor Prepare & Submit Bids - ERP #2A	10	0	8/17/2026	8/28/2026	5D - Hol
PST-1640	CM Prepare & Submit Letter of Recommendation- ERP #2A	10	0	8/31/2026	9/14/2026	5D - Hol
PST-1630	Review & Award Vendor - ERP #2A	8	0	9/15/2026	9/24/2026	5D - Hol
100% Construction Documents						
PST-1100	Produce 100% Construction Documents	54	26	8/17/2026	10/30/2026	5D - Hol
PST-1120	GMP Development	20	61	12/2/2026	12/30/2026	5D - Hol
PST-1130	Execute GMP	5	61	12/31/2026	1/7/2027	5D - Hol
PST-1160	100% MSBA - Conformed Set	1	497	1/8/2027	1/8/2027	5D - Hol
Final Bid Package #3						
PST-1360	Final Bid Package #3 - Documents Published	0	26		10/30/2026	5D - Hol
PST-1110	Subcontractors Prepare & Submit Bids - Final Bid Package #3	20	26	11/2/2026	12/1/2026	5D - Hol
PST-1140	Review & Award Priority Subcontractors - Final Bid Package #3	20	26	12/2/2026	12/30/2026	5D - Hol
Permitting						
PRMT-1000	Submit Site Building Permit Application	1	88	2/9/2026	2/9/2026	5D - Hol
PRMT-1010	Building Department Review & Issue Site Building Permit	20	88	2/10/2026	3/9/2026	5D - Hol
PRMT-1040	Submit Foundation Permit Application	1	115	5/18/2026	5/18/2026	5D - Hol
PRMT-1050	Building Department Review & Issue Foundation Permit	20	115	5/19/2026	6/16/2026	5D - Hol
PRMT-1020	Submit Full Building Permit Application	1	33	11/2/2026	11/2/2026	5D - Hol
PRMT-1030	Building Department Review & Issue Full Building Permit	20	33	11/3/2026	12/2/2026	5D - Hol
Submittals & Procurement						
Division 03 - Concrete						
Cast-In-Place Concrete						
SUBM-1220	Prepare & Submit Cast-In-Place Concrete | Mix Designs	15	50	9/16/2026	10/6/2026	5D - Hol
SUBM-1620	Review & Approve Cast-In-Place Concrete | Mix Designs	10	50	10/7/2026	10/20/2026	5D - Hol
Foundation Rebar						
SUBM-1000	Prepare & Submit Foundation Rebar | Shop Drawings	15	12	9/16/2026	10/6/2026	5D - Hol
SUBM-1580	Review & Approve Foundation Rebar | Shop Drawings	10	12	10/7/2026	10/20/2026	5D - Hol
SUBM-1990	Fabricate & Deliver Foundation Rebar	10	12	10/21/2026	11/3/2026	5D - Hol
Division 04 - Masonry						
Masonry / Stone Assemblies						
SUBM-3240	Prepare & Submit Masonry | Shop Drawings / Samples	20	155	12/31/2026	1/28/2027	5D - Hol
SUBM-3250	Review & Approve Masonry | Shop Drawings / Samples	15	155	1/29/2027	2/18/2027	5D - Hol
SUBM-3260	Fabricate & Deliver Brick & Stone Assemblies	60	155	2/19/2027	5/13/2027	5D - Hol
Division 05 - Metals						
Structural Steel (Academic Wing | North)						
SUBM-1210	Prepare & Submit Structural Steel | Shop Drawings	30	2	9/16/2026	10/27/2026	5D - Hol
SUBM-2390	Review & Approve Structural Steel | Shop Drawings	15	2	10/28/2026	11/17/2026	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
SUBM-3030	Fabricate & Deliver Structural Steel	40	2	11/18/2026	1/18/2027	5D - Hol
Metal Decking (Academic Wing | North)						
SUBM-1120	Prepare & Submit Metal Decking | Shop Drawings	30	7	9/16/2026	10/27/2026	5D - Hol
SUBM-2340	Review & Approve Metal Decking | Shop Drawings	15	7	10/28/2026	11/17/2026	5D - Hol
SUBM-3020	Fabricate & Deliver Metal Decking	45	7	11/18/2026	1/25/2027	5D - Hol
Cold-Formed Metal Framing						
SUBM-1110	Prepare & Submit Cold-Formed Metal Framing | Product Data / Shop Drawings	30	26	12/31/2026	2/11/2027	5D - Hol
SUBM-2330	Review & Approve Cold-Formed Metal Framing | Product Data / Shop Drawings	15	26	2/12/2027	3/4/2027	5D - Hol
SUBM-2770	Fabricate & Deliver Cold-Formed Metal Framing	20	26	3/5/2027	4/1/2027	5D - Hol
Metal Fabrications						
SUBM-1140	Prepare & Submit Metal Fabrications | Product Data / Shop Drawings	30	250	12/31/2026	2/11/2027	5D - Hol
SUBM-2360	Review & Approve Metal Fabrications | Product Data / Shop Drawings	15	250	2/12/2027	3/4/2027	5D - Hol
SUBM-2790	Fabricate & Deliver Metal Fabrications	60	250	3/5/2027	5/27/2027	5D - Hol
Metal Stairs and Railings						
SUBM-1130	Prepare & Submit Metal Stairs and Railings | Shop Drawings	45	220	12/31/2026	3/4/2027	5D - Hol
SUBM-2350	Review & Approve Metal Stairs and Railings | Shop Drawings	15	220	3/5/2027	3/25/2027	5D - Hol
SUBM-2780	Fabricate & Deliver Metal Stairs	60	220	3/26/2027	6/18/2027	5D - Hol
SUBM-2820	Fabricate & Deliver Metal Railings	60	235	3/26/2027	6/18/2027	5D - Hol
Division 06 - Wood, Plastics, and Composites						
Interior Architectural Woodwork						
SUBM-1230	Prepare & Submit Interior Architectural Woodwork | Product Data / Shop Drawings	60	162	12/31/2026	3/25/2027	5D - Hol
SUBM-2800	Review & Approve Interior Architectural Woodwork | Product Data / Shop Drawings	15	162	3/26/2027	4/15/2027	5D - Hol
SUBM-3040	Fabricate & Deliver Interior Architectural Woodwork	80	162	4/16/2027	8/9/2027	5D - Hol
Division 07 - Thermal and Moisture Protection						
Bituminous Damproofing						
SUBM-1100	Prepare & Submit Bituminous Damproofing | Product Data	10	47	9/16/2026	9/29/2026	5D - Hol
SUBM-2080	Review & Approve Bituminous Damproofing | Product Data	10	47	9/30/2026	10/13/2026	5D - Hol
Crystalline Waterproofing						
SUBM-1280	Prepare & Submit Crystalline Waterproofing | Product Data	20	323	9/16/2026	10/13/2026	5D - Hol
SUBM-2130	Review & Approve Crystalline Waterproofing | Product Data	15	323	10/14/2026	11/3/2026	5D - Hol
SUBM-2610	Fabricate & Deliver Crystalline Waterproofing	20	323	11/4/2026	12/3/2026	5D - Hol
Roofing & Flashing						
SUBM-1090	Prepare & Submit Roofing & Flashing | Product Data / Shop Drawings	20	31	12/31/2026	1/28/2027	5D - Hol
SUBM-2070	Review & Approve Roofing & Flashing | Product Data / Shop Drawings	15	31	1/29/2027	2/18/2027	5D - Hol
SUBM-2570	Fabricate & Deliver Roofing & Flashing	30	31	2/19/2027	4/1/2027	5D - Hol
Thermal Insulation						
SUBM-1760	Prepare & Submit Thermal Insulation | Product Data / Shop Drawings	20	41	12/31/2026	1/28/2027	5D - Hol
SUBM-2940	Review & Approve Thermal Insulation | Product Data / Shop Drawings	15	41	1/29/2027	2/18/2027	5D - Hol
SUBM-3170	Fabricate & Deliver Thermal Insulation	30	41	2/19/2027	4/1/2027	5D - Hol
Air Barriers						
SUBM-1070	Prepare & Submit Air Barriers | Product Data	20	61	12/31/2026	1/28/2027	5D - Hol
SUBM-2050	Review & Approve Air Barriers | Product Data	15	61	1/29/2027	2/18/2027	5D - Hol
SUBM-2550	Fabricate & Deliver Air Barriers	30	61	2/19/2027	4/1/2027	5D - Hol
Panels / Siding						
SUBM-1290	Prepare & Submit Panels / Siding | Product Data	40	195	12/31/2026	2/25/2027	5D - Hol
SUBM-2140	Review & Approve Panels / Siding | Product Data	15	195	2/26/2027	3/18/2027	5D - Hol
SUBM-2620	Fabricate & Deliver Panels / Siding	30	195	3/19/2027	4/29/2027	5D - Hol
Division 08 - Openings						
Hollow Metal Doors & Frames						
SUBM-1260	Prepare & Submit HM Doors & Frames | Product Data / Shop Drawings / Schedule	30	60	12/31/2026	2/11/2027	5D - Hol
SUBM-1860	Review & Approve HM Doors & Frames | Product Data / Shop Drawings / Schedule	15	60	2/12/2027	3/4/2027	5D - Hol
SUBM-2400	Fabricate & Deliver HM Doors	60	255	3/5/2027	5/27/2027	5D - Hol
SUBM-2410	Fabricate & Deliver Door Frames	60	60	3/5/2027	5/27/2027	5D - Hol
Flush Wood Doors						
SUBM-1050	Prepare & Submit Flush Wood Doors | Product Data / Shop Drawings / Schedule	30	172	12/31/2026	2/11/2027	5D - Hol
SUBM-1830	Review & Approve Flush Wood Doors | Product Data / Shop Drawings / Schedule	15	172	2/12/2027	3/4/2027	5D - Hol
SUBM-2320	Fabricate & Deliver Flush Wood Doors	100	172	3/5/2027	7/26/2027	5D - Hol
Overhead Coiling Doors						
SUBM-1030	Prepare & Submit Overhead Coiling Doors | Product Data / Shop Drawings / Schedule	60	128	12/31/2026	3/25/2027	5D - Hol
SUBM-2760	Review & Approve Overhead Coiling Doors | Product Data / Shop Drawings / Schedule	15	128	3/26/2027	4/15/2027	5D - Hol
SUBM-3010	Fabricate & Deliver Overhead Coiling Doors	80	128	4/16/2027	8/9/2027	5D - Hol
Aluminum-Framed Entrances & Storefronts						

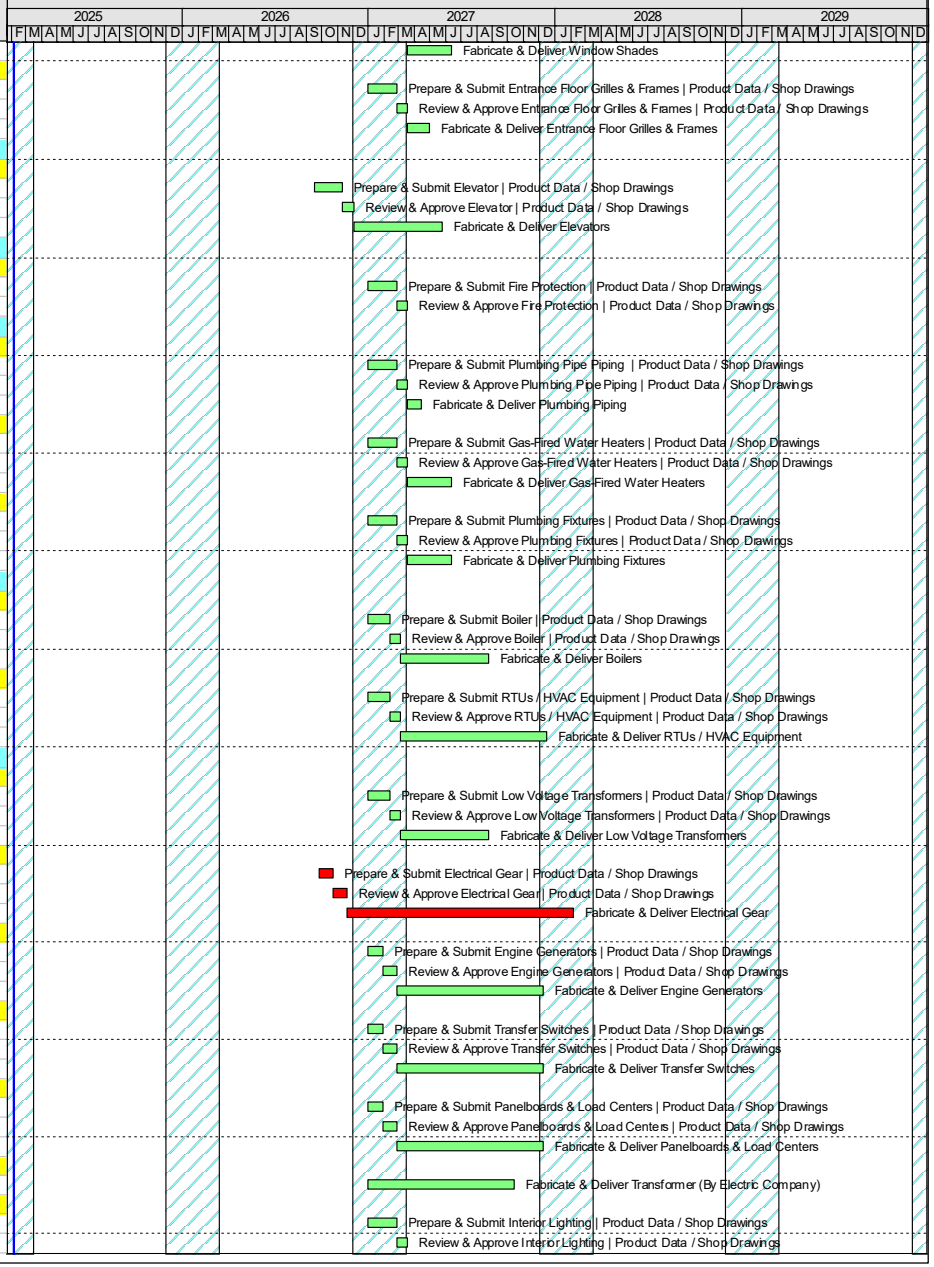


Wilmington Elementary School: Proposal Schedule Rev03

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
SUBM-1200	Prepare & Submit Aluminum-Framed Entrances & Storefronts | Product Data / Shop Drawings	30	225	12/31/2026	2/11/2027	5D - Hol
SUBM-1850	Review & Approve Aluminum-Framed Entrances & Storefronts | Product Data / Shop Drawings	15	225	2/12/2027	3/4/2027	5D - Hol
SUBM-2380	Fabricate & Deliver Aluminum-Framed Entrances & Storefronts	80	225	3/5/2027	6/25/2027	5D - Hol
Glazed Aluminum Curtain Walls						
SUBM-1040	Prepare & Submit Glazed Aluminum Curtain Walls | Product Data / Shop Drawings	30	175	12/31/2026	2/11/2027	5D - Hol
SUBM-1820	Review & Approve Glazed Aluminum Curtain Walls | Product Data / Shop Drawings	15	175	2/12/2027	3/4/2027	5D - Hol
SUBM-2310	Fabricate & Deliver Glazed Aluminum Curtain Walls	80	175	3/5/2027	6/25/2027	5D - Hol
Windows						
SUBM-1320	Prepare & Submit Windows | Product Data / Shop Drawings	30	175	12/31/2026	2/11/2027	5D - Hol
SUBM-1880	Review & Approve Windows | Product Data / Shop Drawings	15	175	2/12/2027	3/4/2027	5D - Hol
SUBM-2430	Fabricate & Deliver Windows	80	175	3/5/2027	6/25/2027	5D - Hol
Door Hardware						
SUBM-1180	Prepare & Submit Door Hardware | Product Data / Schedule	30	200	12/31/2026	2/11/2027	5D - Hol
SUBM-1840	Review & Approve Door Hardware | Product Data / Schedule	15	200	2/12/2027	3/4/2027	5D - Hol
SUBM-2370	Fabricate & Deliver Door Hardware	80	200	3/5/2027	6/25/2027	5D - Hol
Division 09 - Finishes						
Resilient Flooring & Accessories						
SUBM-1800	Prepare & Submit Resilient Flooring & Accessories | Product Data / Samples	40	212	12/31/2026	2/25/2027	5D - Hol
SUBM-2970	Review & Approve Resilient Flooring & Accessories | Product Data / Samples	15	212	2/26/2027	3/18/2027	5D - Hol
SUBM-3200	Fabricate & Deliver Resilient Flooring & Accessories	30	212	3/19/2027	4/29/2027	5D - Hol
Tiling						
SUBM-1650	Prepare & Submit Tiling | Product Data / Samples	40	122	12/31/2026	2/25/2027	5D - Hol
SUBM-2830	Review & Approve Tiling | Product Data / Samples	15	122	2/26/2027	3/18/2027	5D - Hol
SUBM-3060	Fabricate & Deliver Tile	60	122	3/19/2027	6/11/2027	5D - Hol
Acoustical Tile Ceilings						
SUBM-1750	Prepare & Submit Acoustical Tile Ceilings | Product Data / Shop Drawings	40	187	12/31/2026	2/25/2027	5D - Hol
SUBM-2930	Review & Approve Acoustical Tile Ceilings | Product Data / Shop Drawings	15	187	2/26/2027	3/18/2027	5D - Hol
SUBM-3160	Fabricate & Deliver Acoustical Tile Ceilings	20	187	3/19/2027	4/15/2027	5D - Hol
Division 10 - Specialties						
Visual Display Surfaces						
SUBM-1730	Prepare & Submit Visual Display Surfaces | Product Data / Shop Drawings / Samples	40	235	12/31/2026	2/25/2027	5D - Hol
SUBM-2910	Review & Approve Visual Display Surfaces | Product Data / Shop Drawings / Samples	15	235	2/26/2027	3/18/2027	5D - Hol
SUBM-3140	Fabricate & Deliver Visual Display Surfaces	60	235	3/19/2027	6/11/2027	5D - Hol
Toilet Compartments						
SUBM-1710	Prepare & Submit Toilet Compartments | Product Data / Shop Drawings / Samples	40	240	12/31/2026	2/25/2027	5D - Hol
SUBM-2890	Review & Approve Toilet Compartments | Product Data / Shop Drawings / Samples	15	240	2/26/2027	3/18/2027	5D - Hol
SUBM-3120	Fabricate & Deliver Toilet Compartments	60	240	3/19/2027	6/11/2027	5D - Hol
Folding Panel Partitions						
SUBM-1720	Prepare & Submit Folding Panel Partitions | Product Data / Shop Drawings / Samples	40	235	12/31/2026	2/25/2027	5D - Hol
SUBM-2900	Review & Approve Folding Panel Partitions | Product Data / Shop Drawings / Samples	15	235	2/26/2027	3/18/2027	5D - Hol
SUBM-3130	Fabricate & Deliver Folding Panel Partitions	75	235	3/19/2027	7/2/2027	5D - Hol
Lockers						
SUBM-1700	Prepare & Submit Lockers | Product Data / Shop Drawings	40	147	12/31/2026	2/25/2027	5D - Hol
SUBM-2880	Review & Approve Lockers | Product Data / Shop Drawings	15	147	2/26/2027	3/18/2027	5D - Hol
SUBM-3110	Fabricate & Deliver Lockers	80	147	3/19/2027	7/12/2027	5D - Hol
Division 11 - Equipment						
Stage Curtains						
SUBM-1680	Prepare & Submit Stage Curtains | Product Data / Samples	40	250	12/31/2026	2/25/2027	5D - Hol
SUBM-2860	Review & Approve Stage Curtains | Product Data / Samples	15	250	2/26/2027	3/18/2027	5D - Hol
SUBM-3090	Fabricate & Deliver Stage Curtains	60	250	3/19/2027	6/11/2027	5D - Hol
Foodservice Equipment						
SUBM-1240	Prepare & Submit Foodservice Equipment | Product Data / Shop Drawings	40	187	12/31/2026	2/25/2027	5D - Hol
SUBM-2100	Review & Approve Foodservice Equipment | Product Data / Shop Drawings	15	187	2/26/2027	3/18/2027	5D - Hol
SUBM-2590	Fabricate & Deliver Foodservice Equipment	80	187	3/19/2027	7/12/2027	5D - Hol
Gym Equipment						
SUBM-1790	Prepare & Submit Gymnasium Equipment | Product Data / Shop Drawings	40	190	12/31/2026	2/25/2027	5D - Hol
SUBM-2960	Review & Approve Gymnasium Equipment | Product Data / Shop Drawings	15	190	2/26/2027	3/18/2027	5D - Hol
SUBM-3190	Fabricate & Deliver Gymnasium Equipment	80	190	3/19/2027	7/12/2027	5D - Hol
Division 12 - Furnishings						
Window Shades						
SUBM-1670	Prepare & Submit Window Shades | Product Data / Shop Drawings	40	220	12/31/2026	2/25/2027	5D - Hol
SUBM-2850	Review & Approve Window Shades | Product Data / Shop Drawings	15	220	2/26/2027	3/18/2027	5D - Hol

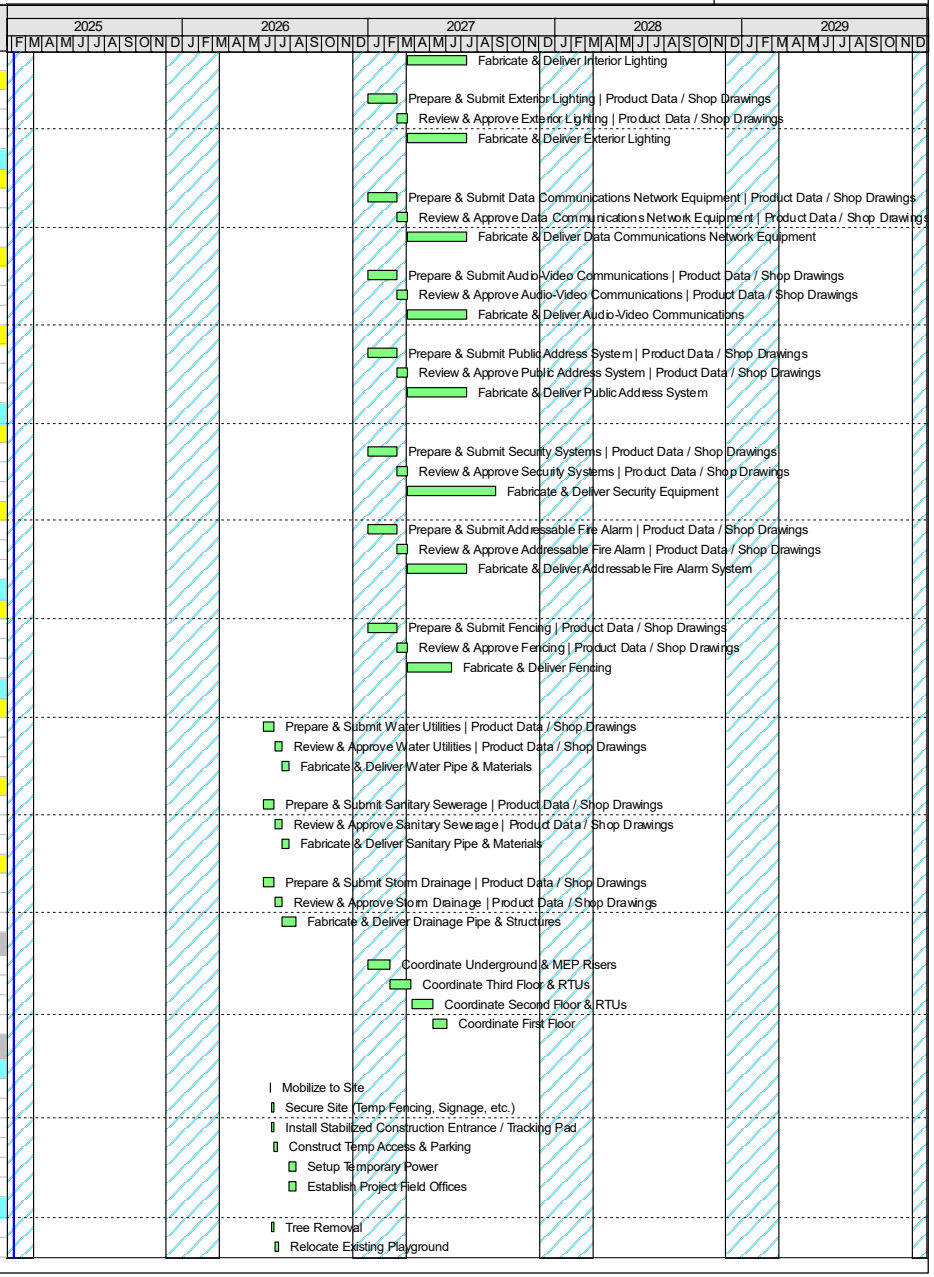
Wilmington Elementary School: Proposal Schedule Rev03

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
SUBM-3080	Fabricate & Deliver Window Shades	60	220	3/19/2027	6/11/2027	5D - Hol
Entrance Floor Grilles & Frames						
SUBM-1660	Prepare & Submit Entrance Floor Grilles & Frames | Product Data / Shop Drawings	40	232	12/31/2026	2/25/2027	5D - Hol
SUBM-2840	Review & Approve Entrance Floor Grilles & Frames | Product Data / Shop Drawings	15	232	2/26/2027	3/18/2027	5D - Hol
SUBM-3070	Fabricate & Deliver Entrance Floor Grilles & Frames	30	232	3/19/2027	4/29/2027	5D - Hol
Division 14 - Conveying Equipment						
Elevators						
SUBM-1250	Prepare & Submit Elevator | Product Data / Shop Drawings	40	208	9/16/2026	11/10/2026	5D - Hol
SUBM-2110	Review & Approve Elevator | Product Data / Shop Drawings	15	208	11/11/2026	12/3/2026	5D - Hol
SUBM-2600	Fabricate & Deliver Elevators	120	208	12/4/2026	5/24/2027	5D - Hol
Division 21 - Fire Suppresion						
Fire Protection						
SUBM-1190	Prepare & Submit Fire Protection | Product Data / Shop Drawings	40	75	12/31/2026	2/25/2027	5D - Hol
SUBM-2090	Review & Approve Fire Protection | Product Data / Shop Drawings	15	75	2/26/2027	3/18/2027	5D - Hol
Division 22 - Plumbing						
Plumbing Piping						
SUBM-1380	Prepare & Submit Plumbing Pipe Piping | Product Data / Shop Drawings	40	41	12/31/2026	2/25/2027	5D - Hol
SUBM-2170	Review & Approve Plumbing Pipe Piping | Product Data / Shop Drawings	15	41	2/26/2027	3/18/2027	5D - Hol
SUBM-2640	Fabricate & Deliver Plumbing Piping	20	41	3/19/2027	4/15/2027	5D - Hol
Gas-Fired Water Heaters						
SUBM-1420	Prepare & Submit Gas-Fired Water Heaters | Product Data / Shop Drawings	40	150	12/31/2026	2/25/2027	5D - Hol
SUBM-2200	Review & Approve Gas-Fired Water Heaters | Product Data / Shop Drawings	15	150	2/26/2027	3/18/2027	5D - Hol
SUBM-2670	Fabricate & Deliver Gas-Fired Water Heaters	60	150	3/19/2027	6/11/2027	5D - Hol
Plumbing Fixtures						
SUBM-1440	Prepare & Submit Plumbing Fixtures | Product Data / Shop Drawings	40	207	12/31/2026	2/25/2027	5D - Hol
SUBM-2220	Review & Approve Plumbing Fixtures | Product Data / Shop Drawings	15	207	2/26/2027	3/18/2027	5D - Hol
SUBM-2690	Fabricate & Deliver Plumbing Fixtures	60	207	3/19/2027	6/11/2027	5D - Hol
Division 23 - HVAC						
Boilers						
SUBM-1370	Prepare & Submit Boiler | Product Data / Shop Drawings	30	100	12/31/2026	2/11/2027	5D - Hol
SUBM-1910	Review & Approve Boiler | Product Data / Shop Drawings	15	100	2/12/2027	3/4/2027	5D - Hol
SUBM-2460	Fabricate & Deliver Boilers	120	100	3/5/2027	8/23/2027	5D - Hol
RTUs / HVAC Equipment						
SUBM-1450	Prepare & Submit RTUs / HVAC Equipment | Product Data / Shop Drawings	30	35	12/31/2026	2/11/2027	5D - Hol
SUBM-1930	Review & Approve RTUs / HVAC Equipment | Product Data / Shop Drawings	15	35	2/12/2027	3/4/2027	5D - Hol
SUBM-2480	Fabricate & Deliver RTUs / HVAC Equipment	200	35	3/5/2027	12/16/2027	5D - Hol
Division 26 - Electrical						
Low Voltage Transformers						
SUBM-1390	Prepare & Submit Low Voltage Transformers | Product Data / Shop Drawings	30	107	12/31/2026	2/11/2027	5D - Hol
SUBM-1920	Review & Approve Low Voltage Transformers | Product Data / Shop Drawings	15	107	2/12/2027	3/4/2027	5D - Hol
SUBM-2470	Fabricate & Deliver Low Voltage Transformers	120	107	3/5/2027	8/23/2027	5D - Hol
Electrical Gear						
SUBM-1490	Prepare & Submit Electrical Gear | Product Data / Shop Drawings	20	0	9/25/2026	10/22/2026	5D - Hol
SUBM-1630	Review & Approve Electrical Gear | Product Data / Shop Drawings	20	0	10/23/2026	11/19/2026	5D - Hol
SUBM-2230	Fabricate & Deliver Electrical Gear	305	0	11/20/2026	2/7/2028	5D - Hol
Generator						
SUBM-1500	Prepare & Submit Engine Generators | Product Data / Shop Drawings	20	62	12/31/2026	1/28/2027	5D - Hol
SUBM-1640	Review & Approve Engine Generators | Product Data / Shop Drawings	20	62	1/29/2027	2/25/2027	5D - Hol
SUBM-2240	Fabricate & Deliver Engine Generators	200	62	2/26/2027	12/9/2027	5D - Hol
Transfer Switches						
SUBM-1510	Prepare & Submit Transfer Switches | Product Data / Shop Drawings	20	62	12/31/2026	1/28/2027	5D - Hol
SUBM-1810	Review & Approve Transfer Switches | Product Data / Shop Drawings	20	62	1/29/2027	2/25/2027	5D - Hol
SUBM-2530	Fabricate & Deliver Transfer Switches	200	62	2/26/2027	12/9/2027	5D - Hol
Panelboards & Load Centers Over 400 Amps						
SUBM-3210	Prepare & Submit Panelboards & Load Centers | Product Data / Shop Drawings	20	39	12/31/2026	1/28/2027	5D - Hol
SUBM-3220	Review & Approve Panelboards & Load Centers | Product Data / Shop Drawings	20	39	1/29/2027	2/25/2027	5D - Hol
SUBM-3230	Fabricate & Deliver Panelboards & Load Centers	200	39	2/26/2027	12/9/2027	5D - Hol
Utility Transformer (By Electric Company)						
SUBM-1980	Fabricate & Deliver Transformer (By Electric Company)	200	102	12/31/2026	10/12/2027	5D - Hol
Interior Lighting						
SUBM-1520	Prepare & Submit Interior Lighting | Product Data / Shop Drawings	40	137	12/31/2026	2/25/2027	5D - Hol
SUBM-2250	Review & Approve Interior Lighting | Product Data / Shop Drawings	15	137	2/26/2027	3/18/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

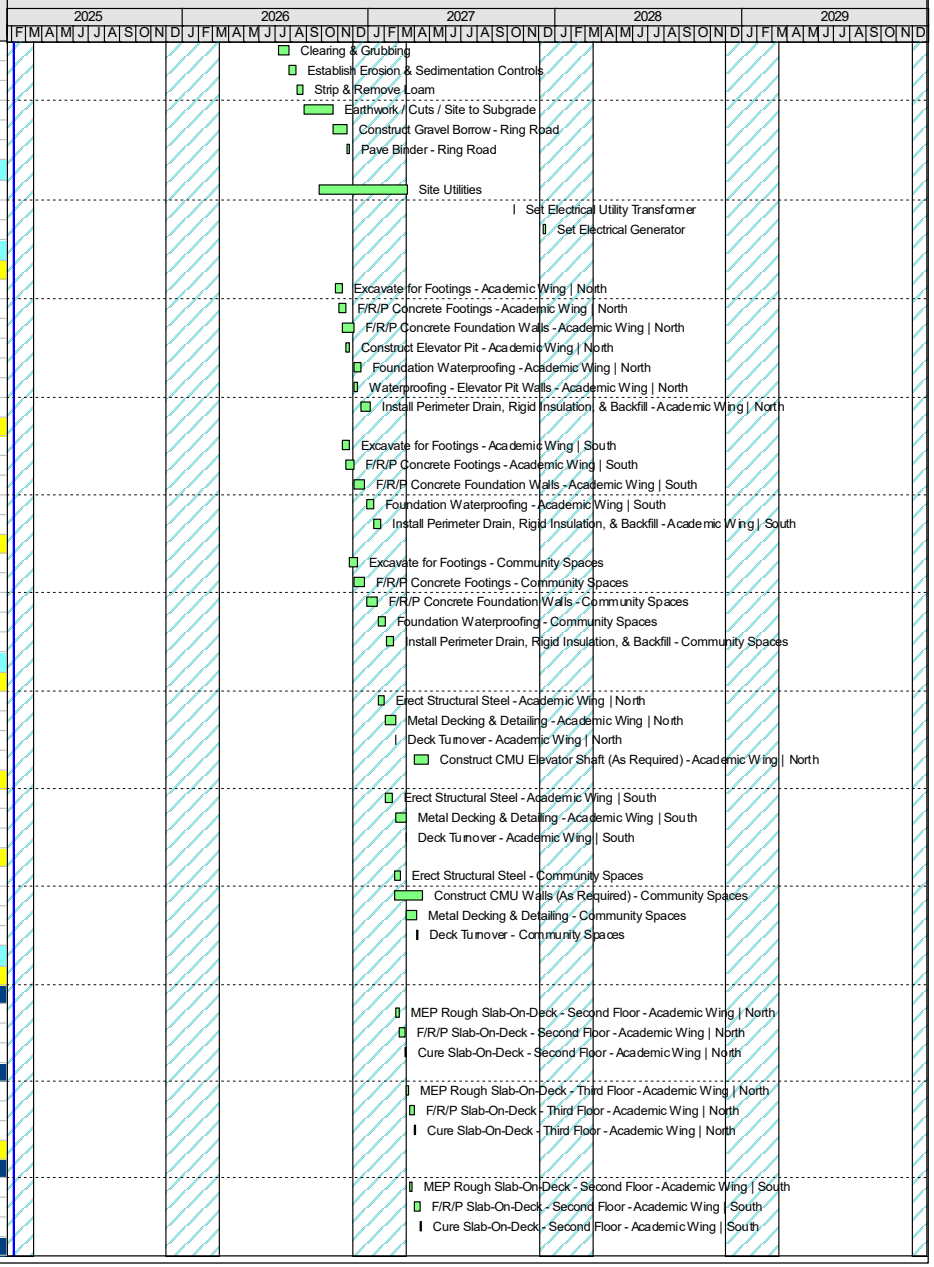
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
SUBM-2700	Fabricate & Deliver Interior Lighting	80	137	3/19/2027	7/12/2027	5D - Hol
Exterior Lighting						
SUBM-1530	Prepare & Submit Exterior Lighting | Product Data / Shop Drawings	40	230	12/31/2026	2/25/2027	5D - Hol
SUBM-2260	Review & Approve Exterior Lighting | Product Data / Shop Drawings	15	230	2/26/2027	3/18/2027	5D - Hol
SUBM-2710	Fabricate & Deliver Exterior Lighting	80	230	3/19/2027	7/12/2027	5D - Hol
Division 27 - Communications						
Data Communications Network Equipment						
SUBM-1400	Prepare & Submit Data Communications Network Equipment | Product Data / Shop Drawings	40	167	12/31/2026	2/25/2027	5D - Hol
SUBM-2180	Review & Approve Data Communications Network Equipment | Product Data / Shop Drawings	15	167	2/26/2027	3/18/2027	5D - Hol
SUBM-2650	Fabricate & Deliver Data Communications Network Equipment	80	167	3/19/2027	7/12/2027	5D - Hol
Audio-Video Communications						
SUBM-1540	Prepare & Submit Audio-Video Communications | Product Data / Shop Drawings	40	167	12/31/2026	2/25/2027	5D - Hol
SUBM-2270	Review & Approve Audio-Video Communications | Product Data / Shop Drawings	15	167	2/26/2027	3/18/2027	5D - Hol
SUBM-2720	Fabricate & Deliver Audio-Video Communications	80	167	3/19/2027	7/12/2027	5D - Hol
Public Address System						
SUBM-1550	Prepare & Submit Public Address System | Product Data / Shop Drawings	40	167	12/31/2026	2/25/2027	5D - Hol
SUBM-2280	Review & Approve Public Address System | Product Data / Shop Drawings	15	167	2/26/2027	3/18/2027	5D - Hol
SUBM-2730	Fabricate & Deliver Public Address System	80	167	3/19/2027	7/12/2027	5D - Hol
Division 28 - Electronic Safety & Security						
Electronic Access Control, Intrusion Detection & Intercom Systems						
SUBM-1410	Prepare & Submit Security Systems | Product Data / Shop Drawings	40	135	12/31/2026	2/25/2027	5D - Hol
SUBM-2190	Review & Approve Security Systems | Product Data / Shop Drawings	15	135	2/26/2027	3/18/2027	5D - Hol
SUBM-2660	Fabricate & Deliver Security Equipment	120	135	3/19/2027	9/7/2027	5D - Hol
Addressable Fire Alarm System						
SUBM-1560	Prepare & Submit Addressable Fire Alarm | Product Data / Shop Drawings	40	137	12/31/2026	2/25/2027	5D - Hol
SUBM-2290	Review & Approve Addressable Fire Alarm | Product Data / Shop Drawings	15	137	2/26/2027	3/18/2027	5D - Hol
SUBM-2740	Fabricate & Deliver Addressable Fire Alarm System	80	137	3/19/2027	7/12/2027	5D - Hol
Division 32 - Exterior Improvements						
Fencing						
SUBM-1430	Prepare & Submit Fencing | Product Data / Shop Drawings	40	357	12/31/2026	2/25/2027	5D - Hol
SUBM-2210	Review & Approve Fencing | Product Data / Shop Drawings	15	357	2/26/2027	3/18/2027	5D - Hol
SUBM-2680	Fabricate & Deliver Fencing	60	357	3/19/2027	6/11/2027	5D - Hol
Division 33 - Utilities						
Water Utilities						
SUBM-1160	Prepare & Submit Water Utilities | Product Data / Shop Drawings	15	288	6/10/2026	6/30/2026	5D - Hol
SUBM-1600	Review & Approve Water Utilities | Product Data / Shop Drawings	10	288	7/1/2026	7/15/2026	5D - Hol
SUBM-2010	Fabricate & Deliver Water Pipe & Materials	10	288	7/16/2026	7/29/2026	5D - Hol
Sanitary Sewerage Utilities						
SUBM-1150	Prepare & Submit Sanitary Sewerage | Product Data / Shop Drawings	15	288	6/10/2026	6/30/2026	5D - Hol
SUBM-1590	Review & Approve Sanitary Sewerage | Product Data / Shop Drawings	10	288	7/1/2026	7/15/2026	5D - Hol
SUBM-2000	Fabricate & Deliver Sanitary Pipe & Materials	10	288	7/16/2026	7/29/2026	5D - Hol
Storm Drainage Utilities						
SUBM-1170	Prepare & Submit Storm Drainage | Product Data / Shop Drawings	15	388	6/10/2026	6/30/2026	5D - Hol
SUBM-1610	Review & Approve Storm Drainage | Product Data / Shop Drawings	10	388	7/1/2026	7/15/2026	5D - Hol
SUBM-2020	Fabricate & Deliver Drainage Pipe & Structures	20	388	7/16/2026	8/12/2026	5D - Hol
MEP Coordination						
CORD-1000	Coordinate Underground & MEP Risers	30	36	12/31/2026	2/11/2027	5D - Hol
CORD-1030	Coordinate Third Floor & RTUs	30	36	2/12/2027	3/25/2027	5D - Hol
CORD-1010	Coordinate Second Floor & RTUs	30	36	3/26/2027	5/6/2027	5D - Hol
CORD-1020	Coordinate First Floor	20	36	5/7/2027	6/4/2027	5D - Hol
Phase 1 - Building Construction						
Mobilization & Construction Startup						
CSTR-1000	Mobilize to Site	1	3	6/23/2026	6/23/2026	5D - Hol
CSTR-1010	Secure Site (Temp Fencing, Signage, etc.)	4	24	6/24/2026	6/29/2026	5D - Hol
CSTR-1020	Install Stabilized Construction Entrance / Tracking Pad	4	34	6/24/2026	6/29/2026	5D - Hol
CSTR-1030	Construct Temp Access & Parking	5	86	6/30/2026	7/7/2026	5D - Hol
CSTR-1220	Setup Temporary Power	10	70	7/30/2026	8/12/2026	5D - Hol
CSTR-1230	Establish Project Field Offices	10	70	7/30/2026	8/12/2026	5D - Hol
Early Enabling Work						
CSTR-1240	Tree Removal	5	3	6/24/2026	6/30/2026	5D - Hol
CSTR-1210	Relocate Existing Playground	5	3	7/1/2026	7/8/2026	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

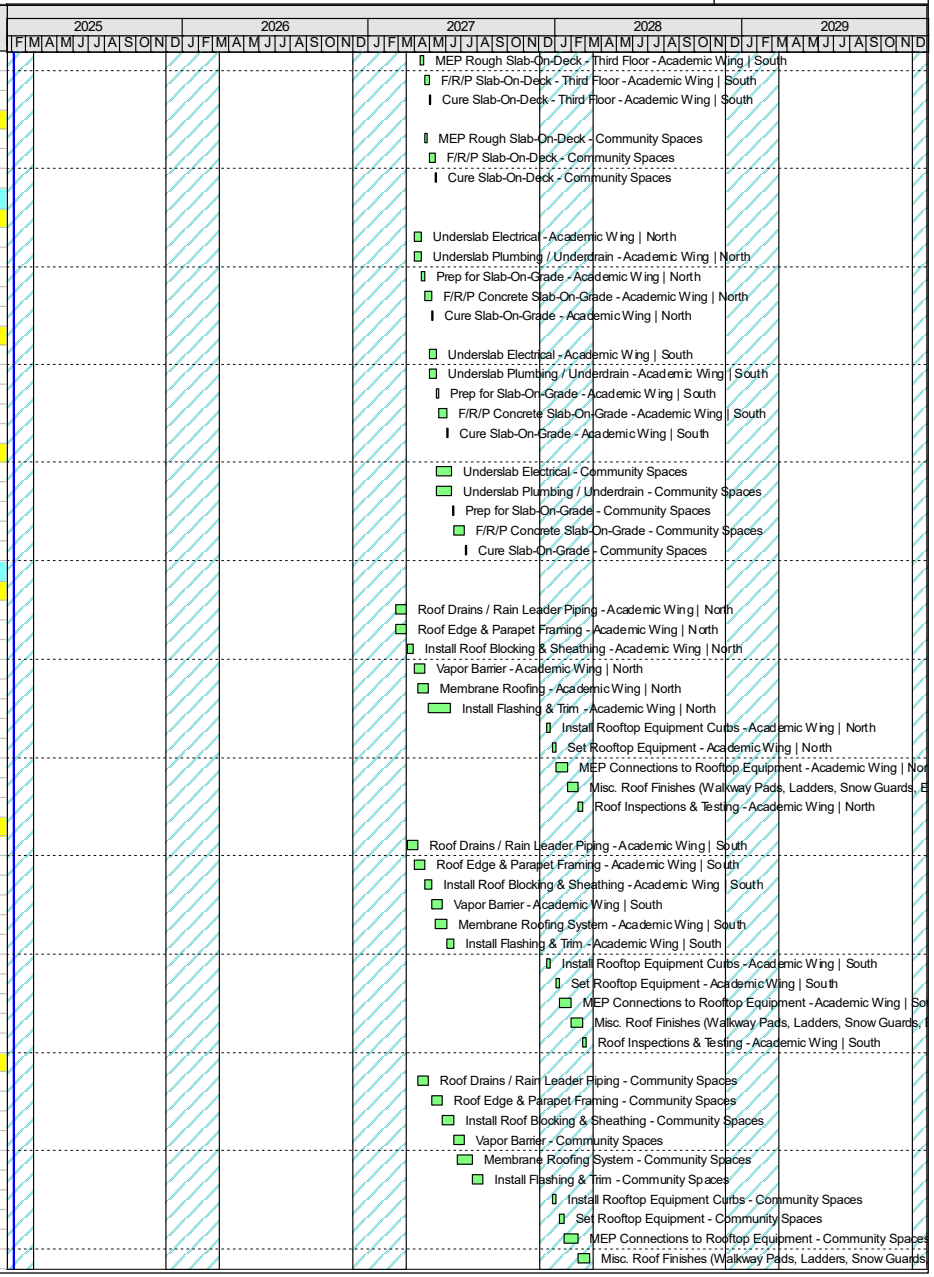
Data Date 2/4/2025

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-1200	Clearing & Grubbing	15	3	7/9/2026	7/29/2026	5D - Hol
CSTR-1250	Establish Erosion & Sedimentation Controls	10	3	7/30/2026	8/12/2026	5D - Hol
CSTR-1270	Strip & Remove Loam	10	3	8/13/2026	8/26/2026	5D - Hol
CSTR-1320	Earthwork / Cuts / Site to Subgrade	40	3	8/27/2026	10/22/2026	5D - Hol
CSTR-1330	Construct Gravel Borrow - Ring Road	20	3	10/23/2026	11/19/2026	5D - Hol
CSTR-1340	Pave Binder - Ring Road	2	3	11/20/2026	11/23/2026	5D - Hol (No Winter)
Sitework						
CSTR-1390	Site Utilities	120	248	9/25/2026	3/17/2027	5D - Hol
CSTR-3300	Set Electrical Utility Transformer	2	102	10/13/2027	10/14/2027	5D - Hol
CSTR-4100	Set Electrical Generator	2	62	12/10/2027	12/13/2027	5D - Hol
Concrete Foundations						
Academic Wing - North						
CSTR-1400	Excavate for Footings - Academic Wing | North	10	12	10/28/2026	11/10/2026	5D - Hol
CSTR-1410	F/R/P Concrete Footings - Academic Wing | North	10	12	11/4/2026	11/17/2026	5D - Hol
CSTR-1430	F/R/P Concrete Foundation Walls - Academic Wing | North	15	12	11/11/2026	12/3/2026	5D - Hol
CSTR-1450	Construct Elevator Pit - Academic Wing | North	5	27	11/18/2026	11/24/2026	5D - Hol
CSTR-1510	Foundation Waterproofing - Academic Wing | North	10	12	12/4/2026	12/17/2026	5D - Hol
CSTR-1690	Waterproofing - Elevator Pit Walls - Academic Wing | North	5	323	12/4/2026	12/10/2026	5D - Hol
CSTR-1540	Install Perimeter Drain, Rigid Insulation, & Backfill - Academic Wing | North	10	12	12/18/2026	1/4/2027	5D - Hol
Academic Wing - South						
CSTR-1440	Excavate for Footings - Academic Wing | South	10	30	11/11/2026	11/24/2026	5D - Hol
CSTR-1460	F/R/P Concrete Footings - Academic Wing | South	10	30	11/18/2026	12/3/2026	5D - Hol
CSTR-1520	F/R/P Concrete Foundation Walls - Academic Wing | South	15	25	12/4/2026	12/24/2026	5D - Hol
CSTR-1570	Foundation Waterproofing - Academic Wing | South	10	28	12/28/2026	1/11/2027	5D - Hol
CSTR-1590	Install Perimeter Drain, Rigid Insulation, & Backfill - Academic Wing | South	10	28	1/12/2027	1/25/2027	5D - Hol
Large Group / Community Spaces						
CSTR-1480	Excavate for Footings - Community Spaces	10	30	11/25/2026	12/10/2026	5D - Hol
CSTR-1500	F/R/P Concrete Footings - Community Spaces	15	30	12/4/2026	12/24/2026	5D - Hol
CSTR-1560	F/R/P Concrete Foundation Walls - Community Spaces	15	25	12/28/2026	1/18/2027	5D - Hol
CSTR-1610	Foundation Waterproofing - Community Spaces	12	25	1/19/2027	2/3/2027	5D - Hol
CSTR-1620	Install Perimeter Drain, Rigid Insulation, & Backfill - Community Spaces	12	25	2/4/2027	2/19/2027	5D - Hol
Structural Steel / CMU						
Academic Wing - North						
CSTR-1660	Erect Structural Steel - Academic Wing | North	10	2	1/19/2027	2/1/2027	5D - Hol
CSTR-1670	Metal Decking & Detailing - Academic Wing | North	15	2	2/2/2027	2/22/2027	5D - Hol
CSTR-1710	Deck Turnover - Academic Wing | North	1	2	2/23/2027	2/23/2027	5D - Hol
CSTR-2160	Construct CMU Elevator Shaft (As Required) - Academic Wing | North	20	149	4/1/2027	4/28/2027	5D - Hol (No Winter)
Academic Wing - South						
CSTR-1680	Erect Structural Steel - Academic Wing | South	10	23	2/2/2027	2/15/2027	5D - Hol
CSTR-1720	Metal Decking & Detailing - Academic Wing | South	15	13	2/23/2027	3/15/2027	5D - Hol
CSTR-1780	Deck Turnover - Academic Wing | South	1	13	3/16/2027	3/16/2027	5D - Hol
Large Group / Community Spaces						
CSTR-1700	Erect Structural Steel - Community Spaces	10	25	2/22/2027	3/5/2027	5D - Hol
CSTR-1650	Construct CMU Walls (As Required) - Community Spaces	40	178	2/22/2027	4/16/2027	5D - Hol
CSTR-1770	Metal Decking & Detailing - Community Spaces	15	19	3/16/2027	4/5/2027	5D - Hol
CSTR-1870	Deck Turnover - Community Spaces	1	19	4/6/2027	4/6/2027	5D - Hol
Concrete Slabs-On-Deck						
Academic Wing - North						
Second Floor						
CSTR-1820	MEP Rough Slab-On-Deck - Second Floor - Academic Wing | North	5	2	2/24/2027	3/2/2027	5D - Hol
CSTR-1860	F/R/P Slab-On-Deck - Second Floor - Academic Wing | North	8	2	3/3/2027	3/12/2027	5D - Hol
CSTR-1990	Cure Slab-On-Deck - Second Floor - Academic Wing | North	3	41	3/13/2027	3/15/2027	7D - No Hol (MS Cal)
Third Floor						
CSTR-1750	MEP Rough Slab-On-Deck - Third Floor - Academic Wing | North	5	2	3/15/2027	3/19/2027	5D - Hol
CSTR-1760	F/R/P Slab-On-Deck - Third Floor - Academic Wing | North	8	2	3/22/2027	3/31/2027	5D - Hol
CSTR-1810	Cure Slab-On-Deck - Third Floor - Academic Wing | North	3	22	4/1/2027	4/3/2027	7D - No Hol (MS Cal)
Academic Wing - South						
Second Floor						
CSTR-7820	MEP Rough Slab-On-Deck - Second Floor - Academic Wing | South	5	10	3/22/2027	3/26/2027	5D - Hol
CSTR-7810	F/R/P Slab-On-Deck - Second Floor - Academic Wing | South	8	7	4/1/2027	4/12/2027	5D - Hol
CSTR-7800	Cure Slab-On-Deck - Second Floor - Academic Wing | South	3	31	4/13/2027	4/15/2027	7D - No Hol (MS Cal)
Third Floor						



Wilmington Elementary School: Proposal Schedule Rev03

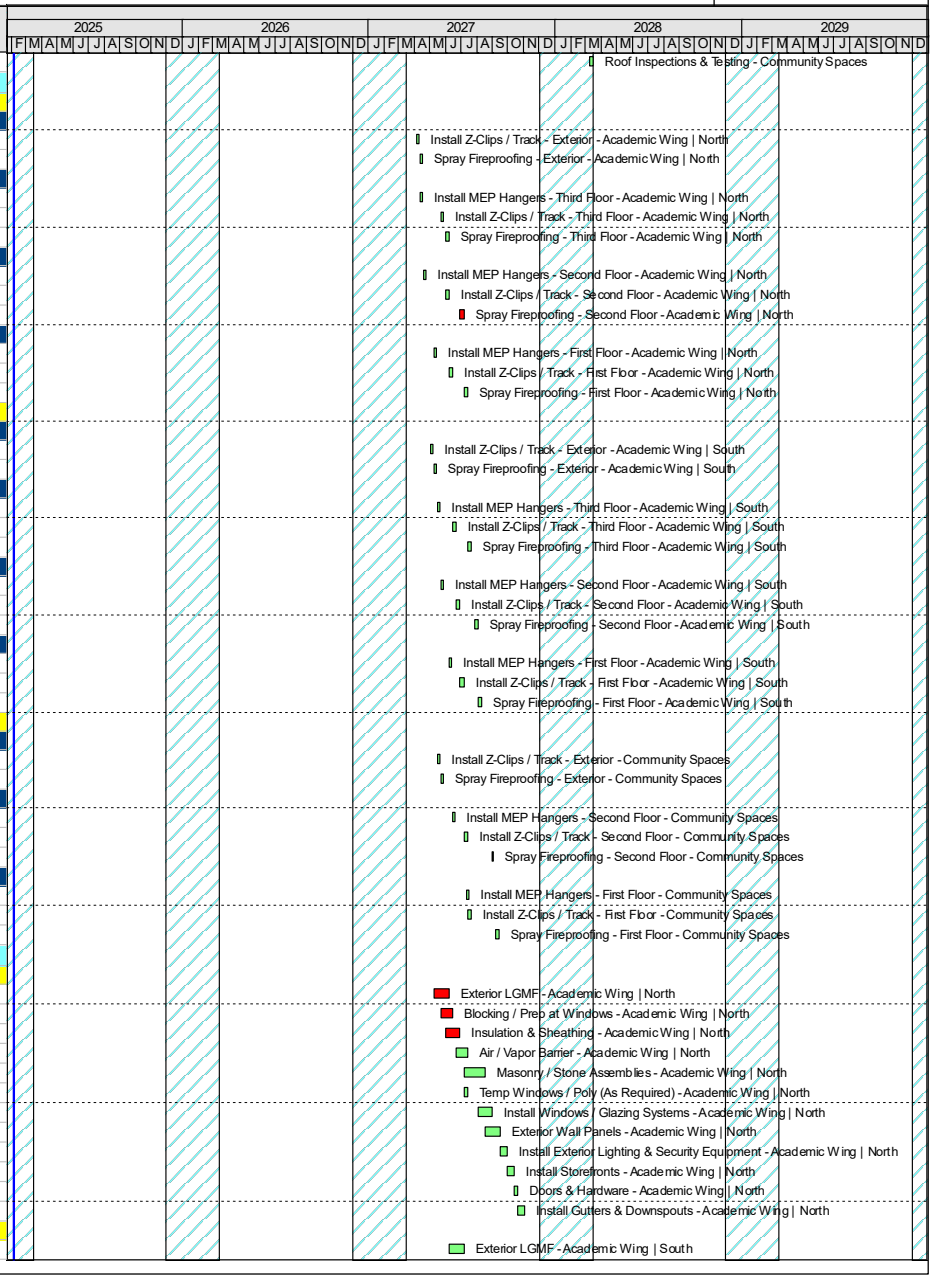
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-7790	MEP Rough Slab-On-Deck - Third Floor - Academic Wing | South	5	7	4/13/2027	4/19/2027	5D - Hol
CSTR-7780	F/R/P Slab-On-Deck - Third Floor - Academic Wing | South	8	7	4/20/2027	4/29/2027	5D - Hol
CSTR-7770	Cure Slab-On-Deck - Third Floor - Academic Wing | South	3	14	4/30/2027	5/2/2027	7D - No Hol (MS Cal)
Large Group / Community Spaces						
CSTR-1920	MEP Rough Slab-On-Deck - Community Spaces	5	10	4/20/2027	4/26/2027	5D - Hol
CSTR-2010	F/R/P Slab-On-Deck - Community Spaces	8	7	4/30/2027	5/11/2027	5D - Hol
CSTR-2040	Cure Slab-On-Deck - Community Spaces	3	9	5/12/2027	5/14/2027	7D - No Hol (MS Cal)
Concrete Slabs-On-Grade						
Academic Wing - North						
CSTR-1970	Underslab Electrical - Academic Wing | North	10	2	4/1/2027	4/14/2027	5D - Hol
CSTR-1980	Underslab Plumbing / Underdrain - Academic Wing | North	10	2	4/1/2027	4/14/2027	5D - Hol
CSTR-2190	Prep for Slab-On-Grade - Academic Wing | North	4	2	4/15/2027	4/20/2027	5D - Hol
CSTR-2240	F/R/P Concrete Slab-On-Grade - Academic Wing | North	10	2	4/21/2027	5/4/2027	5D - Hol
CSTR-2370	Cure Slab-On-Grade - Academic Wing | North	3	2	5/5/2027	5/7/2027	7D - No Hol (MS Cal)
Academic Wing - South						
CSTR-2200	Underslab Electrical - Academic Wing | South	10	26	4/30/2027	5/13/2027	5D - Hol
CSTR-2210	Underslab Plumbing / Underdrain - Academic Wing | South	10	26	4/30/2027	5/13/2027	5D - Hol
CSTR-2340	Prep for Slab-On-Grade - Academic Wing | South	3	26	5/14/2027	5/18/2027	5D - Hol
CSTR-2390	F/R/P Concrete Slab-On-Grade - Academic Wing | South	10	26	5/19/2027	6/2/2027	5D - Hol
CSTR-2440	Cure Slab-On-Grade - Academic Wing | South	3	38	6/3/2027	6/5/2027	7D - No Hol (MS Cal)
Large Group / Community Spaces						
CSTR-2320	Underslab Electrical - Community Spaces	20	26	5/14/2027	6/11/2027	5D - Hol
CSTR-2330	Underslab Plumbing / Underdrain - Community Spaces	20	26	5/14/2027	6/11/2027	5D - Hol
CSTR-2490	Prep for Slab-On-Grade - Community Spaces	3	26	6/14/2027	6/16/2027	5D - Hol
CSTR-2550	F/R/P Concrete Slab-On-Grade - Community Spaces	15	26	6/17/2027	7/8/2027	5D - Hol
CSTR-2620	Cure Slab-On-Grade - Community Spaces	3	38	7/9/2027	7/11/2027	7D - No Hol (MS Cal)
Roof						
Academic Wing - North						
CSTR-1730	Roof Drains / Rain Leader Piping - Academic Wing | North	15	43	2/24/2027	3/16/2027	5D - Hol
CSTR-1740	Roof Edge & Parapet Framing - Academic Wing | North	15	28	2/24/2027	3/16/2027	5D - Hol
CSTR-1800	Install Roof Blocking & Sheathing - Academic Wing | North	10	28	3/17/2027	3/30/2027	5D - Hol
CSTR-1880	Vapor Barrier - Academic Wing | North	15	28	3/31/2027	4/20/2027	5D - Hol
CSTR-1910	Membrane Roofing - Academic Wing | North	15	28	4/7/2027	4/27/2027	5D - Hol
CSTR-2130	Install Flashing & Trim - Academic Wing | North	30	242	4/28/2027	6/9/2027	5D - Hol
CSTR-4220	Install Rooftop Equipment Curbs - Academic Wing | North	5	35	12/17/2027	12/23/2027	5D - Hol
CSTR-4430	Set Rooftop Equipment - Academic Wing | North	5	35	12/27/2027	1/3/2028	5D - Hol
CSTR-4610	MEP Connections to Rooftop Equipment - Academic Wing | North	15	35	1/4/2028	1/25/2028	5D - Hol
CSTR-5050	Misc. Roof Finishes (Walkway Pads, Ladders, Snow Guards, Etc.) - Academic Wing | North	15	85	1/26/2028	2/15/2028	5D - Hol
CSTR-5450	Roof Inspections & Testing - Academic Wing | North	5	85	2/16/2028	2/23/2028	5D - Hol
Academic Wing - South						
CSTR-1840	Roof Drains / Rain Leader Piping - Academic Wing | South	15	88	3/17/2027	4/6/2027	5D - Hol
CSTR-1890	Roof Edge & Parapet Framing - Academic Wing | South	15	54	3/31/2027	4/20/2027	5D - Hol
CSTR-1960	Install Roof Blocking & Sheathing - Academic Wing | South	10	54	4/21/2027	5/4/2027	5D - Hol
CSTR-2120	Vapor Barrier - Academic Wing | South	15	63	5/5/2027	5/25/2027	5D - Hol
CSTR-2170	Membrane Roofing System - Academic Wing | South	15	63	5/12/2027	6/2/2027	5D - Hol
CSTR-2350	Install Flashing & Trim - Academic Wing | South	10	237	6/3/2027	6/16/2027	5D - Hol
CSTR-4210	Install Rooftop Equipment Curbs - Academic Wing | South	5	50	12/17/2027	12/23/2027	5D - Hol
CSTR-4420	Set Rooftop Equipment - Academic Wing | South	5	45	1/4/2028	1/10/2028	5D - Hol
CSTR-4600	MEP Connections to Rooftop Equipment - Academic Wing | South	15	45	1/11/2028	2/1/2028	5D - Hol
CSTR-5060	Misc. Roof Finishes (Walkway Pads, Ladders, Snow Guards, Etc.) - Academic Wing | South	15	80	2/2/2028	2/23/2028	5D - Hol
CSTR-5460	Roof Inspections & Testing - Academic Wing | South	5	80	2/24/2028	3/1/2028	5D - Hol
Large Group / Community Spaces						
CSTR-1950	Roof Drains / Rain Leader Piping - Community Spaces	15	94	4/7/2027	4/27/2027	5D - Hol
CSTR-2070	Roof Edge & Parapet Framing - Community Spaces	15	54	5/5/2027	5/25/2027	5D - Hol
CSTR-2110	Install Roof Blocking & Sheathing - Community Spaces	15	54	5/26/2027	6/16/2027	5D - Hol
CSTR-2290	Vapor Barrier - Community Spaces	15	54	6/17/2027	7/8/2027	5D - Hol
CSTR-2380	Membrane Roofing System - Community Spaces	20	54	6/24/2027	7/22/2027	5D - Hol
CSTR-2590	Install Flashing & Trim - Community Spaces	15	197	7/23/2027	8/12/2027	5D - Hol
CSTR-4410	Install Rooftop Equipment Curbs - Community Spaces	5	55	12/27/2027	1/3/2028	5D - Hol
CSTR-4590	Set Rooftop Equipment - Community Spaces	5	50	1/11/2028	1/18/2028	5D - Hol
CSTR-4740	MEP Connections to Rooftop Equipment - Community Spaces	20	50	1/19/2028	2/15/2028	5D - Hol
CSTR-5310	Misc. Roof Finishes (Walkway Pads, Ladders, Snow Guards, Etc.) - Community Spaces	15	70	2/16/2028	3/8/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

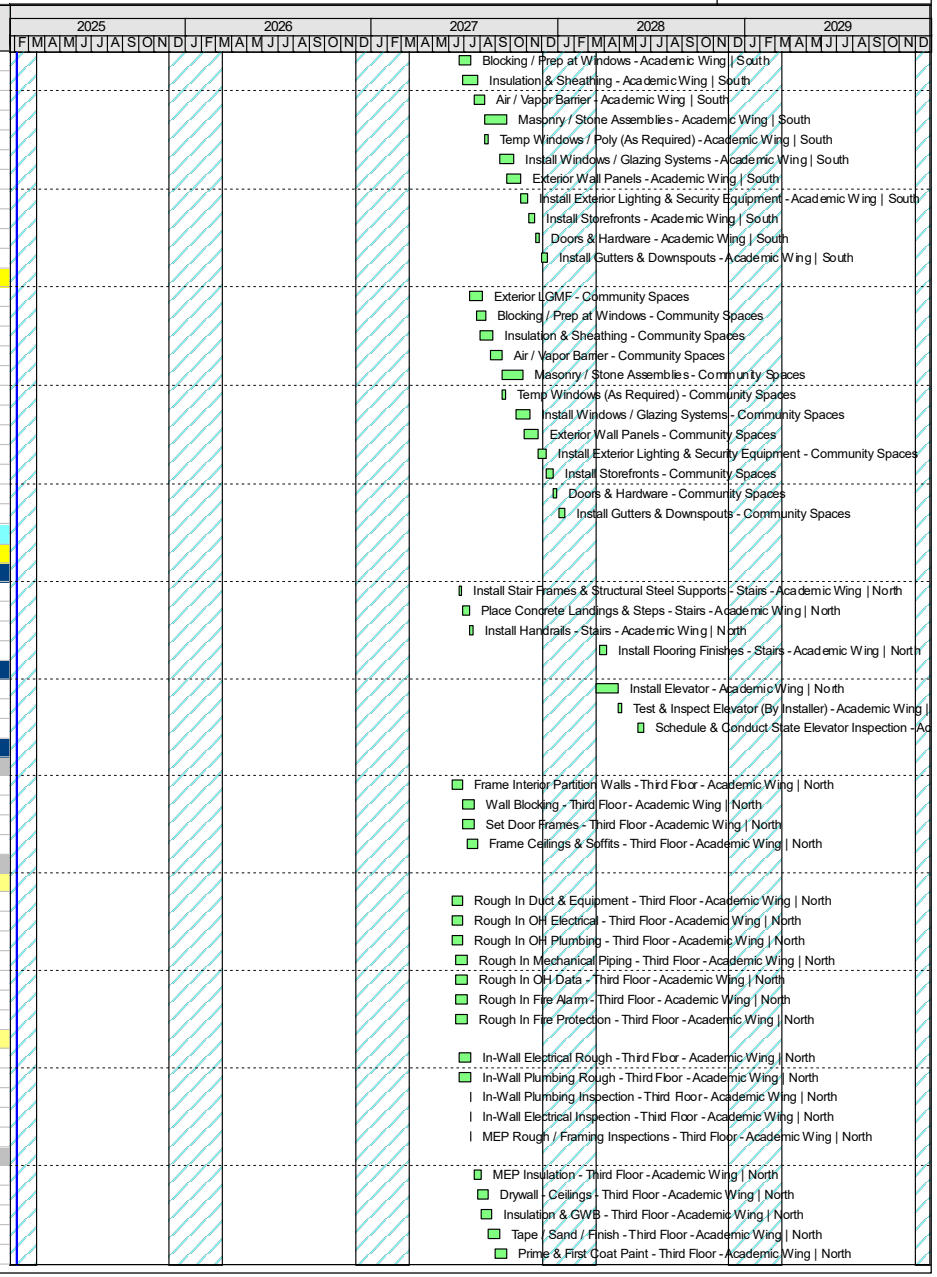
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-5670	Roof Inspections & Testing - Community Spaces	5	70	3/9/2028	3/15/2028	5D - Hol
Fireproofing						
Academic Wing | North						
Exterior						
CSTR-2020	Install Z-Clips / Track - Exterior - Academic Wing | North	5	15	4/5/2027	4/9/2027	5D - Hol
CSTR-2150	Spray Fireproofing - Exterior - Academic Wing | North	5	15	4/12/2027	4/16/2027	5D - Hol
Third Floor						
CSTR-2230	Install MEP Hangers - Third Floor - Academic Wing | North	5	35	4/12/2027	4/16/2027	5D - Hol
CSTR-2220	Install Z-Clips / Track - Third Floor - Academic Wing | North	5	5	5/24/2027	5/28/2027	5D - Hol
CSTR-2280	Spray Fireproofing - Third Floor - Academic Wing | North	5	5	6/1/2027	6/7/2027	5D - Hol
Second Floor						
CSTR-2270	Install MEP Hangers - Second Floor - Academic Wing | North	5	45	4/19/2027	4/23/2027	5D - Hol
CSTR-2260	Install Z-Clips / Track - Second Floor - Academic Wing | North	5	10	6/1/2027	6/7/2027	5D - Hol
CSTR-2920	Spray Fireproofing - Second Floor - Academic Wing | North	5	0	6/29/2027	7/6/2027	5D - Hol
First Floor						
CSTR-2430	Install MEP Hangers - First Floor - Academic Wing | North	5	45	5/10/2027	5/14/2027	5D - Hol
CSTR-2420	Install Z-Clips / Track - First Floor - Academic Wing | North	5	25	6/8/2027	6/14/2027	5D - Hol
CSTR-2980	Spray Fireproofing - First Floor - Academic Wing | North	5	10	7/7/2027	7/13/2027	5D - Hol
Academic Wing | South						
Exterior						
CSTR-2050	Install Z-Clips / Track - Exterior - Academic Wing | South	5	10	5/3/2027	5/7/2027	5D - Hol
CSTR-2360	Spray Fireproofing - Exterior - Academic Wing | South	5	40	5/10/2027	5/14/2027	5D - Hol
Third Floor						
CSTR-7850	Install MEP Hangers - Third Floor - Academic Wing | South	5	55	5/17/2027	5/21/2027	5D - Hol
CSTR-7840	Install Z-Clips / Track - Third Floor - Academic Wing | South	5	35	6/15/2027	6/21/2027	5D - Hol
CSTR-7830	Spray Fireproofing - Third Floor - Academic Wing | South	5	20	7/14/2027	7/20/2027	5D - Hol
Second Floor						
CSTR-2470	Install MEP Hangers - Second Floor - Academic Wing | South	5	65	5/24/2027	5/28/2027	5D - Hol
CSTR-2460	Install Z-Clips / Track - Second Floor - Academic Wing | South	5	45	6/22/2027	6/28/2027	5D - Hol
CSTR-3200	Spray Fireproofing - Second Floor - Academic Wing | South	5	25	7/28/2027	8/3/2027	5D - Hol
First Floor						
CSTR-2570	Install MEP Hangers - First Floor - Academic Wing | South	5	76	6/7/2027	6/11/2027	5D - Hol
CSTR-2560	Install Z-Clips / Track - First Floor - Academic Wing | South	5	55	6/29/2027	7/6/2027	5D - Hol
CSTR-3230	Spray Fireproofing - First Floor - Academic Wing | South	5	35	8/4/2027	8/10/2027	5D - Hol
Large Group / Community Spaces						
Exterior						
CSTR-2100	Install Z-Clips / Track - Exterior - Community Spaces	5	5	5/17/2027	5/21/2027	5D - Hol
CSTR-2600	Spray Fireproofing - Exterior - Community Spaces	5	56	5/24/2027	5/28/2027	5D - Hol
Second Floor						
CSTR-2660	Install MEP Hangers - Second Floor - Community Spaces	5	77	6/14/2027	6/18/2027	5D - Hol
CSTR-2650	Install Z-Clips / Track - Second Floor - Community Spaces	5	56	7/7/2027	7/13/2027	5D - Hol
CSTR-3530	Spray Fireproofing - Second Floor - Community Spaces	5	28	8/30/2027	9/3/2027	5D - Hol
First Floor						
CSTR-2710	Install MEP Hangers - First Floor - Community Spaces	5	63	7/12/2027	7/16/2027	5D - Hol
CSTR-2700	Install Z-Clips / Track - First Floor - Community Spaces	5	61	7/14/2027	7/20/2027	5D - Hol
CSTR-3590	Spray Fireproofing - First Floor - Community Spaces	5	28	9/7/2027	9/13/2027	5D - Hol
Exterior Envelope						
Academic Wing | North						
CSTR-2410	Exterior LGMF - Academic Wing | North	20	0	5/10/2027	6/7/2027	5D - Hol
CSTR-2580	Blocking / Prep at Windows - Academic Wing | North	15	0	5/24/2027	6/14/2027	5D - Hol
CSTR-2640	Insulation & Sheathing - Academic Wing | North	20	0	6/1/2027	6/28/2027	5D - Hol
CSTR-2860	Air / Vapor Barrier - Academic Wing | North	15	5	6/22/2027	7/13/2027	5D - Hol
CSTR-2960	Masonry / Stone Assemblies - Academic Wing | North	30	119	7/7/2027	8/17/2027	5D - Hol
CSTR-3040	Temp Windows / Poly (As Required) - Academic Wing | North	5	5	7/7/2027	7/13/2027	5D - Hol
CSTR-3210	Install Windows / Glazing Systems - Academic Wing | North	20	179	8/4/2027	8/31/2027	5D - Hol
CSTR-3030	Exterior Wall Panels - Academic Wing | North	20	119	8/18/2027	9/15/2027	5D - Hol
CSTR-3440	Install Exterior Lighting & Security Equipment - Academic Wing | North	10	159	9/16/2027	9/29/2027	5D - Hol
CSTR-3580	Install Storefronts - Academic Wing | North	10	159	9/30/2027	10/13/2027	5D - Hol
CSTR-3830	Doors & Hardware - Academic Wing | North	5	159	10/14/2027	10/20/2027	5D - Hol
CSTR-3920	Install Gutters & Downspouts - Academic Wing | North	10	159	10/21/2027	11/3/2027	5D - Hol
Academic Wing | South						
CSTR-2690	Exterior LGMF - Academic Wing | South	20	25	6/8/2027	7/6/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

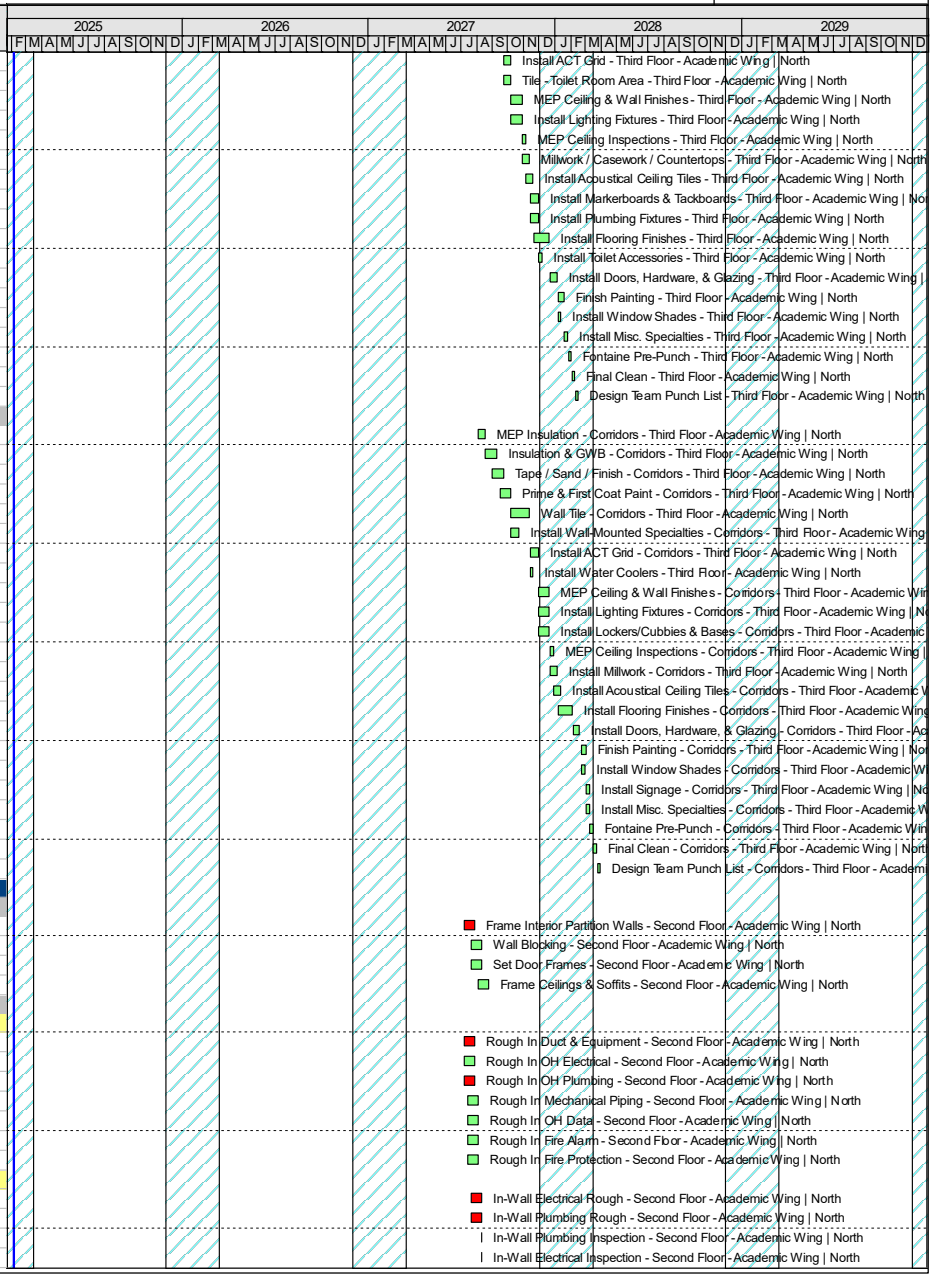
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-2870	Blocking / Prep at Windows - Academic Wing | South	15	25	6/22/2027	7/13/2027	5D - Hol
CSTR-2910	Insulation & Sheathing - Academic Wing | South	20	25	6/29/2027	7/27/2027	5D - Hol
CSTR-3110	Air / Vapor Barrier - Academic Wing | South	15	61	7/21/2027	8/10/2027	5D - Hol
CSTR-3330	Masonry / Stone Assemblies - Academic Wing | South	30	114	8/11/2027	9/22/2027	5D - Hol
CSTR-3340	Temp Windows / Poly (As Required) - Academic Wing | South	5	61	8/11/2027	8/17/2027	5D - Hol
CSTR-3570	Install Windows / Glazing Systems - Academic Wing | South	20	124	9/9/2027	10/6/2027	5D - Hol
CSTR-3990	Exterior Wall Panels - Academic Wing | South	20	114	9/23/2027	10/20/2027	5D - Hol
CSTR-4670	Install Exterior Lighting & Security Equipment - Academic Wing | South	10	134	10/21/2027	11/3/2027	5D - Hol
CSTR-4980	Install Storefronts - Academic Wing | South	10	134	11/4/2027	11/17/2027	5D - Hol
CSTR-5270	Doors & Hardware - Academic Wing | South	5	134	11/18/2027	11/24/2027	5D - Hol
CSTR-5420	Install Gutters & Downspouts - Academic Wing | South	10	134	11/29/2027	12/10/2027	5D - Hol
Large Group / Community Spaces						
CSTR-2970	Exterior LGMF - Community Spaces	20	28	7/12/2027	8/6/2027	5D - Hol
CSTR-3120	Blocking / Prep at Windows - Community Spaces	15	28	7/26/2027	8/13/2027	5D - Hol
CSTR-3220	Insulation & Sheathing - Community Spaces	20	28	8/2/2027	8/27/2027	5D - Hol
CSTR-3450	Air / Vapor Barrier - Community Spaces	15	81	8/23/2027	9/13/2027	5D - Hol
CSTR-3690	Masonry / Stone Assemblies - Community Spaces	30	111	9/14/2027	10/25/2027	5D - Hol
CSTR-3700	Temp Windows (As Required) - Community Spaces	5	95	9/14/2027	9/20/2027	5D - Hol
CSTR-4000	Install Windows / Glazing Systems - Community Spaces	20	121	10/12/2027	11/8/2027	5D - Hol
CSTR-4880	Exterior Wall Panels - Community Spaces	20	111	10/26/2027	11/22/2027	5D - Hol
CSTR-5440	Install Exterior Lighting & Security Equipment - Community Spaces	10	111	11/23/2027	12/8/2027	5D - Hol
CSTR-5640	Install Storefronts - Community Spaces	10	111	12/9/2027	12/22/2027	5D - Hol
CSTR-5930	Doors & Hardware - Community Spaces	5	111	12/23/2027	12/30/2027	5D - Hol
CSTR-6060	Install Gutters & Downspouts - Community Spaces	10	111	1/3/2028	1/14/2028	5D - Hol
Interior Finish-Out						
Academic Wing | North						
Stairs						
CSTR-2400	Install Stair Frames & Structural Steel Supports - Stairs - Academic Wing | North	5	220	6/21/2027	6/25/2027	5D - Hol
CSTR-2450	Place Concrete Landings & Steps - Stairs - Academic Wing | North	10	220	6/28/2027	7/12/2027	5D - Hol
CSTR-2630	Install Handrails - Stairs - Academic Wing | North	5	220	7/13/2027	7/19/2027	5D - Hol
CSTR-7190	Install Flooring Finishes - Stairs - Academic Wing | North	10	50	3/23/2028	4/5/2028	5D - Hol
Elevator						
CSTR-6480	Install Elevator - Academic Wing | North	30	5	3/16/2028	4/27/2028	5D - Hol
CSTR-7060	Test & Inspect Elevator (By Installer) - Academic Wing | North	5	5	4/28/2028	5/4/2028	5D - Hol
CSTR-7680	Schedule & Conduct State Elevator Inspection - Academic Wing | North	10	5	6/5/2028	6/16/2028	5D - Hol
Third Floor - Academic Wing | North						
Framing						
CSTR-2730	Frame Interior Partition Walls - Third Floor - Academic Wing | North	15	5	6/8/2027	6/28/2027	5D - Hol
CSTR-2930	Wall Blocking - Third Floor - Academic Wing | North	15	39	6/29/2027	7/20/2027	5D - Hol
CSTR-2940	Set Door Frames - Third Floor - Academic Wing | North	15	39	6/29/2027	7/20/2027	5D - Hol
CSTR-3050	Frame Ceilings & Soffits - Third Floor - Academic Wing | North	15	99	7/7/2027	7/27/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-2740	Rough In Duct & Equipment - Third Floor - Academic Wing | North	15	5	6/8/2027	6/28/2027	5D - Hol
CSTR-2750	Rough In OH Electrical - Third Floor - Academic Wing | North	15	18	6/8/2027	6/28/2027	5D - Hol
CSTR-2760	Rough In OH Plumbing - Third Floor - Academic Wing | North	15	5	6/8/2027	6/28/2027	5D - Hol
CSTR-2820	Rough In Mechanical Piping - Third Floor - Academic Wing | North	15	18	6/15/2027	7/6/2027	5D - Hol
CSTR-2830	Rough In OH Data - Third Floor - Academic Wing | North	15	18	6/15/2027	7/6/2027	5D - Hol
CSTR-2840	Rough In Fire Alarm - Third Floor - Academic Wing | North	15	18	6/15/2027	7/6/2027	5D - Hol
CSTR-2850	Rough In Fire Protection - Third Floor - Academic Wing | North	15	14	6/15/2027	7/6/2027	5D - Hol
In-Wall Roughs						
CSTR-2950	In-Wall Electrical Rough - Third Floor - Academic Wing | North	15	5	6/22/2027	7/13/2027	5D - Hol
CSTR-2900	In-Wall Plumbing Rough - Third Floor - Academic Wing | North	15	5	6/22/2027	7/13/2027	5D - Hol
CSTR-3060	In-Wall Plumbing Inspection - Third Floor - Academic Wing | North	1	42	7/14/2027	7/14/2027	5D - Hol
CSTR-3130	In-Wall Electrical Inspection - Third Floor - Academic Wing | North	1	42	7/14/2027	7/14/2027	5D - Hol
CSTR-3180	MEP Rough / Framing Inspections - Third Floor - Academic Wing | North	1	42	7/15/2027	7/15/2027	5D - Hol
Classroom Finishes						
CSTR-3190	MEP Insulation - Third Floor - Academic Wing | North	10	39	7/21/2027	8/3/2027	5D - Hol
CSTR-3250	Drywall - Ceilings - Third Floor - Academic Wing | North	15	99	7/28/2027	8/17/2027	5D - Hol
CSTR-3310	Insulation & GWB - Third Floor - Academic Wing | North	15	89	8/4/2027	8/24/2027	5D - Hol
CSTR-3510	Tape / Sand / Finish - Third Floor - Academic Wing | North	15	89	8/18/2027	9/8/2027	5D - Hol
CSTR-3650	Prime & First Coat Paint - Third Floor - Academic Wing | North	15	89	9/1/2027	9/22/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

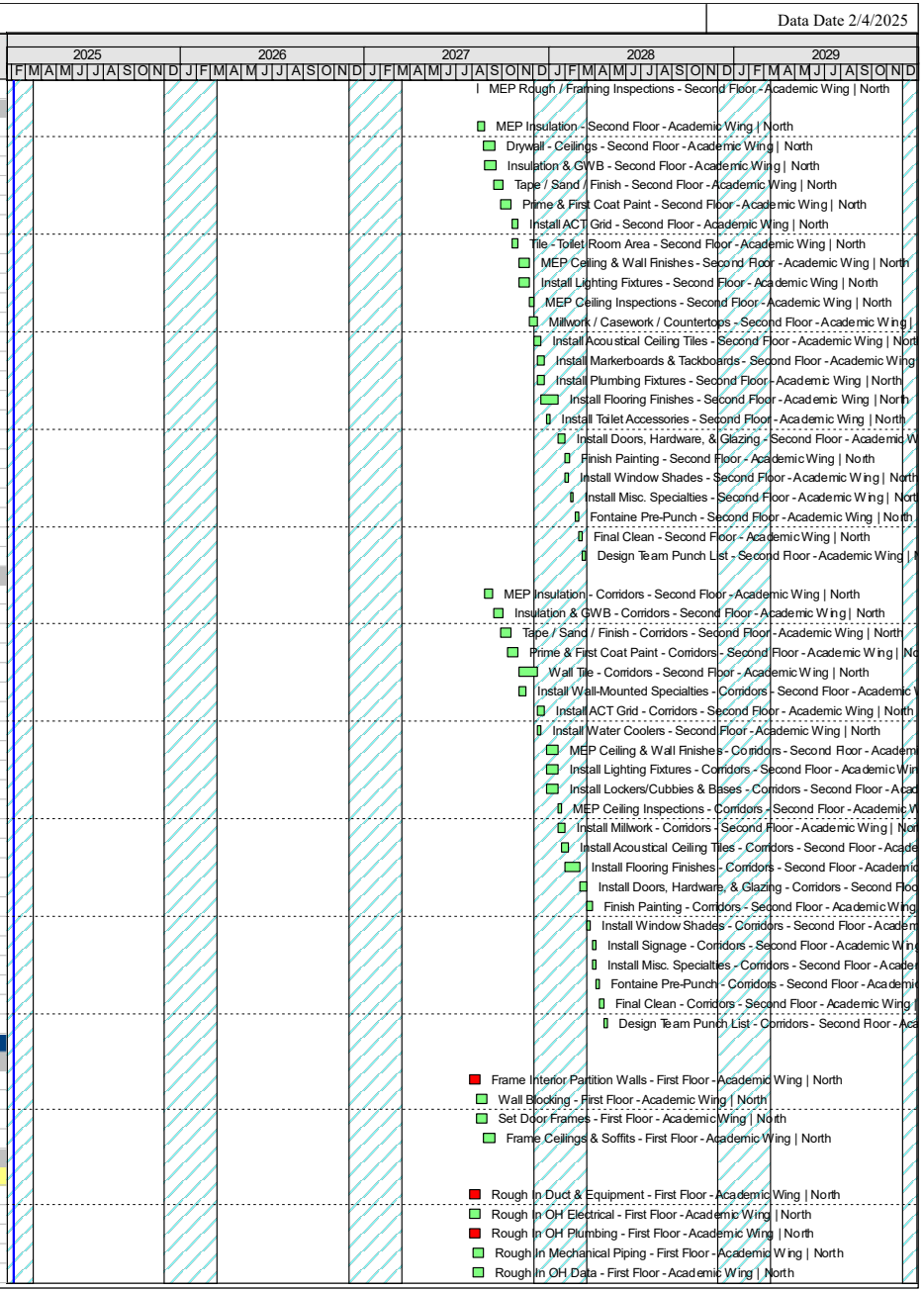
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-3930	Install ACT Grid - Third Floor - Academic Wing | North	10	89	9/23/2027	10/6/2027	5D - Hol
CSTR-3940	Tile - Toilet Room Area - Third Floor - Academic Wing | North	10	147	9/23/2027	10/6/2027	5D - Hol
CSTR-4230	MEP Ceiling & Wall Finishes - Third Floor - Academic Wing | North	15	89	10/7/2027	10/28/2027	5D - Hol
CSTR-4240	Install Lighting Fixtures - Third Floor - Academic Wing | North	15	89	10/7/2027	10/28/2027	5D - Hol
CSTR-4760	MEP Ceiling Inspections - Third Floor - Academic Wing | North	5	89	10/29/2027	11/4/2027	5D - Hol
CSTR-4770	Millwork / Casework / Countertops - Third Floor - Academic Wing | North	10	122	10/29/2027	11/12/2027	5D - Hol
CSTR-4920	Install Acoustical Ceiling Tiles - Third Floor - Academic Wing | North	10	89	11/5/2027	11/19/2027	5D - Hol
CSTR-5080	Install Markerboards & Tackboards - Third Floor - Academic Wing | North	10	127	11/15/2027	11/30/2027	5D - Hol
CSTR-5100	Install Plumbing Fixtures - Third Floor - Academic Wing | North	10	122	11/15/2027	11/30/2027	5D - Hol
CSTR-5180	Install Flooring Finishes - Third Floor - Academic Wing | North	20	89	11/22/2027	12/21/2027	5D - Hol
CSTR-5350	Install Toilet Accessories - Third Floor - Academic Wing | North	5	122	12/1/2027	12/7/2027	5D - Hol
CSTR-5680	Install Doors, Hardware, & Glazing - Third Floor - Academic Wing | North	10	89	12/22/2027	1/6/2028	5D - Hol
CSTR-5960	Finish Painting - Third Floor - Academic Wing | North	8	89	1/7/2028	1/19/2028	5D - Hol
CSTR-5970	Install Window Shades - Third Floor - Academic Wing | North	5	97	1/7/2028	1/13/2028	5D - Hol
CSTR-6240	Install Misc. Specialties - Third Floor - Academic Wing | North	5	89	1/20/2028	1/26/2028	5D - Hol
CSTR-6400	Fontaine Pre-Punch - Third Floor - Academic Wing | North	5	89	1/27/2028	2/2/2028	5D - Hol
CSTR-6460	Final Clean - Third Floor - Academic Wing | North	5	89	2/3/2028	2/9/2028	5D - Hol
CSTR-6600	Design Team Punch List - Third Floor - Academic Wing | North	5	89	2/10/2028	2/16/2028	5D - Hol
Corridor Finishes						
CSTR-3320	MEP Insulation - Corridors - Third Floor - Academic Wing | North	10	39	8/4/2027	8/17/2027	5D - Hol
CSTR-3520	Insulation & GWB - Corridors - Third Floor - Academic Wing | North	15	39	8/18/2027	9/8/2027	5D - Hol
CSTR-3660	Tape / Sand / Finish - Corridors - Third Floor - Academic Wing | North	15	39	9/1/2027	9/22/2027	5D - Hol
CSTR-3910	Prime & First Coat Paint - Corridors - Third Floor - Academic Wing | North	15	39	9/16/2027	10/6/2027	5D - Hol
CSTR-4250	Wall Tile - Corridors - Third Floor - Academic Wing | North	25	39	10/7/2027	11/12/2027	5D - Hol
CSTR-4260	Install Wall-Mounted Specialties - Corridors - Third Floor - Academic Wing | North	10	127	10/7/2027	10/21/2027	5D - Hol
CSTR-5090	Install ACT Grid - Corridors - Third Floor - Academic Wing | North	10	39	11/15/2027	11/30/2027	5D - Hol
CSTR-5110	Install Water Coolers - Third Floor - Academic Wing | North	5	112	11/15/2027	11/19/2027	5D - Hol
CSTR-5320	MEP Ceiling & Wall Finishes - Corridors - Third Floor - Academic Wing | North	15	39	12/1/2027	12/21/2027	5D - Hol
CSTR-5330	Install Lighting Fixtures - Corridors - Third Floor - Academic Wing | North	15	39	12/1/2027	12/21/2027	5D - Hol
CSTR-5340	Install Lockers/Cubbies & Bases - Corridors - Third Floor - Academic Wing | North	15	49	12/1/2027	12/21/2027	5D - Hol
CSTR-5690	MEP Ceiling Inspections - Corridors - Third Floor - Academic Wing | North	5	44	12/22/2027	12/29/2027	5D - Hol
CSTR-5700	Install Millwork - Corridors - Third Floor - Academic Wing | North	10	39	12/22/2027	1/6/2028	5D - Hol
CSTR-5850	Install Acoustical Ceiling Tiles - Corridors - Third Floor - Academic Wing | North	10	77	12/30/2027	1/13/2028	5D - Hol
CSTR-5980	Install Flooring Finishes - Corridors - Third Floor - Academic Wing | North	20	39	1/7/2028	2/4/2028	5D - Hol
CSTR-6500	Install Doors, Hardware, & Glazing - Corridors - Third Floor - Academic Wing | North	10	39	2/7/2028	2/18/2028	5D - Hol
CSTR-6720	Finish Painting - Corridors - Third Floor - Academic Wing | North	8	39	2/22/2028	3/2/2028	5D - Hol
CSTR-6730	Install Window Shades - Corridors - Third Floor - Academic Wing | North	5	47	2/22/2028	2/28/2028	5D - Hol
CSTR-6910	Install Signage - Corridors - Third Floor - Academic Wing | North	5	44	3/3/2028	3/9/2028	5D - Hol
CSTR-6920	Install Misc. Specialties - Corridors - Third Floor - Academic Wing | North	5	39	3/3/2028	3/9/2028	5D - Hol
CSTR-6950	Fontaine Pre-Punch - Corridors - Third Floor - Academic Wing | North	5	39	3/10/2028	3/16/2028	5D - Hol
CSTR-7040	Final Clean - Corridors - Third Floor - Academic Wing | North	5	39	3/17/2028	3/23/2028	5D - Hol
CSTR-7150	Design Team Punch List - Corridors - Third Floor - Academic Wing | North	5	59	3/24/2028	3/30/2028	5D - Hol
Second Floor - Academic Wing | North						
Framing						
CSTR-2990	Frame Interior Partition Walls - Second Floor - Academic Wing | North	15	0	7/7/2027	7/27/2027	5D - Hol
CSTR-3140	Wall Blocking - Second Floor - Academic Wing | North	15	44	7/21/2027	8/10/2027	5D - Hol
CSTR-3150	Set Door Frames - Second Floor - Academic Wing | North	15	44	7/21/2027	8/10/2027	5D - Hol
CSTR-3350	Frame Ceilings & Soffits - Second Floor - Academic Wing | North	15	79	8/4/2027	8/24/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-3000	Rough In Duct & Equipment - Second Floor - Academic Wing | North	15	0	7/7/2027	7/27/2027	5D - Hol
CSTR-3010	Rough In OH Electrical - Second Floor - Academic Wing | North	15	13	7/7/2027	7/27/2027	5D - Hol
CSTR-3020	Rough In OH Plumbing - Second Floor - Academic Wing | North	15	0	7/7/2027	7/27/2027	5D - Hol
CSTR-3070	Rough In Mechanical Piping - Second Floor - Academic Wing | North	15	13	7/14/2027	8/3/2027	5D - Hol
CSTR-3080	Rough In OH Data - Second Floor - Academic Wing | North	15	13	7/14/2027	8/3/2027	5D - Hol
CSTR-3090	Rough In Fire Alarm - Second Floor - Academic Wing | North	15	13	7/14/2027	8/3/2027	5D - Hol
CSTR-3100	Rough In Fire Protection - Second Floor - Academic Wing | North	15	9	7/14/2027	8/3/2027	5D - Hol
In-Wall Roughs						
CSTR-3160	In-Wall Electrical Rough - Second Floor - Academic Wing | North	15	0	7/21/2027	8/10/2027	5D - Hol
CSTR-3170	In-Wall Plumbing Rough - Second Floor - Academic Wing | North	15	0	7/21/2027	8/10/2027	5D - Hol
CSTR-3360	In-Wall Plumbing Inspection - Second Floor - Academic Wing | North	1	42	8/11/2027	8/11/2027	5D - Hol
CSTR-3370	In-Wall Electrical Inspection - Second Floor - Academic Wing | North	1	42	8/11/2027	8/11/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

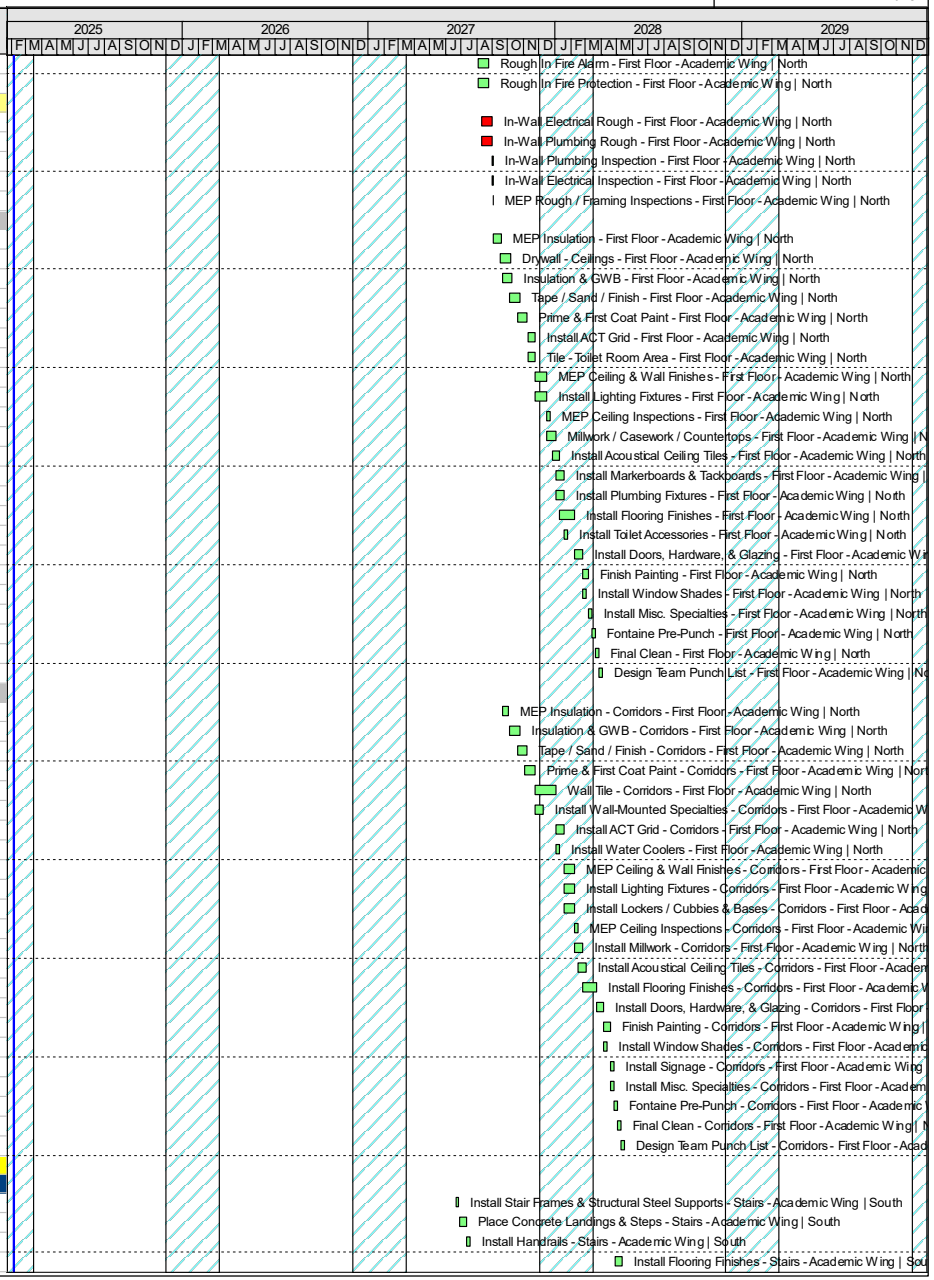
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-3420	MEP Rough / Framing Inspections - Second Floor - Academic Wing | North	1	42	8/12/2027	8/12/2027	5D - Hol
Classroom Finishes						
CSTR-3430	MEP Insulation - Second Floor - Academic Wing | North	10	42	8/13/2027	8/26/2027	5D - Hol
CSTR-3600	Drywall - Ceilings - Second Floor - Academic Wing | North	15	79	8/25/2027	9/15/2027	5D - Hol
CSTR-3550	Insulation & GWB - Second Floor - Academic Wing | North	15	72	8/27/2027	9/17/2027	5D - Hol
CSTR-3800	Tape / Sand / Finish - Second Floor - Academic Wing | North	15	72	9/13/2027	10/1/2027	5D - Hol
CSTR-3950	Prime & First Coat Paint - Second Floor - Academic Wing | North	15	72	9/27/2027	10/18/2027	5D - Hol
CSTR-4440	Install ACT Grid - Second Floor - Academic Wing | North	10	72	10/19/2027	11/1/2027	5D - Hol
CSTR-4450	Tile - Toilet Room Area - Second Floor - Academic Wing | North	10	130	10/19/2027	11/1/2027	5D - Hol
CSTR-4790	MEP Ceiling & Wall Finishes - Second Floor - Academic Wing | North	15	72	11/2/2027	11/23/2027	5D - Hol
CSTR-4800	Install Lighting Fixtures - Second Floor - Academic Wing | North	15	72	11/2/2027	11/23/2027	5D - Hol
CSTR-5190	MEP Ceiling Inspections - Second Floor - Academic Wing | North	5	72	11/24/2027	12/2/2027	5D - Hol
CSTR-5200	Millwork / Casework / Countertops - Second Floor - Academic Wing | North	10	105	11/24/2027	12/9/2027	5D - Hol
CSTR-5360	Install Acoustical Ceiling Tiles - Second Floor - Academic Wing | North	10	72	12/3/2027	12/16/2027	5D - Hol
CSTR-5510	Install Markerboards & Tackboards - Second Floor - Academic Wing | North	10	110	12/10/2027	12/23/2027	5D - Hol
CSTR-5530	Install Plumbing Fixtures - Second Floor - Academic Wing | North	10	105	12/10/2027	12/23/2027	5D - Hol
CSTR-5590	Install Flooring Finishes - Second Floor - Academic Wing | North	20	72	12/17/2027	1/18/2028	5D - Hol
CSTR-5740	Install Toilet Accessories - Second Floor - Academic Wing | North	5	105	12/27/2027	1/3/2028	5D - Hol
CSTR-6090	Install Doors, Hardware, & Glazing - Second Floor - Academic Wing | North	10	72	1/19/2028	2/1/2028	5D - Hol
CSTR-6410	Finish Painting - Second Floor - Academic Wing | North	8	72	2/2/2028	2/11/2028	5D - Hol
CSTR-6420	Install Window Shades - Second Floor - Academic Wing | North	5	80	2/2/2028	2/8/2028	5D - Hol
CSTR-6610	Install Misc. Specialties - Second Floor - Academic Wing | North	5	72	2/14/2028	2/18/2028	5D - Hol
CSTR-6710	Fontaine Pre-Punch - Second Floor - Academic Wing | North	5	72	2/22/2028	2/28/2028	5D - Hol
CSTR-6800	Final Clean - Second Floor - Academic Wing | North	5	72	2/29/2028	3/6/2028	5D - Hol
CSTR-6930	Design Team Punch List - Second Floor - Academic Wing | North	5	72	3/7/2028	3/13/2028	5D - Hol
Corridor Finishes						
CSTR-3560	MEP Insulation - Corridors - Second Floor - Academic Wing | North	10	42	8/27/2027	9/10/2027	5D - Hol
CSTR-3810	Insulation & GWB - Corridors - Second Floor - Academic Wing | North	15	42	9/13/2027	10/1/2027	5D - Hol
CSTR-3960	Tape / Sand / Finish - Corridors - Second Floor - Academic Wing | North	15	42	9/27/2027	10/18/2027	5D - Hol
CSTR-4270	Prime & First Coat Paint - Corridors - Second Floor - Academic Wing | North	15	42	10/12/2027	11/1/2027	5D - Hol
CSTR-4810	Wall Tile - Corridors - Second Floor - Academic Wing | North	25	42	11/2/2027	12/9/2027	5D - Hol
CSTR-4820	Install Wall-Mounted Specialties - Corridors - Second Floor - Academic Wing | North	10	130	11/2/2027	11/16/2027	5D - Hol
CSTR-5520	Install ACT Grid - Corridors - Second Floor - Academic Wing | North	10	42	12/10/2027	12/23/2027	5D - Hol
CSTR-5540	Install Water Coolers - Second Floor - Academic Wing | North	5	115	12/10/2027	12/16/2027	5D - Hol
CSTR-5710	MEP Ceiling & Wall Finishes - Corridors - Second Floor - Academic Wing | North	15	42	12/27/2027	1/18/2028	5D - Hol
CSTR-5720	Install Lighting Fixtures - Corridors - Second Floor - Academic Wing | North	15	42	12/27/2027	1/18/2028	5D - Hol
CSTR-5730	Install Lockers/Cubbies & Bases - Corridors - Second Floor - Academic Wing | North	15	52	12/27/2027	1/18/2028	5D - Hol
CSTR-6100	MEP Ceiling Inspections - Corridors - Second Floor - Academic Wing | North	5	47	1/19/2028	1/25/2028	5D - Hol
CSTR-6110	Install Millwork - Corridors - Second Floor - Academic Wing | North	10	42	1/19/2028	2/1/2028	5D - Hol
CSTR-6290	Install Acoustical Ceiling Tiles - Corridors - Second Floor - Academic Wing | North	10	80	1/26/2028	2/8/2028	5D - Hol
CSTR-6430	Install Flooring Finishes - Corridors - Second Floor - Academic Wing | North	20	42	2/2/2028	3/1/2028	5D - Hol
CSTR-6840	Install Doors, Hardware, & Glazing - Corridors - Second Floor - Academic Wing | North	10	42	3/2/2028	3/15/2028	5D - Hol
CSTR-6980	Finish Painting - Corridors - Second Floor - Academic Wing | North	8	42	3/16/2028	3/27/2028	5D - Hol
CSTR-6990	Install Window Shades - Corridors - Second Floor - Academic Wing | North	5	50	3/16/2028	3/22/2028	5D - Hol
CSTR-7160	Install Signage - Corridors - Second Floor - Academic Wing | North	5	47	3/28/2028	4/3/2028	5D - Hol
CSTR-7170	Install Misc. Specialties - Corridors - Second Floor - Academic Wing | North	5	42	3/28/2028	4/3/2028	5D - Hol
CSTR-7280	Fontaine Pre-Punch - Corridors - Second Floor - Academic Wing | North	5	42	4/4/2028	4/10/2028	5D - Hol
CSTR-7310	Final Clean - Corridors - Second Floor - Academic Wing | North	5	42	4/11/2028	4/18/2028	5D - Hol
CSTR-7390	Design Team Punch List - Corridors - Second Floor - Academic Wing | North	5	42	4/19/2028	4/25/2028	5D - Hol
First Floor - Academic Wing | North						
Framing						
CSTR-3260	Frame Interior Partition Walls - First Floor - Academic Wing | North	15	0	7/28/2027	8/17/2027	5D - Hol
CSTR-3470	Wall Blocking - First Floor - Academic Wing | North	15	27	8/11/2027	8/31/2027	5D - Hol
CSTR-3480	Set Door Frames - First Floor - Academic Wing | North	15	27	8/11/2027	8/31/2027	5D - Hol
CSTR-3720	Frame Ceilings & Soffits - First Floor - Academic Wing | North	15	64	8/25/2027	9/15/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-3270	Rough In Duct & Equipment - First Floor - Academic Wing | North	15	0	7/28/2027	8/17/2027	5D - Hol
CSTR-3280	Rough In OH Electrical - First Floor - Academic Wing | North	15	13	7/28/2027	8/17/2027	5D - Hol
CSTR-3290	Rough In OH Plumbing - First Floor - Academic Wing | North	15	0	7/28/2027	8/17/2027	5D - Hol
CSTR-3380	Rough In Mechanical Piping - First Floor - Academic Wing | North	15	13	8/4/2027	8/24/2027	5D - Hol
CSTR-3390	Rough In OH Data - First Floor - Academic Wing | North	15	13	8/4/2027	8/24/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

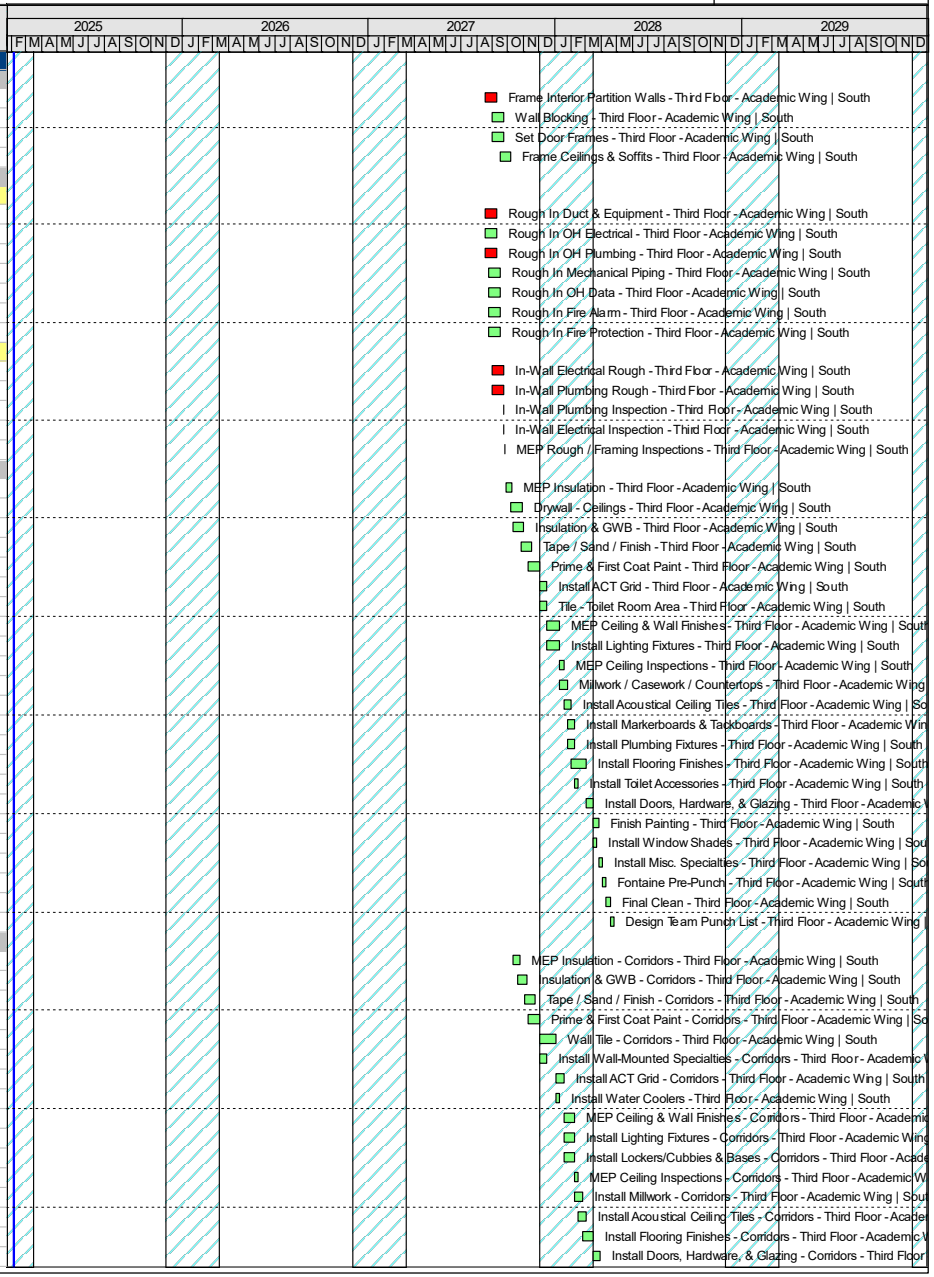
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-3400	Rough In Fire Alarm - First Floor - Academic Wing | North	15	13	8/4/2027	8/24/2027	5D - Hol
CSTR-3410	Rough In Fire Protection - First Floor - Academic Wing | North	15	9	8/4/2027	8/24/2027	5D - Hol
In-Wall Roughs						
CSTR-3490	In-Wall Electrical Rough - First Floor - Academic Wing | North	15	0	8/11/2027	8/31/2027	5D - Hol
CSTR-3500	In-Wall Plumbing Rough - First Floor - Academic Wing | North	15	0	8/11/2027	8/31/2027	5D - Hol
CSTR-3730	In-Wall Plumbing Inspection - First Floor - Academic Wing | North	1	25	9/1/2027	9/1/2027	5D - Hol
CSTR-3740	In-Wall Electrical Inspection - First Floor - Academic Wing | North	1	25	9/1/2027	9/1/2027	5D - Hol
CSTR-3790	MEP Rough / Framing Inspections - First Floor - Academic Wing | North	1	25	9/2/2027	9/2/2027	5D - Hol
Classroom Finishes						
CSTR-3820	MEP Insulation - First Floor - Academic Wing | North	10	25	9/3/2027	9/17/2027	5D - Hol
CSTR-4090	Drywall - Ceilings - First Floor - Academic Wing | North	15	64	9/16/2027	10/6/2027	5D - Hol
CSTR-3970	Insulation & GWB - First Floor - Academic Wing | North	15	57	9/20/2027	10/8/2027	5D - Hol
CSTR-4280	Tape / Sand / Finish - First Floor - Academic Wing | North	15	57	10/4/2027	10/25/2027	5D - Hol
CSTR-4630	Prime & First Coat Paint - First Floor - Academic Wing | North	15	57	10/19/2027	11/8/2027	5D - Hol
CSTR-5120	Install ACT Grid - First Floor - Academic Wing | North	10	57	11/9/2027	11/23/2027	5D - Hol
CSTR-5130	Tile - Toilet Room Area - First Floor - Academic Wing | North	10	115	11/9/2027	11/23/2027	5D - Hol
CSTR-5370	MEP Ceiling & Wall Finishes - First Floor - Academic Wing | North	15	57	11/24/2027	12/16/2027	5D - Hol
CSTR-5380	Install Lighting Fixtures - First Floor - Academic Wing | North	15	57	11/24/2027	12/16/2027	5D - Hol
CSTR-5750	MEP Ceiling Inspections - First Floor - Academic Wing | North	5	57	12/17/2027	12/23/2027	5D - Hol
CSTR-5760	Millwork / Casework / Countertops - First Floor - Academic Wing | North	10	90	12/17/2027	1/3/2028	5D - Hol
CSTR-5860	Install Acoustical Ceiling Tiles - First Floor - Academic Wing | North	10	57	12/27/2027	1/10/2028	5D - Hol
CSTR-6000	Install Markerboards & Tackboards - First Floor - Academic Wing | North	10	95	1/4/2028	1/18/2028	5D - Hol
CSTR-6020	Install Plumbing Fixtures - First Floor - Academic Wing | North	10	90	1/4/2028	1/18/2028	5D - Hol
CSTR-6120	Install Flooring Finishes - First Floor - Academic Wing | North	20	57	1/11/2028	2/8/2028	5D - Hol
CSTR-6330	Install Toilet Accessories - First Floor - Academic Wing | North	5	90	1/19/2028	1/25/2028	5D - Hol
CSTR-6640	Install Doors, Hardware, & Glazing - First Floor - Academic Wing | North	10	57	2/9/2028	2/23/2028	5D - Hol
CSTR-6850	Finish Painting - First Floor - Academic Wing | North	8	57	2/24/2028	3/6/2028	5D - Hol
CSTR-6860	Install Window Shades - First Floor - Academic Wing | North	5	65	2/24/2028	3/1/2028	5D - Hol
CSTR-6960	Install Misc. Specialties - First Floor - Academic Wing | North	5	57	3/7/2028	3/13/2028	5D - Hol
CSTR-7050	Fontaine Pre-Punch - First Floor - Academic Wing | North	5	57	3/14/2028	3/20/2028	5D - Hol
CSTR-7180	Final Clean - First Floor - Academic Wing | North	5	57	3/21/2028	3/27/2028	5D - Hol
CSTR-7290	Design Team Punch List - First Floor - Academic Wing | North	5	57	3/28/2028	4/3/2028	5D - Hol
Corridor Finishes						
CSTR-3980	MEP Insulation - Corridors - First Floor - Academic Wing | North	10	25	9/20/2027	10/1/2027	5D - Hol
CSTR-4290	Insulation & GWB - Corridors - First Floor - Academic Wing | North	15	25	10/4/2027	10/25/2027	5D - Hol
CSTR-4640	Tape / Sand / Finish - Corridors - First Floor - Academic Wing | North	15	25	10/19/2027	11/8/2027	5D - Hol
CSTR-4930	Prime & First Coat Paint - Corridors - First Floor - Academic Wing | North	15	25	11/2/2027	11/23/2027	5D - Hol
CSTR-5390	Wall Tile - Corridors - First Floor - Academic Wing | North	25	25	11/24/2027	1/3/2028	5D - Hol
CSTR-5400	Install Wall-Mounted Specialties - Corridors - First Floor - Academic Wing | North	10	115	11/24/2027	12/9/2027	5D - Hol
CSTR-6010	Install ACT Grid - Corridors - First Floor - Academic Wing | North	10	25	1/4/2028	1/18/2028	5D - Hol
CSTR-6030	Install Water Coolers - First Floor - Academic Wing | North	5	100	1/4/2028	1/10/2028	5D - Hol
CSTR-6300	MEP Ceiling & Wall Finishes - Corridors - First Floor - Academic Wing | North	15	25	1/19/2028	2/8/2028	5D - Hol
CSTR-6310	Install Lighting Fixtures - Corridors - First Floor - Academic Wing | North	15	27	1/19/2028	2/8/2028	5D - Hol
CSTR-6320	Install Lockers / Cubbies & Bases - Corridors - First Floor - Academic Wing | North	15	37	1/19/2028	2/8/2028	5D - Hol
CSTR-6650	MEP Ceiling Inspections - Corridors - First Floor - Academic Wing | North	5	32	2/9/2028	2/15/2028	5D - Hol
CSTR-6660	Install Millwork - Corridors - First Floor - Academic Wing | North	10	27	2/9/2028	2/23/2028	5D - Hol
CSTR-6740	Install Acoustical Ceiling Tiles - Corridors - First Floor - Academic Wing | North	10	65	2/16/2028	3/1/2028	5D - Hol
CSTR-6870	Install Flooring Finishes - Corridors - First Floor - Academic Wing | North	20	27	2/24/2028	3/22/2028	5D - Hol
CSTR-7210	Install Doors, Hardware, & Glazing - Corridors - First Floor - Academic Wing | North	10	27	3/23/2028	4/5/2028	5D - Hol
CSTR-7330	Finish Painting - Corridors - First Floor - Academic Wing | North	8	27	4/6/2028	4/18/2028	5D - Hol
CSTR-7340	Install Window Shades - Corridors - First Floor - Academic Wing | North	5	35	4/6/2028	4/12/2028	5D - Hol
CSTR-7490	Install Signage - Corridors - First Floor - Academic Wing | North	5	32	4/19/2028	4/25/2028	5D - Hol
CSTR-7500	Install Misc. Specialties - Corridors - First Floor - Academic Wing | North	5	27	4/19/2028	4/25/2028	5D - Hol
CSTR-7550	Fontaine Pre-Punch - Corridors - First Floor - Academic Wing | North	5	27	4/26/2028	5/2/2028	5D - Hol
CSTR-7610	Final Clean - Corridors - First Floor - Academic Wing | North	5	27	5/3/2028	5/9/2028	5D - Hol
CSTR-7650	Design Team Punch List - Corridors - First Floor - Academic Wing | North	5	27	5/10/2028	5/16/2028	5D - Hol
Academic Wing | South						
Stairs						
CSTR-7910	Install Stair Frames & Structural Steel Supports - Stairs - Academic Wing | South	5	220	6/21/2027	6/25/2027	5D - Hol
CSTR-7900	Place Concrete Landings & Steps - Stairs - Academic Wing | South	10	220	6/28/2027	7/12/2027	5D - Hol
CSTR-7890	Install Handrails - Stairs - Academic Wing | South	5	220	7/13/2027	7/19/2027	5D - Hol
CSTR-7920	Install Flooring Finishes - Stairs - Academic Wing | South	10	25	4/28/2028	5/11/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

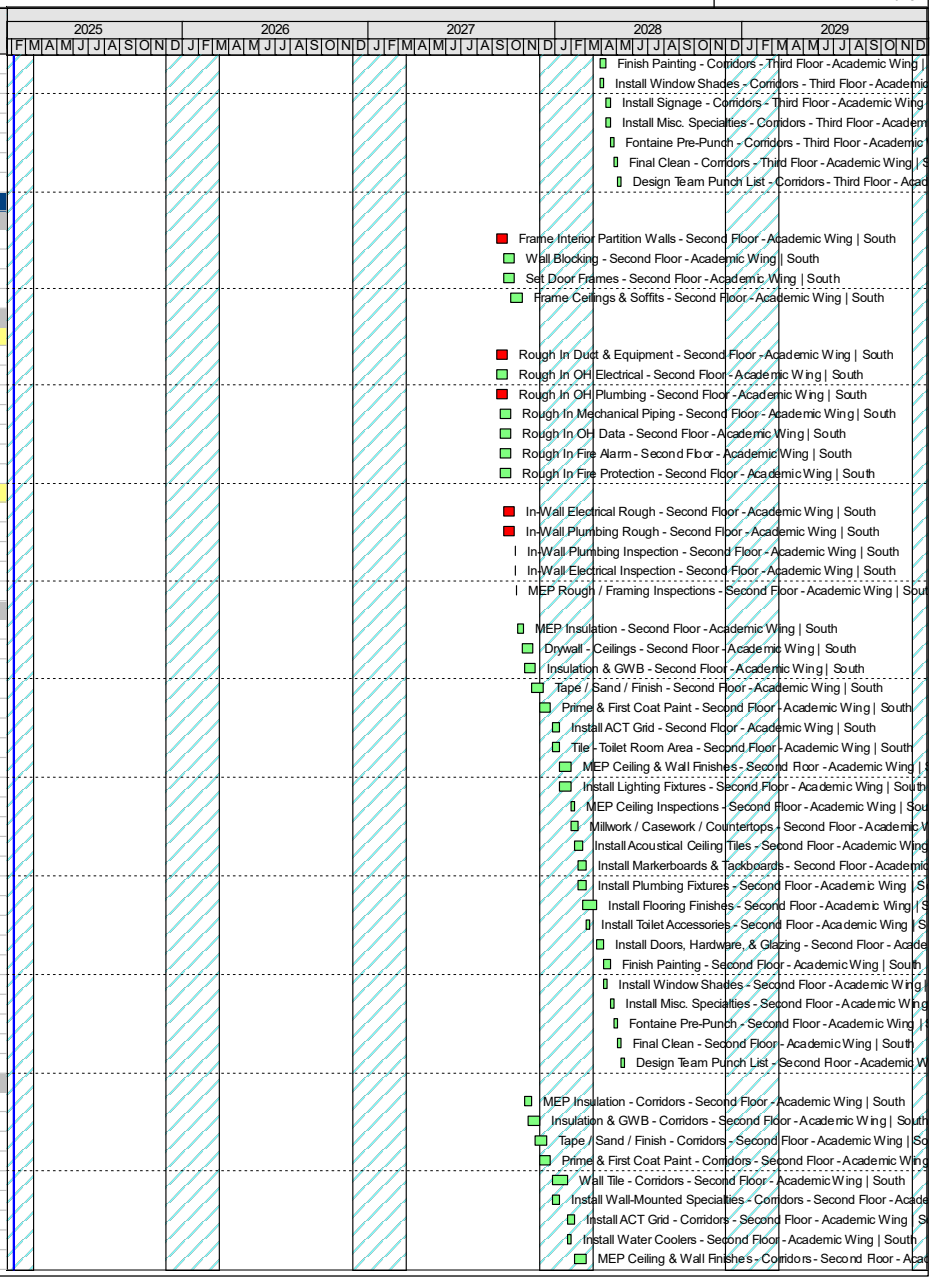
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
Third Floor - Academic Wing | South						
Framing						
CSTR-7930	Frame Interior Partition Walls - Third Floor - Academic Wing | South	15	0	8/18/2027	9/8/2027	5D - Hol
CSTR-7940	Wall Blocking - Third Floor - Academic Wing | South	15	34	9/1/2027	9/22/2027	5D - Hol
CSTR-7950	Set Door Frames - Third Floor - Academic Wing | South	15	34	9/1/2027	9/22/2027	5D - Hol
CSTR-7960	Frame Ceilings & Soffits - Third Floor - Academic Wing | South	15	49	9/16/2027	10/6/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-7970	Rough In Duct & Equipment - Third Floor - Academic Wing | South	15	0	8/18/2027	9/8/2027	5D - Hol
CSTR-7980	Rough In OH Electrical - Third Floor - Academic Wing | South	15	13	8/18/2027	9/8/2027	5D - Hol
CSTR-8000	Rough In OH Plumbing - Third Floor - Academic Wing | South	15	0	8/18/2027	9/8/2027	5D - Hol
CSTR-7990	Rough In Mechanical Piping - Third Floor - Academic Wing | South	15	13	8/25/2027	9/15/2027	5D - Hol
CSTR-8010	Rough In OH Data - Third Floor - Academic Wing | South	15	13	8/25/2027	9/15/2027	5D - Hol
CSTR-8020	Rough In Fire Alarm - Third Floor - Academic Wing | South	15	13	8/25/2027	9/15/2027	5D - Hol
CSTR-8080	Rough In Fire Protection - Third Floor - Academic Wing | South	15	9	8/25/2027	9/15/2027	5D - Hol
In-Wall Roughs						
CSTR-8030	In-Wall Electrical Rough - Third Floor - Academic Wing | South	15	0	9/1/2027	9/22/2027	5D - Hol
CSTR-8040	In-Wall Plumbing Rough - Third Floor - Academic Wing | South	15	0	9/1/2027	9/22/2027	5D - Hol
CSTR-8050	In-Wall Plumbing Inspection - Third Floor - Academic Wing | South	1	32	9/23/2027	9/23/2027	5D - Hol
CSTR-8060	In-Wall Electrical Inspection - Third Floor - Academic Wing | South	1	32	9/23/2027	9/23/2027	5D - Hol
CSTR-8070	MEP Rough / Framing Inspections - Third Floor - Academic Wing | South	1	32	9/24/2027	9/24/2027	5D - Hol
Classroom Finishes						
CSTR-8090	MEP Insulation - Third Floor - Academic Wing | South	10	32	9/27/2027	10/8/2027	5D - Hol
CSTR-8540	Drywall - Ceilings - Third Floor - Academic Wing | South	15	49	10/7/2027	10/28/2027	5D - Hol
CSTR-8100	Insulation & GWB - Third Floor - Academic Wing | South	15	42	10/12/2027	11/1/2027	5D - Hol
CSTR-8110	Tape / Sand / Finish - Third Floor - Academic Wing | South	15	42	10/26/2027	11/16/2027	5D - Hol
CSTR-8120	Prime & First Coat Paint - Third Floor - Academic Wing | South	15	42	11/9/2027	12/2/2027	5D - Hol
CSTR-8130	Install ACT Grid - Third Floor - Academic Wing | South	10	42	12/3/2027	12/16/2027	5D - Hol
CSTR-8140	Tile - Toilet Room Area - Third Floor - Academic Wing | South	10	100	12/3/2027	12/16/2027	5D - Hol
CSTR-8150	MEP Ceiling & Wall Finishes - Third Floor - Academic Wing | South	15	42	12/17/2027	1/10/2028	5D - Hol
CSTR-8160	Install Lighting Fixtures - Third Floor - Academic Wing | South	15	42	12/17/2027	1/10/2028	5D - Hol
CSTR-8170	MEP Ceiling Inspections - Third Floor - Academic Wing | South	5	42	1/11/2028	1/18/2028	5D - Hol
CSTR-8190	Millwork / Casework / Countertops - Third Floor - Academic Wing | South	10	75	1/11/2028	1/25/2028	5D - Hol
CSTR-8180	Install Acoustical Ceiling Tiles - Third Floor - Academic Wing | South	10	42	1/19/2028	2/1/2028	5D - Hol
CSTR-8200	Install Markerboards & Tackboards - Third Floor - Academic Wing | South	10	80	1/26/2028	2/8/2028	5D - Hol
CSTR-8500	Install Plumbing Fixtures - Third Floor - Academic Wing | South	10	75	1/26/2028	2/8/2028	5D - Hol
CSTR-8210	Install Flooring Finishes - Third Floor - Academic Wing | South	20	42	2/2/2028	3/1/2028	5D - Hol
CSTR-8510	Install Toilet Accessories - Third Floor - Academic Wing | South	5	75	2/9/2028	2/15/2028	5D - Hol
CSTR-8220	Install Doors, Hardware, & Glazing - Third Floor - Academic Wing | South	10	42	3/2/2028	3/15/2028	5D - Hol
CSTR-8230	Finish Painting - Third Floor - Academic Wing | South	8	42	3/16/2028	3/27/2028	5D - Hol
CSTR-8260	Install Window Shades - Third Floor - Academic Wing | South	5	50	3/16/2028	3/22/2028	5D - Hol
CSTR-8240	Install Misc. Specialties - Third Floor - Academic Wing | South	5	42	3/28/2028	4/3/2028	5D - Hol
CSTR-8270	Fontaine Pre-Punch - Third Floor - Academic Wing | South	5	42	4/4/2028	4/10/2028	5D - Hol
CSTR-8280	Final Clean - Third Floor - Academic Wing | South	5	42	4/11/2028	4/18/2028	5D - Hol
CSTR-8290	Design Team Punch List - Third Floor - Academic Wing | South	5	42	4/19/2028	4/25/2028	5D - Hol
Corridor Finishes						
CSTR-8300	MEP Insulation - Corridors - Third Floor - Academic Wing | South	10	32	10/12/2027	10/25/2027	5D - Hol
CSTR-8310	Insulation & GWB - Corridors - Third Floor - Academic Wing | South	15	32	10/19/2027	11/8/2027	5D - Hol
CSTR-8320	Tape / Sand / Finish - Corridors - Third Floor - Academic Wing | South	15	32	11/2/2027	11/23/2027	5D - Hol
CSTR-8330	Prime & First Coat Paint - Corridors - Third Floor - Academic Wing | South	15	32	11/9/2027	12/2/2027	5D - Hol
CSTR-8350	Wall Tile - Corridors - Third Floor - Academic Wing | South	20	32	12/3/2027	1/3/2028	5D - Hol
CSTR-8400	Install Wall-Mounted Specialties - Corridors - Third Floor - Academic Wing | South	10	110	12/3/2027	12/16/2027	5D - Hol
CSTR-8340	Install ACT Grid - Corridors - Third Floor - Academic Wing | South	10	32	1/4/2028	1/18/2028	5D - Hol
CSTR-8530	Install Water Coolers - Third Floor - Academic Wing | South	5	100	1/4/2028	1/10/2028	5D - Hol
CSTR-8360	MEP Ceiling & Wall Finishes - Corridors - Third Floor - Academic Wing | South	15	32	1/19/2028	2/8/2028	5D - Hol
CSTR-8370	Install Lighting Fixtures - Corridors - Third Floor - Academic Wing | South	15	32	1/19/2028	2/8/2028	5D - Hol
CSTR-8490	Install Lockers/Cubbies & Bases - Corridors - Third Floor - Academic Wing | South	15	42	1/19/2028	2/8/2028	5D - Hol
CSTR-8380	MEP Ceiling Inspections - Corridors - Third Floor - Academic Wing | South	5	37	2/9/2028	2/15/2028	5D - Hol
CSTR-8520	Install Millwork - Corridors - Third Floor - Academic Wing | South	10	32	2/9/2028	2/23/2028	5D - Hol
CSTR-8390	Install Acoustical Ceiling Tiles - Corridors - Third Floor - Academic Wing | South	10	65	2/16/2028	3/1/2028	5D - Hol
CSTR-8410	Install Flooring Finishes - Corridors - Third Floor - Academic Wing | South	15	32	2/24/2028	3/15/2028	5D - Hol
CSTR-8420	Install Doors, Hardware, & Glazing - Corridors - Third Floor - Academic Wing | South	10	32	3/16/2028	3/29/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

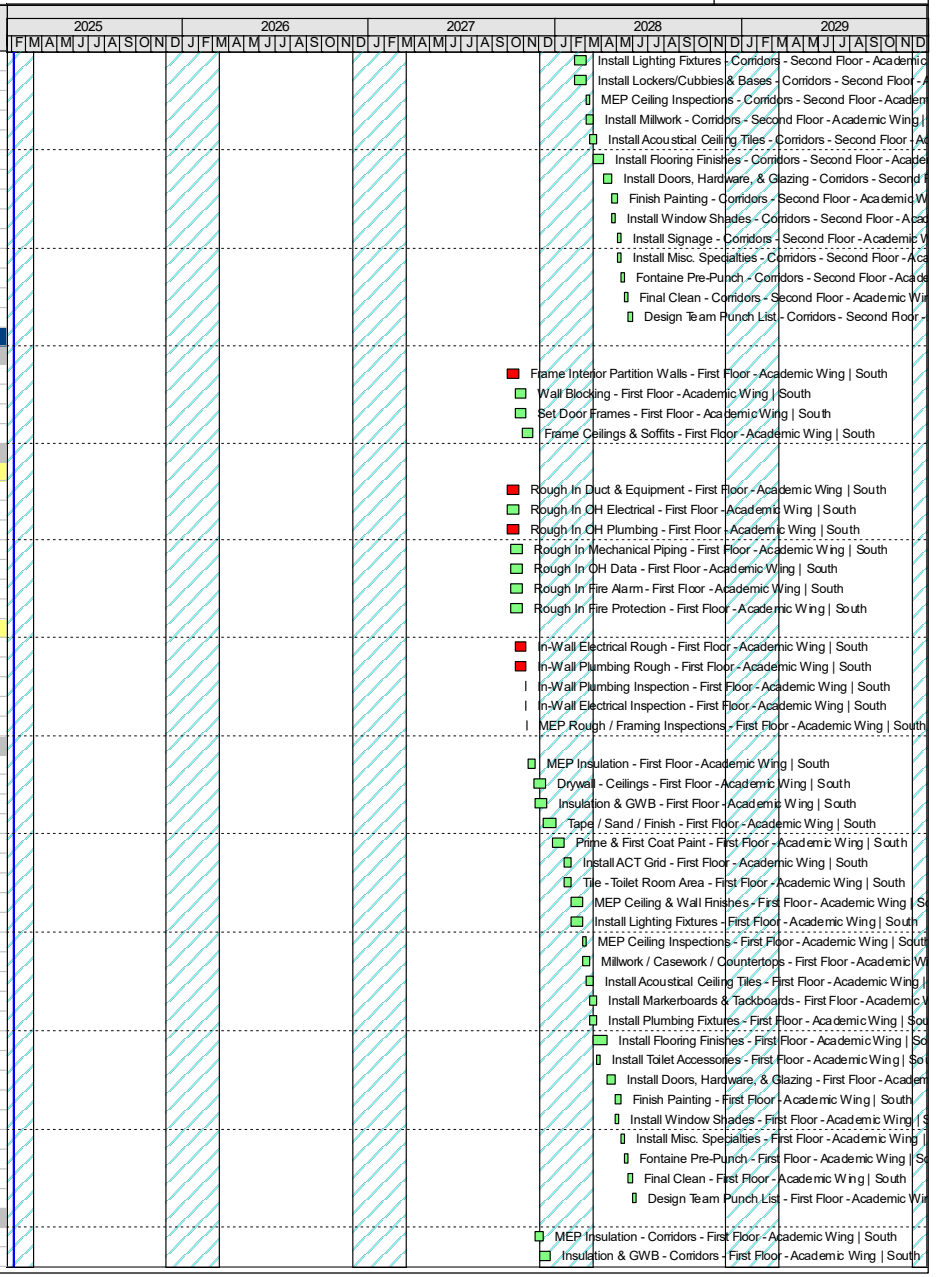
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-8430	Finish Painting - Corridors - Third Floor - Academic Wing | South	8	32	3/30/2028	4/10/2028	5D - Hol
CSTR-8450	Install Window Shades - Corridors - Third Floor - Academic Wing | South	5	40	3/30/2028	4/5/2028	5D - Hol
CSTR-8250	Install Signage - Corridors - Third Floor - Academic Wing | South	5	37	4/11/2028	4/18/2028	5D - Hol
CSTR-8440	Install Misc. Specialties - Corridors - Third Floor - Academic Wing | South	5	32	4/11/2028	4/18/2028	5D - Hol
CSTR-8460	Fontaine Pre-Punch - Corridors - Third Floor - Academic Wing | South	5	32	4/19/2028	4/25/2028	5D - Hol
CSTR-8470	Final Clean - Corridors - Third Floor - Academic Wing | South	5	32	4/26/2028	5/2/2028	5D - Hol
CSTR-8480	Design Team Punch List - Corridors - Third Floor - Academic Wing | South	5	32	5/3/2028	5/9/2028	5D - Hol
Second Floor - Academic Wing | South						
Framing						
CSTR-8550	Frame Interior Partition Walls - Second Floor - Academic Wing | South	15	0	9/9/2027	9/29/2027	5D - Hol
CSTR-8560	Wall Blocking - Second Floor - Academic Wing | South	15	19	9/23/2027	10/14/2027	5D - Hol
CSTR-8570	Set Door Frames - Second Floor - Academic Wing | South	15	19	9/23/2027	10/14/2027	5D - Hol
CSTR-8580	Frame Ceilings & Soffits - Second Floor - Academic Wing | South	15	34	10/7/2027	10/28/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-8590	Rough In Duct & Equipment - Second Floor - Academic Wing | South	15	0	9/9/2027	9/29/2027	5D - Hol
CSTR-8600	Rough In OH Electrical - Second Floor - Academic Wing | South	15	13	9/9/2027	9/29/2027	5D - Hol
CSTR-8620	Rough In OH Plumbing - Second Floor - Academic Wing | South	15	0	9/9/2027	9/29/2027	5D - Hol
CSTR-8610	Rough In Mechanical Piping - Second Floor - Academic Wing | South	15	13	9/16/2027	10/6/2027	5D - Hol
CSTR-8630	Rough In OH Data - Second Floor - Academic Wing | South	15	13	9/16/2027	10/6/2027	5D - Hol
CSTR-8640	Rough In Fire Alarm - Second Floor - Academic Wing | South	15	13	9/16/2027	10/6/2027	5D - Hol
CSTR-8700	Rough In Fire Protection - Second Floor - Academic Wing | South	15	9	9/16/2027	10/6/2027	5D - Hol
In-Wall Roughs						
CSTR-8650	In-Wall Electrical Rough - Second Floor - Academic Wing | South	15	0	9/23/2027	10/14/2027	5D - Hol
CSTR-8660	In-Wall Plumbing Rough - Second Floor - Academic Wing | South	15	0	9/23/2027	10/14/2027	5D - Hol
CSTR-8670	In-Wall Plumbing Inspection - Second Floor - Academic Wing | South	1	17	10/15/2027	10/15/2027	5D - Hol
CSTR-8680	In-Wall Electrical Inspection - Second Floor - Academic Wing | South	1	17	10/15/2027	10/15/2027	5D - Hol
CSTR-8690	MEP Rough / Framing Inspections - Second Floor - Academic Wing | South	1	17	10/18/2027	10/18/2027	5D - Hol
Classroom Finishes						
CSTR-8710	MEP Insulation - Second Floor - Academic Wing | South	10	17	10/19/2027	11/1/2027	5D - Hol
CSTR-9160	Drywall - Ceilings - Second Floor - Academic Wing | South	15	34	10/29/2027	11/19/2027	5D - Hol
CSTR-8720	Insulation & GWB - Second Floor - Academic Wing | South	15	27	11/2/2027	11/23/2027	5D - Hol
CSTR-8730	Tape / Sand / Finish - Second Floor - Academic Wing | South	15	27	11/17/2027	12/9/2027	5D - Hol
CSTR-8740	Prime & First Coat Paint - Second Floor - Academic Wing | South	15	27	12/3/2027	12/23/2027	5D - Hol
CSTR-8750	Install ACT Grid - Second Floor - Academic Wing | South	10	27	12/27/2027	1/10/2028	5D - Hol
CSTR-8760	Tile - Toilet Room Area - Second Floor - Academic Wing | South	10	85	12/27/2027	1/10/2028	5D - Hol
CSTR-8770	MEP Ceiling & Wall Finishes - Second Floor - Academic Wing | South	15	27	1/11/2028	2/1/2028	5D - Hol
CSTR-8780	Install Lighting Fixtures - Second Floor - Academic Wing | South	15	27	1/11/2028	2/1/2028	5D - Hol
CSTR-8790	MEP Ceiling Inspections - Second Floor - Academic Wing | South	5	27	2/2/2028	2/8/2028	5D - Hol
CSTR-8810	Millwork / Casework / Countertops - Second Floor - Academic Wing | South	10	60	2/2/2028	2/15/2028	5D - Hol
CSTR-8800	Install Acoustical Ceiling Tiles - Second Floor - Academic Wing | South	10	27	2/9/2028	2/23/2028	5D - Hol
CSTR-8820	Install Markerboards & Tackboards - Second Floor - Academic Wing | South	10	65	2/16/2028	3/1/2028	5D - Hol
CSTR-9120	Install Plumbing Fixtures - Second Floor - Academic Wing | South	10	60	2/16/2028	3/1/2028	5D - Hol
CSTR-8830	Install Flooring Finishes - Second Floor - Academic Wing | South	20	27	2/24/2028	3/22/2028	5D - Hol
CSTR-9130	Install Toilet Accessories - Second Floor - Academic Wing | South	5	60	3/2/2028	3/8/2028	5D - Hol
CSTR-8840	Install Doors, Hardware, & Glazing - Second Floor - Academic Wing | South	10	27	3/23/2028	4/5/2028	5D - Hol
CSTR-8850	Finish Painting - Second Floor - Academic Wing | South	8	27	4/6/2028	4/18/2028	5D - Hol
CSTR-8880	Install Window Shades - Second Floor - Academic Wing | South	5	35	4/6/2028	4/12/2028	5D - Hol
CSTR-8860	Install Misc. Specialties - Second Floor - Academic Wing | South	5	27	4/19/2028	4/25/2028	5D - Hol
CSTR-8890	Fontaine Pre-Punch - Second Floor - Academic Wing | South	5	27	4/26/2028	5/2/2028	5D - Hol
CSTR-8900	Final Clean - Second Floor - Academic Wing | South	5	27	5/3/2028	5/9/2028	5D - Hol
CSTR-8910	Design Team Punch List - Second Floor - Academic Wing | South	5	27	5/10/2028	5/16/2028	5D - Hol
Corridor Finishes						
CSTR-8920	MEP Insulation - Corridors - Second Floor - Academic Wing | South	10	17	11/2/2027	11/16/2027	5D - Hol
CSTR-8930	Insulation & GWB - Corridors - Second Floor - Academic Wing | South	15	17	11/9/2027	12/2/2027	5D - Hol
CSTR-8940	Tape / Sand / Finish - Corridors - Second Floor - Academic Wing | South	15	17	11/24/2027	12/16/2027	5D - Hol
CSTR-8950	Prime & First Coat Paint - Corridors - Second Floor - Academic Wing | South	15	17	12/3/2027	12/23/2027	5D - Hol
CSTR-8970	Wall Tile - Corridors - Second Floor - Academic Wing | South	20	17	12/27/2027	1/25/2028	5D - Hol
CSTR-9020	Install Wall-Mounted Specialties - Corridors - Second Floor - Academic Wing | South	10	95	12/27/2027	1/10/2028	5D - Hol
CSTR-8960	Install ACT Grid - Corridors - Second Floor - Academic Wing | South	10	17	1/26/2028	2/8/2028	5D - Hol
CSTR-9150	Install Water Coolers - Second Floor - Academic Wing | South	5	85	1/26/2028	2/1/2028	5D - Hol
CSTR-8980	MEP Ceiling & Wall Finishes - Corridors - Second Floor - Academic Wing | South	15	17	2/9/2028	3/1/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

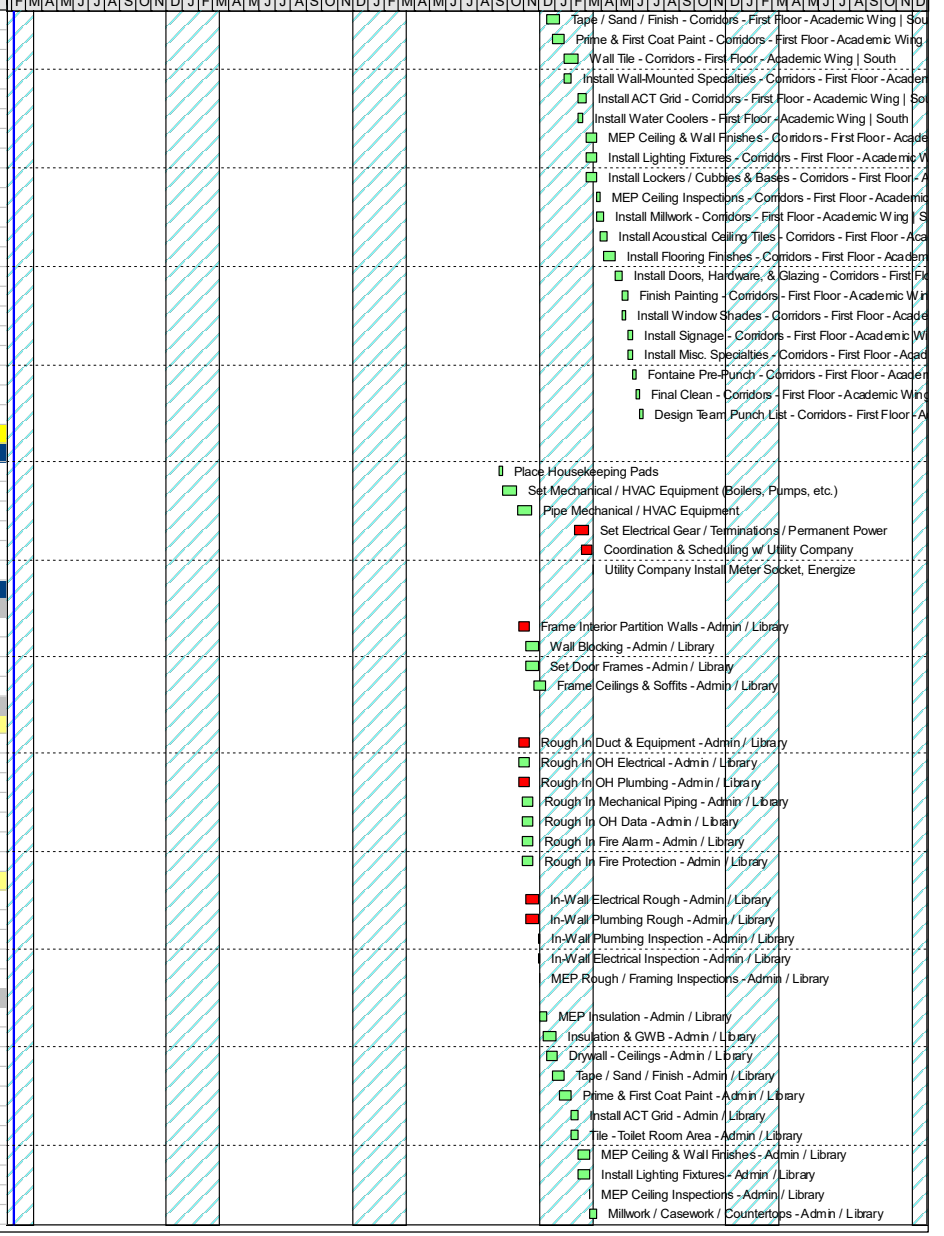
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-8990	Install Lighting Fixtures - Corridors - Second Floor - Academic Wing | South	15	17	2/9/2028	3/1/2028	5D - Hol
CSTR-9110	Install Lockers/Cubbies & Bases - Corridors - Second Floor - Academic Wing | South	15	27	2/9/2028	3/1/2028	5D - Hol
CSTR-9000	MEP Ceiling Inspections - Corridors - Second Floor - Academic Wing | South	5	22	3/2/2028	3/8/2028	5D - Hol
CSTR-9140	Install Millwork - Corridors - Second Floor - Academic Wing | South	10	17	3/2/2028	3/15/2028	5D - Hol
CSTR-9010	Install Acoustical Ceiling Tiles - Corridors - Second Floor - Academic Wing | South	10	50	3/9/2028	3/22/2028	5D - Hol
CSTR-9030	Install Flooring Finishes - Corridors - Second Floor - Academic Wing | South	15	17	3/16/2028	4/5/2028	5D - Hol
CSTR-9040	Install Doors, Hardware, & Glazing - Corridors - Second Floor - Academic Wing | South	10	17	4/6/2028	4/20/2028	5D - Hol
CSTR-9050	Finish Painting - Corridors - Second Floor - Academic Wing | South	8	17	4/21/2028	5/2/2028	5D - Hol
CSTR-9070	Install Window Shades - Corridors - Second Floor - Academic Wing | South	5	25	4/21/2028	4/27/2028	5D - Hol
CSTR-8870	Install Signage - Corridors - Second Floor - Academic Wing | South	5	22	5/3/2028	5/9/2028	5D - Hol
CSTR-9060	Install Misc. Specialties - Corridors - Second Floor - Academic Wing | South	5	17	5/3/2028	5/9/2028	5D - Hol
CSTR-9080	Fontaine Pre-Punch - Corridors - Second Floor - Academic Wing | South	5	17	5/10/2028	5/16/2028	5D - Hol
CSTR-9090	Final Clean - Corridors - Second Floor - Academic Wing | South	5	17	5/17/2028	5/23/2028	5D - Hol
CSTR-9100	Design Team Punch List - Corridors - Second Floor - Academic Wing | South	5	17	5/24/2028	5/31/2028	5D - Hol
First Floor - Academic Wing | South						
Framing						
CSTR-9170	Frame Interior Partition Walls - First Floor - Academic Wing | South	15	0	9/30/2027	10/21/2027	5D - Hol
CSTR-9180	Wall Blocking - First Floor - Academic Wing | South	15	4	10/15/2027	11/4/2027	5D - Hol
CSTR-9190	Set Door Frames - First Floor - Academic Wing | South	15	4	10/15/2027	11/4/2027	5D - Hol
CSTR-9200	Frame Ceilings & Soffits - First Floor - Academic Wing | South	15	19	10/29/2027	11/19/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-9210	Rough In Duct & Equipment - First Floor - Academic Wing | South	15	0	9/30/2027	10/21/2027	5D - Hol
CSTR-9220	Rough In OH Electrical - First Floor - Academic Wing | South	15	13	9/30/2027	10/21/2027	5D - Hol
CSTR-9240	Rough In OH Plumbing - First Floor - Academic Wing | South	15	0	9/30/2027	10/21/2027	5D - Hol
CSTR-9230	Rough In Mechanical Piping - First Floor - Academic Wing | South	15	13	10/7/2027	10/28/2027	5D - Hol
CSTR-9250	Rough In OH Data - First Floor - Academic Wing | South	15	13	10/7/2027	10/28/2027	5D - Hol
CSTR-9260	Rough In Fire Alarm - First Floor - Academic Wing | South	15	13	10/7/2027	10/28/2027	5D - Hol
CSTR-9320	Rough In Fire Protection - First Floor - Academic Wing | South	15	9	10/7/2027	10/28/2027	5D - Hol
In-Wall Roughs						
CSTR-9270	In-Wall Electrical Rough - First Floor - Academic Wing | South	15	0	10/15/2027	11/4/2027	5D - Hol
CSTR-9280	In-Wall Plumbing Rough - First Floor - Academic Wing | South	15	0	10/15/2027	11/4/2027	5D - Hol
CSTR-9290	In-Wall Plumbing Inspection - First Floor - Academic Wing | South	1	2	11/5/2027	11/5/2027	5D - Hol
CSTR-9300	In-Wall Electrical Inspection - First Floor - Academic Wing | South	1	2	11/5/2027	11/5/2027	5D - Hol
CSTR-9310	MEP Rough / Framing Inspections - First Floor - Academic Wing | South	1	2	11/8/2027	11/8/2027	5D - Hol
Classroom Finishes						
CSTR-9330	MEP Insulation - First Floor - Academic Wing | South	10	2	11/9/2027	11/23/2027	5D - Hol
CSTR-9780	Drywall - Ceilings - First Floor - Academic Wing | South	15	19	11/22/2027	12/14/2027	5D - Hol
CSTR-9340	Insulation & GWB - First Floor - Academic Wing | South	15	12	11/24/2027	12/16/2027	5D - Hol
CSTR-9350	Tape / Sand / Finish - First Floor - Academic Wing | South	15	12	12/10/2027	1/3/2028	5D - Hol
CSTR-9360	Prime & First Coat Paint - First Floor - Academic Wing | South	15	12	12/27/2027	1/18/2028	5D - Hol
CSTR-9370	Install ACT Grid - First Floor - Academic Wing | South	10	12	1/19/2028	2/1/2028	5D - Hol
CSTR-9380	Tile - Toilet Room Area - First Floor - Academic Wing | South	10	70	1/19/2028	2/1/2028	5D - Hol
CSTR-9390	MEP Ceiling & Wall Finishes - First Floor - Academic Wing | South	15	12	2/2/2028	2/23/2028	5D - Hol
CSTR-9400	Install Lighting Fixtures - First Floor - Academic Wing | South	15	12	2/2/2028	2/23/2028	5D - Hol
CSTR-9410	MEP Ceiling Inspections - First Floor - Academic Wing | South	5	12	2/24/2028	3/1/2028	5D - Hol
CSTR-9430	Millwork / Casework / Countertops - First Floor - Academic Wing | South	10	45	2/24/2028	3/8/2028	5D - Hol
CSTR-9420	Install Acoustical Ceiling Tiles - First Floor - Academic Wing | South	10	12	3/2/2028	3/15/2028	5D - Hol
CSTR-9440	Install Markerboards & Tackboards - First Floor - Academic Wing | South	10	50	3/9/2028	3/22/2028	5D - Hol
CSTR-9740	Install Plumbing Fixtures - First Floor - Academic Wing | South	10	45	3/9/2028	3/22/2028	5D - Hol
CSTR-9450	Install Flooring Finishes - First Floor - Academic Wing | South	20	12	3/16/2028	4/12/2028	5D - Hol
CSTR-9750	Install Toilet Accessories - First Floor - Academic Wing | South	5	45	3/23/2028	3/29/2028	5D - Hol
CSTR-9460	Install Doors, Hardware, & Glazing - First Floor - Academic Wing | South	10	12	4/13/2028	4/27/2028	5D - Hol
CSTR-9470	Finish Painting - First Floor - Academic Wing | South	8	12	4/28/2028	5/9/2028	5D - Hol
CSTR-9500	Install Window Shades - First Floor - Academic Wing | South	5	20	4/28/2028	5/4/2028	5D - Hol
CSTR-9480	Install Misc. Specialties - First Floor - Academic Wing | South	5	12	5/10/2028	5/16/2028	5D - Hol
CSTR-9510	Fontaine Pre-Punch - First Floor - Academic Wing | South	5	12	5/17/2028	5/23/2028	5D - Hol
CSTR-9520	Final Clean - First Floor - Academic Wing | South	5	12	5/24/2028	5/31/2028	5D - Hol
CSTR-9530	Design Team Punch List - First Floor - Academic Wing | South	5	12	6/1/2028	6/7/2028	5D - Hol
Corridor Finishes						
CSTR-9540	MEP Insulation - Corridors - First Floor - Academic Wing | South	10	2	11/24/2027	12/9/2027	5D - Hol
CSTR-9550	Insulation & GWB - Corridors - First Floor - Academic Wing | South	15	2	12/3/2027	12/23/2027	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

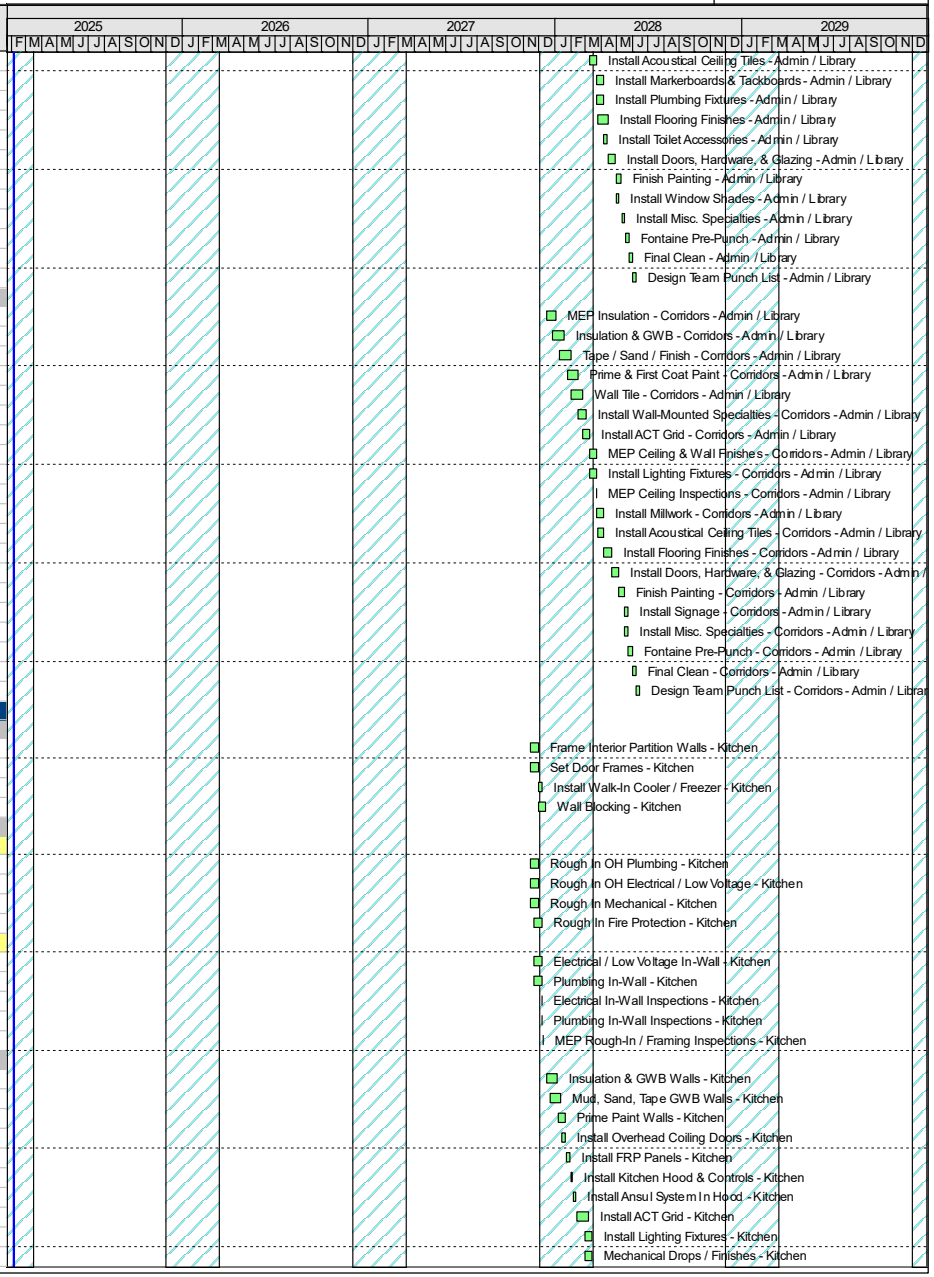
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-9560	Tape / Sand / Finish - Corridors - First Floor - Academic Wing | South	15	2	12/17/2027	1/10/2028	5D - Hol
CSTR-9570	Prime & First Coat Paint - Corridors - First Floor - Academic Wing | South	15	2	12/27/2027	1/18/2028	5D - Hol
CSTR-9590	Wall Tile - Corridors - First Floor - Academic Wing | South	20	2	1/19/2028	2/15/2028	5D - Hol
CSTR-9640	Install Wall-Mounted Specialties - Corridors - First Floor - Academic Wing | South	10	80	1/19/2028	2/1/2028	5D - Hol
CSTR-9580	Install ACT Grid - Corridors - First Floor - Academic Wing | South	10	2	2/16/2028	3/1/2028	5D - Hol
CSTR-9770	Install Water Coolers - First Floor - Academic Wing | South	5	70	2/16/2028	2/23/2028	5D - Hol
CSTR-9600	MEP Ceiling & Wall Finishes - Corridors - First Floor - Academic Wing | South	15	2	3/2/2028	3/22/2028	5D - Hol
CSTR-9610	Install Lighting Fixtures - Corridors - First Floor - Academic Wing | South	15	2	3/2/2028	3/22/2028	5D - Hol
CSTR-9730	Install Lockers / Cubbies & Bases - Corridors - First Floor - Academic Wing | South	15	12	3/2/2028	3/22/2028	5D - Hol
CSTR-9620	MEP Ceiling Inspections - Corridors - First Floor - Academic Wing | South	5	7	3/23/2028	3/29/2028	5D - Hol
CSTR-9760	Install Millwork - Corridors - First Floor - Academic Wing | South	10	2	3/23/2028	4/5/2028	5D - Hol
CSTR-9630	Install Acoustical Ceiling Tiles - Corridors - First Floor - Academic Wing | South	10	35	3/30/2028	4/12/2028	5D - Hol
CSTR-9650	Install Flooring Finishes - Corridors - First Floor - Academic Wing | South	15	2	4/6/2028	4/27/2028	5D - Hol
CSTR-9660	Install Doors, Hardware, & Glazing - Corridors - First Floor - Academic Wing | South	10	2	4/28/2028	5/11/2028	5D - Hol
CSTR-9670	Finish Painting - Corridors - First Floor - Academic Wing | South	8	2	5/12/2028	5/23/2028	5D - Hol
CSTR-9690	Install Window Shades - Corridors - First Floor - Academic Wing | South	5	10	5/12/2028	5/18/2028	5D - Hol
CSTR-9490	Install Signage - Corridors - First Floor - Academic Wing | South	5	7	5/24/2028	5/31/2028	5D - Hol
CSTR-9680	Install Misc. Specialties - Corridors - First Floor - Academic Wing | South	5	2	5/24/2028	5/31/2028	5D - Hol
CSTR-9700	Fontaine Pre-Punch - Corridors - First Floor - Academic Wing | South	5	2	6/1/2028	6/7/2028	5D - Hol
CSTR-9710	Final Clean - Corridors - First Floor - Academic Wing | South	5	2	6/8/2028	6/14/2028	5D - Hol
CSTR-9720	Design Team Punch List - Corridors - First Floor - Academic Wing | South	5	2	6/15/2028	6/21/2028	5D - Hol
Large Group / Community Spaces						
Main Electrical / Mechanical Rooms						
CSTR-3670	Place Housekeeping Pads	5	81	9/14/2027	9/20/2027	5D - Hol
CSTR-4830	Set Mechanical / HVAC Equipment (Boilers, Pumps, etc.)	20	81	9/21/2027	10/18/2027	5D - Hol
CSTR-5430	Pipe Mechanical / HVAC Equipment	20	81	10/19/2027	11/15/2027	5D - Hol
CSTR-5810	Set Electrical Gear / Terminations / Permanent Power	20	0	2/8/2028	3/7/2028	5D - Hol
CSTR-6080	Coordination & Scheduling w/ Utility Company	15	0	2/23/2028	3/14/2028	5D - Hol
CSTR-6470	Utility Company Install Meter Socket, Energize	1	0	3/15/2028	3/15/2028	5D - Hol
Classrooms / Administration / Library						
Framing						
CSTR-3610	Frame Interior Partition Walls - Admin / Library	15	0	10/22/2027	11/12/2027	5D - Hol
CSTR-3870	Wall Blocking - Admin / Library	15	5	11/5/2027	11/30/2027	5D - Hol
CSTR-3880	Set Door Frames - Admin / Library	15	9	11/5/2027	11/30/2027	5D - Hol
CSTR-4170	Frame Ceilings & Soffits - Admin / Library	15	13	11/22/2027	12/14/2027	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-3620	Rough In Duct & Equipment - Admin / Library	15	0	10/22/2027	11/12/2027	5D - Hol
CSTR-3630	Rough In OH Electrical - Admin / Library	15	13	10/22/2027	11/12/2027	5D - Hol
CSTR-3640	Rough In OH Plumbing - Admin / Library	15	0	10/22/2027	11/12/2027	5D - Hol
CSTR-3750	Rough In Mechanical Piping - Admin / Library	15	13	10/29/2027	11/19/2027	5D - Hol
CSTR-3760	Rough In OH Data - Admin / Library	15	13	10/29/2027	11/19/2027	5D - Hol
CSTR-3770	Rough In Fire Alarm - Admin / Library	15	13	10/29/2027	11/19/2027	5D - Hol
CSTR-3780	Rough In Fire Protection - Admin / Library	15	9	10/29/2027	11/19/2027	5D - Hol
In-Wall Roughs						
CSTR-3890	In-Wall Electrical Rough - Admin / Library	15	0	11/5/2027	11/30/2027	5D - Hol
CSTR-3900	In-Wall Plumbing Rough - Admin / Library	15	0	11/5/2027	11/30/2027	5D - Hol
CSTR-4180	In-Wall Plumbing Inspection - Admin / Library	1	7	12/1/2027	12/1/2027	5D - Hol
CSTR-4190	In-Wall Electrical Inspection - Admin / Library	1	7	12/1/2027	12/1/2027	5D - Hol
CSTR-4200	MEP Rough / Framing Inspections - Admin / Library	1	7	12/2/2027	12/2/2027	5D - Hol
Classroom Finishes						
CSTR-4300	MEP Insulation - Admin / Library	10	7	12/3/2027	12/16/2027	5D - Hol
CSTR-4650	Insulation & GWB - Admin / Library	15	11	12/10/2027	1/3/2028	5D - Hol
CSTR-4690	Drywall - Ceilings - Admin / Library	15	13	12/15/2027	1/6/2028	5D - Hol
CSTR-4940	Tape / Sand / Finish - Admin / Library	15	11	12/27/2027	1/18/2028	5D - Hol
CSTR-5220	Prime & First Coat Paint - Admin / Library	15	11	1/11/2028	2/1/2028	5D - Hol
CSTR-5600	Install ACT Grid - Admin / Library	10	11	2/2/2028	2/15/2028	5D - Hol
CSTR-5610	Tile - Toilet Room Area - Admin / Library	10	60	2/2/2028	2/15/2028	5D - Hol
CSTR-5870	MEP Ceiling & Wall Finishes - Admin / Library	15	11	2/16/2028	3/8/2028	5D - Hol
CSTR-5880	Install Lighting Fixtures - Admin / Library	15	11	2/16/2028	3/8/2028	5D - Hol
CSTR-6340	MEP Ceiling Inspections - Admin / Library	1	11	3/9/2028	3/9/2028	5D - Hol
CSTR-6350	Millwork / Casework / Countertops - Admin / Library	10	35	3/9/2028	3/22/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

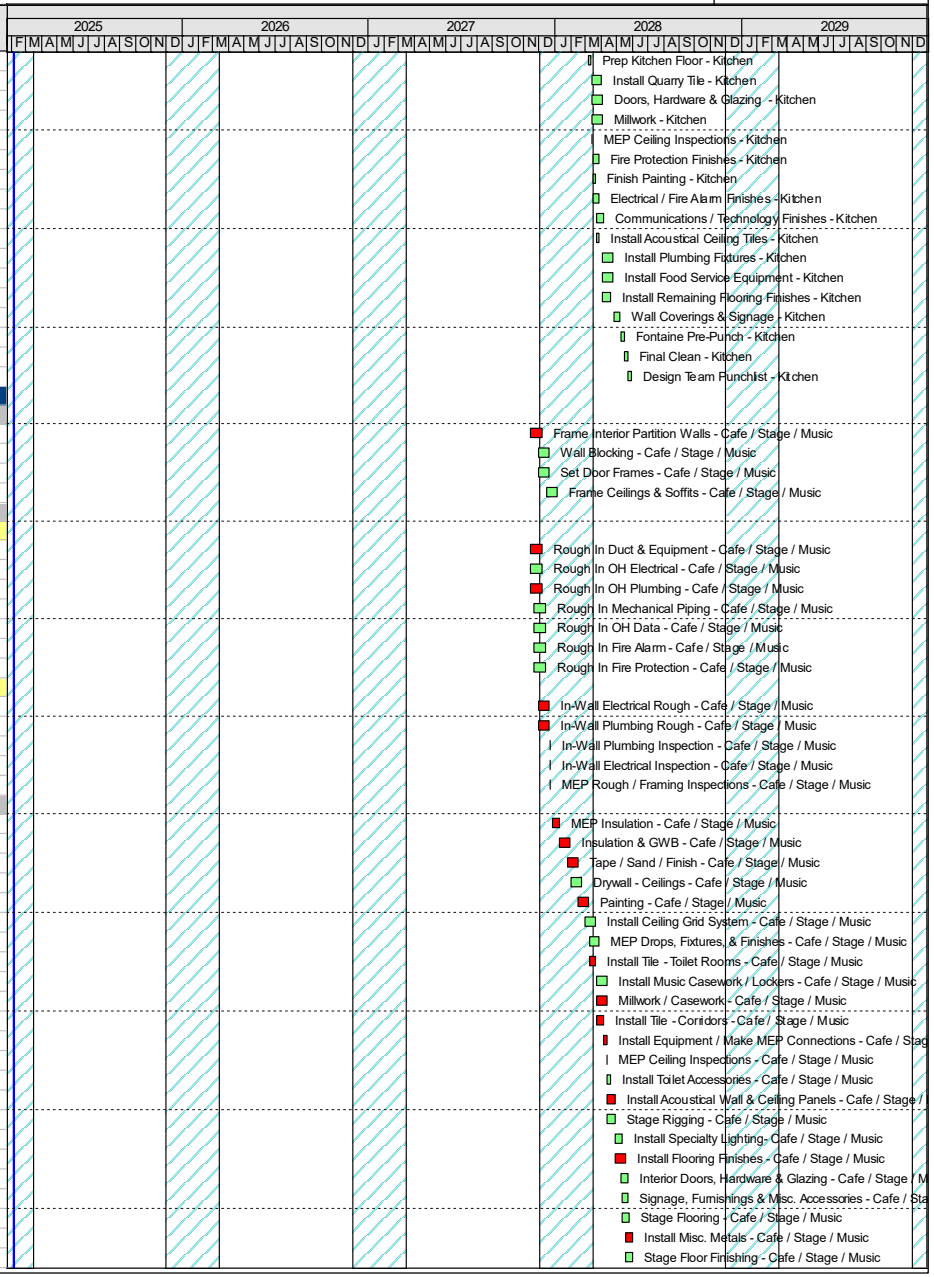
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-6440	Install Acoustical Ceiling Tiles - Admin / Library	10	11	3/10/2028	3/23/2028	5D - Hol
CSTR-6510	Install Markerboards & Tackboards - Admin / Library	10	40	3/23/2028	4/5/2028	5D - Hol
CSTR-6530	Install Plumbing Fixtures - Admin / Library	10	35	3/23/2028	4/5/2028	5D - Hol
CSTR-6670	Install Flooring Finishes - Admin / Library	15	11	3/24/2028	4/13/2028	5D - Hol
CSTR-6770	Install Toilet Accessories - Admin / Library	5	35	4/6/2028	4/12/2028	5D - Hol
CSTR-7000	Install Doors, Hardware, & Glazing - Admin / Library	10	11	4/14/2028	4/28/2028	5D - Hol
CSTR-7220	Finish Painting - Admin / Library	8	11	5/1/2028	5/10/2028	5D - Hol
CSTR-7230	Install Window Shades - Admin / Library	5	19	5/1/2028	5/5/2028	5D - Hol
CSTR-7320	Install Misc. Specialties - Admin / Library	5	11	5/11/2028	5/17/2028	5D - Hol
CSTR-7400	Fontaine Pre-Punch - Admin / Library	5	11	5/18/2028	5/24/2028	5D - Hol
CSTR-7510	Final Clean - Admin / Library	5	11	5/25/2028	6/1/2028	5D - Hol
CSTR-7560	Design Team Punch List - Admin / Library	5	11	6/2/2028	6/8/2028	5D - Hol
Corridor Finishes						
CSTR-4660	MEP Insulation - Corridors - Admin / Library	10	7	12/17/2027	1/3/2028	5D - Hol
CSTR-4950	Insulation & GWB - Corridors - Admin / Library	15	7	12/27/2027	1/18/2028	5D - Hol
CSTR-5230	Tape / Sand / Finish - Corridors - Admin / Library	15	7	1/11/2028	2/1/2028	5D - Hol
CSTR-5550	Prime & First Coat Paint - Corridors - Admin / Library	15	7	1/26/2028	2/15/2028	5D - Hol
CSTR-5890	Wall Tile - Corridors - Admin / Library	15	7	2/2/2028	2/23/2028	5D - Hol
CSTR-5900	Install Wall-Mounted Specialties - Corridors - Admin / Library	10	60	2/16/2028	3/1/2028	5D - Hol
CSTR-6520	Install ACT Grid - Corridors - Admin / Library	10	7	2/24/2028	3/8/2028	5D - Hol
CSTR-6750	MEP Ceiling & Wall Finishes - Corridors - Admin / Library	10	7	3/9/2028	3/22/2028	5D - Hol
CSTR-6760	Install Lighting Fixtures - Corridors - Admin / Library	10	7	3/9/2028	3/22/2028	5D - Hol
CSTR-7010	MEP Ceiling Inspections - Corridors - Admin / Library	1	16	3/23/2028	3/23/2028	5D - Hol
CSTR-7020	Install Millwork - Corridors - Admin / Library	10	7	3/23/2028	4/5/2028	5D - Hol
CSTR-7080	Install Acoustical Ceiling Tiles - Corridors - Admin / Library	10	39	3/24/2028	4/6/2028	5D - Hol
CSTR-7240	Install Flooring Finishes - Corridors - Admin / Library	10	7	4/6/2028	4/20/2028	5D - Hol
CSTR-7540	Install Doors, Hardware, & Glazing - Corridors - Admin / Library	10	7	4/21/2028	5/4/2028	5D - Hol
CSTR-7630	Finish Painting - Corridors - Admin / Library	8	7	5/5/2028	5/16/2028	5D - Hol
CSTR-7660	Install Signage - Corridors - Admin / Library	5	12	5/17/2028	5/23/2028	5D - Hol
CSTR-7670	Install Misc. Specialties - Corridors - Admin / Library	5	7	5/17/2028	5/23/2028	5D - Hol
CSTR-7700	Fontaine Pre-Punch - Corridors - Admin / Library	5	7	5/24/2028	5/31/2028	5D - Hol
CSTR-7710	Final Clean - Corridors - Admin / Library	5	7	6/1/2028	6/7/2028	5D - Hol
CSTR-7730	Design Team Punch List - Corridors - Admin / Library	5	7	6/8/2028	6/14/2028	5D - Hol
Kitchen						
Interior Framing						
CSTR-4010	Frame Interior Partition Walls - Kitchen	10	9	11/15/2027	11/30/2027	5D - Hol
CSTR-4020	Set Door Frames - Kitchen	10	15	11/15/2027	11/30/2027	5D - Hol
CSTR-4110	Install Walk-In Cooler / Freezer - Kitchen	5	10	12/1/2027	12/7/2027	5D - Hol
CSTR-4120	Wall Blocking - Kitchen	10	5	12/1/2027	12/14/2027	5D - Hol
MEP Rough-Ins						
Overhead MEP Roughs						
CSTR-4040	Rough In OH Plumbing - Kitchen	10	14	11/15/2027	11/30/2027	5D - Hol
CSTR-4050	Rough In OH Electrical / Low Voltage - Kitchen	10	14	11/15/2027	11/30/2027	5D - Hol
CSTR-4060	Rough In Mechanical - Kitchen	10	14	11/15/2027	11/30/2027	5D - Hol
CSTR-4030	Rough In Fire Protection - Kitchen	10	9	11/22/2027	12/7/2027	5D - Hol
In-Wall MEP Roughs						
CSTR-4130	Electrical / Low Voltage In-Wall - Kitchen	10	9	11/22/2027	12/7/2027	5D - Hol
CSTR-4140	Plumbing In-Wall - Kitchen	10	9	11/22/2027	12/7/2027	5D - Hol
CSTR-4460	Electrical In-Wall Inspections - Kitchen	1	9	12/7/2027	12/7/2027	5D - Hol
CSTR-4470	Plumbing In-Wall Inspections - Kitchen	1	9	12/7/2027	12/7/2027	5D - Hol
CSTR-4480	MEP Rough-In / Framing Inspections - Kitchen	1	9	12/8/2027	12/8/2027	5D - Hol
Interior Finishes						
CSTR-4580	Insulation & GWB Walls - Kitchen	15	5	12/15/2027	1/6/2028	5D - Hol
CSTR-4680	Mud, Sand, Tape GWB Walls - Kitchen	15	5	12/22/2027	1/13/2028	5D - Hol
CSTR-5020	Prime Paint Walls - Kitchen	10	5	1/7/2028	1/21/2028	5D - Hol
CSTR-5140	Install Overhead Coiling Doors - Kitchen	5	20	1/14/2028	1/21/2028	5D - Hol
CSTR-5290	Install FRP Panels - Kitchen	6	5	1/24/2028	1/31/2028	5D - Hol
CSTR-5470	Install Kitchen Hood & Controls - Kitchen	4	5	2/1/2028	2/4/2028	5D - Hol
CSTR-5580	Install Ansul System In Hood - Kitchen	5	5	2/7/2028	2/11/2028	5D - Hol
CSTR-5660	Install ACT Grid - Kitchen	15	5	2/14/2028	3/6/2028	5D - Hol
CSTR-5940	Install Lighting Fixtures - Kitchen	10	6	2/29/2028	3/13/2028	5D - Hol
CSTR-5950	Mechanical Drops / Finishes - Kitchen	10	6	2/29/2028	3/13/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

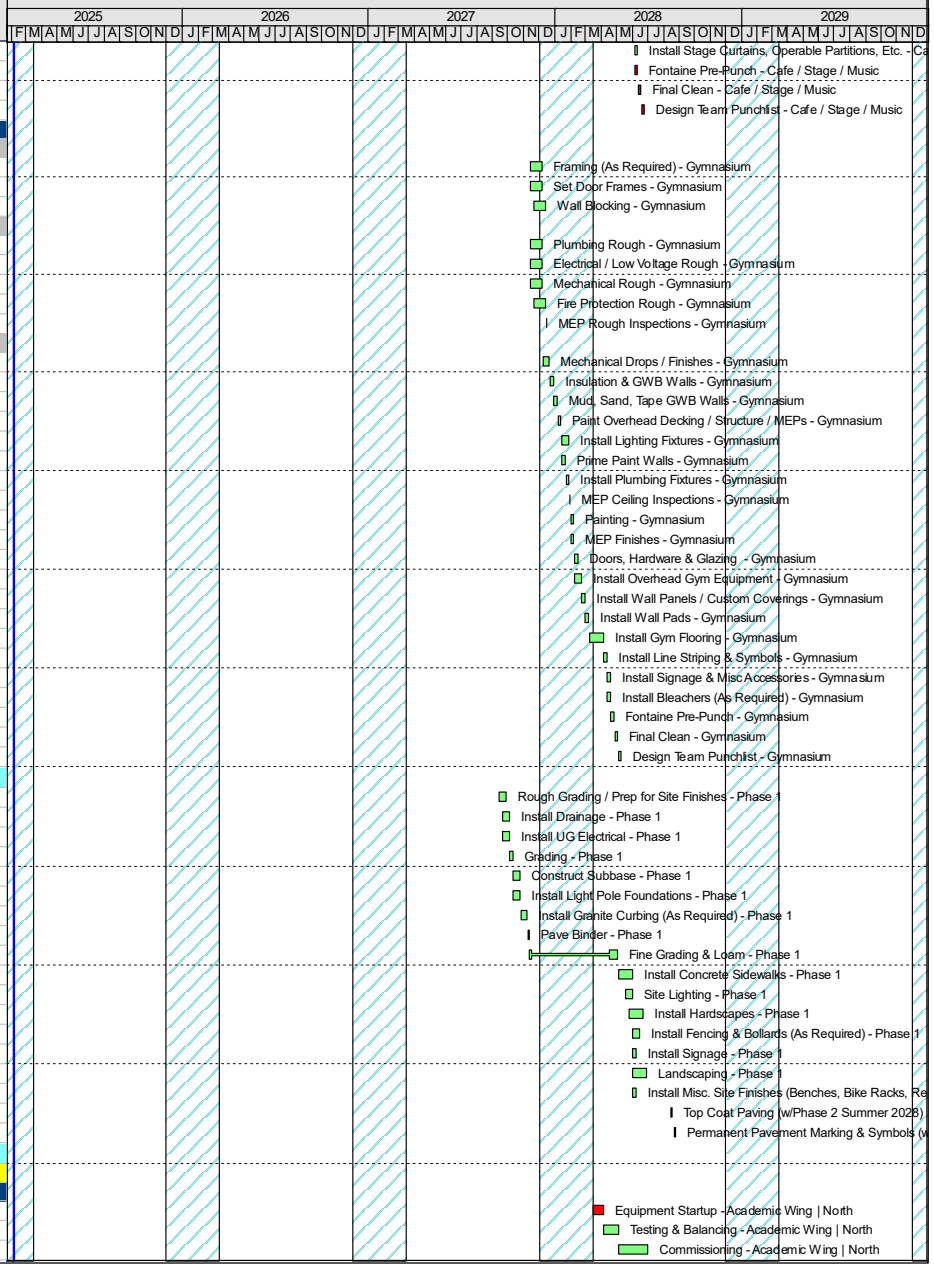
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-6070	Prep Kitchen Floor - Kitchen	4	5	3/7/2028	3/10/2028	5D - Hol
CSTR-6150	Install Quarry Tile - Kitchen	15	5	3/13/2028	3/31/2028	5D - Hol
CSTR-6180	Doors, Hardware & Glazing - Kitchen	15	14	3/14/2028	4/3/2028	5D - Hol
CSTR-6190	Millwork - Kitchen	15	14	3/14/2028	4/3/2028	5D - Hol
CSTR-6200	MEP Ceiling Inspections - Kitchen	1	6	3/14/2028	3/14/2028	5D - Hol
CSTR-6210	Fire Protection Finishes - Kitchen	10	18	3/15/2028	3/28/2028	5D - Hol
CSTR-6220	Finish Painting - Kitchen	5	18	3/15/2028	3/21/2028	5D - Hol
CSTR-6230	Electrical / Fire Alarm Finishes - Kitchen	10	6	3/15/2028	3/28/2028	5D - Hol
CSTR-6380	Communications / Technology Finishes - Kitchen	10	28	3/22/2028	4/4/2028	5D - Hol
CSTR-6390	Install Acoustical Ceiling Tiles - Kitchen	5	18	3/22/2028	3/28/2028	5D - Hol
CSTR-6560	Install Plumbing Fixtures - Kitchen	15	5	4/3/2028	4/24/2028	5D - Hol
CSTR-6570	Install Food Service Equipment - Kitchen	15	5	4/3/2028	4/24/2028	5D - Hol
CSTR-6590	Install Remaining Flooring Finishes - Kitchen	10	14	4/4/2028	4/18/2028	5D - Hol
CSTR-6900	Wall Coverings & Signage - Kitchen	10	5	4/25/2028	5/8/2028	5D - Hol
CSTR-7030	Fontaine Pre-Punch - Kitchen	5	5	5/9/2028	5/15/2028	5D - Hol
CSTR-7110	Final Clean - Kitchen	5	5	5/16/2028	5/22/2028	5D - Hol
CSTR-7250	Design Team Punchlist - Kitchen	5	5	5/23/2028	5/30/2028	5D - Hol
Cafeteria / Stage / Music						
Framing						
CSTR-4370	Frame Interior Partition Walls - Cafe / Stage / Music	15	0	11/15/2027	12/7/2027	5D - Hol
CSTR-4700	Wall Blocking - Cafe / Stage / Music	15	11	12/1/2027	12/21/2027	5D - Hol
CSTR-4710	Set Door Frames - Cafe / Stage / Music	15	11	12/1/2027	12/21/2027	5D - Hol
CSTR-5040	Frame Ceilings & Soffits - Cafe / Stage / Music	15	21	12/15/2027	1/6/2028	5D - Hol
MEP Roughs						
OH Roughs						
CSTR-4380	Rough In Duct & Equipment - Cafe / Stage / Music	15	0	11/15/2027	12/7/2027	5D - Hol
CSTR-4390	Rough In OH Electrical - Cafe / Stage / Music	15	21	11/15/2027	12/7/2027	5D - Hol
CSTR-4400	Rough In OH Plumbing - Cafe / Stage / Music	15	0	11/15/2027	12/7/2027	5D - Hol
CSTR-4540	Rough In Mechanical Piping - Cafe / Stage / Music	15	21	11/22/2027	12/14/2027	5D - Hol
CSTR-4550	Rough In OH Data - Cafe / Stage / Music	15	21	11/22/2027	12/14/2027	5D - Hol
CSTR-4560	Rough In Fire Alarm - Cafe / Stage / Music	15	21	11/22/2027	12/14/2027	5D - Hol
CSTR-4570	Rough In Fire Protection - Cafe / Stage / Music	15	21	11/22/2027	12/14/2027	5D - Hol
In-Wall Roughs						
CSTR-4720	In-Wall Electrical Rough - Cafe / Stage / Music	15	0	12/1/2027	12/21/2027	5D - Hol
CSTR-4730	In-Wall Plumbing Rough - Cafe / Stage / Music	15	0	12/1/2027	12/21/2027	5D - Hol
CSTR-5150	In-Wall Plumbing Inspection - Cafe / Stage / Music	1	0	12/22/2027	12/22/2027	5D - Hol
CSTR-5160	In-Wall Electrical Inspection - Cafe / Stage / Music	1	0	12/22/2027	12/22/2027	5D - Hol
CSTR-5170	MEP Rough / Framing Inspections - Cafe / Stage / Music	1	0	12/23/2027	12/23/2027	5D - Hol
Interior Finishes						
CSTR-5240	MEP Insulation - Cafe / Stage / Music	10	0	12/27/2027	1/10/2028	5D - Hol
CSTR-5410	Insulation & GWB - Cafe / Stage / Music	15	0	1/10/2028	1/31/2028	5D - Hol
CSTR-5620	Tape / Sand / Finish - Cafe / Stage / Music	15	0	1/25/2028	2/14/2028	5D - Hol
CSTR-5780	Drywall - Ceilings - Cafe / Stage / Music	15	5	2/1/2028	2/22/2028	5D - Hol
CSTR-6130	Painting - Cafe / Stage / Music	15	0	2/15/2028	3/7/2028	5D - Hol
CSTR-6450	Install Ceiling Grid System - Cafe / Stage / Music	15	6	3/1/2028	3/21/2028	5D - Hol
CSTR-6550	MEP Drops, Fixtures, & Finishes - Cafe / Stage / Music	15	6	3/8/2028	3/28/2028	5D - Hol
CSTR-6690	Install Tile - Toilet Rooms - Cafe / Stage / Music	10	0	3/8/2028	3/21/2028	5D - Hol
CSTR-6780	Install Music Casework / Lockers - Cafe / Stage / Music	15	16	3/22/2028	4/11/2028	5D - Hol
CSTR-6680	Millwork / Casework - Cafe / Stage / Music	15	0	3/22/2028	4/11/2028	5D - Hol
CSTR-6890	Install Tile - Corridors - Cafe / Stage / Music	10	0	3/22/2028	4/4/2028	5D - Hol
CSTR-6880	Install Equipment / Make MEP Connections - Cafe / Stage / Music	5	0	4/5/2028	4/11/2028	5D - Hol
CSTR-7090	MEP Ceiling Inspections - Cafe / Stage / Music	1	0	4/12/2028	4/12/2028	5D - Hol
CSTR-7100	Install Toilet Accessories - Cafe / Stage / Music	5	31	4/12/2028	4/19/2028	5D - Hol
CSTR-7120	Install Acoustical Wall & Ceiling Panels - Cafe / Stage / Music	10	0	4/13/2028	4/27/2028	5D - Hol
CSTR-7130	Stage Rigging - Cafe / Stage / Music	10	15	4/13/2028	4/27/2028	5D - Hol
CSTR-7360	Install Specialty Lighting- Cafe / Stage / Music	10	5	4/28/2028	5/11/2028	5D - Hol
CSTR-7370	Install Flooring Finishes - Cafe / Stage / Music	15	0	4/28/2028	5/18/2028	5D - Hol
CSTR-7530	Interior Doors, Hardware & Glazing - Cafe / Stage / Music	10	2	5/9/2028	5/22/2028	5D - Hol
CSTR-7520	Signage, Furnishings & Misc. Accessories - Cafe / Stage / Music	8	8	5/11/2028	5/22/2028	5D - Hol
CSTR-7600	Stage Flooring - Cafe / Stage / Music	10	5	5/12/2028	5/25/2028	5D - Hol
CSTR-7570	Install Misc. Metals - Cafe / Stage / Music	10	0	5/19/2028	6/2/2028	5D - Hol
CSTR-7690	Stage Floor Finishing - Cafe / Stage / Music	10	5	5/19/2028	6/2/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

Data Date 2/4/2025

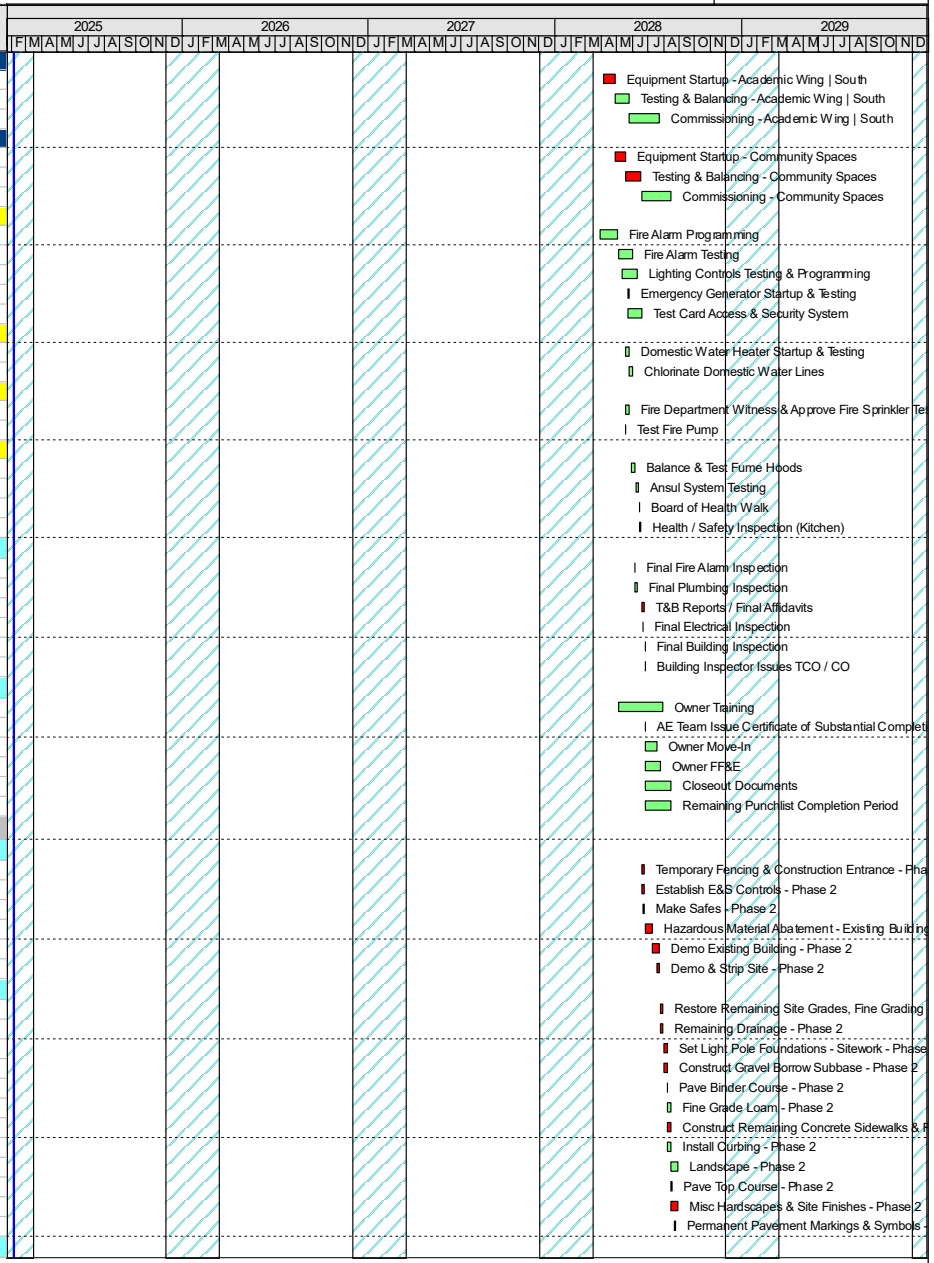
Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
CSTR-7720	Install Stage Curtains, Operable Partitions, Etc. - Cafe / Stage / Music	5	5	6/5/2028	6/9/2028	5D - Hol
CSTR-7740	Fontaine Pre-Punch - Cafe / Stage / Music	5	0	6/5/2028	6/9/2028	5D - Hol
CSTR-7750	Final Clean - Cafe / Stage / Music	5	0	6/12/2028	6/16/2028	5D - Hol
CSTR-7760	Design Team Punchlist - Cafe / Stage / Music	5	0	6/19/2028	6/23/2028	5D - Hol
Gymnasium						
Interior Framing						
CSTR-4890	Framing (As Required) - Gymnasium	15	36	11/15/2027	12/7/2027	5D - Hol
CSTR-4900	Set Door Frames - Gymnasium	15	41	11/15/2027	12/7/2027	5D - Hol
CSTR-4990	Wall Blocking - Gymnasium	15	36	11/22/2027	12/14/2027	5D - Hol
MEP Rough-Ins						
CSTR-4850	Plumbing Rough - Gymnasium	15	40	11/15/2027	12/7/2027	5D - Hol
CSTR-4860	Electrical / Low Voltage Rough - Gymnasium	15	40	11/15/2027	12/7/2027	5D - Hol
CSTR-4870	Mechanical Rough - Gymnasium	15	31	11/15/2027	12/7/2027	5D - Hol
CSTR-4840	Fire Protection Rough - Gymnasium	15	35	11/22/2027	12/14/2027	5D - Hol
CSTR-5260	MEP Rough Inspections - Gymnasium	1	35	12/15/2027	12/15/2027	5D - Hol
Interior Finishes						
CSTR-5250	Mechanical Drops / Finishes - Gymnasium	10	31	12/8/2027	12/21/2027	5D - Hol
CSTR-5560	Insulation & GWB Walls - Gymnasium	5	31	12/22/2027	12/29/2027	5D - Hol
CSTR-5630	Mud, Sand, Tape GWB Walls - Gymnasium	5	31	12/30/2027	1/6/2028	5D - Hol
CSTR-5790	Paint Overhead Decking / Structure / MEPs - Gymnasium	5	31	1/7/2028	1/13/2028	5D - Hol
CSTR-5910	Install Lighting Fixtures - Gymnasium	10	31	1/14/2028	1/28/2028	5D - Hol
CSTR-5920	Prime Paint Walls - Gymnasium	5	32	1/14/2028	1/21/2028	5D - Hol
CSTR-6050	Install Plumbing Fixtures - Gymnasium	5	32	1/24/2028	1/28/2028	5D - Hol
CSTR-6140	MEP Ceiling Inspections - Gymnasium	1	31	1/31/2028	1/31/2028	5D - Hol
CSTR-6160	Painting - Gymnasium	5	31	2/1/2028	2/7/2028	5D - Hol
CSTR-6170	MEP Finishes - Gymnasium	5	41	2/1/2028	2/7/2028	5D - Hol
CSTR-6360	Doors, Hardware & Glazing - Gymnasium	5	46	2/8/2028	2/14/2028	5D - Hol
CSTR-6370	Install Overhead Gym Equipment - Gymnasium	10	31	2/8/2028	2/22/2028	5D - Hol
CSTR-6580	Install Wall Panels / Custom Coverings - Gymnasium	5	31	2/23/2028	2/29/2028	5D - Hol
CSTR-6700	Install Wall Pads - Gymnasium	5	31	3/1/2028	3/7/2028	5D - Hol
CSTR-6790	Install Gym Flooring - Gymnasium	20	31	3/8/2028	4/4/2028	5D - Hol
CSTR-7140	Install Line Striping & Symbols - Gymnasium	5	31	4/5/2028	4/11/2028	5D - Hol
CSTR-7260	Install Signage & Misc Accessories - Gymnasium	5	31	4/12/2028	4/19/2028	5D - Hol
CSTR-7270	Install Bleachers (As Required) - Gymnasium	5	31	4/12/2028	4/19/2028	5D - Hol
CSTR-7300	Fontaine Pre-Punch - Gymnasium	5	31	4/20/2028	4/26/2028	5D - Hol
CSTR-7350	Final Clean - Gymnasium	5	31	4/27/2028	5/3/2028	5D - Hol
CSTR-7480	Design Team Punchlist - Gymnasium	5	31	5/4/2028	5/10/2028	5D - Hol
Site Finishes - Phase 1						
STPH-1000	Rough Grading / Prep for Site Finishes - Phase 1	10	113	9/14/2027	9/27/2027	5D - Hol
STPH-1010	Install Drainage - Phase 1	10	113	9/21/2027	10/4/2027	5D - Hol
STPH-1020	Install UG Electrical - Phase 1	10	113	9/21/2027	10/4/2027	5D - Hol
STPH-1030	Grading - Phase 1	5	113	10/5/2027	10/11/2027	5D - Hol
STPH-1040	Construct Subbase - Phase 1	10	113	10/12/2027	10/25/2027	5D - Hol
STPH-1050	Install Light Pole Foundations - Phase 1	10	123	10/12/2027	10/25/2027	5D - Hol
STPH-1060	Install Granite Curbing (As Required) - Phase 1	10	113	10/26/2027	11/8/2027	5D - Hol
STPH-1070	Pave Binder - Phase 1	3	30	11/9/2027	11/11/2027	5D - Hol (No Winter)
STPH-1080	Fine Grading & Loam - Phase 1	15	11	11/12/2027	5/3/2028	Pave 5D - Hol
STPH-1090	Install Concrete Sidewalks - Phase 1	20	11	5/4/2028	6/1/2028	5D - Hol (No Winter)
STPH-1100	Site Lighting - Phase 1	10	16	5/18/2028	6/1/2028	5D - Hol (No Winter)
STPH-1110	Install Hardscapes - Phase 1	20	16	5/25/2028	6/22/2028	5D - Hol (No Winter)
STPH-1120	Install Fencing & Bollards (As Required) - Phase 1	10	115	6/2/2028	6/15/2028	5D - Hol (No Winter)
STPH-1130	Install Signage - Phase 1	5	120	6/2/2028	6/8/2028	5D - Hol (No Winter)
STPH-1140	Landscaping - Phase 1	20	106	6/2/2028	6/29/2028	5D - Hol (No Winter)
STPH-1150	Install Misc. Site Finishes (Benches, Bike Racks, Receptacles, etc.) - Phase 1	5	11	6/2/2028	6/8/2028	5D - Hol (No Winter)
STPH-1160	Top Coat Paving (w/Phase 2 Summer 2028)	2	68	8/16/2028	8/17/2028	5D - Hol (No Winter)
STPH-1170	Permanent Pavement Marking & Symbols (w/Phase 2 Summer 2028)	1	68	8/23/2028	8/23/2028	5D - Hol (No Winter)
Startup & Testing						
HVAC Equipment						
Academic Wing | North						
CLST-1040	Equipment Startup - Academic Wing | North	15	0	3/16/2028	4/5/2028	5D - Hol
CLST-1160	Testing & Balancing - Academic Wing | North	20	30	4/6/2028	5/4/2028	5D - Hol
CLST-1230	Commissioning - Academic Wing | North	40	103	5/5/2028	6/30/2028	5D - Hol



Wilmington Elementary School: Proposal Schedule Rev03

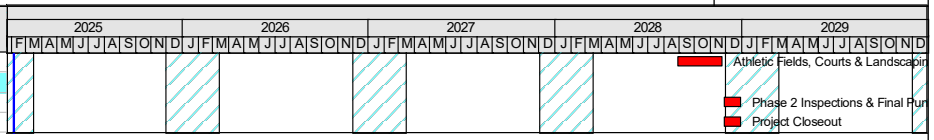
Data Date 2/4/2025

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
Academic Wing | South						
CLST-1000	Equipment Startup - Academic Wing | South	15	0	4/6/2028	4/27/2028	5D - Hol
CLST-1170	Testing & Balancing - Academic Wing | South	20	7	4/28/2028	5/25/2028	5D - Hol
CLST-1240	Commissioning - Academic Wing | South	40	108	5/26/2028	7/24/2028	5D - Hol
Large Group / Community Spaces						
CLST-1080	Equipment Startup - Community Spaces	15	0	4/28/2028	5/18/2028	5D - Hol
CLST-1150	Testing & Balancing - Community Spaces	20	0	5/19/2028	6/16/2028	5D - Hol
CLST-1220	Commissioning - Community Spaces	40	93	6/19/2028	8/14/2028	5D - Hol
Electrical / Low Voltage						
CLST-1030	Fire Alarm Programming	25	6	3/29/2028	5/3/2028	5D - Hol
CLST-1110	Fire Alarm Testing	20	5	5/5/2028	6/2/2028	5D - Hol
CLST-1020	Lighting Controls Testing & Programming	20	9	5/12/2028	6/9/2028	5D - Hol
CLST-1060	Emergency Generator Startup & Testing	3	20	5/22/2028	5/24/2028	5D - Hol
CLST-1100	Test Card Access & Security System	20	2	5/23/2028	6/20/2028	5D - Hol
Plumbing						
CLST-1140	Domestic Water Heater Startup & Testing	5	10	5/19/2028	5/25/2028	5D - Hol
CLST-1180	Chlorinate Domestic Water Lines	5	10	5/26/2028	6/2/2028	5D - Hol
Fire Protection						
CLST-1010	Fire Department Witness & Approve Fire Sprinkler Testing	5	15	5/19/2028	5/25/2028	5D - Hol
CLST-1050	Test Fire Pump	1	20	5/19/2028	5/19/2028	5D - Hol
Food Services / Kitchen						
CLST-1070	Balance & Test Fume Hoods	5	5	5/31/2028	6/6/2028	5D - Hol
CLST-1090	Ansul System Testing	5	5	6/7/2028	6/13/2028	5D - Hol
CLST-1120	Board of Health Walk	2	5	6/14/2028	6/15/2028	5D - Hol
CLST-1130	Health / Safety Inspection (Kitchen)	1	5	6/16/2028	6/16/2028	5D - Hol
Final Inspections						
CLST-1200	Final Fire Alarm Inspection	1	13	6/5/2028	6/5/2028	5D - Hol
CLST-1190	Final Plumbing Inspection	5	10	6/5/2028	6/9/2028	5D - Hol
CLST-1210	T&B Reports / Final Affidavits	5	0	6/19/2028	6/23/2028	5D - Hol
CLST-1250	Final Electrical Inspection	1	2	6/21/2028	6/21/2028	5D - Hol
CLST-1260	Final Building Inspection	1	0	6/26/2028	6/26/2028	5D - Hol
CLST-1270	Building Inspector Issues TCO / CO	1	0	6/26/2028	6/26/2028	5D - Hol
Building Closeout						
CLST-1320	Owner Training	60	103	5/5/2028	7/31/2028	5D - Hol
CLST-1300	AE Team Issue Certificate of Substantial Completion	1	0	6/26/2028	6/26/2028	5D - Hol
CLST-1280	Owner Move-In	15	112	6/27/2028	7/18/2028	5D - Hol
CLST-1290	Owner FF&E	20	107	6/27/2028	7/25/2028	5D - Hol
CLST-1310	Closeout Documents	34	93	6/27/2028	8/14/2028	5D - Hol
CLST-1330	Remaining Punchlist Completion Period	34	93	6/27/2028	8/14/2028	5D - Hol
Phase 2 Construction						
Demolition						
PHS2-1000	Temporary Fencing & Construction Entrance - Phase 2	5	0	6/19/2028	6/23/2028	Summer 2028
PHS2-1010	Establish E&S Controls - Phase 2	5	0	6/19/2028	6/23/2028	5D - Hol
PHS2-1020	Make Safes - Phase 2	3	0	6/21/2028	6/23/2028	5D - Hol
PHS2-1120	Hazardous Material Abatement - Existing Building - Phase 2	10	0	6/26/2028	7/10/2028	5D - Hol
PHS2-1040	Demo Existing Building - Phase 2	10	0	7/11/2028	7/24/2028	5D - Hol
PHS2-1260	Demo & Strip Site - Phase 2	5	0	7/18/2028	7/24/2028	5D - Hol
Sitework / Parking / Drives						
PHS2-1050	Restore Remaining Site Grades, Fine Grading - Phase 2	5	0	7/25/2028	7/31/2028	5D - Hol
PHS2-1060	Remaining Drainage - Phase 2	5	0	7/25/2028	7/31/2028	5D - Hol
PHS2-1070	Set Light Pole Foundations - Sitework - Phase 2	5	0	8/1/2028	8/7/2028	5D - Hol
PHS2-1080	Construct Gravel Borrow Subbase - Phase 2	5	0	8/1/2028	8/7/2028	5D - Hol
PHS2-1090	Pave Binder Course - Phase 2	1	0	8/8/2028	8/8/2028	5D - Hol
PHS2-1100	Fine Grade Loam - Phase 2	5	1	8/8/2028	8/14/2028	5D - Hol
PHS2-1110	Construct Remaining Concrete Sidewalks & Ramps - Phase 2	5	0	8/9/2028	8/15/2028	5D - Hol
PHS2-1280	Install Curbing - Phase 2	5	63	8/9/2028	8/15/2028	5D - Hol
PHS2-1150	Landscape - Phase 2	10	65	8/15/2028	8/28/2028	5D - Hol (No Winter)
PHS2-1160	Pave Top Course - Phase 2	2	65	8/16/2028	8/17/2028	5D - Hol (No Winter)
PHS2-1140	Misc Hardscapes & Site Finishes - Phase 2	10	0	8/16/2028	8/29/2028	5D - Hol
PHS2-1170	Permanent Pavement Markings & Symbols - Phase 2	1	65	8/23/2028	8/23/2028	5D - Hol (No Winter)
Fields / Remaining Site Finishes						



Wilmington Elementary School: Proposal Schedule Rev03

Activity ID	Activity Description	Orig. Dur.	Total Float	Start	Finish	Calendar
PHS2-1430	Athletic Fields, Courts & Landscaping	58	0	8/30/2028	11/22/2028	5D - Hol
Project Closeout						
PHS2-1180	Phase 2 Inspections & Final Punchlist	24	0	11/27/2028	12/29/2028	5D - Hol
PHS2-1190	Project Closeout	24	0	11/27/2028	12/29/2028	5D - Hol



APPENDIX III – SITE UTILIZATION PLAN

Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISIONS 00 & 01 –WHICH ARE HEREBY MADE A PART OF THIS Section of the Specifications.

For the purpose of this section, the term Contractor shall refer to all, Trade Contractors and Non-Trade Contractors on the project.

DESCRIPTION OF WORK
This section presents the site utilization plan for the project for each major phase of the work.

SITE UTILIZATION
The site plans attached to this section shows the anticipated construction zones for the project.

These plans are provided as a general guidance to understand the flow and restrictions on the work site. The Construction Manager reserves the right to make modifications to this plan to serve the needs of the project as necessary. The site utilization plan is a tool to facilitate the planning, communication, and execution of the work. Adjustments to this plan that do not fundamentally and substantially alter the scope or quantity of the work shall be accommodated by the Contractors without additional cost to the project.

Emphasis is placed on the fact that the project site will have adjacent school occupancy throughout the project.

This is a multi-phased project. The majority of phase 1 will have ample room for lay down areas, on-site parking, storage trailers and office trailers. The transitional period from Phase 1 into Phase 2, and Phase 2 in totality, will render a more constrained site in terms of available lay down areas, on-site parking, storage trailers, and office trailers. Contractors during this period must plan and perform their work under the assumption that there will be space and logistical constraints.

Off-site storage to store materials until they are needed on-site, for all phases, shall be the responsibility of the Contractor. Should the contractor wish to store materials on site, this must be reviewed and approved by the Construction Manager. At any point throughout the duration of the project, the construction manager may ask contractors to relocate and/or remove materials stored on site. These materials shall be relocated and/or removed without hesitation and at no additional costs.

PARKING
It is anticipated that there will be ample parking for Contractor worker vehicles during Phase 1.

In the event that available parking space for construction vehicles becomes an issue, Contractors may be limited to one vehicle for every four workers on site.

The Construction Manager reserves the right to reduce parking down foreman only parking on site as Phase 2 progresses towards final project completion.

Contractor Parking will not be allowed along Ballardvale Street, Salem Street, or any adjacent public ways. In the event parking on site does become restricted, the contractor shall be responsible for transportation to and from the jobsite at no additional cost.

The above parking restrictions and requirements will be monitored and strictly enforced. Violators will be subject to towing without warning and at their own expense.

OFFICE AND STORAGE TRAILERS
The following trades will be allowed one 40’ office or storage trailer on-site located by the Construction Manager:

- Site Contractor
- Electrical Contractor
- HVAC Contractor
- Plumbing Contractor
- Window Contractor

All contractors other than those listed above are responsible for off-site storage of their materials until required for

installation; unless permission is otherwise requested to and approved by the Construction Manager.

DELIVERIES AND CONSTRUCTION TRAFFIC
Notify Fontaine Brothers at least 48 hours in advance of any material or equipment deliveries.

Deliveries are forbidden before the hours of 7:00 AM and after 3:00 PM. Additionally, there are phases of the project that will require logistical coordination with the existing school traffic patterns. Because of this circumstance, there will be blackout periods for deliveries arriving or departing from site. Blackout periods:

- Morning: 7:AM - 7:30AM
- Afternoon: 1:40PM – 2:10PM

Deliveries that are not scheduled in advance or arrive outside of the allowable delivery time period will be turned away. Repeat offenders will be subject to fines of $200 per incident.

Subcontractors shall have someone on site to accept deliveries or deliveries will be turned away. Subcontractors shall have a means of offloading all deliveries.

There will not be allowed any truck idling / delivery to wait on surrounding streets within a 2-mile radius of the project site. Communication with the delivery trucks is the responsibility of the Contractor.

Site access shall be via Ballardvale Street. Reference the **Site Access Route** below for further instruction.

DUST CONTROL
Each Trade Contractor or Non-Trade Contractor in addition to requirements stated in other sections shall be responsible for wetting down and/or chemically treating all demolition, excavation, and general construction operations that generate dust in accordance with OSHA Silica regulations. Such wetting or treating is to be performed in a concurrent and continuous method during dust generating activities. Trash chutes must be enclosed. Dirt piles shall be covered if wetting or chemical treatment does not keep dust from becoming airborne. Dust generated from brushing, grinding, or similar operations shall be treated in such a way as to prohibit it from becoming airborne and migrating from the site. Particular attention shall be paid to any adjacent windows, parked cars, and the neighborhood play field.

NOISE AND VIBRATION CONTROL
There shall be particular attention paid to noisy or significant vibratory operations and equipment. All machines shall be muffled and maintained in good operating condition. All jack hammering and high-impact operations shall be scheduled with the Construction Manager.

As this is an occupied academic campus, there will be black out days for high noise activities to accommodate school programs such as testing. The Construction Manager reserves the right to limit noise producing activities during these periods at no additional cost or time reimbursement to the contract.

SITE UTILIZATION PLANS
Included in this section are site utilization plans for reference to the construction process. Note, the utilization plans are intended to provide a general overview of the site utilization, lay down and storage approach for each phase. Adjustments to these site utilization plans that do not fundamentally and substantially alter the scope of quantity of the work shall be accommodated by all contractors without additional cost to the project. Reference the following pages for the Site Access Route and Site Utilization Plans.

Large format plans can be provided upon request.

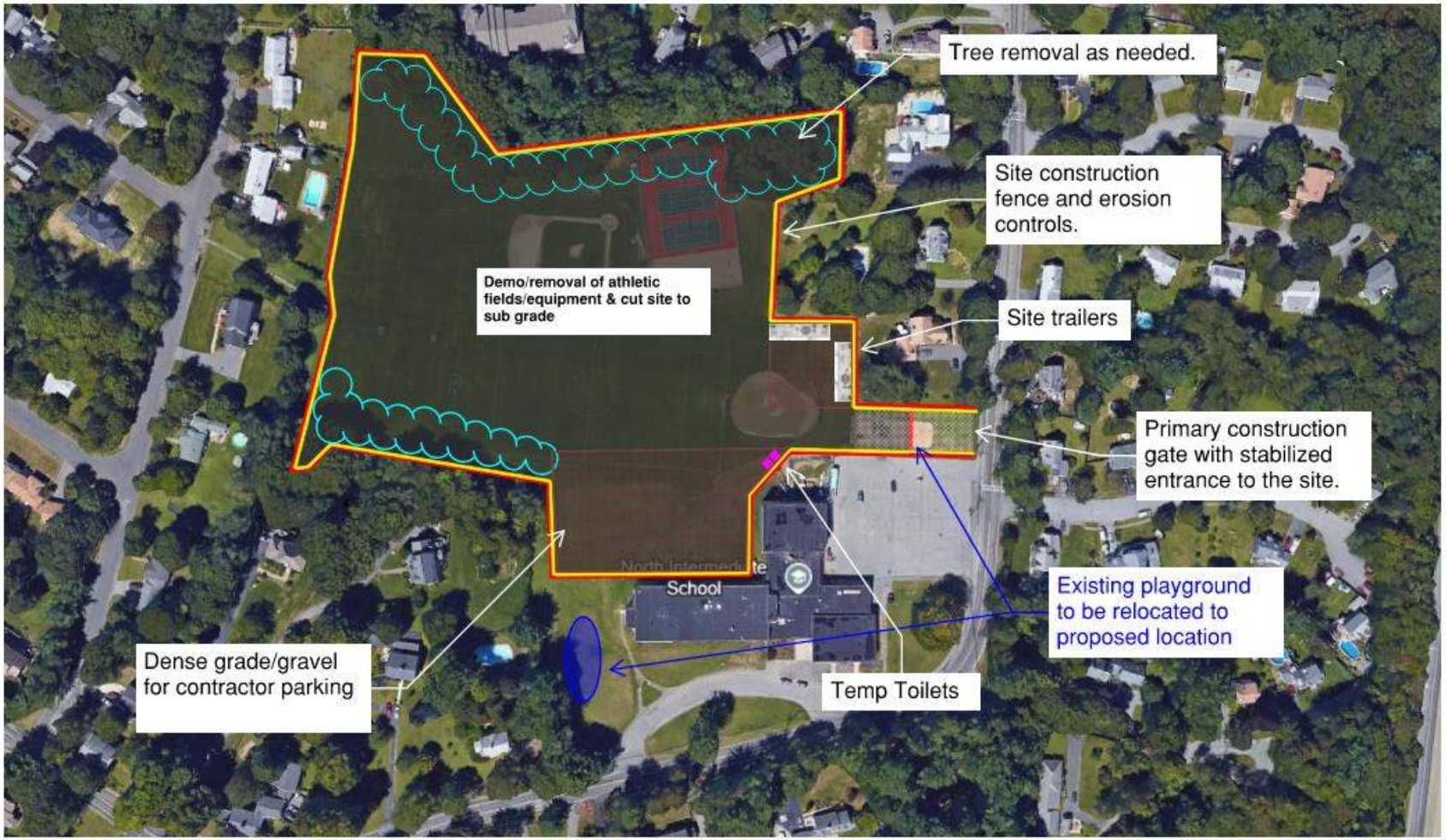
Attachment 1: Site Access Route

Route 3 - Primary Route to the site will be via Exit 35 off I-93. From there follow:

a. Head south on Ballardvale Street.

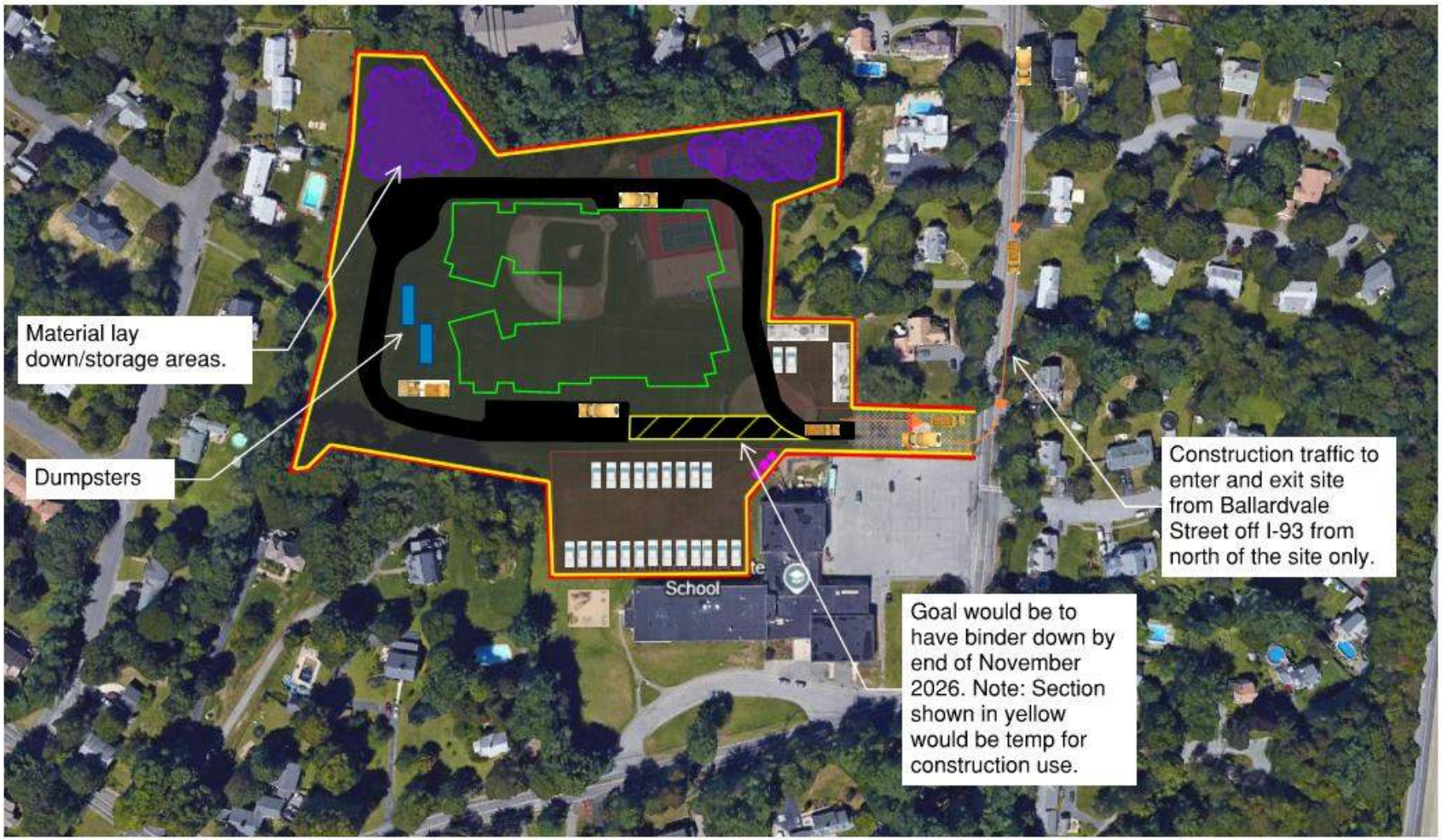
d. Construction entrance will be on the right-hand side of the road

Site Enabling
End of June 2026 - End of August 2026



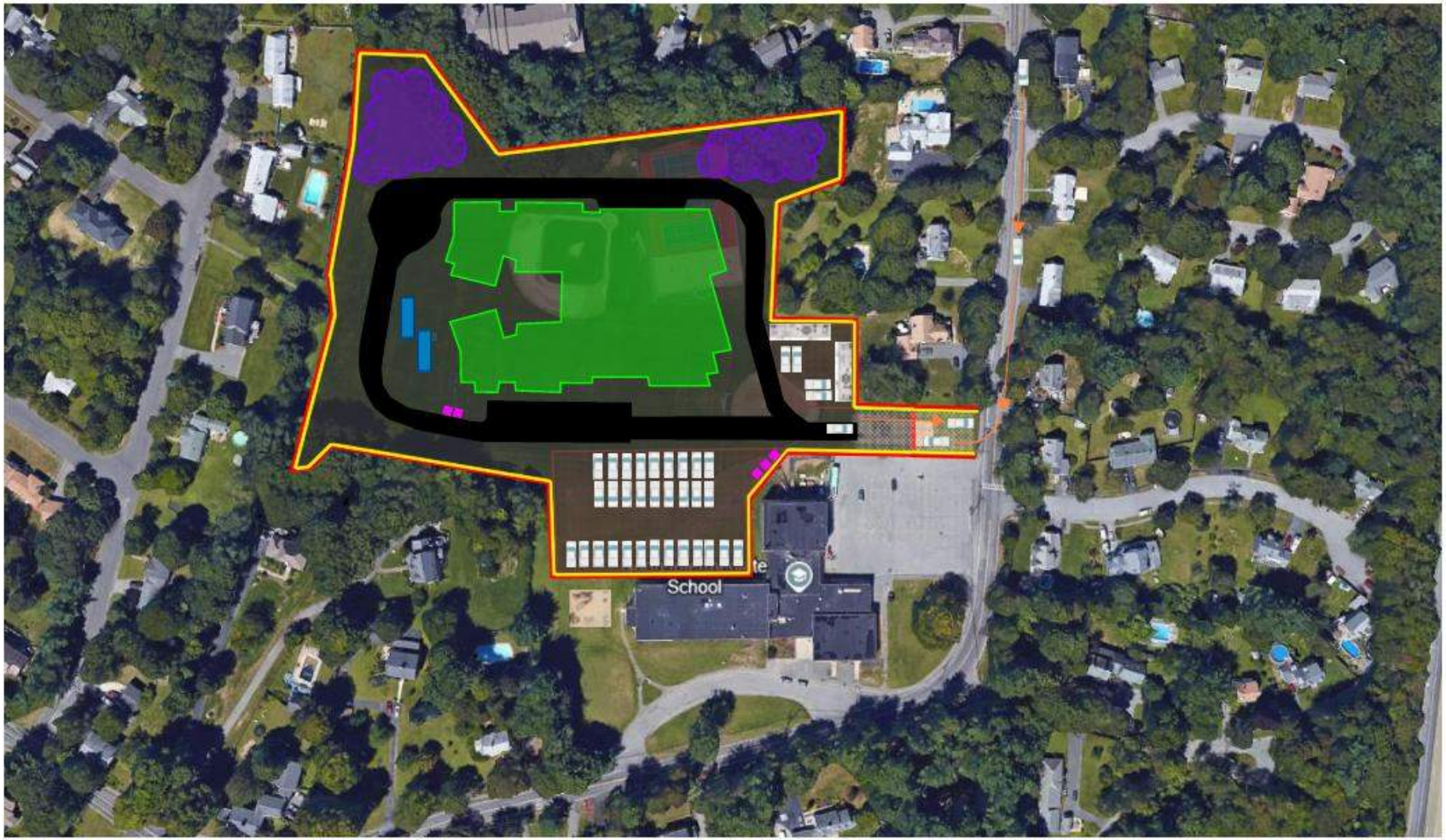
Attachment 2: Logistical Setup 1A

Site Utilities, Concrete Foundations, & Steel
September 2026 - Beginning of April 2027



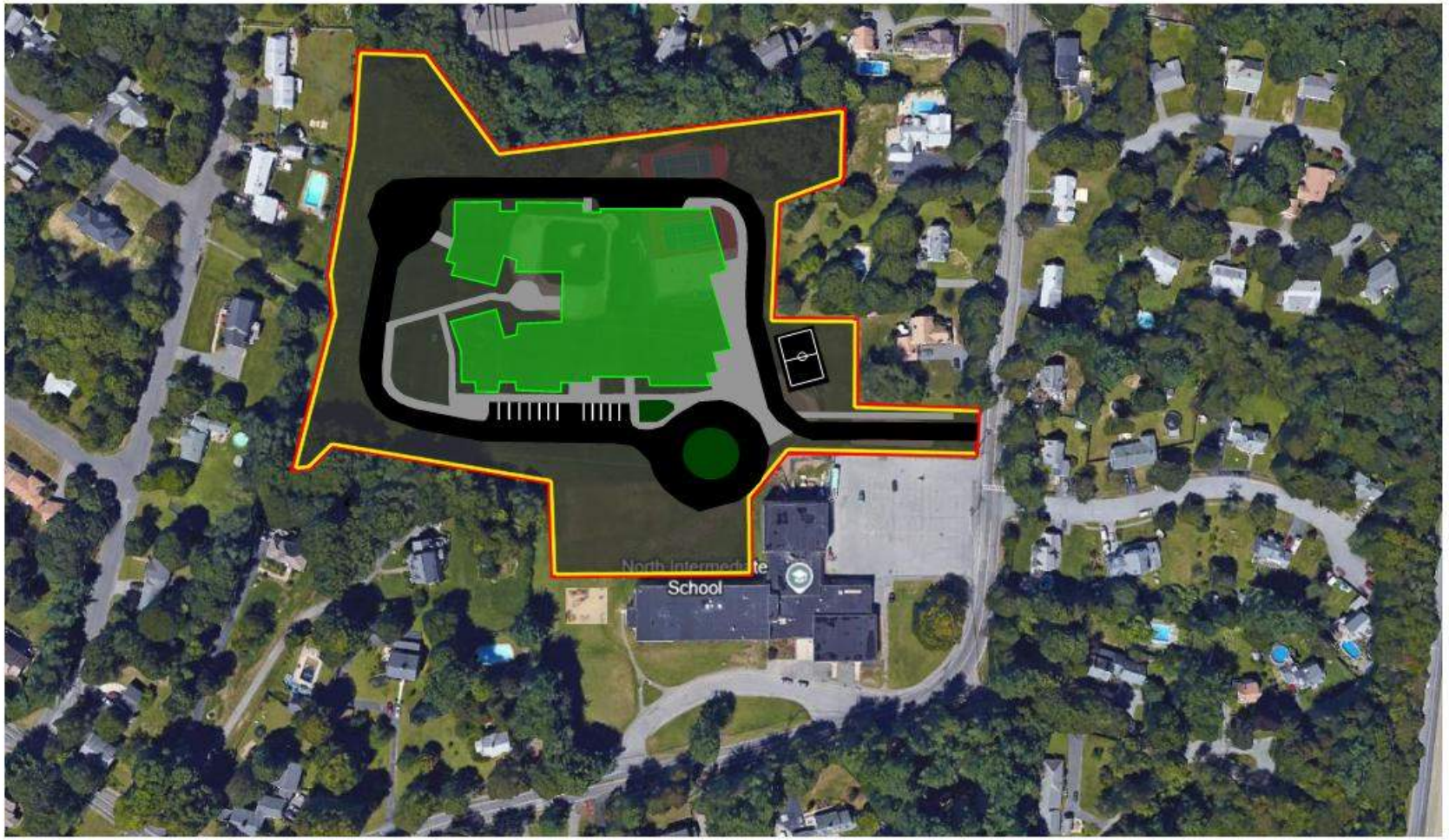
Attachment 3: Logistical Setup 1B

Exterior Envelope & Interior Fit Out
Beginning of April 2027 - End of June 2028



Attachment 4: Logistical Setup 1C

Continuation of Interior Fit Out & Site Finish Work
April 2028- June 2028



Attachment 5: Logistical Setup 1D

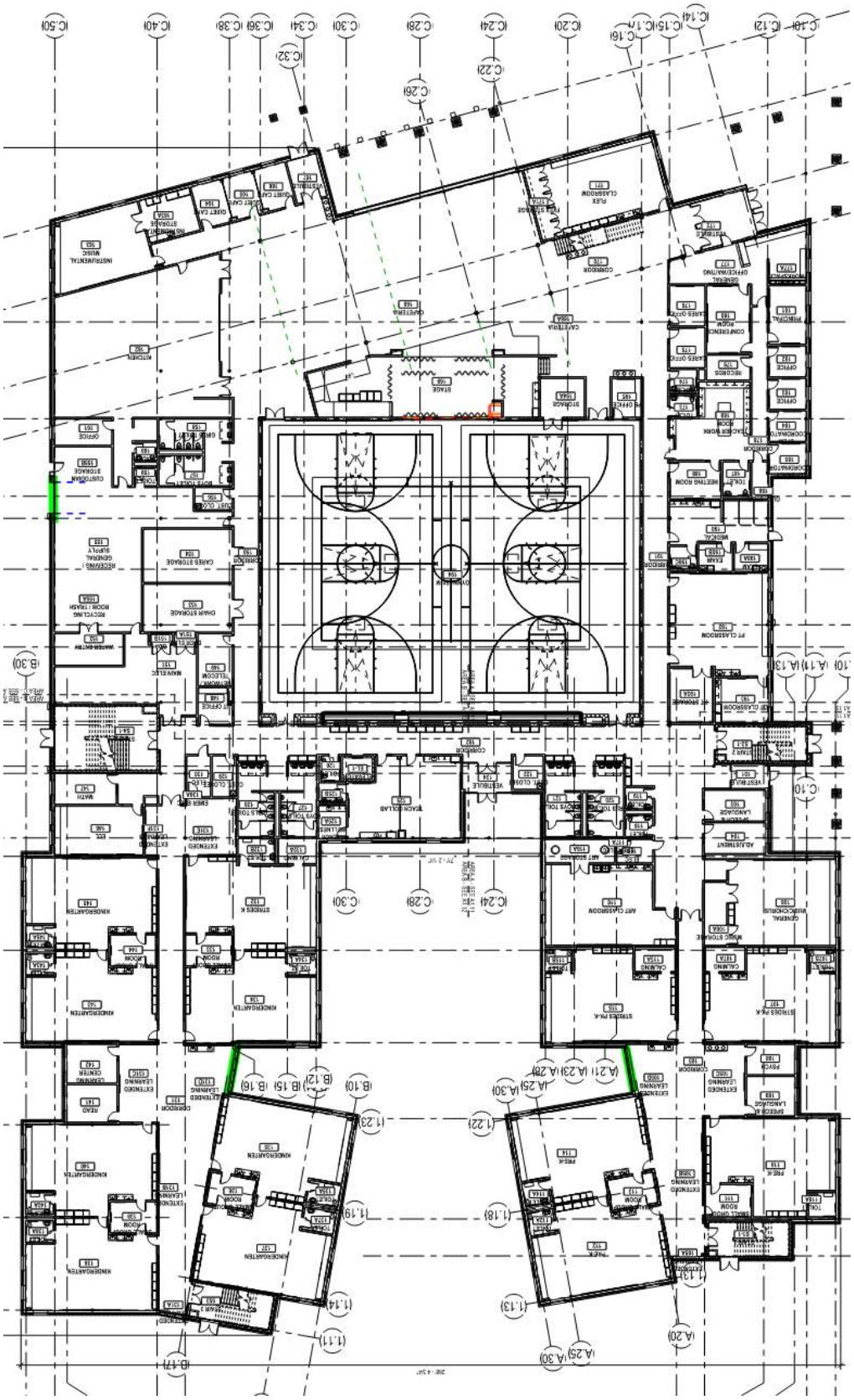
Abatement & Demo of Existing School
End of June 2028- End of August 2028

Attachment 6: Logistical Setup 2A

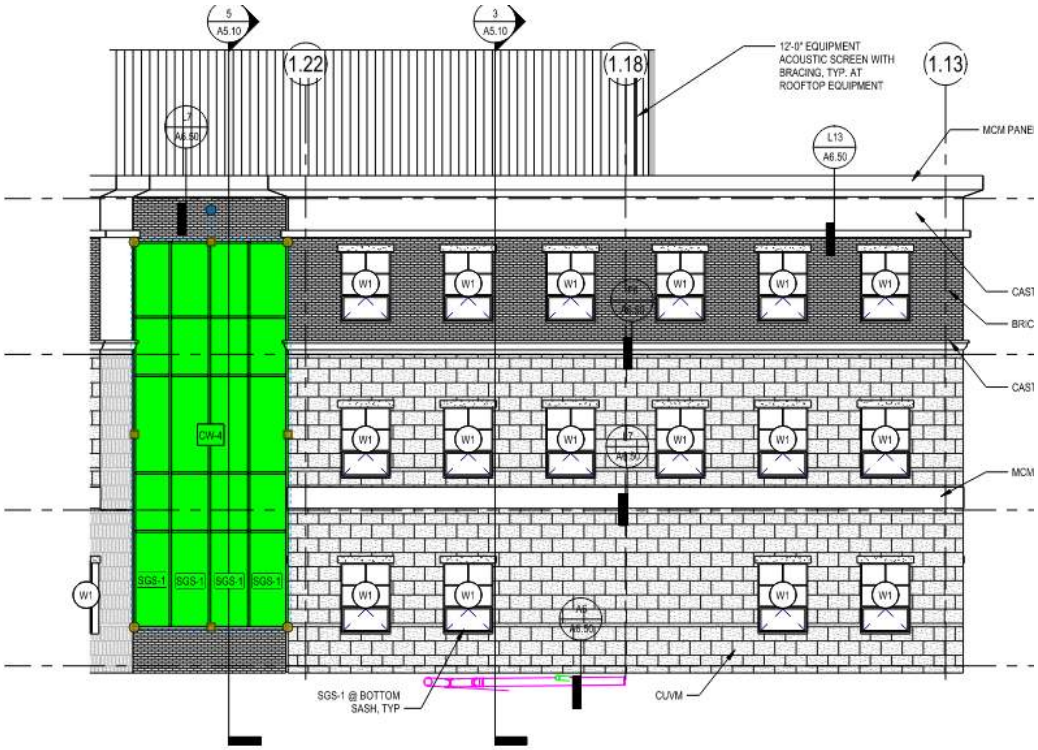
Continuation of Phase 2 Site Finishes
End of August 2028 - End of November 2028

Attachment 7: Logistical Setup 2B

Attachment 8: First & Second Floor Loading Zones

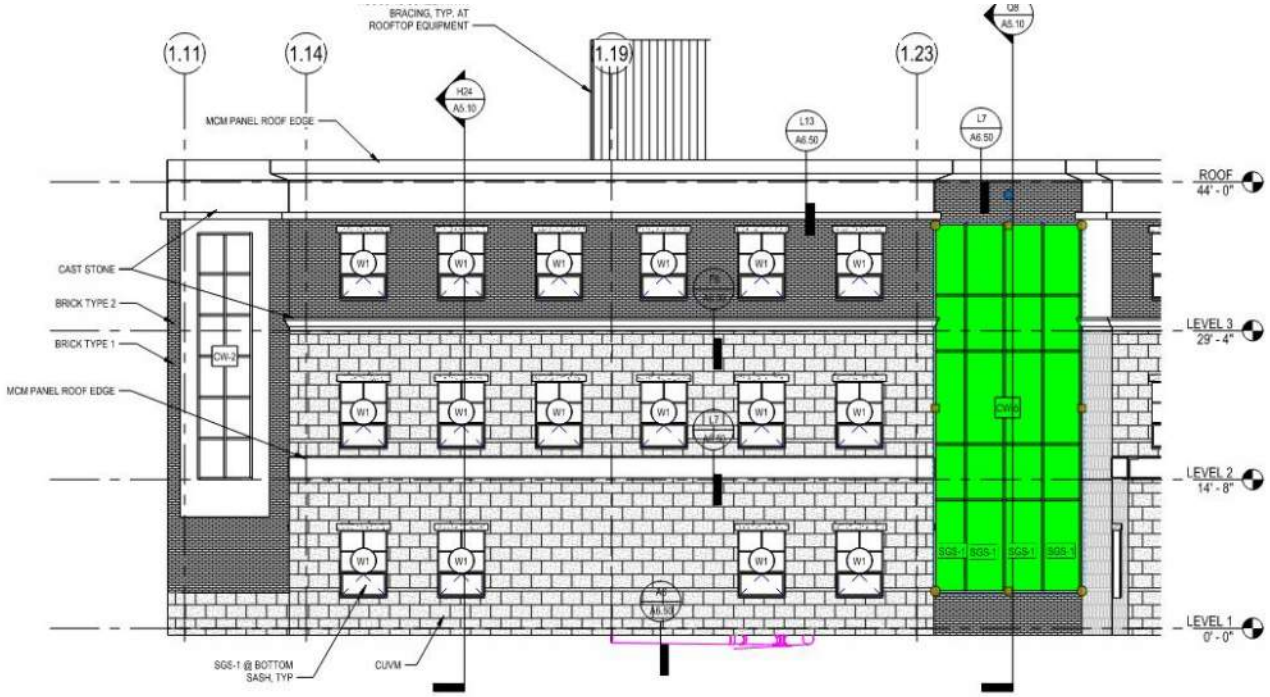


NORTH ELEVATION - OVERALL



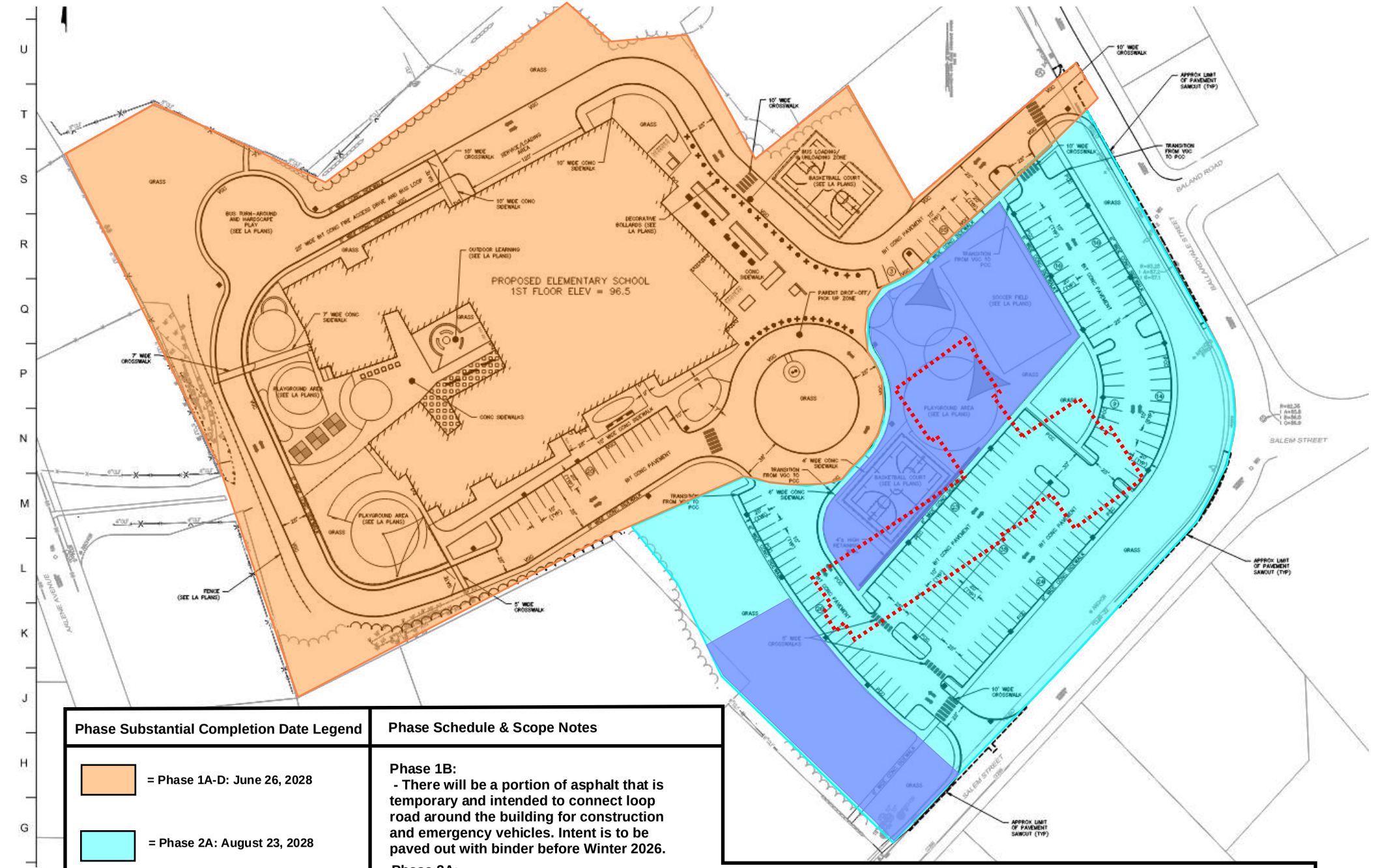
4 PARTIAL NORTH ELEVATION 4

1/8" = 1'-0"



1 PARTIAL SOUTH ELEVATION 5
1/8" = 1'-0"

APPENDIX IV – PROJECT PHASING PLAN



Phase Substantial Completion Date Legend	Phase Schedule & Scope Notes
= Phase 1A-D: June 26, 2028 = Phase 2A: August 23, 2028 = Phase 2B: November 22, 2028	**Phase 1B:** - There will be a portion of asphalt that is temporary and intended to connect loop road around the building for construction and emergency vehicles. Intent is to be paved out with binder before Winter 2026. **Phase 2A:** - Intent is to get all sidewalks completed before the start of the school year 2028 so staff/community can utilize parking spaces and sidewalk infrastructure to access building.

Phase 2B:
-Will be a shared campus while working on the field work. All construction personnel need to abide by safety regulations and ongoing school operations.

General Note:
-Phase plans to be reviewed in conjunction with Fontaine Logistical Setup plans for further clarifications.

APPENDIX V – BIM REQUIREMENTS

VIRTUAL DESIGN AND CONSTRUCTION (VDC) IMPLEMENTATION PLAN

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The primary objective of the VDC Implementation Plan is to facilitate the creation of a 3-dimensional model that enhances collaboration between all project teams for design visualization and comprehension, cost estimating, trade coordination, off-site fabrication, and constructability review. The culmination of this process will yield an as-built model of the project to support an integrated facility life cycle process.

1. The primary goals of this process include, but are not limited to:
2. Maximize efficiencies in the construction process.
3. Effectively coordinate building trades.
4. Proactively identify design coordination issues to mitigate issues in the field.
5. Visualize the project to facilitate effective decision making and greater understanding for all stakeholders.
6. Increase productivity to enhance the projects schedule.
7. Encourage pre-fabrication of building systems to enhance the projects schedule.
8. Minimize the number of RFIs and change orders.
9. Deliver a virtual as-built model to the owner for use during operations and maintenance.

B. This VDC Implementation Plan contains all Virtual Design and Construction (VDC) Standards & Specifications pertaining to the Wilmington High School Project. This document does not relieve trade contractors from any contractual requirements including the submission of shop drawings and coordinating work with other trades. Furthermore, this document does not diminish the standards and requirements set forth in spec sections 21 05 00, 22 05 00, 23 05 00, 26 05 20, and 27 05 10.

C. The following trade contractors are required to participate in the Virtual Design and Construction process and shall adhere to all requirements set forth in this document and the associated appendices.

1. Cast-In-Place Concrete Contractor (03 30 00)
2. Architectural Precast Concrete Contractor (03 33 00)
3. Structural Steel Contractor (05 12 00)
4. Cold-Formed Metal Framing Contractor (05 40 00)
5. Miscellaneous Metal Contractor (05 50 10)
6. Curtain Wall System Contractor (08 44 13)
7. Gearless Traction Elevators (14 21 26)
8. Pneumatic Tube Contractor (14 92 00)
9. Fire Suppression Contractor (Division 21)
10. Plumbing Contractor (Division 22)
11. Heating Ventilation and Air Conditioning Contractor (Division 23)
12. Integrated Automation Contractor (Division 25)
13. Electrical Contractor (Division 26)
14. Communications Contractor (Division 27)
15. Electronic Safety and Security Contractor (Division 28)
16. Site Work Contractor (Division 31, 32, 33)
17. Theatrical Equipment Contractor (11 06 10)
18. Gymnasium Equipment Contractor (11 66 23)

19. Food Service Equipment Contractor (11 40 00)
20. Laboratory Equipment and Laboratory Fume Hood Contractor (11 53 00 & 11 53 13)

D. Should Fontaine Bros. precoordinate the underslab MEP/FP systems and site utilities in an effort to proactively address constructability issues and ultimately define foundation penetrations. Fontaine Bros. expects that each trade contractor participating in the underground coordination process confirm and utilize the dedicated pre-defined foundation penetrations in an effort to maximize efficiencies and minimize foundation wall coring.

E. The foundation penetration layouts that may be provided by Fontaine Bros. is for convenience and should not be construed as fixed or formal direction. Fontaine Bros. expects that each trade contractor undertake their own internal coordination process to confirm that the penetrations provided are adequately sized and located based upon their specific system's routing and spatial constraints. Any coring that may be required will be at the design teams discretion and at the trade contractor's expense.

1.2 COORDINATION TEAM

A. Each trade contractor listed under the "General Requirements" section of this document is required to contribute modeling content and will assign a "BIM Lead" to the project.

B. If the trade contractor does not have the in-house capability to produce the required model/models, the trade contractor may utilize the service of an outside entity to provide this service.

C. The trade contractor shall, within five (5) business days of being identified as the apparent low bidder, provide to Fontaine Bros. the name, qualifications, and experience history of the proposed BIM Lead.

D. The BIM Lead shall have the experience on projects of similar size, scope, and complexity. Fontaine Bros. has the right to approve any proposed BIM Lead. If the BIM Lead is not approved by Fontaine Bros., then the trade contractor shall identify another firm acceptable to Fontaine Bros. without any change in cost.

E. The BIM Lead will be responsible for producing a model/models to represent the work of the trade contractor in accordance with the scope of work to be provided by Fontaine Bros. Additionally, the BIM Lead has several responsibilities. They include, but are not limited to:

1. Transferring modeling content from one party to another
2. Validating the level of detail and controls as defined for each project phase
3. Validating completeness and accuracy of modeling content during each phase
4. Combining or linking multiple models
5. Participating in design review and model coordination sessions
6. Communicating issues back to the internal and cross-company teams
7. Keeping file naming accurate
8. Managing version control
9. Properly uploading models to the Procore Documents module
10. Attending all regularly scheduled coordination meetings
11. Resolving model conflicts during and outside of all coordination meetings
12. Updating their files per RFIs, ASIs and addenda in a timely manner
13. Access doors and frames for walls and ceilings.

1.3 SCHEDULE AND SCOPE

A. Each Trade Contractor will be responsible for producing a model/models to represent the work of the trade contractor in accordance with the scope of work to be provided by Fontaine Bros.

B. Trade contractor BIM Leads will be responsible for updating their models to the Procore Documents module a minimum of 24 hours prior to the coordination/clash meetings. If the meetings are conducted on a daily basis, uploads must occur by the end of the day for the next morning's coordination meeting. Files which are not submitted on time will be given lowest coordination priority.

C. The trade contractor BIM Leads are expected to submit timely coordination updates, in accordance with the BIM Coordination Schedule and the overall project schedule. Failure to meet the schedule requirements will result in corrective action by Fontaine Bros. Please refer to Appendix C for typical MEP coordination schedule workflow and logic.

D. Fontaine Bros. will manage the system file coordination process via Navisworks Manage and the Procore VDC tool.

E. Model uploads (submissions) shall occur via the Procore Documents module.

F. All trade contractors are expected to store and archive local copies of their respective system models

G. All trade contractors are expected to utilize the Procore VDC tool as the primary means of documenting and tracking critical coordination issues.

H. All BIM Leads shall provide models with a scope representing a level of detail greater than or equal to what is typically drawn on 2D plans at ¼"=1'-0" scale. Greater level of detail may be needed to include all the required model elements. Refer to sections "Required Model Elements" and "Trade Contractor Model Scope Overview."

I. All objects in models must be sized and located in a dimensionally accurate manner.

J. All objects shall incorporate all construction, installation, operational and maintenance clearances needed to install, operate, and maintain the building through its operational lifespan on a separate layer.

K. Work which does not appear in the trade contractors model may not proceed until the modeled and coordinated systems are completely installed. At that point "field coordinated' work may proceed. Any "field coordinated" work is assumed to be "at-risk" for rework, as directed by Fontaine Bros.

L. The trade contractor's BIM Lead will maintain any software, equipment and personnel necessary to fully participate in the coordination process. This includes license(s) of appropriate or required modeling software and the current versions of Autodesk Navisworks Manage and Revit.

M. All building systems should be installed using tools that allow the model's accuracy to be executed in the field. Trade contractors will be responsible for attaining the model's accuracy to 0'-0 ¼" tolerance using tools such as total stations for field layout. Each trade contractor is responsible for supplying and maintaining such tools at their own expense.

N. Models must contain all required model elements. Refer to sections “Required Model Elements” and “Trade Contractor Model Scope Overview.”

O. Once each specified area has been fully coordinated and clash free, shop drawings will be required to be submitted for approval by the Architect. Each trade contractor shall produce 2D shop drawings derived from their 3D models for approval in the traditional fashion as required by their contract. Shop drawings must be submitted in both PDF and CAD .dwg file formats.

P. Participating in the BIM coordination process does not relieve any trade contractor from the requirements of their contract including the submission of shop drawings and coordinating work with other trades.

Q. Each trade contractor shall be responsible for providing models which have been properly coordinated (clash free) with respect to the building architecture, structure as well as other trade contractor’s systems.

R. All trade contractors are expected to communicate throughout the coordination process to resolve as many system conflicts as possible prior to the BIM coordination meetings. The BIM coordination meetings shall be used to address critical coordination issues only.

S. BIM Coordination and clash detection sessions will be scheduled on an as-needed basis. Fontaine Bros. reserves the right to modify meeting frequency in an effort to support the projects schedule requirements.

T. All following changes shall be incorporated into the model within five (5) business days of notification:

1. RFIs (Requests for Information)
2. Bulletins
3. PRs (Proposal Requests)
4. CCAs (Construction Change Authorizations)
5. CCDs (Construction Change Directives)
6. ASIs (Architect’s Supplemental Information)
7. Owner changes
8. Changes in the sequence of work
9. Field modifications
10. Shop drawing review comments
11. Multiple coordination meeting review comments
12. Changes requested by Fontaine Bros.
13. Temporary construction such as man-lifts, tower cranes, temporary risers, temporary or permanent shoring etc.

U. During the BIM coordination process, any conflicts shall be documented as RFIs or confirming RFIs if the architect verbally agrees to a change in the coordination meetings. Trade contractors are responsible for writing such RFIs and incorporating any necessary changes into their respective models within 5 business days.

V. Coordination issues that are captured within the Procore VDC tool may be elevated to RFIs only after Fontaine Bros. review and approval. Trade contractors are expected to accurately name each coordination issue and provide appropriate screenshots and supporting documentation in an effort to adequately convey the conflict being presented.

W. As the RFI process transitions into construction, the models are to be updated (no later than 5 business days after acceptance of the RFI) and in accordance to changes required in the field.

X. All trade contractors are responsible for updating their respective model to reflect all field changes within 5 business days. This requirement is effective until installation of each of their systems are complete. This process should conclude with a field-accurate as-built model, required as part of the turnover deliverables to the owner at the end of the project.

Y. All as-builts will be provided in a timely fashion in an agreed-upon 2D and 3D file format.

Z. The design drawings and associated models are diagrammatic in nature. The respective trade contractors are responsible for:

1. Field verification of all on-site conditions relevant to their work
2. All associated cost of installing the final coordinated systems.

AA. Each trade contractor shall provide all horizontal and vertical penetration layout files to Fontaine Bros. for overlay and formal submission. Files shall be submitted in both PDF and CAD .dwg file formats. Horizontal and vertical penetrations include but are not limited to: slabs, roofs, foundation walls, shear walls, masonry walls, and elevator shafts. Penetration layout files shall contain all size and dimensional information specific to each individual penetration. Refer to sections “Required Model Elements” and “Trade Contractor Model Scope Overview.”

BB. Each trade contractor shall provide all equipment pad layouts to Fontaine Bros. for overlay and formal submission. Files shall be submitted in both PDF and CAD .dwg file formats. Refer to sections “Required Model Elements” and “Trade Contractor Model Scope Overview.”

CC. Each trade contractor shall produce an accesses drawing indicating the location of all access zones required for servicing and maintaining valves, dampers, mechanical equipment, etc. The layout must indicate the size, orientation, and location of all access panels (horizontal and vertical) located within inaccessible ceiling assemblies (i.e. GWB). All access panels must be sized (annotated) and dimensioned from finished face of wall to the access panel center point. The layout must also indicate the access zones located within accessible ceiling assemblies (ACT).

1.4 MEP+FP SPATIAL COORDINATION PROCEDURES

A. Trade contractors will adhere to the following guidelines and requirements during 3D BIM coordination as it relates to MEP+FP systems and their interface with adjacent building systems.

B. Fontaine Bros. will manage the system file coordination process via Navisworks Manage.

C. Fontaine Bros. will lead the 3D coordination/clash meetings on a consistent day each week at a location determined by Fontaine Bros. Meetings may be held virtually at Fontaine Bros.’s discretion.

D. The process is to create and upload system models to the Procore Documents module as frequently as required by Fontaine Bros. and for other trades to use while modeling their systems.

E. All MEP+FP trade contractors shall color-code their respective systems based upon the color scheme standard provided by Fontaine Bros.. It is imperative that all MEP+FP contractors adhere to their assigned system color schemes to visually differentiate between building systems.

F. Fontaine Bros. 's BIM Coordination process in many respects follows a traditional sequence of drawing/modeling those systems with the most constraints in their routing and then following with those trades that have more flexibility in their placement.

G. The conflict management process will be directed by Fontaine Bros., and may be modified to accommodate design changes, trade interactions, and project schedule requirements.

H. Clash Management Specifics:

1. All clash tests will be performed as (type) "Hard Conservative" with the tolerance of 0"
2. During coordination meetings, the coordination team will review the merged coordination models and identify any pending critical coordination issues and/or conflicts
3. Post coordination meeting, BIM Leads are required to utilize Navisworks Manage and the Procore VDC tool as the primary means of model review, conflict identification/resolution, and collaboration
4. BIM Leads are required to then make the necessary modifications prior to the next coordination meeting
5. All BIM Leads are expected to communicate throughout the coordination process to resolve as many system conflicts as possible prior to the weekly meeting. The weekly coordination meetings shall be used to address critical coordination issues only.

I. All contractors are required to prepare their system models using software that allows 2D drawing sheets to be extracted from the model so that production of theses sheets do not require a special duplicated CAD effort. The system models and any drawings produced from the coordination process will be treated as shop drawings and are to be used for coordination purposes only. All subcontractors are responsible to verify that their systems are being installed per the contract documents, RFIs, bulletins, design changes, etc.

J. Upon completion of coordination activities for a floor or area as dictated by Fontaine Bros., a 2D composite drawing or series of drawings representing the floor or area will be compiled by the sheet metal contractor for review by Fontaine Bros. and the entire coordination team. This will become the record coordination document.

K. Each trade contractor participating in the MEP+FP coordination process shall provide the sheet metal subcontractor with their respective system's model in CAD .dwg file format. The CAD .dwg files must be identical to the system model files used for the model based coordination process and include all text, dimensions, and annotations ("turned on") necessary to indicate system size, penetration size, penetration length, distance from structural grids or control lines, vertical distance from the top of structural slab, elevation, etc.

1.5 FILE TYPES AND UNITS

A. Models must be provided in their native file format. Models must also be exported and shared in a file format compatible with Navisworks Manage (Refer to Appendix A). Fontaine Bros. shall specify the required file format based upon the trade contractor's specific software application.

B. Prior to submitting to Fontaine Bros., all trade contractors should be able to validate the completeness and accuracy of their model based on the following parameters:

1. Imperial Units ("feet and fractional inches") should be used in all instances. One unit in the model equals 0'-1"
2. The same origin point is to be utilized across all disciplines and all phases of the project. The 0, 0 (x and y axis) origin shall match the Architect's model, and the z axis elevation of each floor's submitted model must be at the proper elevation specified by the

Architects' documents, unless specified by Fontaine Bros. All submitted files are required to display a designation, such as a crosshair, at the file insertion point (0,0,0) for use in location verification in the composite project model. Files which do not coincide with the Architect's project origin will be rejected for use until corrected. The correct insertion point/location in 3D space (x, y, and z coordinates) will ensure that each model will align properly for the master aggregate model without modification.

3. All objects must be 3D solids, parametric components, or AEC (Architecture, Engineering, and Construction) objects. Wireframe, line based, or polymesh models are not acceptable.
4. All 3D models submitted to Fontaine Bros. shall be purged and free of anything other than the 3D model components (No 2D linework, links, xrefs, titleblocks, backgrounds, other contractors' models, annotations, prefabrication information, etc.).
5. Multiple files covering larger areas may be required for large coordination efforts. The boundaries of these areas files shall be specified by Fontaine Bros. prior to commencement of work.
6. All trade contractors are required to utilize the naming convention standard set by Fontaine Bros. Please note there is no date stamp requirement as the Procore Documents module utilizes automatic version control. Trade contractors will simply "update" their respective files and all previous versions will be automatically logged with upload date and time. Files shall be named according to the standards set forth by Fontaine Bros. Files which do not comply with the naming standard will be rejected for use until corrected.
7. All other project participants shall be informed of the software application that each subcontractor will be utilizing. This includes the manufacturer, application, version, and any add-ons, plug-ins or object enablers that are needed in order to view the file properly. Add-ons, plug-ins and object enablers must be the appropriate version for the software and made available to all project participants in a timely manner.
8. All models will be provided in the format specified by Fontaine Bros. . Refer to Appendix A for file formats compatible with Navisworks Manage. A 2D progress layout file shall also be provided in PDF format.
9. Unless explicitly granted permission to deviate, the electrical trade contractor shall model using Autodesk Revit.
10. Unless explicitly granted permission to deviate, the mechanical trade contractor shall model all mechanical equipment, (that is, all elements under Section "Trade Contractor Model Scope Overview," subsection "Mechanical" and/or "Mechanical Piping" except for piping, ductwork, and conduit) using Autodesk Revit. It is up to the trade contractor as to whether the trade contractor draws this scope once or twice. This requirement is critical to the facilities management process.
11. The structural steel fabrication trade contractor shall convert all Native modeling files (Tekla, SDS2, etc) into both CAD and IFC at milestones specified by Fontaine Bros.

1.6 ARCHITETURAL, STRUCTURAL AND MEP DESIGN MODEL OVERVIEW

A. Trade contractors will be given access to the design team's electronic files. These files shall be considered the "Design Models." The Design Models may be shared in a variety of file formats, and all disciplines may not necessarily be available in Revit (.rvt) file format.

B. The two dimensional drawings govern the construction. They show the design intent and are part of the Contract Documents.

C. The Design Models are not included in the Contract Documents and are not intended to replace the contract drawings. The Design Models are developed for convenience and provided "as- is". Ultimately, the Design Models are provided as a tool to assist in the coordination and construction process.

D. Trade contractors are expected review the Design Model against the contract documents and/or as-built conditions for model completeness and accuracy. Trade contractors must notify Fontaine Bros. immediately when discrepancies are found.

E. As the contract documents are updated during the construction process (via RFI, ASI, CCD, etc.) Fontaine Bros. anticipates that the design team will periodically share updated architectural Design Model information on a "for reference only basis." These periodic Design Model updates are not guaranteed, nor will they necessarily reflect all contract document changes and updates. Fontaine Bros. expects that all trade contractors incorporate any changes initiated by RFIs, ASIs, CCDs, etc. without the use of updated "backgrounds" or Design Models.

1.7 REQUIRED MODEL ELEMENTS

A. The trade contractor shall provide the level of detail defined below which represents the minimum level of detail required. Greater level of detail shall be incorporated if typically drawn on 2D plans, or as required to accurately represent or coordinate the complete building system.

B. The level of detail defined below may exceed other LOD requirements found elsewhere. In every instance, the trade contractor is expected to adhere to the more stringent LOD requirement.

C. Horizontal and Vertical Penetrations

1. All horizontal and vertical structural steel penetrations must be modeled in 3D to the outermost dimension needed for a pipe, conduit, or duct to pass through. Steel beam penetrations shall be placed on a separate layer.
2. All horizontal and vertical concrete penetrations (sleeves and cores) must be modeled in 3D to the outermost dimension needed for a pipe, conduit, or duct to pass through. Concrete penetrations shall be placed on a separate layer.
3. Each trade contractor shall provide all horizontal and vertical penetration layout files to Fontaine Bros. per the requirements set forth in this plan's "Schedule and Scope" item #25.

D. Access Panels

1. All access panels needed to maintain a building system in ceilings, walls, floors, roofs, etc. must be modeled in 3D (line work not acceptable). Access panels shall be placed on a separate layer named 'Access_Panels'
2. Each trade contractor shall provide all access zone layout files to Fontaine Bros. per the requirements set forth in this plan's "Schedule and Scope" item #27.

E. All temporary services must be modeled and include all of the elements listed below as required to complete the temporary building system. Temporary services may include, but are not limited to: electrical power, sprinkler standpipes, steam, gas, etc.

PART 2 - TRADE CONTRACTOR MODEL SCOPE OVERVIEW

2.1 STRUCTURAL STEEL

A. At a minimum, this trade contractor shall model the following items:

1. Primary steel members (columns, beams, trusses and joists)

2. Secondary steel members (X-bracing, façade support angles, lintels, gusset plates, braces, equipment supports, kickers, clip angles, etc.)
3. Prefabricated penetrations in primary or secondary members
4. Structural stair components
5. Decks (metal, prefab penetrations and openings)
6. Misc. Metals used in the support of interior systems such as projection screens, projectors, won doors, fire doors, fire shutters, etc.
7. Steel camber or slope.
8. Steel/concrete embeds for curtain walls, precast panels or other systems.
9. Reinforcing steel in slab edges
10. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.2 HEATING VENTILATION AND AIR CONDITIONING

A. At a minimum, this trade contractor shall model the following items:

1. Tanks, pumps, controllers, and any other equipment that would show on a ¼" Plan
2. Equipment pads (as included in their scope of work)
3. Piping (all hard piping 1" in diameter or greater – modeled pipes must reflect slopes) and be on a system specific layer, system type or object style
4. Condenser unit and Condensate drain piping irrespective of diameter
5. Valves, backflow preventers, and fittings
6. Required clearance areas and access zones (modeled as separate semi-transparent, 3D, components on their own layer)
7. All access panels needed to maintain the building system in ceilings, walls, floors, roofs, etc.
8. Hard insulation or fireproofing around objects (modeled as separate semi- transparent components on their own layer)
9. All hangers, seismic support, stands, and sleepers, as well as zones of influence around hanger attachments
10. Soft insulation around objects (clearly identified as different from hard insulation
11. Chillers
12. Boilers
13. Pumps
14. Heaters
15. Compressors
16. Dryers
17. Tanks
18. All mechanical and air handling equipment
19. Ductwork
20. Diffusers, return air ducts and flex duct
21. Linear diffusers
22. Plenum boxes
23. All dampers, volume, control, manual, and automatic
24. Actuators
25. Piping associated with mechanical equipment and not included in the Plumbing model
26. Electrical that is solely associated with mechanical equipment
27. Equipment pads (regardless of their inclusion in their scope of work)
28. Valves and fittings
29. Embeds and sleeves
30. Duct joints and flanges
31. All other items consisting of temporary HVAC or mechanical pipe scope of work, including, but not limited to: temporary heating, temporary cooling.

32. Additionally, the trade contractor shall model any object or collection of objects that occupy more than 1 cubic inch of space – this includes a ½" pipe with ½" of insulation, or two (2) 5/8" pipes that routed in parallel
33. All hangers, stands, and sleepers
34. Control panels and conduits, weather stations and any other systems that would show up on a ¼" Scale Plan
35. All underground piping must be modeled up to their respective site utility connection points (minimum of 10'-0" beyond the exterior face of foundation walls)
36. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.3 ELECTRICAL, TEL/DATA, BUILDING AUTOMATION SYSTEMS AND/OR BUILDING CONTROLS

A. At a minimum, this trade contractor shall model the following items:

1. Power feeds must be modeled up to their respective site utility connection points (a minimum of 10'-0" beyond the exterior face of foundation walls)
2. Switch gear
3. Transformers
4. Panelboards
5. Underground duct bank from the transformer to the building, including concrete encasement
6. TeleData duct bank must be modeled up to their respective site utility connection points (a minimum of 10'-0" beyond the exterior face of foundation walls)
7. Generators
8. Any other electrical equipment shown on a design schedule or in the specifications.
9. Light fixtures with junction boxes and required installation space
10. Cable trays that include a 12" access zone above and a 24" access zone from below on at least one side of the cable tray for cable installation access
11. Security cameras (if no Telcom Contractor)
12. Specialty systems (generators, UPS, etc.)
13. Conduit and fittings (all conduit 1" in diameter or greater)
14. Pull boxes
15. Equipment pads (regardless of their inclusion in their scope of work)
16. Required clearance areas or access zones (modeled as separate semi-transparent, 3D components on their own layer)
17. All access panels needed to maintain the building system in ceilings, walls, floors, roofs, etc.
18. Hard insulation or fireproofing around objects (modeled as separate semi- transparent components on their own layer)
19. Additionally, the trade contractor shall model any object or collection of objects (MC, MI, EMT, Low Voltage wiring, etc) that occupy more than 1 cubic inch of space – this includes a ½" conduit with ½" of clearance, or two (2) 5/8" conduits that are run together.
20. Soft insulation or clearance around objects (clearly identified as different from hard insulation)
21. All hangers, seismic support, stands, and sleepers, as well as zones of influence around hanger attachments
22. Outlets, switches and junction boxes
23. Flexible conduit
24. Groups of wires and MC greater than 1"
25. Groups of Low Voltage Wiring greater than ½" in diameter.
26. Groups of Mineral Insulated cable greater than or equal to ½" in diameter.
27. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

28. AA. All Fire-Alarm Devices (Conduit, Speakers (annunciators), Strobes, Fire Alarm Pull Devices, smoke detectors, heat detectors)
29. All underground conduit must be modeled up to their respective site utility connection points (minimum of 10'-0" beyond the exterior face of foundation walls)

2.4 PLUMBING

A. At a minimum, this trade contractor shall model the following items:

1. Tanks
2. Pumps, sumps, grease interceptors, and any other equipment that would show on a ¼" plan
3. Any other equipment shown on a design schedule or in the specifications
4. Piping (all hard piping 1" in diameter or greater whether it is for water, gas, drainage, etc. – modeled pipes must reflect slopes) and be on a system specific layer, system type or object style
5. Condensate drain piping irrespective of diameter
6. Open ended drains
7. Floor and roof drains
8. Plumbing fixtures
9. Electrical equipment associated with plumbing equipment
10. Valves, backflow preventers, fittings, cleanouts, drains, floors, sinks and traps
11. Equipment pads (regardless of inclusion in their scope of work)
12. Required clearance areas and access zones (modeled as separate semi-transparent components on their own layer)
13. Hard insulation or fireproofing around objects (modeled as separate semi- transparent components on their own layer)
14. Additionally, the trade contractor shall model any object or collection of objects that occupy more than 1" of space – this includes a ½" pipe with ½" of insulation, or two (2) 5/8" pipes that are routed in parallel
15. All hangers, seismic support, stands, and sleepers, as well as zones of influence around hanger attachments
16. Soft insulation around objects (clearly identified as different from hard insulation)
17. All underground piping must be modeled up to their respective site utility connection points (minimum of 10'-0" beyond the exterior face of foundation walls)
18. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.5 FIRE PROTECTION

A. At a minimum, this trade contractor shall model the following items:

1. Tanks
2. Fire pumps, and all temporary equipment associated with fabrication and installation.
3. Other equipment
4. Fire protection control panels
5. Compressors
6. Piping (all hard piping 1" in diameter or greater – modeled pipes must reflect slopes)
7. Valves, backflow preventers, fittings and sprinkler heads
8. Required clearance areas and access zones (modeled as separate semi-transparent components on their own layer)
9. Hard insulation or fireproofing around objects (modeled as separate semi- transparent components on their own layer)

10. Additionally, the trade contractor shall model any object or collection of objects that occupy more than 1 cubic inch of space – this includes a ½" pipe with ½" of insulation, or four (4) 5/8" pipes that are routed in parallel
11. All hangers, seismic support, stands, and sleepers, as well as zones of influence around hanger attachments
12. Soft insulation around objects (clearly identified as different from hard insulation)
13. Wall hydrants, fire department cabinets (fire hose cabinets and valve cabinets)
14. All underground conduit must be modeled up to their respective site utility connection points (minimum of 10'-0" beyond the exterior face of foundation walls)
15. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.6 PNEUMATIC TUBE SYSTEMS

A. At a minimum, this trade contractor shall model the following items:

1. Tubing
2. Equipment
3. Connections
4. All hangers, seismic support, stands, and sleepers, as well as zones of influence around hanger attachments
5. Required clearance areas and access zones (modeled as separate semi-transparent components on their own layer)
6. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.7 COLD FORMED METAL FRAMING

A. At a minimum, this trade contractor shall model the following items:

1. Wall stud framing
2. Door header stud framing
3. Box headers
4. Box beams
5. King studs
6. Kickers
7. Priority walls
8. 6" AHCA wall clearance requirement

2.8 CAST-IN-PLACE CONCRETE

A. At a minimum, this trade contractor shall model the following items:

1. Structural foundations
2. Structural foundation walls
3. Slab-On-Grade
4. Elevated slabs
5. Topping slabs
6. Curbs
7. Columns
8. Beams
9. Shear Walls
10. Stairs

11. Slab openings
12. Penetrations for items such as MEP
13. Any permanent forming or shoring components
14. Shear reinforcing and stud rails
15. Critical structural zones for coordination, including but limited to zones that cannot be penetrated, cut, or damaged

2.9 ARCHITECTURAL PRECAST CONCRETE

A. At a minimum, this trade contractor shall model the following items:

1. All structural members
2. All sloping surfaces
3. Chamfer
4. Expansion joints
5. Embeds
6. Anchor rods
7. Penetrations for items such as MEP
8. Any permeant forming or shoring components
9. Critical structural zones for coordination, including but limited to zones that cannot be penetrated, cut, or damaged

2.10 CURTAIN WALL AND GLAZING SYSTEMS

A. At a minimum, this trade contractor shall model the following items:

1. All Windows, curtain walls, storefront systems, skylights, borrowed lites and windows leaves
2. Frames and mullions
3. Any clips, embed or supports
4. Glazing panels and spandrel panels,
5. Pressure plates
6. Gaskets, anchors, fasteners, etc.
7. Insulation and sealant systems such as backer rod
8. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space
9. Any other elements included in this scope of work

2.11 MISCELLANEOUS METALS

A. At a minimum, this trade contractor shall model the following items:

1. All elements provided under scope of work of this Bid Package shall be modeled accurate and complete
2. All miscellaneous metal supports extending above ceilings shall be modeled
3. Misc. Metals used in the support of interior systems such as projection screens, projectors, won doors, fire doors, fire shutters, etc.
4. The 3D models submitted by the Trade Contractor for overall coordination are required to be checked and coordinated with the structure and the Trade Contractor's own work prior to submittal
5. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space
6. Any other elements included in this scope of work

2.12 SECURITY, CAMERAS AND AUDIO-VISUAL SYSTEMS

A. At a minimum, this trade contractor shall model the following items:

1. All elements provided under scope of work of this bid package shall be modeled accurate and complete
2. All equipment included in this scope of work, including but not limited to security cameras, card readers, information displays, projectors, projector screens, televisions, control panels, conduit, and cable trays. Reference Electrical above for size/LOD requirements
3. All equipment required to complete the systems in this scope of work
4. All supports, hangers, bracing, or other special equipment needed to support the equipment and any required clearances for visibility, maintenance and access.
5. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space
6. Any other elements included in this scope of work

2.13 KITCHEN CASEWORK AND EQUIPMENT

A. At a minimum, this trade contractor shall model the following items:

1. All casework, including work surfaces and casework chases
2. All equipment shall include clearance zones modeled based on manufacturer's recommendations for operation and maintenance
3. Kitchen Equipment Included in Specifications, Including

    a. Ovens
    b. Ranges
    c. Freezers
    d. Refrigerators
    e. Microwaves
    f. Mop Sinks
    g. Ice Maker
    h. Grinders, Slicers, Disposal Systems

4. MEPFP Tie-In Locations

    a. Gas
    b. Electricity
    c. Outlet Locations, both 120 and 210
    d. Mechanical Connections (Hoods, exhaust fans)
    e. Plumbing (Sinks, Drains, grease interceptors,)
    f. Shutoff Valves
    g. Fire Suppression

5. Sleeves through walls and roofs that may be needed early in construction
6. For larger equipment ensure all associated equipment is modeled (i.e. control panels, compressors, pumps, condenser units, condensate drains, etc.)
7. For walk-in equipment, ensure all utilities and devices within the equipment is modeled (i.e. shelves, racks, lighting, fire suppression, etc.) with the correct elevations and dimensions
8. Any other elements included with or attached to this scope of work which occupies more than 1 cubic inch of space

2.14 SITEWORK

A. At a minimum, this trade contractor shall model the following items:

1. Site utility Piping (all hard piping 1" in diameter or greater – modeled pipes must reflect slope and elevation) and be on a system specific layer, system type or object style

a. Liquid and gas piping
b. Water piping
c. Domestic water piping
d. Fire protection water piping
e. Sanitary sewage piping
f. Storm drainage piping
g. Irrigation water piping
h. Site energy piping
i. Site fuel piping

2. Site utility structures a. Storage tanks

a. Septic tanks
b. Culverts
c. Water drains
d. Drainage pumps
e. Manhole structures

3. Tunnels

PART 3 - MODEL CHANGES AND AS-BUILTS

3.1 FIELD INSTALLATION CHANGES AND UPDATES

A. All trade contractors are responsible for updating their respective model to reflect all field changes within 5 business days. This requirement is effective until installation of each of their systems are complete.

B. Coordinated work takes precedence over uncoordinated work

C. Work which does not appear in the trade contractors model may not proceed until the modeled and coordinated systems are completely installed. At that point "field coordinated' work may proceed. Any "field coordinated" work is assumed to be "at-risk" for rework, as directed by Fontaine Bros.

D. If a Trade Contractor intends to propose any departure from the coordinated and approved installation, the Contractor shall submit a written request to the Fontaine Bros. VDC Manager and obtain written approval **before** commencing the work. Any unapproved deviation that results in a conflict shall be corrected at the Contractor's sole expense, including all associated rework and schedule impacts.

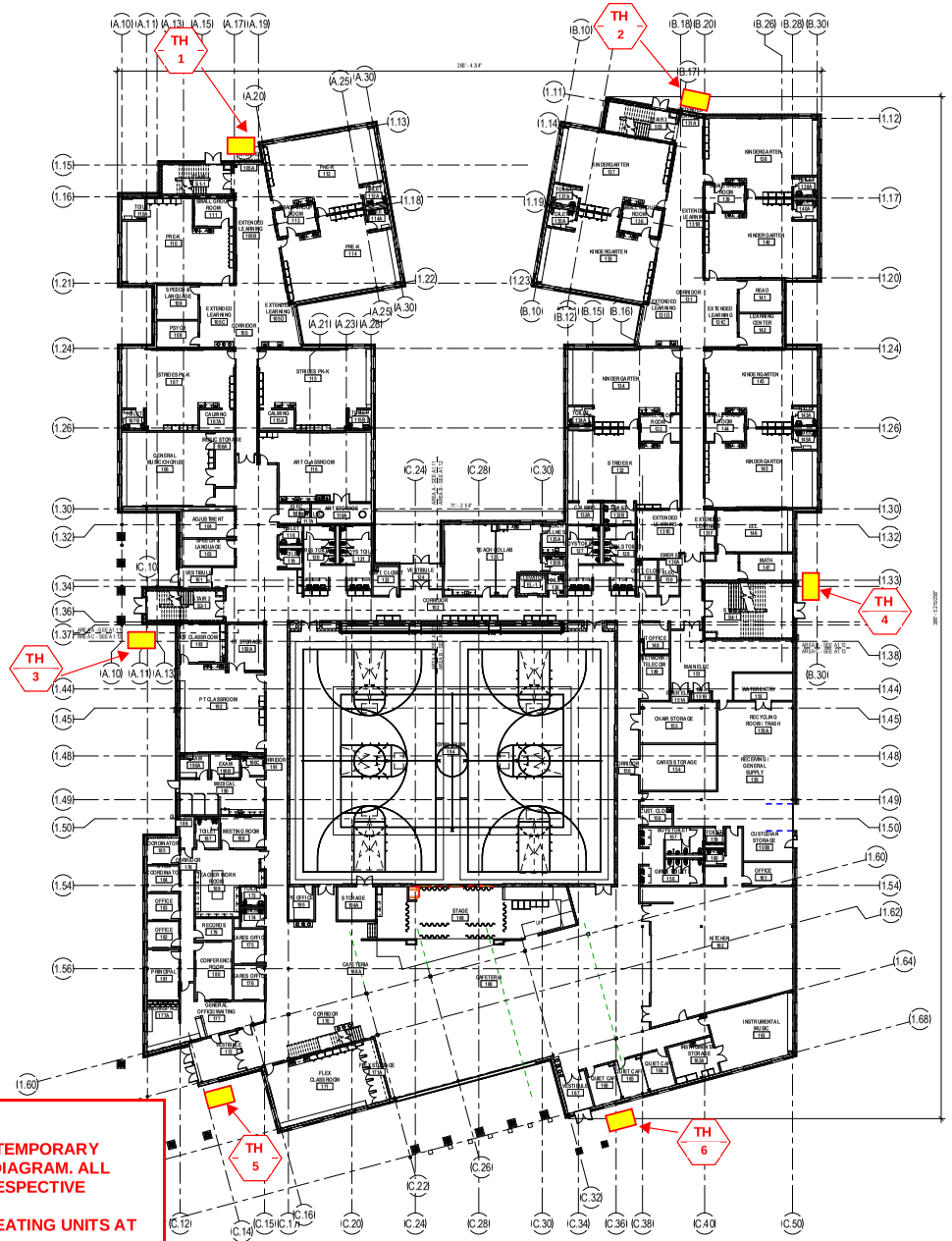
3.2 MODEL AS-BUILTS

A. All trade contractor system models shall be submitted to Fontaine Bros. at the completion of substantial field installation. System models must reflect all accepted changes to date. This process should conclude with a field-accurate as-built model, required as part of the turnover

deliverables to the owner at the end of the project. All as-builts will be provided in a timely fashion in an agreed-upon 2D and native 3D file format and must to adhere to all requirements set forth in this plan.

END OF SECTION

APPENDIX VI – PROJECT TEMPORARY HEATING PLAN



PLAN GENERAL NOTES

1. ALL INTERIOR DWJ PARTITIONS ARE TYPE 'E' UNLESS NOTED OTHERWISE. ALL INTERIOR STUD PARTITIONS ARE TYPE 'A' UNLESS NOTED OTHERWISE.
2. WHERE DOORS, WINDOWS, BORROWED LITES, GRILLES, OR OPENINGS OCCUR IT SHALL BE ASSUMED THAT THE WALL CONSTRUCTION IS THE SAME ABOVE AS ADJACENT, UNLESS NOTED OTHERWISE.
3. WHERE COLUMN LINES ARE SHOWN INSIDE WALLS AND PARALLEL TO THE WALL, IT SHALL BE ASSUMED THAT THE WALL IS CENTERED ON THE COLUMN LINE UNLESS DIMENSIONED OTHERWISE.
4. WHERE ENLARGED PLANS ARE INDICATED, REFER TO ENLARGED PLAN SHEET FOR DIMENSIONS, WALL TYPES, AND DETAIL REFERENCES.
5. REFER TO HORIZONTAL CONTROL PLANS AND STRUCTURAL DRAWINGS FOR SLAB INFORMATION (INCLUDING DEPRESSIONS, EDGE DIMENSIONS, AND SHAFT OPENINGS).

LEVEL 1 ROOM SCHEDULE

Number	Name	Area
101	VESTIBULE	88 SF
102	CORRIDOR	3189 SF
103	SPEECH & LANGUAGE	200 SF
104	ADJUSTMENT	200 SF
105	CORRIDOR	983 SF
105A	EXTENDED LEARNING	42 SF
105B	EXTENDED LEARNING	259 SF
105C	EXTENDED LEARNING	234 SF
105D	EXTENDED LEARNING	309 SF
106	GENERAL MUSIC/CHORUS	975 SF
106A	MUSIC STORAGE	149 SF
107	STRIDES PK-K	1102 SF
107A	CALMING	100 SF
107B	TOILET	64 SF
108	PSYCH	154 SF
109	SPEECH & LANGUAGE	201 SF
110	PRE-K	1105 SF
110A	TOILET	69 SF
111	SMALL GROUP ROOM	154 SF
112	PRE-K	1110 SF
112A	TOILET	63 SF
113	SMALL GROUP ROOM	150 SF
114	PRE-K	1109 SF
114A	TOILET	63 SF
115	STRIDES PK-K	1095 SF
115A	CALMING	101 SF
115B	TOILET	64 SF
116	ART CLASSROOM	1006 SF
116A	ART STORAGE	169 SF
117	ELEC	80 SF
117A	EMER ELEC	4 SF
118	TOILET	61 SF
119	TOILET	61 SF
120	GIRLS TOILET	282 SF
121	BOYS TOILET	282 SF
122	CUST. CLOSET	105 SF
124	VESTIBULE	134 SF
125	TEACH COLLAB	896 SF
125A	TEACH WELLNESS	97 SF
125B	TOILET	54 SF
126	TOILET	49 SF
127	BOYS TOILET	281 SF
128	GIRLS TOILET	281 SF
129	CUST. CLOSET	103 SF
130	ELEC	94 SF
130A	EMER ELEC	4 SF
131	CORRIDOR	1422 SF
131A	EXTENDED LEARNING	41 SF
131B	EXTENDED LEARNING	325 SF
131C	EXTENDED LEARNING	253 SF
131D	EXTENDED LEARNING	299 SF
131E	EXTENDED LEARNING	306 SF
131F	EXTENDED LEARNING	85 SF
132	STRIDES K	1114 SF
132A	CALMING	101 SF
132B	TOILET	98 SF
133	SMALL GROUP ROOM	150 SF
134	KINDERGARTEN	1086 SF
134A	TOILET	66 SF
135	KINDERGARTEN	1098 SF
135A	TOILET	73 SF
136	SMALL GROUP ROOM	146 SF
137	KINDERGARTEN	1097 SF
137A	TOILET	74 SF
138	KINDERGARTEN	1109 SF
138A	TOILET	63 SF
139	SMALL GROUP ROOM	150 SF

LEVEL 1 ROOM SCHEDULE

Number	Name	Area
140	KINDERGARTEN	1109 SF
140A	TOILET	63 SF
141	READ	199 SF
142	LEARNING CENTER	206 SF
143	KINDERGARTEN	1070 SF
143A	TOILET	64 SF
144	SMALL GROUP ROOM	146 SF
145	KINDERGARTEN	1097 SF
145A	TOILET	64 SF
146	ELL	456 SF
147	MATH	201 SF
148	IT OFFICE	122 SF
149	NETWORK / TELECOM	185 SF
150	CORRIDOR	801 SF
151	MAIN ELEC	792 SF
151A	EMER ELEC	20 SF
151B	BDA	20 SF
152	WATER ENTRY	227 SF
153	CHAIR STORAGE	449 SF
154	CARES STORAGE	499 SF
155	RECEIVING / GENERAL SUPPLY	1202 SF
155A	RECYCLING ROOM / TRASH	413 SF
155B	CUSTODIAN STORAGE	246 SF
156	CUST. CLOSET	87 SF
157	BOYS TOILET	239 SF
158	GIRLS TOILET	239 SF
159	TOILET	45 SF
160	TOILET	45 SF
161	OFFICE	159 SF
162	KITCHEN	2678 SF
163	INSTRUMENTAL MUSIC	703 SF
163A	INSTRUMENTAL STORAGE	240 SF
164	QUIET CAFE	146 SF
165	QUIET CAFE	141 SF
166	QUIET CAFE	140 SF
167	VESTIBULE	142 SF
168	CAFETERIA	3155 SF
168A	CAFETERIA	1101 SF
169	STAGE	1148 SF
170	CORRIDOR	4072 SF
171	FLEX CLASSROOM	905 SF
171A	FLEX STORAGE	99 SF
172	VESTIBULE	296 SF
173	TOILET	62 SF
174	TOILET	62 SF
175	CARES OFFICE	150 SF
176	CARES OFFICE	150 SF
177	GENERAL OFFICE/WAITING	532 SF
177A	ADMIN WORKSPACE	99 SF
178	CORRIDOR	444 SF
179	RECORDS	113 SF
180	CONFERENCE ROOM	308 SF
181	PRINCIPAL	230 SF
182	OFFICE	121 SF
183	OFFICE	120 SF
184	STEM COORDINATOR	120 SF
185	LITERACY COORDINATOR	120 SF
186	GUID. STOR.	63 SF
187	TOILET	98 SF
188	MEETING ROOM	200 SF
189	TEACHER WORK ROOM	346 SF
190	MEDICAL	438 SF
190A	EXAM	99 SF
190B	EXAM	99 SF
190C	TOILET	63 SF
191	CORRIDOR	812 SF
192	PT CLASSROOM	1024 SF
192A	PT STORAGE	251 SF
193	OT CLASSROOM	251 SF
194	GYMNASIUM	12024 SF
194A	STORAGE	180 SF
195	PE OFFICE	120 SF
S53	STAIR 3	291 SF
EL-1	ELEVATOR	67 SF
S1-1	STAIR 1	291 SF
S2-1	STAIR 2	326 SF
S4-1	STAIR 4	692 SF

NOTES:

1. DIV. 26 IS REQUIRED TO SUPPORT PROVISIONS FOR TEMPORARY HEATING (PROVIDED BY F.B.I.) IN ACCORDANCE WITH DIAGRAM. ALL MATERIAL AND LABOR SHALL BE PROVIDED BY THE RESPECTIVE DIVISION
2. PROVIDE TEMPORARY POWER TO (6) TEMPORARY HEATING UNITS AT LOCATIONS SHOWN.
3. HEATERS SHALL BE POWERED BY DEDICATED 120V CIRCUIT.
4. FUEL FOR UNITS TO BE PROVIDED BY CM.

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978)499-2999
VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802)863-1428

WILMINGTON ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS

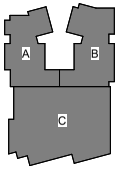
NO.	DATE	TITLE

ISSUE TITLE AND DATE:

SCHEMATIC DESIGN PRICING SET
02/20/2025

COPYRIGHT © 2023 by Dore & Whittier Architects, Inc. (D+W). Reuse by someone else of D+W's work owned by it and all rights reserved. Some or all of these rights, however, may not be exercised unless D+W's express written consent is first obtained. Any such unauthorized reuse will be at your risk and responsibility.

KEY PLAN



ORIENTATION AND SCALE:

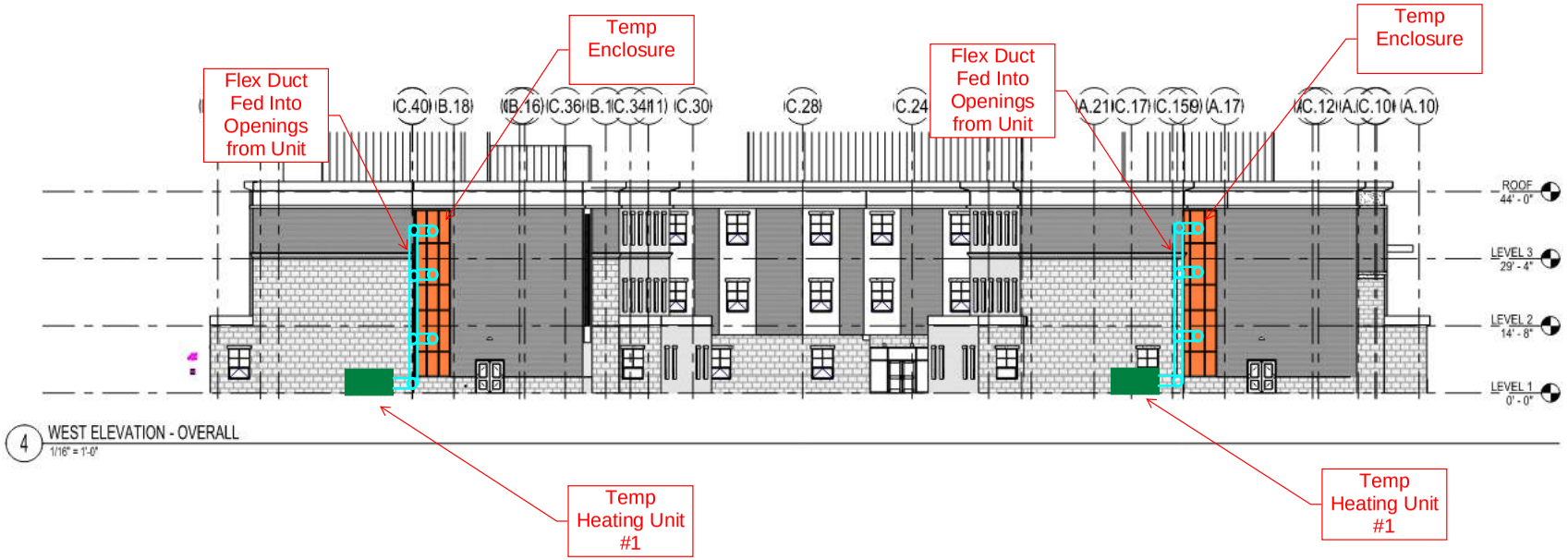
PROJECT NORTH
TRUE NORTH
SCALE: 1/16"=1'-0" GRAPHIC SCALE

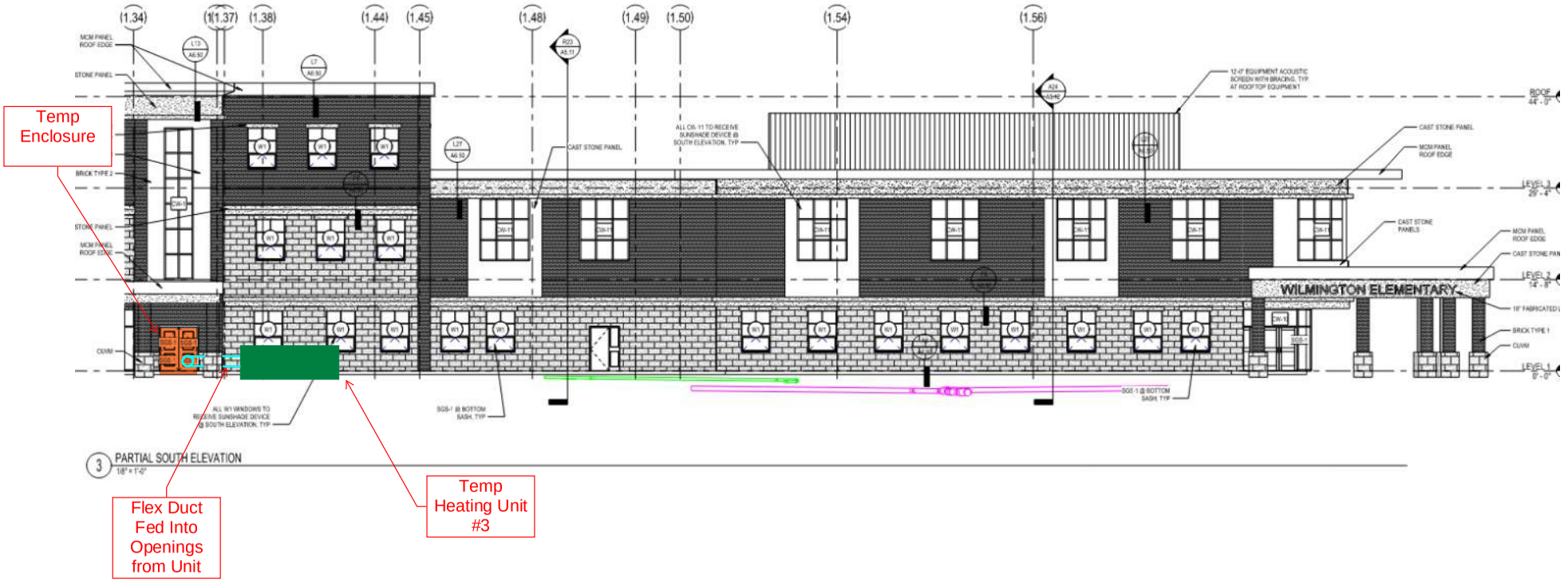
SHEET TITLE

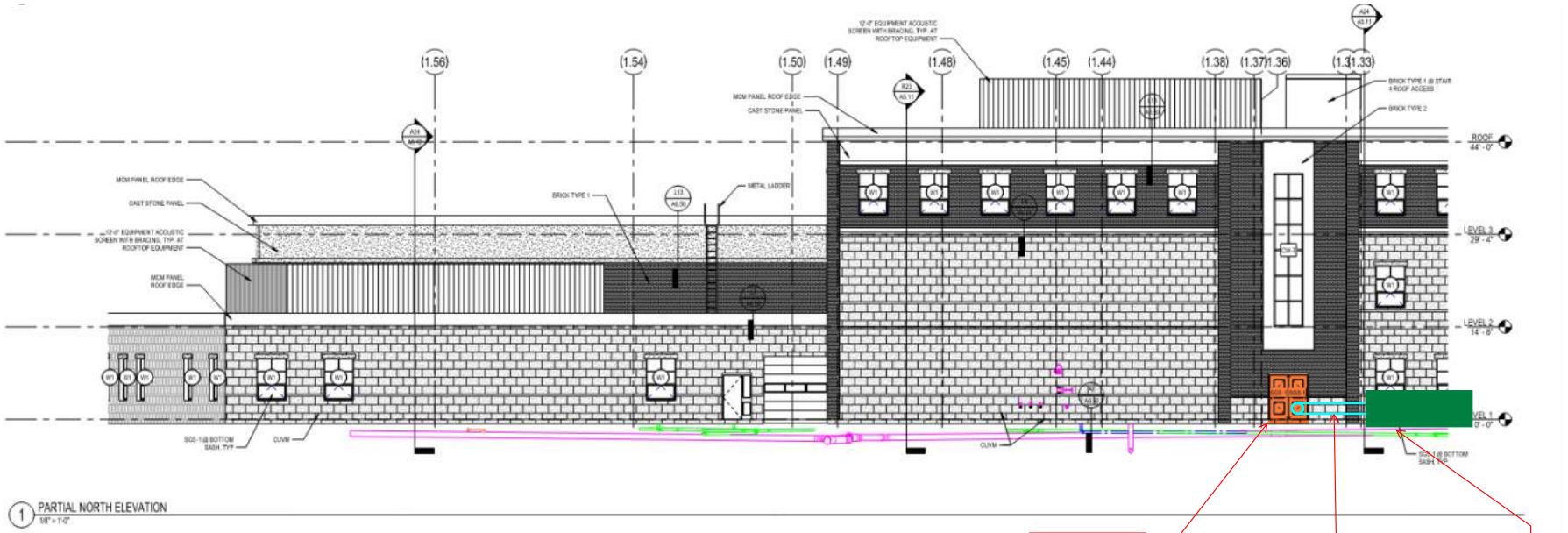
LEVEL 1 OVERALL PLAN

SHEET NUMBER:

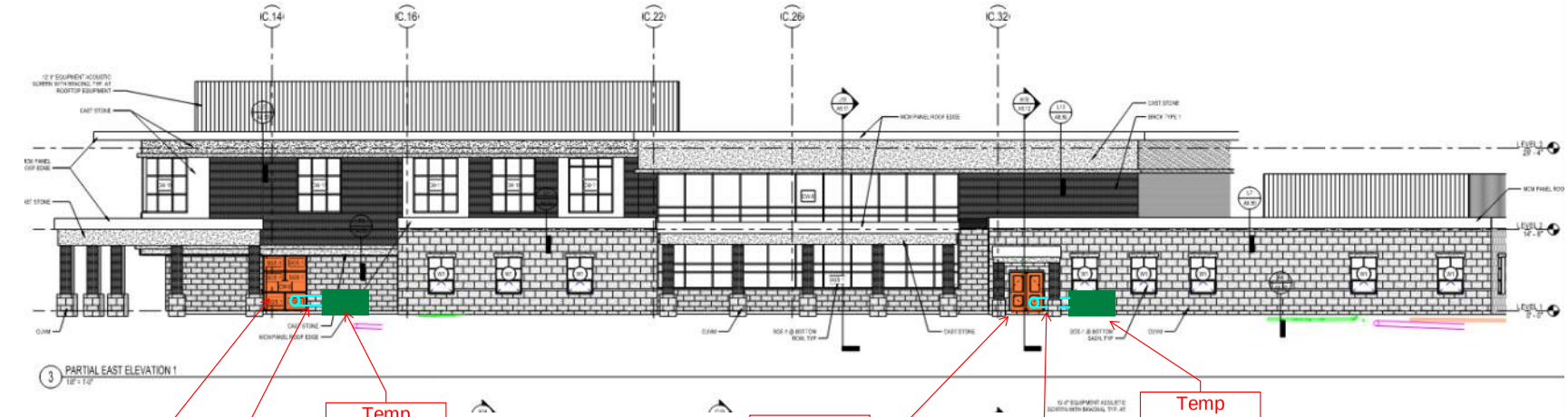
A1.10


Temp Enclosure
Flex Duct Fed Into Openings from Unit
Flex Duct Fed Into Openings from Unit
Temp Enclosure
ROOF 44' - 0"
LEVEL 3 29' - 4"
LEVEL 2 14' - 8"
LEVEL 1 0' - 0"
4 WEST ELEVATION - OVERALL
1/16" = 1'-0"
Temp Heating Unit #1
Temp Heating Unit #1


Temp Enclosure
WILMINGTON ELEMENTARY
3 PARTIAL SOUTH ELEVATION
1/8" = 1'-0"
Flex Duct Fed Into Openings from Unit
Temp Heating Unit #3



1 PARTIAL NORTH ELEVATION



3 PARTIAL EAST ELEVATION 1

END OF SECTION

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Wilmington Elementary School.

B. Owner's Name: Town of Wilmington, Wilmington Public Schools.

C. Architect's Name: Dore & Whittier Architects Inc.

D. The project consists of the construction of a new elementary school, including educational spaces, assembly spaces including a Library, Gymnatorium, Cafeteria, and related support spaces. Demolition of the existing North Intermediate School; associated site work; parking; and fields to support the new school building. Demolition and remedial site work at the North Intermediate School shall include hazardous material abatement and demolition of the existing school building.

1. Project area: 165,035 square feet.
2. Preliminary opinion of probable construction cost: $137,743,666.

1.02 CONTRACT DESCRIPTION

A. Contract type: Construction Management contract with Trade Contract sub-bids as defined by Massachusetts General Law Chapter 149A.

1.03 PREVAILING WAGES

A. Pursuant to M.G.L. c.149, s.26-27H, Massachusetts prevailing wages are applicable to this project and shall be paid to all contractors' field labor. See requirements in General Conditions.

1. See Section 00 60 01 - Prevailing Wage Rate Schedule - Prevailing Wage Rates for list of rates and additional requirements.

1.04 WORKFORCE DIVERSITY REQUIREMENTS

A. See Section 00 21 15 - Workforce Diversity for project's diversity requirements, including: definition; goals for minority and women workforce participation; liaison committee; reports and records; access to work site; solicitations for subcontracts, and for the procurement of materials and equipment; sanctions; severability; Construction Manager's certification, and subcontractor requirements.

1. Construction Manager and every Trade Contractor and non-filed sub-bid subcontractor shall implement a program to meet these workforce diversity goals for their scope of work. Within four weeks of award, Construction Manager shall develop and submit a workforce diversity plan that outlines the Construction Manager’s program and specific plan of action for achieving the goals. This program shall include a commitment of effort, resources and intentions to achieve the goals.
2. Recruitment efforts: If Construction Manager, Trade Contractor , or non-filed sub-bid subcontractor cannot meet the goals due to lack of appropriate employees, said contractor shall be required to diligently exercise each of the following procedures:
    a. Newspaper advertisement.
    b. Assistance from local hiring agency.
    c. Union hall contact / response.
    d. Radio ad notices.
    e. Documentable recruitment efforts.
3. In the event that the work is progressing, and the goals are not being met, any or all of the following may occur, at the discretion of the Owner:
    a. Written notification from Owner to Construction Manager of areas of shortcomings.

b. Weekly on-site meeting attended by Construction Manager project team and senior management to review plan implementation and areas for improvement.
c. Withholding payment due to Construction Manager, equal to ten percent of total outstanding payment due.

4. Failure to meet goals may result in sanctions by the Awarding Authority.
5. In the case of blatant disregard of these goals, Construction Manager may be subject to contract termination and associated damages for breach of contract.
6. A reduction of the goals may be allowed, but only after good faith efforts have been demonstrated that the maximum achievable outcome is being realized.

1.05 PRODUCT/ ASSEMBLY/ SYSTEM SUBSTITUTIONS

A. Where the Bid Documents stipulate particular acceptable products, utilization of one of the listed products is encouraged. In accordance with MGL Chapter 30, § 39M, products of other manufacturers not listed in the specifications shall be submitted as substitutions with accompanying comparison to specified product and will be evaluated by the Awarding Authority for equality to the specified product. The submitting contractor shall prepare sufficient data to enable review and comparison of submitted products for conformance to specification requirements, and comparison to listed products in terms of construction, quality, strength, performance, durability, and/or appearance. Allow for 30 days review time for Substitution Requests. The Awarding Authority will make final determination of acceptance.
   1. See Section 01 25 00 - Substitution Procedures for submittal requirements.
   2. See Section 01 25 01 - Substitution Request Form - During Construction for evaluation form to be completed for each such product request.

1.06 PROPRIETARY PRODUCTS

A. Where the Bid Documents stipulate a particular product with a designation as a "Proprietary Product" the Awarding Authority has undertaken a reasonable investigation of the specified product and competing products, if any, and determined that, for sound reasons in the public interest, the product has been voted as proprietary by the Awarding Authority. In accordance with MGL Chapter 30, §39M, the Awarding Authority will consider products of other manufacturers for equality to the specified product under the criteria defined in the statute. The submitting contractor shall submit a Substitution Request Form per the paragraph above and Section 01 25 00 - Substitution Procedures and 01 25 01 - Substitution Request Form - During Construction, with sufficient data and supporting literature to enable review and comparison of submitted products for conformance with statutory requirements, and allowing the Awarding Authority to evaluate if the proposed substitution:
   1. Is at least equal in quality, durability, appearance, strength, and design.
   2. Will perform at least equally the function imposed by the general design for the public work being contracted or material being purchased.
   3. Conforms substantially, even with deviations, to the detailed requirements for the item specified as proprietary.
B. The Awarding Authority will make final determination of acceptance.
C. Proprietary products include the following, inclusive of accessories, sealants, and other items required per manufacturer to meet terms of warranties and for a complete installation:
   1. Section 07 21 00 - Thermal Insulation:
      a. Cellular Glass Insulation: Pittsburgh Corning FOAMglas Perinsul SIB.
   2. Section 08 71 00 - Door Hardware:
      a. Locks, cylinders, and keying: TO BE DETERMINED.
      b. Mortise locksets: TO BE DETERMINED.
      c. Exit devices: TO BE DETERMINED.

d. Cast iron door closers: TO BE DETERMINED.

3. Section 08 80 00 - Glazing:
   a. School Guard laminated security glazing.
      1) Where School Guard glazing is used, sealant and accessories shall be of types approved by School Guard manufacturer.
4. Section 10 44 00 - Fire Protection Specialties:
   a. Knox; Rapid Entry System.
5. Section 12 24 00 - Window Shades: Blackout shades:
   a. Rollease Acmeda, or Draper, Inc.
6. Division 22 - Plumbing:
   a. Water meters and meter interface units: TO BE DETERMINED.
   b. Plumbing Fixtures: TO BE DETERMINED.
7. Division 23 - HVAC:
   a. Building Management System: Johnson Controls.
8. Division 26 - Electrical:
   a. Lighting Controls: Current NX Site Manager.
   b. Electric Vehicle Charging Stations: TO BE DETERMINED.
9. Division 27 - Communications:
   a. Network Switches: Cisco.
   b. Wireless: Meraki.
   c. VOIP Phone: Yealink.
   d. Distributed Communication: TO BE DETERMINED.
   e. Classroom Audio Systems: Lightspeed Topcat.
10. Section 28 10 00 - Electronic Building Security Systems:
    a. Door access control systems, including door hardware, control electronic hardware, and operating system software: Genetec.
    b. Video surveillance equipment, including closed circuit video cameras, control electronic hardware, and operating system software: Genetec.
    c. Cameras/ Intrusion Detection: Axis.

1.07 CORI REQUIREMENTS

A. CORI requirements apply to all contractors working on the site.
   1. See Section 01 50 00 - Temporary Facilities and Controls.

1.08 OSHA REQUIREMENTS

A. Pursuant to M.G.L. C. 30, SEC. 39S (A)(2), all employees to be employed on the project site shall have successfully completed a course in construction safety and health approved by OSHA and of at least ten hours in duration.

1.09 CRISIS-RELATED RESPONSE REQUIREMENTS

A. Construction Manager, Trade Contractors, and subcontractors shall be prepared to comply with crisis-related provisions of federal, state, or local mandates or laws currently enacted or enacted in the future throughout the life of the project, without additional compensation. In addition, crisis-related provisions shall be accommodated by Construction Manager, Trade Contractors, and subcontractors without claims for schedule extensions.

1.10 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building through Phases 1 and 2.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the work to accommodate Owner occupancy.

1.11 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:

1. Owner and public occupancy of adjacent portions of the existing building during the construction period.

C. Provide access to and from site pursuant to requirements of local authorities, fire department and emergency responder agencies, law, and Owner.

D. Emergency Building Exits During Construction: Keep all exits open during construction period; provide temporary access paving as indicated on phasing plans. Review any unanticipated temporary closure of exits or rerouting of egress paths with local authorities to obtain approval prior to closing exits. Provide temporary exit signs when exit routes are altered.

E. Existing building spaces may not be used for storage.

F. Time Restrictions:

1. See Section 01 50 00 - Temporary Facilities and Controls for work hours and restrictions.
2. Comply with Town of Wilmington ordinances.

G. Utility Outages and Shutdown:

1. Utility interruptions shall be limited to momentary disconnect-connect switchovers scheduled in advance and approved in advance by Owner. To the extent possible, limit disruption of utility services to hours the building is unoccupied.
    a. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without seven days' notice to Owner and authorities having jurisdiction.
2. Prevent accidental disruption of utility services to other facilities.

1.12 WORK SEQUENCE

A. Construct work in multiple phases with separate Dates of Substantial Completion.

1. Phases are generally described as the following: See drawings and project phasing drawings for additional information related to the activities of each phase.

1.13 LIQUIDATED DAMAGES

A. Liquidated damages apply to each project phase, and to the overall completion of the project.

1. See Section 00 52 00 - Owner-Contractor Agreement Form (A101, Article TO BE DETERMINED) for liquidated damages.

1.14 LEED CERTIFICATION

A. This project is intended to obtain LEED for Schools v4/v4.1 certification, LEED "Silver" level, as a sustainable project. The Basis of Design products listed in this Specification were selected by the design team to provide the credits described in Section 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard.

B. The Construction Manager and subcontractors shall be responsible for evaluating and making product selections for content that would assist in obtaining LEED credits, and to document LEED construction phase credits to the LEED Manager, and to evaluate product selections for potential LEED credits, and to maintain the minimum number of Construction Phase credits required in order to obtain the listed certification level.

1.15 SPECIFICATION SECTIONS APPLICABLE TO ALL SUBCONTRACTORS

A. The sections listed below contain provisions that apply to all subcontractors. Specific items of work listed under individual contract descriptions constitute exceptions.

1. Section 01 20 00 - Price and Payment Procedures.
2. Section 01 22 00 - Unit Prices.

3. Section 01 23 00 - Alternates.
4. Section 01 25 00 - Substitution Procedures.
5. Section 01 25 01 - Substitution Request Form - During Construction.
6. Section 01 30 00 - Administrative Requirements.
7. Section 01 30 01 - Request for Interpretation Form.
8. Section 01 30 02 - Submittal Data Sheet.
9. Section 01 31 14 - Coordination.
10. Section 01 31 15 - Building Information Modeling Services.
11. Section 01 31 16 - Terms of Use of Digital Drawings and Electronic Data.
12. Section 01 32 16 - Construction Progress Schedule.
13. Section 01 40 00 - Quality Requirements.
14. Section 01 41 00 - Regulatory Requirements.
15. Section 01 50 00 - Temporary Facilities and Controls.
16. Section 01 51 00 - Temporary Utilities.
17. Section 01 52 13 - Field Offices and Sheds.
18. Section 01 60 00 - Product Requirements.
19. Section 01 70 00 - Execution and Closeout Requirements.
20. Section 01 74 19 - Construction Waste Management and Disposal.
21. Section 01 78 00 - Closeout Submittals.
22. Section 01 78 29 - Final Site Survey.
23. Section 01 79 00 - Demonstration and Training.
24. Section 01 81 09 - Testing for Indoor Air Quality.
25. Section 01 81 13 - Sustainable Design Requirements.
26. Section 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard.
27. Section 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form.
28. Section 01 81 16 - Materials Tracking Matrix.
29. Section 01 81 19 - Indoor Air Quality Requirements.
30. Section 01 91 13 - MEP Commissioning Requirements.
31. Section 01 91 19 - Building Envelope Commissioning.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Schedule of Values.
B. Applications for progress payments.
C. Documentation of changes in Contract Sum and Contract Time.
D. Modification procedures.
E. Application for final payment.

1.02 SCHEDULE OF VALUES

A. Form to be used: Based on AIA G703 with modifications as described in the General Conditions .
B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
    1. Construction Manager shall submit pencil requisition, MSBA summary form, and final payment requests in a 'live file" in Microsoft Excel format.
C. Forms filled out by hand will not be accepted.
D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the Specification section. Identify site mobilization.
    1. Include breakdown of work categories separating material and labor.
    2. No single line item shall amount to more than $50,000.
    3. Each item and activity identified in the Construction Schedule shall also be a line item in the schedule of values.
E. Revise schedule to list approved Change Orders, with each Application for Payment.
F. Final Schedule of Values shall be submitted in an MSBA summary form with each monthly progress payment request.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.
B. Forms to be used: AIA G702 and G703.
C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
D. Forms filled out by hand will not be accepted.
E. Execute certification by signature of authorized officer.
F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
H. Submit one electronic and three hard copies of each Application for Payment.
I. Include the following with the application:
    1. Construction progress schedule, revised and current as specified in Section 01 32 16 - Construction Progress Schedule.
        a. Include updated submittal schedule, to support construction progress schedule.
    2. Current construction photographs specified in Section 01 30 00 - Administrative Requirements .
    3. Partial release of liens from major subcontractors and vendors.
    4. Certification of status of project record drawings per General Conditions.

5. Affidavits attesting to, and photographic documentation of, off-site stored products.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

K. Pencil Requisition:

1. Prior to each monthly application for payment, and in every case by the 25th day of the month, submit a 'pencil requisition' in the same computerized format as the formal application for payment with all columns fully calculated and updated to represent the anticipated formal monthly application for payment.
2. Review the pencil requisition with the Architect and Architect's consultants, and Owner's Project Manager, and make adjustments per direction prior to submission of the formal monthly requisition.

1.04 MODIFICATION PROCEDURES

A. See General Conditions for additional requirements related to Change Orders and Construction Change Directives.

B. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Construction Manager's employ or subcontractors of changes to Contract Documents.

C. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue Architect's Supplemental Instructions directly to Construction Manager.

D. For other required changes, Architect will issue a Construction Change Directive signed by Owner instructing Construction Manager to proceed with the change, for subsequent inclusion in a Change Order.

1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
2. Promptly execute the change.

E. For changes for which advance pricing is desired, Architect will issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised drawings and specifications. Construction Manager shall prepare and submit a fixed price quotation within ten business days.

F. Construction Manager may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document all requested substitutions in accordance with Section 01 25 00 - Substitution Procedures

G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

H. Substantiation of Costs: Provide full information required for evaluation. Lump sum costs will not be considered.

1. Provide following data:
   a. Quantities of products, labor, and equipment, each identified separately.
   b. Taxes, insurance, and bonds.
   c. Overhead and profit.
   d. Justification for any change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.

b. Dates and times work was performed, and by whom.
c. Time records and wage rates paid.
d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

I. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

J. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

K. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

L. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 70 00 - Execution and Closeout Requirements.
2. Other requirements for Substantial Completion and Final Completion as indicated in the General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 22 00
UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Measurement and payment criteria applicable to work performed under a unit price payment method.

B. See Section 00 43 22 - Unit Prices Form for Unit Prices Schedule and base bid amounts to be carried.

1.02 COSTS INCLUDED

A. Unit Prices included on the 00 43 22 - Unit Prices Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the work; overhead and profit.

1.03 MEASUREMENT OF QUANTITIES

A. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect and/or Clerk of the Works.

B. Assist by providing necessary equipment, workers, and survey personnel.

C. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

1. C.Y.: Cubic Yards.

D. Measurement by Area: Measured by square dimension using mean length and width or radius.

1. S.Y.: Square Yards.
2. S.F.: Square Feet.

E. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

1. L.F.: Linear Feet.
2. V.F.: Vertical Feet.

F. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as a completed item or unit of the work.

1. EA: Per Unit.

G. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect and/or Clerk of the Works prior to starting work.

H. Construction Manager's engineer responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

I. All work is to be accomplished in accordance with applicable sections of the specifications.

1.04 PAYMENT

A. Payment for work governed by unit prices will be made on the basis of the actual measurements and quantities of work that is incorporated in or made necessary by the work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required work.
5. Products remaining on hand after completion of the work.
6. Loading, hauling, and disposing of rejected products.

1.05 UNIT PRICES SCHEDULE

A. See Section 00 43 22 - Unit Prices Form for Unit Prices Schedule and base bid amounts to be carried.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acceptance of Alternates.

B. Schedule of Alternates that shall be reflected on bid forms, and included in the Contract if accepted by Owner.

1.02 ACCEPTANCE OF ALTERNATES

A. Alternates will be reviewed and accepted or rejected by the Owner in the order in which they are listed below. Accepted alternates will be identified in the Owner-Construction Manager Agreement.

B. Coordinate related work and modify surrounding work to integrate the work of each Alternate.

1.03 SCHEDULE OF ALTERNATES

A. Alternate No. 1:

1. Description of Base Bid: To be determined.
2. Description of Alternate: To be determined.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.02 DEFINITIONS

A. Substitutions: See General Conditions for definition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. See Section 01 60 00 - Product Requirements for requirements for existing and new products, product options, local materials, and maintenance materials.

B. A Substitution Request for products, assemblies, materials, and equipment will be granted reasonable consideration under the provisions of M.G.L. c.30 s.39M for sound reasons in the public interest. In its evaluation the Awarding Authority may consider a proposed substitution which:

1. Meets or exceeds the quality level of the specified product, equipment, assembly, or system, and is compatible with adjacent materials.
2. Is provided with the same warranty as for the specified product.
3. Is provided with same or equivalent maintenance service, practices, and source of replacement parts, as applicable.
4. Can be readily coordinated with and not require extensive revisions to the work, nor additional cost to Owner.
5. Will not incur collateral claims for additional costs or time extension.
6. Will not require additional compensation to be paid to the Architect for review or redesign services associated with re-approval by regulatory authorities.
7. Meets or exceeds LEED requirements: provide documentation.

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

1. Note explicitly any non-compliant characteristics.
2. For products for which a color selection has been indicated in the specifications, or for which a color selection will be required for the substituted product, a full range of available standard and non-standard colors shall be included with the Substitution Request Form, to allow the appearance of the product to be evaluated at the same time as the technical criteria.

D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.

1. Section 01 25 01 - Substitution Request Form - During Construction included in the Project Manual is adequate for this purpose and shall be used.

E. Limit each request to a single proposed substitution item.

F. Substitutions will not be considered under one or more of the following circumstances:

1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
2. Without a separate written request.
3. When acceptance will require revisions to Contract Documents.

3.02 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide the requested data in an expeditious manner.

B. Architect will notify Construction Manager in writing of decision to accept or reject request.

1. Architect's final decision following review of proposed substitution will be noted on the submitted form.

3.03 ACCEPTANCE

A. Accepted substitutions change the work of the project. They will be documented and incorporated into the work of the project by Change Order, Construction Change Directive, Architect's Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.04 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Include completed Substitution Request Forms as part of the project record. Include both approved and rejected Requests.

3.05 ATTACHMENTS

A. A facsimile of Section 01 25 01 - Substitution Request Form - During Construction, required to be used on the project, is included following this section.

END OF SECTION

SECTION 01 25 01
SUBSTITUTION REQUEST FORM - DURING CONSTRUCTION

Wilmington Elementary School - # 23-0847

Date: _____

Construction Manager / Subcontractor Requesting Substitution: _____

Specification Section / Paragraph Number: _____

Item Description per Specification: _____

Proposed Substitution Product Trade Name: _____

Manufacturer Name: _____

Manufacturer Address: _____

Product History: ☐ New Product ☐ 1 - 5 years ☐ 5 - 10 years ☐ 10+ years

Material or Performance Differences Between Specified and Proposed Products: Provide general description here, and provide point by point comparison of products including, but not limited to all specified requirements, product characteristics, performance features, warranties, and material and installation costs. **Substitution requests received without a thorough comparison will be rejected.**

Provide reason for not providing specified product:

Similar Installation References:

Project: _____

Address: _____

Owner's Representative: _____

Architect Name and Phone: _____

Date of Installation: _____

Proposed substitution affects other parts of work: ☐ No ☐ Yes, as follows:

_____

_____

_____

_____

_____

_____

_____

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

Proposed substitution affects LEED for Schools v4/v4.1 requirements of work: ☐ No ☐ Yes

If "Yes", specifically identify the credit criteria impacted and demonstrate how the proposed substitution meets the same credit criteria: _____

_____

_____

_____

_____

Construction Manager's Certification

I have reviewed this substitution request thoroughly, and certify the following by undersigning below:

1. Proposed substitution has been fully investigated by the Construction Manager and has been determined to be equal or superior in all respects to specified product.
2. At a minimum, a warranty equivalent to that available for the specified product or required by the specification shall be furnished for proposed substitution. Where the proposed substitution features a superior warranty, the superior warranty shall be conveyed to the Owner.
3. The same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed substitution shall have no adverse effect on other trades and shall not affect or delay progress schedule.
5. The cost data associated with this substitution as stated below is complete, and a change request is attached. Claims for additional costs related to accepted substitution which may subsequently become apparent shall be waived.
6. Proposed substitution does not affect dimensions and functional clearances, and I certify that the substitution has been fully coordinated with all related work and construction. Any deviations from the construction documents required to accommodate this substitution are indicated on the attached sketches and drawings.
7. Payment shall be made to the Architect on behalf of the design team for any required modifications to the project design, including modifications to the construction documents, additional review time, and construction administration costs caused by the substitution.
8. Coordination, installation, and changes in the Work necessitated by accepted substitution shall be completed in all respects and at no additional cost to the Owner.

Savings to Owner for accepting Substitution: _____ dollars ($_____)

Proposed substitution changes Contract Time: ☐ No ☐ Yes ☐ Add ☐ Deduct _____ days.

Signed by: _____

Construction Manager Firm: _____

Construction Manager Attachments: _____

Unsigned / incomplete Substitution Request Forms will be rejected.

Architect's Review and Action

☐ Substitution accepted: Prepare full submittals in accordance with Specification Section 01 25 00 - Substitution Procedures.

☐ Substitution conditionally accepted as noted below: Prepare full submittals in accordance with the following:

Section 01 25 00 - Substitution Procedures.

Section 01 60 00 - Product Requirements.

☐ Substitution rejected: Use specified materials. The substitution has been reviewed with the Awarding Authority and found not to be equivalent to the specified product in terms of quality, durability, performance, and/or appearance.

☐ Substitution Request not timely: Use specified materials.

Review Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Signed by (Print): _____ Date: _____

Signature: _____

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.
B. Preconstruction meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Coordination drawings.
F. Submittal schedule.
G. Submittals for review, information, and project closeout.
H. Number of copies of submittals.
I. Requests for Interpretation (RFI) procedures.
J. Submittal procedures.
K. Architect's action on submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs, stores, displays, and makes available for download documents, provides electronic stamping and signatures, and notifies addressees of uploads and changes in status via email.
    1. In addition to applying to submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Construction Manager's correction punch list, and any other document any participant wishes to make part of the project record.
    2. Although electronic websites may be capable of producing printed logs, the logs prepared by the Architect for tracking submittals, Requests for Interpretation, Job Drawings, Proposal Requests, ASIs, and Change Orders shall be the official record for the project.
    3. It shall be Construction Manager's responsibility to submit documents in allowable format.
    4. Subcontractors, suppliers, Owner's Project Manager, Clerk of the Works, Architect, and Architect's consultants are to be permitted to use the service at no extra charge.
    5. The submittal service website shall permit the assignment of administrative limitations to user firms, such that ability to view, or upload/download information to specific folders can be established by firm or staff personnel.
    6. The Architect must be provided the ability to manage the administrative limitations, and to manage, edit, and create file folders, and to upload files to any folders.
    7. Users of the electronic document submittal service are required to have an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
    8. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
    9. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to physical samples or color selection charts.

Transmittals and other documentation of such samples shall be made electronically via the submittal service and will be reviewed and returned electronically by the Architect.

a. Review of sample submittals will not begin until the electronic submittal of the transmittal and submittal forms are entered into the web-based submittal service, and samples are delivered to the Architect's office, whichever is later.

B. Cost: The cost of the service is to be paid by Construction Manager; include the cost of the service in the contract amount.

C. Submittal Service: Subject to compliance with these specifications, use one of the following:

1. Submittal Exchange: www.submittalexchange.com.
2. Newforma Constructex: www.newforma.com/our-solutions/constructex.
3. Procore: www.procore.com.
4. Other online collaboration software specializing in the construction industry, with features, navigation, and operability acceptable to the Owner's Project Manager and Architect.

D. Training: When requested, one 1-hour, web-based training session will be arranged for all participants, with representatives of Owner's Project Manager , Clerk of the Works , Architect and Construction Manager participating; further training is the responsibility of the user of the service.

E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

F. Construction Manager shall be responsible for exporting archive copies of all project files.

1. See Section 01 78 00 - Closeout Submittals.

3.02 PRECONSTRUCTION MEETING

A. The Owner's Project Manager will schedule a meeting to take place within 15 days after Notice of Award.

B. Attendance Required:

1. Owner.
2. Clerk of the Works.
3. Architect.
4. Architect's consultants, as invited by Architect.
5. Construction Manager's project manager and superintendent.
6. Subcontractors performing work at the site, and major suppliers.

C. Suggested Agenda:

1. Introductions.
2. Architect's overview of project and key aspects of the construction.
3. Owner's statements.
4. Distribution of Contract Documents.
5. Distribution and discussion of:
   a. List of major subcontractors and suppliers, including contact information for each.
   b. Projected construction schedules.
   c. Submittals Schedule Checklist, with submission dates and return-required dates to support the construction schedule.
   d. List of long lead time items requiring prioritization.
6. Project phasing.
7. Owner requirements for continuing occupancy and operations.
   a. Access, Egress, Utilities.
   b. Temporary facilities for continuing Owner occupancy and operations.

c. Separation and protection of building occupants from dust, fumes, noise, and other construction disturbances and hazards.

8. Critical work sequencing.
9. Major equipment deliveries and priorities.
10. Project coordination:
    a. Designation of responsible personnel.
11. Designation of personnel representing the parties to Contract, Owner's Project Manager, and Architect.
12. Procedures and processing of:
    a. Applications for Payment.
    b. RFIs.
    c. Proposal requests.
    d. Submittals.
    e. Change Order proposals.
    f. Change Orders.
    g. Construction Change Directives.
13. Procedures for maintaining Record Documents.
14. Control of Site:
    a. Protection of adjacent occupied areas, neighboring properties, structures, and _____ from dust, damage, erosion, noise, and other construction disturbances and hazards.
    b. Limitations on site access and construction traffic.
    c. Contractor staging and parking areas.
15. Use of premises:
    a. Office, work and storage areas.
    b. Owner's requirements.
16. Construction facilities, controls and construction aids and their relationships to project phases.
17. Temporary utilities and their relationships to project phases.
18. Safety and first aid procedures.
19. Security procedures.
20. Survey and layout.
21. Housekeeping procedures.
22. Scheduling.
    a. Scheduling activities of a Geotechnical Engineer.
    b. Scheduling inspections to be provided by other consultants to the Owner.
    c. Scheduling of mock-ups.
        1) See Section 01 40 00 - Quality Requirements for mock-up requirements.
    d. Scheduling trade-specific pre-construction conferences.

D. The Owner's Project Manager will record pre-construction meeting minutes and distribute copies within three days after meeting to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum two-week intervals.

B. Make arrangements for meetings, prepare agendas with copies for participants, preside at meetings.

C. Attendance Required:
   1. Construction Manager.
   2. Architect.
   3. Construction Manager's superintendent.
   4. Trade Contractor s, major subcontractors and suppliers, as relevant to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Owner concerns, including those related to ongoing Owner occupancy and operations.
   3. Review of work progress.
   4. Field observations, problems, and decisions.
   5. Identification of problems that impede, or will impede, planned progress.
   6. Review of submittals schedule and status of submittals, including sustainability submittals.
   7. Review of off-site fabrication and delivery schedules.
   8. Maintenance of progress schedule.
   9. Corrective measures to regain projected schedules.
   10. Planned progress during succeeding work period.
   11. Coordination of projected progress.
   12. Maintenance of quality and work standards.
   13. Effect of proposed changes on progress schedule and coordination.
   14. Other business relating to work.

E. The Owner's Project Manager or their designee will record minutes and distribute copies within three days after meeting to Owner, Architect, Construction Manager, participants, and those affected by decisions made.

F. The Owner's Project Manager's or their designee's meeting minutes will serve as the project record.

3.04 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than three days prior to submission of application for payment.

B. Photography Type: Digital; electronic files.

C. Provide photographs of site and construction throughout progress of work produced by a photographer acceptable to Architect.

D. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Preconstruction photographs of site, including interfaces with surrounding properties, adjacent paved surfaces including roadways, curbs, sidewalks, manholes, and grating inlets.
   2. Accepted mock-ups.
   3. Completion of site clearing.
   4. Excavations in progress.
   5. Foundations in progress and upon completion.
   6. Site photographs demonstrating compliance with Erosion and Sediment Control Plan and LEED requirements.
   7. Other photographs satisfying LEED construction phase submittal requirements.
   8. Structural framing in progress and upon completion.
   9. M-E-P-FP record rough-in photographs at all levels and areas of the building. Document complete rough-in for all areas prior to the installation of ceiling or wall finishes.

10. Underslab M-E-P-FP record rough-in photographs below all slab on grade areas prior to back-fill and preparation for slab placement.
11. Underslab insulation and vapor retarder preparation, prior to slab placement.
12. Underground exterior storm water infiltration system construction progression. Document excavation, pre-installation preparation, and all installation and connections prior to backfill.
13. Enclosure of building, upon completion.
14. Final completion, minimum of _____ photos.
15. Photo documentation as may be required for project grant funding sources. Coordinate requirements with Owner.

E. Views:
1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
2. Consult with Architect for instructions on additional views required.
3. Provide factual presentation.
4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
5. Point of View Sketch: Provide sketch in electronic PDF form, identifying point of view of each photograph. Include point of View identification in each photo file name.

F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via electronic submittal service.
a. Photographs shall be dated, unaltered, and digitally keyed to an interactive web-based system that is accessible to the Owner, Owner's Project Manager, Construction Manager, and Architect, to view construction progress.
1) A digital record shall be included within the Project Record Documents required by Section 01 78 00 - Closeout Submittals.
2. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
3. Hard Copy: Provide one printed, color hardcopy of each image and point of view sketch with each payment requisition.

3.05 COORDINATION DRAWINGS

A. See Section 01 31 14 - Coordination for requirements.
B. Review coordination drawings prior to submission to Architect.

3.06 REQUESTS FOR INTERPRETATION (RFI)

A. Format for RFI Submittals:
1. RFIs are to be submitted exclusively by the Construction Manager, on the form included in this project manual, or reasonable facsimile with Architect's prior approval, indicating at a minimum the following:
a. RFIs must include sufficient clear information to determine the specific location(s), trade(s), material(s), or assembly(ies) in question. RFIs that are not clear will be returned unanswered. Questions submitted informally via email and or without an RFI cover sheet and RFI number do not constitute formal requests for interpretation, and will not be returned.
b. All RFIs submitted must include a proposed solution, including a statement of any potential impact on project schedule or cost.

B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Allow sufficient time so the information will not delay installation as a result of the

time required for processing. Failure to submit an RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.

1. Prepare a separate RFI for each specific item.
2. Prepare using software provided by the Electronic Document Submittal Service.

C. The Owner reserves the right to back-charge the Construction Manager for time spent or fees incurred by the Architect, and by the Architect's consultants, due to reviewing and responding to frivolous RFIs, those where no solution is proposed by the Construction Manager, those that demonstrate a failure by the Construction Manager to coordinate the work with other trades, or those where the solution is evident in or readily interpreted or apparent in the construction documents. Charges billed to the Owner by the Architect or by other subcontractors and consultants as additional services will be deducted from the Construction Manager.

D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.

1. The title “Request for Interpretation”
2. Official project name and number.
3. Origin of RFI (Construction Manager, Trade Contractor, subcontractor, vendor.)
4. Unique and consecutive RFI number, and descriptive subject/title.
5. Critical dates:
    a. Date of request.
    b. Date of response (leave blank.)
6. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
7. RFIs must include sufficient clear information to determine the specific location(s), trade(s), material(s), or assembly(ies) in question. RFIs that are not clear will be returned unanswered.

E. Review Time: Architect will respond and return RFIs to Construction Manager within 15 working days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 2 PM will be considered as having been received on the following regular working day.

1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

3.07 SUBMITTAL SCHEDULE

A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect, and additional time for handling and reviewing submittals required by those corrections.

1. Initial Submittal: Submit concurrently with preliminary construction schedule. Include all submittals required by the project specifications and submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the work and those required early because of long lead time for manufacture or fabrication.
    a. Payment requisitions and technical submittals submitted will not be reviewed until a submittal schedule meeting the requirements of this section is submitted and accepted by Architect.
2. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Construction Manager's construction schedule and schedule of values.

3. Final Submittal: Submit concurrently with the first complete submittal of Construction Manager's construction schedule.
    a. Submit revised submittal schedule with each construction schedule update to reflect changes in current status and timing for submittals.
4. Format schedule to allow tracking of status of submittals throughout duration of construction.
5. Arrange information to include:
    a. Scheduled date for first submittal.
    b. Specification section number and title.
    c. Submittal category: i.e., action; informational.
    d. Role and name of subcontractor or Trade Contractor.
    e. Description of the work covered.
    f. Anticipated date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Activity or event number
6. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.08 SUBMITTALS FOR REVIEW

A. All submittal content shall be prepared solely by the subcontractor or vendor providing the materials being submitted, and shall be provided to Construction Manager for submittal to Architect. In no case shall Construction Manager prepare submittal content on behalf of any subcontractor or vendor.

B. When the following are specified in individual sections, submit them for review:
    1. Product data.
    2. Shop drawings.
    3. Samples for selection.
    4. Samples for verification.
    5. Sustainability data applicable to products.

C. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

D. When required by the specifications, shop drawings shall be prepared specifically for the project, and shall include project-specific data related to adjacent materials and their relationship to the submitted item where noted in the technical specifications. Standard catalog information is not a replacement for shop drawings.

E. Samples will be reviewed for aesthetic, color, or finish selection.

F. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes.
    1. See Section 01 78 00 - Closeout Submittals for requirements for record documents.

G. Resubmit each submittal returned by the Architect indicated as "Resubmit" as many times as called for to obtain approval.

H. Failure to submit required submittals, failure to obtain an approved submittal prior to installation of specified products, and or failure to resubmit submittals prior to Substantial Completion may result in the withholding of back-charges of not less than $500 per instance, for administrative time not fulfilled by Contractor(s).

3.09 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Sustainability design submittals and reports.
   3. Certificates.
   4. Test reports.
   5. Inspection reports.
   6. Copies of Building and Occupancy Permits obtained for project.
   7. Manufacturer's field reports.
   8. Construction Waste Management update reports
   9. Other types indicated.
B. Submit for Architect's knowledge as contract administrator or for Owner.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit the Construction Manager's Correction Punch List prior to requesting Substantial Completion. Architect will not conduct punch list inspections until the Construction Manager's punch list is submitted.
B. Submit the Construction Manager's Final Correction Punch List showing all work identified on the initial and Architect's punch list as completed prior to requesting Substantial Completion.
C. When the following are specified in individual sections, submit them prior to requesting Substantial Completion:
   1. Project record documents.
   2. Operation and maintenance data, including Testing and Balancing Reports.
   3. Receipt of delivery and acceptance of attic stock or surplus materials by Owner.
   4. Documentation of training sessions, submitted on flash drive(s).
   5. Warranties.
   6. Bonds.
   7. Construction Manager's Release of Liens.
   8. Construction Manager's Insurance Certificates for the General Warranty period.
   9. Construction Manager's Asbestos-Free Certification.
   10. Other types as indicated.
   11. Submit in compliance with requirements of Section 01 78 00 - Closeout Submittals.
D. Submit for Owner's benefit during and after project completion.

3.11 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review or Information: Submit one electronic copy in PDF format; an electronically marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
B. Samples: Submit the number specified in individual specification sections, or if not specified, submit three samples; two of which will be retained by Architect.
   1. Retained samples will not be returned to Construction Manager unless specifically so stated.

3.12 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Transmit each submittal using 01 30 02 - Submittal Data Sheet found in this project manual, including sample submittals.
   2. Electronic submittals are required in PDF format. Reviewed submittals will also be returned electronically.

3. Identify submittals with the section number and by sequentially numbering each transmittal in the order submitted. As an example, submittal 10 44 00-001 would indicate the first submittal filed under Section 10 44 00 - Fire Protection Specialties.
    a. Revisions to submittals shall be submitted under the original submittal number, which shall be appended with the suffix "R1" for the first resubmittal, "R2" for the second resubmittal, and so on. For example,10 44 00-001-R2 would indicate the second resubmittal of the Fire Protection Specialties submittal noted above. Title shall remain as per original submittal.
    b. Do not resubmit submittals previously returned for resubmittal with different sequential numbers without indicating which submittal the new item supersedes.
    c. Do not group products specified in separate specification sections under one submittal and data sheet. Submittals received in this manner will be returned without review.
    d. Submittals prepared and transmitted with Data Sheets that indicate incorrect specification references, or which contain items from multiple specification sections, will be returned without review.
    e. Grouping of multiple items within one specification section into one submittal is not recommended, as the Architect's Action Stamp will govern all content within the submittal. Partial approval of selective submittal content will not be granted if any content requires resubmittal.
4. Identify: Project; Construction Manager; subcontractor, Trade Contractor , or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, on each copy.
5. The Construction Manager shall provide the Owner's Project Manager with one hard copy of all final submittals and shop drawings, to be filed at the Owner's Project Manager 's site office and turned over to the Owner at Project Closeout.
6. Apply Construction Manager's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    a. Submittals forwarded without completed and signed Submittal Data Sheets will be returned to the Construction Manager without review.
    b. No claims for delay or expense related to the Construction Manager's failure to provide proper submittal data sheets will be considered.
7. Subcontractor and Trade Contractor submittals shall be submitted to Construction Manager for Construction Manager's review and submittal to Architect.
8. The Construction Manager shall post all submittal documents for review to the electronic document submittal service to be used for project submittal communications.
9. Schedule submittals to expedite the project, and coordinate submission of related items.
    a. For each submittal for review, allow 15 working days for Architect, plus 15 working days for consultant days excluding delivery time to and from the Construction Manager.
        1) Review time for submittals posted to the electronic document submittal service begins when submittals are posted and notification to the Architect is provided by the website or Construction Manager. Review time for submittals posted after 2 PM on weekdays, or on weekend days or holidays, will begin on the next business day.
        2) Review time for samples shipped to the Architect's business address begins upon receipt in the Architect's office; days in transit are not counted in review time.

3) Submittals received out of sequence with the submittal schedule will not be reviewed until such time as called for by the submittal schedule. Tracking of the review time shall align with the construction schedule.

10. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
11. Provide space for Construction Manager and Architect review stamps.
12. When revised for resubmission, identify all changes made since previous submission, by clouding or highlighting.
13. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
14. The Architect will review the first submittal and the first resubmittal for each item submitted without prejudice. Should subsequent resubmittals become necessary due to the Construction Manager's failure to prepare adequate submittals, for reasons such as (but not limited to) failure to acknowledge previous review comments, field conditions, or perform required coordination with other trades, the Architect and consultants reserve the right to invoice the Owner for time spent reviewing such resubmittals. The Owner may elect to back-charge the Construction Manager for these charges.
15. The Architect reserves the right to refuse submittals that were not requested.

B. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
   2. Copies of the Construction Documents marked up with submittal information do not meet the requirements for shop drawings.
   3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

C. Samples Procedures:
   1. Deliver samples and other submittals not appropriate for electronic submittal to Architect at their business address. Do not deliver samples to field trailers or to site meetings, unless requested by Architect to do so.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.13 ARCHITECT'S ACTION ON SUBMITTALS

A. Except for submittals for record, information or similar purposes, where action and return are required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.
   1. Compliance with specified characteristics is the Construction Manager's responsibility.

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
   1. Final Unrestricted Release: Where submittals are marked "Reviewed (No Comment)," that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
   2. Final-But-Restricted Release: When submittals are marked "Reviewed (See Comments)," that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
   3. Record Submittal: When submittal is marked "Reviewed (Accepted for Record)" either the submitted documentation is not required by the Contract Documents and is accepted only as

a record of additional information provided by the Construction Manager, or required re-submitted documentation is accepted as demonstration that required revisions to previous submittal were corrected and that changes in the work were made to comply with the Contract Documents.

4. Returned for Resubmittal: When submittal is marked "Reviewed (Revise and Resubmit)," do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
    a. Do not permit submittals marked "Reviewed (Resubmit)" to be used at the project site, or elsewhere where work is in progress.
5. Rejected: When a submittal is marked "Rejected" the submitted information is not applicable or appropriate for the project and will not be permitted to be incorporated into the work. No resubmittal is required and any incorporation of the submitted information will be considered non-conforming work.

C. The Action Stamp applied to each submittal governs all content of that submittal, and as such the inclusion of multiple items under one submittal may subject otherwise acceptable content to be returned for resubmittal (when other content is not acceptable.) Submittals will not be "segregated" during review and returned with different actions applicable to portions of the content. The Construction Manager shall use good common sense judgment regarding grouping of items when preparing submittals.
    1. When submittals are returned for resubmittal, the resubmittal shall include all content from the returned submittal, unless the Architect's review comments allow otherwise. If only specific items are requested for submittal by the Architect, the remainder of the submittal content not requested for resubmittal shall not be considered approved until all submittal content is approved.

END OF SECTION

SECTION 01 30 01
REQUEST FOR INTERPRETATION FORM

Wilmington Elementary School - #23-0847

TO:	**FROM**:	**RFI #**:
Dore & Whittier Architects Inc. 260 Merrimac St., Bldg.7 Newburyport, MA 01950 **Attn**: Bryce Taft	[Name of Contractor] [Street Address] [City, State, ZIP]	
	Reply Requested by:	**Issue Date**:

RFI DESCRIPTION (Indicate origin of RFI. Summarize question or information type required.)

REFERENCES (List relevant drawings or specification sections and paragraphs):

SENDER'S RECOMMENDATION (All RFIs must include a contractor's recommended solution to each condition, including a statement of cost or schedule of impact if applicable. The submitting contractor may be backcharged by the Owner for designer's review time for any RFI submitted without sender's recommended solution or where response is evident in drawings.)

DESIGNER'S RESPONSE:

BY:	**DATE**:	**COPIES TO**:

END OF SECTION

SECTION 01 30 02
SUBMITTAL DATA SHEET

SPEC DIVISION	**NO.**	**REV.**

Name of Construction Manager:	
Date Submitted:	
Item Submitted:	
Specification Paragraph Reference.:	
Is this item a substitution?	(If yes, provide a Substitution Request Form, Section 01 25 01)
Return Requested By:	(Allow 15 working days for Architect, and 15 working days for consultant reviews.)

Construction Manager's Certification:
The Construction Manager hereby certifies that the Construction Manager has reviewed the submitted item / system for compliance with the contract documents, verified all required field dimensions, and coordinated this item / system with related items / systems and with the overall work prior to making this submittal.

SIGNED: _____ **DATE** :_____

END OF SECTION

SECTION 01 31 14
COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General coordination requirements.
B. Project administration.
C. Coordination of submittals.
D. Coordination of substitutions and modifications.
E. Coordination of elements of the work.
F. Coordination of utilities, mechanical and electrical.
G. Coordination of cutting and patching.
H. Coordination of contract closeout.
I. Coordination documents.

1.02 MECHANICAL AND ELECTRICAL COORDINATOR

A. Employ and pay for services of a person, technically qualified and administratively experienced in field coordination of the type of work required to be coordinated, for the duration of the work.

1.03 SUBMITTALS

A. Schedules:
   1. Submit schedules for intended submittals prior to submitting shop drawings, product data, and samples.
B. Coordination Documents:
   1. Submit completed coordination drawings in both pdf format and AutoCAD-based dwg files.
      a. The work of each trade shall be a separate layer in the CAD and pdf files.
   2. Color code the work of each trade in the pdf and CAD file.
   3. Submit coordination drawings after all conflicts have been resolved; identify conflicts that cannot be resolved without modifications to the architecture.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 COORDINATION REQUIRED

A. The Construction Manager shall coordinate scheduling, submittals, and work of the various sections of specifications and subcontractors to ensure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
B. Coordinate progress schedules, including dates for submittals and for delivery of products.
C. Coordinate sequence of work to accommodate Owner occupancy as specified.
D. Conduct meetings among subcontractors and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
E. Conduct pre-installation conferences with personnel and subcontractors to ensure coordination of work.
F. Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and required changes in schedules. Transmit minutes of meetings and reports to concerned parties.

3.02 PROJECT ADMINISTRATION

A. Prepare memoranda and communications for distribution to each party involved outlining required coordination procedures. Include required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
2. Conduct conferences among subcontractors and others concerned with the work, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
3. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:
   a. Preparation of schedules.
   b. Installation and removal of temporary facilities.
   c. Delivery and processing of submittals.
   d. Progress meetings.
   e. Project closeout activities.

3.03 COORDINATION DOCUMENTS

A. Prepare coordination drawings to organize installation of products, building components, and systems, for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
   1. Coordination drawings include, but are not necessarily limited to:
      a. Structure.
      b. Building expansion and movement joints.
      c. Partition/room layout.
      d. Ceiling layout and heights.
      e. Stair and ramp layout.
      f. Light fixtures.
      g. Access panels.
      h. Sheet metal, heating coils, boxes, grilles, diffusers, and similar items.
      i. All heating piping and valves.
      j. Smoke and fire dampers.
      k. Soil, waste and vent piping.
      l. Major water piping.
      m. Roof drain piping.
      n. Rooftop equipment, including required access clearances.
      o. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
      p. Above-ceiling miscellaneous metal.
      q. Sprinkler piping and heads.
      r. Radon venting.
      s. All equipment, including items in the Contract as well as items furnished and installed by Owner (OFI) or furnished by Owner and installed by Construction Manager (OFCI).
      t. Equipment located above finished ceiling requiring access for maintenance and service. In locations where acoustical lay-in ceilings occur, indicate areas in which the required access area may be greater than the suspended grid system.
      u. Seismic Restraints.
      v. Accommodations for future equipment, piping, electrical conduits, and other devices or system components that are indicated in the drawings or readily inferable from the proposed configurations associated with distribution to other buildings.
      w. Sleeves and openings through foundations, walls, partitions, slabs, floors, or roof assemblies necessary to accommodate building systems.

x. Soil improvements.
y. Site utilities (i.e. electrical, water, sewer, storm drainage, temporary utilities). Drawings shall include elevations of all underground utilities and safety distances from other underground elements.
z. Irrigation system and associated electrical and water lines and site utilities that are not associated with irrigation system (i.e. Stormwater infiltration, water, sewer).
aa. HVAC, Electrical Plumbing, Technology, and Security Systems relative to timber framing.
bb. Timber Framing and Structural Steel and foundation.

B. Timing: Prior to fabricating materials or beginning work, supervise and direct the creation of one complete set of coordination drawings showing complete coordination and integration of work, including, but not limited to:
1. Structural.
2. Architectural.
3. Mechanical.
4. Plumbing.
5. Fire protection.
6. Elevators.
7. Electrical.

C. Intent: Coordination drawings are for the Construction Manager's use during construction and are not to be construed as replacing shop drawings or record drawings. Architect’s review of submitted coordination drawings shall not relieve the Construction Manager from overall responsibility for the coordination of the work of the Contract.

D. Base sheets: Construction Manager shall prepare and provide one accurately scaled set of reproducible building coordination drawing “base sheets” showing all architectural and structural work. Base sheets shall be at appropriate scale; congested areas and sections through vertical shafts shall be at larger scale.
1. Highlight all fire rated, smoke, and acoustical partitions.
2. Indicate horizontal and vertical dimensions to avoid interference with structural framing, ceilings, partitions and other services.
3. Indicate elevations relative to finished floor for bottom of ductwork and piping and conduit (6 inches and greater in diameter).
4. Indicate the main paths for installation, or removal of, equipment from mechanical and electrical rooms.

E. Construction Manager shall circulate coordination drawings to the following subcontractors and other installers whose work might conflict with other work. Each of these subcontractors shall accurately and neatly show actual size and location of respective equipment and work. Each subcontractor shall note apparent conflicts, suggest alternate solutions and return drawings to Construction Manager.
1. Elevator Trade Contractor.
2. Plumbing Trade Contractor.
3. Fire Protection Trade Contractor.
4. Heating Ventilating and Air Conditioning Trade Contractor.
5. Electrical Trade Contractor.
6. Telecommunications sub-subcontractor, including Owner's vendors.
7. Control system subcontractor, including Owner's vendors.

F. Review and modify and approve coordination drawings in cooperation with individual installers and subcontractors to ensure conflicts are resolved before work in field is begun and to ensure location of work exposed to view is as indicated by Architect.
   1. The Construction Manager shall stamp, sign and submit coordination drawing originals to Architect for review.
   2. Do not commence work in areas described in the coordination drawings until receipt of Architect's comments.

G. Prepare a master schedule identifying responsibilities for activities that directly relate to this work, including submittals and temporary utilities; organized by specification section.

H. Identify electrical power characteristics and control wiring required for each item of equipment.

I. Maintain documents for the duration of the work, recording changes due to site instructions, modifications or adjustments.

J. After Architect's review of original and revised documents, reproduce and distribute copies to concerned parties.

3.04 COORDINATION OF SUBMITTALS

A. The Construction Manager shall:
   1. Schedule and coordinate submittals
   2. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work. Transmit copies of reviewed documents, with Construction Manager's stamp, to Architect.
   3. Check field dimensions and clearances and relationship to available space and anchors.
   4. Check compatibility with equipment and work of other sections, electrical characteristics, and operational control requirements.
   5. Coordinate requests for substitutions to ensure compatibility of specifications, of operating elements, and effect on space requirements and work of other sections.
   6. Check motor voltages and control characteristics.
   7. Coordinate controls, interlocks, wiring of switches, and relays.
   8. Coordinate wiring and control diagrams.
   9. When changes in the work are made, review their effect on other work.
   10. Verify information and coordinate maintenance of record documents.

3.05 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

A. Review proposals and requests for substitution prior to submission to Architect.

B. Verify compliance with Contract Documents and for compatibility with work of other sections.

C. Submit with recommendation for action.

3.06 COORDINATION OF ELEMENTS OF THE WORK

A. Before commencing work, the Construction Manager shall prepare and submit a sequence of operations for all work under this Contract for approval by the Architect and Owner's Project Manager.

B. If, in the judgment of the Architect, continued work under the submitted sequence of operations may interfere with the progress of the work or the Owner 's use of occupied portions of the building, the Architect may advise the Owner to direct the Construction Manager to accelerate, interrupt, or cease work at particular points. The Construction Manager shall make reasonable changes in the sequence of operations to accommodate these directions, at no additional cost to the Owner.

C. The Construction Manager shall be responsible for the proper fitting of all work and the coordination of the operations of all trades, subcontractors, materials and equipment engaged in the work. Construction Manager shall guarantee each of Construction Manager's subcontractors

the dimensions which they may require for the fitting of their work to all surrounding work and shall do or cause the subcontractors to do all cutting, fitting, adjusting and patching necessary to make the several parts of the work come together properly and to fit the work to receive or be received by that of other contractors.

D. The Construction Manager shall have a competent superintendent and assistants on the work at all times during the progress of the work to ensure the proper coordination and expediting of the work.

E. The Construction Manager shall lay out the work, and be responsible for all lines, elevations, and measurements of the building, grading, paving, and other work executed under the Contract. Construction Manager shall exercise proper precautions to verify the dimensions shown on the drawings before laying out the work and will be held responsible for errors resulting from Construction Manager's failure to exercise such precautions.

F. The Construction Manager shall be in charge of the entire work and shall be responsible for the prompt coordination of all trades, including Construction Manager's own forces and Construction Manager's subcontractors, as well as the Owner’s separate contractors if they are on the job during the Construction Manager’s operations, and become fully familiar with all work required under the Contract.

G. Care shall be given to the proper scheduling, delivery, and installation of items to be built into rough construction which will affect the latter portions of the work, such as anchors, pipe sleeves, inserts, conduit, pipes, lugs, clips, brackets, braces, hangers, bolts, miscellaneous metal, wood blocking and similar items. These items are not necessarily specified under the trade section under which they are to be installed. The Construction Manager shall ascertain that all are properly installed in their correct locations at the proper time so as to prevent cutting and patching of finished work.

H. The Construction Manager shall be fully responsible for coordination of general construction work with that of subcontractors for fire protection, plumbing, electrical, photovoltaic, heating and ventilating, communications, security, and other specialized trades. Construction Manager shall investigate, together with the subcontractors involved, the routing of pipes, ductwork, and conduit with particular attention to interference of structural members, other pipes, ducts, and conduit cuts, head room conditions, door and window openings and swings, pipe chases, and associated maintenance or repair access clearances, and similar features of the building which may affect installation and proper functioning of such items.

I. Changes in design locations, which may be necessary in the routing of pipes and ducts, or in the location of mechanical, electrical or other equipment, shall be anticipated and made prior to installation. Additional compensation will not be allowed for costs incurred as a result of the Construction Manager's failure to anticipate the necessity for such changes.

J. There shall be no change or variation in ceiling height, wall layout, shaft, chase, soffit, furring, exposed conduit or surface raceways, or other dimensions shown on drawings, without the specific written approval of the Architect.

K. The Construction Manager’s responsibility for the coordination of all work under the Contract shall be complete, and shall extend to all modifications in the work, whether or not such modifications entail a change in the Contract Price. Where the Contract Documents allow an optional material or method of performing a portion of the work, or where the Construction Manager is ultimately allowed or directed to perform a part of the work using a substitute material or method, the Construction Manager shall provide all other coordination and additional work that such change necessitates, without additional cost to the Owner.

3.07 COORDINATION OF UTILITIES, MECHANICAL AND ELECTRICAL

A. Coordinate the work of site work and site utilities, fire protection, plumbing, mechanical, electrical, communications, security, and fire alarm sections with work of other sections.

B. Give all advance notice to public utility companies where required by law, and provide proper disposition, subject to Owner's approval, of all existing pipe lines, conduits, sewers, drains, poles, wiring, and other utilities that interfere with the work, whether or not they are specifically shown on the drawings.
C. Notify Owner and appropriate authorities when coming across an unknown utility line(s) and await decision as to how to dispose of same.
D. When an existing utility line must be cut and plugged or capped, moved or relocated or has become damaged, notify the Owner and utility company involved, and ensure the protection, support or moving of utilities to adjust them to the new work.
E. The Construction Manager shall be responsible for all damage caused to existing, active utilities located within the limits of this Contract, whether or not such utilities are shown on the drawings, including resultant damages or injuries to persons or properties.
F. Provide openings in the work for penetration of mechanical and electrical work.
G. When applicable, anticipate and coordinate with and accommodate the work of Owner's separate contractors, and provide components necessary to support their work, as identified in the documents.

3.08 COORDINATION OF CUTTING AND PATCHING

A. Cutting and patching coordination: The Construction Manager is responsible for coordination of all cutting and patching necessary for the completion of this Contract and for the quality and appearance of all patch work in expose-to-view finished materials.

3.09 OBSERVATION OF WORK

A. Observe work for compliance with Contract Documents.
B. Maintain a list of observed deficiencies and defects. identify and document observed deviations, deficiencies and defects to the Owner and Architect immediately upon occurrence.
C. Ensure that all observed non-conforming work, deficiencies, and defects are resolved and accepted by Architect and Owner prior to requesting Substantial Completion.

3.10 DOCUMENTATION

A. Observe and maintain a record of tests. Record:
    1. Specification section number and product name.
    2. Name of Construction Manager, subcontractor and supplier.
    3. Name of testing agency and name of inspector.
    4. Name of manufacturer's representative present.
    5. Date, time, and duration of tests.
    6. Type of test, and results.
    7. Retesting required.
B. Assemble background documentation for record.
C. Submit copies of documentation to Architect upon request.

3.11 COORDINATION OF CONTRACT CLOSEOUT

A. The Construction Manager shall coordinate the completion and cleaning of the work of subcontractors in preparation for requesting Substantial Completion.
B. After Owner occupancy of premises, coordinate access to the site by subcontractors for correction of defective or unfinished work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
C. Assemble and coordinate closeout submittals.
    1. See Section 01 78 00 - Closeout Submittals.
D. Cooperate with the Commissioning Authority and ensure that all pertinent subcontractors similarly cooperate.

3.12 EQUIPMENT START-UP

A. Verify utilities, connections, and controls are complete and equipment is in operable condition.
   1. See Section 01 70 00 - Execution and Closeout Requirements.
B. Observe start-up and adjustments, test run, record time and date of start-up, and results.
C. Observe equipment demonstrations made to Owner; record times and additional information required for operation and maintenance manuals.

3.13 INSPECTION AND ACCEPTANCE OF EQUIPMENT

A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
B. Assist Owner's Project Manager and Architect with review. Prepare list of items to be completed and corrected.

END OF SECTION

SECTION 01 31 15
BUILDING INFORMATION MODELING SERVICES

PART 1 GENERAL

1.01 SCOPE INCLUDES

A. Participation by the Construction Manager and Trade Contractor in Building Information Modeling (BIM) and BIM-related coordination activities throughout and Construction Phases of the project for coordination and record modeling.

1. Generally the BIM Services scope for the project is intended to create a technically accurate and detailed three-dimensional computer model of the building architecture, structural frame, and building systems including: Fire Protection, Plumbing, HVAC, Electrical, Fire Alarm, Communications Systems, and Security, which reflects the built condition and includes all changes and adjustments to the building design made by the design team or in the field during the construction phase.
    a. Preparation of three-dimensional Coordination Models and exported two-dimensional coordination drawings based on models of the structure created by the Construction Manager, and model content prepared by Fire Protection, Plumbing, HVAC, and Electrical Trade Contractors, and preparation of Clash Reports by the Construction Manager, as part of the building coordination effort.
    b. Preparation of a Clash Detection report by the Construction Manager based on the prepared coordination models.
    c. Preparation of Construction Record Model.

1.02 DEFINITIONS

A. BIM Coordinator: An employee or consultant of the Construction Manager, possessing a minimum of seven years of experience creating Building Information Models, including management of models, and preparation of Clash Detection reports, preferably AutoDesk Revit and Navisworks Manage software.

B. Coordination Drawings:

1. Coordination Drawings consist of printed, two-dimensional representations of the coordination model, and are intended to be used as the record representation of the Coordination Model, and all comments in review of the coordination model shall be recorded on the coordination drawings.
2. The Coordination Model shall not be considered a substitution for Coordination Drawings required elsewhere in the project Specification.
    a. Refer to Section 01 31 14 - Coordination for additional coordination requirements.

C. Coordination Model:

1. The Coordination Model consists of the digital Building Information Models created by the Construction Manager and Trade Contractors, and represents the actual materials, locations, heights, and sizes of components as intended in the construction.
    a. The Coordination Model shall be the primary tool to facilitate overall review of systems layout within the building, confirm that adequate clearances have been provided between the utilities and equipment of the steel, foundations, Fire Protection, Plumbing, HVAC, Electrical, fire alarm, Communications, and Security trades, and confirm that adequate ceiling and wall cavities have been provided.
    b. The Coordination Model shall be the basis for 2D coordination drawings to be submitted for review as a record of the coordination review.
    c. Clash detection reporting shall be performed on the Coordination Model by the Construction Manager as part of the coordination process.

1) Refer to Section 01 30 00 - Administrative Requirements for additional coordination activities.

D. Construction Record Model:
   1. The Construction Record Model consists of the digital building information models created by the Construction Manager and Trade Contractors, and represents the actual materials, locations, heights, and sizes of components as installed in the final construction. The Construction Record model shall include views of all drawing sheet details provided in the Construction Documents, with all variations from design details recorded or annotated.
   2. The Construction Record Model shall be an accurate record of the construction, and record all deviations and changes necessitated during the construction, including the following:
      a. Changes to manufacturers, models, or features of equipment made during the submittal process.
      b. Changes initiated by the Architect and conveyed by Architect's issued minor modifications of the work, Proposal Requests incorporated into the work, and Construction Change Directive.
      c. Changes initiated by Construction Manager’s change requests.
      d. Other field changes and deviations enacted by the Owner or subcontractors, whether or not formally submitted or notified to the design team.

E. Design Model:
   1. The Design Model constitutes the model created by the project design consultants, including the Architect, Structural, Fire Protection, Plumbing, HVAC, and Electrical consultants. The Design Model remains the property of the Architect and design consultants.
      a. Native Revit files (RVT file extension) of the Design Model may be issued to the Construction Manager upon request and after an executed 01 31 16 - Terms of Use of Digital Drawings and Electronic Data form is provided from each Contractor requesting use of the native RVT file.

F. M-E-P-FP Coordinator: An employee of the Construction Manager, with minimum ten years of experience specialized in field coordination of building utilities and services and management of Trade Contractor, with dedicated focus on the coordination process for this project. The Construction Manager's project superintendent shall not serve as M-E-P-FP Coordinator, however the BIM Coordinator and the M-E-P-FP Coordinator may be the same person.

G. Construction Record Drawings:
   1. Construction Record Drawings consist of printed, two-dimensional representations of the construction record model and printed drawings marked up by the Construction Manager, Trade Contractor, and other subcontractors throughout the construction phase to record all field changes, and are intended to be used as the record representation of the construction.
   2. The Construction Record Model shall not be considered a substitution for Record Drawings required elsewhere in the project specification.
   3. Refer to the following for record drawing requirements:
      a. Section 01 70 00 - Execution and Closeout Requirements.
      b. Section 01 78 00 - Closeout Submittals.

H. Shop Drawings:
   1. Shop Drawings consist of printed, two-dimensional representations of the project, and are intended to be the primary tool to facilitate detailed review of specific scopes of work of each trade.
      a. The Coordination and Record models shall not be considered a substitution for Shop Drawings required elsewhere in the project specification.

1) Refer to Section 01 30 00 - Administrative Requirements for shop drawing submittal requirements and procedures.

b. To the greatest extent practical, shop drawings shall be generated from the Coordination Model to assure coordination.

1) The structural coordination model shall be used to create the steel erection shop drawings.

1.03 GENERAL REQUIREMENTS FOR ALL BUILDING INFORMATION MODELS

A. All parties using exported model data in any form (NWC, DWG, XLS or other format) provided by the Architect and design team for use on the project shall complete and sign the required “Terms of Use of Digital Information” form following this section.

B. All models created by the Construction Manager, Trade Contractor, or other parties on behalf of the Construction Manager or any contractor shall conform to the following requirements:

1. All models shall extend to 10 feet beyond the exterior walls of the building in plan view, and from the lowest extent of the foundations or underground utilities (whichever is lower) up through the highest point of roof construction.
2. All building systems shall be included and represented in their full horizontal and vertical extents, including underground utilities within the building footprint, and roof mounted equipment.
3. All models shall include the architectural background of the building and the structural control grid, and be constructed around a common work point and coordinate system to be established by the Construction Manager to facilitate linking of models.
4. All models shall be constructed in a manner to facilitate exportation of all views and model elements to 2D AutoCAD based drawing files without loss or distortion of information.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Construction Submittals

1. Completed form 01 31 16 - Terms of Use of Digital Drawings and Electronic Data, included at the end of this section - to be completed by each Contractor or subcontractor requesting access to exported data files from the Design Model.
2. Coordination Model and Drawings
   a. Detailed BIM Coordination Specification prepared by the Construction Manager, describing the roles of the BIM Coordinator and M-E-P-FP Coordinator, order of modeling, stratification of work, Level of Detail, coordination meetings, modeling standards, and other criteria conforming to the requirements of this Section.
   b. Submit the coordination model and coordination drawings simultaneously for review.
      1) Coordination models and drawings that are submitted and deemed to be incomplete will be rejected outright and returned without further review.
      2) Submittal of coordination drawings without simultaneous submittal of a coordination model
   c. Submit the coordination model and coordination drawings and obtain acceptance from the Architect prior to the fabrication or installation of any building utilities or ceilings represented in the coordination model or drawing content.
   d. Submit a Clash Detection Report on the final coordination model and coordination drawing content being submitted.
   e. Refer to Section 01 31 14 - Coordination for requirements that relate to the coordination of the work prior to submittal.
   f. The coordination model shall be submitted in electronic format as a Revit (RVT) or Navisworks file.

1) All linked models shall be included in the same submittal.
2) The model content of each trade shall be color coded for clarity.

g. Coordination drawings shall be submitted in print (hard copy) or Adobe Acrobat (PDF) format.
1) Coordination drawings shall include the work of all Trade Contractors. Do not submit coordination drawings that are incomplete or do not reflect the work of all trades.
2) The work of each trade shall be color coded for clarity.
3) Include plans of all areas of the building drawn at minimum 1/4 inch per foot scale. Provide larger scale plans at utility and equipment rooms with operating clearances indicated to demonstrate proper fit of equipment and that required clearances are being maintained.

C. Closeout Submittals
1. Final Record Model
a. Deliver the record model in digital form, with all linked files to provide a complete model reflecting the work of all trades.
2. BIM Software
a. Furnish to the Owner, at no additional cost, one copy or license of software capable of viewing the completed Construction Record Model.
1) Software shall be fully licensed and registered in the name of the Owner in the version that the construction record model was created and submitted.
3. Construction Record Drawings
a. Submit in accordance with the following:
1) Section 01 70 00 - Execution and Closeout Requirements.
2) Section 01 78 00 - Closeout Submittals.

1.05 REQUIRED SOFTWARE

A. Building Information Models shall be provided using the following software programs:
1. Revit Architecture; most up to date version, but no earlier than 2022, or other software fully compatible with Revit Architecture.
2. Revit M-E-P; most up to date version, but no earlier than 2022, or other software used by subcontractors to create model content and fully compatible with Revit Architecture.
3. Revit Structure; most up to date version, but no earlier than 2022, or other software used by subcontractors to create model content and fully compatible with Revit Architecture.
4. Navisworks Manage; most up to date version, but no earlier than 2022.
5. Bluebeam, Adobe Acrobat, or similar software for creating PDF files.

B. The Construction Manager and subcontractors shall obtain and pay for licenses of the most current version of these programs needed to fulfill the requirements of the project:

C. Due to the anticipated duration of the project phases, it is likely that BIM and Navisworks software updates might become available at some point during the project. In such case, the Construction Manager and subcontractors shall upgrade their software to the most current releases as they become available, at no cost to the project or Owner.
1. The Construction Manager shall coordinate the scheduled upgrade with the Architect and obtain consent to the upgrade prior to implementing the change in software platforms.
2. The Architect and Owner reserve the right to waive this requirement, and if so will direct the Construction Manager to continue the project in the same version of the software.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 COLLABORATION

A. Project Website

1. The Construction Manager shall maintain a collaboration website throughout the construction of the project. This website shall be used for all project communications and document management.
2. Refer to Section 01 30 00 - Administrative Requirements for information and requirements.

3.02 REQUIRED CONSTRUCTION PHASE SERVICES

A. Modeling Implementation Meeting

1. Prior to starting the coordination or construction models, the Construction Manager shall host a Modeling Implementation Meeting to review the protocols and procedures to be followed by all parties in preparation of the Models.
2. Prepare and submit minutes of the Modeling Implementation Meeting to the Architect.

B. Coordination Model

1. The Construction Manager shall oversee the creation of the coordination model and assure coordination of the work of all trades.
    a. The Construction Manager shall employ a BIM Coordinator to oversee the creation of the coordination models by the Construction Manager and Trade Contractors.
    b. The Structural erection shop drawings shall be developed from three-dimensional model of the framing, which shall be the source of the structural elements in the Coordination Model.
    c. The Construction Manager shall employ a dedicated “M-E-P-FP Coordinator” during the coordination effort to lead the coordination of all contractors and assure that the work is arranged, and clashes are resolved in the best possible manner beneficial to all parties, and to minimize impacts on the building architecture.
2. Submit the coordination model and coordination drawings and obtain release from the Architect prior to the fabrication or installation of any building utilities or ceilings represented in the model or drawing content.
    a. Provide adequate time in the project schedule (where applicable) for the review of the Coordination Drawings and Clash Detection Reports. Allow 20 working days for review.
    b. No payment will be made to the Construction Manager for relocation, modification, or alteration of any affected building or site utilities, conduits, piping, ductwork, or other utility equipment, or architectural features or finishes due to coordination should the Construction Manager not complete the Coordination process prior to fabrication or installation of related materials.
    c. Requests for Information (RFI’s) related to coordination or fit of Trade Contractor work such as ductwork, piping, and other above-ceiling utility items submitted prior to submittal of the coordination model and drawings may be returned without review.
3. The Construction Manager and the Trade Contractors shall work in harmony with the other parties to resolve as many coordination issues as possible in the best collective solution for all trades prior to submittal of the Coordination Model for clash detection or the submittal of coordination drawings for review.
4. All contractors and subcontractors are advised that the models they create will be shared among all trades and shall be the basis for coordination, fabrication, and installation of the work. Payment for costs incurred for post-coordination changes caused by unauthorized deviations from the Coordination Model will be rejected, and corrective actions shall be completed at no cost to the Owner.

5. Each contractor or Trade Contractor shall color code their content in the coordination model (and drawings) as follows:
    a. Architecture: White (black for printed material.)
    b. Structure: Dark Gray.
    c. Fire Protection Sprinkler Systems: Red.
    d. Plumbing: Blue.
    e. HVAC: Green.
    f. Electrical: Yellow.
    g. Technology: Orange.

C. Clash Detection of Coordination Models.
1. Prior to submittal of the Coordination Model and Drawings, the Construction Manager shall perform a clash detection of the Coordination Models.
    a. All clashes shall be resolved with Trade Contractors prior to the submittal of the Coordination Model.
    b. Submit a copy of the final Clash Report with the Coordination Model and Drawings.
        1) Requirements of Preconstruction Clash Detection Services also apply to this required report.

D. Coordination Meetings
1. The Construction Manager shall host Coordination Meetings to review the Architect's comments and arrive at solutions to all conflicts that could not be resolved without modification of the building architecture or finishes.
    a. The Construction Manager's M-E-P-FP Coordinator, BIM Coordinator, and the BIM Leads and field supervisors from each Trade Contractor shall attend.
    b. The coordination meeting shall include review of the Coordination Model and Drawings, and the Clash detection report.
    c. Refer to Section 01 31 14 - Coordination for additional requirements.

E. Construction Record Modeling
1. Maintain an accurate model documenting all changes affecting the building that occur following completion of the Coordination process.
    a. The Coordination Model shall be the basis for the Construction Record Model.
2. The Record Model shall be shared with Trade Contractors not less than once every two weeks, by the Construction Manager. Trade Contractors shall maintain current versions of all linked models for use in coordinating and updating their scopes of work.
3. The Construction Manager and Trade Contractors shall promptly record into the record drawings and model, all changes to the document scope, including, but not limited to the following:
    a. Construction Change Directives (CCDs).
    b. Architect's Supplemental Information documents (ASIs).
    c. Proposal Requests (PRs), once changes in costs and durations are agreed upon by the Owner.
    d. Request for Information (RFI) Responses.
    e. Shop Drawing review comments.
    f. Bulletins.
    g. Contractor-initiated change requests, once changes in costs and durations are agreed upon by Owner.
    h. Field changes.
4. All changes shall be "clouded" and annotated as to origin and date of the change.

5. The final Construction Record Model and Construction Record Drawings shall be submitted for review by the Architect.
    a. Submit the final record model documenting the installed products, elements, and configurations for review prior to requesting Substantial Completion.
    b. The Construction Manager and Trade Contractors shall adjust and correct the construction record model and drawings to assure that the data depicted is an accurate record of all changes to the project scope.
    c. Refer to the following for additional requirements:
        1) Section 01 70 00 - Execution and Closeout Requirements.
        2) Section 01 78 00 - Closeout Submittals.
    d. The Construction Record Model and Drawings are required work and deliverables for this project. Failure to submit a Construction Record Model and Construction Record Drawings will result in the pursuit of a credit change order based on proposals from qualified firms to complete the work.

3.03 TECHNICAL SCOPE REQUIREMENTS

A. Structure:
    1. All structural steel framing including, but not limited to columns, beams, joists, girders, trusses, bridging, and diagonal steel braced framing shall be modeled.
    2. Structural slabs and roof decks.
    3. Trade Contractors shall be prepared to attend all coordination meetings deemed necessary by the Construction Manager to resolve conflicts within the model.
    4. Include clearances for applied fireproofing on steel indicated to receive fireproofing.

B. Architecture:
    1. All architectural features that define the building volumes shall be modeled, including, but not limited to:
        a. Interior partitions, shaft enclosure, and exterior walls (including load-bearing, non-loadbearing, and shear walls).
        b. Doors, windows, transoms, borrowed lights, curtainwalls, louvers, and other openings in partitions and walls.
        c. Access panels required by the documents, but not necessarily required by the Trade Contractors for Fire Protection, Plumbing, HVAC, Electrical, and communication system equipment.
        d. Ceilings and ceiling features such as coffers, coves, beams, soffits, fascia, including depth of framing and finish.
        e. Accessories and specialty equipment, including, but not limited to fire extinguishers and cabinets, toilet and shower partitions, casework, acoustic wall panels, marker and tack boards.

C. Fire Protection:
    1. Fire protection main, standpipes, sprinkler mains, sprinkler loops and drain, piping 1-1/2 inch in diameter and larger, and hose and valve boxes shall be modeled and coordinated.
    2. All sprinkler heads and branch piping less than 1-1/2 inch diameter is not required to be fully modeled, however the layout of sprinkler heads shall be indicated and linked into corresponding views.
    3. Include clearances for equipment – included as a modeled volume such that clash detection and coordination can be accommodated relating to necessary clearances.
    4. All access panels required by the Trade Contractor shall be indicated in actual size.

5. The Trade Contractor shall be prepared to attend all coordination meetings deemed necessary by the Construction Manager to resolve conflicts within the model.
6. The models submitted by the Trade Contractor for coordination are required to be checked and coordinated with the structure, the model content created previously by all other Trade Contractors, and the Trade Contractor's own work prior to submittal to the Construction Manager.

D. Plumbing:
1. All plumbing fixtures, pumps, boosters, water heaters, drains, breechings, flues, roof drains, and piping larger than 2 inches shall be modeled and coordinated.
2. All plumbing equipment shall be modeled to its overall height, width and depth.
3. Pipes shall be modeled to the outside diameter of the pipe or the pipe insulation, whichever is greater.
4. Pipe slope shall be incorporated in the model, with elevations noted at elbows, long runs, and low points.
5. Pipe racks shall be modeled and coordinated vertically, but are not required to be drawn at exact location horizontally (pipe spacing) for clarity in 2D representation.
6. Pipe fittings and connections will not be modeled. All valves, clean outs and accessories shall be modeled.
7. Roof drains shall be shown on levels in which the draining occurs (not the highest most roof plan showing all drains including lower levels).
8. Include clearances and access areas for equipment – included as a modeled volume such that clash detection and coordination can be accommodated relating to necessary clearances.
9. All access panels required by the Trade Contractor shall be indicated in actual size.
10. The Trade Contractor shall be prepared to attend all coordination meetings deemed necessary by the Construction Manager to resolve conflicts within the model.
11. The models submitted by the Trade Contractor for coordination are required to be checked and coordinated with the structure, the model content created previously by all other Trade Contractors, and the Trade Contractor's own work prior to submittal to the Construction Manager.

E. Mechanical:
1. All HVAC piping 4 inches and larger, piping insulation, ductwork of all sizes, equipment in finished spaces and ceiling cavities including, but not limited to Cabinet Unit Heaters, Fan-type Unit Heaters, Convectors, and Radiant Panels, and VAV boxes, Air Handling Units, Expansion Tanks, VRF units, and other equipment in utility spaces or on roofs shall be modeled and coordinated.
2. All piping dropping below ceiling to serve finned tube heating, wall convectors, cabinet unit heaters, unit ventilators, or similar equipment shall be fully modeled and coordinated.
3. Ducts shall be modeled to the outside face dimension.
4. Equipment shall be modeled to its overall height, width and depth.
5. Pipes shall be modeled to the outside diameter of the pipe or pipe insulation (whichever is greater).
6. Pipe hangers and hanger assemblies, and dunnage shall be modeled for clash detection and coordination. Fittings and connections shall not be modeled. The intent of this model is to show the ductwork and piping in a true representation of the actual condition at construction completion.
7. Pipe fittings and connections shall not be modeled. All valves, clean outs and accessories shall be modeled.

8. Include required clearances and access spaces for equipment – included as a modeled volume such that clash detection and coordination can be accommodated relating to necessary clearances.
9. All access panels required by the Trade Contractor shall be indicated in actual size.
10. Air Terminals and terminal boxes shall be located and coordinated.
11. The Trade Contractor shall be prepared to attend all coordination meetings deemed necessary by the Construction Manager to resolve conflicts within the model.
12. The models submitted by the Trade Contractor for coordination are required to be checked and coordinated with the structure, the model content created previously by all other Trade Contractors, and the Trade Contractor's own work prior to submittal to the Construction Manager.

F. Electrical and Technology:
1. All light fixtures whether recessed, pendant, or surface mount, electrical equipment within finished spaces or in ceilings, conduits 2 inches and larger, distribution panels, and equipment in utility spaces including, but not limited to main panels, switchboards, automatic transfer switches, and generators shall be modeled to their overall size.
2. Security, fire alarm, specialty lighting, sound, and communications control panels, cable trays, equipment racks, UPS equipment, and other equipment in utility spaces shall be modeled to their overall size.
3. All conduit 2 inches and larger shall be modeled and coordinated.
4. All light fixtures shall be modeled to reflect the overall volume and depth required for that fixture.
5. Include clearances for equipment – included as a modeled volume such that clash detection and coordination can be accommodated relating to necessary clearances.
6. All access panels required by the Trade Contractor shall be indicated in actual size.
7. The Trade Contractor shall be prepared to attend all coordination meetings deemed necessary by the Construction Manager to resolve conflicts within the model.
8. The models submitted by the Trade Contractor for coordination are required to be checked and coordinated with the structure, the model content created previously by all other Trade Contractors, and the Trade Contractor's own work prior to submittal to the Construction Manager.
9. Penetrations through building systems shall be identified in the model by means of a modeled sleeve.
10. All panel-boards shall be modeled to reflect the actual size and width of the panels.

END OF SECTION

SECTION 01 31 16
TERMS OF USE OF DIGITAL DRAWINGS AND ELECTRONIC DATA

WHEREAS, Dore & Whittier Architects Inc. (hereafter referred to as Architect) agrees to furnish _____ (hereafter referred to as “User”) electronic files and data relating to the Wilmington Elementary School project (hereafter referred to as “the project”) at the User’s request, providing that the User agrees to the following conditions:

In accepting and utilizing any exported data from Building Information Models, drawings or other data on any form of electronic media generated and provided by the Architect, the User covenants and agrees that all such drawings and data are instruments of service of the Architect, who will be deemed the author of said drawings and data, and will retain all common law, statutory law and other rights, including copyrights. By providing the exported data from the building information model, drawings, and other electronic data to the User, Dore & Whittier Architects Inc. grants the User a non-exclusive, non-transferable royalty-free license to use said drawings and data for informational purposes only in connection with the project in strict accordance with these Terms of Use, the BIM Execution Plan, and AIA Document E202 that apply to the project

The User further agrees not to use the exported data from the Building Information Model, drawings, or other data in whole or in part, for any purpose or project other than the project which is the subject of this agreement. The User agrees to waive all claims against the Architect resulting in any way from any unauthorized changes or reuse of said drawings and data for any other project or by anyone other than the Architect.

Under no circumstances will transfer of the exported data from the Building Information Model, drawings and other data and other instruments of service on electronic media for use by the User be deemed a sale by the Architect, and Dore & Whittier Architects Inc. makes no warranties, either express or implied, of merchantability and fitness for any other particular purpose.

The exported data from Building Information Models, drawings, and other electronic data files are made available to the User solely for the User's convenience and informational purposes only and are not instruments of service, and do not constitute the construction documents. Differences may exist between said electronic files and corresponding hard-copy construction documents. Dore & Whittier Architects Inc. makes no representation or warranties, express or implied regarding the accuracy or completeness of the electronic files provided to the User. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by Dore & Whittier Architects Inc. and the electronic files, the signed or sealed hard-copy construction documents will govern. The User is responsible for determining if any conflict exists.

By receipt and use of the exported data from the Building Information Models, drawings, and other electronic data files, the User is not relieved of their contractual obligation to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate the work with that of other contractors and trades for the project. The User is not to rely solely upon the exported data from the Building Information Model or the data and/or information contained therein in preparing any of the coordination documents for the project.

By opening the files provided, the User agrees that these terms apply to all electronic files provided by the Architect, including exported data from the Building Information Model, drawings, and other computer data in their entirety, together with all of its component parts and data. The User acknowledges that the requirements of these Terms of Use apply to all of User’s principals, employees and agents.

Because information presented on the electronic files can be modified, unintentionally or otherwise, Dore & Whittier Architects Inc. reserves the right to remove all indications of ownership and/or involvement from each electronic display.

Upon completion of the User's involvement with the project or at any time upon written request of Dore & Whittier Architects Inc., the User shall promptly deliver to the Architect all electronic storage media containing the exported data from the Building Information Model any other material containing or reflecting any information or data in the computer model, drawings, and other data (whether prepared by the Architect, the User or otherwise) and will not retain copies, extracts or other reproductions, tangible or intangible, in whole or in part of said data or drawings. The User's non-disclosure and non-use obligations set forth herein shall survive the return, destruction, or deletion of said drawings and data. If the User becomes legally compelled, by subpoena or court order, to disclose the Model, or any information contained therein, the User shall provide the Architect with prompt notice so that a protective order or other appropriate remedy may be sought by and at the expense of the Architect and/or compliance with the provisions of this paragraph of the Terms of Use may be waived.

The User agrees that in the event the User, its officers, directors, shareholders, partners, agents, employees, consultants independent contractors, successors or assigns use the exported data from the Building Information Model, drawings, and other electronic data are solely at the User's risk and it will, to the fullest extent permitted by law, defend, indemnify and hold the Architect and its officers, directors, shareholders, partners, principals, consultants, agents and employees harmless from and against any and all actions, damages, demands, claims, suits, losses, liability, judgments, recoveries, costs and expenses, including, but not limited to, reasonable attorney's fees which any of them may incur in connection with, arising from, resulting from or related to any use of the exported data from the Building Information Model, drawings, or other electronic data and/or the information contained therein by the User or any third party who receives said drawings and data from the User. Such claims include, without limitation, any claim which may arise due to deletions, omissions or variations of data due to mechanical or technical failure in connection with the transmission of the drawings and data.

The User hereby agrees, to the fullest extent permitted by law, that in no event will the Architect be liable to User for any damages or losses of any kind including, but not limited to, damages for death or bodily injury to persons, injury to property, and direct, indirect, consequential, special, or incidental damages, resulting from any error, omission, inaccuracy, deficiency or defect in or problem with, the data exported from the Building Information Model, drawings, or the data and/or information contained therein. Without limiting the foregoing, the User acknowledges that said data and/or information contained therein may be inaccurate and/or incomplete and that the Architect will have no obligation to update or modify the data exported from the Building Information Model, drawings, or other electronic data, and/or information contained in it because said drawings and data were prepared solely for informational purposes and are not part of the Construction or Contract Documents for the project.

The User acknowledges reviewing other sections of the Project Manual related to this section, including but not limited to:

Section 01 30 00 - Administrative Requirements.

Section 01 31 15 - Building Information Modeling Services.

Section 01 70 00 - Execution and Closeout Requirements.

Section 01 78 00 - Closeout Submittals.

The User acknowledges and agrees that these Terms of Use do not convey a contract with Dore & Whittier Architects Inc. with respect to any claims or causes of action related to or arising out of the project. The User further agrees to obligate any contractor, consultant or other party who uses the data exported from the Building Information Model, drawings, or other electronic data to be bound by the terms and conditions contained herein. Any User's use of said drawings and data, and the information contained therein constitutes such User's acceptance of all the terms here specified.

Agreed and Accepted By:

Date:	_____	Date:	_____
Name:	_____ (Please Print)	Witness:	_____ (Please Print)
Signature:	_____	Signature:	_____
Title:	_____	Title:	_____

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction progress schedule, with network analysis diagrams and reports.
B. Submittal schedule.
C. Progress revisions.
D. Distribution of schedule.

1.02 ABBREVIATIONS AND ACRONYMS

A. CPM. Critical Path Method.
B. M-H. McGraw-Hill Higher Education; http://www.cpminconstructionmanagement.com.

1.03 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced.
B. M-H (CPM) - CPM in Construction Management - Project Management with CPM.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Schedule Planning Session:
    1. Within 15 days of Contract Award, the Construction Manager shall meet with Owner and Owner's consultants to review the planned approach to scheduling the work.
C. Baseline Schedule:
    1. Within 60 days from the award of the Contract, prepare and submit a draft Construction Schedule to Owner and Architect.
        a. The Construction Manager shall modify the draft schedule when necessary and within ten days submit the revised schedule to Owner and Architect.
D. Within 30 days from the award of the Contract, submit a Submittals Schedule for shop drawings, product data, and samples. Submittal Schedule shall coincide and align with Project Schedule and critical path items and dates as noted.
    1. Lack of "buyout" of certain trades, subcontractors, or materials does not constitute justification for not developing a submittal schedule. The Construction Manager shall anticipate the lead times for the various materials and components required for the project and the sequencing and scheduling of when said materials will be required on site, and develop a submittal schedule including all required submittals to demonstrate proper management and planning of the work.
    2. Submittals made to the Architect by the Construction Manager or any subcontractor in advance of the submittal of a submittal schedule will not be reviewed.
    3. Construction Manager and subcontractors shall adhere generally to the Submittal Schedule, and not "flood" submittals that are premature to the project schedule. Submittals that are received out of sequence based on the Submittal Schedule and project schedule may be returned unreviewed by Architect for resubmittal at the time approximate to the submittal schedule.
    4. At peak periods of the project, when requested by the Architect, Construction Manager shall prioritize the submittals currently submitted as to preferred order of review. A priority review list for any week shall not include more than ten submittals.
E. Submit scheduler's qualifications.

1.05 QUALITY ASSURANCE

A. Scheduler: Construction Manager's personnel or specialist consultant specializing in CPM scheduling with five years minimum experience in scheduling construction work of a complexity comparable to this project and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
   1. The Construction Manager shall submit resume of proposed scheduler to the Owner for approval. This person shall not be the same person as the Project Superintendent or Project Manager.

B. Construction Manager's Administrative Personnel: Five years minimum experience in using and monitoring CPM schedules on comparable projects.

1.06 SCHEDULE FORMAT

A. All Schedules required by the Project Schedule Program shall be a computer generated, CPM network utilizing the precedence diagram and Gantt Chart method of scheduling. Comply with requirements of M-H (CPM).
   1. Use commercially available CPM scheduling software to develop and maintain the schedule, and to prepare and print spreadsheets, schedules, Gantt Charts, and reports. Prepare a spreadsheet listing activities, a network schedule showing the connections between activities, and Gantt Charts (bar charts) required by this section.
      a. Acceptable software packages include the most recent editions of the following:
         1) Oracle: Primavera.
         2) Microsoft Project.
         3) Prolog Manager.
         4) Phoenix CPM.
         5) Other software acceptable to the OPM and Owner.

B. Provide supplementary drawings in the form of site plans, floor plans, and roof plans marked up to show the following for each required phase and sub-phase of construction:
   1. Construction limits by phase.
   2. Staging areas.
   3. Construction material delivery routes.
   4. Owner school bus loops, delivery routes, passenger vehicle routes, and pedestrian routes.
   5. Owner parking.
   6. Contractor personnel parking.
   7. Barricades including traffic control devices and construction fencing.
   8. Temporary facilities including:
      a. Construction Manager's office.
      b. Owner's Project Manager's office.
      c. Architect's office.
      d. Construction Manager's and subcontractors' storage trailers.
   9. Temporary protected walkways for Owner access around or through construction zones to facilities and are that are required to be maintained during construction.
   10. Other required temporary construction.
   11. Signs including project signs and traffic control signs.
   12. Required exits from existing facilities.

1.07 CONSTRUCTION PROGRESS SCHEDULE CONTENT

A. The project requires an integrated cost/schedule controls program with which the Construction Manager shall comply until final completion of all work. The Construction Manager is advised that its schedules as specified herein will be an integral part of the Owner’s management

program. The Construction Manager's schedules will be used by the Owner to monitor project progress and as a critical decision-making tool. Accordingly, the Construction Manager shall ensure that it complies fully with the requirements specified herein and that its schedules are both timely and accurate throughout the life of the project. The planning, scheduling, and execution of the work and the accuracy of project schedules shall remain the sole responsibility of the Construction Manager.

1. The project schedules shall be used by the Owner, Architect and Construction Manager for the following purposes as well as other purposes for which the issue of time is relevant:
    a. To communicate to the Owner and Architect the Construction Manager's current plan for carrying out the work.
    b. To identify work paths that are critical to the timely completion of the work.
    c. To identify upcoming activities on the critical path(s).
    d. To evaluate the best course of action for mitigating the impact of unforeseen events.
    e. As the basis of progress payments to the Construction Manager.
    f. As the basis for analyzing the time impact of changes in the work.
    g. As a reference in determining the cost associated with increases or decreases in the work.
    h. To identify when submittals will be submitted to the Architect.
    i. To prioritize the Architect's review of submittals.
    j. To document the actual progress of the work.
    k. To evaluate resource requirements of the Construction Manager and Owner and Architect.
    l. To integrate the work with the operational requirements of the Owner's facilities.
    m. To facilitate efforts to complete the work in a timely manner.

B. The Project Schedule Program requires the following schedules and elements:
    1. Draft Schedule Submittal: Within ten days following award of Contract, submit the following to the Architect and OPM for review:
        a. A feasible CPM schedule for completion of the entire work under this contract within the times specified.
        b. Demonstrate the format to be used for the detailed CPM schedule complying with the requirements of this section.
        c. At a minimum, Include the following milestone dates:
            1) Notice to Proceed.
            2) Establishment of field offices.
            3) Start of construction of temporary walls or barricades.
            4) Start of temporary utilities as shown on phasing drawings.
            5) Start of below-slab mechanical, electrical, and plumbing work.
            6) Start and completion of slab on grade and foundation work.
            7) Start and completion of load-bearing CMU work.
            8) Start of Steel erection.
            9) Steel "topping off".
            10) Start and completion of elevated slab work.
            11) Start and completion of interior construction of new walls and openings.
            12) Start and completion of mechanical, electrical, plumbing and fire protection work.
            13) Start and completion of roof framing work.
            14) Start and completion of roofing work.

15) Start and completion of masonry veneer and siding work.
16) Building weather-tightness achieved.
17) Delivery of major pieces of mechanical and electrical equipment.
18) Start and completion of each phase of the work as defined in the construction documents.
19) Starts of major testing, including testing of concrete, steel, windows, curtain wall, roofing, building envelope, and _____.
20) Start of commissioning.
21) Substantial Completion.

2. Schedule Planning Session: Within five working days after submittal of the Draft Schedule, and prior to submission of the Baseline Schedule, the Construction Manager shall host and conduct a one-day schedule planning session. This session will be attended by the Owner, Architect, Owner's Project Manager, Construction Manager's project manager, superintendent, and scheduler, and responsible representatives of major subcontractors. During this session, the Construction Manager shall present in detail its planned approach to the project (including the work to be performed by the Construction Manager and its subcontractors) including, but not limited to: the planned construction sequence and phasing; planned crew sizes; summary of equipment types, sizes, and numbers to be used for each work activity; estimated durations of major work activities; the anticipated critical path of the project and a summary of the activities on that critical path; a summary of the most difficult schedule challenges the Construction Manager is anticipating and how it plans to manage and control those challenges.
3. Baseline Schedule: Submittal shall incorporate the entire scope of the work. The Baseline Schedule shall be the Schedule of Record from which entitlement for adjustments in Contract Time shall be measured.
4. Baseline Schedule Revision: A Baseline Schedule Revision occurs whenever changes in the original Baseline Schedule are required to accurately reflect any changes in the Construction Manager's logic, durations or plan for performing the work or the impact of any approved changes in the work. Any proposed changes and/or revisions to the Baseline Schedule shall be incorporated into the Current Baseline Schedule and submitted as a Baseline Schedule Revision Submittal. This Baseline Schedule Revision Submittal must accurately reflect the Construction Manager's plan (including accurate logic and durations) for completing the remaining work. Once it is determined by the Owner and Architect that the submitted Baseline Schedule Revision accurately reflects the Construction Manager's plan for completing the remaining work, the Baseline Schedule Revision shall become the Schedule of Record from which entitlement for adjustments in Contract Time shall be measured and shall be used for subsequent Schedule Updates.
5. Monthly Schedule Updates: Monthly Progress Schedule Updates shall update the Baseline Schedule with actual status during the period of the Update and reflect the Construction Manager's current plan for performing the work. An updated schedule shall be submitted with each application for payment.
6. Recovery Schedule: A proposed schedule that shows how the Construction Manager plans to revise the Current Baseline Schedule to remove or mitigate delays.
7. Schedule Narrative: Provide a narrative report to define:
   a. Problem areas, anticipated delays, and the impact on the schedule.
   b. Corrective action recommended, and its effect.
   c. Changes since last Schedule Update.
   d. The effect on changes on schedules of other contractors.

8. The above listed Project Schedules shall be used for evaluating all issues related to time for this Contract. The Project Schedules shall be updated in accordance with the requirements of this section to reflect the actual progress of the work and the Construction Manager's current plan for the timely completion of the work.

C. The Project Schedules shall at all times accurately reflect the Construction Manager's current plan for the work. This section requires the Construction Manager to submit the Project Schedules in a specific format. Failure to meet the full requirements of this section will adversely affect the Owner and Architect's ability to administer this Contract.
   1. Schedule Requirements shall include but not be limited to:
      a. Activity Identification: Each activity in the Project Schedules shall have an activity identifier (activity ID). The Construction Manager is encouraged to utilize the activity ID to contain a structure enabling easy identification of work type, location and subcontractor. The activity ID of an existing activity shall not be modified or assigned to another activity. Show projected percentage of completion for each item as of the first day of each month.
      b. Activity Description: The activity description shall identify the scope of the activity. There shall not be any two activities with the same activity description. It shall not be necessary to investigate activity code assignments or logic relationships to identify the scope of an activity. For example, the description "INSTALL LOCKERS" will not be acceptable; the description "INSTALL LOCKERS - MAIN LEVEL AREA B" will be acceptable.
      c. Activity Predecessors and Successors: Every activity shall have logically assigned predecessors and successors in conformance with the requirements of this section.
      d. Activity Duration: The majority of construction activities shall have a duration from five to 30 working days, based on a five-day work week. The Construction Manager shall minimize activities having a duration of less than five working days (a short duration) or greater than 30 working days (a long duration).
      e. Activity Type: The implementation of scheduling software features that may impact activity float calculations shall be in accordance with the software manufacturer's recommendations.
      f. Activity Dates: Early and late, start and finish dates of activities shall be calculated for each activity based upon the schedule data date, actual dates, schedule logic, schedule constraints, calendars, and original duration or remaining duration, in accordance with the scheduling parameters defined in this section. All date constraints shall be reviewed and corrected as part of the monthly update procedure.
      g. Schedule of Values: Coordinate the Current Baseline Schedule with the Schedule of Values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules, including Owner's extracurricular schedules.
      h. Substantial Completion Date: Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.
      i. Use of Float: Total Float (TF) shall be defined as the number of days from the late finish date (LF) to the early finish date (EF) of an activity. When the LF is later than the EF, the total float shall be positive. When the LF and the EF are the same, the total float shall be zero. When the LF is earlier than the EF, the total float shall be negative. Unless otherwise specified, all references to "float" shall mean "total float". Float is not for the exclusive use or benefit of either the Owner and Architect or the Construction Manager, but is an expiring resource available to all parties, acting in good faith to meet any specified completion date(s). As float is an expiring resource, if the work is delayed

on the Critical Path due to a delay caused by the Owner/Architect, the Construction Manager may not use any float created by such delay on any other path. Use of such float on any parallel path shall be construed as a concurrent delay to any delay caused by the Owner/Architect.

j. Use of Constraints or Float Suppression Techniques: The use of constraints within the schedule is limited to Early Start constraints for Access Restraints and Early Finish constraints for specified completion dates defined in the Contract Documents. Any other use of constraints is prohibited. This includes the following: Zero Free Float, Start On, Expected Finish, Mandatory Start or Finish, along with early and late constraints for starts and finishes for activities other than access restraints and specified completion dates defined in the Contract Documents. The use of negative lags or the use of any other float suppression techniques is also prohibited from use in Project Schedules.

2. Activity Codes
   a. The Project Schedules shall contain activity code classifications and code values. The Construction Manager shall propose a coding structure for the Owner/Architect's review and comment. The activity code structure combined with the activity identification number shall provide the capability to organize information by location, room, building floor, building wing, structure, work type, subcontractor and discipline.
3. Activity Calendars
   a. The planning unit for the work shall be business days.
4. Resource Loading
   a. The Project Schedules shall be resource loaded for both the Construction Manager and all of its subcontractors as detailed below. The Construction Manager may propose additional or alternative resource loading for the Owner/Architect’s review and comment. Defining a resource shall consist of identifying the resource name, resource description, unit of measure, and calendar assignment.
      1) Labor Resources: Labor shall refer to all craft labor including foremen. Labor shall be measured in person-days. The labor resource definitions shall be consistent with the subcontractors' work scopes.
5. Mitigation of Delays
   a. The Construction Manager shall be responsible for developing mitigation measures for all delays, regardless of responsibility for the delays, and to identify all time and cost impacts on the work associated with those mitigation measures. Unless circumstances otherwise require, the Construction Manager shall not pursue mitigation action for which it expects the Owner/Architect to be liable, prior to notifying the Owner/Architect and receiving Owner/Architect authorization to proceed with the mitigation action. Any action taken by the Construction Manager prior to receiving approval from the Owner/Architect shall be at the Construction Manager’s risk.
6. Time Extensions may be granted only to the extent that equitable adjustments for the activity or activities affected exceed or exceeded the total or remaining float along the Critical Path or activities at the time of the actual delay. The Critical Path is defined as the longest continuous series of activities through the network to a specified completion date or to Contract Completion. Where the path to a specified completion date has become negative the critical path shall be the longest continuous chain of activities with the greatest amount of negative float. Time Extensions may only be considered if a delay occurs that: a) Is beyond the control of and without fault of or negligence of the Construction Manager and its subcontractors or suppliers, at any tier; and b) Extends the actual performance of the work beyond any specified completion date.

a. No extension of Contract Time shall be considered unless the Construction Manager complies with all of the following requirements.
   1) The Construction Manager shall clearly demonstrate via the timely submittal of a detailed schedule analysis that the specified Completion Date(s) were extended due to events that were beyond the control of and without the fault or negligence of the Construction Manager and its subcontractors or suppliers, at any tier. The Construction Manager's detailed schedule analysis shall use the current Schedule of Record as the Baseline Schedule in this analysis. The Construction Manager shall use the Contemporaneous Window Analysis methodology or other similar methodology acceptable to the Owner in performing this analysis. The analysis shall include: a) a detailed narrative which clearly describes the events causing the delay and the resulting impacts on the project schedule; b) records such as daily field reports and time sheets, substantiating and supporting the delay; c) detailed CPM schedule(s) clearly delineating the delay; d) a matrix showing Owner-caused delays, Construction Manager caused delays, third-party delays, and force delays during the period of the requested time extension; and e) any additional information reasonably requested by the Owner, in order to enable the Owner to perform a timely and informed analysis of the request for extension of Contract Time.
   2) The Construction Manager shall have no claim for damages of any kind, or extension or increase to the Contract Time(s) or specified completion date(s) on account of any delay, interruption or suspension of the work or any portion thereof (hereinafter collectively referred to as "Delay"), unless the prerequisites of this Subsection are met. The requirements of this Subsection are in addition to and not in lieu of the requirements of any other applicable part of the Contract Documents.

7. No Claim by the Construction Manager for extension of or increase to Contract Time(s) or specified completion date(s) on account of any delay shall be allowed unless the Construction Manager shall have notified the Owner/Architect in writing of its claim not more than three work days after the commencement of the event causing such claimed delay and complied with the requirements for timely submission of a detailed schedule analysis. If the Construction Manager does not provide such notification and submit a detailed schedule analysis for a specific change order or delay in a timely manner, the Construction Manager shall be deemed to have irrevocably waived any right to additional time.
8. Anticipated Drawdown. An anticipated monthly drawdown shall be submitted in addition to the initial construction schedule. The drawdown shall include the anticipated amount to be billed each month for the duration of the project. Drawdown shall be coordinated and consistent with the construction schedule and will be used to evaluate construction progress.
   a. The practice of front-end loading cost items will not be permitted. When the Construction Manager plans to request payment for material not incorporated into the work, the delivery activity for that material shall be cost loaded up to a maximum value of the purchase price of the material delivered.

1.08 SUBMITTAL SCHEDULE CONTENT

A. Required Submittals and Delivery Activities
   1. Submittals Schedule for shop drawings, product data and samples: Prepare the schedule in chronological order; include all submittals required during construction. The Construction Manager shall submit a list in tabular format of all submittals required by the Contract Documents in both electronic and hard copy format. The tabular submittal list shall contain the following information for each submittal:
      a. Scheduled date for first submission.
      b. Specification section.

c. Submittal category.
d. Name of Trade Contractor or subcontractor.
e. Description of the submittal and part of the work covered.
f. Scheduled date for resubmittal (when applicable).
g. Scheduled date for the Architect's final release or approval.

2. Submit revised schedules with each application for payment and/or as otherwise required by this section.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROGRESS REVISIONS:

A. Indicate progress of each activity to date of submission.
B. Show changes occurring since previous submission of schedule:
   1. Major changes in scope.
   2. Activities modified since previous submission of schedule.
   3. Revised projections of progress and completion.
   4. Other identifiable changes.
C. Submit progress revisions to Schedules with each monthly request for payment. Failure to provide monthly updates may result in the Owner withholding partial payment for required Administrative time by Construction Manager that has not been fulfilled.

3.02 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to:
   1. Construction Manager's project site file.
   2. Trade Contractor and subcontractors.
   3. Suppliers.
   4. Architect.
   5. Owner.
   6. Clerk of the Works.
   7. Other parties required to comply with scheduled dates.
   8. Post copies in the project meeting room and temporary field office.
   9. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
B. Instruct recipients to promptly report to the Construction Manager, in writing, problems anticipated by projections indicated in schedules.
C. Provide electronic copies if requested by Owner or Architect.

END OF SECTION

SECTION 01 35 43
HAZARDOUS MATERIALS PROCEDURES

PART 1 - GENERAL

1.01 - RELATED DOCUMENTS

A. All the Contract Documents, including Drawings, General Conditions, and all Sections of Division 01 - General Requirements, apply to the work of this Section.

1.02 - DESCRIPTION OF WORK

A. The Work of this Section shall include, but not be limited to, provision of all labor and materials necessary to complete and document abatement and removal of existing hazardous building materials in accordance with requirements of Federal, State, and local authorities having legal control, and the Contract Documents.

1.03 - RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all the Contract Documents for requirements which affect the work of this Section.

B. Other Specification Sections which directly relate to the work of this Section.

1.04 - SUBMITTALS

A. Provide submittals in accordance with requirements of Section 01 30 00 – Administrative Requirements.

B. Submit qualification data for abatement firm.

C. Submit landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.05 - HAZARDOUS MATERIALS PROCEDURE

A. Asbestos:

1. Asbestos Materials Exist On-Site: There are accessible and inaccessible Asbestos Containing Materials (ACM) in the existing buildings. ACM affected by the demolition project are included under this contract. The General Contractor shall retain the services of a Massachusetts licensed Asbestos/Demolition Contractor “Demolition Contractor.” The Demolition Contractor shall formally notify each subcontractor that there are ACM existing in each building. Hidden ACM may only be found during demolition. Refer to items 2 and 3 below.
2. The Demolition Contractor shall be responsible for all work, quantities and unit prices listed in this Section.
3. The Demolition Contractor must fully comply with the Department of Environmental Protection (DEP) 310 CMR regulations at no additional cost to the owner
4. Unknown and inaccessible ACM: During demolition work of the Contract, it is possible that previously unknown asbestos materials may be discovered in currently concealed locations.
5. Notification: If the Demolition Contractor discover or encounter any ACM during the performance of the work, the Demolition Contractor shall immediately:
    a. Stop work, notify the OPM and UEC about the presence of suspect ACM and request instructions for proper action, and
    b. Take whatever steps and measures are necessary to reduce, control or eliminate the risk of exposure of workers and the public to the ACM.
6. Responsible Person On-Site: The General Contractor shall designate one of its senior on-site employees to oversee coordination between the Architect, the Demolition Contractor, and all subcontractors with respect to hazardous materials issues.
7. Responsibility for Hazardous Material Discovery: It is the sole responsibility of the Demolition Contractor and its Subcontractor to undertake whatever measures, methods of procedures are necessary, required or otherwise appropriate to safeguard the health and safety of all workers and members of the public with respect to identification and discovery of previously unknown hazardous materials during the work of the Project.

8. Roofing materials including tar, caulking, mastic, and flashing were found to contain asbestos. The Demolition Contractor shall own the removal and disposal of all roofing materials as asbestos at no additional cost to the Owner in accordance with all federal and state regulations. The Demolition Contractor is solely responsible for notifications, means and methods, and techniques used to properly remove and dispose of the material. It is also the Demolition Contractor's responsibility to comply with DEP 310 CMR 7.15 and DLS 454 CMR 28 regulations.

9. Foundation, building, including windows, roofs and construction flashing were found to exist and found to contain asbestos. Damproofing, paper, glue and glue daubs on Styrofoam were found to contain asbestos and assumed/found to exist on both exterior and foundation walls including under floor slab below grade. It is the Demolition Contractor' responsibility to remove and dispose of all ACM coated walls and columns/beams. The Demolition Contractor shall segregate the ACM coated walls from non-ACM coated walls and shall also excavate around the foundation walls and to separate ACM coated walls and to remove and dispose at no additional cost to the Owner in accordance with all federal and state regulations. The Demolition Contractor shall assume the responsibility of quantifying the material. The Demolition Contractor is solely responsible for means and methods and techniques used to properly remove and dispose of the ACM and shall comply with all federal, state and OSHA regulations. The Demolition Contractor shall include in their bid the disposal of 2,500 tons of ACM coated walls/columns/beams. UEC will record daily all quantities removed. The Demolition Contractor shall be required to do the same. At the completion of the demolition project, should quantities of ACM coated walls removed were found to be less than 2,500 tons, the Demolition Contractor shall be required to issue a credit to the owner based on $280.00 per ton or will be paid $300.00 per ton should quantities of ACM coated walls removed were found to be greater than the listed above. The unit price includes all applicable costs. It is also the Demolition Contractor' responsibility to comply with DEP 310CMR 7.15 regulations. At no additional cost to the owner, the Demolition Contractor shall be required to separate ACM coated walls and beams from non-ACM coated walls. Only ACM coated walls and columns/beams will be included for proper disposal by the Demolition Contractor.

10. Quantities for materials included above are an additional to the scope in the demolition section and only to be used for additions and credits. If no ACM was found, then full credit for the estimated quantity listed above multiplying by the credit price shall be given to the owner. The Demolition Contractor shall carry all costs related to demolition and disposal in his bid as non-ACM per the demolition Section and all scope and quantities listed above.

11. The Demolition Contractor shall assume that all ACM coated columns/beams to be properly disposed with no salvage value to the Demolition Contractor.

12. UEC will prepare a Non-Traditional Work Abatement Plan for submission and approval by the DEP in accordance with DEP 310CMR 7.15. It is the Demolition Contractor's responsibility to assist UEC with additional destructive testing including providing a backhoe and to perform exterior destructive testing at no additional cost to the Owner. It should be noted that the NTWP might take up to 5 weeks for DEP approval.

13. Transite and ACM insulated pipes were assumed to exist underground. The Demolition Contractor shall excavate around the pipes to expose the pipes at no additional cost to the owner for removal by the asbestos contractor.

14. Indemnification: To the fullest extent permitted by law, the Demolition Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including, but not limited to, attorneys' fees arising out of or relating to the performance of the Work, including the discovery or identification of any hazardous materials, provided that any such claim, damage, loss or expense if attributable to bodily injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the lose of use resulting therefrom; and is caused in whole or in part by any negligent act or omission of the Demolition Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

B. Lead:

1. The Demolition Contractor shall be made aware that Lead Based Paint exists on painted surfaces throughout the building including but not limited to walls, ceilings, beams, and wood.

2. It is the Demolition Contractor responsibility to either test painted surfaces or assume that all existing painted surfaces are coated with Lead Paint. All costs for testing shall be the responsibility of the Demolition Contractor at no additional cost to the Owner.

3. All the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance, and guidelines in such from in which they exist at the time of the work on the Contract and as may be required by subsequent regulations.

4. The Demolition Contractor is solely responsible for means and methods, and techniques used for demolition and lead control. The Demolition Contractor shall collect and control lead contaminated debris and to properly remove and dispose of lead contaminated soil around the building due to demolition activities.
5. The Demolition Contractor shall at their own cost and expense comply with all laws, ordinance, rules, and regulations of Federal, State, Regional and Local authorities during demolition, prepping, sanding, cutting, scraping, painting over, grinding and regarding handling, storing, and disposing of lead and lead contaminated waste material.
6. The Demolition Contractor shall submit to the Architect prior to commencing of work the following:
    a. Written respiratory and notification program
    b. Written lead compliance program in accordance with OSHA regulations including:
    c. Training requirement certifications.
    d. Supervisor qualifications.
    e. Written compliance program specific to this project
    f. Respirators fit test records.
    g. Medical surveillance certificates.
7. EPA and the DEP require demolition debris with lead to be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine the potential for significant amounts of lead to leach out of the waste. If the results are below the DEP standard (5.0 ppm), the waste may be disposed of in a conventional landfill for demolition debris. If, however, the TCLP results are above the DEP standard, the waste must be disposed of in a DEP approved, hazardous waste landfill. The Demolition Contractor shall at own cost and expense perform all required testing of waste by the TCLP. The Demolition Contractor must submit to the Owner copy of tests performed and all waste shipment records prior to disposing of debris. The Owner reserves the right to have own TCLP samples collected to verify results. All disposal costs shall be at the Demolition Contractor responsibility.
8. The following references are cited as current applicable publications. This project is subject to compliance with all regulations including but not limited to:
    a. Commonwealth of Massachusetts, Department of Labor Standards.
    b. Commonwealth of Massachusetts, Department of Environmental Protection, and Hazardous Materials Regulations at 310 CMR 30.00 as currently amended.
    c. U. S. Department of Labor, Occupational Safety and Health Administration Title 29 CFR 1910.1025 and 29 CFR Part 1926.62.
    d. Commonwealth of Massachusetts, Department of Environmental Protection, 310 CMR 6.0-8.0.
9. All above regulations are applicable to this project. Where there is a conflict between this section and the applicable regulations, the more stringent requirement shall prevail.

C. Other Hazardous Materials:

1. The Demolition Contractor shall be made aware that other hazardous materials may be found inside the building.
2. The Demolition Contractor shall be responsible for quantifying, removal, and proper disposal of all remaining hazardous materials in the building, including but not limited to batteries and related electrolytic material, PCB's and mercury inside transformers and switches and Freon inside air conditioners.

D. Polychlorinated Biphenyls (PCB's):

1. The Demolition Contractor be made aware that building materials including but not limited to painted surfaces, roofing, mastic, glue, coatings, and other building materials (Material) might contain greater than 1 ppm of PCB's.
2. The Demolition Contractor shall fully comply with EPA "Alternate PCB's Extraction Method and Amendments to PCB's Cleanup and Disposal Regulations" effective February 26, 2024, at no additional cost to the Owner.
3. EPA does not require testing and therefore, no testing will be performed or permitted.
4. All the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance, and guidelines.
5. The Demolition Contractor is solely responsible for means and methods, and techniques used for demolition and control. The Demolition Contractor shall collect and control PCB's contaminated debris and soil.

6. The Demolition Contractor shall at his own cost and expense comply with all laws, ordinance, rules, and regulations of Federal, State, Regional and Local authorities during prepping, sanding, cutting, burning, scraping, painting over, grinding and regarding handling, storing, and disposing of contaminated waste material and during renovation and demolition.

E. Silica Dust:

1. The Demolition Contractor shall be made aware that building materials (Material) may contain Silica.
2. Due to the difficulty associated with exhaustive testing, the Owner has elected to direct the Construction Manager and Sub-Contractors to assume that Silica was found.
3. The Demolition Contractor shall review and comply with most recent US Department of Labor Final Rule and shall take extra precautions to protect workers and other personnel on site.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.
B. References and standards.
C. Testing and inspection agencies and services.
D. Control of installation.
E. Mock-ups.
F. Manufacturers' field services.
G. Defect assessment.

1.02 ABBREVIATIONS AND ACRONYMS

A. ASTM. ASTM International: www.astm.org.
B. NIST. National Institute of Standards and Technology; www.nist.gov.

1.03 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced.
B. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.
C. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
D. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
E. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
F. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
G. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
H. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Construction Submittals
    1. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
        a. Include information for each individual professional responsible for producing, or supervising production of, delegated design-related professional services provided by Construction Manager.
            1) Full name.
            2) Professional licensure information.
            3) Statement addressing extent and depth of experience specifically relevant to design of items assigned to Construction Manager.
    2. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
        a. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
        b. Include required product data and shop drawings.

c. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
d. Where delegated design is required per individual specification sections, include signature and seal of design professional responsible for allocated design services on calculations and drawings.

3. Testing Agency Qualifications: Prior to start of work, submit agency name, address, telephone number, and names of full time licensed engineer and responsible officer providing Contractor-furnished testing.
4. Test Reports: After each test/inspection, promptly submit copies of reports in digital format to Architect.
   a. Include:
      1) Date issued.
      2) Project title and number.
      3) Name of inspector.
      4) Date and time of sampling or inspection.
      5) Identification of product and specifications section.
      6) Location in project.
      7) Type of test/inspection.
      8) Date of test/inspection.
      9) Results of test/inspection.
      10) Compliance with Contract Documents.
      11) When requested by Architect, provide interpretation of results.
   b. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
5. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Construction Manager to Architect, in quantities specified for Product Data.
   a. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications.
   b. Certificates may be based on recent or previous test results on material or product but must be acceptable to Architect.
6. Mock-Ups: Upon acceptance of mock-up assemblies, submit photographs of sufficient clarity to document the level of quality and installation techniques used in the construction.
7. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   a. Submit report in duplicate within five days of observation to Architect for information.
   b. Submit for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
8. Specimen Warranties: When specified in individual specification sections, submit specimen warranties for indicated terms.

C. Sustainability Submittals
   1. The proposed project is intended to be certified as a LEED "Silver" building per the LEED for Schools v4/v4.1 rating system. Sections 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard and 01 81 13 - Sustainable Design Requirements apply to all technical

specification sections. Additional prerequisite and credit compliance requirement information is available from the USGBC LEED for Schools v4/v4.1 credit library.

2. The Construction Manager and Trade Contractors shall provide all documentation indicating applicability of products of their respective scopes to potential LEED credits, to the Project LEED Administrator using the 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form.
    a. Include sustainability documentation indicated in each technical section.

D. Closeout Submittals
1. Manufacturer's Operation and Maintenance Instructions: When specified in individual specification sections, submit printed instructions for start-up, operation, adjusting, and maintenance, for the Owner's information.
2. Maintenance Materials and Attic Stock: When specified in individual specification sections, submit materials of type and quantities indicated, in manufacturer's original labeled packaging.
3. Executed Warranties: When specified in individual specification sections, submit warranties for indicated terms, executed in Owner's name.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.
1. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

D. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

E. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ services of an independent testing agency to perform certain specified testing and will pay the cost of such testing, except that the Construction Manager shall pay the cost of retesting of failed tests. Tests performed by the Owner's independent testing agency will include the following, and other testing listed in technical specification sections as by Owner:
1. In-place earthwork density testing as described in Section 31 20 00 - Earthwork.
2. Initial Work Area Clearance Testing as described in Section 02 80 00 - Asbestos Abatement.
3. Indoor Air Quality Testing as described in Section 01 81 09 - Testing for Indoor Air Quality.
4. Testing to be directed by the Structural Engineer of Record in accordance with Section 01 45 23 - Testing and Inspecting Services, including but not limited to testing so listed in the following sections:
    a. Section 01 45 23 - Testing and Inspecting Services.
    b. Section 03 30 00 - Cast-in-Place Concrete.
    c. Section 04 20 00 - Unit Masonry.
5. Water leakage and air infiltration testing of work of the following sections:
    a. Section 08 43 13 - Aluminum-Framed Storefronts.

b. Section 08 44 13 - Glazed Aluminum Curtain Walls.
c. Section 08 44 35 - Fire-Rated Glazed Assemblies.
d. Section 08 51 13 - Aluminum Windows.

6. Infra-Red Scan of Insulated Building Envelope.
   a. On a phase by phase basis, the Owner will schedule and provide an infra-red thermographic scan of the building envelope and roof upon receipt of notice from Construction Manager that the project phase is substantially complete. Identified heat loss areas will be inspected by Construction Manager and Architect, and those areas that are determined to have incomplete or missing insulation and/or other required envelope components shall be corrected by Construction Manager as a condition of Substantial Completion. Construction Manager shall pay the cost of any required retesting for non-roof surfaces. The roofing Trade Contractor shall pay the cost of required retesting for roofing surfaces.
7. Testing indicated in Section 01 91 19 - Building Envelope Commissioning and Section 01 91 13 - MEP Commissioning Requirements.
8. Other testing which the Owner may elect to do, but such testing shall not relieve the Construction Manager and trade and subcontractors of responsibility for specified tests.

B. Construction Manager shall engage and pay for services of an independent testing agency to perform other specified testing and inspection, including but not limited to:
   1. Other testing and inspection required by these project specifications, except where assigned to specific Trade Contractor.
   2. Other testing and inspection required by applicable regulations.
   3. Employment of agency in no way relieves Construction Manager of obligation to perform work in accordance with requirements of Contract Documents.
   4. Construction Manager Employed Agency:
      a. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
      b. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
      c. Laboratory: Authorized to operate in Massachusetts.
      d. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
      e. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST-established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
B. Comply with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Have work performed by persons qualified to produce required and specified quality.
F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work. The purpose of mock-ups is to demonstrate the proposed range of aesthetic effects and level of quality of workmanship to which all work on the building will be compared.

B. Reflect the construction, observation, and completion of mock-ups in the baseline construction schedule required by Section 01 32 16 - Construction Progress Schedule.

C. Accepted mock-ups establish the standard of quality the Architect will use to judge the work.

D. Work on each material class on mock-ups shall not commence until submittals for that material class are reviewed and accepted. Schedule submittals such that materials required for mock-ups are submitted, reviewed, and accepted prior to construction of the mock-ups. Allow time for resubmittal and review. Use only accepted colors and materials.

1. Following acceptance of submittals for material components and selection of colors provide materials of each color selected, installed in place on the mock-up for final review by Architect prior to proceeding with the work.

E. Exterior Envelope Mock-Up: The project scope shall include a freestanding mock-up assembly representative of the exterior envelope of the building, as shown on drawings.

1. Notify the following team members not less than five business days in advance of dates and times when freestanding building envelope mock-up will be constructed:
    a. Architect.
    b. Building Envelope Commissioning Agent.
2. Provide supervisory personnel who will oversee mock-up construction. Provide workers who will be employed during the construction at project site.
3. The mock-up shall be constructed full size as indicated on drawings, and include the building exterior wall, portions of the roof assembly, construction of a corner, a "T" intersection, and a window head, sill and jamb condition with specified sill and head materials and conditions, utilizing specified colors and materials, and demonstrating the anticipated range of materials, workmanship, and finish expected, of the following:
    a. Exterior brick veneer, concrete masonry units, CUVM, natural stone veneer units, and specified mortar. Accepted mock-ups will be used as standard of comparison for colors and textures of units, mortar, bond pattern, joint finish, joint reinforcement, anchors, ties, workmanship, and other pertinent details, including proposed method of keeping cavities free of mortar.
    b. Precast architectural concrete.
    c. Cast stone masonry.
    d. Cold-formed metal framing.
    e. Loose lintels.
    f. Rough carpentry.
    g. Sheet waterproofing.
    h. Thermal insulation.
    i. Foamed-in-place insulation: include insulation overcoat, insulation of wall construction, window and frame insulation, and door frame insulation.
    j. VR / AIB materials, demonstrating transitions and sequencing required in creating a continuous VR/AIB system.
    k. Metal wall and soffit panels.

l. Metal composite material wall panels.
m. Thermoplastic membrane roofing.
n. Through-wall flashing details in the relationship as shown on drawings.
o. Roof edge and coping.
p. Preformed joint seals.
q. Provide doors for mock-up as shown on mock-up drawing and door schedule.
    1) Provide door hardware for mock-up as indicated in door schedule.
r. Aluminum-framed storefront.
s. Glazed aluminum curtain walls.
t. Fire-rated glazed assemblies.
u. Aluminum windows.
v. Other components of the exterior envelope, as indicated on mock-up drawings.

4. The freestanding exterior envelope mock-up shall be observed multiple times during its construction, to review the quality of workmanship prior to the work being concealed by application or installation of overlying materials. All corrective actions required by the Architect and Owner shall be completed and mock-up accepted prior to commencing work of building envelope.
    a. Anticipate such observations in the project schedule so as not to cause a delay in the progression of the work, and notify the Architect when the installation of the following interval work is complete and ready for review:
        1) Completion of foundation and "backup" wall construction, including foundation dampproofing, cold-formed metal framing and sheathing or concrete masonry units and including masonry veneer anchors, wood blocking at openings.
        2) Completion of the building air barrier/vapor barrier system, including VR/AIB membranes, through-wall flashings required to be installed between layers of membranes, and window sub-frame with seal to VR/AIB when subframes are indicated in details.
        3) Completion of wall insulation system.
        4) Completion of exterior finish systems, generally described as brick veneer, metal wall panels, and rainscreen systems, or other finishes as indicated on the mock-up drawings.
        5) Completion of installation of openings, including windows, doors, curtain wall systems, and storefront systems as indicated on mock-up drawings, and including perimeter air seals.
5. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
    a. See Section 01 91 19 - Building Envelope Commissioning for testing provisions related to commissioning.
6. It shall be assumed that all details provided in the contract documents relate to the construction of the freestanding mock-up just as they do to the finished construction as intended in the documents, whether or not specific details are called out in mock-up drawings. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
7. Payment will not be made for work related to the freestanding exterior envelope mock-up if mock-up is not accepted prior to commencement of that work on the project. The Architect will make final determination of amounts to be retained from payments for mock-up work not accepted.

F. In-Place Prototype Mock-Ups:

1. Where indicated in respective specification sections, provide in-place mock-ups of "first installation" of materials and components.
2. Location of mock-up shall be proposed by the Construction Manager and agreeable to the Architect and Owner.
3. Unless specifically noted in respective sections, in place mock-ups shall be not less than 100 square feet in area.
4. Each in-place mock-up shall be observed by the Architect and Owner to review the aesthetics and quality of workmanship. Notify Architect and Owner's Project Manager not less than five working days in advance of dates and times when each mock-up will be ready for observation.
    a. Anticipate such observations in the project schedule so as not to cause delay in the progression of the work.
5. Where the project requires multiple colors and patterns, provide representative sample of each color and pattern.
6. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
    a. Architect will issue written comments within seven working days of initial review and each subsequent follow up review of each mock-up.
    b. Modify and/or replace mock-ups as many times as are necessary to obtain Architect's and Owner's approval.

G. Architect will use accepted mock-ups as a comparison standard for the remaining work, as standard of comparison for criteria includig but not limited to: colors and textures, joint finish. joint reinforcement, anchors, ties, workmanship, and other pertinent details.
    1. With Architect's consent, accepted in-place mock-ups may remain as part of the finished construction.

H. Photograph accepted mock-ups and submit for reference in constructing remaining related work.

I. Protect mock-ups throughout construction.

J. Do not destroy mock-ups unless and until directed. Where mock-up has been accepted by Architect, and when directed to do so by Architect and Owner, remove mock-up completely and clear the area.
    1. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

K. Where possible salvage and recycle demolished mock-up materials.

3.03 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 30 days in advance of required observations.
    1. Observer subject to approval of Architect and Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.04 DEFECT ASSESSMENT

A. Replace work or portions of the work not complying with specified requirements.

END OF SECTION

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

A. Regulatory requirements applicable to this project are the following:

1. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
2. 29 CFR 1910 - Occupational Safety and Health Standards.
3. Massachusetts Architectural Access Board Accessibility Regulations (521 CMR).
4. Building Code: Massachusetts Building Code (780 CMR), 10th Edition.
    a. The 10th edition code is based on modified versions of the following 20 codes as published by the International Code Council (ICC):
        1) International Building Code (IBC).
        2) International Existing Building Code (IEBC).
        3) International Mechanical Code (IMC).
        4) MA Stretch Energy Code (225 CMR 23, excluding Appendix CC) has been adopted by the Town of Wilmington.
        5) International Energy Conservation Code (IECC): The 2021 IECC as amended.
5. Fire Safety Code: Massachusetts State Fire Code (527 CMR 1.00), 2021 Edition.
6. Plumbing Code: Massachusetts Uniform State Plumbing Code (248 CMR 10.00).
7. Electrical Code: Massachusetts State Electric Code (527 CMR 12).
    a. NFPA 70 - National Electrical Code.
8. Standard for Safeguarding Construction, Alteration, and Demolition Operations: NFPA 241, 2022 Edition.
    a. In accordance with Section 4.1.1 of the referenced standard, the Owner will delegate to the Construction Manager the designation of a person responsible for the Fire Prevention Program for the project. This person's title shall be Fire Prevention Program Manager (FPPM) per Section 4.1.1.3 of the referenced standard.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 23
TESTING AND INSPECTING SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The 10th Edition of the Massachusetts State Building Code, 780 CMR, under which this project is designed and will be built, requires the structural engineer of record (SER) to provide a program of structural tests and inspections for this project in accordance with 780 CMR 17.00. The SER is the structural engineer (an individual) who is in responsible charge of the preparation of the structural drawings and structural specifications for this project and whose Massachusetts professional engineering seal appears on said structural drawings.

B. The SER has prepared a document entitled Statement of Special Inspections for Compliance with Chapter 17 of IBC 2021, which has been or will be submitted to the building official who has jurisdiction over this project, with the application for a building permit.

C. The statement of structural tests and inspections shall not relieve the General Contractor or its subcontractors of their responsibilities and obligations for quality control of the Work, their other obligations for supervising the work, for any design work which is included in their scope of services, and for full compliance with the requirements of the Contract Documents. Furthermore, the detection of, or failure to detect, deficiencies or defects in the Work during the testing and inspection conducted pursuant to the program shall not relieve the General Contractor or its subcontractors of their responsibility to correct all deficiencies or defects, whether detected or undetected, in all parts of the Work, and to otherwise comply with all requirements of the Contract Documents.

D. The statement of structural tests and inspection does not apply to the General Contractor's equipment, temporary structures used by the General Contractor to construct the project, the General Contractor's means, methods, and procedures, and job site safety.

1.02 GENERAL CONTRACTOR'S RESPONSIBILITIES

A. Where the document Statement of Special Inspections for Compliance with Chapter 17 of IBC 2021 indicates that a structural component or system is subject to structural tests and inspections by 780 CMR 17.00 and that the SER for the project has not been retained to design said component or system or to prepare a performance specification for said component or system, and the Architect has not otherwise provided for the structural design of said component or system, the General Contractor shall retain, or require others under his aegis to retain, a professional engineer registered in Massachusetts to design said component or system and to provide the required program of structural tests and inspections for said component or system.

B. This engineer shall visit the site and provide an affidavit to the SER addressed to the Building Inspector verifying that construction has been completed in accordance with the submitted documents.

C. The General Contractor shall provide free and safe access to the Work for the SER and all other individuals who are observing the Work or performing structural tests or inspections. The General Contractor shall provide all ladders, scaffolding, staging, and up-to-date safety equipment, all in good and safe working order, and qualified personnel to handle and erect them, as may be required for safe access.

D. The General Contractor shall give reasonable notice to the SER, or to those performing inspections and tests under the SER's direction, of when the various parts of the Work will be ready for inspection. The General Contractor shall obtain instructions from the SER as to what is reasonable notice for the various aspects of the work, and who is to be notified.

E. The Owner reserves the right to back charge the General Contractor for additional expense incurred by the Owner for the services of the SER or those under his direction when work is not

reasonably ready for inspection in accordance with the notice provided by the General Contractor.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telecommunications services.
B. Temporary sanitary facilities.
C. Temporary potable water filling stations.
D. Temporary controls: Barriers and fencing.
E. Temporary bracing, shoring, sheeting, tie-down.
F. Temporary hoisting equipment and machinery
G. Staging and scaffolding
H. Temporary stairs, ladders, ramps and platforms.
I. Temporary protective treads and handrails at permanent Stairs.
J. Temporary protective covers.
K. Exterior enclosures.
L. Temporary exits, corridors, and related facilities for normal operations and Owner occupancy during phased construction.
M. Interior enclosures.
N. Special occupancy isolation barriers (SOIB).
O. Security requirements.
P. CORI forms.
Q. Vehicular access and parking.
R. Waste removal facilities and services.
S. Water control.
T. Dust control.
U. Welding precautions.
V. Fire watches.
W. Ventilation for wood flooring systems.
X. Temporary weather protection.
Y. Project identification sign.
Z. Removal of utilities, facilities, and controls.
AA. Groundbreaking shovels.
BB. Work hours and site work plan.

1.02 ABBREVIATIONS AND ACRONYMS

A. ASTM. ASTM International: www.astm.org.
B. CMR. Code of Massachusetts Regulations: www.mass.gov/code-of-massachusetts-regulations-cmr.

1.03 REFERENCE STANDARDS

A. Editions of standards as referenced in applicable building codes, or most recent edition if not referenced by codes.
B. 803 CMR 2.00 - Criminal Offender Record Information (CORI).
C. 963 CMR 2.00 - Massachusetts School Building Authority, School Building Grant Program.
D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal requirements.

B. Construction Submittals

1. Site Work Plan: Including but not limited to proposed lay down areas, traffic patterns, and entrance/exit to the site.

1.05 TEMPORARY TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications and internet services, equipment and connections for Construction Manager's field office and labor at time of project mobilization, throughout duration of project, at no additional cost to Owner.

1. Provide local telephone service and reliable high speed internet for the legitimate use of those connected with work.

B. Provide, maintain, and pay for telecommunications services with Verizon local and long-distance service, equipment and connections for Owner's site office.

1. See Section 01 52 13 - Field Offices and Sheds for additional requirements for telephone lines, internet, and communications equipment for Owner's site office.

C. Pay all permits and charges related to temporary telephone service.

1.06 TEMPORARY SANITARY FACILITIES

A. Construction Manager shall make all arrangements for and provide and maintain temporary sanitary facilities for the use of all workers. Provide separate, locking sanitary facilities for men and women. Provide at time of project mobilization. Facilities shall meet all requirements of the local Authorities Having Jurisdiction.

1. Facilities shall be adequately screened to be inaccessible to flies.
2. Facilities shall be for individual use or separate facilities shall be provided for male and female use.

B. Maintain daily in clean and sanitary condition.

C. Completely remove temporary sanitary facilities upon completion of the contract.

D. See Section 01 52 13 - Field Offices and Sheds for sanitary facilities required for Owner's site office.

1.07 TEMPORARY POTABLE WATER FILLING STATIONS

A. Provide large iced thermal cooler potable water filling stations in at least three convenient locations throughout the project site, and keep filling station clean, filled, and iced daily.

1. Provide powder-mixed sport drinks with electrolytes during hot weather.
2. Encourage the use of personal reusable beverage containers.
3. Recycle beverage containers in accordance with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

1.08 TEMPORARY CONTROLS: BARRIERS AND FENCING

A. Construction Manager shall be fully responsible for security of the work areas of the site, and for patrolling and protecting the work under construction, and for Construction Manager's and Owner’s materials stored or otherwise located on the site.

B. Construction Manager shall provide temporary fencing, barricading, and overhead protection of substantial nature to protect workers, other personnel, and the public against various hazards and attendant nuisances that come about as the work progresses such as, but not necessarily limited to, falling materials, dangerous excavations, dangerous projections or obstructions, stored or stockpiled materials. Comply fully with governing laws and codes.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect vehicular traffic, stored materials, site, and structures from damage.

E. Fencing:

1. Construction Manager shall provide fencing of the construction and staging areas. Fencing, scrim, and lockable gates shall be as detailed on drawings and shall be continuous, surrounding and enclosing the work area, totally separating the general public from construction activity, with nylon fabric scrim to obscure view, and of sufficient height to satisfy General Conditions of the Contract, but not less than 6 foot in height above grade. Temporary fencing shall also be provided at other locations indicated on the site drawings. Relocate temporary fencing in accordance with phasing requirements and remove from site at the conclusion of project.

1.09 TEMPORARY BRACING, SHORING, SHEETING, TIE-DOWN

A. Construction Manager shall take all precautions to protect the work against collapse or other damage by forces including but not limited to earth or construction loads, high winds, snow and rain loads, damage by adverse weather conditions or geological disturbances, by temporary bracing, shoring, sheeting, guying, lacing, covering, weighting, and other reasonable and prudent means.

1.10 TEMPORARY HOISTING EQUIPMENT AND MACHINERY

A. Each Trade Contractor entering upon the work shall furnish, install, operate, and maintain in safe condition all hoisting equipment and machinery required for the work of that specific sub-trade.

B. The Construction Manager shall furnish, install, operate, and maintain in safe condition all hoisting equipment and machinery required for Construction Manager 's own use.

C. All hoisting equipment and machinery and operation shall comply in all respects to the governing laws and codes.

1.11 STAGING AND SCAFFOLDING

A. Staging and scaffolding shall be of engineered design adequate and suitable for the intended purpose and loading and in compliance with all applicable federal, State, and local laws and regulations, shall have all accident prevention devices and other features required by federal, State and local laws and regulations, and shall be erected and removed by experienced staging erectors/builders.

B. Each Trade Contractor entering upon the work shall furnish, erect and maintain all staging and scaffolding required for work under Trade Contractor's own subcontract. Each Trade Contractor shall dismantle and remove such staging and scaffolding on completion of work of their subcontract, and at other times when necessary to accommodate and facilitate orderly progress of the work including work by other trades.

C. The Construction Manager shall furnish, erect and maintain all staging and scaffolding required for Construction Manager 's own work and shall dismantle and remove such staging and scaffolding on completion of Construction Manager's work and at other times when necessary to accommodate and facilitate orderly progress of the work including work by sub-trades.

1.12 TEMPORARY STAIRS, LADDERS, RAMPS AND PLATFORMS

A. The Construction Manager shall provide and maintain all necessary temporary stairs, ladders, ramps, platforms, and other temporary construction required for the proper execution of the work, all of which shall comply with requirements of the governing laws and codes.

B. Within one week of the placement of concrete slabs on deck or other floor systems, the Construction Manager shall provide and maintain at least one temporary stair or permanent stair to each level above grade floor level, from the completion of steel decking throughout the completion of the project. Remove temporary stairs prior to completion.

1.13 TEMPORARY PROTECTIVE HANDRAILS AND TREADS AT PERMANENT STAIRS

A. As soon as permanent stairs, ladders, ramps and platforms are erected, the Construction Manager shall provide temporary protective wood treads and temporary handrails, or other protection acceptable to the Architect, before the stairs are permitted to be used.

1.14 TEMPORARY PROTECTIVE COVERS

A. After door and fixed glass frames have been installed, the Construction Manager shall provide all necessary protective covers and framing required to ensure that such items will not be damaged as the work progresses.

1.15 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.16 TEMPORARY EXITS, CORRIDORS, AND RELATED FACILITIES FOR NORMAL OPERATIONS AND OWNER OCCUPANCY DURING PHASED CONSTRUCTION

A. The Construction Manager shall allow for continued normal, safe operations on the site, including serving utilities, deliveries, safe pedestrian and vehicle access and parking.
   1. Owner will vacate parts of the building and grounds during the construction period as indicated on the Phasing Schedule and Phasing Plans.
   2. The Construction Manager shall maintain controlled and fenced demolition, construction and staging areas.
   3. The Construction Manager shall provide and maintain safe, protected exits from the occupied parts of the building to the public way. Every phase or sub-phase of the project shall include, as part of the cost of the Construction Manager's work without additional payment, the proper number and arrangement of exits from the occupied parts of the building. Where existing exits that serve occupied areas are removed or blocked by construction, and the remaining exits are not sufficient in quantity or arrangements, then temporary exits shall be provided in order to maintain code-required egress from the occupied building areas.
      a. See Phasing Plans for anticipated scope of temporary exits and temporary exterior pathway.
      b. Temporary exits shall include insulated hollow metal doors and frames meeting specification requirements for permanent doors and frames (interior requirements for interior doors and exterior requirements for exterior doors). Doors shall be equipped with exit devices, closers, hinges, and other hardware equal in function to similar permanent exits and shall be labeled where required to maintain fire-resistance ratings of the wall construction. Hardware shall be of a grade equal to the existing exit door hardware.
      c. Temporary exits shall have floors and exterior pads that are level on each side of the door except for 1/2 inch high thresholds and 1/4 inch per foot maximum slope away from the door (exterior pads). Exterior pads shall be constructed of concrete with a minimum thickness of four inches and medium broom finish or an approved equal durable, non-slip construction. Exterior pads shall extend a minimum distance of 10 feet from the building wall to a smooth transition to maintained walkways, and the minimum width of the pad shall be three feet wider than the width of the temporary exit doors, centered on the doors.
      d. Pathways from temporary exits shall be fenced to the public way with 6 feet minimum height fencing equal to permanent chain link fencing. Provide plywood or other suitable barriers and overhead protection where such pathways occur adjacent to construction activity and are subject to flying or falling dust and debris.
      e. Temporary exits shall be provided with code-required exit pathway lighting (interior and exterior) and illuminated exit signs of sufficient quantity and arrangement to provide the

building occupants with clear direction to the exit. Provide fixtures and signs with built-in battery back-up for emergency use.

f. Temporary interior partitions and doors shall be built where required to limit dead end corridors to 20 feet in length.

g. Remove temporary exits and related work of the phase or, in the case of extended need, when the exit is no longer needed, and restore the walls and grade and other affected construction to a condition consistent with requirements of the finished project. Where a temporary exit occurs in a part of the building scheduled for demolition, the doors, frame and hardware and electrical devices may be reused for other scheduled temporary exits, or they may be demolished as part of scheduled demolition work.

4. No extra payment will be approved for the Construction Manager on account of changes in temporary exit locations, arrangements, and/or construction made necessary by Construction Manager-initiated schedule or phasing changes.
5. During Owner-scheduled use of the facility throughout the duration of the project, the Construction Manager shall provide and maintain temporary parking equal in number of spaces to parking displaced by construction activities and shall provide signs, barricades and notifications to assist the Owner (and faculty, students, staff, parents, and public) in utilizing such parking.
6. The Construction Manager shall provide and maintain temporary ventilation and all additional measures necessary to protect occupied areas of the building from dust, fumes, off-gassing, odors and other contaminants related to demolition, construction and renovation. See other Specifications and General Conditions for requirements that are specific to Asbestos Abatement and other hazardous materials. The Construction Manager shall also be responsible for ensuring that mechanical air intakes for occupied areas of the building are not blocked or contaminated by demolition, renovation and construction activities. Where air intakes are adjacent to construction or demolition activity or are otherwise affected by dust or fumes related to construction or demolition activity, the Construction Manager shall provide (at no additional cost to the Owner) charcoal filters and weatherproof ductwork to extend or relocate intakes up to a level above the roof line and away from such contaminants.
7. The Construction Manager shall provide exhaust scrubbers on all diesel equipment operating in the vicinity of the occupied building.
8. The Construction Manager shall provide and maintain temporary, weatherproof connecting passageways for Owner during the phases of the project where indicated on the drawings and, if not indicated, where Owner occupancy occurs in parts of the building that are separated and not contiguous. These passageways shall be constructed with accessible floor surfaces meeting the requirements of the Massachusetts Architectural Access Board . Minimum clear width shall be 7 feet, and minimum clear height from the floor to the underside of the roof shall be eight feet zero inches. Walls and roof shall be metal stud framed and insulated and sheathed with 5/8 inch thick exterior grade plywood or approved equal on the exterior and 5/8 inch thick high impact fiber reinforced gypsum board on the interior. The exterior face of the walls shall be covered with 30 lb. building paper installed to shed water. Temporary lighting shall be provided to meet code minimum lighting levels for egress and at a minimum rate of one 100-watt incandescent fixture, or one LED fixture with equivalent lumen output, spaced not more than 12 feet on center. Daylighting shall be provided by aluminum framed insulating glass windows, minimum size 3 feet by 3 feet located at the rate of not more than 20 feet on center along the length of the temporary passageway or corridor. Roofing shall consist of 30 lb. roll roofing or equivalent installed in a

leak-proof manner. Exterior drainage shall be provided to prevent water from entering at the grade level. Temporary passageways shall meet the requirements for temporary exits, and they shall be equipped with doors and illuminated exit signs meeting the criteria for temporary exits. Temporary passageways and corridors shall be maintained and relocated to accommodate scheduled construction activities and continued Owner use until permanent corridors are complete and provide equivalent access and egress. Dismantle and remove temporary corridors and passageways and related work and remove from site when no longer required.

9. The Construction Manager shall complete the work of the project in phases as indicated in the Phasing Schedule and on the Phasing Drawings.
    a. The Phasing Schedule and Phasing Drawings are diagrammatic and intended to illustrate major parts of the work without describing in detail all of the work required within each phase. The Phasing Schedule and Phasing Drawings shall be read and used together with all General Requirements, drawings and specifications to establish the complete requirements for each phase.
    b. The phases shall be completed on or before the dates indicated to accommodate and facilitate Owner moves, partial completions and occupancies, and Substantial Completion and final occupancy in keeping with the continued normal operations. However, if the Construction Manager completes any phase before the indicated completion date for that phase, the Owner does not guarantee a corresponding change in the Owner's schedule, and the Construction Manager shall not be entitled to an adjustment in either the Contract Sum or Contract Time as a result of the Owner's inability or failure to reschedule or accomplish a move or vacation of an area ahead of schedule to facilitate the early start of a subsequent phase.
    c. The durations in months indicated for the phases are not minimums but are instead maximum time periods within which the activities of the respective phases shall be completed, and the required completion dates shall not be postponed to accommodate a later start date for any phase.
    d. Submit diagrams of mobilization and site usage of each phase with dates for activities coordinated with construction progress schedule.
        1) See Section 01 32 16 - Construction Progress Schedule.
10. Construction Manager is encouraged to plan the work to take advantage of normal school recesses including weekends, holidays, and vacations.

1.17 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
    1. Acoustic insulation to be provided within temporary enclosures to provide an STC rating of 35 in accordance with ASTM E90.
    2. Maximum flame spread rating of 75 in accordance with ASTM E84.

C. Paint surfaces exposed to view from Owner-occupied areas.

1.18 SPECIAL OCCUPANCY ISOLATION BARRIERS (SOIB)

A. In addition to barriers required by law and regulations to separate hazardous materials removal activities (e.g., asbestos abatement) from occupied areas and other areas and activities, the Construction Manager shall provide and maintain a Special Occupancy Isolation Barrier (SOIB) to separate the occupied areas of the building from the construction zone (including general

areas of abatement, demolition, renovation, and new construction). The SOIB shall consist of a combination of existing walls and full height, temporary metal stud and gypsum board partitions, and both existing and temporary partitions shall be constructed to form a continuous floor-to-roof barrier for the entire length of the boundary separating the occupied area from the construction zone. The SOIB shall be completely covered with a reinforced, fire-retardant rated barrier sheet equal to Reef Industries “Griffolyn” Type 55 FR. All penetrations and edges shall be sealed air-tight, vapor- and dust-proof. The Construction Manager shall maintain the SOIB throughout all phases of construction and shall reposition and relocate the SOIB components in a manner that both maintains the SOIB and provides access to the construction zone side for required contract work. The SOIB shall be maintained until the completion of all renovation and construction activity and then shall be removed by the Construction Manager to leave the scheduled spaces and finishes in new condition.

1.19 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.20 CORI FORMS

A. Construction Manager shall submit to the School District, CORI forms for Construction Manager and subcontractors, employees, and suppliers engaged in work at the site. The Construction Manager shall comply with all requirements as identified in the Department of Criminal Justice Information Services, 803 CMR 2.00 Criminal Offender Record Information (CORI).

1.21 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstruction.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Construction Manager shall provide and maintain temporary parking in quantity required for construction personnel, Owner's Project Manager, Clerk of the Works, Architect, and visitors (e.g., Owner, Town authorities, and inspectors.) See Section 01 52 13 - Field Offices and Sheds for parking spots required at Owner 's site office.

1. Construction shall consist of a minimum of 4 inches of trap rock gravel graded to drain.
2. When site space is not adequate, provide additional dedicated off-site parking, through arrangement with third-party landowners and businesses.
    a. If dedicated off-site parking is located more than _____ from project site provide shuttles to and from temporary off-site parking, at no additional cost to the project.
3. Temporary parking shall not be permitted within 25 feet of residential abutters' property lines, or distance required by Town zoning, whichever is greater.

1.22 WASTE REMOVAL FACILITIES AND SERVICES

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Provide waste removal facilities and services required to maintain the site in clean and orderly condition.

C. Provide a staging area for separation of staging waste.

D. The Construction Manager shall provide and pay all costs for temporary dumpster type trash containers outside the building, for use by all Trade Contract and non- Trade Contract trades, and shall have the containers replaced, hauled away, and the contents legally disposed of at

sufficient intervals to maintain them at all times in sufficiently empty condition that they are continuously ready to receive trash and debris.

1. Excluded from these temporary trash containers shall be:
    a. All removed existing materials, trash, and debris resulting from abatement operations.
    b. All removed materials resulting from site work, including all excavated site materials, whether the work of these categories is by Construction Manager, Trade Contractor, or by other subcontractors.

E. Waste materials and rubbish which might otherwise raise dust shall be sprinkled during handling and loading to minimize this effect. Debris shall be carried out of the structure in containers or dropped in fully enclosed chutes and shall not be passed through, or thrown from balconies, windows or other wall openings, and in no case shall be permitted to drop freely therefrom.

F. All waste materials and rubbish shall be disposed of legally, off site.
    1. The Construction Manager shall maintain record copies of land-fill receipts and shall submit copies of these to the Clerk of the Works on a weekly basis.

G. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

H. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.23 WATER CONTROL

A. Construction Manager shall be responsible for site drainage and snow removal within the project limits and shall maintain such drainage and removal during the life of the Contract in a manner approved by Owner and Architect and so as not to adversely affect the adjacent area.

B. Legally remove by pumping, draining, or bailing, any water which may accumulate or be found on the site within the contract limits where excavating and grading are to be done, whether from rain, surface flow, springs, ground water, backing-up drains or sewers, or from other cause, at all times, and under any and all circumstances and contingencies that may arise. Form all pump wells, sumps, dams, flumes or other necessary work to keep trenches and excavations entirely clear of water. The Construction Manager shall have at all times upon the site sufficient pumping machinery. Pump wells or well points and under drains, as may be required, shall be provided where needed to properly handle the water. The final trimming excavation shall not be done until de-watering means are in place and in operation.

C. Water from trenches and excavations shall be disposed of in such a manner as will not be a threat to public health nor cause damage to public or private property. It shall not be disposed of over surfaces of roads, walks, and streets, nor be permitted to cause any interference with the normal use of same.

D. Remove snow and ice from within the contract limits at the site to the extent needed to maintain the continual progress of the work, including that required to keep work areas, access roads, and storage areas, clear, free and in use, to allow Owner access around work areas, and to prevent damage to existing construction and new work in place.

1.24 DUST CONTROL

A. Construction Manager shall be responsible for minimizing and keeping dust down on the site and adjacent roadways subject to dust from construction activity at all times, seven days a week. Construction Manager shall have on site and in good working conditions and shall use sufficient, appropriate watering equipment, including watering trucks, hoses, sprinklers, and the like to eliminate dust from construction and related activities, including but not limited to excavation and filling, spreading, rolling, hauling, transporting and delivering, spraying, and all

other activities of Construction Manager, subcontractors, and suppliers. In addition, Construction Manager shall:

1. Maintain, man, and operate a vehicle washing station to remove dust, dirt, mud and debris from truck and equipment wheels and tires before they leave the site.
2. Remove (on a daily basis) dust, dirt, mud, and debris from adjacent roadways where same is deposited by trucks, equipment, and other vehicles leaving the site.
3. Provide and maintain temporary (minimum of four inch thick) trap rock gravel roadways and parking areas for trucks and personal vehicles to minimize the accumulation of dust, mud, dirt, and debris on wheels and tires.

B. In the event that dust, mud, dirt, or debris become problems on adjacent property or roadways, Owner will take the measures necessary to eliminate the problem, and all costs will be deducted from the Contract Sum.

1.25 WELDING PRECAUTIONS

A. Arc welding activities shall be screened from view with temporary, opaque tarps positioned to occlude views of the welding from adjacent buildings, neighboring properties, and school.
   1. Tarps shall be located at sufficient distances from welding activities so as not to pose fire hazards.

1.26 FIRE WATCHES

A. When open-flame or spark producing tools such as blow torches, welding equipment, and the like are required in the process of executing the work and a fire watch for such work is not assigned to a Trade Contractor , Construction Manager shall provide fire protective covering and maintain constant dedicated fire watch who is not otherwise employed as active installation labor where work is being performed until it is completed.

1.27 VENTILATION FOR WOOD FLOORING SYSTEMS

A. Construction Manager shall schedule the work such that the permanent building heating and ventilation system is operational at the time of delivery, acclimatizing, installation and finishing of wood flooring materials, and Construction Manager shall continue to operate the ventilation system to maintain proper conditions for the completed floor system thereafter until building acceptance by Owner.

1.28 TEMPORARY WEATHER PROTECTION

A. Construction Manager shall provide weather protection, which includes temporary protection of that work adversely affected by rain, snow, moisture, wind, or cold, by providing temporary covering or enclosure and/or heating of the workspace. Without exception this shall include tenting of scaffolding related to construction of the building exterior envelope, inclusive of installation of air barrier systems, insulation, and masonry.

B. Weather protection enclosures and heating shall be provided during the months of November through March to provide adequate working areas in accordance with applicable laws. A minimum temperature of 40 degrees Fahrenheit shall be maintained at the working surface in order to permit construction to be carried on during such period in accordance with the Progress Schedule.

C. After the building or portions thereof are substantially enclosed by permanent or substantial temporary construction having a thermal resistance comparable to the specified permanent construction, Construction Manager shall provide heat therein of not less than 55 degrees Fahrenheit.

D. Maintain weather protection continuously, 24 hours per day, when required to prevent damage to construction.

E. The foregoing provisions do not supersede any specific requirements for storage or heating of specific materials, curing of materials, and similar provisions listed in individual specification sections.

1.29 PROJECT IDENTIFICATION

A. Construction Manager shall furnish and erect a wooden project sign, the least of: 4 feet by 8 feet; or as shown on the drawings; or the maximum size allowed by local sign ordinances; before starting any construction under this Contract, and shall maintain the sign in acceptable condition during the entire construction period until final acceptance of all work under this Contract. This sign shall be the only advertisement displayed at the project site.

1. The design of the sign shall be as indicated in the drawings, or as furnished by the Architect.
    a. The sign shall specifically include the words "This project funded in part by the Massachusetts School Building Authority" whether specifically included in the design or not, in accordance with 963 CMR 2.00, Paragraph 2.09-(3)-g.
2. Location shall be approved by the Architect and Owner and shall be visible from the primary roadway serving the site.
3. Text shall be painted, or vinyl applied by a professional sign painter and shall include the project name, names and addresses of Owner, Architect and consultant team, and Construction Manager, as shown in the design.
4. A graphic full-color rendering of the building (approximately 18 inches by 32 inches) will be provided by the Architect on a flash drive format and/or hard copy. This image shall be electrostatically reproduced onto high-performance vinyl and applied onto the sign at the dimensions shown on the design. The color integrity of the original rendering shall be strictly maintained.
5. The sign shall be two-sided (the same design is displayed on both sides of the sign).
6. The sign shall have two colors (not including the graphic colored rendering); a dark background color, white border/trim and white text. The background color will be selected by Architect.

B. No other signs are allowed without Owner permission except those required by law.

1.30 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

1.31 GROUNDBREAKING SHOVELS:

A. Provide 15 ceremonial ground-breaking shovels and 15 adjustable band protective hard hats for use by Owner, Owner's Project Manager, Clerk of the Works, Architect, and other dignitaries at the groundbreaking ceremony.

B. Shovels shall be traditional spade style with D-type handle, with metal parts of chrome plated bright-polished metal finish. Wood portions shall be natural, clear finish.

C. Engrave shovel handles or apply an engraved metal plate to handle indicating name of project and date of groundbreaking.

D. At conclusion of ceremony, shovels shall remain the property of Owner or of dignitary using shovel.

E. Hard hats shall remain on site as visitor personal protection devices for duration of project.

1.32 WORK HOURS AND SITE WORK PLAN

A. Work Hours: The existing building will remain operational during the performance of the work on the project and Construction Manager shall take that into account in arriving at the Contract Price and commitment to perform the work per the Contract Time. The Construction Manager

shall closely coordinate with the Owner's Project Manager regarding work and work hours so as to not disrupt the normal school operations.

B. The Construction Manager shall submit for the Owner's Project Manager's review and approval a Site Work Plan to coordinate the location, hours, and other performance criteria of the work so as to allow the normal operation of the building during the contemporaneous performance of the work. The Site Work Plan shall be updated on a periodic basis, but at least monthly. To the extent not otherwise covered in the Construction Manager's Site Work Plan approved by Owner's Project Manager, regular work hours for the construction project are Monday through Friday 7 AM to 5 PM. Equipment shall not be started prior to 7 AM. Limit especially noisy, malodorous, and / or dusty exterior work to the hours of 9 AM to 3 PM.The Owner may allow work to be performed at times other than those listed if indicated in the approved Construction Manager's Site Work Plan, as updated. If the Construction Manager desires to carry on the work outside of regular hours, or on Saturdays or holidays, the Construction Manager shall update the Construction Manager's Site Work Plan, or in case of an unplanned necessity, provide the Owner with 48-hours prior notice to allow satisfactory arrangements to be made for observing work in progress, and the Construction Manager shall reimburse the Owner for the additional costs Owner incurs to monitor work performed outside of regular hours or hours stated in the approved Construction Manager's Site Work Plan.
   1. Site Work Plan shall comply with Town of Wilmington ordinances.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 GENERAL

1.01 TRADE BID REQUIRED

A. Part of the work of this section, being the provision of temporary power and lighting systems and components, is included in the Trade Bid. See Section 26 00 01 - Electrical Trade Bid Summary for additional information.

1.02 SECTION INCLUDES

A. Temporary Utilities: Provision of the following, required for construction activities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary water service.

B. See Section 01 52 13 - Field Offices and Sheds for temporary utilities associated with field offices and sheds.

C. See Sections 01 81 13 - Sustainable Design Requirements and 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard for project's sustainability goals and requirements that may apply to work of this section.

1.03 ABBREVIATIONS AND ACRONYMS

A. CFR. Code of Federal Regulations; www.gpo.gov.

B. NEMA. National Electrical Manufacturers Association; www.nema.org.

1.04 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced.

B. 29 CFR 1926 - Safety and Health Regulations for Construction.

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.05 TEMPORARY ELECTRICITY

A. Cost: By Construction Manager.
   1. Construction Manager shall pay for the cost of electrical energy consumed by all trades during the construction period.
   2. Construction Manager shall pay for all temporary wiring required for Construction Manager's field offices.
   3. Construction Manager shall pay for all temporary wiring required for field offices to be used by Architect and Owner's Project Manager.

B. The Electrical Trade Contractor shall make arrangements with the local electric utility and shall furnish, install, maintain and remove temporary electrical power and lighting in accordance with Division 26.
   1. The Electrical Trade Contractor shall pay utility company charges in connection with the temporary service, including any fees associated with provision of transformers and poles required to bring service into the site.
   2. The Electrical Trade Contractor shall make all modifications to temporary power and lighting required to accommodate project phasing.

C. Wiring to and within shanties and trailers and any resulting increase in service capacity shall be paid for by the subcontractor requiring such supply.

D. System Description: The Electrical Trade Contractor shall provide a system that consists of the following:

1. Complete temporary distribution system including feeders and branch circuits suitably supported and protected and located to serve all work areas without hindering permanent construction.
2. Load centers of adequate capacity to support loads to be served and having branch circuit protection. All load centers shall have a NEMA 3R enclosure per NEMA EN 10250.
    a. Provide one load center for every 25,000 square feet of building floor area (each floor).
3. System and equipment ground fault protection shall be furnished in accordance with code requirements.
4. The extent of the system shall be sufficient to serve all areas where work is to be performed.
5. 120-volt power outlets shall be located to allow reaching any point with a standard 50-foot extension cord.
6. Wiring for large power outlets and any resulting increase in service capacity shall be paid for by the subcontractor requiring such supply.

E. Maintenance:
1. The Electrical Trade Contractor shall:
    a. Maintain all wiring and devices in safe operating condition.
    b. Maintain all lamps in the temporary system and temporary lamps in the permanent system for the duration of the work.
    c. When changeover of the power system necessitates a shutdown, minimize construction delay by scheduling the outage outside of normal working hours or by providing a standby power source.

F. Removal:
1. The Electrical Trade Contractor shall:
    a. Disconnect and remove temporary electrical system in its entirety, including temporary lighting provisions, at the conclusion of each phase of construction.
    b. Coordinate removal with activities of other contractors and subcontractors.

G. Construction Manager, Trade Contractor, or subcontractor requiring service for equipment of 230 volts or more than 20 amperes at 115 volts (120 volts) shall have separate feeder installed from service point, and all such installation costs shall be paid by the Construction Manager, Trade Contractor, or subcontractor requiring the service.

H. No electrical space heating equipment shall be allowed.

I. Temporary or permanent service for permanently installed building equipment including but not limited to sump pumps, boilers, boiler controls, fans and pumps shall be the responsibility of the Electrical Trade Contractor and shall be installed and maintained such that such equipment may be operated when required and so ordered by the Architect for drainage or temporary heat.

1.06 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.

B. Temporary lighting shall be based on a minimum of 1 watt per square foot, or lighting intensities required by federal, State, or Town standards or laws, whichever is higher, covering each and every square foot of floor area in the building.
1. Install sufficient wiring, lamps, and outlets to ensure proper lighting in all rooms, spaces, stairwells, and corridors.

C. Provide and maintain 0.25 watt/sq ft lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps.

E. Maintain lighting and provide routine repairs.

1.07 TEMPORARY HEATING

A. Cost of energy for temporary heating and electrical costs associated with the new construction until the facility is turned over to the Owner shall be paid for by the Construction Manager.

B. The Construction Manager shall provide weather protection during the months of November through March in accordance with requirements of the General Conditions and shall provide heat during construction in accordance with the following requirements.

1. Exception: The Masonry Trade Contractor shall heat stockpiled materials (such as sand, cement, bricks, CMU, precast concrete, and water) to appropriate temperature for masonry construction.

C. Heating Phase I - Permanent Heating System Not Ready for Operation:

1. Both prior to and after the building is enclosed, heat including, but not limited to fuel and/or energy necessary therefore, shall be provided and paid for by the Construction Manager to the extent needed to accomplish the following:
    a. Protect completed work.
    b. Protect material and equipment being installed.
        1) See Section 04 00 01 - Masonry Trade Bid Summary for temporary heating requirements for masonry, and associated responsibilities.
    c. Enable workers to accomplish their work in an acceptable manner.
    d. Maintain the submitted progress schedule.
2. The method of heat shall meet all applicable codes and ordinances. Heat shall be maintained at not less than 50 degrees F unless lower temperatures are sufficient to meet the requirements of the paragraph above (C.1. a through d), but in no circumstances less than 40 degrees F.
3. The building shall be considered enclosed when the specified exterior surfaces and required assembly materials are completed so that they exclude the elements and retain the heat. The Construction Manager shall make all enclosures of the building as soon as practical in accordance with the approved progress schedule. The approved progress schedule shall include an item entitled "building enclosure". It shall be the responsibility of the Construction Manager to notify the Architect and the other contractors/subcontractors that the building is enclosed.

D. Heating Phase II - Permanent Heating System Operable:

1. The Construction Manager shall pay all fuel and power costs related to operation of the heating system during construction.
2. Use of the permanent heating system during construction shall not affect heating system guarantees, and such guarantees shall begin to run only when the Owner accepts the building in the form of a Substantial Completion Form.

E. Provide heating devices and heat necessary to maintain specified conditions for construction operations.

F. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.08 TEMPORARY WATER SERVICE

A. Cost of Water Used: Paid by Construction Manager.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Maintain suitable quality water service for construction operations throughout the construction period, including:
   1. Demolition.
   2. All phases of project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 52 13
FIELD OFFICES AND SHEDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Owner's site office for use of Owner, Clerk of the Works, Owner's Project Manager and Architect.

B. Temporary field offices for use of Construction Manager.

C. Temporary storage sheds for use of Construction Manager.

D. Maintenance, relocation if necessary, and removal of Construction Manager 's field offices and facilities, Owner 's site office, and storage sheds.

1.02 USE OF EXISTING FACILITIES

A. Existing facilities shall not be used for field offices or storage.

1.03 USE OF PERMANENT FACILITIES

A. Consult with Owner's Project Manager and Architect regarding feasibility of use of permanent facilities for field offices.

B. Coordinate use and occupy permanent facilities only with advance written approval by Owner, through Owner's Project Manager.

C. Comply with all Owner requirements for Construction Manager use of permanent building spaces, including insurance and other requirements.

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, adequate for required purposes. New or used materials, equipment, and furnishings shall be acceptable except where otherwise noted.

2.02 CONSTRUCTION

A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations. At entrance doors provide steps, landings, handrails / guardrails, and lighting.

B. Construction: Structurally sound, secure, weather-tight enclosures for offices. Maintain offices during progress of work; remove at completion of work.

C. Construction Manager shall procure permits required for Construction Manager 's field offices, Owner's site office, and storage sheds.

D. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.

E. Exterior Materials: Weather resistant, finished in one color.

F. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.

G. Lighting for Offices: 50 fc at desktop height, LED.

H. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.03 ENVIRONMENTAL CONTROL

A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions and acceptable to the Authority Having Jurisdiction. Maintain throughout duration of project.

2.04 CONSTRUCTION MANAGER FIELD OFFICE AND FACILITIES

A. Provide office facilities in size required to accommodate Construction Manager's general use and to provide space for project meetings. Maintain a complete set of current project drawings and specifications at this office at all times. Maintain a file with all shop drawings, permits and other data pertinent to the work.

B. Telecommunications and Internet Services: As specified in Section 01 50 00 - Temporary Facilities and Controls.
C. Furnishings in Meeting Area: Conference table and chairs to seat at least 12 persons.
D. Racks and files for Contract Documents, submittals, and project record documents.
E. Provide adequate electrical outlets within the meeting area: Minimum of two free quad outlets per side of the meeting table, in addition to outlets dedicated to appliances and equipment.
F. Other Furnishings: Construction Manager's option.
G. Equipment:
    1. Minimum of 15 OSHA-approved adjustable band protective hard hats including those provided for the groundbreaking ceremony shall remain on site for visitors' use.
    2. One 60-inch Wi-Fi-enabled flat screen in conference room, with access and software required to read and display all project documents, and capable of displaying web-based meetings via Teams, Zoom, or similar applications.
    3. One tabletop Bluetooth / USB microphone speaker.
    4. One 10-inch outdoor weather thermometer.
    5. Other equipment, as determined by Construction Manager.
H. Relocate Construction Manager's field office and facilities when required by the phasing of the work or work sequence activities.

2.05 CONSTRUCTION MANAGER STORAGE SHEDS

A. The Construction Manager shall provide such storage sheds, temporary buildings, or trailers to facilitate the performance of the Contract.
    1. Materials shall be handled, stored, and protected in accordance with best industry practice, and except where otherwise specified in the Contract Documents, in accordance with manufacturer's specifications and directions. Protect all construction materials from damage due to moisture, wind, cold, vandalism, and other sources, in accordance with requirements of applicable sections of the Contract Documents. Damage to construction materials will be at the expense of the Construction Manager.
B. All temporary storage sheds and other temporary structures shall be removed prior to requesting Substantial Completion.
C. Dimensions: Adequate for storage and handling of products.
D. Ventilation: Comply with applicable codes and manufacturers' requirements for products stored.
E. Heating: Adequate to maintain temperatures specified in respective sections for the products stored, where applicable.
F. Relocate sheds when required by the phasing of the work or work sequence activities, or when directed by the Owner.

2.06 OWNER'S SITE OFFICE

A. Provide and maintain Owner's site office on site throughout construction period.
    1. Within ten days of Notice to Proceed the Construction Manager shall provide and maintain for the duration of the project a suitable site office, solely for use of Owner, Owner's Project Manager, Clerk of the Works, and Architect, which shall be referred to as the “Owner’s Site Office”. Provide separate space for sole use of Owner's Project Manager and Architect, with separate entrance door with new lock and two keys.
        a. Basis of Design: William Scotsman Model MO6412, or Owner-accepted equal, complying with these specifications.
        b. If the provided Owner's site office is a trailer or prefabricated building, it shall be new.
    2. Location: Owner’s site office shall be strategically positioned with the prior approval of Architect and Owner.

3. Construction: Owner’s site office shall be constructed of suitable materials, fully enclosed including bottom, providing adequate thermal, sound and weather protection to occupants, and acceptable to Authority Having Jurisdiction.
4. Support: Owner's site office shall be supported and secured in accordance with best practice, and with manufacturer's recommendations if it is a trailer or prefabricated building, and shall comply with all codes related to such temporary facilities.
5. Offices: Provide two private office spaces as described:
    a. Owner's Project Manager's and Clerk of the Works' Office: 12 feet by 16 feet minimum.
    b. Architect's office: 12 feet by 12 feet minimum.
6. Conference Room / Meeting Space: Of adequate size to comfortably accommodate conference table and number of chairs indicated in Furnishings, Fittings, Equipment, and Services subparagraph, below.
7. Closet: Provide one closet, located to be convenient to offices and conference room, 5 feet by 4 feet, with clothes pole and shelf.
8. Locks and keys: Equip the Owner’s site office and toilet room(s) with keyed locks. Furnish four sets of keys to the Owner's Project Manager.
    a. Key Architect's and Owner's Project Manager 's / Clerk of the Works' offices separately, but keyed alike to exterior door.
9. Security System: Provide security system to protect Owner's site office, with connection to central station and notification to cell phone. Unit shall be protected with ADT security system or Owner-accepted equal, tied to immediate notification of the local police and/or fire departments.
10. Area: At least 700 square feet of working area, exclusive of corridors, closets, and storage areas, finished, furnished, equipped, heated, air conditioned, naturally ventilated, lighted and wired with electrical power.
11. Windows: Equip Owner's site office with weatherproof operable windows, in area equal to at least 15 percent of the working floor area, with an operable sash, insect screen, and blinds. Locate windows to provide views of construction area.
    a. Provide security grilles at windows and door vision lites when directed by Owner (through Owner's Project Manager).
12. Temporary telecommunications services as specified in Section 01 50 00 - Temporary Facilities and Controls.
    a. Telephone lines, as follows:
        1) One two-line phone with service and one high-speed internet connection / service with wireless router for Owner's Project Manager 's / Clerk of the Works' office.
        2) One one-line phone with service and one high-speed internet connection / service with wireless router for Architect's office.
        3) One dedicated telephone line and service for fax machine (or for fax feature in multi-function printer/copier/scanner/fax.)
        4) One dedicated telephone land line and service for hands-free conference speakerphone phone.
13. Sanitary Facilities: Owner's site office shall be complete with fully operable toilet room, including functioning lavatory and integral sanitary water supply.
    a. Provide Temporary "Port-O-Let" style toilet facilities located on the site are not acceptable in lieu of providing functional toilet facilities within the Owner's site office.

B. Furnishings, Fittings, Equipment, and Services: Furnish Owner's site office with the following for the duration of the Project. All furniture, fittings, and equipment shall be in new and unused

condition, and shall become the property of Owner at completion of construction, before Owner 's site office is removed from site.

1. Desks: Provide one desk each for Owner's Project Manager, Clerk of the Works, and Architect. 60 by 24 inch, nominal, each with three locking drawers. Subject to compliance with these specifications, provide products of one of the following:
   a. Allied Plastics; Mobile Single Pedestal Teacher and Administrator Desk: www.worthingtondirect.com.
   b. HON; SmartLink Mobile Teacher's Pedestal Desk: www.officechairsusa.com.
   c. Global Industries; Interion Office Desk With 3 Drawers - Gray: www.globalindustrial.com. (Basis of Design)
2. Carpet Mats: Provide one carpet mat underneath each desk, 6 feet by 3 feet, nominal.
3. Desk Lights: Provide one spring-mounted LED desk task light per desk.
4. Plan Tables: Provide one plan table at least 4 feet by 8'-6" for Owner's Project Manager and Clerk of the Works, and one plan table at least 4 feet by 6 feet for Architect. Plan tables shall each have slanted top and lip at bottom edge. Provide one 12 inch wide shelf above each plan table, for full length of table. Subject to compliance with these specifications, provide plan tables from one of the manufacturers listed for other types of furnishings in this section.
5. Drawing Racks: Provide four plan racks, including one rack sized for half-sized drawing sets, capable of handling all construction set drawings, shop drawings, and other drawings. Subject to compliance with these specifications, provide products of one of the following:
   a. Alpine Industries; AdirOffice Portable Expandable Steel Plan Center Hanging File: www.alpineindustries.com.
   b. Global Industrial: Brookside Design Blueprint Mobile Storage Rack with Twelve Pivot Hanger and 42 inch clamps, White: www.globalindustrial.com. (Basis of Design)
   c. Uline; Mobile Blueprint Rack: www.uline.com.
   d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
6. Folding Worktables: 2'-6" by 8 feet, nominal. Provide four. Subject to compliance with these specifications, provide products of one of the following:
   a. Allsteel: www.allsteeloffice.com.
   b. KI; ValueLite Folding Table: www.ki.com. (Basis of Design)
   c. Steelcase: www.steelcase.com.
   d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
7. File Cabinets: Provide five standard four-drawer legal size metal filling cabinets with locks and two keys per lock. Subject to compliance with these specifications, provide products of one of the following:
   a. Allsteel: www.allsteeloffice.com.
   b. KI: www.ki.com.
   c. Steelcase: www.steelcase.com.
   d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
8. Fireproof Cabinets: Provide one two-drawer fire proof file cabinet. Subject to compliance with these specifications, provide products of one of the following:

a. FireKing; Patriot 2-Drawer 31-9/16 inch Deep Letter-Size: www.fireking.com. (Basis of Design)
b. KLSecurity: www.klsecurity.com.
c. Phoenix Safe; www.phoenixsafeusa.com.
d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.

9. Shelving: 12-inch deep steel shelving, either wall-mounted on steel stanchions with steel shelf supports, or as floor-supported bookcases: minimum 40 linear feet in aggregate length, not including wall shelving above plan tables. Locate for use by Owner's Project Manager, Clerk of the Works, and Architect.
10. Desk Chairs: Provide four desk chairs with swivel base and casters, 300 pound capacity minimum. Subject to compliance with these specifications, provide products of one of the following:
    a. Allsteel; Pli: www.allsteeloffice.com. (Basis of Design)
    b. Global Furniture Group; Stream Task Chair with Arms: www.globalfurnituregroup.com.
    c. SitOnIt Seating; Novo Task Chair: www.sitonit.net.
    d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
11. Conference Table: Provide one 4 by 12 foot conference table with plastic laminated oak finish with oak edging and double tee leg base. Subject to compliance with these specifications, provide products of one of the following:
    a. Global Furniture Group; Swap Table: www.globalfurnituregroup.com.
    b. KI; Pirouette Table: www.ki.com. (Basis of Design)
    c. Steelcase; Groupwork: www.steelcase.com.
    d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
12. Conference Chairs: Provide 14 padded folding chairs, 300 pound capacity minimum. Subject to compliance with these specifications, provide products of one of the following:
    a. Allsteel: www.allsteeloffice.com.
    b. KI; 600 Series with Upholstered Seat and Back: www.ki.com. (Basis of Design)
    c. Steelcase: www.steelcase.com.
    d. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.
13. Drafting Chairs: Provide two drafting chairs with casters and adjustable height and back. 300 pound capacity minimum. Subject to compliance with these specifications, provide products of one of the following:
    a. Manufacturers: Provide drafting chairs from same manufacturer as for desk chairs.
14. Tackboards:
    a. Manufacturers: See Section 10 11 00 - Visual Display Units for acceptable tackboard manufacturers.
        1) Provide tackboards from same manufacturer as for markerboards.
    b. Provide two wall-mounted 36 inch by 48 inch tackboards for Owner's Project Manager's and Clerk of the Works' office.

c. Provide one wall-mounted 36 inch by 48 inch tackboard for Architect's office.
d. Provide at least 48 square feet of wall-mounted tack boards at Conference Room / Meeting Area.

15. Markerboards:
    a. Manufacturers: See Section 10 11 00 - Visual Display Units for acceptable markerboard manufacturers.
        1) Provide markerboards from same manufacturer as for tackboards.
    b. Provide two wall-mounted 36 inch by 48 inch markerboards with marker trays, for Owner's Project Manager's and Clerk of the Works' office.
    c. Provide one wall-mounted 36 inch by 48 inch markerboard with marker tray, for Architect's office.
    d. Provide wall-mounted markerboards with at least 32 square feet of writing surface, with marker trays, at Conference Room / Meeting Area.
16. One coat rack for Conference Room / Meeting Space, consisting of wall-mounted panel equipped with six coat hooks at 6 inch spacing; and hat shelf for 20 hard hats.
17. One waste basket per each desk and plan table.
18. One waste receptacle for Conference Room / Meeting Space, 30-gallon size, with lid.
19. One step-on type, lidded, self-closing kitchen waste receptacle, 25-gallon size.
20. One recording thermometer, outdoor type, in weatherproof metal enclosure; with 8 inch circular chart temperature recorder, capable of recording from negative 20 degrees F to 120 degrees F, with a seven-day duration. Mount at exterior of Owner's site office window, viewable from interior.
21. Construction Hard Hats, Vests, and Safety Goggles: Provide 12 OSHA-accepted construction hard hats with adjustable dials, 12 reflective safety vests, and 12 sets of safety goggles.
22. First Aid Kits: Provide two first aid kits of size and type suitable and recommended by manufacturer for construction sites.
23. Water Dispenser: Provide drinking water dispenser which furnishes instant hot water, as well as cold water. Provide water service for the duration of the project, delivered on a schedule to prevent running out.
24. Coffee Maker: Provide one "K-cup"-type coffee maker with multiple cup size programs, with direct plumb kit for connection to cold water supply. Provide unit with pour-over manual fill reservoir if plumbed water supply is not available. Subject to compliance with these specifications, provide products of one of the following:
    a. Cuisinart; SS-10: www.cuisinart.com.
    b. Drinkpod; JAVAPod: www.drinkpod.com.
    c. Keurig; K150 OfficePro brewing system; www.commercial.keurig.com. (Basis of Design)
    d. At completion of project, install direct-plumb connection kit or adapt machine to and make connection to water supply with third-party conversion kit compatible with selected coffee maker, in the finished construction.
25. Refrigerator: Provide one under-counter refrigerator with freezer compartment, six cubic feet minimum, nominal.
    a. See Section 11 30 13 - Appliances for list of acceptable manufacturers.
26. Microwave Oven: Provide one, 21-3/4 inches wide by 13 inches high by 20 inches deep, nominal. Stainless steel or gray finish. Features shall include glass turntable, LED clock, timer (on/off), control lock, glass recessed turntable, convection cooking, and a minimum of ten power levels.

C. Technology, Equipment and Services: Provide Owner's site office with the following technology equipment, services, fittings, and related accessories for duration of project. All technology equipment, services, fittings, and related accessories shall be new and unused, and shall be turned over to Owner at completion of project. Provide all technical support required to keep all hardware and software in this section continuously operational throughout duration of project.
   1. Telephone Equipment: Furnish and maintain phone system in Owner's site office. Basis of Design: Norstar Compact ICS by Nortel, or accepted equal, with touch-tone dialing services.
      a. Each phone shall be capable of line hunting sequencing and have speaker-phone capability.
      b. Provide one hands-free conference speakerphone, with privacy and mute features. Basis of Design: Polycom Sound Station IP 6000 or accepted equal. Connect each instrument to wall-mounted jack, with cord not less than 10 feet long.
      c. Provide three AT&T or accepted equal two-line cordless phones with 1/2-mile range. Connect each phone base unit to wall-mounted jack, with cord not less than 10 feet long.
      d. Coordinate locations of phone jacks for the above mentioned service with the Architect and Owner's Project Manager.
      e. Provide voicemail connected to all voice lines; equipped with remote message retrieval, separate incoming and outgoing messages, time and date message stamp, call monitoring and automated call attendant.
      f. Provide necessary training and support to ensure proper operation of the telephone equipment for the duration of the project.
   2. High Speed Internet Connection: Provide the following high speed internet connection and related equipment:
      a. Determine available internet service providers (ISP) for the jobsite location and report the options to the Architect for review and approval.
      b. Comcast Small Business Service or Broadband Business Service, or accepted equal, at 1 GB/sec minimum upstream and downstream, with modem and router compatible with and approved by the accepted local Service Provider. Internet Service Provider (ISP) choice shall be coordinated and accepted by the Architect and Owner's Project Manager.
      c. Internet connection shall be dedicated for the use of the occupants of Owner's site office only and shall not be shared with Construction Manager's field office, or with other outside users without permission of Architect and Owner's Project Manager.
      d. High-Speed Internet Connection shall be fully configured and operational on all computer workstations, video conferencing equipment, and other internet-compatible devices specified for Owner's site office.
      e. Dynamic IP is acceptable, static IP is not required.
      f. Confirm that the ISP permits the use of VPN (Virtual Private Network) connections through their network / internet access service.
      g. Provide multi-port 10/100 switch within Owner's site office for networking equipment and internet access.
      h. Routers with built-in wireless must have WEP encryption configured and turned on. WEP key information shall be provided to the Architect.
      i. The high-speed data connection shall terminate in the Owner's site office in a locked room or closet. If no such room is available, coordinate the location with the Architect and Owner's Project Manager. Network equipment and high-speed modem shall be located such that they are hidden from immediate sight and preferably located in a

corner of a room or mounted on a shelf high on a wall, and not on a desk or other readily accessible surface where they may be easily tampered with.

j. Provide six-outlet minimum surge protectors for all Internet access / network equipment, and at each desk.

k. Provide Owner's Project Manager and Clerk of the Works with all account numbers, user names, and passwords applicable to the ISP agreement, as well as support contact information such as Toll-Free and 24/7 support phone numbers for said ISP for use in contacting the ISP during times of apparent lack of connectivity.

l. High-speed internet access service shall commence within one week of Owner's site office occupancy or one week following activation of electrical service to the Owner's site office; whichever comes first. Service shall remain activated and financial account status shall remain in good standing with ISP until such time as the Architect and Owner's Project Manager agree to terminate service. Construction Manager shall plan to keep internet service active for at least one month following current project completion date or one month after scheduled removal of Owner's site office, whichever is the later of the two.

m. Construction Manager shall advise subcontractors of the location of wires and cables associated with high-speed internet and power connections to the Owner's site office, to avoid disruption of service during construction or site work.

3. Project Email: Provide dedicated email account / address reserved for project use.

4. Printers, Copiers, Scanners, and Fax Machines: Provide the following printers, copiers, and fax machines. Provide necessary maintenance and support to ensure continuous operation for the following equipment for the duration of the project.

   a. Construction Manager shall have the option of providing one multifunction large-format digital copier/scanner/fax/printer by Canon Corporation or accepted equal, providing all the functions listed below for copier, scanner, laser printer, and fax machine, in lieu of providing separate laser printer, copier, scanner, and fax machines.

   b. Facsimile (fax) Service: Minimum of one dedicated fax machine / printer, with dedicated phone line.

   c. Scanner: Hewlett-Packard 5590 or accepted equal; furnish with cables for connection to USB port.

   d. Copy Machine: Provide one networked color copy machine, complete with wheeled stand, as manufactured by Canon Corporation or accepted equal, with 50-page top mounted automatic document feeder, and separate feeder trays for 8-1/2 inch by 11 inch, 8-1/2 inch by 14 inch and 11 inch by 17 inch paper. Machine shall be capable of printing, copying, scanning to USB, email or desktop, reducing, enlarging, double sided copying, stack loading, sorting, and stapling, and shall be supported by a three-year on-site service plan with 24-hour response.

   e. Printers: Printers shall be networked and include WiFi-enalbed printing:

      1) Provide one laser printer: Hewlett Packard Model HP LaserJet 5100TN or accepted equal, with the following.

         (a) 1200 dpi resolution.

         (b) HPGL/2, HP PCL 5e, HP PCL 6 and PostScript Level 3 emulation.

         (c) 20 pages per minute minimum.

         (d) 32MB memory standard.

         (e) 110 TrueType plus HP FontSmart.

         (f) One 500 sheet paper input tray for 8-1/2 inch by 11 inch paper.

         (g) One 250 sheet paper input tray for 11 inch by 17 inch paper.

(h) IEEE 1284 Compliant Bi-directional Parallel Cable. 3m (9ft); DB-25 to 36-pin Centronics male; A to B connection.

(i) Three-year service plan with next day service.

2) Provide one color inkjet Bluetooth-capable printer: Hewlett Packard Model HP 6540 or accepted equal, capable of 20 pages per minute of color printing, including all necessary cables connected to USB port. Provide service program with three-years part and labor limited warranty, and three-year on-site service plan with 24-hour response.

3) One large-format printer, HP Designjet T120 ePrinter series or accepted equal, capable of printing up to 24 inch wide roll feed or sheet paper, with up to 1200 by 1200 DPI, separate cartridges for each ink color. Ethernet, Hi-Speed USB2, or Wi-Fi connectivity.

f. Power strips with surge protectors: Provide for all printers, copiers, scanners, and fax machines.

g. Dust Covers: Provide for all printers, copiers, scanners, and fax machines.

5. Computers:

a. Owner's Project Manager 's and Clerk of the Works' computer equipment, to be turned over to Owner at end of project: Provide two fully functional personal laptop computers, by Dell or accepted equal. Each computer workstation shall be provided with the following hardware, installed and configured software, peripherals, and support:

1) Dell Precision 7720, Intel Core i7-7920HQ, Quad Core 3.1GHz, 4.1GHz Turbo, 8MB.

2) Three-Year CompleteCare Accidental Damage Protection.

3) 17.3 inch Ultrasharp FHD IPS (1920x1080) AG LED Backlit w/ Prem Pan Guarantee (72 percent Color Gamut) with camera and microphone.

4) 8 GB (1x8GB) 2400MHz DDR4.

5) 1 TB hard drive.

6) NTFS file system.

7) Dell Wireless 1820 802.11 AC Dual Band and BT 4.1 Card.

8) Integrated 10/100 Network Interface.

9) Radeon Pro WX 4130 2/gb GGDR5.

10) Nine-Cell Primary Battery Deluxe Nylon Carrying Case.

11) EPort Plus Replicator, compatible with system specified above.

12) Dell 19 inch UltraSharp™ 1908FP Flat Panel, adjustable stand, VGA/DVI.

13) Dell A215 Speakers.

14) Dell USB Enhanced Multimedia Keyboard with built in two-port USB Hub.

15) Dell USB two-Button Optical Mouse w/ scroll.

16) APC BackUPS Pro 500 with power management software.

17) Belkin 12-Outlet Slimline Surge Protector.

18) Microsoft Windows 64 Bit: latest version available.

19) Microsoft Office Professional Suite full license: latest version available.

20) Microsoft Project scheduling software: per requirements of Section 01 32 16 - Construction Progress Schedule or if not specified then latest version available.

21) Bluebeam Revu CAD: atest version available.

22) McAfee® Total Protection for Small Business, 36 Month, latest version available.

23) Autodesk Architecture 2010 standalone license on one of two computers only.

24) One 500 GB external hard drive.

25) Provide 24-hour, seven days per week technical support to keep operational all hardware and software in this section for the duration of the project.
26) Provide network connection between each computer, to allow sharing of files.
27) Configure computer workstation to print to all networkable devices provided under the work of this section for Owner's site office.
28) Dell Limited Hardware Warranty Plus Service: Provide Initial Year, and Extended Year(s) for duration of project.
29) ProSupport: Next Business Day Limited Onsite Service After Remote Diagnosis Two-Year Extended.
30) ProSupport: 24-hour, sevens days per week Technical Support, Two-Year Extended.

b. Architect's Computer Equipment: Provide one fully functional personal laptop computer for Architect's use, by Dell or accepted equal. Each computer workstation shall be provided with the following hardware, installed and configured software, peripherals, and support:
   1) Dell Precision 7720, Intel Core i7-7920HQ, Quad Core 3.1GHz, 4.1GHz Turbo, 8MB
   2) Three-Year CompleteCare Accidental Damage Protection.
   3) 17.3 inch Ultrasharp FHD IPS (1920x1080) AG LED Backlit w/ Prem Pan Guarantee (72 percent Color Gamut) with camera and microphone.
   4) 8 GB (1x8GB) 2400MHz DDR4.
   5) 1 TB hard drive.
   6) NTFS file system.
   7) Dell Wireless 1820 802.11 AC Dual Band and BT 4.1 Card.
   8) Integrated 10/100 Network Interface.
   9) Radeon Pro WX 4130 2/gb GGDR5.
   10) Nine-Cell Primary Battery Deluxe Nylon Carrying Case.
   11) EPort Plus Replicator, compatible with system specified above.
   12) Dell 19 inch UltraSharp™ 1908FP Flat Panel, adjustable stand, VGA/DVI.
   13) Dell A215 Speakers.
   14) Dell USB Enhanced Multimedia Keyboard with built in two-port USB Hub.
   15) Dell USB two-Button Optical Mouse w/ scroll.
   16) APC BackUPS Pro 500 with power management software.
   17) Belkin 12-Outlet Slimline Surge Protector.
   18) Microsoft Windows 64 Bit: latest version available.
   19) Microsoft Office Professional Suite full license: latest version available.
   20) Microsoft Project scheduling software: per requirements of Section 01 32 16 - Construction Progress Schedule or if not specified then latest version available.
   21) Bluebeam Revu CAD: latest version available.
   22) McAfee® Total Protection for Small Business, 36 Month, latest version available.
   23) Autodesk Architecture 2010 standalone license on one computer only.
   24) One 500 GB external hard drive.
   25) Provide next-day technical support to keep operational all hardware and software in this section for the duration of the project.
   26) Provide network connection between each computer to allow sharing of files.
   27) Configure computer workstation to print to all networkable devices provided under the work of this section for Owner's site office.

28) Dell Limited Hardware Warranty Plus Service: Provide Initial Year, and Extended Year(s) for duration of project.
29) ProSupport: Next Business Day Limited Onsite Service After Remote Diagnosis Two-Year Extended.
30) ProSupport: 24-hour, seven day per week Technical Support, Two-Year Extended.

6. Monitors: Provide one 24 inch monitor at each desk, with all associated cabling, compatible with Owner's, Owner's Project Manager's, and Architect's computers.
   a. Basis of Design: Dell U2422H, or equal.
7. Data Cabling: Provide data cabling as follows:
   a. Provide adequate data cabling within the Owner’s site office so that there are a minimum of three data connections (Cat 5e or Cat 6) in each office and conference room / meeting area, at each planned workstation and desk.
   b. Provide cabling from the ISP entry point of the Owner's site office to each wall jack.
   c. The exact location and quantity of data drops shall be coordinated and aped by the Architect and Owner's Project Manager prior to implementation.
   d. The use of a wireless network within Owner's site office is not an acceptable alternative (wireless capabilities are acceptable but shall not to be provided in lieu of data cabling).
   e. An additional two data drops and power outlets shall be available in the center of the Owner's site office, for use by visitors. This connection point shall be situated near the conference room table.
   f. An additional data drop shall be provided at a central location in Owner's site office for use by a networked printer.
8. Video-Conferencing Equipment: Provide color, high definition wall mounted video conferencing camera and table mounted multi-directional microphone compatible with web-based meetings via Microsoft Teams, Zoom, or similar web-based applications, acceptable to Owner and Architect.
   a. Camera and microphone shall integrate with display monitor to broadcast meeting content.
   b. Provide computer console or other hardware and internet connection as required to run web-based meeting software.
   c. Provide equipment and accessories including:
      1) One Polycom VSX 7800S Presenter; mP: Incl VSX 7000s or accepted equal, one microphone array, Visual Concert VSX, People+Content IP, 4-way MPPlus, English remote.
      2) Polycom Quad BRI Module for VSX 7000s and VSX 7000 or accepted equal. Include four 20 ft/6m ISDM cables (with green connectors), ROHS-compliant.
      3) One Samsung or accepted equal 60-inch LED monitor, with low profile wall mount and speakers.
      4) One Samsung SDP-850DX Compact digital Presenter, or accepted equal, with 42x autofocus zoom and USB2.0.
      5) Polycom Premier or accepted equal, compatible with products provided: Two-Year, VSX7000 Series service plan or accepted equal.
9. Digital Camera: Provide one Canon Power Shot ELPH 300HS or accepted equal by Nikon or Olympus, with 12.1 megapixels or better, two 4 GB Picture Card Storage Media, battery charger, one additional AA InfoLithium rechargeable spare battery, and carrying case.
10. Tablets: Provide three of the most recent model iPad or accepted equal, to be turned over to Owner at completion of project. Tablets shall include the following:
    a. Wi-Fi and 5G enabled with service for the duration of the project plus three months.

b. 256 GB minimum of memory.
c. Built-in camera.
d. Three-year accidental damage protection.
e. Next-day technical support for all hardware and software, to ensure continuous operation for duration of project.
f. Tablet software shall include:
    1) Bluebeam or other software to allow PDF review and editing and CAD file review.
    2) Microsoft Office package to enable office document review and editing: most recent version.
    3) Construction Manager's web-based software application for submittal and document collaboration and punch list management.
    4) Security / password software.
    5) Notes pad application.
g. Tablet accessories shall include:
    1) Soft Carrying Case: Targus City Gear Mini, or equal.
    2) Hard Protective Case: Otter Box Defender, or equal.
    3) Clear protective screen cover.
    4) Power adapters for car and wall.
    5) External wireless keyboard.
    6) Stylus.

11. Electronic labeling system: desktop model. Basis of Design: Brother Model #PT2700.
    a. Or equal. Substitutions: Other manufacturers' products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and appearance. Submit as substitutions: See Section 01 25 00.

D. Consumables for Owner's site office. Furnish new, unused supplies to maintain Owner's site office, and replenish to ensure continuous availability throughout duration of project, including, but not limited to, the following:
1. Recyclable, flat-bottom cups for water.
2. Insulated, recyclable cups for coffee, with travel-style plastic lids.
3. Recyclable plates and bowls.
4. Recyclable forks, spoons, and knives.
5. Stock of hand soap, hand sanitizer, toilet paper, paper towels, paper napkins, and air freshener.
6. Supplies for printers: Toners, ink cartridges, and paper.
7. "K-cup"-type coffee pods: compatible with specified coffee machine, including "Light Roast" flavor coffee as manufactured by Green Mountain Coffee Roasters or equal coffee acceptable to Owner's Project Manager and their representatives, and decaffeinated coffee of same brand.
8. Wood or recyclable plastic coffee stirrers.
9. Sugar packets, and single-use sized containers of creamer that do not require refrigeration.
10. First Aid Supplies: To continuously and fully stock first aid kits specified above.
11. Lamps: LED bulbs of appropriate types and wattages for overhead light fixtures, desk lights, and exterior light fixtures at entrances to Owner's site office.
12. Plastic waste receptacle liners, of sizes to fit specified waste receptacles.
13. Label-making tape and other supplies compatible with specified electronic labeling system.

14. Office Supplies: Provide office supplies for Owner's Project Manager, Clerk of the Works, and Architect for duration of project. Supplies shall include, but are not limited to: paper, pens, erasers, pencil sharpeners, file folders, staplers and staples, heavy duty stapler and heavy duty staples, clear tape, tape dispensers, drafting dots, heavy duty hole punch, loose file holders, lever-arch files, scissors, paper clips, binder clips, three-inch thick three-ring binders, pushpins, and erasable markerboard markers including black and a minimum of four other colors.

E. Relocate Owner's Project Manager and Architect's field offices and facilities when required by the phasing of the work or work sequence activities.

PART 3 EXECUTION

3.01 LOCATION AND ACCESS

A. Prior to installation of offices and sheds, consult with Architect and Owner on location, access and related facilities.

3.02 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.03 INSTALLATION

A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

B. Parking: Provide one hard surfaced parking space each for use by Clerk of the Works,Owner's Project Manager and Architect, connected to office by hard surfaced walk.

C. Install office furnishings and equipment ready for use.

D. Interconnect the Owner's Project Manager 's computer, Clerk of the Works' computer, and Architect's computer to the multi-function printer/copier/scanner/fax and to the laser printer.

E. Connect and test the video conferencing equipment. Consult Architect to arrange connectivity testing of both of the Architect's offices to the site equipment.

F. Construction Personnel Residential Occupancy: Not allowed on Owner's property.

3.04 MAINTENANCE AND CLEANING

A. Construction Manager shall maintain Construction Manager 's field offices and Owner 's site office, offices, equipment, and furnishings in a clean and orderly condition, including but not limited to washing the floors, bathrooms and trash removal weekly, performed by a professional bonded and insured cleaning service.

B. Maintain approach walks, steps, and driveways free of mud, water, and snow.

3.05 REMOVAL

A. At completion of work remove buildings and their associated foundations, utility services, furnishings, equipment, and debris. Restore areas.

1. Owner’s site office shall be removed upon receipt of written direction by Architect or Owner's Project Manager.

END OF SECTION

SECTION 01 56 39
TEMPORARY TREE AND PLANT PROTECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:
   1. General protection of existing vegetation to remain.

B. Related Sections:
   1. Section 01 50 00 "TEMPORARY FACILITIES AND CONTROLS" for temporary site fencing.
   2. Section 31 10 00 "SITE CLEARING" for protecting and removal of vegetation, topsoil stockpiling, management of above and below-grade utilities, and erosion and sedimentation control measures.
   3. Section 31 13 00 “SELECTIVE REMOVAL, TRIMMING, AND ROOT PRUNING” for removal and pruning of existing trees and shrubs, including roots.
   4. Section ”31 00 00 “EARTH MOVING” for site preparation.
   5. Section 31 25 00 "EROSION AND SEDIMENTATION CONTROLS" for temporary erosion and sedimentation control measures.

1.03 DEFINITIONS

A. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than two inches (50 millimeters) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings defined by a circle concentric with each tree with a radius one and a half times the diameter of the drip line unless otherwise indicated.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

E. Caliper: Diameter of a trunk measured by a diameter tape at 4’-6” above the ground or DBH (diameter at breast height). (Standard as defined by the ISA – International Society for Arboriculture).

F. Critical Root Zone: Portion of the root system that is the minimum necessary to maintain vitality or stability of the tree. Encroachment or damage to the Critical Root Zone (CRZ) that puts the tree at risk of failure. (Standard as defined by the ASCA - American Society of Consulting Arborists). The ISA – International Society for Arboriculture defines the measure of the Critical Root Zone as an area equal to a one-foot radius from the base of the tree’s trunk for each one-inch of the tree’s diameter at 4’-6” above grade or DBH (diameter at breast height).

G. Arborist or Certified Arborist: As referenced here in all “arborists” or “certified arborists” shall be at minimum an ISA Certified Arborist in the jurisdiction where Project is located or a Massachusetts Certified Arborist unless other specified.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of the following:

1. Organic Mulch: one-pint (0.5-liter) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
2. Protection-Zone Fencing: Assembled Samples of Manufacturer's standard size made from full-size components.
3. Trunk Protection: Assembled Sample of Manufacturer's standard size made from full-size components.
4. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

C. Tree Protection Plan: A Certified Arborist to provide a tree protection plan document for review and acceptance by Owner's Representative prior to the commencement of any construction activities.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.06 QUALITY ASSURANCE

A. Arborist: Retain the services of a Certified Arborist for this Project.

B. Arborist Qualifications: An experienced arborist certified by ISA, be licensed in the jurisdiction where Project is located, and be a current member of ASCA, or registered Consulting Arborist as designated by ASCA.

C. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that shall assign an experienced, qualified arborist to Project site during execution of the Work.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

    a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    b. Enforcing requirements for protection zones.
    c. Arborist's responsibilities.
    d. Field quality control.

1.07 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than one inch (25-millimeter) in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

1. Obtain topsoil only from well-drained sites where topsoil is four inches (100-millimeter) deep or more; do not obtain from bogs or marshes.

B. Topsoil: Imported or manufactured topsoil complying with ASTM D 5268.

C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.
2. Size Range: three inches (76-millimeter) maximum, one half inch (13-millimeter) minimum.
3. Color: Natural.

D. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with two-inch (50-millimeter) maximum opening in pattern and weighing a minimum of 0.4 pounds per foot (0.6 kilograms per meter); remaining flexible from minus 60 to plus 200 degrees Fahrenheit (minus 16 to plus 93 degrees Celsius); inert to most chemicals and acids; minimum tensile yield strength of 2000 pounds per square inch (13.8 megapascals) and ultimate tensile strength of 2680 pounds per square inch (18.5 megapascals); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than eight feet (2.4 meters) apart.

    a. Height: four feet (1.2 meters).
    b. Color: High-visibility orange, nonfading.

E. Trunk Protection: To be used only when Protection-Zone Fencing cannot be provided due to site constraints.

1. Black Corrugated Plastic Pipe: Trunk protection constructed of black corrugated plastic pipe cut in half lengthwise and bound with 12-millimeter galvanized strapping or nine-gauge galvanized wire.
2. Height: Six feet (1.8 meters).
3. Diameter: Provide various diameters of pipe depending upon the trunk diameters of existing trees to be protected.
4. Color: Black

PART 3 EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare a written report, endorsed by Arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a one-inch (25-millimeter) blue-vinyl tape around each tree trunk at 54 inches (1372-millimeter) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.

1. Apply four-inch (100-millimeter) average thickness of organic mulch. Do not place mulch within six inches (150 millimeter) of tree trunks.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that prevents people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
2. Plastic Protection-Zone Fencing: Install to comply with Manufacturer’s written instructions.
3. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support.

B. Trunk Protection: Install trunk protection around all trees to be protected where Protection-Zone Fencing cannot be provided due to site constraints, before materials or equipment are brought on the site and before construction operations begin.

1. Black Corrugated Plastic Pipe: Install to comply with Manufacturer’s written instructions. Position plastic pipe one foot (0.30 meter) above the existing grade. Bind with 12-millimeter galvanized strapping or nine-gauge galvanized wire.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

E. Maintain protection-zone fencing, trunk protection, and signage in good condition and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing or trunk protection, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by Arborist if a root buffer effective against soil compaction is constructed. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section “31 00 00 “EARTH MOVING"

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots for root pruning under the supervision of a certified arborist.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits to bend and redirect them without breaking. If encountered

immediately adjacent to location of new construction and redirection is not practical, cut roots approximately three inches (75-millimeters) back from new construction and for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.05 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: See Section 31 13 00 “SELECTIVE REMOVAL, TRIMMING, AND ROOT PRUNING.” Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is two inches (50-millimeter) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.06 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.07 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have Arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Owner’s Representative.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Owner’s Representative determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced for each tree that measures four inches (100-millimeter) or smaller in caliper size.
2. Provide one new tree(s) of four-inch (100-millimeter) caliper size for each tree being replaced that measures more than four inches (100-millimeter) in caliper size.

    a. Species: Species selected by Owner’s Representative.

3. Plant and maintain new trees as specified in Section 32 93 00 "PLANTS."

C. Soil Aeration: Where directed by Owner’s Representative, aerate surface soil compacted during construction. Aerate 10 feet (three meter) beyond drip line and no closer than 36 inches (900-millimeter) to tree trunk. Drill two-inch- (50- millimeter-) diameter holes a minimum of 12 inches (300-millimeter) deep at 24 inches (600-millimeter) on center. Backfill holes with an equal mix of augured soil and sand.

3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Re-use of existing products.
B. Transportation, handling, storage and protection.
C. Product option requirements.
D. Substitution limitations.
E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced.
B. WaterSense - Water Sense, an EPA Partnership Program.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
    1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
D. Maintenance Materials: including extra materials, spare parts, tools, and software. Items and quantities indicated in other specifications sections, and Owner's signed receipts of delivery.
E. Sustainable Design Submittals: Items necessary to document use of sustainable construction materials, products, and practices.
    1. See technical sections, and Sections 01 81 13 - Sustainable Design Requirements and for Construction Manager's reporting necessary for achievement of targeted LEED for Schools v4/v4.1 LEED "Silver" certification level.
    2. For existing reused products: state cost of each reused product, quantity installed, and total cost of reused products.
F. Certification stating that there is no asbestos in any product or material supplied to or built into the project.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store per directions of Owner.
C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Construction Manager; remove from site.

2.02 LOCAL MATERIALS

A. To the greatest extent practical, products and materials manufactured, fabricated, or mined in the State of Massachusetts shall be given highest selection priority, and materials manufactured, fabricated, or mined in the United States shall be given second selection priority.

2.03 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:

1. Made using or containing CFC's or HCFC's.
2. Made of wood from newly cut old growth timber.
3. Containing asbestos: There shall be no asbestos (i.e., Zero content) in any product or material supplied, delivered to, or built into the project, and it is expressly intended that the materials in these specifications and indicated on the drawings contain no asbestos.
    a. As a condition of Substantial Completion, the Construction Manager shall submit a signed certificate which states that there is no asbestos in any product or material supplied to or built into the project.

C. Construction Manager shall meet project's sustainability goals by providing products identified in Sections 01 81 13 - Sustainable Design Requirements, 01 81 16 - Materials Tracking Matrix, and in individual technical sections, to have the following requirements:

1. If used on interior, have lower emissions, as defined in Section 01 81 13 - Sustainable Design Requirements.
2. If wet-applied, have lower VOC content, as defined in Section 01 81 13 - Sustainable Design Requirements.
3. Are extracted, harvested, and/or manufactured within 100 miles of the project.
    a. Indicate location of manufacture; in all cases indicate location of final assembly; for harvested products, indicate location of harvest; for extracted (i.e., mined) products, indicate location of extraction; for products involving multiple manufacturing steps, indicate all locations of manufacture or assembly; provide manufacturer or supplier certification of location information.
4. Result in less construction waste. See Section 01 74 19 - Construction Waste Management and Disposal.
5. Are made of recycled materials.
6. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber when so specified elsewhere.
    a. Certification: Provide wood certified or labeled by the following, and provide Chain of Custody documentation for all vendors, suppliers, and fabricators using certified wood for fabrication of elements:
        1) FSC Principles for Natural Forest Management.
7. Have a published Environmental Product Declaration (EPD) for project's targeted Materials and Resources credits.
8. Have a published Health Product Declaration (HPD) for project's targeted Materials and Resources credits.
9. Have WaterSense ratings for applicable plumbing fixtures per project's targeted Water Efficiency credits.

2.04 PRODUCT OPTIONS

A. In Accordance with Massachusetts General Law, Chapter 30, Section 39M, product selection and use of alternative products shall comply with the following:

1. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
2. Products Specified by Naming One or More Manufacturers: Contractors are encouraged to use a product of one of the manufacturers named and meeting specification requirements. Products of other manufacturers not listed will be considered substitutions, and the submitting contractor shall prepare sufficient data to enable review and comparison of submitted products for conformance to specification requirements, and comparison to listed products in terms of construction, quality, strength, performance, durability, and/or appearance, and submit said comparison using the Product Substitution Form provided following this section. Allow for 30 days review time for Substitution Requests. The Awarding Authority will make final determination of acceptance.
3. Products Specified by Naming One Manufacturer as “Proprietary”: Following a reasonable investigation, the Awarding Authority has designated the specified product as "proprietary".
   a. See Section 01 10 00 - Summary for proprietary designations.
4. Equal substitution request: Products, materials and systems included in the Contract Documents are not intended to prohibit or discourage the consideration of “Equal” products by the Awarding Authority. Whether described in the Contract Documents with an “or equal” clause or not, substitution requests for alternative products, items, or systems will be given reasonable consideration under the provisions of M.G.L. c.30 s.39M.
   a. See Section 01 25 00 - Substitution Procedures.
5. Products Specified as Basis-of-Design: Submit substitution requests for unnamed products to Architect for evaluation.

2.05 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

C. Maintenance materials shall be clean and new, delivered in labeled, unopened packages. Repackaged materials from the site will not be accepted.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.02 PACKAGING WASTE MANAGEMENT

A. When ordering materials and products, request of each manufacturer, fabricator, supplier, and shipper that they provide the least amount of packaging that adequately and properly protects, supports and contains the items shipped, and is reusable, returnable, or recyclable.

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage. Package equipment to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Provide protection of stored materials and products against theft, casualty, or deterioration.

B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

1. See Section 01 79 00 - Demonstration and Training.

C. Store and protect products in accordance with manufacturers' instructions.

D. Store with seals and labels intact and legible.

E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product being stored.

F. For exterior storage of fabricated products, place on sloped supports above ground.

G. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

I. Comply with manufacturer's warranty conditions, if any.

J. Do not store products directly on the ground.

K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

L. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

M. Prevent contact with material that may cause corrosion, discoloration, or staining.

N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.
B. Pre-installation meetings.
C. Cutting and patching.
D. Cleaning and protection.
E. Starting of systems and equipment.
F. Closeout procedures, including Construction Manager's Correction Punch List, except payment procedures.
G. General requirements for maintenance service.

1.02 ABBREVIATIONS AND ACRONYMS

A. CMR. Code of Massachusetts Regulations; www.mass.gov.
B. NFPA. National Fire Protection Association; www.nfpa.org.
C. OSHA. Occupational Safety and Health Administration; www.osha.gov.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Construction Submittals
    1. Survey work:
        a. Submit name, address, and telephone number of Surveyor before starting survey work.
            1) On request, submit documentation verifying accuracy of survey work.
            2) Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
            3) Submit surveys and survey logs for the project record.
        b. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
            1) Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
            2) Identify demolition firm and submit qualifications.
            3) Include a summary of safety procedures.
    2. Cutting and patching:
        a. Submit written request in advance of cutting or alteration that affects:
            1) Structural integrity of any element of project.
            2) Integrity of weather-exposed or moisture-resistant element.
            3) Efficiency, maintenance, or safety of any operational element.
            4) Visual qualities of sight-exposed elements.
            5) Work of Owner or separate contractor.
C. Closeout Submittals
    1. Post-Occupancy Submittals:
        a. Maintenance and service contracts, including post-occupancy testing.
        b. HVAC water quality testing.

1.04 QUALIFICATIONS

A. For field engineering, employ a professional engineer of the discipline required for specific service on project, licensed in Massachusetts. Employ only individual(s) trained and

experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on projects of similar size, scope and/or complexity.

B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in Massachusetts.

1.05 PROJECT CONDITIONS

A. Use of explosives is not permitted, except as specifically required by Division 31.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide erosion control measures to protect site from soil erosion per Division 31 requirements.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.
2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
5. Prevent stormwater runoff into delineated wetlands on site, and/or onto adjacent properties during construction.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

1. Coordinate times for coring with Owner at least 48 hours in advance of such work.

G. Pest and Rodent Control: Provide methods, means, and facilities in accordance with municipal pest management policy to prevent pests and insects from accessing or invading premises and from damaging the work.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections, or if not specified, of quality, type, thickness, insulative value, and durability as existing materials and meeting the requirements of the building code for new construction.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 25 00 - Substitution Procedures.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

1. Online meetings may be permitted, at the discretion of Architect and Owner's Project Manager.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect five days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Owner will locate and protect survey control and reference points.

D. Control datum for survey is that established by Owner provided survey.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
2. Grid or axis for structures.
3. Building foundation, column locations, and ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with current edition of NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations, including applicable recommendations in Appendix A of the Standard.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.
B. All cutting, coring, and patching shall be coordinated through and by the Construction Manager. Any and all cutting of structural members shall require approval of the project's structural engineer; refer to Structural Drawings for penetrations typically allowed and for required provisions related to such penetrations.
    1. The Masonry Trade Contractor is not responsible for cutting and patching to accommodate Fire Protection, Plumbing, HVAC, and Electrical subtrade penetrations.
    2. The Masonry Trade Contractor shall provide cutting and patching of openings in existing masonry walls and partitions to accommodate new windows, doors, doorways, and recessed or semi-recessed architectural equipment.
    3. The Construction Manager shall be responsible for demolition of masonry walls and partitions where entire runs of masonry partitions are scheduled to be removed and where required partition removal extends beyond opening(s) required for new windows, doors, doorways, and recessed or semi-recessed architectural equipment.
C. Perform whatever cutting and patching is necessary to:
    1. Complete the work.
    2. Fit products together to integrate with other work.
    3. Provide openings for penetration of mechanical, electrical, and other services.
    4. Match work that has been cut to adjacent work.
    5. Repair areas adjacent to cuts to required condition.
    6. Repair new work damaged by subsequent work.
    7. Remove samples of installed work for testing when requested.
    8. Remove and replace defective and non-complying work.
D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces.
F. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval.
G. Restore work with new products in accordance with requirements of Contract Documents.
H. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element. Provide label adjacent to sealed penetration indicating manufacturer, firestop system, hourly rating, and date of installation. When possible apply in concealed location, such as above ceiling.
    1. Fire rated material shall comply with Section 07 84 00 - Firestopping.
J. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work and existing completed work, equipment, and finishes from damage by construction operations.
   1. Protect HVAC equipment, vents, light fixtures, and other exposed equipment and appurtenances, to prevent dust and debris from sanding and other construction operations from entering them.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate with requirements of Section 01 91 13 - MEP Commissioning Requirements.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable Construction Manager personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 CONSTRUCTION MANAGER'S CORRECTION PUNCH LIST

A. The Construction Manager shall inspect the project and prepare a list of corrective or incomplete work to be completed. This punch list shall be completed and submitted to the Architect prior to Substantial Completion and before request for the Architect to conduct a punch list inspection.

B. Punch lists shall be created using electronic PDF files and Bluebeam or equivalent PDF editing software, and one master PDF file shall be used by all project stakeholders for the entry and management of all punch list items. The procedures for punch listing with PDF files shall be as follows:

1. The Architect shall prepare the PDF file using selected Drawings of the construction document set with all changes issued during the construction process as part of Proposal Requests, Architect's Supplemental Instructions, and Construction Change Requests recorded. The PDF file will be formatted to facilitate organization and tracking of comments on an area-by-area basis, including interior spaces, the building exterior, and site. Preconfigured punch list markup tools will also be provided to the Construction Manager for use during the punch list inspections, or the Construction Manager shall provide markup tools acceptable to the Architect.
2. The Construction Manager shall provide the following, for use by all project stakeholders during the punch listing duration:
    a. Tablet computers, preloaded with Bluebeam software, and capable of recording punch list comments and capturing images. A minimum of three tablets shall be provided for use during punch listing, and sufficient quantity shall be provided to facilitate punch list inspections by multiple parties within the anticipated time provided in the project schedule for punch list inspections. Tablets may remain the property of the Construction Manager at the completion of the project.
        1) Tablet processors shall be minimum Intel i3 or equivalent, or as recommended by Bluebeam for large PDF files with multiple drawing sheets.
        2) Tablet RAM shall be minimum 4GB (32-bit Windows) or 8GB (64-bit Windows).
        3) Tablet storage capacity shall be sufficient to accommodate large drawing set PDF files, comments, and captured images. Storage capacity shall be 16 GB minimum; 32 GB storage capacity is recommended.
    b. A project-specific web-based "cloud" file-sharing account capable of being synchronized with tablet computers and Bluebeam program. Acceptable web-based services include, but are not limited to Dropbox, Box, FileShare, Evernote, or WebDAV. Access shall be provided to the Architect and all project consultants performing punch list inspections with ability to read and write to the site.
3. The Architect will copy the prepared PDF file and the markup tools to the file sharing account, which shall be used for recording of all punch list comments and ongoing punch list management until all inspections and reinspections are complete, and management of items can shift to other methods, as determined by the Architect. This prepared PDF file located on the file-sharing website shall be referred to hereinafter in this section as "the PDF file". The Construction Manager shall load the PDF file and markup tools onto the tablet computers.
4. The Construction Manager shall utilize the PDF file and markup tools for recording their initial inspection comments, locating graphic tags accurately to locate each comment or issue. All comments shall be saved to the PDF file upon completion. The Construction Manager shall also submit hard copy summary reports (exported from the PDF file) of their initial punch list with the request for the Architect and Architect's consultants to begin punch list inspections. Punch listing by the Architect and consultants will not commence prior to receipt of the Construction Manager's initial punch list summary report.

5. The Architect and other project consultants will complete punch list inspections using the PDF file that contains the Construction Manager's initial inspection comments. Once comments are entered on the PDF file, they shall not be removed by any party, i.e. punch list comments that have been completed shall not be deleted from the PDF file in any case.
6. The Construction Manager shall utilize the PDF file to manage the completion of the punch list items with the subcontractors. Additional tools, such as spreadsheets and lists, are at the Construction Manager's option, however the completion of all items shall be indicated on the PDF file. When the Construction Manager determines in their opinion that all comments in the building or in a substantial area (as agreeable to the Architect) have been completed and a reinspection is warranted, they shall amend the PDF file accordingly and notify the Architect and request a reinspection.
7. The Architect, and other consultants as relevant, will conduct reinspection using the PDF file and record the status of each comment.
8. The PDF file shall be maintained as the primary tool for punch list management until Final Completion, or a time determined by the Architect. Monetization of the punch list shall be completed in the PDF file until a time when no further inspections are anticipated (as determined by the Architect).

C. The Architect will provide one punch list inspection and one reinspection "back-punch" of each building or site area without prejudice to the project. Costs related to additional punch list inspections will be charged as an additional service to the Owner and will be backcharged against the project retainage.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. The Construction Manager shall execute final cleaning prior to final project assessment.
   1. Use cleaning materials that are non-hazardous.
   2. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
   3. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
   4. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
      a. Examine and clean HVAC equipment, vents, light fixtures, and other exposed equipment and appurtenances, to ensure operating equipment is free of dust and construction debris.
   5. Replace filters of operating equipment.
   6. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
   7. Clean site: sweep paved areas, rake clean landscaped surfaces.
   8. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of it in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities, including Commissioning Agent.
   1. Provide copies to Architect.

B. Submit initial draft copy of operations and maintenance / closeout documentation prior to requesting Substantial Completion.

C. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Construction Manager's Correction Punch List for Construction Manager's Notice of Substantial Completion.
D. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
E. Submit written certification containing Construction Manager's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Construction Manager's comprehensive list of items identified to be completed or corrected, and submit to Architect.
G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in Specification sections and per the project's commissioning agent.
B. Maintenance Period: As indicated in Specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate to assure proper operation.
D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.
F. Submit signed service or maintenance agreement, including anticipated date for on-site services. Include post-occupancy testing, including but not limited to water quality, as indicated by individual Specifications sections. Provide reports of tests conducted to Owner's designated representative, Owner's Project Manager and Architect, within 14 days of sampling.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section includes requirements for the Construction Manager's implementation of waste management controls and systems for the duration of the work.

1.02 SUSTAINABLE DESIGN INTENT

A. Owner requires that this project generate the least amount of trash and waste practical. Processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
   1. All waste shall be recycled or properly disposed of off-site, as described herein, unless specifically noted to be salvaged or re-used as part of the project.
   2. See Section 01 81 13 - Sustainable Design Requirements for project's sustainability goals and requirements.

B. Performance Goals:
   1. General: Develop waste management plan that results in end-of-project rates of recycling and minimum number of material streams indicated in WASTE MANAGEMENT REQUIREMENTS paragraph below.
   2. Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous construction waste as possible. See WASTE MANAGEMENT REQUIREMENTS and LANDFILL ALTERNATIVES PROPOSAL paragraphs below for specific materials.

1.03 WASTE MANAGEMENT REQUIREMENTS

A. Employ processes that ensure the generation of as little waste as possible.

B. Minimize trash/waste disposal in landfills. Reuse, salvage, or recycle as much waste as economically feasible.

C. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.

D. Required Recycling, Salvage, and Reuse: The following demolition and construction waste may not be disposed of in landfills or by incineration. Regardless of salvage/recycling goal indicated above, salvage or recycle 100 percent of the following uncontaminated materials:
   1. Packaging:
      a. Paper
      b. Cardboard.
      c. Boxes.
      d. Plastic sheet and film.
      e. Polystyrene packaging.
      f. Wood crates.
      g. Plastic pails.
      h. Aluminum, paper, and plastic beverage and food containers, including but not limited to those used by on-site workers.
   2. Wood pallets.
   3. Wood sheet materials.
   4. Wood trim.
   5. Clean dimensional wood that does not contain preservatives (i.e. creosote, arsenic, and chromium-containing preservatives): may be used as blocking or furring.

6. Land clearing debris, including brush, branches, logs, and stumps. See Section 31 10 00 - Site Clearing for use options. Land clearing debris shall not be included in LEED percentage diversion calculations.
7. Concrete: may be crushed and used as aggregate, sub-base material, or fill, following review and acceptance by Architect.
8. Bricks: may be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill, following review and acceptance by Architect.
9. Concrete masonry units: may be used on project if whole, or crushed and used as sub-base material or fill, following review and acceptance by Architect.
10. Metals, including but not limited to: packaging banding, stud trim, ductwork, piping, concrete reinforcing steel, roofing, aluminum stairs, metal studs, sheet metal, structural steel, door frames, trim, and other items made of steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
11. Glass.
12. Gypsum board and plaster.
13. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed.

E. LEED Certification for this project is dependent on diversion of 75 percent, by weight, of potential landfill trash/waste by recycling and/or salvage, and diversion of a minimum of _____ four separate waste streams. Commingled waste counts as only one waste stream for purposes of the LEED credit.
1. Comply with sustainable design requirements measured and documented in accordance with LEED for Schools v4/v4.1. Refer to Section 01 81 13 - Sustainable Design Requirements.
2. Construction Manager shall direct, manage, and monitor the diversion of landfill trash/waste to achieve LEED goals.
3. Diverted waste includes recycled, salvaged, reused, and donated materials.
4. Alternative daily cover (ADC) does not qualify as material diverted from disposal. Include materials destined for ADC in the calculations as waste, not diversion.
5. Include wood waste converted to fuel (biofuel) in the calculations as diversion. Other types of waste-to-energy are not considered diversion for the Construction Waste Management credit under LEED for Schools v4/v4.1.
6. Exclude excavated soil and land-clearing debris entirely from calculations. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

F. Methods of trash/waste disposal that are not acceptable are:
1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.

G. Regulatory Requirements: Construction Manager is responsible for knowing and complying with regulatory requirements, including but not limited to federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.04 DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

A. ADC: Alternative Daily Cover.

B. CARE: Carpet America Recovery Effort.

C. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

D. Construction and Demolition Waste: Solid wastes typically include building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
E. DOE: U.S. Department of Energy.
F. EPA: U.S. Environmental Protection Agency.
G. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
H. LEED: Leadership in Energy and Environmental Design, US Green Building Council; www.usgbc.org/leed.
I. MGL: Massachusetts General Law.
J. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
K. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
L. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse.
M. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse.
N. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
O. Return: To give back reusable items or unused products to vendors for credit.
P. Reuse: To reuse a construction waste material in some manner on the project site.
Q. Salvage: To remove a waste material from the project site to another site for resale or reuse.
R. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
S. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
T. Toxic: Poisonous to humans either immediately or after a long period of exposure.
U. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
V. USGBC: U.S Green Building Council; www.usgbc.org.
W. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
X. WDF: Wood Derived Fuel.
Y. WMP: Waste Management Plan.

1.05 REFERENCE STANDARDS

A. Editions of listed Standards as referenced by applicable codes; if no edition is referenced, the current edition of the following:
B. MassDEP Beyond the Bin Recycling Directory - Massachusetts Department of Environmental Protection: Beyond the Bin Recycling Directory.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Construction Submittals
    1. Landfill Alternatives Proposal:
        a. Within ten calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner, submit a projection of trash/waste that will require disposal and a list of alternatives to landfilling.

1) Submit to Architect for Owner's review and approval.
2) If Owner wishes to implement any cost alternatives, the Contract Sum will be adjusted as specified elsewhere.
3) Include an analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
4) Describe as many alternatives to landfilling as possible:
   (a) List each material proposed to be salvaged, reused, or recycled during the course of the project.
   (b) List the proposed local market for each material.
   (c) State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.
5) Provide alternatives to landfilling for at least the following materials:
   (a) Asphaltic concrete paving.
   (b) Slurry wall materials.
   (c) Furniture, fixtures, and equipment.
   (d) Plastics other than plastic pails and polyethylene sheet, including but not limited to bubble wrap.
   (e) Rigid foam insulation.
   (f) Roofing.
   (g) Mechanical equipment.
   (h) Electrical equipment including but not limited to:
      (1) Electrical conduit.
      (2) Copper wiring.
      (3) Lighting fixtures.
      (4) Lamps.
      (5) Ballasts.
      (6) Other electrical devices.
   (i) Acoustical ceiling tile and panels.
   (j) Building components which can be removed relatively intact from existing construction.

2. Submit Waste Management Plan (WMP) within 21 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste types that will require disposal and alternatives to landfilling. Submit WMP in a format acceptable to Architect and in compliance with USGBC requirements. Demolition shall not begin until WMP has been approved.
   a. See SUSTAINABLE DESIGN INTENT paragraph above, for project's waste diversion goals.
      1) Identify materials (both structural and nonstructural) targeted for diversion.
      2) Determine and document the estimated percentage of the overall waste that these materials represent.
   b. Document if these materials will be site separated or commingled and sorted off site.
   c. Describe the diversion strategies.
   d. Identify the locations as to where the materials will be taken include recycling facilities, sorting facilities and landfills.
   e. Indicate person/party responsible for managing the waste management process and tracking the progress.

f. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
g. Landfill Options: Include the name, address, and telephone number of each landfill at which trash/waste will be delivered, the applicable landfill tipping fee(s), and the projected cost of disposing of project trash/waste in the landfill(s).
    1) Landfill Certification: Provide a statement of verification that the landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive the estimated waste from this project.
h. Recycled, and Salvaged Materials: List all waste materials that will be diverted from landfills during the course of the project by reuse, salvage, or recycling. Include anticipated volumes for a minimum of five major construction waste materials generated by the project.
    1) List each material proposed to be salvaged, reused, or recycled.
    2) List the local market for each material.
    3) State the estimated net cost versus landfill disposal.
    4) List the approximate percentage of overall project waste each material is projected to represent.
    5) Specify whether material will be site separated or commingled.
i. Off-Site Sorting: The name of off-site sorting facilities to receive commingled demolition and construction debris collected in mixed materials containers on site, and how the materials will be processed.
    1) If sorted off-site, identify the sorting facilities and how the materials will be processed
j. Construction and Demolition Handling Facilities:
    1) Indicate the name(s) of the facilities where construction and demolition waste will be delivered and the applicable tipping fees.
    2) Provide a statement of verification that the landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive the estimated waste from this project.
k. Co-Mingled Materials: Co-mingled waste may be considered only one material stream unless the facility can provide project specific diversion rates for specific materials. Provide the following for co-mingled materials collected in mixed containers on site and sorted off-site:
    1) For Each Container: A detailed breakdown of the weight of each material after sorting, including materials diverted to landfills.
    2) For Each Sorting Facility:
        (a) Provide documentation that the facility is State regulated.
        (b) Provide annual report from local or state government authority and summary attachment of diverted materials with the average annual recycling rates. Figures in the summary must be derived from the annual reports in concise clear language.
        (c) If Wood Derived Fuel (WDF) was listed as a diverted material in the above, vendors shall furnish a letter from the biomass plant stating their DOE operating permit number and that WDF was received from vendor, for the same year as the annual report.
        (d) Provide tipping invoices for commingled waste.
l. Hazardous Materials: Include the safe removal and disposal of hazardous materials in the Construction Waste Management plan. Hazardous materials shall be tracked separately and shall not be included in the project’s calculated total waste.

m. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
n. Material Handling Procedures, at Project Site: Describe the means by which materials to be diverted from landfills will be protected from contamination and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
    1) Indicate which material streams shall be source separated and which shall be commingled.
o. Material Handling Procedures, at Handling Facilities:
    1) Specify which materials shall be source separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facilities will process the materials.
    2) Indicate annual recycling rates and material streams, as defined by local authorities having jurisdiction.
p. Transportation: Identify the destination and means of transportation of materials to be recycled, i.e., whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for offsite sorting.
q. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether each organization is tax exempt.
r. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether each organization is tax exempt.

3. Waste Management Progress Reports to be submitted concurrent with each Application for Payment. Provide a written Waste Management Progress Report, in the same format required for Final Report, and updated tracking spreadsheet.
4. Submit a list of all existing materials intended to be reused in the building or on site. Indicate the intended use, location, and volume of each material to be reused.

C. Closeout Submittals
1. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan.
    a. Include the name and location of disposal facilities.
    b. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:
        1) Material category, including source separated material streams.
        2) Generation points of waste.
        3) Total quantity of waste, by weight.
        4) Quantity of waste salvaged, both estimated and actual.
        5) Quantity of waste recycled, both estimated and actual.
        6) Total quantity of waste recovered (salvaged plus recycled).
        7) Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
2. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether each organization is tax exempt.
3. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether each organization is tax exempt.

4. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
5. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
6. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
7. Specific LEED for Schools v4/v4.1 Submittals:
    a. Provide completed Construction and Demolition Waste Calculator for applicable LEED version.
    b. Provide final report detailing waste streams generated, including tipping slips, disposal rates, and diversion rates.

D. Recycling Incentive Programs:
1. Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
    a. Submit all documentation required by Owner for recycling incentives in addition to information provided in periodic Waste Disposal Report.

1.07 RECYCLING

A. Construction Manager may subcontract work of this section to a subcontractor specializing in recycling and salvaging construction waste, including but not limited to the following:
1. Eco-One Solutions, Natick MA, 01760; tel. (978).270-8950.
2. IRN Surplus | The ReuseNetwork, Concord, NH 03301; tel. (603) 229-1962.
3. Waste Solutions, Inc., Marshfield, MA 02050; tel. (781)-834-7007.
4. Other subcontractors accepted by the Awarding Authority as equal to the specified sub-contractors. Submit as substitutions: See Section 01 25 00 - Substitution Procedures.

B. Gypsum Wallboard Recycling: New, paper-faced gypsum wallboard scrap (cuts from construction - not demolition waste) generated at project shall be recycled by Georgia-Pacific Gypsum, or other gypsum wallboard recycling company that will provide documentation for LEED credits. Keep scrap dry. Contact Georgia-Pacific Gypsum at (603) 433-8000, to coordinate recycling efforts.

C. Acoustical Ceiling Panel Recycling: Demolition and construction waste pulpable mineral fiber ceiling panels may be recycled by Armstrong World Industries and US Gypsum. Contact Armstrong at 1-877-ARMSTRONG (1-877-276-7876) or www.armstrongceilings.com/recycling or contact USG at 1-800-USG-4YOU (1-800-874-4968 x2) or www.usgdesignstudio.com, to coordinate recycling efforts, apply for product approvals, and receive reclamation procedure requirements.

D. Carpet Recycling: Demolition and construction waste carpet and carpet padding may be recycled by Carpet America Recovery Effort (CARE). Visit www.carpetrecovery.org to locate carpet reclaimers in the local project area and reclamation procedure requirements.

E. Refer to the MassDEP Beyond the Bin Recycling Directory at recyclesmartma.org/beyond-the-bin-search/ for recycling operations within the state.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Section 01 25 00 - Substitution Procedures for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 25 00:
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the contract sum.
   3. Proposed disposal method for waste products.
   4. Markets for recycled waste products.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 02 41 00 - Demolition for list of items to be salvaged from the existing building for relocation in project or for Owner.
B. See Section 01 30 00 - Administrative Requirements for additional requirements for project meetings, reports, submittal procedures, and project documentation.
C. See Section 01 50 00 - Temporary Facilities and Controls for additional requirements related to trash/waste collection and removal facilities and services.
D. See Section 01 60 00 - Product Requirements for waste prevention requirements related to packaging, delivery, storage, and handling.
E. See Section 01 70 00 - Execution and Closeout Requirements for trash/waste prevention procedures related to cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Construction Manager shall implement Waste Management Plan (WMP) for this project. WMP shall be submitted for approval by Architect and Owner's Project Manager.
   1. Provide containers, storage, signage, transportation, and other items required to implement WMP, throughout the entire duration of the contract.
   2. Include both demolition and construction waste management.
   3. Deliver waste directly to construction and demolition handling facilities. Do not deliver to transfer stations.
B. Each Trade Contractor shall be responsible for segregating their own waste per directions of Construction Manager.
C. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at project site full time for duration of project. Superintendent may be the waste management coordinator.
D. Communication: Construction Manager shall distribute copies of the WMP to job site foreman, each Trade Contractor, subcontractor, Owner, and Architect.
E. Instruction: Construction Manager shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
F. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Preconstruction meeting.
   3. Regular job-site meetings.
G. Site Access: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
H. Facilities: Construction Manager shall provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by Trade Bid

Contractors, subcontractors, and installers. Location shall be acceptable to the Architect and Owner.

1. Commingling: Waste commingling shall be approved prior to job site tipping, per requirements of this Section. Commingling waste at the job site may be allowed, provided that the following conditions are met:
    a. Commingled materials shall be included in the WMP.
    b. Additional commingled materials must be pre-approved by the Architect via WMP addenda, prior to tipping on the job site.
2. As a minimum, provide:
    a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
    b. Separate dumpsters for each category of recyclable.
    c. Recycling and compost bins at worker lunch area, and at convenient locations on each level in each wing of the building project.
    d. Separate bins on the project site to isolate construction or demolition waste materials targeted for reuse off-site, donation, or recycling programs.
        1) Sorted materials on-site shall include at a minimum: metals, wood, ceiling tiles, furniture, and concrete.
    e. Provide containers in quantity to adequately support operations.
    f. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
    g. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible, reuse project construction waste materials if possible.
    h. Locate enclosures out of the way of construction traffic.
    i. Provide adequate space for pick-up and delivery and convenience to Trade Contractors and subcontractors.
    j. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
3. Keep recycling, compost, and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

I. Hazardous Wastes: Unforeseen hazardous waste shall be separated, stored, and disposed of according to applicable regulations and per directions of Owner. Hazardous waste shall not be included in diversion calculations.

J. Recycling and Compost: Separate, store, protect, and handle at the site identified recyclable and compostable waste products from other waste materials, trash, and debris, in order to prevent contamination of materials and to maximize recyclability of materials. Separate recyclable waste by type at project site to the maximum extent possible. Arrange for timely pickups from the site or deliveries to recycling facility.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from project site. Include list of acceptable and unacceptable materials at each container and bin.
2. Inspect containers and bins for contamination and remove contaminated materials if found.
3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
5. Store components off the ground and protect from weather.

6. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.
7. Packaging:
    a. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
    b. Polystyrene Packaging: Separate and bag materials.
    c. Pallets: To the extent possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
    d. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
8. Site-Clearing Wastes: Chip brush, branches, and trees on-site or at landfill facility.
    a. Comply with requirements in _____ for use of chipped organic waste as organic mulch.
9. Wood Materials:
    a. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
    b. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
    c. Comply with requirements in _____ for use of clean sawdust as organic mulch.
10. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
11. Maintain compost bins in a controlled area to prevent attraction of or infestation by pests.

K. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

L. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

M. Comply with Section 01 50 00 - Temporary Facilities and Controls for controlling dust and dirt, environmental protection, and noise control.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.
B. Operation and maintenance data.
C. Warranties and bonds.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Closeout Submittals
    1. Submit in accordance with this Section and Section 01 70 00 - Execution and Closeout Requirements. Submit Closeout Documents under original specification division, not under Division 01.
        a. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
        b. Operation and Maintenance Data:
            1) Submit preliminary manuals electronically, in accordance with submittal procedures. Architect will review drafts and provide comments.
            2) For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
            3) Submit completed documents not less than three weeks prior to Substantial Completion. A copy will be returned with Architect comments. Revise content of all document sets prior to final submission.
            4) Submit three sets of revised final documents in final form not less than one week prior to Substantial Completion.
            5) Submit flash drive or external hard-drive containing copies of each training session - see Section 01 79 00 - Demonstration and Training.
            6) Submit Owner's certification of acceptance of training - see Section 01 79 00 - Demonstration and Training.
        c. Warranties and Bonds:
            1) For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
            2) Make other submittals not later than two weeks prior to Substantial Completion.
            3) For items of work for which acceptance is delayed beyond date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the work:
    1. Drawings.
    2. Specifications.
    3. Addenda.
    4. Change Orders and other modifications to the Contract.
    5. Proposal Requests (PRs).

6. Requests for Information (RFIs).
7. Architect's Supplemental Instructions (ASIs).
8. Reviewed shop drawings, product data, and samples.
9. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.
C. Store record documents separate from documents used for construction.
D. Record information concurrent with construction progress.
E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.
F. Provide digital record file of all project documents included on the project FTP or project management site.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
D. Typed Text: Provide to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
C. Additional information as specified in individual product specification sections.
D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.
B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
E. Provide servicing and lubrication schedule, and list of lubricants required.
F. Include manufacturer's printed operation and maintenance instructions.
G. Include sequence of operation by controls manufacturer.
H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
I. Provide control diagrams by controls manufacturer as installed.
J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
K. Include test and balancing reports.
L. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
D. Prepare data in the form of an instructional manual.
E. Binders: Commercial quality, 8-1/2 by 11 inch three-ring side-bound binders with durable plastic covers; 3 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Construction Manager and subcontractors, with names of responsible parties.
H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
J. Text: Manufacturer's printed data, or typewritten data on 24-pound paper.
K. Drawings: Provide with reinforced punched binder tab. Bind in with text. Fold larger drawings to size of text pages.
L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
    1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Construction Manager, subcontractors, and major equipment suppliers.
    2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

O. Provide one printed copy and one pdf copy.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until date of Substantial Completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

1. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Construction Manager and equipment supplier; and name of responsible company principal.
2. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
3. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.07 ASBESTOS FREE CERTIFICATION:

A. As a condition of Substantial Completion in accordance with Section 01 60 00 - Product Requirements, the Construction Manager shall submit a signed certificate which states that there is no asbestos in any product or material supplied to or built into the project.

END OF SECTION

SECTION 01 78 29
FINAL SITE SURVEY

1.01 SECTION INCLUDES

A. Provision of a post-construction survey verification of the built above- and below-grade site conditions and configurations, including surveyed data and incorporating data received from subcontractors.

1.02 SUBMITTALS

A. Submit in accordance with the following:
   1. Section 01 30 00 - Administrative Requirements.
   2. Section 01 70 00 - Execution and Closeout Requirements.
   3. Section 01 78 00 - Closeout Submittals.

B. Prior to requesting Substantial Completion, submit a complete Final Site Survey of the entire project site in digital and printed form, documenting the following features as constructed:
   1. The limits of clearing of wooded areas.
   2. The layout and outline of all buildings, pavements, curbing, surfaces and visible site improvements included in the project or existing, including but not limited to culverts, vehicular guardrails, surface fill materials such as rip-rap or stone bedding, drainage swales and bioretention areas, landscape planting areas, fences and gates, sport courts and fields, playgrounds, and storage sheds.
   3. Site topography at 1-foot contour intervals for all disturbed areas.
   4. Spot grades on all pavements, walkways, accessible site ramps and parking spaces, all building finish floors, at all doorway locations, and at all building entrances.
      a. Spot grades shall be provided at intervals not in excess of 20 feet, at all corners or intersections of paving, and at all observable breaks or changes in grade or elevation.
      b. Spot grades shall be provided at curbs documenting the top and bottom of curb elevations.
   5. Installed location and elevations (rims, inlet and outlet inverts, sumps, top of outlet structures, top and bottom of all tanks, tees, etc.) of all site utilities including:
      a. Storm drainage system including drainage pipes, roof drains, catch basins, piping, cleanouts, detention systems, manholes, stormwater treatment systems, flared-end sections and headwalls.
      b. Sewer system including all sanitary and special waste sewer pipes, vent pipes, cleanouts, industrial waste holding tank, grease trap, pumps, sanitary force mains, sanitary leaching field, sanitary distribution tanks, bends, connections and all other sanitary components.
      c. Water and fire protection including all valves, hydrants, tees, bends and connections.
      d. All overhead and underground electrical and communications utilities and equipment, including electric and telecommunications duct banks (telephone, fire alarm and cable tv) with all manholes, transformers, standby generators and handholes.
      e. Abandoned and capped underground utilities, including the location of capped or terminated piping and abandoned structures remaining in place.
      f. Underground natural gas supply system including all valves, bends and connections and gas meter.
      g. Underground and above ground components of the HVAC system including above ground (at grade) HVAC unit and above ground or underground piping.
      h. Irrigation systems, including all valves, bends, power supplies, elevations of piping, and sprinkler heads or connections.

6. Include schedules identifying drainage structures shown and listing rim and invert elevations and other data when the information cannot reasonably be included and be legible in the drawing area.
7. Submit the final site survey in the following formats:
   a. Submit an initial draft of the completed survey in electronic PDF form for review. Make all requested revisions or adjustments to the format or content, providing additional field verification if needed until the survey is acceptable to the Architect, Owner, and agencies having jurisdiction. Upon acceptance, submit the final survey in digital and paper forms as specified. Final submission shall occur prior to Request for Substantial Completion.
   b. After the initial files are accepted for format and content, submit the following as record documents:
      1) Electronic Files:
         (a) In AutoCAD DWG or AutoCAD-compatible file format compatible with the current release of AutoCAD, or other file format required by or acceptable to the Awarding Authority or AHJ, bearing an electronic facsimile of the seal of the licensed surveyor.
         (b) In PDF format file, bearing an electronic facsimile of the seal of the licensed surveyor.
         (c) Submit final electronic copies of accepted survey data on USB storage devices.
      2) DWG and PDF files shall be formatted with survey data on separate layers to facilitate legibility and selectivity of viewing data. Layers shall generally be provided for each category of data identified above. Multipage DWG or PDF files with content on separate views will not be accepted.
      3) In print form: submit three copies, bearing the seal of the licensed surveyor.

1.03 QUALITY ASSURANCE

A. The Final Site Survey shall be prepared by a professional land surveyor licensed to practice in the Commonwealth of Massachusetts. All drawings shall be signed and sealed by the Massachusetts Registered Professional Land Surveyor who is responsible for the survey documentation.

1.04 COORDINATION

A. Coordinate the preparation of survey documents with the progress and execution of the work of the following sections:
   1. Division 31 – Earthwork sections.
   2. Division 32 – Site Improvements sections.
   3. Division 33 – Site Utilities sections

1.05 DRAWING CONFIGURATION STANDARDS

A. All electronic site survey information must reference the State Plane Coordinate System and spatial GIS data and shall not require the manipulation of the survey data in an attempt to correct improperly spatially referenced surveys. It’s the certifying Surveyor or Engineer’s responsibility to ensure all submitted information adheres to the specifications.

B. The Surveyor performing the data collection shall independently verify the positional accuracy relative to the referenced horizontal and vertical datum. Local, state or federal agencies vertical and horizontal control points will be used and are independent of checks to local project controls.

C. The positional accuracy relative to the referenced published control points used shall not exceed 0.5 feet horizontally and 0.1 feet vertically for water and reclaimed water utilities and 0.01 feet vertically for sewer utilities.

D. Coordinates on the utility mains will be required at all pipe dead ends, size changes, points of connection to existing system, fittings (bends, valves, tees, plugs, etc.), at intersections of pipe, at 100 foot intervals for water mains and 500 foot intervals for reclaimed and force mains, or to the nearest fitting/structure whichever is less.

E. Layer naming shall follow the National Cad Standard conventions.

F. Each drawing layer in the AutoCAD and PDF files shall have a unique color. Layers shall be named intuitively per the National CAD standard.

G. All annotation and text shall be inserted in AutoCAD model space with the drawing content. Annotation and text shall not conceal graphic content of the site survey.

H. Intended Display Scale: The scale of the submitted survey for PDF and paper files shall be 1:20 or larger scale, or as required by local authorities

I. All utility mains and lines including but not limited to water, sewer, and storm drains shall be represented as continuous polylines, connected with no broken segments except where they meet valves, reducers and changes in pipe size, taps, and tees, manholes and structures, and adapters and couplings including changes in pipe materials.

1.06 SURVEY PREPARATION

A. All measurements are to be made by the Surveyor or Engineer who will be certifying the project as constructed.

1. Where other sections of the project manual require the verification of installed utilities, the Surveyor may rely on and shall incorporate the data provided by those sections, provided that the record data provided by the subcontractors is prepared by and bears the stamp of a licensed engineer or surveyor.

B. The Construction Manager is responsible for coordinating with the Surveyor or Engineer during construction and shall provide access to all utilities prior to being buried; allowing accurate horizontal and vertical measurements to be acquired by the Surveyor or Engineer.

1.07 RECORDS RETENTION & AVAILABILITY

A. All field books, computer files, and computations required for the above-described work shall be kept in a neat and orderly manner, clearly indexed, and shall retained by the surveyor and shall be available for inspection and reference for not less than seven years after the completion of the project.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:

1. All software-operated systems.
2. HVAC systems and equipment, including but not limited to building management control systems.
3. Plumbing equipment, fixtures, and controls.
4. Electrical systems and equipment, including but not limited to lighting, automated sensors, fire alarm, mass notification, photovoltaic infrastructure, and emergency generator.
5. Fire protection equipment.
6. Conveying equipment.
7. Folding panel partitions.
8. Lockers.
9. Markerboards.
10. Emergency aid specialties.
11. Fire protection specialties.
12. Appliances.
13. Bleachers.
14. Gymnasium equipment.
15. Climbing walls.
16. Stage rigging and draperies.
17. Window shades.
18. Kilns.
19. Communication and technology systems, including audio visual, sound amplification, access control, safety and security, and telephone.
20. Other items specified in individual product sections.

C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:

1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
2. Windows.
3. Curtain walls.
4. Storefronts.
5. Doors.
6. Door hardware.
7. Finishes, including flooring, wall finishes, ceiling finishes.
8. Fixtures and fittings.
9. Underground stormwater infiltration systems and pervious pavement.
10. Other items specified in individual technical sections of these specifications.

1.02 SUBMITTALS

A. See Section for submittal procedures, except:

1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Agent.

2. Submit one copy to the Commissioning Agent, not to be returned.
3. Make commissioning submittals on time schedule specified by Commissioning Agent.
4. Submittals indicated as "Draft" are intended for the use of the Commissioning Agent in preparation of overall Training Plan; submit in editable electronic format, most recent version of Microsoft Word preferred.

B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect for transmittal to Owner.
   2. Submit to Commissioning Agent for review and inclusion in overall training plan.
   3. Submit not less than four weeks prior to start of training.
   4. Revise and resubmit until acceptable.
   5. Provide an overall schedule showing all training sessions.
   6. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations and hands-on.
      g. Media to be used, such as slides and handouts.
      h. Training equipment required, such as projector and projection screen to be provided by Construction Manager.

C. Training Manuals: Provide a training manual for each attendee; allow for a minimum of two attendees per training session.
   1. Include applicable portion of Operations and Maintenance manuals.
   2. Include copies of all handouts, slides, overheads and manufacturers' video presentations that are not included in Operations and Maintenance manuals.
   3. Provide two extra copies of each training manual to be included with operation and maintenance data.

D. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use. Training shall not commence until systems have been demonstrated to be fully operational.
   1. Format: Flash drive.
   2. Employ a professional videographer, experienced in digital photography to ensure proper documentation of demonstration and training.
   3. Ensure lighting and sound quality, such that recordings can be used for future training purposes.
   4. If training involves hands-on demonstrations, ensure that camera position captures the item being demonstrated. Stop training session and reposition camera when necessary, to capture full demonstration.
   5. Organize content of recordings in chapters, identified in a navigable table of contents flash drive.
   6. Label each flash drive and container with session identification and date.

E. Owner Signature: After all training has been completed, provide signed Training Forms for each area of training noted in Part 1.01 above. Training Forms shall be signed by representative(s) designated by the Owner to receive training.

1.03 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this Section, unless approved in advance by Owner.

B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.

C. Demonstration may be combined with Owner personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstrations for other seasons within six months of Substantial Completion. This requirement includes seasonal demonstrations and training after Substantial Completion, if required by season.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Commissioning Agent will prepare the Training Plan based on draft plans submitted.

B. Conduct training on-site unless otherwise indicated.

C. Owner will provide classroom and seating at no cost to Construction Manager.

D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Agent and Owner.

E. Provide training in minimum two-hour segments.

F. The Commissioning Agent is responsible for determining that the training was completed and will provide approval forms.

G. Training schedule will be subject to availability of Owner's personnel to be trained; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Construction Manager for personnel "show-up" time.

H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the Operations and Maintenance manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the Operations and Maintenance manuals.

I. Product- and System-Specific Training:
   1. Review the applicable Operations and Maintenance manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.

3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
4. Provide hands-on training on all operational modes possible and preventive maintenance.
5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
6. Discuss common troubleshooting problems and solutions.
7. Discuss any peculiarities of equipment installation or operation.
8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
9. Review recommended tools and spare parts inventory suggestions of manufacturers.
10. Review spare parts and tools required to be furnished by Construction Manager.
11. Review spare parts suppliers and sources and procurement procedures.

J. Be prepared to answer questions raised by training attendees; if unable to answer during the training session, provide written response within three days.

END OF SECTION

SECTION 01 81 09
TESTING FOR INDOOR AIR QUALITY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions, and Construction Manager's Scoping Documents, other Division 01 specification sections, and specifications of materials mentioned in this section, apply to this section.

1.02 SUMMARY

A. General: This Section provides requirements for Baseline Indoor Air Quality (IAQ) Testing for maximum indoor pollutant concentrations for acceptance of the facility.

1.03 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced:
   1. ASHRAE. American Society of Heating, Refrigerating and Air-Conditioning Engineers.
      a. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality.
   2. CDPH. California Department of Public Health; www.cdph.ca.gov.
      a. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2.
   3. ISO. International Organization for Standardization; www.iso.org.
      a. ISO 17025 - General Requirements for the Competence of Testing and Calibration Laboratories.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Construction Submittals
   1. Baseline IAQ Testing: Submit a report for each test site specified for IAQ baseline testing as prescribed herein below and in Division 23: section on “Testing, Adjusting, and Balancing.” Report on air concentrations of targeted pollutants identified in Subsection 3.01 of this Section.

1.05 SEQUENCING AND SCHEDULING

A. Identify, program, and schedule all IAQ testing well in advance of construction in a manner to prevent delays to the performance of the work of this Contract in order to perform and complete all testing after the completion of construction activities and prior to occupancy.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 BASELINE IAQ TESTING

A. HVAC System Verification: To assure compliance with recognized standards for indoor air quality including ASHRAE Std 62.1-2010, the Construction Manager’s independent testing and balancing agency shall verify the performance of each HVAC system prior to Indoor Air Quality testing, including space temperature and space humidity uniformity, outside air quantity, filter installation, drain pan operation, and any obvious contamination sources.

B. Indoor Air Quality Testing: Upon verification of HVAC system operation, the Construction Manager shall hire an independent contractor, subject to approval by the Contracting Officer’s Representative, with a minimum of five years' experience in performing the types of testing specified herein, to test levels of indoor air contaminants for compliance with specified requirements.

1. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO 17025 for the test methods they use.
2. Conduct baseline IAQ testing using testing protocols consistent with the United States Environmental Protection Agency Compendium of Methods for the Determination of Air Pollutants in Indoor Air.
3. A test plan shall be submitted for the approval of the Contracting Officer's Representative. The plan shall specify procedures, times, instrumentation, and sampling methods that will be employed.
4. Perform IAQ testing for at least the minimum number of required sampling locations, determined as follows: For each portion of the building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq. ft., or for each contiguous floor area, whichever is larger, and include areas with the least ventilation as calculated by Ventilation Rate Procedure of ASHRAE Std 62.1-2010and greatest presumed source strength as identified by Owner. Collect air samples on three consecutive days and average the results of each three-day test cycle to determine compliance or non-compliance of indoor air quality for each air handling zone tested.
    a. Verify areas to be tested with the Contracting Officer's Representative. Areas with 100 percent outside air ventilation rates such as laboratories are excluded from these testing requirements. The Contracting Officer's Representative is the sole judge of areas exempt from testing.
5. Perform IAQ testing following the completion of all interior construction activities and prior to occupancy. The building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Perform testing after installation of furniture, workstation components, and casework.
6. Perform IAQ testing within the breathing zone, between 3 feet and 6 feet above the finished floor and over a minimum 4-hour period.
7. Collect air samples during normal occupied hours (prior to occupancy) with the building ventilation system starting at the daily normal start times and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.
8. Sample and record outside air levels of formaldehyde and TVOC contaminants at three outside air locations (as determined by Owner) simultaneously with indoor tests to establish basis of comparison for these contaminant levels by averaging the three outdoor readings for each contaminant.
9. Perform airborne mold and mildew air sampling and specification with simultaneous indoor and outdoor readings.
    a. Samples are to be collected using a 12 liter-per-minute pump and a 0.45-micron polycarbonate filter, with a 4-hour duration for each sample.
    b. Speciation shall be done with DNA detection using the quantitative polymerase chain reaction (QPCR) method. To ensure that filters are not precontaminated with mold, a field blank filter cartridge shall be tested after every eighth sample is tested.
10. Acceptance of respective portions of the building by the Owner is subject to compliance with specified limits of indoor air quality contaminant levels.

C. Indoor air quality shall conform to the following standards and limits:
    1. Formaldehyde: less than 27 ppb.
    2. Particulates:
        a. PM 10: 50 micrograms per cubic meter.
        b. PM2.5: 15 micrograms per cubic meter.
    3. Ozone: 0.075 ppm.

4. Total VOCs: less than 500 micrograms/m3.
5. Carbon Monoxide: Not to exceed 9 ppm, no more than 2 ppm above outdoor limits.
6. Comply with target chemicals list in CAL (CDPH SM), Table 4-1 except formaldehyde per CAL (CDPH SM) Allowable Concentrations, Table 4-1.
7. Airborne Mold and Mildew: The species identified in indoor air cannot vary by more than 10 percent from those identified in the exterior samples.

D. Test Reports: Prepare test reports showing the results and location of each test, a summary of the HVAC operating conditions, and a listing of any discrepancies and recommendations for corrective actions, if required.
   1. Include certification of test equipment calibration with each test report.

E. For each sampling point where the maximum concentration limits are exceeded, the Construction Manager is responsible for conducting additional flush-out with outside air and retesting the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test. Retesting shall be performed at no additional expense to the Owner.

F. For each sampling point where the airborne mold and mildew indoor species distribution varies by more than 10 percent from exterior sampling speciation, Contractor shall identify the source of the mold and/or mildew and remediate with corrective action, then retest in accordance with Paragraph 3.1.B above until compliant results are attained.

G. In the event that any non-compliant test results occur, Contractor shall evaluate the source of the non-compliant results, and provide a written report to the Owner describing the source(s) of the non-compliant condition(s) and the corrective action(s) implemented.
   1. If non-compliant test results occur as a result of the construction project, Contractor shall remediate and provide retesting until compliant test results are achieved.

3.02 INDEPENDENT MATERIALS TESTING:

A. Materials That Must Be Tested: All materials listed below that are proposed for use on this project shall be tested for permanent, in-place indoor air quality performance in accordance with requirements of these specifications. Results shall be furnished to the Contracting Officer's Representative. Materials meeting the criteria for independent testing are as follows:
   1. Field-applied paint systems on appropriate substrate. Paint primers and intermediate coats (if used) shall be applied with a typical drying time allowed between coats (not to exceed seven days).
   2. Wallcoverings
   3. Carpet including manufacturer's recommended adhesive. The carpet will be applied to the appropriate flooring per manufacturer's instructions so that the testing is of the "carpet assembly."
   4. Ceiling tile.
   5. Interior furnishings.
   6. Any fireproofing material that may be exposed to indoor air, directly or in a plenum, applied to appropriate substrate.

B. Materials for Testing: Only test representative samples of actual products selected for use on this project. Tests of products generically and/or technically similar but produced by a manufacturer other than that of the product selected for use on this project are invalid.

C. Materials Testing and Evaluation Protocol: CAL (CDPH SM) including addenda.

D. Performance Thresholds: All compounds detected that have chronic reference exposure levels listed in the CAL (CDPH SM) document shall be analyzed and compared to the allowable concentration levels.

E. Materials Test Reports: Submit test reports to the Contracting Officer's Representative. The report shall include raw emission levels, as well as the calculated resulting concentrations and the assumptions (loading, volume of space, ventilation rates) used to determine those resulting concentrations.

F. Product/Material Evaluation: All products/materials shown by testing to comply with emissions limits and other criteria specified in this Section will be reviewed for use on this project subject to compliance with all other specified requirements of the Project Manual. Products/materials shown to exceed specified emission limits shall be discussed, test results interpreted, and a determination made as to alternative product uses or selections.

END OF SECTION

SECTION 01 81 10
WHOLE BUILDING AIR PRESSURIZATION TESTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. For the work of this section, the Construction Manager shall employ an independent agency to conduct the whole building air pressurization test on the building envelope in accordance with this specification section and ASTM E3158.

B. The Construction Manager's testing agent shall perform testing, and if required retesting of the whole building and where applicable each independent building compartment / enclosure.

1.02 DEFINITIONS

A. Air Barrier Envelope: The surface that separates the inside air from the outside air. The combination of air barrier assemblies and air barrier components, connected by air barrier accessories are designed to provide a continuous barrier to the movement of air through an environmental separator. A single building may have more than one air barrier envelope. The air barrier surface includes the top, bottom, and sides of the envelope. The term "air barrier envelope" is also known as "air barrier system" or simply "air barrier".

B. Air Leakage Rate: How leaky, or conversely how airtight a building envelope is. The air leakage is normally described in terms of air flow rate for the surface area of the envelope at a defined differential pressure.

C. Bias Pressure: Also known as zero flow pressure, baseline pressure, offset pressure or background pressure. With the envelope not artificially pressurized, bias is the differential pressure that always exists between the envelope that has been prepared (sealed) for the pressure test and the outdoors. Bias pressure is made up of two components, fixed static offset (usually due to stack effect or the HVAC system) and fluctuating pressure (usually due to wind or a moving elevator). Because of pressure fluctuations many bias pressure readings are recorded and averaged for use in the calculations.

D. Blower Door: Commonly used term for an apparatus used to pressurize and depressurize the space within the building envelope and quantify air leakage through the envelope. The blower door typically includes a door fan and an air resistant fabric or a series of hard panels that extends to cover and seal the door opening between the fan shroud and door frame. The door fan is a calibrated fan capable of measuring air flow and is usually placed in the opening of an exterior door. With the air barrier otherwise sealed, air produced by the door fan pressurizes or de-pressurizes the envelope, depending on the fan's orientation.

E. Environmental Separator: The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments. The term "environmental separator" is also known as the "control layer".

F. Pressure Test: A generic term for a test in which the envelope is either pressurized or depressurized with respect to the outdoors.

1. Negative Pressure Test (Depressurization Test) - A test wherein air inside the envelope is drawn to the outdoors. This places the envelope at a lower (negative) pressure with respect to the outdoors.
2. Positive Pressure Test (Pressurization Test) - A test wherein outdoor air is pushed into the envelope. This air movement places the envelope at a higher (positive) pressure with respect to the outdoors.

1.03 ABBREVIATIONS AND ACRONYMS

A. ANSI. American National Standards Institute: www.ansi.org.

B. ASHRAE. American Society of Heating, Refrigerating and Air-Conditioning Engineers: www.ashrae.org.
C. ASNT. American Society for Nondestructive Testing: www.asnt.org.
D. ASTM. ASTM International: www.astm.org.
E. NIST. National Institute of Standards and Technology: www.nist.gov.

1.04 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced.
B. ANSI/ASNT CP-105 - ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel.
C. ANSI/ASNT CP-189 - ANSI/ASNT CP-189: ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel.
D. ASHRAE RP-1455 - Seminar 65 - Standardized Best of Class Sequences for HVAC Systems.
E. ASNT SNT-TC-1A - Recommended Practice: Personnel Qualification and Certification in Nondestructive Testing.
F. ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
G. ASTM E1186 - Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
H. ASTM E1258 - Standard Test Method for Airflow Calibration of Fan Pressurization Devices.
I. ASTM E1827 - Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.
J. ASTM E3158 - Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building.

1.05 WORK PLAN

A. WORK PLAN: Submit the following not later than 120 calendar days after contract award, but 60 days before start of pressure testing work, steps to be taken by the lead pressure test technician to accomplish the required testing.
B. Memorandum of test procedure.
    1. Proposed dates for conducting the pressure, thermographic and fog tests.
    2. Submit detailed pressure test procedures prior to the test. Provide a plan view showing proposed locations (personnel doors or other similar openings) to install blower doors or flexible ducts (for trailer mounted fans), if used.
C. Test equipment to be used.
D. Scaffolding, scissor lifts, power, electrical extension cords, duct tape, plastic sheeting and other support equipment required to perform all tests.
E. Other support personnel who will be on site for testing.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Submit the Following:
    1. Work Plan.
    2. Product Data for equipment used in the process.
    3. Design Data for envelope surface area and building volume calculations.
    4. Certificates of qualification of testing agencies and equipment calibrations.
    5. Test Reports.

1.07 QUALITY ASSURANCE

A. Perform all pressure and diagnostic tests according to the referenced publications listed in paragraph REFERENCE STANDARDS and as modified by this section. Consider the advisory or recommended provisions, of the referred references, as mandatory.

B. Qualifications of Test Agency: Submit, no later than 15 calendar days after contract award, information certifying that the pressure test agency is not affiliated with any other company participating in work on this contract. The work of the test agency is limited to pressure testing the building envelope, performing a thermography test and fog test, and investigating, through various methods, the location of air leaks through the air barrier.

1. Verification of two years of experience as an agency in pressure testing on buildings of similar size, scope, and complexity.
2. List of at least five applicable projects with building envelopes that the agency has tested within the past two years. Include building name, address, and name of Construction Manager and point-of-contact information.
3. Confirmation of two years of relevant building pressure test experience for the lead pressure test technician and the thermographer in using the specified ASTM E3158 testing standard.
4. References from five Contracting Officers for facilities where the lead test technician has supervised commercial and or industrial building pressure tests within the last two years.
5. Verification that the lead pressure test technician has been employed by a building pressure testing agency in the capacity of a lead pressure test technician for not less than two years.
6. Description of training, qualification, and certifications of test agency personnel. Include trainings and certifications complying with ANSI/ASNT CP-105, ANSI/ASNT CP-189, and ASNT SNT-TC-1A.

C. Test Instruments and Date of Last Calibration: Submit a signed and dated list of test instruments, their application, manufacturer, model, serial number, range of operation, accuracy and date of most recent calibration. Calibration data applicable to fan systems must be in accordance with ASTM E1258.

D. Test Reports: No later than 14 days after completion of the pressure test, submit electronic copies of an organized report. The report shall contain a table of contents, an executive summary, an introduction, a results section and a discussion of the results. Include in the report the following information for all tests:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Outdoor Air Conditions on day of test.
7. Designation of the work and test method.
8. Identification of product and specification section.
9. Complete inspection or test data.
10. Test results and interpretation of test results.
11. Comments or professional opinion on whether inspected or tested work complies with contract document requirements.
12. Recommendations on retesting.

1.08 CLIMATE CONDITIONS SUITABLE FOR TESTING

A. As the test date approaches, monitor the weather forecast for the test site. In accordance with the ASTM E3158 tests shall be performed under appropriate climate and weather conditions.,

Avoid testing on days forecast to experience high winds, rain, or snow. Monitor weather forecasts prior to shipping pressure test equipment to the site. Based on current and forecast weather conditions, the Contracting Officer's representative is to grant final approval for testing to occur.

PART 2 PRODUCTS

2.01 EQUIPMENT FOR TESTING

A. General: Depending on site conditions and size of each envelope volume, the test may be conducted using blower door equipment and/or trailer-mounted fans. The testing agency shall supply sufficient quantity of blower equipment that will produce the required differential pressure under ASTM E3158 between the envelope and outdoors using the test to perform the tests. The testing agency shall supply additional blower test equipment to provide additional airflow capacity or to act as a backup when necessary.

B. Blower Door Fans and Trailer Mounted Fans: Each air flow measuring system including blower door fans and trailer mounted fans are to be calibrated within the last five years. Calibrated blower door fans and trailer mounted fans must measure accurately to within plus or minus 5 percent of the flow reading. Blower door equipment and trailer mounted fans are to be specifically designed to pressurize building envelopes. Each set of blower door equipment is to include fan(s), digital gage(s), door frame, door fabric or hard panels.

C. Digital Gages as Test Instruments: Use only digital gages as measuring instruments in the pressure test; analog gages are not acceptable. The gauges must be accurate to within 1.0 percent of the pressure reading or 0.15 Pa, whichever is greater. Each gage is to have been calibrated within two years of the test. The calibration is to be checked against a National Institute of Standards and Technology (NIST) traceable standard.

D. Thermal measuring equipment: Use thermal measuring equipment in accordance with the requirements of ASTM E3158 testing standard. Provided calibration certifications.

PART 3 EXECUTION

3.01 TEST AGENCY

A. All work shall be performed by qualified personnel as stated in the qualifications section of this specification.

B. Field work: The lead pressure test technician shall be present at the project site while testing is performed and is to be responsible for conducting, supervising, and managing of their respective test work. Management includes health and safety of test agency employees.

C. The lead test technician is to prepare, sign, and date the test agenda, equipment list, and submit a certified Air Leakage Test Report. The Construction Manager is to prepare a final report that identifies improvements that were made to the envelope to reduce air leaks and other issues with the envelope discovered during diagnostic tests.

3.02 ENVELOPE SURFACE AREA CALCULATION

A. The architectural air barrier boundary includes the floor, walls, and ceiling for each building volume to be tested. After construction of the air barrier envelope is complete, field measure the envelope to ensure the physical measurements match the design drawings and calculate the air barrier envelope surface. If the calculation result is not within 10 percent of the defined air barrier boundary calculation result as indicated by the design team, submit the envelope surface area calculation and results for review.

3.03 PREPARATION

A. Testing During Construction: The pressure test cannot be conducted until all components of the air barrier system and contiguous envelope have been installed. After all sealing as described herein has been completed, inspect the envelope to ensure it has been adequately prepared. During the pressure test, stop all ongoing construction within and neighboring the

envelope which may impact the test or the air barrier integrity. The pressure test may be conducted before finishes that are not part of the air barrier envelope have been installed. For example, if suspended ceiling tile, interior gypsum board or cladding systems are not part of the air barrier the test can be conducted before they are installed. Recommend testing prior to installing the finished ceilings within the envelope and immediately surrounding it. The absence of finished ceilings allows for inspection and diagnostic testing of the roof/wall interface and for implementation of repairs to the air barrier, if necessary to comply with the maximum allowed leakage.

B. Sealing the Air Barrier Envelope: Seal all penetrations through the air barrier. Unavoidable penetrations due to electrical boxes or conduit, plumbing, and other assemblies that are not airtight are to be made so by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement or damage and transfer the load to the structure. Durably construct the air barrier to last the anticipated service life of the assembly and to withstand the maximum positive and negative pressures placed on it during pressure testing. Do not install lighting fixtures that are equipped with ventilation holes through the air barrier.
C. Sealing Plumbing: Prime all plumbing traps located within the envelope full of water.
D. Close and Lock Doors: Close and lock all doors and windows in the envelope perimeter. For doors not equipped with latching hardware, temporarily secure them in the closed position. Secure the doors in such a way that they remain fully closed, for the duration of the test, even when the maximum anticipated differential air pressure produced during the test acts on them.
E. Hold Excluded Building Areas at the Outdoor Pressure Level: Keep building areas immediately surrounding but excluded from the test envelope at the outdoor pressure level during the pressure test. Maintain these areas at the outdoor pressure level by propping exterior doors open, opening windows and de-energizing all air moving devices in or serving these areas.
F. Maintain an Even Pressure within the Envelope: To the requirements of ASTM E3158, ensure the pressure differences within the envelope are minimized by opening all internal air pathways including propping open all interior doors. Distribute test fans throughout the envelope to ensure the internal pressures are uniform. Maintained at a differential pressure in accordance with the standard with respect to the outdoors.
G. Minimize Potential for Blowing Dust and Debris: Because high velocity air will be blown into and out of the envelope during the test, debris, including dust and litter, may become airborne. Provide adequate notice to building occupants of blowing dust and debris, and general disruption of normal activities during the test.
H. De-energize Air Moving Devices: De-energize all air moving devices serving the envelope to keep air within the envelope as still as reasonably achievable.
    1. De-energize all fans that deliver air to, exhaust air from, or recirculate air within the envelope. In addition, de-energize all fans serving areas adjacent to but excluded from the envelope.
    2. Controls Contractor shall be available to support this work the day of the test and shall restore air moving devices to automatic operation following the test. The controls contractor shall also be involved in the preparation meeting prior to the test.
I. Installing Blower Door Equipment in a Door Opening: Where blower door fans are used, before installing blower door equipment, select a door opening that does not restrict air flow into and out of the envelope and has at least 5 feet clear distance in front of and behind the door opening. Disconnect the door actuator and secure the door open to prevent it from being drawn into the fan-by-fan pressure. Avoid installing blower door equipment on the windward side of the building. Comply with ASTM E779.

3.04 BUILDING ENVELOPE AIR TIGHTNESS REQUIREMENT

A. The purpose of the pressure (air leakage) test is to determine final compliance with the airtightness requirement by demonstrating the performance of the continuous air barrier. An effective air barrier envelope minimizes infiltration and exfiltration through unintended air paths (leaks). The tests may be performed in any desired order. Comply with ASTM E1186 and ASTM E1827.

B. Architectural envelope: The test envelope is the architectural air barrier boundary as defined on the contract drawings. This boundary includes connecting walls, roof and floor which comprise a complete, whole, and continuous three-dimensional envelope. Perform both a positive pressure test and a negative pressure test on this envelope, unless otherwise directed.

C. Test Goal: Input data from the test into an Air Leakage Rate by Fan Pressurization spreadsheet in an Air Leakage Test Form that follows the ASTM E3158 for reporting, and ASHRAE RP-1455 when applicable to buiding height. Compare output from the spreadsheet against the maximum allowable leakage defined in specification for the air barrier system. The envelope passes the test if the leakage rate, as calculated using the spreadsheet, is equal to or lower than the leakage rate goal stated in the CONDUCTING THE PRESSURE TEST paragraph of this specification.

D. Preparing the Envelope for the Pressure Test: All openings through the Air Barrier shall be sealed. The testing agency shall prepare a checklist and shall work with the Construction Manager to document and prepare all enclosures for testing. Temporarily close all perimeter windows, roof hatches and doors in the envelope perimeter except for those doors that are to remain open to accommodate blower door or trailer mounted fan test equipment installation. Seal, or isolate all other intentional openings, pathways and fenestrations through the architectural envelope prior to pressure testing. Follow the recommended envelope conditions required by the testing standard and associated referenced standards. These openings may include but are not limited to: boiler flues, fuel-burning water heater flues, fuel-burning kitchen equipment, clothes dryer vents, fireplaces, wall or ceiling grilles, and diffusers. Before sealing flues, close their associated fuel valves and verify the associated pilot lights are extinguished. Prime all plumbing traps located within the envelope full of water. In lieu of applying tape and/or plastic, typical temporary sealing materials include tape and sheet plastic or a self-adhesive grille wrap. Use and apply tape and plastic in a manner that does not deface or remove paint or mar the finish of permanent surfaces. Be especially aware of residue that remains from tape applied to stainless steel surfaces such as kitchen hoods or rollup doors. For painted surfaces, use tape types that do not remove finish paint when the tape is removed. If paint is removed from the finished surface, repaint to match existing surfaces. Secure dampers closed either manually or by using the building's HVAC system controls.

3.05 CONDUCTING THE PRESSURE TEST

A. The Construction Manager's independent testing agent shall perform the Whole building air infiltration test in for the building and/or each designated separate compartment in accordance with ASTM E3158. The whole building and each designated whole building area must not have an air leakage rate more than 0.17 cfm/sf at a pressure differential of 0.3 in. wg.

B. To perform the testing, notify the Contracting Officer at least ten working days before conducting the pressure tests to provide the Government the opportunity to witness the tests and to monitor weather forecasts for conditions favorable for testing. Do not pressure test until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions. During the pressure test periodically inspect temporarily sealed items to ensure they are still sealed. Seals on temporarily sealed items tend to release more readily at higher pressures. Test data obtained after temporarily sealed items become unsealed cannot be used as input into the calculation program. Follow the Envelope Pressure Test Procedures in the

paragraphs below. Submit detailed pressure test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed for the building envelope pressure (air tightness) test.

C. Extend Pneumatic Tubes and Establish a Reference Differential Pressure: Confirm the various zones within the envelope have a relatively uniform interior pressure distribution by establishing a representative differential pressure between the envelope and the outdoors with blower door or trailer-mounted fans operating.

D. Bias Pressure Readings: With the fan pressurization equipment de-energized and the envelope sealed, obtain the differential pressure between the outdoors and the envelope. Record 12 bias pressure readings before the pressure test and 12 bias pressure readings after the pressure test. Each reading is the average of ten or more 1-second measurements. Include positive and negative signs for each reading. To help dampen bias pressures that significantly contribute to test pressure, reduce temperature differences between indoor and outdoor air. Temperature differences can be reduced by operating test fan equipment for a few minutes to replace most of the indoor air with outdoor air.

E. Testing in Both Positive and Negative Directions: Testing of the building envelope enclosures shall be conducted in both the pressurized and depressurized directions.

F. The Construction Manager’s third parting testing group shall calculate the envelope leakage rate and other required outputs, input the data obtained during the pressure tests as documented in the Air Leakage Test practices outlined in ASTM E3158 and develop an Excel spread sheet to report the Air Leakage Rate by Fan Pressurization.

3.06 REPAIR, RESTORATION AND PROTECTION AFTER COMPLETION OF THE TEST

A. After all pressure and/or diagnostic testing has been completed unseal all temporarily sealed items. Unless otherwise directed by the Contracting Officer, return all dampers, doors, and windows to their pre-test condition. Remove tape and plastic from all temporarily sealed openings, being careful not to deface painted surfaces. If paint is removed from finished surfaces, repaint to match existing surfaces. Unless otherwise directed by the Contracting Officer's representative, return fuel (gas) valves to their pre-test position and relight pilot lights. Return all fans and air handling units to pre-test conditions.

B. Repair and protection shall be the Construction Manager's responsibility, regardless of the assignment of responsibility for testing, inspection, and similar services. Upon completion of inspection, testing, or sample taking and similar services, repair damaged construction and restore substrates and finishes, protect construction exposed by or for quality control service activities, and protect repaired construction.

3.07 REPORTING

A. As outlined in the QUALITY ASSURANCE paragraph of this specification, the test agency shall prepare a report of the findings of the test. Provide revisions and clarifications required by Owner.

3.08 FAILURES AND RETESTING

A. In the case of the failure of the test the Owner will have the right to request retesting of the building and/or the enclosures where failures have occurred at no additional cost to the owner.

B. The Construction Manager shall remediate the failure points based on the findings of the test and the advisory findings of the testing agent.

END OF SECTION

SECTION 01 81 13
SUSTAINABLE DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section includes general requirements and procedures for compliance with certain prerequisites and credits needed for project to obtain LEED for Schools v4/v4.1 certification.

B. Sustainable Design Intent: Comply with project requirements intended to achieve a LEED "Silver" rating, measured and documented according to the LEED Green Building Rating System of the US Green Building Council (USGBC).

1. Comply with requirements for LEED for Schools v4/v4.1.
2. For specific LEED credit goals refer to 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard attached following this section. The Project will be seeking compliance with selected credits that align with LEED version 4.1.
    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification may depend on aspects of project that are not part of the Work of the Contract.
3. A copy of 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form - LEED Product Data Submittal - Sustainable Attributes Reporting Form is included following this section.
4. Refer to 01 81 16 - Materials Tracking Matrix attached at the end of this section, for specific materials-related LEED requirements that pertain to each individual specification section.
5. Refer to individual specification sections for additional requirements.
6. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as criteria to evaluate substitution requests and comparable product requests.

C. Construction Manager shall be responsible for compliance with and completion of all required documentation for all of the following LEED Credits:

1. Sustainable Sites Prerequisite: Construction Activity Pollution Prevention.
2. Materials and Resources Prerequisite: Storage and Collection of Recyclables.
3. Materials and Resources Prerequisite: Construction and Demolition Waste Management Planning.
4. Materials and Resources Credit: Construction and Demolition Waste Management.
5. Materials and Resources Credit: Building Product Disclosure and Optimization, Environmental Product Declarations – Option 1: EPDs.
6. Materials and Resources Credit: Building Product Disclosure and Optimization, Environmental Product Declarations – Option 2: HPDs.
7. Materials and Resources Credit: Building Product Disclosure and Optimization, Sourcing of Raw Materials – Option 2: Leadership Extraction Practices.
8. Materials and Resources Credit: Building Product Disclosure and Optimization, Material Ingredients – Option 1: Material Ingredient Reporting.
9. Materials and Resources Credit: Building Product Disclosure and Optimization, Material Ingredients – Option 2: Material Ingredient Optimization.
10. Indoor Environmental Quality Prerequisite: Environmental Tobacco Smoke Control.
11. Indoor Environmental Quality Credit: Environmental Tobacco Smoke Control.
12. Indoor Environmental Quality Credit: Low Emitting Materials.
13. Indoor Environmental Quality Credit: IAQ Construction Plan.

14. Indoor Environmental Quality Credit: IAQ Assessment.
15. Refer to Section 01 81 19 - Indoor Air Quality Requirements for post-construction requirements.

D. Additional prerequisite and credit compliance requirement information is available from the LEED for Schools v4/v4.1, and LEED v4.0 and v4.1, credit libraries: http://www.usgbc.org/credits.

1.02 DEFINITIONS

A. Agrifiber Products: Composite panel products derived from agricultural fiber.

B. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.

C. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.

D. Bio-Based Materials: Materials that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM D6866 and be legally harvested, as defined by the exporting and receiving country.

E. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood-based materials and products have been certified in accordance with the Forest Stewardship Council’s (FSC) Principles and Criteria. Certificates shall include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.

F. Chain-of-Custody (COC): A procedure that tracks a product from the point of harvest or extraction to its end use, including all successive stages of processing, transformation, manufacturing, a distribution.

G. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.

H. Composite Wood and Agrifiber: A product made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

I. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, and demolition operations. A construction waste management plan is to be provided by the Construction Manager as defined in Section 01 74 19 - Construction Waste Management and Disposal.

J. Cradle-to-Gate Assessment: analysis of a product's partial life cycle, from resource extraction (cradle) to the factory gate, before it’s transported for distribution and sale. It omits the use and the disposal phases of the product.

K. EPD: Environmental Product Declaration. An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.

1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
2. Industry-Wide (Generic) EPD: Provide products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
3. Product-Specific Type III EPD: A product with a third-party certification, including external verification, in which the manufacturer is explicated recognized by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle-to-gate scope.

L. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the product's useful life.
M. HPD: Health Product Declaration, a tool for the accurate reporting of a product or material's components and ingredients. The HPD is the standard format for reporting product content and associated health information for building products and materials. www.hpd-collaborative.org/.
N. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Construction Manager to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA (IAQ)) "IAQ Guidelines for Occupied Buildings Under Construction." See Section 01 81 19 - Indoor Air Quality Requirements for additional requirements.
O. LCCA: Life Cycle Cost Analysis.
P. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.
Q. LEED: The Leadership in Energy and Environmental Design green building rating systems developed and adopted by the U.S. Green Building Council.
R. LEED S: The Leadership in Energy and Environmental Design green building rating system developed and adopted by the USGBC for school buildings.
S. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.
T. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.
U. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following six categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone creation; nonrenewable resource depletion.
V. Passive (As Related to MEP): Not part of the active portions of the Mechanical, Electrical, and Plumbing systems, for example piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, showerheads, and lamp housings.
W. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Claims must be compliant with ISO 14021.
X. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
Y. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream per FTC Act, Part 260: www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguides.pdf.
Z. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the project site.
AA. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured.
BB. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible

photochemical reactivity, listed in 40 CFR 51.100(s), are also excluded from this regulatory definition.

1.03 ABBREVIATIONS AND ACRONYMS

A. ANSI. American National Standards Institute; www.ansi.org.
B. ASTM. ASTM International: www.astm.org.
C. BIFMA. Business and Institutional Furniture Manufacturer's Association: www.bifma.org.
D. CAL (CDPH). California Department of Public Health: cdph.ca.gov.
E. CARB. California Air Resources Board: ww2.arb.ca.gov.
F. Cradle-to-Cradle Certified Product Standard: c2ccertified.org/.
G. CRI (GL) and (GLP). The Carpet and Rug Institute Green Label and Green Label Plus: carpet-rug.org.
H. EN. European Standards: www.en-standard.eu.
I. Federal Trade Commission, Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7(e): www.govinfo.gov/app/details/CFR-2011-title16-vol1/CFR-2011-title16-vol1-sec260-7.
J. FSC: Forest Stewardship Council: us.fsc.org/.
K. GreenScreen Certified: certifies products that are PFAS-free and avoid other toxic chemicals, including phthalates, bisphenols, and organohalogens. www.greenscreenchemicals.org/.
L. ISO. International Organization for Standardization: www.iso.org.
M. SMACNA. The Sheet Metal and Air Conditioning Contractors' National Association: www.smacna.org.
N. South Coast Air Quality Management District (SCAQMD): www.aqmd.gov.
O. U.S. Green Building Council (USGBC); www.usgbc.org.

1.04 REFERENCE STANDARDS

A. 16 CFR 260.7 - Federal Trade Commission Guide for the Use of Environmental Marketing Claims.
B. 40 CFR 51.100 - Requirements for Preparation, Adoption, and Submittal of Implementation Plans - Subpart F-Procedural Requirements.
C. 2002 Farm Bill - Farm Security and Rural Investment Act.
D. ASTM D6866 - Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis.
E. BIFMA e3 - Furniture Sustainability Standard.
F. BIFMA M7.1 - Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components, and Seating.
G. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2.
H. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products.
I. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board.
J. CRI (GL) - Green Label Testing Program - Certified Products.
K. CRI (GLP) - Green Label Plus Testing Program - Certified Products.
L. EN 15804 - Sustainability of Construction Works - Environmental Product Declarations - Core Rules for the Product Category of Construction Products.
M. ENERGY STAR - ENERGY STAR.
N. FSC-STD-01-001 - FSC Principles and Criteria for Forest Stewardship.
O. FTC Act, Part 260 - Guides for the Use of Environmental Marketing Claims.

P. ISO 14021 - Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling).
Q. ISO 14025 - Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures.
R. ISO 14040 - Environmental Management - Life Cycle Assessment - Principles and Framework.
S. ISO 14044 - Environmental Management - Life Cycle Assessment - Requirements and Guidelines.
T. ISO 21930 - Sustainability in Buildings and Civil Engineering Works — Core Rules for Environmental Product Declarations of Construction Products and Services.
U. SCAQMD 1113 - Architectural Coatings.
V. SCAQMD 1168 - Adhesive and Sealant Applications.
W. SMACNA (IAQ) - SMACNA IAQ Guidelines for Occupied Buildings Under Construction.
X. WaterSense - Water Sense, an EPA Partnership Program.

1.05 SUBMITTALS

A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted USGBC's final review of LEED certification.
   1. Provide documentation required by LEED and LEED review, for specific credits listed below, and by Section 01 81 16 - Materials Tracking Matrix, and by individual technical specifications sections.
B. Information Submittals
   1. Coordination of submittals: Coordinate LEED submittals with general submittal requirements as indicated in Section 01 30 00 - Administrative Requirements.
   2. Qualification Data: For LEED Coordinator.
   3. Sustainable Design Action Plans: Provide preliminary submittals within 14 days of date established for commencement of the work, indicating how the following requirements will be met:
      a. List of proposed products with EPDs.
      b. List of proposed products complying with requirements for multi-attribute optimization.
      c. List of proposed products complying with requirements for sourcing of raw materials.
      d. List of proposed products complying with requirements for material ingredient reporting.
      e. List of proposed products complying with requirements for material ingredient optimization.
      f. Waste management plan complying with Section 01 74 19 - Construction Waste Management and Disposal.
      g. Construction IAQ management plan.
      h. IAQ assessment plan.
      i. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.
C. LEED Documentation Submittals
   1. Sustainability submittals shall be in addition to other submittals. If a submitted item is identical to that submitted to comply with other requirements, include an additional copy with the other submittal as record of compliance with indicated LEED requirements. Mark additional copy "Sustainability Submittal."
   2. For all credits: LEED documentation submittals must be prepared and submitted using the LEED-Online Credit web-based application (https://www.usgbc.org/leedonline/) and minimum system requirements.

3. Once Construction Manager has joined the project through LEED-Online, the LEED Project Administrator will assign the LEED credits that the Construction Manager is responsible for completing.
4. Once Construction Manager has joined the project through LEED-Online, the LEED Project Administrator will assign the LEED credits that the Construction Manager is responsible for completing.
    a. LEED Online is only accessible through Safari, Internet Explorer and Firefox at this time.
    b. Each “Credit Form” is an editable Adobe pdf document. It may be completed or updated at any time prior to the LEED Construction Submittal. After you have completed documenting the credit, use the ‘Save’ button at the lower right hand corner of the Form to save the data online.
    c. Additional submittal documentation and back-up requirements should be uploaded to the “File Uploads” section of LEED-Online following the required documentation support for each credit.
5. Contractor must use 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form to track LEED materials.
6. Project submittals must be accompanied by a completed 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form. Submittal packages must also include highlighted documentation supporting the sustainability claims made on the 01 81 15 - LEED v4 Product Data - Sustainable Attributes Reporting Form.
7. Provide separate submittal packages for each of the following categories:
    a. Plumbing.
    b. Mechanical.
    c. Electrical.
8. Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.
9. Recycled Content: Submittals for all materials with recycled content (excluding active MEP systems equipment and components) must include the following documentation:
    a. Cost of each material or product, including taxes and delivery expenses to project site, but excluding cost of labor and equipment for installation.
    b. Manufacturer’s product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product.
10. Provide documentation for products that comply with LEED requirements for multi-attribute optimization.
11. Credit-Specific Submittal Requirements:
    a. Sustainable Sites Prerequisite Construction Activity Pollution Prevention. Using the LEED Online Credit form, provide:
        1) A narrative describing the implemented erosion and sedimentation control measures and how these were maintained.
        2) Photographic evidence of the implemented measures from various stages throughout construction.
    b. Water Efficiency Prerequisite and Credit Water Metering and Energy & Atmosphere Prerequisite and Credit Energy Metering: Product Data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy and water consumption performance over time.

c. Materials and Resources Prerequisite and Credit: Construction and Demolition Waste Management: Comply with Division 01 Section "Construction Waste Management." Using the LEED Construction and Demolition Waste Calculator and the LEED Credit Form:
   1) Complete the construction waste calculation tables including: General description of each type/category of waste generated; location of receiving agent (recycler/landfill) for waste; quantity of waste diverted (by category) in tons or cubic yards.
   2) Provide a narrative describing the project's construction waste management approach including a copy of the project's construction waste management plan. Please provide any additional comments or notes to describe special circumstances or considerations regarding the project's credit approach.
   3) Provide the Construction Waste Management Plan.
   4) Provide the hauling/recycling tags/tickets or receipts from the project.
   5) Provide project-specific documentation of recycling rate for comingled facilities.

d. Materials and Resources Credit: Building Product Disclosure and Optimization – Environmental Product Declaration- EPDs - Environmental Product Declarations Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
   1) Provide a list of manufacturers providing EPDs.
   2) Provide copy of each EPD including statement type for each EPD: Product specific declarations, Industry wide generic EPDs and product-specific Type III EPDs are acceptable. Provide EPDs that conform to ISO 14025, ISO 14040, ISO 14044, and EN 15804 or ISO 21930 and have a cradle-to-gate scope.

e. Materials and Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials, Leadership Extraction Practices - Recycled Content Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
   1) Provide the total project materials cost per “Project Materials Cost Data” in the Submittals section above.
   2) Provide a tabulation of each material used on the project that is being tracked for recycled content. The tabulation must include a description of the material, the manufacturer of the material, the product cost, the pre-consumer and/or post-consumer recycled content percentage, and the source of the recycled content data.
   3) Provide a tabulation of each material used on the project that is being tracked for regional content (excluding active MEP systems equipment and components). The tabulation must include:
      (a) Description of the material.
      (b) Manufacturer of the material.
      (c) Cost of each material or product, including taxes and delivery expenses to project site, but excluding cost of labor and equipment for installation.
      (d) Percentage of the product by weight that meets both the extraction and manufacturer location criteria.
      (e) Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the project site.
      (f) Distance between the project site and final manufacturing location.

(g) Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the project site to the point of manufacture for each regional material.

4) Provide Manufacturer cut sheets, literature, or letters highlighting the overall post-consumer and/or post-industrial recycled content percentages (by weight) of each listed product.

5) Provide Manufacturer cut sheets, literature, or letters highlighting address location of each material's extraction/harvest/recovery and manufacturing / processing sites and a map (Yahoo Maps, Google Maps or equivalent) indicating distances from each location to the project site.

f. Building Product Disclosure and Optimization – Sourcing of Raw Materials, Leadership Extraction Practices - FSC Certified Wood Products. Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:

1) Provide total of all new, permanently installed wood-based construction materials cost per "Project Materials Cost Data" in the Submittals section above.

2) Provide a list of items (and/or components of products) claimed as FSC-certified, including product type, manufacturer, and the entity's Chain of Custody (COC) certification number. (Each product name can then be cross-referenced with the manufacturer or vendor COC number during the LEED certification review.) Visit www.fscus.org/green_building for more information.

3) Provide official proof of FSC Chain of Custody certification of all fabricators including, but not limited to, millworkers and cabinetmakers, who modify or alter the FSC wood products before they are installed in the project.

4) Submittals for all wood-based materials must include itemized invoices indicating the cost of each listed product containing FSC Certified wood, inclusive of taxes and delivery costs, exclusive of labor and equipment for installation, and certificates of chain-of-custody from manufacturers certifying that specified certified-wood products were made from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC-STD-01-001 1.2 "Principles and Criteria." All woodworkers or subcontractors that supply custom wood products to the project must also carry a chain-of-custody certificate.

g. Materials and Resources Credit: Building Product Disclosure and Optimization – Material Ingredients- Material Ingredient Reporting- Material Ingredient Reporting Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:

1) Provide a list of manufactures providing material ingredient reporting.

2) Provide a list of each separate product providing material ingredient reporting.

3) Provide copy of each material reporting statement that may contribute to the documentation. Provide compliant material ingredient reports for products that comply with LEED requirements, including but not limited to the following:

(a) Manufacturer Inventory.

(b) Health Product Declaration.

(c) Cradle to Cradle Material Health Certificate.

(d) Declare product labels.

(e) UL Product Lens certifications.

(f) ANSI / BIFMA e3 Furniture Sustainability Standard.

(g) Other USGBC-approved program.

h. Indoor Environmental Quality Credit Low-Emitting Materials. Using the LEED Low Emitting Calculator and LEED Online Credit Form, provide the following:
   1) A listing of each interior applied paints and coating. Include the manufacture's name, product name, specific VOC data (in g/L less water) for each product, and the corresponding allowable VOC from the referenced standard: California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario, VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. Include cut sheets, MSDS, or other manufacturers' data confirming compliance with the VOC limits.
   2) A listing of each indoor adhesive, sealant and sealant primer product used on the project. Include the manufacture's name, product name, specific VOC data (in g/L less water) for each product, and the corresponding allowable VOC from the referenced standard, California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario, or SCAQMD Rule 1168, July 1, 2005. Include cut sheets, MSDS, or other manufacturers' data confirming compliance with the VOC limits.
      (a) Provide manufacturers' documentation and/or product data highlighting VOC content and verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.
      (b) Wet applied products: Provide documentation that the paints and/or coatings meet the CAL (CDPH SM): for the emissions testing and requirements of all products and materials except furniture. Compliance claims must include the amount applied in mass per surface area and state the range of total VOCs (tVOCs) after 14 days measured as indicated in the CAL (CDPH SM).
   3) A listing of each exterior applied adhesive, sealant, coating, roofing, and waterproofing materials on the project. Include the manufacture's name, product name, specific VOC data (in g/L less water) for each product, and the corresponding allowable VOC from the referenced standard, California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings, and SCAQMD Rule 1168, July 1, 2005. Include cut sheets, MSDS, or other manufacturers' data confirming compliance with the VOC limits.
   4) A listing of each composite wood and agrifiber product (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) installed in the building interior, including those manufactured off-site, such as toilet partitions, backer board, door cores and engineered wood, including manufacture's name and product name. Confirm that the product meets the low formaldehyde emissions that meet the CARB (ATCM) for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins. Include cut sheets or manufacturer literature or letters indicating the bonding agents for each composite wood and agrifiber material used in the project, showing that no added urea-formaldehyde resins were used in these products or meets ULEF criteria.
      (a) Salvaged and reused architectural millwork more than one year old at the time of occupancy is considered compliant, provided it meets the requirements for site-applied paints, coatings, adhesives, and sealants.
   5) A listing of flooring installed in the project. Include manufacturer's documentation confirming that the product has been tested and determined compliant in

accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

(a) Carpet Systems: Submittals for all carpet must include manufacturer's product data verifying that all carpet systems meet or exceed the testing and product requirements of the CRI (GLP) program, and laboratory test reports for carpet systems documenting compliance with requirements for low-emitting materials.

(b) Terrazzo and Fluid-Applied Flooring: Submittals for all resilient floorcoverings must include manufacturer's product data verifying compliance with CAL (CDPH SM), and laboratory test reports for terrazzo and fluid-applied flooring documenting compliance with requirements for low-emitting materials.

(c) Engineered Wood Flooring and Bamboo Flooring: Submittals for all engineered wood flooring and bamboo flooring must include manufacturer's product data verifying No Added Formaldehyde, and laboratory test reports for engineered wood flooring and bamboo flooring documenting compliance with requirements for low-emitting materials.

6) Ceilings: Submittals for all ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, and suspended systems. Submittals for all ceiling systems must include manufacturer's product data verifying compliance with CAL (CDPH SM) .

7) Insulation: Submittals for all thermal and acoustic boards, batts, rolls, blankets, sound attenuation fire blankets, foamed-in place, and sprayed insulation. Submittals for all insulation must include manufacturer's product data verifying compliance with CAL (CDPH SM).

8) Batt insulation: Submittals for batt insulation products including manufacturer's product data verifying no added formaldehyde including urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde.

i. Indoor Environmental Quality Credit Construction IAQ Management Plan. Provide the following:

1) A copy of the project's Indoor Air Quality Management Plan, highlighting the no-smoking policy.

2) Confirm if the permanently installed air handling equipment was used during construction.

3) Six photographs at each of three different times during the construction period to highlight the implemented construction IAQ practices.

4) List all filtration media (manufacturer, model number, MERV rating, location of installed filter) installed during construction and confirm that each unit was replaced prior to occupancy.

5) A narrative describing protection measures for absorbent materials.

j. Indoor Air Quality Assessment: Provide the following:

1) A Flush-out Report documenting the required volume and duration of the flush-out and describing the project's specific flush-out procedures, with product data for filtration media used during flush-out and during occupancy.

Or:

2) A copy of the Air Testing Report documenting the procedures for air testing, the locations, dates and results of each test.

12. Project Materials Cost Data: Provide a USGBC-approved spreadsheet in an electronic file indicating the total cost for the project and the total cost of building materials used for the project, as follows:

a. Not more than 60 days after the preconstruction meeting, the Construction Manager shall provide to the Owner and Architect a preliminary schedule of materials costs for all materials used for the project organized by Specification section. Exclude labor costs and all active mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:
   1) Identify each reused or salvaged material, its cost, and its replacement value.
   2) Identify each recycled-content material, its post-consumer and pre- consumer recycled content as a percentage of the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
   3) Identify each regional material, its cost, its manufacturing location, the distance of this location from the project site, the source location for each raw material component of the material, the distance of these extraction locations from the project site, and the total value of regional materials as a percentage of total materials costs.
   4) Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
   5) Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of FSC Certified wood as a percentage of total wood-based materials costs.
b. Provide final versions of the above spreadsheets to the Owner and Architect not more than 14 days after Substantial Completion.

D. LEED Coordinator: Engage an experienced LEEP Accedited Professional to coordinate LEED Requirements. LEED Coordinator may also serve as Waste Management Coordinator.

1.06 QUALITY ASSURANCE

A. Preconstruction Meeting: After award of contract and prior to the commencement of the work, schedule and conduct meeting with Owner, Architect, and all subcontractors to discuss the Construction Waste Management Plan, the required Construction Indoor Air Quality (IAQ) Management Plan, and all other sustainable design requirements. The purpose of this meeting is to develop a mutual understanding of the project's sustainable design requirements and coordination of the Construction Manager's management of these requirements with the Contracting Officer and the Construction Quality Manager.

B. Construction Job Conferences: The status of compliance with the sustainable design requirements of these Specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

C. LEED Coordinator: Engage an experienced LEEP Accedited Professional to coordinate LEED Requirements. LEED Coordinator may also serve as Waste Management Coordinator.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this section. Although other sections may specify some requirements that contribute to LEED credits, Construction Manager shall determine additional materials and procedures necessary to obtain LEED credits indicated. Contractor to determine a combination of credit options best suited for achieving credits required.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

B. Unauthorized Products: Materials and products required for work of this section shall not contain asbestos, lead, mercury, polychlorinated biphenyls (PCBs), or other hazardous materials identified by the Owner.

2.02 PRODUCT ENVIRONMENTAL REQUIREMENTS

A. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 1. Provide at least 20 permanently installed products (sourced from at least five different manufacturers) meeting one of the disclosure criteria:
   1. ISO 14044 Conforming LCA: Valued as one whole product.
   2. Industry-Wide Type III EPD: Valued as one whole product.
   3. Product-Specific Type III EPD (Internally Reviewed): Valued as one whole product.
   4. Product-Specific Type III EPD (Externally Reviewed and Verified): Valued as 1-1/2 products.

B. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 2. Use products that have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD. Use at least 5 permanently installed products sourced from at least three different manufacturers.

C. Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices. Provide products that meet at least one of the responsible extraction criteria below for at least 25 percent, by cost, of the total value of permanently installed building products in the project:
   1. Extended producer responsibility program.
   2. Bio-based materials.
   3. FSC Certified Wood: Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:
      a. Rough carpentry.
      b. Miscellaneous carpentry.
      c. Heavy timber construction.
      d. Wood decking.
      e. Metal-plate-connected wood trusses.
      f. Structural glued-laminated timber.
      g. Finish carpentry.
      h. Architectural woodwork.
      i. Wood paneling.
      j. Wood veneer wall covering.
      k. Wood flooring.
      l. Wood cabinets.
      m. Furniture.
   4. Materials Reuse: The following materials may be salvaged, refurbished, or reused materials:
      a. Those identified by Architect.
   5. Recycled content.
      a. Exceptions: Do not include fire protection, operational plumbing, operational mechanical, and operational electrical components, and specialty items, such as elevators and equipment, in the calculation.

b. Regional content: Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

6. Additionally, for any product meeting at least one of attributes 1-5 above: Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

D. Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

1. Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm), which meet one of the following disclosure criteria:
   a. Manufacturer Inventory.
   b. Health Product Declarations (HPDs).
   c. Cradle to Cradle (C2C) certifications.
   d. Declare product labels.
   e. BIFMA e3 Furniture Sustainability Standard,
   f. UL Product Lens certifications.

E. Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

1. Use at least 5 permanently installed products sourced from at least three different manufacturers that have a compliant material ingredient optimization report or action plan. Products are weighted as shown below.
   a. Material Ingredient Screening and Optimization Action Plan (0.5 product) - action plan based on publicly available material Inventory to at least 1,000ppm prepared by the manufacturer and signed by a manufacturer executive.
   b. Advanced Inventory and Assessment (1 product) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Bronze Level or higher, Declare Label designated as Red List Free or LBC Red List Free, or Health Product Declaration (HPD) that Inventories Ingredients to at least 100ppm and no GreenScreen LT-1 hazards or GHS Category 1 hazards are present OR 75 percent by weight of the product Is assessed using GreenScreen and the remaining 25 percent has been Inventoried.
   c. Material Ingredient Optimization (1.5 products) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Silver Level or higher, Living Product Challenge certified with Imperative 09, or Health Product Declaration (HPD) that Inventories to at least 100ppm and 95 percent by weight of the product Is assessed using GreenScreen with no BM-1 hazards present and the remaining 5 percent has been Inventoried and screened using GreenScreen List Translator and no LT-1 hazards are present.

F. Indoor Water Use Reduction:

1. Appliances: Provide ENERGY STAR or performance equivalent.
2. Plumbing Fixtures: Do not exceed water flow requirements indicated in Division 22 – Plumbing. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled.

2.03 LOW-EMITTING MATERIALS

A. General Emissions requirements for all applicable products under the Low-Emitting Materials credit.

1. Products must demonstrate they have been tested and determined compliant in accordance with CAL (CDPH SM), using the applicable exposure scenario.

2. Manufacturer's documentation demonstrating compliance must state the range of total VOCs (tVOC) after 14 days measured as specified in the CAL (CDPH SM) as follows:
   a. .5mg/m3 or less.
   b. Between 0.5 and 5.0 mg/m3.
   c. .50 mg/m3 or more.

B. Adhesives and sealants used inside the building waterproofing system must meet the following standards:
   1. Testing and product requirements of CAL (CDPH SM).
   2. VOC Content: SCAQMD 1168 VOC limits, Less Water and Less Exempt Compounds (as per the table below)
   3. Exterior applied adhesives, sealants, coatings, roofing, and waterproofing applied on site must meet the general emissions requirements AND the VOC limits of CARB (SCM) and SCAQMD 1168.
   4. Adhesives used to apply laminates, whether shop-applied or field-applied, shall contain No Added Formaldehyde.

C. Paints and Coatings:
   1. Paints and Coatings applied inside the building waterproofing system must meet the following standards:
      a. Testing and product requirements of CAL (CDPH SM).
      b. VOC content: SCAQMD 1113 (see the table below):

SCAQMD 1113	
Product Type	Allowable VOC Content (g/L)
Bond Breaker	350
Building Envelope Coatings	50
Clear wood finishes - Varnish	275
Clear wood finishes - Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant – Architectural Coatings, excluding IM coatings	50
Colorant – Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete – Curing compounds	100
Concrete – Curing compounds for roadways and bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings – Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings – Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150

SCAQMD 1113	
Product Type	Allowable VOC Content (g/L)
Industrial maintenance coatings	100
Industrial maintenance coatings - color indicating safety coatings	480
Industrial maintenance coatings – High temperature IM coatings	420
Industrial maintenance coatings – Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings – Zinc rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	150
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac - Clear	730
Shellac – Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings - other	340
Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete / masonry sealers	
Wood preservatives	350
Low solids coatings	120
SCAQMD 1168 **- Architectural Applications**	
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50

SCAQMD 1168 **- Architectural Applications**	
Indoor carpet adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
SCAQMD 1168 **- Substrate Specific Applications**	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50
Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
SCAQMD 1168 **- Sealants**	
Architectural sealant	250
Marine deck sealant	760
Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealants	420
SCAQMD 1168 **- Sealant Primers**	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
SCAQMD 1168 **- Other**	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

D. Flooring Systems: Provide products that conform to one of the following compliance paths:
   1. Path 1: All flooring elements installed in the building interior must meet the testing and product requirements of CAL (CDPH SM). Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.
   2. Path 2: All flooring must comply with the following as applicable to the project scope:
      a. All carpet installed in the building interior must meet the testing and product requirements of CRI (GLP). (Green Label Plus does not address backer or adhesive.)
      b. All carpet pads must meet or exceed CRI (GL) testing and product requirements. http://www.carpet-rug.org/.
      c. FloorScore standard is applicable if the testing includes CAL (CDPH SM) evaluation. All hard surface flooring must meet the requirements of the FloorScore standard (current as of the date of this rating system, or more stringent version) as shown with testing by an independent third party. Flooring products covered by FloorScore include linoleum, laminate flooring, ceramic flooring, rubber flooring and wall base.
      d. Mineral based finish-flooring products such as tile, without integral organic-based coatings and sealants qualify for credit without any IAQ testing requirements. However,

associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based flooring system to qualify for credit.

e. Concrete finishes such as sealer, stain and finish must meet the requirements of SCAQMD 1113.

f. Tile setting adhesives and grout must meet SCAQMD 1168.

g. Provide certification from manufacturer that product complies with requirements.

E. Composite Wood and Agrifiber Products: Provide products conforming to one of the following compliance paths:

1. Path 1: All composite wood and agrifiber products installed in the building interior must meet the testing and product requirements of CARB (SCM) for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
2. Path 2: Composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added ureaformaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores. Materials considered fixtures, fit-out, furniture, and equipment (FFE) are not considered base building elements and are not included.

F. Furniture:

1. Furniture Evaluation - tested in accordance with BIFMA M7.1; comply with BIFMA e3 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in BIFMA M7.1.

G. Ceilings and Walls: All ceiling and wall products installed in the building interior must meet the general emissions testing and product requirements of the CAL (CDPH SM).

H. Insulation:

1. Batt insulation products may contain no added formaldehyde, including urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde.
2. All insulation installed in the building interior must meet the general emissions testing and product requirements of CAL (CDPH SM).

2.04 INDOOR WATER USE REDUCTION

A. Building and appliance water use reduction:

1. Provide water reduction labeled products for interior plumbing fixtures. Do not exceed water flow requirements indicated in Section 22 00 10 - Plumbing.
2. Provide US EPA ENERGY STAR or performance equivalent appliances or water process equipment. Comply with other LEED requirements for process water use, indicated in Sections 22 00 10 - Plumbing and 23 00 10 - HVAC.

PART 3 EXECUTION

3.01 PROCEDURES

A. General: Conduct project management and construction operations in a manner consistent with, and in support of successful achievement of Owner's targeted certification level.

B. Construction Waste Management and Disposal: Implement approved waste management plan during the entire duration of the Contract. See Section 01 74 19 - Construction Waste Management and Disposal.

C. Commissioning Authority Activities: Cooperate with Commissioning Authority to coordinate construction and closeout activities scheduling. See Section 01 91 13 - MEP Commissioning Requirements.

D. Smoking Policy: See Section 01 81 19 - Indoor Air Quality Requirements.

END OF SECTION

SECTION 01 81 14
LEED PROJECT SCORECARD

LEEDv4 BD+C: Schools (LEEDv4 SC)
Project Scorecard

The Green Engineer
Sustainable Design Consulting

Project: Wilmington Elementary School
Address: 320 Salem Street Wilmington, MA
Date: 2/19/26

Yes	Maybe	No				
1	0	0	**INTEGRATIVE PROCESS**		**1**	**Responsible**
1			IPc1	Integrative Process	1	Team
Yes	**Maybe**	**No**				
4	0	11	**LOCATION & TRANSPORTATION**		**15**	**Responsible**
		N	LTc1	LEED for Neighborhood Development Location	15	Team
1			LTc2	Sensitive Land Protection	1	Civil
1		1	LTc3	High Priority Site	1-2	Env. Eng.
1		4	LTc4	Surrounding Density and Diverse Uses	1-5	TGE
		4	LTc5	Access to Quality Transit	1-4	TGE
		1	LTc6	Bicycle Facilities	1	Arch/LA
		1	LTc7	Reduced Parking Footprint	1	Arch/Civil
1			LTc8	Green Vehicles	1	Arch/Civil
Yes	**Maybe**	**No**				
7	4	1	**SUSTAINABLE SITES**		**12**	**Responsible**
Y			SSpr1	Construction Activity Pollution Prevention	Req'd	Civl/CM
Y			SSpr2	Environmental Site Assessment	Req'd	Env. Eng.
1			SSc1	Site Assessment	1	Arch/Civil/LA
2			SSc2	Site Development - Protect or Restore Habitat	1-2	LA
1			SSc3	Open Space	1	LA
1	2		SSc4	Rainwater Management	2-3	Civil
	2		SSc5	Heat Island Reduction	1-2	Arch/LA
1			SSc6	Light Pollution Reduction	1	MEP/LA
		1	SSc7	Site Master Plan	1	Owner
1			SSc8	Joint Use of Facilities	1	Arch/Owner
Yes	**Maybe**	**No**				
8	2	2	**WATER EFFICIENCY**		**12**	**Responsible**
Y			WEpr1	Outdoor Water Use Reduction	Req'd	LA
Y			WEpr2	Indoor Water Use Reduction	Req'd	MEP
Y			WEpr3	Building-level Water Metering	Req'd	Owner/MEP
2			WEc1	Outdoor Water Use Reduction	1-2	LA
3	2	2	WEc2	Indoor Water Use Reduction	1-7	MEP
2			WEc3	Cooling Tower Water Use	1-2	MEP
1			WEc4	Water Metering	1	MEP
Yes	**Maybe**	**No**				
23	1	7	**ENERGY & ATMOSPHERE**		**31**	**Responsible**
Y			EApr1	Fundamental Commissioning and Verification	Req'd	CxA
Y			EApr2	Minimum Energy Performance	Req'd	Team/Modele
Y			EApr3	Building-level Energy Metering	Req'd	MEP
Y			EApr4	Fundamental Refrigerant Management	Req'd	MEP
6			EAc1	Enhanced Commissioning	2-6	CxA
16			EAc2	Optimize Energy Performance	1-16	Team/Modele
1			EAc3	Advanced Energy Metering	1	MEP
		2	EAc4	Demand Response	1-2	Owner/MEP
		5	EAc5	Renewable Energy Production	1-3	Owner
	1		EAc6	Enhanced Refrigerant Management	1	MEP

Yes	Maybe	No	MATERIALS & RESOURCES		13	Responsible
Y			MRpr1	Storage & Collection of Recyclables	Req'd	Owner/Arch.
Y			MRpr2	Construction and Demolition Waste Management Plan	Req'd	CM
	1	4	MRc1	Building Life-Cycle Impact Reduction	2-5	Arch
1	1		MRc2	Building Product Disclosure & Optimization-EPD's	1-2	Arch/CM
	1	1	MRc3	Building Product Disclosure & Optimization-Raw Materials	1-2	Arch/CM
1	1		MRc4	Building Product Disclosure & Optimization-Material Ingredients	1-2	Arch/CM
1	1		MRc5	Construction and Demolition Waste Management	1-2	CM

Yes	Maybe	No	INDOOR ENVIRONMENTAL QUALITY		16	Responsible
Y			EQpr1	Minimum IAQ Performance	Req'd	MEP
Y			EQpr2	Environmental Tobacco Smoke (ETS) Control	Req'd	Owner
Y			EQpr3	Minimum Acoustical Performance	Req'd	Acoust. Eng.
2			EQc1	Enhanced IAQ Strategies	1-2	Arch/MEP
3			EQc2	Low-Emitting Materials	1-3	Arch/CM
1			EQc3	Construction IAQ Management Plan	1	CM
1	1		EQc4	IAQ Assessment	1-2	Owner/CM
1			EQc5	Thermal Comfort	1	MEP
1	1		EQc6	Interior Lighting	1-2	Arch/MEP
	3		EQc7	Daylight	1-3	Arch
	1		EQc8	Quality Views	1	Arch
	1		EQc9	Acoustic Performance	1	Acoust. Eng.

Yes	Maybe	No	INNOVATION		6	Responsible
1			INc1.1	Innovation: O+M - Green Cleaning + IPM	1	Team
1			INc1.2	Innovation: Local Food Production	1	Team
1			INc1.3	Innovation: Purchasing - Lamps	1	Team
1			INc1.4	Exemplary Performance Credit: Optimize Process Water Use (100% reduction)	1	Team
1			INc1.5	Pilot Credit: Integrative Analysis of Building Materials	1	Team
1			INc2	LEED Accredited Professional	1	Team

Yes	Maybe	No	REGIONAL PRIORITY 01887 (underlined)		4	Responsible
		X	RPc1	Regional: Surrounding Density (4 pts)	1	-
		X	RPc2	Regional: Access to Quality Transit (1 pt)	1	-
1			RPc3	Regional: Protect or Restore Habitat (2 pts)	1	-
1			RPc4	Regional: Optimize Energy Performance (8 pts)	1	-
			RPcX	Regional: Renewable Energy (2 pts)	1	-
			RPcX	Regional: Building Lifecycle Impact Reduction (2 pts)	1	-

Yes	Maybe	No	PROJECT TOTALS (Certification Estimates)	110
63	19	26		

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

END OF SECTION

SECTION 01 81 15
LEED PRODUCT DATA SUBMITTAL - SUSTAINABLE ATTRIBUTES REPORTING FORM

LEED PRODUCT DATA SUBMITTAL - SUSTAINABLE ATTRIBUTES REPORTING FORM

THIS FORM IS REQUIRED TO BE SUBMITTED *WITH ALL 'Product Data Submittals'*

You must include backup documentation such as *SPECIFIC* Product Data Sheets, Cut Sheets, Product Specific Letter from Manufacturer, and others. DO NOT INCLUDE GENERIC MARKETING MATERIAL

PROJECT NAME:
SUBCONTRACTOR:
Specification Section: _____ Submittal Number: _____

	Project Product Data *Applies to permanently installed products, Divisions 3-10, 31 and 32 (31.60.00, 32.10.00, 32.30.00, 32.90.00) (MEP - optional, furniture - optional)*			**MR Building Product Disclosure and Optimization Information**										**IEQ Low-Emitting Materials Information**		
				EPDs	***Sourcing of Raw Materials***			***Material Ingredients***						***Product Categories***	***Some Emissions Evaluation Standards***	
	Product Description	Manufacturer	Product Costs [1] (only exclude install labor) ($)	Environmental Product Declaration (EPD) [2], Product Specific (PS) or Industry Wide (IW)	FSC Certified [4] Wood Products? (percent)	Post-Consumer Recycled Content [5] (percent)	Pre-Consumer Recycled Content [6] (percent)	Extracted, Manufactured, and Purchased within 100 miles?	Locally Sourced? (extracted, manufactured and purchased within 100 miles of the project site)	Declare Label with ingredient disclosure greater than 1000 ppm?	HPD to 1000 ppm Declaration [3] included?	C2C version (2.1.1 or 3.0) Level of Certification		Paints, Coatings, Adhesives, Sealants	CDPH v1.1 or 1.2; or i.e, Greenguard Gold
														Composite (Particle Board, MDF, Hardwood Plywood)	NAF or CARB ULEF
														Flooring	FloorScore or Green Label Plus
														Ceilings	CDPH v1.1 or 1.2; or i.e, Greenguard Gold
														Wall Panels	CDPH v1.1 or 1.2; or i.e, Greenguard Gold
														Insulation (Thermal & Acoustic)	CDPH v1.1 or 1.2; or i.e, Greenguard Gold
														Furniture	ANSI/BIFMA Level 7.6.1 or 7.6.2
													GENERAL EMISSIONS EVALUATION [7, 9]		***VOC CONTENT*** [8]
													Product Category from above? (Select one or NA) Applies to all products installed within waterproofing membrane	Which Emissions Evaluation Standard does it meet?	**VOC Content [8] (grams/liter)** (Applies ONLY to Paints, Coatings, Adhesives and Sealants installed within waterproofing membrane	Wet-Applied Products Volume Used (liters or gallons)
Ex.	ABC Product	ABC, Inc.	$ XX.XXX	Yes/No; PS/IW	percent	percent	percent	Yes/No; # miles	Yes / No	Yes / No	Yes / No	C2C version (2.1.1 or 3.0) Level of Certification	Select Category	List compliance name	# grams/liter	# liters or gallons
1																
2																
3																
4																
5																
6																
7																
8																
9																

NOTES / DEFINITIONS:

1. Furnish Costs include all expenses to deliver the material to the project site, including taxes, transport, fabrication and profit. Do not include site labor or installation.
2. Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. https://spot.ul.com/
3. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard. https://www.hpd-collaborative.org/hpd-public-repository/
4. Wood products must be certified by the Forest Stewardship Council (FSC) and must provide proof of vendor FSC Chain-of-Custody with this Product Data Submittal. http://info.fsc.org/certificate.php
5. Post-Consumer Recycled Content: Sourced from recovered Consumer Waste and used as a raw material (e.g. plastic bottles, newspaper)
6. Pre-Consumer Recycled Content: Recovered Industrial Materials diverted from municipal solid waste for use in a different mfg. process, prior to use by a consumer. Note: "home scrap" from the original mfg. process that is reused / reprocessed do not qualify.
7. Building Products must have a 'General Emissions Evaluation' that tested and determined compliance in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010 or v1.2-2017 http://www.usgbc.org/resources/low-emitting-materials-third-party-certification-table
8. All paints and coatings wet-applied on site must meet applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
9. Composite Wood Evaluation as defined by the California Air Resources Board (CARB), Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde (NAF) resins.

I, _____ a duly authorized representative of _____ hereby certify that the material information submitted here is an accurate representation of the material to be provided under our contract.

EMAIL CONTACT FOR AUTHORIZED REPRESENTATIVE: _____ **Direct Phone:** _____
SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ **DATE:** _____

SECTION 01 81 19
INDOOR AIR QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Construction Manager's implementation of indoor air quality management controls and systems for the duration of the work and before occupancy.
   1. Sustainable Design Intent: Comply with project requirements intended to achieve LEED "Silver" level rating, measured and documented according to the LEED Green Building Rating System, of the US Green Building Council. See Section 01 81 13 - Sustainable Design Requirements for project certification requirements.
      a. With regard to these goals the Construction Manager shall develop, for Owner and Architect review, a Construction Indoor Air Quality Management Plan for this project, to achieve minimum IAQ performance standards during the construction period.
      b. Indoor Air Quality Assessment: Requirements for assessment of minimum indoor air quality (IAQ) performance standards through either:
         1) Building flush-out before or during occupancy.
         2) Air testing before occupancy.
   2. Project's no smoking and no environmental tobacco policy.

1.02 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute; www.ansi.org.
B. EPA: U.S. Environmental Protection Agency; www.epa.gov.
C. IAQ: Indoor Air Quality.
D. IEQ: Indoor Environmental Quality.
E. LEED: Leadership in Energy and Environmental Design, US Green Building Council; www.usgbc.org/leed.
F. MERV: Minimum Efficiency Reporting Value.
G. MSDS: Material Safety Data Sheet.
H. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
I. USGBC; U.S Green Building Council; www.usgbc.org.
J. VOC: Volatile Organic Compound.

1.03 REFERENCE STANDARDS

A. Editions of listed standards shall be as referenced by these Specifications, or by applicable codes, or most current edition if not otherwise referenced.
B. ASHRAE Std 52.2-2010 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; with Addendum.
C. ASHRAE Std 62.1-2010 - Ventilation for Acceptable Indoor Air Quality.
D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2.
E. EPA 600/4-90/010 - Compendium of Methods for the Determination of Air Pollutants in Indoor Air.
F. ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories.
G. LEED Reference Guide for Building Design and Construction - LEED Reference Guide for Building Design and Construction.
H. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Construction Submittals

1. Construction IAQ Management Plan: With the completed Form of Bidder's Proposal, the Construction Manager shall submit a preliminary Construction IAQ Management Plan.
    a. Within 21 calendar days after receipt of Notice to Proceed, the Construction Manager shall submit to the Owner a finalized Construction IAQ Management Plan.
    b. The proposed Plan shall comply with requirements of Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC).
    c. The proposed Plan shall include, but not be limited to, the following:
        1) Protection of ventilation system components during construction.
        2) Cleaning and replacing contaminated ventilation system components after construction, including filtration media.
        3) Temporary ventilation.
        4) Protection of absorptive materials from moisture damage when stored on-site and after installation, including exterior wall rain protection.
        5) Sequence of finish installation plan.
        6) Selection of cleaning products and procedures to be used during construction and final cleaning.
        7) The five requirements of SMACNA (OCC), 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3, including a no-smoking policy.
    d. Coordinate Construction IAQ Management Plan with Owner's current IAQ management plans and procedures.
    e. Comply with the requirements of project's intended LEED EQ Credits - refer to Section 01 81 14 - LEED for Schools v4/v4.1 Project Scorecard.
2. Indoor Air Quality Assessment Testing Documentation:
    a. Submit a signed flush-out report that includes duration calculations, dates when flush-out was begun and completed, description of flush-out procedures, and statement that filtration media was replaced after flush-out. Include a log of dates, hours, and recorded temperature and humidity. Also include the capacity of all HVAC units used and indicate which are permanent and which are temporary.
    b. Submit an IAQ testing reports from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements, including testing laboratory name and date clearly identified, a narrative describing procedures and how locations were determined, dates, and results of each test.
3. MSDS: Submit for materials, with date clearly identified. MSDS must contain specific chemical content data identifying the percent of the total product mass represented by each listed chemical.
4. Product Data: Submit for each type of filtration media used during construction and installed immediately prior to occupancy, with MERV values clearly identified.
5. Photographs documenting construction IAQ management measures implemented during construction of each of the five SMACNA requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Prevent accumulation of moisture on materials and within packaging during delivery, storage, and handling to prevent development of mold and mildew inside packaging and on products.

B. Store materials in dry conditions indoors, under cover, and off the ground or floor.

C. Protect absorptive materials from moisture damage when stored on-site and after installation.
D. Immediately remove from site and properly dispose of any materials showing signs of microbial growth, including materials with moisture stains, and replace with new, undamaged materials.
E. When not in use, store products in original sealed containers, in a designated location.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Coordinate with Owner's current IAQ management plans and procedures, if any.
B. Comply with minimum requirements of Sections 4 through 7 of ASHRAE Std 62.1-2010,
   1. Coordinate with Commissioning activities specified in 01 91 13 - MEP Commissioning Requirements and 01 91 19 - Building Enclosure Commissioning.
C. Prevent exposure of building systems to environmental tobacco smoke during construction. At a minimum, take the following measures:
   1. Do not allow smoking anywhere on the project site.
      a. This prohibition includes but is not limited to enclosed portions of the project site, unenclosed portions of the project site, rooftops, and within construction trailers.
      b. This prohibition includes tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances and the emissions produced by electronic smoking devices.
D. During construction meet or exceed the minimum requirements of the recommended Control Measures of SMACNA (OCC), Chapter 3.
E. During construction, comply with the following requirements:
   1. If permanently installed air handlers are used during construction, filtration media with a MERV of 8 shall be used at each return air grille, as determined by ASHRAE Std 52.2-2010. Protect active outdoor air intakes and return air grilles with applicable filtration media. Periodically inspect temporary media and replace every three months, or as recommended by equipment and filter manufacturers, whichever is less. Replace filtration media immediately prior to occupancy with MERV 13 or higher.
   2. After construction ends but before occupancy, comply with one of the following requirements, per LEED IEQ Air Quality Assessment:
      a. Perform a building flush-out with outside air.
      b. Conduct IAQ testing for air contaminant levels in the building after all finishes, furniture, and furnishings have been installed. See Section 01 81 09 - Testing for Indoor Air Quality.

2.02 FILTRATION MEDIA

A. Filtration Media: Comply with ASHRAE Std 52.2-2010 and provide MERV rated filtration.

PART 3 EXECUTION

3.01 CONSTRUCTION IAQ MANAGEMENT PLAN IMPLEMENTATION

A. IAQ Manager: The Construction Manager shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the project.
   1. Distribution: The Construction Manager shall distribute copies of the Construction IAQ Management Plan to the job site foreman, each subcontractor, the Owner, and the Architect.
   2. Instruction: The Construction Manager shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the project.
   3. Progress Meetings: Construction-related IAQ procedures shall be included in pre-construction and construction progress meeting agendas.

B. Preconditioning: Allow products, which have odors and significant VOC emissions, to off-gas in a dry, well-ventilated space for sufficient period to dissipate odors and emissions prior to delivery to project.
   1. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
   2. Condition products in ventilated warehouse or other building.

C. Ventilation: Ventilate interior spaces directly to the exterior to minimize accumulation of odors and VOC emissions during construction.

D. Coordinate Construction IAQ Management Plan with final cleaning as indicated in Section 01 70 00 - Execution and Closeout Requirements.

3.02 INDOOR AIR QUALITY (IAQ) ASSESSMENT

A. Indoor Air Quality Assessment: Option 1, Flush-Out:
   1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60 degrees F and a relative humidity no higher than 60 percent.
      a. Operating Requirements: See Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC).
   2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cubic feet of outdoor air per square foot of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per square foot of outside air or the design minimum outside-air rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cubic feet per square foot of outside air has been delivered to the space.
      a. Operating Requirements: See Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC).

B. Indoor Air Quality Assessment: Option 2, Indoor Air Quality Testing: Engage testing agency to perform the following:
   1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with EPA 600/4-90/010 "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Building Design and Construction."
      a. Laboratories which conduct the test for chemical analysis of formaldehyde and VOCs must be accredited under ISO/IEC 17025 for the utilized test methods.
   2. Demonstrate that contaminants do not exceed the following concentrations:
      a. Particulates (PM2.5): 12 mcg/cu. m.
      b. Particulates (PM10): 50 micrograms/cu. m.
      c. Acetaldehyde: 140 mcg/cu. m.
      d. Benzene: 3 mcg/cu. m.
      e. Carbon Monoxide (CO): 9 ppm and no greater than 2 ppm above outdoor levels.
      f. Dichlorobenzene: 800 mcg/cu. m.
      g. Formaldehyde: 27 ppb.
      h. Hexane: 7000 mcg/cu. m.
      i. Naphthalene: 9 mcg/cu. m.
      j. Ozone: 0.075 ppm.

k. Phenol: 200 mcg/cu. m.
l. Styrene: 900 mcg/cu. m.
m. Tetrachloroethylene: 35 mcg/cu. m.
n. Toluene: 300 mcg/cu. m.
o. Vinyl Acetate: 200 mcg/cu. m.
p. Xylenes - Total: 700 mcg/cu. m.
q. Total Volatile Organic Compounds (TVOCs): 500 micrograms/cu. m.
r. Target Volatile Organic Compounds: CAL (CDPH SM), v1.2–2017, Table 4-1.

3. For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.
4. Air-sample testing shall be conducted as follows:
   a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-air flow rate for the occupied mode throughout the duration of the air testing.
   b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
   c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 square feet.
      1) For large open spaces, one sampling point per 50,000 square feet. may be used.
   d. Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION

SECTION 01 91 13
MEP COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DRAWINGS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 DESCRIPTION

A. Commissioning. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance and the warranty period with actual verification of performance. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training.

B. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:

1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.
3. Verify that the Owner's operating personnel are adequately trained.
4. Verify all documentation required to operate and maintain the facility has been submitted.

C. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

D. Abbreviations. The following are common abbreviations used in the *Specifications* and in the *Commissioning Plan.* Definitions are found in Section 1.06.

A/E	Architect and design engineers	FT	Functional performance test
CA	Commissioning authority	MC	Mechanical contractor
CC	Controls contractor	PC	Prefunctional checklist
CM	Construction Manager (the owner's representative)	PM	Project manager (of the Owner)
Cx	Commissioning	Subs	Subcontractors to General
Cx Plan	Commissioning Plan document	TAB	Test and balance contractor
EC	Electrical contractor		

PART 2 - COORDINATION

2.01 OVERVIEW

A. Commissioning Team. The members of the commissioning team consist of the Commissioning authority (CA), the Project Manager (PM), the designated representative of the Owner's Construction Management firm (CM), the architect and design engineers (particularly the mechanical engineer), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative, the Controls Contractor (CC), any other installing subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

B. Management. The CA is hired by the building owner. The CA directs and coordinates the commissioning activities and the reports to the building owner. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. Refer to Section 019113 Part 1.4 for additional management details.

C. Scheduling. The CA will work with the CM according to established protocols to schedule the commissioning activities. The CA will provide sufficient notice to the CM for scheduling commissioning activities. The CM shall integrate all commissioning activities into the master schedule. All parties shall address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

D. The CA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The *Commissioning Plan* provides a format for this schedule. As construction progresses more detailed schedules are developed by the CA. The Commissioning Plan also provides a format for detailed schedules.

2.02 DEFINITIONS

A. Acceptance Phase - phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

B. Approval - acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

C. Architect / Engineer (A/E) - the prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

D. Basis of Design - the basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components, conditions and methods chosen to meet the intent. Some reiterating of the design intent may be included.

E. Commissioning authority (CA) - an independent agent, not otherwise associated with the A/E team members or the Contractor, though he/she may be hired as a subcontractor to them. The CA directs and coordinates the day-to-day commissioning activities. The CA does not take an oversight role like the CM. The CA is part of the Construction Manager (CM) team or shall report directly to the CM.

F. Commissioning Plan - an overall plan, developed before or after bidding, that provides the structure, schedule and coordination planning for the commissioning process.

G. Contract Documents - the documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, Cx Plan).

H. Contractor - the general contractor or authorized representative.

I. Control system - the central building energy management control system.

J. Construction Manager (CM)

1. The Owner’s representative in the day-to-day activities of construction. In general, the construction management services contractor (CM) is hired by the owner to assist in the overall management of the project including supervising and on-site managing authority over a project’s construction. The CM is the Owner’s on-site representative.
2. When the CA is hired by the owner, the CM referred to in the commissioning process is a member of the CM team (staff or independent contractor) who shall have direct significant mechanical engineering and commissioning experience. That person designated from the CM team is the owner’s representative verifying the adequacy of the commissioning process. In this case, the CM shall be more involved in the commissioning work and in witnessing portions of the process (selected start-up and functional tests) and reviewing documents (test approvals) than in the following case.

K. Datalogging - monitoring flows, currents, status, pressures of equipment using stand-alone dataloggers separate from the control system.

L. Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed.

M. Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).
N. Design Intent - a dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to the owner. It is initially the outcome of the programming and conceptual design phases.
O. Design Narrative or Design Documentation - sections of either the Design Intent or Basis of Design.
P. Factory Testing - testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.
Q. Functional Performance Test (FPT) - test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed after prefunctional checklists and startup are complete.
R. Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed.
S. Manual Test - using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
T. Monitoring - the recording of parameters (flow, current, status, pressure) of equipment operation using dataloggers or the trending capabilities of control systems.
U. Non-Compliance – see Deficiency
V. Non-Conformance – see Deficiency
W. Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50 degrees Fahrenheit to 75 degrees Fahrenheit to verify economizer operation). See also "Simulated Signal."
X. Owner-Contracted Tests - tests paid for by the Owner outside the CM's contract and for which the CA does not oversee. These tests shall not be repeated during functional tests if properly documented.
Y. Phased Commissioning - commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.
Z. Prefunctional Checklist (PFC) - a list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CA to the Sub. Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated). However, some prefunctional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a

three-phase pump motor of a chiller system). The word prefunctional refers to before functional testing. Prefunctional checklists augment and are combined with the manufacturer's start-up checklist. Even without a commissioning process, contractors typically perform some, if not many, of the prefunctional checklist items a commissioning authority shall recommend. However, few contractors document in writing the execution of these checklist items. Therefore, for most equipment, the contractors execute the checklists on their own. The commissioning authority only requires that the procedures be documented in writing, and does not witness much of the prefunctional checklist, except for larger or more critical pieces of equipment.

AA. Project Manager (PM) - the contracting and managing authority for the owner over the design and/or construction of the project, a staff position.

BB. Sampling. - functionally testing only, a fraction of the total number of identical or near identical pieces of equipment. Refer to Section 019113, Part 4.06 for details.

CC. Seasonal Performance Tests - FT that are deferred until the system(s) shall experience conditions closer to their design conditions.

DD. Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

EE. Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance, or pressure to the transducer and DDC system to simulate a sensor value.

FF. Specifications - the construction specifications of the Contract Documents.

GG. Startup - the initial starting or activating of dynamic equipment, including executing prefunctional checklists.

HH. Subcontractor (Subs) - the subcontractors to the CM who provide and install building components and systems.

II. Test Procedures - the step-by-step process which shall be executed to fulfill the test requirements. The test procedures are developed by the CA.

JJ. Test Requirements - requirements specifying what modes and functions shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

KK. Vendor - supplier of equipment.

LL. Warranty Period - warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

2.03 COMMISSIONING PROCESS

A. Commissioning Plan. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CA will update the plan which is then considered the "final" plan, though it shall continue to evolve and expand as the project progresses. The Specifications shall take precedence over the Commissioning Plan.

B. Commissioning Process. The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings shall be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. Equipment documentation is submitted to the CA during normal submittals, including detailed start-up procedures.

4. The CA works with the Subs in developing startup plans and startup documentation formats, including providing the Subs with prefunctional checklists to be completed, during the startup process.
5. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.
6. The Subs, under their own direction, execute and document the prefunctional checklists and perform startup and initial checkout. The CA documents that the checklists and startup were completed according to the approved plans. This may include the CA witnessing start- up of selected equipment.
7. The CA develops specific equipment and system functional performance test procedures. The Subs review the procedures.
8. The procedures are executed by the Subs, under the direction of, and documented by the CA.
9. Items of non-compliance in material, installation or setup are corrected at the Sub's expense and the system retested. The Subs are responsible for to cost of the CA to return for more than one retest of any system or component.
10. Commissioning is completed before Substantial Completion.
11. The CA reviews pre-approves and the training plan. The CM coordinates the training provided by the Subs. The CA verifies that is was completed.
12. Ensure the operating and maintenance manuals and as built drawings are complete and submitted.
13. Deferred testing is conducted, as specified, or required.
14. Minimum of two weeks of trend data shall be provided by the control's contractor. The points list to be trended shall be made available in the commissioning manual.

2.04 COMMISSIONING TEAM

A. Members Appointed by Contractor(s):
   1. Communications with Contractor should be conveyed by Architect, even when recommendations originate with Commissioning Authority.
   2. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning.
   3. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning.
   4. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning.
   5. Appointed team members shall have the authority to act on behalf of the entity they represent.

B. Members Appointed by Owner:
   1. Commissioning authority, plus consultants that Commissioning Authority may deem appropriate for a particular portion of the commissioning.
   2. Owner representative(s), facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning.
   3. Architect, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning.

2.05 SYSTEMS TO BE COMMISSIONED

A. The following checked systems shall be commissioned in this project.
   1. Mechanical – HVAC

2. Plumbing
3. Electrical

2.06 RESPONSIBLITIES

A. The responsibilities of various parties in the commissioning process are provided in this section.

B. All Parties
   1. Follow the Commissioning Plan.
   2. Attend commissioning scoping meeting and additional meetings, as necessary.

C. Mechanical and Electrical Designers/Engineers (of the A/E)
   1. Provide any design narrative, Basis of Design, documentation.
   2. Construction and Acceptance Phase:
      a. Perform normal submittal review, construction observation, as-built drawing preparation as contracted. One site observation should be completed just prior to system startup.
      b. Provide any design narrative and sequences documentation requested by the CA. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
      c. Attend commissioning scoping meetings and other selected commissioning team meetings.
      d. Participate in the resolution of system deficiencies identified during commissioning, according to the contract documents.
      e. Prepare and submit the final as-built design intent and operating parameters documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.
      f. From the Contractor's red-line drawings, edit and update one-line diagrams developed as part of the design narrative documentation and those provided by the vendor as shop drawings for the chilled and hot water, condenser water, domestic water, steam and condensate systems; supply, return and exhaust air systems and emergency power system.
      g. Provide a presentation at one of the training sessions for the Owner's personnel.
   3. Warranty Period:
      a. Participate in the resolution of non-compliance, non-conformance and design deficiencies identified during commissioning during warranty-period commissioning.

D. Commissioning Authority (CA)
   1. The CA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the construction manager and the A/E. The primary role of the CA is to develop and coordinate the execution of a testing plan, observe and document performance—that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors shall provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified testing with portable data - loggers, which shall be supplied and installed by the CA.
   2. The CA will review the Owner's Project Requirements Document (OPR) and provide comments, as necessary. The CA will use the OPR to review the basis of design and comments on application in meeting the owner's requirements and goals for the project.

3. The CA will review the contract documents for applicability to the owner's project requirements, basis of design, and general good engineering practice inclusive of requirements, as applicable.
4. Construction and Acceptance Phase:
    a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
    b. Coordinate the commissioning work and, with the CM, ensure that commissioning activities are being scheduled into the master schedule.
    c. Revise, as necessary, the Commissioning Plan — Construction Phase.
    d. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
    e. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
    f. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
    g. Review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
    h. Write and distribute prefunctional tests and checklists.
    i. Develop a start-up and initial systems checkout plan with Subs.
    j. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
    k. Witness all or part of the HVAC piping test and flushing procedure, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify the construction manager of any deficiencies in results or procedures.
    l. Witness all or part of any ductwork testing and cleaning procedures, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify construction manager of any deficiencies in results or procedures.
    m. Approve prefunctional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.
    n. Approve systems startup by reviewing start-up reports and by selected site observation.
    o. Review TAB execution plan.
    p. Oversee sufficient functional testing of the control system and approve it to be used for TAB before TAB is executed.
    q. Approve air and water systems balancing by spot testing, by reviewing completed reports and by selected site observation.
    r. With necessary assistance and review from installing contractors, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing. Submit to CM for review, and for approval if required.
    s. Analyze any monitoring data to verify performance.

t. Coordinate, witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
u. Maintain a master deficiency and resolution log and a separate testing record. Provide the CM with written progress reports and test results with recommended actions.
v. Witness performance testing of smoke control systems by others and all other owner contracted tests or tests by manufacturer's personnel over which the CA may not have direct control. Document these tests and include this documentation in Commissioning Record in O&M manuals.
w. Review equipment warranties to ensure that the Owner's responsibilities are clearly defined.
x. Oversee and approve the training of the Owner's operating personnel.
y. Compile and maintain a commissioning record and building systems book(s).
z. Review and approve the preparation of the O&M manuals.
aa. Provide a final commissioning report (as described in this section).
bb. Review operating and maintenance manuals and as-built drawings are complete and submitted to the owner as specified.

5. Warranty Period:
a. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
b. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

E. Construction Manager
1. Owner to provide project requirements document or finalized and approved Basis of Design.
2. Construction and Acceptance Phase:
a. Facilitate the coordination of the commissioning work by the CA, and, ensure that commissioning activities are being scheduled into the master schedule.
b. Review the final Commissioning Plan for understanding and support.
c. Include the cost of commissioning in the total contract price.
d. Attend a commissioning scoping meeting and other commissioning team meetings.
e. Facilitate the normal review of Contractor submittals.
f. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
g. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training.
h. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
i. Review for understanding the functional performance test procedures submitted by the CA, prior to testing. Ensure that subcontracted trades receive and understand procedures.
j. Observe and witness prefunctional checklists, startup and functional testing of selected equipment.

k. Review commissioning progress and deficiency reports and respond with corrective action plan where and when deficiencies are found should the deficiency be related to improper installation.
l. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
m. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
n. Sign-off (final approval) on individual commissioning tests as completed and passing. Recommend completion of the commissioning process to the Owner.
o. Coordinate the training of owner personnel.
p. Prepare O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

3. Warranty Period
a. Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
b. Facilitate the coordination of the commissioning work by the CA and ensure that commissioning activities are being scheduled into the master schedule.
c. Ensure that Subs execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
d. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
e. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
f. Coordinate the training of owner personnel.

F. Mechanical, Electrical, Plumbing, Controls and TAB Subcontractors
1. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Cx process.
2. Subcontractors shall assist (along with the design engineers) in clarifying the operation and control of commissioned equipment as required.
3. Develop professional/start-up check lists and a full start-up and initial checkout plan using manufacturer’s start-up procedures all commissioned equipment. Submit to CA for review prior to startup.
4. Fill-out completely, the pre-functional checklists provided by the CA. These pre-functional forms should be completed prior to start-up of the associated piece of equipment. Completed pre-functional checklists are to be reviewed and approved, by the CA; prior to any functional testing of equipment begins.
5. Provide assistance to the CA in preparing the specific functional performance test procedures. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
6. Address current A/E and CA punch list items before functional testing. Air and water TAB shall be completed with discrepancies and problems remedied before functional testing of the respective air- or water-related systems.
7. Include all special tools and instruments (if only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CA.
8. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA and A/E and retest the equipment.

9. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
10. During construction, maintain as-built red-line drawings for all drawings and provide final CAD record drawings. Update after completion of commissioning (excluding deferred testing).
11. Provide training of the Owner's operating staff using expert qualified personnel.
12. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.
13. Warranty Period:
    a. Execute seasonal or deferred functional performance testing, witnessed by the CA.
    b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal or deferred testing.

G. Mechanical Subcontractor
1. The responsibilities of the mechanical subcontractor, during Construction Phases in addition to those listed above are:
    a. Prepare a preliminary schedule and plan for system testing, flushing and cleaning, equipment start-up and TAB start and completion for use by the CA. Update the schedule as appropriate.
    b. Notify the CM, who shall notify the CA, when startup of each piece of equipment and TAB shall occur. Be responsible to notify the CM, ahead of time, when commissioning activities not yet performed or not yet scheduled shall delay construction.

H. Control Subcontractor
1. The responsibilities of the control's subcontractor, during Construction Phases in addition to those listed above are:
    a. Assist and cooperate with the CA in the following manner:
    b. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system as specified for the controls contractor. Assist in the functional testing of all equipment specified.
    c. Execute all control system trend logs specified.
2. Provide a signed and dated certification to the CM upon completion of the checkout of each controlled device, equipment and system prior to functional testing for each piece of equipment or system, that all system programming is complete as to all respects of the Contract Documents, except functional testing requirements.
3. Beyond the control points necessary to execute all documented control sequences, provide monitoring, long term trends, control and virtual points as requested by the CA to demonstrate system operation.
4. List and clearly identify on the as-built duct and piping drawings the locations of all static and differential pressure sensors (air, water and building pressure).

I. TAB Subcontractor
1. The responsibilities of the TAB subcontractor, in addition to those listed above are:
    a. Submit the outline of the TAB plan and approach for each system and component to the CM six weeks prior to starting the TAB. This plan shall be developed after the TAB has some familiarity with the control system.
    b. A running log of events and issues shall be kept by the TAB field technicians. Submit hand-written reports of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests to the CM at least weekly.

c. Communicate in writing to the controls contractor all setpoint and parameter changes made, or problems and discrepancies identified during TAB which affect the control system setup and operation.
d. Provide a draft TAB report within two weeks of completion. A copy shall be provided to the CA. The report shall contain a full explanation of the methodology, assumptions and the results in a clear format with designations of all uncommon abbreviations and column headings. The report should follow the latest and most rigorous reporting recommendations by AABC, NEBB or ASHRAE Standard 111.
e. Provide the CA with any requested data, gathered, but not shown on the draft reports.
f. Provide a final TAB report for the CA with details, as in the draft.

PART 3 – PRODUCTS

3.01 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. Two-way radios shall be provided by the Division Controller.
B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone datalogging equipment that may be used by the CA.
C. Datalogging equipment shall be provided by the CA but shall not become the property of the Owner.
D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 degrees Fahrenheit and a resolution of + or - 0.1 degrees Fahrenheit. Pressure sensors shall have an accuracy of + or - 2.0 percent of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.
E. Refer to Section 019113,4.07 for details regarding equipment that may be required to simulate required test conditions.

PART 4 – EXECUTION

4.01 MEETINGS

A. Scoping Meeting. Within 90 days of commencement of construction, the CA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes shall be distributed to all parties by the CA. Information gathered from this meeting shall allow the CA to revise the commissioning Plan to its "final" version, which shall also be distributed to all parties.
B. Miscellaneous Meetings. Other meetings shall be planned and conducted by the CA as construction progresses. These meetings shall cover coordination, deficiency resolution and planning issues with particular Subs. The CA will plan these meetings and shall minimize unnecessary time being spent by Subs.

4.02 REPORTING

A. The CA will provide regular reports to the CM or PM, depending on the management structure, with increasing frequency as construction and commissioning progresses. Standard forms are provided and referenced in the Commissioning Plan.
B. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, commissioning action list updates, progress reports.
C. Testing or review approvals and non-conformance and deficiency reports are available online to all team members for ease in access, commenting, and management.
D. A final summary report by the CA will be provided to the CM or PM, focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues shall be compiled in appendices and provided with the summary report. Prefunctional checklists, functional tests and monitoring reports shall not be part of the final report but shall be stored in the Commissioning Record in the O&M manuals.

4.03 SUBMITTALS

A. The CA will provide appropriate contractors with a specific request for the type of submittal documentation the CA requires facilitating the commissioning work. These requests shall be integrated into the normal submittal process and protocol of the construction team. At minimum, the request shall include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning authority. All documentation requested by the CA will be included by the Subs in their O&M manual contributions.
B. The Commissioning authority shall review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning authority shall notify the CM, PM or A/E as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.
C. The CA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.
D. These submittals to the CA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor.

4.04 START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned, according to Section 1.6, Systems to be commissioned. Some systems that are not comprised so much of actual dynamic machinery, e.g., electrical system power quality, may have very simplified PCs and startup.
B. General. Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. No sampling strategies are used. The prefunctional testing for a given system shall be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
C. Start-up and Initial Checkout Plan. The CA will assist the commissioning team members responsible for startup of any equipment in developing detailed start-up plans for all equipment.

The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and startup are identified in the commissioning scoping meeting and in the checklist forms. Parties responsible for executing functional performance tests are identified in the testing requirements in the commissioning plan.

1. The CA adapts, if necessary, the representative prefunctional checklists and procedures. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
2. These checklists and tests are provided by the CA to the Contractor. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form shall have more than one trade responsible for its execution.
3. The subcontractor responsible for the purchase of the equipment develops the full start-up plan by combining (or adding to) the CA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan. The full start-up plan could consist of something as simple as:
    a. The CA's prefunctional checklists.
    b. The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
    c. The manufacturer's normally used field checkout sheets
4. The subcontractor submits the full startup plan to the CA for review and approval.
5. The CA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
6. The full start-up procedures and the approval form may be provided to the CM for review and approval, depending on management protocol.

D. Sensor and Actuator Calibration.
    1. All field-installed temperature, relative humidity, CO, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described below. Alternate methods may be used, if approved by the Owner before-hand. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
    2. All procedures used shall be fully documented on the prefunctional checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.
    3. Sensor Calibration Methods
        a. All Sensors. Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable, are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2 degrees Fahrenheit of each other for temperature and within a tolerance equal to two percent of the reading, of each other, for pressure. Tolerances for critical applications may be tighter.
        b. Sensors Without Transmitters--Standard Application. Make a reading with a calibrated test instrument within six inches of the site sensor. Verify that the sensor reading (via the

permanent thermostat or gage)) is within the tolerances in the table below of the instrument-measured value. If not, calibrate or replace sensor.

c. Sensors With Transmitters--Standard Application. Disconnect sensor. Connect a signal generator in place of sensor. Connect ammeter in series between transmitter and the control panel. Using manufacturer's resistance-temperature data, simulate minimum desired temperature. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the control panel. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction. Reconnect sensor. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat or gage) is within the tolerances in the table below of the instrument-measured value. If not, replace sensor and repeat. For pressure sensors, perform a similar process with a suitable signal generator.

d. Critical Applications. For critical applications (process, manufacturing) more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

4. Tolerances, Standard Applications

Sensor	Required Tolerance (+/-)	Sensor	Required Tolerance (+/-)
Cooling coil, chilled and condenser water temps	0.4°F	Flow rates, water	4 percent of design
AHU wet bulb or dew point	2.0°F	Relative humidity	4 percent of design
Outside air, space air, duct air temps	0.4°F	Barometric pressure	0.1 in. of Hg
Watthour, voltage & amperage	1 percent of design	Pressures, air, water and gas	3 percent of design
Flow rates, air	10 percent of design		

5. Valve and Damper Stroke Setup and Check

a. Set pumps or fans to normal operating mode. Command valve or damper closed, visually verify that valve or damper is closed and adjust output zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position does not reasonably correspond, replace actuator, or add pilot positioner (for pneumatics).

b. Closure for heating coil valves (NO): Set heating setpoint 20 degrees Fahrenheit above room temperature. Observe valve open. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set heating setpoint to 20 degrees Fahrenheit below room temperature. Observe the valve close. For pneumatics, increase pressure to valve by three psi (do not exceed actuator pressure rating) and verify valve stem and actuator position does not change. Restore to normal.

c. Closure for cooling coil valves (NC): Set cooling setpoint 20 degrees Fahrenheit above room temperature. Observe the valve close. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set cooling setpoint to 20 degrees Fahrenheit below room temperature. Observe valve open. For pneumatics, increase pressure to valve by three psi (do not exceed actuator pressure rating) and verify valve stem and actuator position does not change. Restore to normal.

E. Execution of Prefunctional Checklists and Startup.
   1. Four weeks prior to startup, the Subs and vendors schedule startup and checkout with the CM and CA. The performance of the prefunctional checklists, startup and checkout are directed and executed by the Sub or vendor. When checking off prefunctional checklists, signatures may be required of other Subs for verification of completion of their work.
   2. The CA will observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved by the CM). In no case shall the number of units witnessed be less than four on anyone building, nor less than 20 percent of the total number of identical or very similar units.
   3. For lower-level components of equipment, (e.g., VAV boxes, sensors, controllers), the CA will observe a sampling of the prefunctional and start-up procedures. The sampling procedures are identified in the commissioning plan.
   4. The Subs and vendors shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.
   5. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

F. Deficiencies, Non-Conformance and Approval in Checklists and Startup.
   1. The Subs shall clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CA within two days of test completion.
   2. The CA reviews the report and submits either a non-compliance report or an approval form to the Sub or CM. The CA will work with the Subs and vendors to correct and retest deficiencies or uncompleted items. The CA will involve the CM and others, as necessary. The installing Subs or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA recommends approval of the execution of the checklists and startup of each system to the CM using a standard form.
   3. Items left incomplete, which later cause deficiencies or delays during functional testing may result in back charges to the responsible party. Refer to Part 4.07 herein for details.

4.05 PHASED COMMISSIONING

A. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the CA, CM, mechanical, TAB and controls. Results shall be added to the master and commissioning schedule.

4.06 FUNCTIONAL PERFORMANCE TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.

B. The general list of equipment to be commissioned is found in Section 019113, Part 1.5. The specific equipment and modes to be tested are found in the commissioning manual.

C. The parties responsible to execute each test are listed with each test in Sections.

D. Objectives and Scope. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

E. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system

response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure shall also be tested. Specific modes required in this project are given in the commissioning manual.

F. Development of Test Procedures. Before test procedures are written, the CA will obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements the CA will develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Sub or vendor responsible to execute a test, shall provide limited assistance to the CA in developing the procedures review (answering questions about equipment, operation, sequences). Prior to execution, the CA will provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CA may submit the tests to the A/E for review, if requested.

G. The CA will review owner-contracted, factory testing or required owner acceptance tests which the CA is not responsible to oversee, including documentation format, and shall determine what further testing or format changes may be required to comply with the Specifications. Redundancy of testing shall be minimized.

H. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

I. The test procedure forms developed by the CA will include (but not be limited to) the following information:
   1. System and equipment or component name(s)
   2. Equipment location and ID number
   3. Unique test ID number, and reference to unique prefunctional checklist and start-up documentation ID numbers for the piece of equipment
   4. Date
   5. Project name
   6. Participating parties
   7. A copy of the specification section describing the test requirements
   8. A copy of the specific sequence of operations or other specified parameters being verified
   9. Formulas used in any calculations
   10. Required pre-test field measurements
   11. Instructions for setting up the test
   12. Special cautions, alarm limits
   13. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format
   14. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
   15. A section for comments
   16. Signatures and date block for the CA

J. Test Methods
   1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using stand-alone dataloggers. The commissioning manual shall specify which methods shall be used for each test. The CA may substitute specified methods or require an additional method to be executed, other than what was specified, with the approval of the CM. This may require a change order and adjustment in charge to the

Owner. The CA will determine which method is most appropriate for tests that do not have a method specified.

2. Simulated Conditions. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
3. Overwritten Values. Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems shall be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.
4. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended overusing the sensor to act as the signal generator via simulated conditions or overwritten values.
5. Altering Setpoints. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55 degrees Fahrenheit, when the outside air temperature is above 55 degrees Fahrenheit, temporarily change the lockout setpoint to be two degrees Fahrenheit above the current outside air temperature.
6. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during prefunctional testing.
7. Setup. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Sub executing the test shall provide all necessary materials, system modifications to produce the necessary flows, pressures, temperatures necessary to execute the test according to the specified conditions. At completion of the test, the Sub shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
8. Sampling. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. The specific recommended sampling rates are specified in the commissioning manual. It is noted that no sampling by Subs is allowed in prefunctional checklist execution.
    a. A common sampling strategy referenced in the Specifications as the “xx percent Sampling—yy percent Failure Rule” is defined by the following example.
    b. xx = the percent of the group of identical equipment to be included in each sample. yy = the percent of the sample that if failing, shall require another sample to be tested.
    c. The example below describes a 20 percent Sampling—10 percent Failure Rule.
    d. Randomly test at least 20 percent (xx) of each group of identical equipment. In no case test less than three units in each group. This 20 percent , or three, constitute the “first sample.”
    e. If 10 percent (yy) of the units in the first sample fail the functional performance tests, test another 20 percent of the group (the second sample).
    f. If 10 percent of the units in the second sample fail, test all remaining units in the whole group.

g. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CA may stop the testing and require the responsible Sub to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.

K. Coordination and Scheduling. The Subs shall provide sufficient notice to the CA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CA will schedule functional tests through the CM and affected Subs. The CA will direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.

L. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. The control system is sufficiently tested and approved by the CA before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting, individual systems has been achieved, the interface or coordinated responses between systems is checked.

M. Test Equipment. Refer to Section 019113, Part 2 for test equipment requirements.

N. Problem Solving. The CA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the CM, Subs and A/E.

4.07 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation. The CA will witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the CM for review and approval and to the Subs for review.

B. Non-Conformance.

1. The CA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the CM on a standard non-compliance form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution shall be documented on the procedure form.
3. Every effort shall be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the CM.
4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
   a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
      1) The CA documents the deficiency and the Sub's response and intentions and they go on to another test or sequence. After the day's work, the CA submits the non-compliance reports to the CM for signature, if required. A copy is provided to the Sub and CA. The Sub corrects the deficiency, signs the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and sends it back to the CA.
      2) The CA reschedules the test and the test is repeated.
   b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

1) The deficiency shall be documented on the non-compliance form with the Sub's response and a copy given to the CM and to the Sub representative assumed to be responsible.
2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Project Manager.
3) The CA documents the resolution process.
4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non- compliance form and provides it to the CA. The CA reschedules the test and the test is repeated until satisfactory performance is achieved.

5. Cost of Retesting
   a. The cost for the Sub to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the CM.
   b. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the following shall apply: The CA and Sub shall direct the retesting of the equipment once at no "charge" to the CM for their time. However, the CA's and Sub's time for a second retest shall be charged to the GC, who may choose to recover costs from the responsible Sub.
   c. The time for the CA and CM to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, shall be back charged to the GC, who may choose to recover costs from the party responsible for executing the faulty prefunctional test.
   d. Refer to the sampling section of Section 019113, Part 4.06 for requirements for testing and retesting identical equipment.

C. Failure Due to Manufacturer Defect. If 10 percent , or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CM or PM. In such case, the Contractor shall provide the Owner with the following:
   1. Within one week of notification from the CM or PM, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CM or PM within two weeks of the original notice.
   2. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
   3. The CM or PM shall determine whether a replacement of all identical units or a repair is acceptable.
   4. Two examples of the proposed solution shall be installed by the Contractor and the CM shall be allowed to test the installations for up to one week, upon which the CM or PM shall decide whether to accept the solution.
   5. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval. The CA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CA and by the CM, if necessary. The CA recommends acceptance of each test to the CM using a standard form. The CM gives final approval on each test using the same form, providing a signed copy to the CA and the Contractor.

4.08 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals.
   1. The specific content and format requirements for the standard O&M manuals are detailed in each section.
   2. A/E Contribution. The A/E shall include in the beginning of the O&M manuals a separate section describing the systems including:
      a. The design intent narrative prepared by the A/E and provided as part of the bid documents, updated to as-built status by the A/E.
      b. Simplified professionally drawn single line system diagrams on 8-1/2 inch by 11 inch or 11 inch by 17 inch sheets. These shall include chillers, water system, condenser water system, heating system, supply air systems and exhaust systems. These shall show major pieces of equipment such as pumps, chillers, boilers, control valves, expansion tanks, coils, service valves.
   3. CA Review and Approval. Prior to substantial completion, the CA will review the O&M manuals, documentation and redline as-builds for systems that were commissioned and to verify compliance with the Specifications. The CA will communicate deficiencies in the manuals to the CM, PM, or A/E, as requested. Upon a successful review of the corrections, the CA recommends approval and acceptance of these sections of the O&M manuals to the CM, PM, or A/E. The CA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E's contract.

B. Commissioning Record in O&M Manuals.
   1. The CM is responsible to compile, organize and index by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the owner and or A/E. Three copies of the manuals shall be provided.
   2. Final Report Details. The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas: 1) Equipment meeting the equipment specifications, 2) Equipment installation, 3) Functional performance and efficiency, 4) Equipment documentation and design intent, and 5) Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, data loggers) and include observations and conclusions from the testing.
   3. Other documentation shall be retained by the CA.

4.09 TRAINING OF OWNER PERSONNEL

A. The CM shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

B. The CA will be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.
   1. The CA will interview the facility manager and lead engineer to determine the special needs and areas where training shall be most valuable. The Owner and CA will decide how rigorous the training should be for each piece of commissioned equipment. The CA will communicate the results to the Subs and vendors who have training responsibilities.
   2. The specific training requirements of Owner personnel by Subs and vendors are specified in their respective divisions.
   3. Each Sub and vendor responsible for training shall submit a written training plan to the CA for review and approval prior to training. The plan shall cover the following elements:
      a. Equipment (included in training)
      b. Intended audience
      c. Location of training
      d. Objectives
      e. Subjects covered (description, duration of discussion, special methods)
      f. Duration of training on each subject
      g. Instructor for each subject
      h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)
      i. Instructor and qualifications
   4. For the primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.
   5. The CA develops an overall training plan and coordinates and schedules, with the CM, the overall training for the commissioned systems. The CA develops criteria for determining that the training was satisfactorily completed, including attending some of the training. The CA recommends approval of the training to the CM using a standard form. The CM also signs the approval form.
   6. Videotaping of the training sessions shall be provided by the CM to the Owner by the respective contractor and tapes cataloged and the O&M manuals.
   7. The mechanical design engineer shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall include a review of all systems using the simplified system schematics (one-line drawings) including chilled water systems, condenser water or heat rejection systems, heating systems, fuel oil and gas supply systems, supply air systems, exhaust system and outside air strategies.

4.10 DEFERRED TESTING

A. Unforeseen Deferred Tests. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests shall be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties shall be negotiated.

B. Seasonal Testing. During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) required shall be completed as part of this contract. The CA will coordinate this activity. Tests shall be executed, documented and deficiencies corrected by the appropriate Subs, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builds due to the testing shall be made.

4.11 WRITTEN WORK PRODUCTS

A. The commissioning process generates several written work products described in various parts of the Specifications. The Commissioning Plan lists all the formal written work products, briefly describes their contents, who is responsible to create them, their due dates, who receives and approves them and the location of the specification to create them. In summary, the written products are:

	Product	Developed By
1.	Final commissioning plan	CA
2.	Meeting minutes	CA
3.	Commissioning schedules	CA with CM
4.	Equipment documentation submittals	Subs and CM
5.	Sequence clarifications	Subs, CM and A/E as needed
5.	Prefunctional checklists	CA
6.	Startup and initial checkout plan	Subs and CA (compilation of existing documents)
7.	Startup and initial checkout forms filled out	Subs
8.	Duct/Pipe flushing, pressure testing, chemical cleaning	Subs
9.	BAS Point to Point	CA & Controls Technician, and CM
10.	Final TAB report	Subs, TAB and CM
11.	Issues log (deficiencies)	CA
12.	Commissioning Progress Record	CA
13.	Deficiency reports	CA
14.	Functional test forms	CA
15.	Filled out functional tests	CA
16.	O&M manuals	Subs and CM
17.	As built Drawings including BAS Sequencing	Subs and CM
18.	Overall training plan	CA and CM
19.	Specific training agendas	Subs
20.	Final commissioning report	CA
21.	Misc. approvals	CA

END OF SECTION

SECTION 01 91 19
BUILDING ENCLOSURE COMMISSIONING

PART 1 - GENERAL

1.01 SUMMARY

A. This document details the implementation of the Building Enclosure Commissioning (BECx) process, to supplement to the quality control processes executed by the design and construction team for the proposed building. As the Building Enclosure Commissioning Provider (BECxP) for this project, it is the responsibility of Building Enclosure Science, LLC (BES) to implement the BECx process along with the commissioning team. Direction for the commissioning team is provided by the Owner's Project Requirements (OPR).

B. The role of the BECxP will be carried out by Building Enclosure Commissioning Specialists (BECxS) and Building Enclosure Commissioning Technologists (BECxT) who shall work with the Contractor and Contractor's Quality Assurance and Quality Control Plan and personnel to oversee the BECx processes and performance testing. The BECxP will observe tests as deemed appropriate. All required testing, unless otherwise specified in Appendix B – BECx Testing Matrix or in the individual BE technical sections (Divisions 03 through 09), will be performed by an independent third-party testing agency retained by the Contractor.

C. The BECxP will be contracted under the Commissioning Authority (CxA), ICO Energy and Engineering, for commissioning services. The Contractor shall coordinate and assist the BECxP to complete the scope of work outlined in this specifications section.

D. Commissioning does not relieve the installing contractors of their own internal, self-testing and/or quality control procedures.

1.02 SCOPE

A. This section includes exterior enclosure commissioning procedures, including substructure, superstructure, exterior enclosure, and roofing construction that protects climate-controlled interior spaces from unconditioned spaces and the exterior environment, as follows:

1. Below-grade construction including foundations, basements, and slab-on-grade that functions as part of the exterior enclosure system but excluding structural systems and components.
2. Superstructure floor and roof construction that functions as part of the exterior enclosure system.
3. Exterior enclosure construction, above grade, including exterior opaque walls, windows, and doors, including sheathing, framing, and insulation, and interior finish materials attached to the exterior wall.
4. Roofing, including roofing system, roofing insulation, and skylights, hatches, and other roof openings.

1.03 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

B. Commissioning Specifications: See Division 01 Section 01 91 13 - General Commissioning Requirements for general requirements for all commissioning including definitions, means and methods for conducting the commissioning process, commissioning team members, Owner's responsibilities, Contractor's responsibilities, and CxA's responsibilities.

C. Individual Building Enclosure Specification Sections: Individual building enclosure technical sections (Divisions 03 through 09) in Appendix C *(pending)* – BE Technical Sections, stipulate requirements for material performance testing criteria, and warranties for the material, product or assembly specified in the Section. Installation, product testing, and assembly testing are stipulated in each section.

1.04 RELATED SECTIONS

A. Project Enclosure Related Specifications Sections 03-09
B. See Table 1 of BECx Plan for a list of building envelope systems to be commissioned.
C. See Table 5 of BECx Plan for a project specific BECx testing matrix.

1.05 WORK INCLUDED

A. Commissioning requirements common to all Building Enclosure-Related Sections, including but not limited to the following:
    1. Validation of proper and thorough installation of Building Enclosure components.
    2. Building Enclosure component performance verification.
    3. Documentation of tests, procedures, and installations.
    4. Coordination and requirements for field mock-up, trial installation and Functional Performance Testing events.
    5. Preparation and coordination of Building Enclosure Commissioning Report.

1.06 REFERANCE STANDARDS

A. ASHRAE Guideline 0 - 2005 “The Commissioning Process”
B. NIBS Guideline 3-2012, “Exterior Enclosure Technical Requirements for the Commissioning Process”
C. ASTM E2813, “Standard Practice for Building Enclosure Commissioning”
D. ASTM E2947, “Standard Guide for Building Enclosure Commissioning”
E. Reference standards as identified in the individual Building Enclosure technical sections of this specification.
F. Reference standards as identified in Appendix E Referenced standards of this specification.

1.07 DOCUMENTATION

A. The Contractor shall provide a letter, signed by the Contractor and all relevant subcontractors stating that each acknowledges in writing that the Owner regards the new building enclosure to be an important and performance-sensitive single element of the project. In support of this requirement, the Contractor must also acknowledge that they are solely responsible for the quality and coordination all exterior enclosure materials, components and systems such that they result in a fully integrated, weather-tight exterior enclosure that is in compliance with the Contract Documents.
B. The Owner shall provide to the BECxP (and maintain) current contract documents for review and comment at the earliest possible time prior to the onset of construction. BECxP shall perform a constructability review and provide comments related to the durability, performance and BE conformance with the Owner Project Requirements for consideration by the Owner, A/E and Contractor.
C. The Contractor shall provide to the BECxP the following per the procedures specified herein and in other Building Enclosure Technical Sections of the specification (Divisions 03 through 09) and Division 01 Section 01 30 00 - Administrative requirements:
    1. Shop Drawings and Product Data: Provide shop drawings and submittal data for materials, products, systems and equipment that will be part of the BECx process.
        a. The Contractor shall notify the BECxP when Shop Drawings and Product Data have been posted to Project Web-site and after the submittals have been reviewed and commented upon by the A/E. BECxP shall review and provide comments on the A/E reviewed submittal, and submit the BECxP review to the Owner and A/E, who will then review and incorporate the BECxP comments at their discretion and return to the Contractor. The Contractor shall then notify BECxP when the reviewed submittal with A/E submittal review stamp has been posted.

b. Any action taken by the A/E or Contractor based in whole or in part on the comments and recommendations provided by the BECxP as part of its submittal review shall be the sole responsibility of the A/E or Contractor.

2. Factory/Laboratory Test Reports: The Contractor shall provide any factory or laboratory testing documentation, material compatibility testing, or certified test reports required by the specifications. These shall be provided prior to acceptance and installation of the specific item.
3. Schedule Updates: The Contractor shall issue periodic updates to the construction schedule every two weeks or less as appropriate. Contractor shall use schedule to notify BECx team of scheduled tests and milestone installation events.
4. Action Item Response: Respond to Action Items to which BECx team members assign the Contractor responsibility within 10 business days of issue.
5. Testing Agency Reports. Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to acceptance by A/E and installation.

D. Record Drawings: The Contractor shall maintain at the site an updated set of record or 'As- Built' documents reflecting actual installed conditions and all approved changes and modifications to the contract documents. The Contractor shall provide access to the BECxP to review the As-Built and Record Drawings. The Record Drawings shall be maintained concurrently with construction.

1.08 COORDINATION MANAGEMENT PROTOCOLS

A. Unless otherwise defined and agreed to by the parties to the contract documents for this project, coordination responsibilities and management protocols relative to BECx are defined below, subject to further refinement during the Construction Phase BECx pre-construction meeting.

1. Submittals and Shop Drawings: The BECxP shall review submittals and shop drawings in accordance with documentation and procedural requirements outlined in this section.
2. Deficiencies Identified by the BECxP: When the BECxP identifies a deficiency, the Contractor shall make a good faith assessment of responsible parties. Those parties shall be notified of the perceived deficiency. This communication is for information only and is not a direction to resolve the deficiency. Contractor may accept responsibility and resolve the deficiency voluntarily. If Contractor contests either the deficiency or responsibility for that deficiency, Contractor shall respond to that affect in writing to the project team for review.
3. Requests for Meetings (beyond regularly scheduled meetings): In generals requests by the Contractor for additional meetings with the BECxP shall be routed through the Owner who will then confirm the necessity for the meeting. Note that every attempt should be made to deal with BECx issues at regularly scheduled BECx Meetings.
4. Scheduling Coordination: Contractor shall review the BE technical specifications, identify required BECx items (including field test requirements, specified test standards, mock- ups, product submissions, milestone installations, and similar) and provide a schedule to the BECxP with anticipated dates for each. It is the responsibility of the Contractor to provide adequate time from submission of each BECx requirement to response from the BECxP, and resolution of any identified deficiencies without unnecessary deleterious impact on the project schedule.
   a. Contractor shall include BECx commissioning activities in the construction schedule.
5. Notification of Completion Milestones: Contractor shall notify Owner and BECxP at least two weeks prior to an anticipated BECx activity or BECx milestone (such as installation of a new facade component). Contractor and BECxP shall then coordinate the scheduling of the activity between all required parties as applicable. Notification shall be via e-mail.

6. Action List: BECxP maintains a categorized Action List which tracks the BECx related action items. All content of the Action List will be available to all parties who have credentials on the portal. Any party with credentials may post an Action Item. Any party that is copied on an email resulting from an Action Item posting may respond to it and contribute to the dialogue.

1.09 CONTRACTOR'S RESPONSIBILITIES

A. As defined in this Section and in the individual technical Building Enclosure Technical Sections (Divisions 03 through 09), identified in Section 01 91 19A Building Enclosure Commissioning Appendix A, including but not limited to the following:
   1. Review and distribute submittals. Review and comment on BECxP comments on the submittals.
   2. Integrate commissioning activities into the master construction schedule with input from the BECxP.
   3. Attend the routine BECx meetings.
   4. Provide and administrate the internet-based commissioning portal for collaboration on BECx activities.
   5. Coordinate and chair pre-construction/pre-installation and construction-phase coordination meetings.
   6. Provide summary and schedule of field quality control tests and inspections required by the Contract Documents to BECxP.
   7. Participate in BECx Kickoff meeting.
   8. Participate in pre-construction mock-up and field testing coordination meetings.
   9. Coordinate with the BECxP for pre-construction mock-ups and construction testing and submit laboratory and field quality control testing, field checklists and inspection reports on building enclosure construction to the BECxP. Perform out of sequence work as require facilitating field tests.
   10. Perform internal quality control procedures and document procedures prior to notifying the BECxP that systems are ready for testing.
   11. Submit maintenance data for products, assemblies, and components to the BECxP.
   12. Provide test data, inspection reports, and certificates to BECxP.
   13. Review and respond to AI in a timely manner (typically within ten (10) business days).
   14. Provide input for final BECx documentation.
   15. Participate in warranty inspection.
   16. Assist and coordinate with all field performance testing efforts as outlined in Section 01 91 19A Building Enclosure Commissioning Appendix A, whether the Contractor or other party is identified as responsible for the testing.

1.10 A/E RESPONSIBILITIES

A. Attend the Preconstruction BECx Conference and routine BECx meetings.
B. Attend pre-construction and construction-phase coordination meetings.
C. Participate in Pre-construction, Mock-Up, and Field Testing coordination meetings.
D. Provide recommendations for resolving items for which the BECxP and Contractor may disagree.
E. Provide input for final commissioning documentation.
F. Review and comment on BECxP review comments, reports and/or issues logs.

1.11 OWNER RESPONSIBILITIES

A. Review and comment on BECxP review comments, reports and/or issues logs.
B. Attend the Preconstruction BECx Conference and routine BECx meetings.

1.12 BECXP RESPONSILIBILITIES

A. Review submittals.
B. Attend pre-construction meetings.
C. Conduct BECx kickoff meeting.
D. Participate in Project-Specific mock-ups and outline the commissioning process for both field and laboratory performance test procedures and testing criteria.
E. Conduct observations at the fenestration and cladding system fabrication and assembly shops to observe and document that required work and quality processes are being carried out by the relevant contractors in any pre-assembly or off-site construction. The BECxP will document noncomplying work items, report them to the Project Team, and provide a summary report of observations. The summary report will include a list of noncomplying work items to serve as an ongoing record that is updated after each site visit.
F. BECxP will conduct site visits during construction to review the progress of the enclosure work, evaluate its compliance with the design documents and industry standards, witness building enclosure field testing, and milestone installations. The BECxP will document noncomplying work items, report them to the Project Team, and provide a summary report of observations. The summary report will include a list of noncomplying work items to serve as an ongoing record that is updated after each site visit.
G. Conduct routine BECx meetings to review progress on AI list and resolve issues affecting the building enclosure.
H. Compile test data, inspection reports, and certificates for inclusion in the BECx Report.
I. Assist contractor with coordinating independent third-party testing agency for mock-up and field performance testing of building enclosure, or conduct testing as outlined in Section 01 91 19A Building Enclosure Commissioning Appendix A.
J. Participate in 10-month warranty inspection.

1.13 BUILDING ENCLOSURE PERFORMANCE TESTING

A. Quality Assurance and Control: Specific BECx quality-assurance and quality-control requirements for individual Building Enclosure and materials, methods, and assemblies are specified in the BE Technical Sections relating to those activities. Specified commissioning tests, inspections, and related actions are specified in Section 01 91 19A Building Enclosure Commissioning Appendix A, do not limit Contractor's other quality-assurance and quality- control procedures that facilitate compliance with the Contract Document requirements.
B. The objective of Building Enclosure Performance Testing is to demonstrate that each Building Enclosure system, and system-to-system interfaces meet or exceed the performance requirements of the Contract Documents.
C. Contractor and their subcontractors shall provide assistance, coordination and scheduling of field performance testing in accordance with the following requirements:
    1. Complete testing prior to installation of interior insulation and gypsum board.
    2. Complete testing after installation of adjacent air barrier with cladding anchorage components and/or cladding components.
    3. Contractor and their subcontractors to provide powered scaffold, aerial lifts, hose, water supply, communication system and manpower to perform tests.
    4. Contractor will work with the Test Agency and BECxP to determine necessity for additional test methods and for field chamber tests based upon evaluation of initial test results. The BECxP will interpret marginal results and adjust the test procedures as appropriate.
    5. Contractor shall perform out-of-sequence work as required facilitating system tests and comply with BECx field testing schedule and milestones.
D. Initial Building Enclosure Performance Testing should be conducted as soon as possible during the construction phase so that adjustments to material selection, fabrication methods, or

installation practices may be identified and implemented for the remaining construction to minimize negative impacts to overall project cost, schedule, and quality.

1.14 DEFECIENCIES IDENTIFIED DURING BECX FUNCTIONAL PERFORMANCE TESTING

A. Non-Conformance. Non-conformance deficiencies identified during Periodic Site Visits or Building Enclosure Performance Testing shall be resolved as follows:
   1. The BECxP will record the results of the review / field performance test in the BECx Software project database and post reports to Project Web-site. All deficiencies or non-conformance issues shall be noted as Action Items and reported to the Contractor.
   2. Corrections of identified minor deficiencies may be made during the review / tests at the discretion of the BECxP. In such cases the deficiency and associated resolution will be documented in the database.
   3. Every effort will be made by the BECxP to expedite the review / testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
   4. As reviews / tests progress and a deficiency is identified, the BECxP will discuss the issue with the Contractor for follow-up and resolution.
      a. When there is no dispute with respect to the deficiency and the Contractor accepts responsibility to correct it:
         1. The BECxP shall document the deficiency and the Contractor's response. A copy/email of the deficiency shall be generated and provided to the Contractor. The Contractor corrects the deficiency, completes the Action Item response certifying that the issue is resolved and /or the product, material or assembly is ready to be retested and notifies the Project Team.
      b. If there is a dispute about a deficiency:
         1. The deficiency shall be documented as an Action Item with the Contractor's response and the Contractor will be notified. The Contractor will track this issue under the construction contract dispute resolution provisions.
         2. Final interpretive authority is with the Owner. Final acceptance authority is with the Owner or A/E.
         3. The BECxP documents the resolution to the Action Item.
         4. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and responds to the Action Item indicating completion. The Contractor reschedules the review / test, and the review / test is repeated until satisfactory performance is achieved. The Action Item is then considered as closed.

B. Failure: As defined in each Building Enclosure Technical Sections (Divisions 03-09) and/or Section 01 91 19A Building Enclosure Commissioning Appendix A. In event of test failure, the Contractor shall provide the Owner with the following:
   1. Installer/Manufacturer's response in writing as to the cause of the failure and proposed resolution.
   2. Installer/Manufacturer shall implement their proposed resolution on a representative sample of the product.
   3. The Contractor coordinates and schedules re-testing at their own cost. Re-testing shall be performed by the same Testing Agency that performed the initial testing unless alternate Testing Agency is approved by the owner. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner, the remedial action taken will be implemented on a project- wide basis where applicable.
   4. The Owner will determine whether a replacement of all identical units is required or if a repair is acceptable.

5. Upon acceptance, the responsible Party shall replace or repair all identical items at their expense and shall extend the warranty accordingly.
6. Systemic or frequent failures may result in additional testing beyond originally identified to verify performance.
7. Based on the type of failure and the rate of frequency, the number of additional tests will be negotiated between the BECxP, the Owner, and the Contractor.

C. Cost of Retesting and/or Additional Testing:
1. Contractor is responsible for the cost of all re-tests and additional testing and compensation of time for BECxP related to all additional work necessitated by re-testing or additional testing of specimens, if contractor or subcontractors are responsible for the deficiency. If not responsible, cost recoveries for retesting will be negotiated with Contractor.

1.15 COMMISSIONING REPORT CONTENT

A. Building Enclosure Commissioning Report
1. Maintenance Schedule: Contractor will provide a summary table that indexes the building enclosure component requiring maintenance and indicates the frequency each component will require repair or replacement (i.e. replacement of sealants, gaskets, IGUs, repair of paints or coatings). Contractor will provide subcontractors with an Excel spreadsheet that will be completed by each applicable subcontractor and returned to the Contractor for incorporation in the BECx Report by the BECxP.
2. Maintenance Information: Contractor shall provide Maintenance Information for each entry containing the following:
   a. Product Data Sheet: Provide a summary of performance data.
   b. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are a part of. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
   c. Sources of Material: Include reference to contact information where specific materials can be obtained.
   d. Installation and Maintenance Instructions: For each material, component or system.

B. Construction Record Documentation
1. Record Drawings: Contractor shall provide an index of all record drawings with drawing number, title, and electronic file name(s) including electronically referenced drawings.
2. Record Specifications: Contractor shall provide a detailed index of the record specification. Include sections and major items in the specification all indexed to the appropriate page number.
3. Approved Product Data and Shop Drawings:
   a. Contractor shall provide an index of all product data and shop drawings. This shall list all BE materials, components or systems with the associated submittal number.
   b. Contractor shall organize and compile only approved product data and shop drawings. Providing these in a filing format is acceptable provided all files are identified and organized for easy access.
   c. Inclusion of any of this information in previous sections of the Commissioning Report does not allow exclusion in this section.
4. Commissioning Record: BECxP shall provide complete commissioning records including all Performance Test documentation, in both written and electronic format at the discretion of the Owner

END OF SECTION