ARROWSTREET

# LINCOLN-ELIOT ELEMENTARY SCHOOL

## SCHEMATIC DESIGN NARRATIVE

NEWTON, MA

15 JUNE 2022

PREPARED FOR

NEWTON PUBLIC SCHOOLS
Legacy & Excellence

David Fleishman,
Superintendent

Ruthanne Fuller,
Mayor

10 POST OFFICE SQUARE
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# INTRODUCTION

## 10 PROJECT DESCRIPTION

### 1010 Project Summary

#### Summary of Work

The project is a renovation of existing and new addition building for the Lincoln-Eliot Elementary School in Newton, Massachusetts. A facility designed for 396-414 students in Grades Kindergarten to 5th Grade. The school includes classrooms, gymnasium, cafeteria, media center, specialty classrooms and auditorium. The sitework includes new parking areas, driveways, walkways, entrance plaza, playground, multi-use lawn field and landscaping.

**Green Building Rating System**

The City of Newton Public Buildings Department has set forth Building Design and Construction Sustainability Guidelines for new and major renovation projects to register and achieve the minimum certification level of the most recent version of LEED BD+C Schools (LEED-S) as the preferred benchmarking system. Please refer to the following LEED Checklist for credits being pursued.

## LEED v4.1 for BD+C: Schools

Project Checklist

all credits will follow v4.1 criteria unless otherwise noted

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 1 | | | Credit 1 | Integrative Process | 1 |

| 9 | 4 | 2 | | **Location and Transportation** | 15 |
|---|---|---|---|---|---|
| | | | Credit 1 | LEED for Neighborhood Development Location | 15 |
| 1 | | | Credit 2 | Sensitive Land Protection | 1 |
| | | 2 | Credit 3 | High Priority Site | 2 |
| 3 | 2 | | Credit 4 | Surrounding Density and Diverse Uses | 5 |
| 4 | | | Credit 5 | Access to Quality Transit | 4 |
| | 1 | | Credit 6 | Bicycle Facilities | 1 |
| | 1 | | Credit 7 | Reduced Parking Footprint | 1 |
| 1 | | | Credit 8 | Electric Vehicles | 1 |

| 4 | 7 | 1 | | **Sustainable Sites** | 12 |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | Construction Activity Pollution Prevention | Required |
| Y | | | Prereq 2 | Environmental Site Assessment | Required |
| 1 | | | Credit 1 | Site Assessment | 1 |
| | 2 | | Credit 2 | Protect or Restore Habitat | 2 |
| | 1 | | Credit 3 | Open Space | 1 |
| | 3 | | Credit 4 | Rainwater Management | 3 |
| 2 | | | Credit 5 | Heat Island Reduction | 2 |
| 1 | | | Credit 6 | Light Pollution Reduction | 1 |
| | | 1 | Credit 7 | Site Master Plan | 1 |
| | 1 | | Credit 8 | Joint Use of Facilities | 1 |

| 2 | 5 | 5 | | **Water Efficiency** | 12 |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | Outdoor Water Use Reduction | Required |
| Y | | | Prereq 2 | Indoor Water Use Reduction | Required |
| Y | | | Prereq 3 | Building-Level Water Metering | Required |
| | 2 | | Credit 1 | Outdoor Water Use Reduction | 2 |
| 2 | 2 | 3 | Credit 2 | Indoor Water Use Reduction | 7 |
| | | 2 | Credit 3 | Cooling Tower Water Use | 2 |
| | 1 | | Credit 4 | Water Metering | 1 |

| 10 | 21 | | | **Energy and Atmosphere** | 31 |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | Fundamental Commissioning and Verification | Required |
| Y | | | Prereq 2 | Minimum Energy Performance | Required |
| Y | | | Prereq 3 | Building-Level Energy Metering | Required |
| Y | | | Prereq 4 | Fundamental Refrigerant Management | Required |
| 3 | 3 | | Credit 1 | Enhanced Commissioning | 6 |
| 7 | 9 | | Credit 2 | v4 Optimize Energy Performance | 16 |
| | 1 | | Credit 3 | Advanced Energy Metering | 1 |
| | 2 | | Credit 4 | Grid Harmonization | 2 |
| | 5 | | Credit 5 | Renewable Energy | 5 |
| | 1 | | Credit 6 | Enhanced Refrigerant Management | 1 |

Project Name: Lincoln-Eliot Elementary School
Date: 3/8/2022
Prepared By: Arrowstreet

| | | | | | |
|---|---|---|---|---|---|
| **5** | **7** | **1** | **Materials and Resources** | | **13** |
| Y | | | Prereq 1 | Storage and Collection of Recyclables | Required |
| Y | | | Prereq 2 | Construction and Demolition Waste Management Planning | Required |
| 3 | 2 | | Credit 1 | Building Life-Cycle Impact Reduction | 5 |
| 1 | 1 | | Credit 2 | Building Product Disclosure and Optimization - Environmental Product Declarations | 2 |
| | 1 | 1 | Credit 3 | Building Product Disclosure and Optimization - Sourcing of Raw Materials | 2 |
| 1 | 1 | | Credit 4 | Building Product Disclosure and Optimization - Material Ingredients | 2 |
| | 2 | | Credit 5 | Construction and Demolition Waste Management | 2 |

| | | | | | |
|---|---|---|---|---|---|
| **5** | **11** | | **Indoor Environmental Quality** | | **16** |
| Y | | | Prereq 1 | Minimum Indoor Air Quality Performance | Required |
| Y | | | Prereq 2 | Environmental Tobacco Smoke Control | Required |
| Y | | | Prereq 3 | Minimum Acoustic Performance | Required |
| 1 | 1 | | Credit 1 | v4 Enhanced Indoor Air Quality Strategies | 2 |
| 2 | 1 | | Credit 2 | Low-Emitting Materials | 3 |
| 1 | | | Credit 3 | Construction Indoor Air Quality Management Plan | 1 |
| | 2 | | Credit 4 | Indoor Air Quality Assessment | 2 |
| | 1 | | Credit 5 | Thermal Comfort | 1 |
| 1 | 1 | | Credit 6 | v4 Interior Lighting | 2 |
| | 3 | | Credit 7 | Daylight | 3 |
| | 1 | | Credit 8 | Quality Views | 1 |
| | 1 | | Credit 9 | Acoustic Performance | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | | | **Innovation** | | **6** |
| 1 | | | Credit 1.1 | Exemplary Performance: Access to Quality Transit | 1 |
| 1 | | | Credit 1.2 | Pilot Credit: Comprehensive Composting | 1 |
| 1 | | | Credit 1.3 | Innovation: Design for Active Occupants | 1 |
| 1 | | | Credit 1.4 | Innovation: | 1 |
| 1 | | | Credit 1.5 | Innovation: | 1 |
| 1 | | | Credit 2 | LEED Accredited Professional | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **2** | **2** | | **Regional Priority** | | **4** |
| 1 | | | Credit 1 | Access to Quality Transit - threshold 1pt | 1 |
| | 1 | | Credit 2 | Protect Restore Habitat (2pt), Surrounding Density (4pt), Renewable Energy (2 | 1 |
| | 1 | | Credit 3 | Optimize Energy Performance - threshold 8 pts | 1 |
| 1 | | | Credit 4 | Building Life-Cycle Impact Reduction - threshold 2 pts | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **44** | **57** | **9** | **TOTALS** | Possible Points: | **110** |

**Certified:** 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

## 1020.1 Project Program

The following pages is the Space Summary for the project. The target program areas and square footages are noted on the columns noted as “Target Program”. The columns noted “SD DESIGN” are the rooms and square-footages in the current SD Design.

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | DATE: 08/5/2021, UPDATED 3/16/2022 | | | DRAFT | | | | | | | |
| 2 | | **Lincoln-Eliot Preliminary Design Program** | | | **Lincoln-Eliot (Target Program) 396 Students** | | | | | | **Lincoln-Eliot (SD DESIGN)** | |
| 3 | | ROOM TYPE | | ROOM NFA[1] | # OF RMS | area totals | Comments | | ROOM NFA[1] | # OF RMS | area totals | Comments |
| 4 | | | | | | | | | | | | |
| 5 | | **CORE ACADEMIC SPACES** | | | 18 + 2 (SpEd) | **18,000** | | | | | **18,711** | 711 |
| 6 | | *(List classrooms of different sizes separately)* | | | | | | | | | | |
| 7 | | Pre-Kindergarten w/ toilet | | | | | | | | | | |
| 8 | | Kindergarten w/ toilet | | 1,200 | 3 | 3,600 | | | 1,113 - 1,128 | 3 | 3,366 | Includes toilet room in each K classroom |
| 9 | | Kindergarten Breakout Space | | 125 | 0 | 0 | included below | | 125 | 0 | 0 | |
| 10 | | General Classrooms - Grade 1-5 | | 900 | 14 | 12,600 | Size of Classroom adjusted to 900 SF per discussion at 03/05/20 Working Group | | 894 - 936 | 14 | 12,686 | |
| 11 | | General Classrooms - Grade 1 | | 1,200 | 1 | 1,200 | one 1,200 sf classroom - planned for future K classroom | | 1,127 | 1 | 1,127 | Enlarged Grade 1 Classroom to prepare for future use as K classroom to accommodate sudden enrollment increase |
| 12 | | ELL Program | | 300 | 2 | 600 | Due to larger ELL population | | 298-301 | 2 | 599 | |
| 13 | | Projecrt Areas | | | | | | | 137 - 202 | 5 | 933 | 1 per grade except for Kindergarten |
| 14 | | | | | | | | | | | | |
| 15 | | **SPECIAL EDUCATION & SUPPORT SERVICES** | | | | **9,275** | | | | | **9,528** | 253 |
| 16 | | *(List rooms of different sizes separately)* | | | | | | | | | | |
| 17 | | Self-Contained SPED | | 900 | 2 | 1,800 | Difference due to higher needs and Title 1 school. Potential for District wide SpEd program | | 444 | 4 | 1,776 | Half Classrooms requested from SPED Director but in the future, the classroom can be combined to a full 900 SF classroom. |
| 18 | | Self-Contained SPED - toilet | | | | 0 | | | | | 0 | |
| 19 | | Resource Room | | | | 0 | | | | | 0 | |
| 20 | | Substantially Separate Classroom | | | | 0 | | | | | 0 | |
| 21 | | Learning Centers (K-2; 3-5) | | 450 | 2 | 900 | Currently 1 Learning Center in existing L-E | | 149 - 251 | 4 | 800 | Based on feedback from LC teachers. They split time between pulling out and pushing in, prefer two smaller rooms to increase flexibility for testing. Typically only have smaller groups. Added adjacent staff bathroom |
| 22 | | Breakout Rooms (small group/ individual instruction) 1/grade average. Extended Learning Areas | | 125 | 8 | 1,000 | 6 open breakout areas (1 per grade) 2 enclosed w/ glasss/vision panels | | 125 - 176 | 9 | 1,185 | One additional for K requested in K teacher meeting |
| 23 | | OT/PT | | 475 | 1 | 475 | | | 475 | 1 | 475 | |
| 24 | | Sensory Room/ additional OT/PT | | 450 | 1 | 450 | | | 450 | 1 | 450 | |
| 25 | | Quiet Room 1/ academic floor | | 100 | 3 | 300 | | | 91 - 99 | 3 | 286 | |
| 26 | | Speech + Language | | 150 | 2 | 300 | | | 125 - 150 | 2 | 275 | |
| 27 | | Reading Program/ Literacy Room | | 375 | 2 | 750 | Adjusted to two smaller seminar rooms per 03/05/20 Working Group Discussion | | 368-375 | 2 | 743 | |
| 28 | | Inclusion Facilitators (office for 6 adults; 150SF per person) | | 450 | 2 | 900 | Difference due to higher needs and Title 1 school | | 428 - 433 | 2 | 861 | |
| 29 | | Literacy Specialist Offices | | 200 | 4 | 800 | Individual office plus small group meeting area | | 161 - 230 | 4 | 840 | |
| 30 | | Literacy Specialist - Shared Teaching Room | | 500 | 1 | 500 | Shared workroom and teaching space for 6-8 students | | 509 | 1 | 509 | |
| 31 | | Math Coach | | 200 | 2 | 400 | Individual office plus small group meeting area | | 225 | 2 | 450 | |
| 32 | | Team Specialist + IEP Conf Room (12 adults) | | 400 | 1 | 400 | Near Main office | | 434 | 1 | 434 | |
| 33 | | Psychologist (Office, testing, therapy, storage) | | 150 | 1 | 150 | Near Main office | | 150 | 1 | 150 | |
| 34 | | Social Worker (Office, testing, conferences) | | 150 | 1 | 150 | Near Main office | | 150 | 1 | 150 | |
| 35 | | Waiting area @ Social Worker/Psych | | | | | | | 144 | 1 | 144 | |
| 36 | | SPED/ Specialist Work Room | | | | 0 | | | | | | |
| 37 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 2 | Lincoln-Eliot Preliminary Design Program | | | Lincoln-Eliot (Target Program) 396 Students | | | | | Lincoln-Eliot (SD DESIGN) | | | |
| 3 | ROOM TYPE | | | ROOM NFA[1] | # OF RMS | area totals | Comments | | ROOM NFA[1] | # OF RMS | area totals | Comments |
| 38 | **ART & MUSIC** | | | | | **2,650** | | | | | **2,546** | -104 |
| 39 | Art Classroom - 25 seats | | | 1,000 | 1 | 1,000 | 1 Art Classroom currently in existing L-E | | 920 | 1 | 920 | |
| 40 | Art Workroom w/ Storage & kiln | | | 150 | 1 | 150 | | | 70 - 73 | 2 | 140 | Art teacher requested two rooms, one for storage and one for kiln |
| 41 | Music Classroom / Large Group - 25-50 seats | | | 1,200 | 1 | 1,200 | 1 Music Classroom currently in existing L-E | | 1,192 | 1 | 1,192 | |
| 42 | Music Practice / Ensemble (Groups 4-10 students) | | | 150 | 2 | 300 | | | 147 | 2 | 294 | |
| 43 | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | |
| 45 | **HEALTH & PHYSICAL EDUCATION** | | | | | **6,300** | | | | | **6,314** | 14 |
| 46 | Gymnasium | | | 6,000 | 1 | 6,000 | | | 5,997 | 1 | 5,997 | |
| 47 | Gym Storeroom | | | 175 | 1 | 175 | | | 192 | 1 | 192 | Staff requested more gym storage |
| 48 | Health Instructor's Office w/ Shower & Toilet | | | 125 | 1 | 125 | | | 125 | 1 | 125 | |
| 49 | | | | | | | | | | | | |
| 50 | **MEDIA CENTER** | | | | | **2,800** | | | | | **2,785** | -15 |
| 51 | Media Center / Reading Room | | | 2,800 | 1 | 2,800 | | | 2,422 | 1 | 2,422 | |
| 52 | IT Office | | | | | | | | 163 | 1 | 163 | |
| 53 | Library Office | | | | | | | | 200 | 1 | 200 | |
| 54 | | | | | | | | | | | | |
| 55 | **DINING & FOOD SERVICE** | | | | | **6,460** | | | | | **5,824** | -636 |
| 56 | Cafeteria / Dining | | | 3,200 | 1 | 3,200 | | | 3,355 | 1 | 3,355 | |
| 57 | Lunch Breakout | | | | | | | | 246 | 1 | 246 | |
| 58 | Stage | | | 1,000 | 1 | 1,000 | | | 0 | 1 | 0 | Stage is existing, see 'Auditorium' section |
| 59 | Chair / Table / Equipment Storage | | | 360 | 1 | 360 | | | 280 | 1 | 280 | |
| 60 | Kitchen | | | 1,400 | 1 | 1,400 | | | 622 | 1 | 699 | Kitchen & associated spaces are existing |
| 61 | Servery | | | | | | | | 365 | 1 | 365 | Kitchen & associated spaces are existing |
| 62 | Kitchen Storage | | | | | | | | 264 | 1 | 264 | Kitchen & associated spaces are existing |
| 63 | Kitchen Lockers | | | | | | | | 87 | 1 | 87 | Kitchen & associated spaces are existing |
| 64 | Kitchen Office | | | | | | | | 78 | 1 | 78 | Kitchen & associated spaces are existing |
| 65 | Staff Lunch Room (1/3 of staff = 60 staff/3) | | | 250 | 2 | 500 | | | 450 | 1 | 450 | |
| 66 | | | | | | | | | | | | |
| 67 | **MEDICAL** | | | | | **510** | | | | | **546** | 36 |
| 68 | Medical Suite Toilet | | | 60 | 1 | 60 | | | 56 | 1 | 56 | |
| 69 | Nurses' Office / Waiting Room | | | 250 | 1 | 250 | | | 333 | 1 | 333 | |
| 70 | Nurses' Office | | | | | | | | 80 | 1 | 80 | |
| 71 | Examination Room / Resting | | | 100 | 2 | 200 | | | 77 | 1 | 77 | 1 Exam, 1 Nurse Office per Nurse request |
| 72 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DATE: 08/5/2021, UPDATED 3/16/2022 | | | DRAFT | | | | | | | | |
| 2 | **Lincoln-Eliot Preliminary Design Program** | | | **Lincoln-Eliot (Target Program) 396 Students** | | | | | **Lincoln-Eliot (SD DESIGN)** | | | |
| 3 | ROOM TYPE | | | ROOM NFA[1] | # OF RMS | area totals | Comments | | ROOM NFA[1] | # OF RMS | area totals | Comments |
| 73 | **ADMINISTRATION & GUIDANCE** | | | | | **2,675** | | | | | **2,553** | -122 |
| 74 | General Office / Waiting Room / Toilet | | | 650 | 1 | 650 | | | 723 | 1 | 723 | |
| 75 | Teachers' Mail and Time Room | | | Included in General Office | | | | | Included in General Office | | | |
| 76 | Duplicating Room | | | Included in General Office | | | | | Included in General Office | | | |
| 77 | Records Room | | | 100 | 1 | 100 | | | 100 | 1 | 100 | |
| 78 | Principal's Office w/ Conference Area | | | 300 | 1 | 300 | | | 304 | 1 | 304 | |
| 79 | Principal's Secretary / Waiting | | | Included in General Office | | | | | Included in General Office | | | |
| 80 | Assistant Principal's Office | | | 125 | 1 | 125 | | | 125 | 1 | 125 | |
| 81 | Supervisory/ Itinerant teachers/ Extended (Afterschool) Program | | | 650 | 1 | 650 | Needs to be adjacent/near to cafeteria or gym | | 518 | 1 | 518 | |
| 82 | Conference Room | | | 250 | 1 | 250 | | | 225 | 1 | 225 | |
| 83 | Guidance Office/ Storeroom | | | | | | | | | | | |
| 84 | Teachers' Work Room | | | 250 | 2 | 500 | | | 223 - 238 | 2 | 461 | |
| 85 | Lactation Room | | | 100 | 1 | 100 | Difference due to needs of the population | | 97 | 1 | 97 | |
| 86 | | | | | | | | | | | | |
| 87 | **CUSTODIAL & MAINTENANCE** | | | | | **1,705** | | | | | **1,017** | -688 |
| 88 | Custodian's Office | | | 150 | 1 | 150 | | | 143 | 1 | 143 | |
| 89 | Custodian's Workshop | | | 0 | 0 | 0 | | | 0 | 0 | 0 | |
| 90 | Custodian's Storage | | | 375 | 1 | 375 | | | 70 - 197 | 3 | 440 | |
| 91 | Recycling Room / Trash | | | 400 | 1 | 400 | | | 400 | 0 | 0 | |
| 92 | Receiving and General Supply | | | 260 | 1 | 260 | | | 312 | 1 | 312 | |
| 93 | Storeroom | | | 320 | 1 | 320 | | | 320 | 0 | 0 | district-wide storeroom |
| 94 | Custodians Closets | | | | | | | | 17 - 105 | 2 | 122 | See MEP/FP section |
| 95 | Network / Telecom Room | | | 200 | 1 | 200 | | | 200 | 0 | 0 | See MEP/FP section |
| 96 | | | | | | | | | | | | |
| 97 | **ASSEMBLY (AUDITORIUM)** | | | | | **0** | | | | | **9,765** | 9,765 |
| 98 | Auditorium | | | 0 | 0 | 0 | Cafetorium, see Lines 52 & 53 | | 6,509 | 1 | 6,509 | |
| 99 | Auditorium Lobby | | | 0 | 0 | 0 | | | 597 | 1 | 597 | |
| 100 | Stage | | | 0 | 0 | 0 | | | 2,073 | 1 | 2,073 | |
| 101 | Fan Room | | | 0 | 0 | 0 | | | 586 | 1 | 586 | |
| 102 | | | | | | | | | | | | |
| 103 | **DISTRICT WIDE STORAGE** | | | | | **0** | | | | | **4,507** | 4,507 |
| 104 | NPS Storage | | | | | | | | 3,962 | 1 | 3,962 | |
| 105 | Shop Area | | | | | | | | 545 | 1 | 545 | |
| 106 | | | | | | | | | | | | |
| 107 | | | | | | | | | | | | |
| 108 | **TOILETS** | | | | | **0** | | | | | **2,757** | 2,757 |
| 109 | Boys Group Toilets | | | | | | | | 143 - 178 | 4 | 607 | On each floor |
| 110 | Gender Neutral toilets | | | | | | | | 49 | 2 | 98 | 2nd Floor, near media center |
| 111 | Girls Group Toilets | | | | | | | | 168 - 172 | 4 | 676 | On each floor |
| 112 | Kitchen Toilets | | | | | | | | 44 | 1 | 44 | existing |
| 113 | Mens Toilets (Auditorium) | | | | | | | | 169 - 216 | 2 | 385 | for use by school & Auditorium |
| 114 | Staff Toilets | | | | | | | | 43 - 110 | 4 | 275 | On each floor |
| 115 | Womens Toilets (Auditorium) | | | | | | | | 236 - 435 | 2 | 672 | for use by school & Auditorium |
| 116 | | | | | | | | | | | | |
| 117 | | | | | | | | | | | | |

DATE: 08/5/2021, UPDATED 3/16/2022 **DRAFT**

## Lincoln-Eliot Preliminary Design Program

| ROOM TYPE | Lincoln-Eliot (Target Program) 396 Students | | | | Lincoln-Eliot (SD DESIGN) | | | |
|---|---|---|---|---|---|---|---|---|
| | ROOM NFA[1] | # OF RMS | area totals | Comments | ROOM NFA[1] | # OF RMS | area totals | Comments |
| **STORAGE & MEPFP** | | | **0** | | | | **2,765** | 2,765 |
| Mech Room | | | | | 1,392 | 1 | 1,392 | |
| Electrical Room | | | | | 169 - 187 | 2 | 356 | |
| EMR | | | | | 62 - 139 | 2 | 201 | |
| IDF | | | | | 57 | 3 | 171 | |
| Mech RM | | | | | 87 - 126 | 2 | 213 | |
| Storage | | | | | 12-138 | 3 | 230 | |
| Transformer Vault | | | | | 202 | 1 | 202 | |
| **CIRCULATION** | | | **0** | | | | **17,048** | 17,048 |
| Cafeteria Corridor | | | | | 975 | 1 | 975 | |
| Cafeteria Lobby | | | | | 1,121 | 1 | 1,121 | |
| 1st FL Corridor | | | | | 2,146 | 1 | 2,146 | |
| 1st FL Corridor | | | | | 369 | 1 | 369 | |
| 2nd FL Corridor | | | | | 3,073 | 1 | 3,073 | |
| 3rd FL Corridor | | | | | 2,272 | 1 | 2,272 | |
| Main Lobby | | | | | 2,865 | 1 | 2,865 | |
| Auditorium Lobby | | | | | 913 | 1 | 913 | |
| Stairs | | | | | Varies | 5 | 2,362 | |
| Vestibules | | | | | Varies | 6 | 952 | |
| Total Building Net Floor Area (NFA) | | | **50,375** | | | | **64,096** | |
| Proposed Student Capacity / Enrollment | | | **396** | | | | **396** | |
| Total Building Gross Floor Area (GFA)[2] | | | **75,563** | | | | **97,439** | Updated from revit on 3/16 @ 10am |
| Grossing factor (GFA/NFA) | | | **1.50** | | | | **1.52** | |

## 1020.3 Work Restrictions

Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

**On-Site Work Hours:** Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, except as otherwise indicated. Obtain prior authorization from the Owner at least 72 hours in advance for work at the site outside of these hours or on weekends. Schedule deliveries of material and equipment to the site during normal hours of construction operations, however without impeding the normal school operations. School arrival and departure times are approximately 8:10 a.m. and 2:50 p.m. Consult the school calendar for appropriate early release days, half days and no school days.

**If the building were to be occupied, restriction on work within the Lincoln-Eliot Elementary School:** Work shall only be performed within the phased work areas, only after all temporary noise and dust have been constructed and temporary exhaust fans made operational.

**If the building were to be occupied, restrictions on Use of Site:** Site Work and Work outside the building may be performed while school is in session if it does not interfere with or impede school activities, including but not limited to arrivals and departures of students and staff, and outdoor athletic and play activities.

**Existing Utilities Interruptions:** Do not interrupt utilities serving facilities occupied by Owner without prior written approval of the Owner.

**Noise, Vibration, and Odors:** Coordinate operations that may result in elevated levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner. The Owner will be the sole judge of whether construction activities are disrupting operations.

**Quiet Days**: Each phase will include five quiet days, to be chosen by the Owner. During these days no work will be performed, that in the judgment of the Owner, will impact their activities during these days.

**Employee Screening:** Comply with Owner's requirements regarding CORI reporting and requirements stated in the General Conditions regarding CORI screen of Contractor personnel working on the project site.

**Identification Badges:** Provide identification badges for Contractor's employees, and for employees of the Contractor's subcontractors, sub-subcontractors, and suppliers.

### Proprietary Items

The School Building Committee may vote to include proprietary items which they deem are in the best interest of the Town. If this happens these items will be included in future submissions to the School Building Committee and/or Design Review Committee and Development Review Team.

# 1030 Project Criteria

## 1030.10 Zoning Requirements

The project will require local and state permitting. Site plan review, Planning Board, Conservation Commission, and building permits will be reviewed locally.

## 1030.20 Code Analysis

Refer to the *Code Compliance Approach Report* in the drawing set.

## 1030.50 Sustainable Design Requirements

The project will be designed and constructed according to the principles of the USGBC LEED v4 or 4.1 for Schools. Refer to the system checklists in Project Binder.

# 1040 Existing Conditions

## 1040.30 Assessment

**Surveys:** A feasibility survey of the site has been performed and is included in the drawing set.

**Existing Conditions Assessment:** Refer to the *Preliminary Design Program* (PDP) Report.

**Traffic Data Collected:** Refer to Appendix "D - Initial Traffic Study & Data"

## 1040.50 Subsurface Investigation

**Geotechnical Investigations:** Refer to Appendix "A- Geotechnical Report".

**Geoenvironmental Investigations:** Refer to Appendix "B - Geo-environmental Phase IV Remedy Implementation Plan".

# 20 OWNER DEVELOPMENT

# 2030 Professional Services

## 2030.10 Project Managers

**Owner's Project Manager**
Hill International Inc.
330 Congress Street, 6th Floor
Boston, MA 02210
617-778-0900

## 2030.20 Design Professionals

**Architect**
Arrowstreet Inc.
10 Post Office Sq. Suite 700N
Boston, Ma 02109
617-623-5555

**Structural Engineer**
Engineers Design Group
350 Main Street
Malden, MA 02148
781-396-9007

**Mechanical & Electrical Engineer**
Garcia Galuska Desousa
370 Faunce Corner Road
North Dartmouth, MA 02747
508-998-5700

**Plumbing & Fire Protection Engineer**
Akal Engineering Inc.
44 Central Street, Suite 4
Berlin, MA 01503
508-869-0403

**Landscape Architect**
Terraink
7 Central Street, Suite 150
Arlington, MA 02476
781-316-1595

**Civil Engineer & Surveyor**
Nitsch Engineering
2 Center Plaza, Suite 430
Boston, MA 02108
617-338-0063

## 2030.30 Other Consultants

**Geotechnical Engineer**
Ransom Consulting, LLC
50 High Street, Suite 25
North Andover, MA, 01845
978-465-1822

**Sustainable Design Consultant**
Arrowstreet
10 Post Office Square, Suite 700N
Boston, MA 02109

**Geo-Environmental Engineer**
**Hazardous Materials**
Lord Environmental
1506 Providence Hwy, Suite 30
Norwood, MA 02062
781-255-5554

**Hazardous Materials**
Universal Environmental Consultants
12 Brewster Rd,
Framingham, MA 01702
508-628-5486

**Food Service**
Crabtree McGrath Associates, Inc.
161 West Main Street
Georgetown, MA 01833
978-352-8500

**Acoustical**
Acentech
33 Moulton Street
Cambridge, MA 02138
617-499-8000

**Educational Programming**
New Vista Design
32 Sheridan Street
Jamaica Plain, MA 02130
617-733-0847

**Specifications**
Kalin Associates
1121 Washington Street
Newton, MA 02465
617-964-5477

**Code**
Code Red
154 Turnpike Road, Suite 200
Southborough, MA 01772
617-500-7633

**Cost Estimating**
PM&C
20 Downer Avenue, Suite 1C
Hingham, MA 02043

# 30 PROCUREMENT REQUIREMENTS

## 3010 Project Delivery

### 3010.10 Project Delivery Methods

- Chapter 149, Design Bid Build (DBB)

**STRUCTURAL**

## Addition/Renovation

The proposed scheme requires demolition of the existing chapel and the convent and renovation of the entire Academic Wing and the Auditorium. The existing three story Academic Wing and the Auditorium do not rely on the convent and the chapel structure for support thus demolition of these structures would not have any major structural implications to the remaining structures. The scheme calls for renovations of the Academic Wing and the Auditorium, majority of the proposed renovations are non-structural in nature. The scheme calls for addition of an interior elevator and opening up portion of the second floor at the Cafeteria lobby. The scheme proposes a two story addition west of the Academic wing that will house the Administration Department at the first level and the Media Center at the second level. A new gymnasium is planned south of the proposed two story addition.

### PRIMARY STRUCTURAL CODE ISSUES RELATED TO THE EXISTING STRUCTURE

Due to the extent of the proposed demolition, and the renovations and addition to the existing structure, all of the existing masonry walls will be required to be clipped to the floor or roof structure. Due to limited structural modifications to the existing structure no other structural upgrades may be required. At this stage of the project we would propose that an allowance for costs for construction of 8, 20 feet long masonry shear walls supported on new 3’-0” wide x 1’-6” continuous footings be made in the project budget.

## PROPOSED STRUCTURAL SCHEME

The proposed horizontal additions will be structurally separated from the existing structure.

**STRUCTURAL**

# PROPOSED RENOVATIONS

Most of the proposed renovations to the existing structure are non-structural.

## Clipping of Existing Masonry Walls

Tops of all existing masonry walls shall be clipped to the floor and roof structure on both sides with steel angles spaced at 4'-0" on center.

## Second floor Slab Demolition

Portions of existing second floor to be demolished in between existing concrete beams to open up the space above the Cafeteria Lobby.

## Shear Walls

Due to the extent of the proposed renovations and reconfiguration of the interior spaces, additional reinforced masonry shear walls may be required. The proposed shear walls would be located at the existing column lines. An allowance for 8, 20 ft. long, full height shear walls should be made in the project budget. These new shear walls will be supported on new 3 ft.- 0 in. wide x 1 ft.- 6 in. deep reinforced concrete foundations.

## Elevator Shaft

The pit slab of the proposed elevator will be 2'-0" reinforced concrete thick mat. The elevator shaft walls will be load bearing reinforced masonry supported on 12" thick reinforced concrete walls below the first level. The masonry walls of the elevator will support portions of the floor and the roof around the elevator shaft.

Due to the proximity of three of the building columns to the proposed elevator shaft, the existing structure adjacent to the proposed elevator shaft will have to be shored to underside the roof. Two columns will have to be supported on piers on the elevator pit walls and foundation of one of the three columns will have to be underpinned, bottom of underpinning shall match bottom of proposed elevator pit slab.

## Underslab Utilities

Allow for trenching and construction of new 5" thick concrete slab on grade to install new underslab utilities.

## Openings through existing floor and roof

Allow for steel frames to support edges of floor and roof openings at locations of openings for ducts, smoke evacuation hatches above the Auditorium stage.

**STRUCTURAL**

### Existing Grade changes around existing structure

Along the southwest exterior wall of the Auditorium the proposed grade will be raised to create a new patio. We are proposing to construct a new reinforced concrete retaining wall 4'-0" away from the existing auditorium wall to form a light well, the grade within the light well would match the existing grade elevation and would be structural fill topped with a concrete slab. The retaining wall would be 1'-4" thick reinforced concrete wall supported on 8'-0 wide x 2'-0" thick footing.

Along the exterior south wall of the existing Academic wing the proposed grade will be sloped and lowered. We are proposing underpinning the existing foundations such that the underpinning will be four feet below the proposed finish grade.

Along the exterior north wall of the existing Academic wing the existing concrete light well wall will be demolished as the proposed finish grade will be sloped to the exterior wall.

### Roof Top Equipment above the Existing Roof structure

Proposed mechanical equipment will be supported on galvanized steel dunnage above the Academic Wing and the Auditorium. The dunnage steel will be supported on posts located above the existing building columns. Allow for 15 psf of galvanized structural steel for the area of the dunnage platforms.

# PROPOSED ADDITION

## SUBSTRUCTURE

### Foundations

Based on the recommendations of the Geotechnical Engineer, the columns of the proposed addition would bear on reinforced concrete footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft.- 0 in. below grade. With the recommended soil bearing capacity of the soil of 1.5 tons/sf, a typical interior footing would be 9 ft.- 0 in. x 9 ft.- 0 in x 24 in. deep and 8 ft.- 0 in. x 8 ft.- 0 in x 24 in. deep in the two story addition. The typical interior and exterior footings for the Gymnasium Structure would be 9 ft.- 0 in. x 9 ft.- 0 in x 24 in. deep. The exterior foundation walls would be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide x 12 in. deep continuous reinforced concrete strip footings around the perimeter of the additions extending a minimum of 4 ft.- 0 in. below finished grade.

### Slabs-on-Grade

Based on the recommendations of the Geotechnical Engineer, the lowest level of the proposed additions would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12 in. of compacted granular structural fill.

## SUPERSTRUCTURE

**STRUCTURAL**

## Floor Construction

### Typical Floor Construction

A 4 ½ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 14 psf for the typical framing.

## Roof Construction

### Typical Roof Construction

The roof construction would be galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 14 psf.

### Low Roof Structure

The roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 4 ½ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. This roof will be supporting the mechanical units. The units would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel is estimated to be 15 psf.

### Gymnasium Roof Framing

The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA' metal roof deck at the Gymnasium, spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 14 psf.

## VERTICAL FRAMING ELEMENTS

### Columns

Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double story spaces at the Gymnasium and the double story lobby would be HSS 12 x 12.

## Roof Screens

The roof screens will be framed with galvanized HSS members. Allow for 8 psf of structural steel for the roof screen supports.

### Lateral Load-Resisting System

The typical lateral load resisting system would be concentric braced frames of structural steel members. The lateral load resisting system of the Gymnasium structure may be reinforced masonry shear walls or ordinary concentric braced frames comprised of HSS structural steel members.

## Expansion Joint

The proposed addition will be separated from the existing structure by way of an expansion joint.

# B1080 Stairs

## B1080.10 Stair Construction

**Cast-In-Place Concrete:** Cast-in-place concrete risers at learning commons.

**Metal Stairs:** Steel stairs conforming to NAAMM (National Association of Architectural Metal Manufacturers) Commercial Class (egress stairs) or Architectural Class (monumental stair), with structural steel stringers, concrete-filled steel pan treads and platforms, steel plate risers. Steel components shop primed and field painted with alkyd paint system.

## B1080.50 Stair Railings

**Metal Railings:** Steel bar stock balusters with painted steel cap rail and stainless steel handrail. Steel components shop primed and field painted with alkyd paint system. Located at egress stairs.

**Decorative Metal Railings:** Stainless steel tube balusters with stainless steel flexible mesh guardrail infill, stainless steel mounting hardware and stainless steel handrail. Carl Stahl DécorCable Innovations, Inc., X-TEND as basis of design. Located at monumental stair.

## B1080.80 Ladders

Ladders at roof access locations.

# B20 EXTERIOR VERTICAL ENCLOSURES

# B2010 Exterior Walls

## B2010.10 Exterior Wall Veneer

**Precast Concrete Base:** At the base of the wall around the perimeter of the building.

**Unit Masonry:** 2-1/4" x 16"nominal face brick veneer with brick ties and mortar drop control mat, 3 types/colors.

4" x 16" nomimal concrete masonry units (CMU) with masonry veneer anchors and mortar drop control mat, 2 types.

**Manufactured Masonry:**

4" x 16" nominal calcium silicate masonry units (CSMU) with masonry veneer anchors and mortar drop control mat, 2 types. Arriscraft, Architectural Linear Series Brick as basis of design.

**Wall Panels:**

- High Pressure Laminate Phenolic Panels. Pura® NFC by Trespa Siding.

- Aluminum composite material panel with continuous fiberglass furring. 3A Composites USA, Inc., Alucobond Plus as basis of design

**Structural Thermal-Breaks:** Load-bearing, structural thermal break/insulation material to prevent thermal bridging between flanged, bolted, structural steel framing members at connections; Fa-breeka-TIM as basis of design.

**Exterior Signage:** Wall-mounted dimensional building signage, custom fabricated.

## B2010.20 Exterior Wall Construction

**Unit Masonry**

**12" CMU and 12" Acoustical CMU:** At the gym. Sound Seal Soundcell 12" or Soundblox 12": reinforced masonry as basis of design.

**CMU Backup System:**

- 4-inch mineral wool board insulation
- Air Vapor barrier
- 1/2-inch glass-mat gypsum sheathing
- 12-inch nominal normal-weight concrete masonry units

**Structural Metal Stud Framing**

**Typical Wall Backup System:**

- 4-inch mineral wool board insulation
- Air Vapor barrier
- 1/2-inch glass-mat gypsum sheathing
- 6-inch structural metal stud framing
- 3 1/2-inch mineral wool batt insulation (R-15)

## B2010.30 Exterior Wall Interior Skin

**Plaster and Gypsum Board:** 5/8-inch Type X Gypsum Board

## B2010.40 Fabricated Exterior Wall Assemblies

**Curtain Wall Assemblies:** Aluminum curtain wall, pressure plate system with 3-coat Kynar finish. 1-inch-thick insulated glazing units with low-E coating. EFCO S-5600 with Solarban 60 as basis of design. Security glass assemblies at selective locations. Basis of design: School Guard Glass SG4.

# B2020 Exterior Windows

## B2020.10 Exterior Operating Windows

Commercial-grade, thermally broken aluminum windows with 3-coat Kynar finish; fixed, casement type and awning type. 1-inch-thick insulated glazing units with low-E coating. EFCO 510-I with Solarban 60 as basis of design. Security glass assemblies at selective locations. Basis of design: School Guard Glass SG4.

## B2020.90 Exterior Window Supplementary Components

Aluminum sunshades with 3-coat Kynar finish at art rooms and gymnasium. Construction Specialties, Inc., CS-200-4 Horizontal Sunshade System as basis of design.

# B2050 Exterior Doors and Grilles

## B2050.10 Exterior Entrance Doors

Aluminum-framed storefronts and manual-swing aluminum doors with 3-coat Kynar finish. 1-inch-thick insulated glazing units with low-E coating. Laminated, tempered safety glass at select entries. EFCO 403T with Solarban 60 as basis of design. Security glass assemblies at selective locations. Basis of design: School Guard Glass SG4.

## B2050.20 Exterior Utility Doors

Insulated flush steel doors in steel frames.

- Doors: ANSI 250.8 Level 3, "Extra Heavy Duty" doors, with cold-rolled steel faces, seamless edges. Shop-primed and field painted.
- Frames: 0.067-inch-thick cold-rolled steel hollow-metal frames; corners mitered and welded. Furnish drywall and masonry profiles, as appropriate to construction in which doors will be set. Shop-primed and field painted.

# B2070 Exterior Louvers and Vents

## B2070.10 Exterior Louvers

**Horizontal Storm-Resistant Louvers:** 4 inches deep. Frame and Blade Nominal Thickness to comply with structural performance but not less than 0.080-inch. Wind-Driven Rain Performance should be not less than 99% effectiveness when subjected to a rain fall rate of 3 inches per hour and a wind speed of 29 mph at a core area intake velocity of 300 fpm. Provide interior bird screening.

# B30 EXTERIOR HORIZONTAL ENCLOSURES

## B3010 Roofing

### B3010.50 Low-Slope Roofing

**Low-Slope Roofing Membrane**

**Typical Roofing Assembly:**

- White TPO membrane
- 1/4-inch protection board
- 5-inch minimum thickness polyisocyanurate insulation
- Vapor barrier
- 1/2-inch thermal barrier board
- 2-inch metal roof deck
- Spray-applied fire resistive material where required

**Parapet Coping:** Single-ply metal coping with reveal profile; Basis of design: https://www.metalera.com/Products/Details/Metal-Era/Creative-Design-Series/Creative-Design-Reveal-Coping
See drawings for locations.

**Parapet Fascia:** Aluminum composite material panel with continuous fiberglass furring. 3A Composites USA, Inc., Alucobond Plus as basis of design. See drawings for locations.

## B3020 Roof Appurtenances

### B3020.10 Roof Accessories

**Roof Ladders:** Galvanized steel roof ladders between roof levels.

**Roof Curbs:** At rooftop HVAC equipment.

**Roof Walkways:** Maintenance walkway roof pads compatible with roofing assembly.

**Roof Edge Fall Protection:** Aluminum pipe railings at edge of roof deck.

**Mechanical Roof Screens:** Steel framed, steel panel. Cityscape Envisor, Perimeter Wall, Batten panel style for basis of design.

## B3060 Horizontal Openings

### B3060.10 Roof Windows and Skylights

**Unit Skylights:** Curb-mounted, acrylic, double domed, thermally broken unit skylight. Wasco, Thermalized Skydome as basis of design.

**Metal-Framed Skylights:** Assemblies shall match curtainwall framing and finish; laminated insulated glass assemblies as required for sloped glazing.

### B3060.50 Vents and Hatches

**Roof Hatches:** Commercial-grade, thermally broken roof scuttle for maintenance access to the roof. Bilco, NB-50 as basis of design.

**Automatic Smoke Vent:** Commercial-grade, thermally broken, double leaf automatic smoke vents, located above the Stage. Bilco, Type DSH as basis of design

**Vents:** Louvered elevator hoistway penthouse vent with automatic dampers. Industrial Louvers Inc., 480XP Penthouse Louver as basis of design.

## B3080 Overhead Exterior Enclosures

### B3080.20 Exterior Soffits

**Soffit Panels:** Metal composite material soffit panels, 4 colors. 3A Composites USA, Inc., Alucobond Plus as basis of design.

# C INTERIORS

## C10 INTERIOR CONSTRUCTION

## C1010 Partitions

### C1010.10 Interior Fixed Partitions

**Masonry Partitions**

**Construction:** Normal-weight concrete masonry units, typically 8-inch width, ASTM C270 Type S mortar, reinforced with vertical rebar and with horizontal truss-type reinforcing in every other course. Partitions will run from the floor to the underside of steel floor or roof deck above and will be restrained from lateral movement at the top. Located at elevator shafts and gymnasium.

**Gypsum Board Partitions**

**Typical Gypsum Board Partitions:** 5/8-inch-thick gypsum board on 0.0179-inch (25 gauge) steel studs, 3 5/8-inch-deep studs spaced 16 inches on center. Screw gypsum board to studs. Extend to underside of deck.

- Fire-Rated Partitions:
    - 2-hour rated construction around emergency electrical closets, boiler room, main switchgear room, fire pump room.
    - 1-hour rated partitions at stairs.
- Acoustical Partitions: Sound-attenuating partitions constructed with acoustical insulation inside single or double studs and acoustical caulking at top and bottom of the partition.
- Level 5 finish required at specific locations with graphic vinyl coverings. Allow for XXX square feet.

**Shaft Wall:** Galvanized steel C-H studs with 1-inch thick coreboard and 5/8-inch-thick Type X gypsum on outside face. Size studs to limit deflection to 1/175 of unbraced length under 5 psf load. Located at mechanical shafts.

### C1010.90 Interior Partition Supplementary Components

**Interior Partition Firestopping**

Through-penetration firestopping in accordance with a tested UL design, to attain an f-rating equal to the rating of the partitions, and a corresponding T-rating where required by code.

Top-of-partitions firestopping at rated partitions and smoke barriers in accordance with a tested UL. Design.

## C1020 Interior Windows

### C1020.20 Interior Fixed Windows

**Frames, Hollow Metal:** Hollow-metal construction, 16-gauge steel, with corners mitered and welded; shop-primed for field painting.

**Frames, Storefront:** Aluminum storefront framing system. EFCO 402NT as basis of design.

**Glass:** Clear glass; tempered at sidelights and where required by Code; annealed at other locations; laminated, tempered safety glass at main entries.

# C1030 Interior Doors

## C1030.10 Interior Swinging Doors

**Flush Wood Doors:** Flush wood doors in steel frames at cross-corridor doors, classrooms and other teaching spaces, administrative offices, teacher's break rooms, toilet rooms, and for other doors in public areas. Glass lites in doors at classrooms and other teaching spaces.

- Product: Flush wood doors, glazed and solid, hardwood veneer face, WDMA Premium Grade 5-ply construction, natural finish, as manufactured by Algoma, Eggers, Marshfield, Mohawk or VT Industries. Prefit doors to steel frames. Pre-glaze door slabs.
- Face Veneer: Select white maple veneer, plain sliced.
- Finish: Factory finish to match AWI TR-6 conversion varnish.

**Flush Steel Doors:** Flush steel doors in steel frames will be specified for mechanical equipment rooms, electrical equipment rooms, fire pump room, receiving area, and similar service locations.

- ANSI 250.8 Level 2, "Heavy Duty" doors, with 0.042-inch-thick (18 gauge) cold-rolled steel faces, seamless edges. Shop-primed and field painted.

**Steel Frames:** 0.053-inch-thick (16 gauge) cold-rolled steel hollow-metal frames; corners mitered and welded. Furnish drywall and masonry profiles, as appropriate to construction in which doors will be set. Shop-primed and field painted.

## C1030.20 Interior Entrance Doors

**Doors:** Aluminum doors and storefront framing system matching the entrance doors, single glazed with 1/4-inch-thick clear tempered safety glass. Laminated, tempered safety glass at main and entries. EFCO 402NT as basis of design.

**Hardware:** Full height continuous hinges; offset tubular pulls; tubular push bars full width of door; exposed closers.

## C1030.70 Interior Special Function Doors

**Interior Sound Control Doors:** Steel flush-design sound control doors and frames with sound-control seals and sound-retardant core. Located at the Music Room.

## C1030.80 Interior Access Doors and Panels

Recessed wall and ceiling access doors to provide access to plumbing, mechanical, and electrical controls. Trimless frame; stainless steel units in kitchen, painted steel units at other locations. Furnish fire-rated units for installation in fire-rated walls and fire-rated ceiling assemblies.

### C1030.90 Interior Door Supplementary Components

**Door Hardware:** Heavy-commercial quality; US 32D satin stainless finish.

- Locksets: Mortised locksets and latchsets, with lever handles.
- Keying: Grand-Master and Masterkeying system to be coordinated with the Owner.
- Provide key cabinet and key organizing system.

## C1070 Suspended Ceiling Construction

### C1070.10 Acoustical Suspended Ceilings

**Suspended Acoustical Ceiling, Typical:** Acoustical lay-in panels, 24 inches x 24 inches, supported by steel double-web grid with narrow face 9/16-inch-wide aluminum face cap. Armstrong, Ultima High NRC panel as basis of design. Located in all teaching spaces and offices. LEED requires minimum of 0.70 NRC in classrooms/core learning spaces. Standard Ultima 1912 or Ultima 1912HRC (high recycled content) both have 0.75 NRC, so Ultima High NRC is not necessary. Switch to Ultima 1912HRC.

**Suspended Acoustical Ceiling, Cleanable:** Mineral-fiber lay-in panels with scrubbable aluminum or mylar face, 24 inches x 24 inches, supported by steel double-web grid with standard 15/16-inch-wide aluminum face cap. Armstrong, Kitchen Zone panel as basis of design. Located in kitchen and servery.

**Specialty Suspended Ceilings**
Acoustic Ceiling Clouds: Located at Media Center and Main Lobby.

Reflective Acoustical Ceiling Panels: Sound reflecting type acoustical ceiling panel assemblies. Located at Music room.

## C1090 Interior Specialties

### C1090.10 Interior Railings and Handrails

**Egress Stairs**: Painted steel railings, vertical picket design, with stainless steel top rail and handrail. Wall-mounted handrails will be stainless steel pipe or tubing.

**Decorative Metal Railings:** Stainless steel handrails. Perforated metal grille panels, painted finish. Architectural Grille #213 Staggered Hold Perforated Grille as basis of design. Located at balcony and Learning Stairs guardrails.

**Ramps**: Stainless steel handrails.

### C1090.20 Information Specialties

**Visual Display Units**

**Markerboards:** Wall-mounted porcelain on steel markerboards with extruded aluminum trim, marker tray, and map rail with tack-strip along top of board. Magnetic face sheet. Claridge Products & Equipment, Inc., 800 Series/Series 8 as basis of design.

- Typically, one 8-foot-long markerboard is provided in each classroom. In music room markerboard has staff lines.
- One 8-foot long markerboard in Classroom Open Breakout spaces.

**Projection Boards:** Frameless, wall-mounted porcelain on steel markerboards with marker tray. Face sheet magnetic and suitable as projection surface. Claridge Products & Equipment, Inc., Profile Series as basis of design.

- Typically, one (1) 8-foot-long projection board is provided in each classroom.

**Tackboards, Framed:** Wall-mounted vinyl-coated cork tackboards with extruded aluminum trim. Claridge Products & Equipment, Inc., 800 Series/Series 8 as basis of design.

- Typically, four (4) 4-foot-long tackboards are provided in each classroom.
- One (1) 4-foot-long tackboard is provided in each breakout and small group rooms.

**Tackboards, Frameless:** Wall-mounted, self-healing, burlap backed tack surface made of a combination of linseed oil, pine resin, cork and pigments with plywood backer board. Forbo, Bulletin Board as basis of design. Locations to be determined.

**Visual Display Rails:** Combination cork strip and tackless paper holding assembly. Advantus Corp., Grip-A-Strip Map Rail as basis of design.

- Allow 40 linear feet for each classroom.

**Interior Signage**

**Room Signs:** Scope to include code-required room identification signs for each room. Signs at classrooms and offices to include insert areas.

**Panel Signs:** Scope to include painted sign panels with painted or direct-print text mounted to wall surface. Type and extent to be determined.

**Directional Signs:** Allow for painted sign panels with painted or direct-print text. Type and extent to be determined.

**Dimensional Letters:** Allow for five (5) sets of painted, flat-cut, dimensional letters mounted to wall surface. Assume 20 letters for each location.

**LEED Signage**: Type and extent to be determined.

## C1090.25 Compartments and Cubicles

**Toilet Compartments:** Plastic panel compartments, fabricated from high-density polyethylene; floor mounted, overhead braced. Located in multi-user toilet rooms. General Partitions, 40 Series as basis of design.

**Cubicle Curtains:** Five aluminum tracks with curtain in Nurse's office. Construction Specialties, CS Cubicle Curtains, No. 6062N as basis of design.

## C1090.35 Wall and Door Protection

**Corner Guards:** Recessed stainless steel full-height corner guards at all exposed gypsum wallboard corners. Inpro Corporation, Stainless Steel Flush Mount Corner Guard as basis of design.

**Door Protection:** Protection plates on all doors.

## C1090.40 Toilet, Bath, and Laundry Accessories

**Toilet Accessories:** Stainless steel framed mirrors, grab bars, touchless soap dispensers, touchless paper towel dispenser/waste containers, touchless paper towel dispensers at countertop sinks, toilet paper dispensers. Bobrick Classic style as basis of design. Hand dryers in the multi-user restrooms.

- Accessories by Others: Sometimes schools obtain some of these accessories from the vendors who supply the paper and soap. Owner, please advise if you want us to identify any of these accessories as "Owner furnished and installed."

**Shower Accessories:** Fold-down seats, grab bars, shower curtains and curtain hooks; robe hooks. Bobrick as basis of design.

Child Changing Station: one located in the Staff Toilet on Level 1. Pressalit Care 3000 Height Adjustable Changing Table, Model R8534021 as the basis of design.

**Miscellaneous Accessories:** Mop holder for janitor's closets. Bobrick as basis of design.

## C1090.60 Safety Specialties

**Emergency Access and Information Cabinets:** One recessed fire department key vault box at location agreed upon with Fire Department. KnoxBox 3200 Series as basis of design.

**Emergency Evacuation Chairs**: One for each stair (qty: 4). Evauscape EC1 as basis of deisgn.

**AED Recessed Cabinets:** Allow for 4

## C1090.70 Storage Specialties

**Wood Cubbies:**

**Type 1:** 12”x 12”x 48” wood lockers with no doors with one fixed shelf and two hooks. Bases: Lockers will be mounted on wood bases, so legs will not be required. Located in the Kindergarten classrooms.

**Type 2:** 12” x 12” x 72” wood lockers with no doors with two fixed shelves and two hooks. Bases: Lockers will be mounted on wood bases, so legs will not be required. Located in Classroom hallways.

**Employee Lockers:** 15 inches x 15 inches x 6 feet, double tiered, painted steel with louvered doors, padlock eyes. Metal legs and sloped top. Penco Products, Inc., All-Welded Defiant II Single Point Latch as basis of design. Located in Kitchen corridor and Custodian Office.

**Closet and Utility Shelving:** Adjustable standards and shelves with 12-inch deep plastic laminate clad shelves. Extra-heavy-duty double slot standards. Located in storage rooms and copy rooms.

**Storage Shelving:** Not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

### C1090.90 Other Interior Specialties

**Seismic Expansion Joints:** Provide expansion joints assemblies at separated building structures.

**Pipe Grid:** Steel pipe grids for OT/PT and Sensory Rooms.

**Graphics**: Custom, digitally printed wall and glass film and coverings.

## C20 INTERIOR FINISHES

## C2010 Wall Finishes

### C2010.10 Tile Wall Finish

**Ceramic Tile:**

- Unglazed through-body porcelain tile, 8 inches x 24 inches, wainscot to 48 inches in new addition corridors. Creative Materials, Basalt as basis of design.
- Glazed ceramic tile, 200 mm by100 mm by 6.5mm, full height in toilet rooms and at drinking fountains. Johnson Tiles, Prismatics as basis of design.
- Glazed ceramic tile to match existing tiles for repaired area. Locations in Corridors and Kitchen.

### C2010.20 Wall Paneling

**Wood Paneling:** Hardwood veneer paneling. Species, stain color and finish to match existing wood paneling, HPVA Grade AA. Field finished with sealer, stain, 3 coats of clear urethane varnish. Repairs to existing wood paneling only located in cafeteria, auditorium, auditorium lobby.

**Plastic Paneling:** Fiberglass reinforced plastic wall panels, wainscot to 48 inches. Marlite, Standard FRP as basis of design. Located in trash and recycling rooms, loading / receiving room, and custodial rooms.

### C2010.70 Wall Painting and Coating

**Gypsum Board, Typical:** Gypsum board with joints taped and finished; painted with 1-coat primer and 2 top coats of low-VOC latex paint, eggshell finish. Level 4 finish typical, Level 5 finish in selected locations.

**Cement Board, Toilet Rooms and Wet Areas:** Cement board with joints taped and finished; painted with 1-coat primer, 1-coat epoxy and 1-coat urethane coating.

### C2010.80 Acoustical Wall Treatment

**Acoustic Room Components:** Sound absorbing panels in the music room and cafeteria.

- **Gymnasium:** Refer to Exterior Walls. 12" acoustical CMU at the upper portion of the gym walls.

## C2020 Interior Fabrications

**Metal Fabrications**

**Interior Metals Painting and Coating:** Epoxy paint.

**Ornamental Woodwork**

**Window Stools:** Quartz solid surface material

## C2030 Flooring

### C2030.10 Flooring Treatment

**Concrete Floor**: Clear sealer. Exposed concrete floors typical in, mechanical rooms, electrical rooms, IDF and MDF rooms.

### C2030.20 Tile Flooring

**Porcelain Tile:** None used.

**Quarry Tile:** Repairs to the existing quarry tile in the Kitchen.

### C2030.45 Wood Flooring

**Replace Wood Flooring at Stage:** Refinish existing wood floor.

### C2030.50 Resilient Flooring

**Linoleum Tile Flooring:** Forbo, Marmoleum as basis of design. Located at corridors, classrooms, learning center, small group rooms, breakout rooms, and cafeteria.

**Rubber Tile Flooring:** Tarkett, Mesto Configurations Tile as basis of design. Located at ramps.

**Resilient Carpet Tile:** Forbo, Flotex as basis of design. Located at Learning Stairs at Lobby.

**Wall Base:** 4" height rubber at resilient flooring and carpet tile.

**Adhesives:** High RH type adhesives.

### C2030.70 Fluid-Applied Flooring

**Resinous Flooring:** Epoxy resin decorative flooring, consisting of primer, body coat with colored aggregate, clear top coats; 4-inch integral base. Located in toilet rooms.

### C2030.75 Carpeting

**Tile Carpeting:** Carpet tile, glued down, in offices, conference rooms, media center.

**Adhesives:** High RH type adhesives.

### C2030.80 Athletic Flooring

**Wood Athletic Flooring:** Gymnasium flooring system, consisting of hard Maple strip flooring on plywood subfloor supported on neoprene pads. Painted game markings for main court basketball, cross-court basketball volleyball and badminton. Connor Sports, Greenplay as basis of design. Located in gymnasium and heath & wellness room.

### C2030.85 Entrance Flooring

**Entrance Floor Mats:** Under FF&E.

**Entrance Floor Grilles:** None used.

## C2040 Stair Finishes

### C2040.45 Wood Stair Finish

Solid wood flooring, tongue and groove and end matched, with backs channeled. White maple, quarter/rift sawn cut, grade select and better. Located at learning commons, and riser seats at Main Lobby.

### C2040.50 Resilient Stair Finish

**Treads and risers:** Rubber integral treads and risers. Johnsonite, Rubber Stair Treads with Integrated Riser as basis of design. Located at egress stairs.

**Landings:** Rubber tile flooring. Tarkett, Mesto Configurations Tile as basis of design. Located at egress stairs.

## C2050 Ceiling Finishes

### C2050.10 Plaster and Gypsum Board Finish

Gypsum board with joints taped and finished; painted with 1-coat primer and 2 top coats of low-VOC latex paint, flat finish.

### C2050.70 Ceiling Painting and Coating

**Exposed Steel, Joists, Ductwork and Conduit:** Shop primed, field finished with dry-fall or dry-fog paint. Located in media center, main Lobby, mechanical rooms, electrical rooms, storage rooms and elevator machine room.

# D SERVICES

## D10 CONVEYING

## D1010 Vertical Conveying Systems

### D1010.10 Elevators

Two machine-room-less electric traction passenger elevators. 4 stops, 3,500-pound capacity, 150 fpm, stainless steel interior. Otis, Gen2 as basis of design.

### D1010.50 Dumbwaiter / Material Lift

One material lift, 2 stops, to replace existing dumbwaiter. Matot Material Lift, Floor Loading, Car size 48” w x 48” d x 60” h

## D20 PLUMBING

## D2000 General Design Considerations

**Acceptable Plumbing Manufacturers:**

- Vitreous China: Eljer, American Standard, Crane, Kohler or equal.
- Faucets: Chicago Faucet Co., Kohler or T & S Brass or equal.
- Self-Closing Faucets: Chicago Faucet Co., Sloan, Kohler, Symmons or equal.
- Sensor Faucets: Chicago Faucet Co., Hydrotek, Sloan or equal.
- Stainless Steel Sinks: Elkay, Just Manufacturing, Metcraft Inc or equal.
- Mop Service Basins: Crane, Fiat, Stern Williams or equal.
- Carriers and Supports: Jay R. Smith, Wade, Zurn or equal.
- Thermostatic Mixing Valves: Leonard Valve Co., Powers Process Controls, Symmons or equal.
- Pressure Regulating Mixing Valves: Lawler Manufacturing, Leonard Valve Co Symmons or equal.
- Electric Water Coolers: Filtrine, Halsey Taylor, Haws or equal.
- Acrylic Showers: Aquarius, Aquabath, or Crane.
- Flush Valves: Sloan, Delany, Zurn or equal.
- Stops and Supplies: Chicago Faucet Co., Kohler or McGuire.
- P-Traps: McGuire, Sanitary-Dash, or Jameco.

**PLUMBING SYSTEMS**

**NARRATIVE REPORT**

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

## 1. CODES

A. All work installed under Section 22 00 00 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

## 2. DESIGN INTENT

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

## 3. GENERAL

A. The Plumbing Systems that will serve the project are cold water, hot water, tempered water, sanitary waste and vent system, grease waste system, special waste system and storm drain system.

B. The building will be serviced by Municipal water and Municipal sewer system.

C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

## 4. DRAINAGE SYSTEM

A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The exterior grease interceptor 5,000 gallon capacity will provided under Division 33 scope.

C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point 10 feet outside the building.

D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.

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

## 5. WATER SYSTEM

A. Domestic Cold-Water Service

a. New 6" domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided. New reduced pressure backflow preventer will be installed at the main domestic water supply to protect the service (per the DEP regulation 310 CMR 22).

b. Potable water will meet both the NSF 61 and NSF 372 standards for lead-free safe drinking water Act. Domestic cold water inside the building will be "L" type copper tube with wrought or cast copper fittings. All cold water piping will be insulated to prevent condensation

c. Any mechanical take-offs will branch off through a reduced pressure-principle backflow preventer. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

B. Domestic Hot Water Service

a. Domestic hot water supply will be generated through a point of use instantaneous electric water heater. The electric water heater in the range of 3 to 5 kw will be mounted under each fixture requiring hot water. The water heater will be modulating type and will be capable of providing fixture hot water flow at 60 °F rise.

b. The kitchen hot water demand will be generated through one 50 KW electric hot water heater manifold with 120-gallon buffer tank. The buffer tank will exchange heat from the air source heat pump system utilize heat connected with an electric hot water supply system.

c. The hot water will maintain dual system and operate at 140°F to serve the pre-rinse and 3-Compartment sink. The other system will operate at 120°F and will serve the other kitchen appliances, hand sinks, and custodian room sink.

d. Domestic hot water will be distributed in "L" type copper tube with wrought or cast copper fittings. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC2015. Any area subjected to chemical spillage will be provided with tempered and protected water to supply through emergency eyewash/showers.

C. The domestic water supply system will have water meters on strategic location to record water consumption of fixtures on weekly basis. Following location were determine for remote analysis and trending of water consumption.

a. Main domestic water supply. (Whole building)
b. Submeter at domestic hot water supply to Kitchen fixtures
c. Submeter at cold water supply to plumbing fixtures.

D. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system.

E. A dedicated non-potable cold and hot water system will be provided to Science Classrooms. Water system will be protected with a reduced pressure backflow preventer. A dedicated tank type water heater will be provided to deliver hot water to all Science Classroom sinks.

F. Tepid (70 deg. F – 90 deg. F) water will be provided to the emergency shower/eyewash fixtures in Science Classrooms as required by code.

**6. PLUMBING FIXTURES LEED v4**

A. Number of plumbing fixtures will be added in the facility to accommodate population of male students and female students and shall be in accordance with 248 CMR Paragraph 10.10, Table 1.

B. Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction-LEED-V4, Credit 2).

C. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

D. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Sloan, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

E. Fixtures shall be as scheduled on follows:

a. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electronic hand free operated with manual override,1.28 gpf flush valve.

b. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electronic hand free operated with manual override, 0.13 gallon per flush-flush valve.

c. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM hand free electronic faucet.

d. Sink: ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

e. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.

f. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

g. Laboratory Sinks: Faucets with vacuum breakers and 0.74 GPM aerators.

h. Emergency Shower/Eyewash: Recessed barrier free eye wash and shower safety station with ceiling mounted exposed shower and "in wall" drop-down eye wash with drain pan.

**7. DRAINS**

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

**8. VALVES**

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

**9. INSULATION**

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

B. All piping will be insulated with 1 in. thick high density fiberglass. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC 2015.

**10. CLEANOUTS**

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

B. Cleanouts for Special Waste System shall be Zurn #Z9A-C04 polypropylene cleanout plug with Zurn #ZANB-1463-VP nickel bronze scoriated floor access cover.

**11. ACCESS DOORS**

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

**12. GREASE INTERCEPTOR**

A. The kitchen Grease Waste System shall be a completely separate system beginning at the exterior grease interceptor through the kitchen and vented individually through the roof. Do not connect soil lines to the grease waste nor sanitary vents to the grease vent. Furnish and install the cast iron tees and associated piping within the grease trap including 5-foot length on the outlet. All the piping within the grease trap shall be made up with caulked and leaded joints. Install an exterior cleanout as detailed at the point where the line leaves the kitchen area. Grease trap is furnished and set in place including manhole access covers by the General Contractor.

Lincoln-Eliot Elementary School
Newton,

Outline Specification
Plumbing

**D20 PLUMBING**

**1.01 D2010 DOMESTIC WATER DISTRIBUTION**

A. Instant Electric Water Heating Equipment:
   1. Provide a quantity of packaged type instantaneous electric tankless water heater(s) to all plumbing fixtures requires hot water. The Model shall be SPEX – LavAdvantage as manufactured by Eemax. or equal
   2. Tankless water heater shall utilize complex algorithm, actively managing power application to real time system demand. Integrated flow meter, along with inlet and outlet temperature sensors provide data which allows the unit to instantly adapt to variations in input parameters
   3. Tankless water heater user interface must have the following capabilities:
      a. Selectable display including Celsius /Fahrenheit, setpoint, flow rate, inlet temperature outlet temperature, power factor
      b. Capable of displaying flow rate in gallons per minute & liters per minute
      c. Diagnostic features to include error/fault display
      d. Control board must maintain error/fault history of 5 events

B. Commercial Electrical Water Heater (EWH1 for Kitchen area)
   1. The heater shall be a glass-lined, heavy duty commercial electric water heater and constructed in accordance with ASME Code, shall bear appropriate symbol and be listed with the state plumbing board. Th size and capacity are shown on the drawing schedule.
   2. Manufacturers
      a. A.O Smith
      b. American Standard
      c. Ruud
   3. The water heater shall incorporate control interface to Building management system (BMS) for remote monitoring, leak detection and fault alert. Provide BACnet MS/TP control interface module for communication with BMS system.

C. Emergency Shower Electric Water Heating Equipment (EEH)
   1. Subject to compliance with requirements, provide Instantaneous emergency electrical water heater as shown on the drawing schedule
   2. Manufacturers:
      a. Haws
      b. Bradley Corporation.
      c. Chronomite Laboratories, Inc.Or equal.

D. Hot Water Temperature Maintenance and Recirculation:
   1. The Hot water distribution shall be complete water control station equipped with lead free thermostatic master mixing valve and recirculation pump assembly. The Temperature control station shall be equal to Leonard Megatron Model 4N-LF.
   2. The hot water serving science labs shall have electric heat tracing for water temperature control.

E. Water Meter
1. The main house water meter shall be in accordance with the requirements of the local water department.
2. Water flow consumption will monitor at kitchen area through sub-meters for water management.

F. Cross Connection Protection:
1. Protect potable water piping outlets and connections to equipment or machinery against backflow with an air-gap or approved backflow preventer. The reduced pressure backflow preventer shall be lead free equal to Watts model 909LF.
2. Backflow preventer type, application, and installation shall comply with the Commonwealth of Massachusetts, Department of Environmental Protection (DEP) Drinking Water Regulations 310 CMR 22.00.

G. Lab and shop faucets shall have Vacuum breakers at the faucets.
1. Pressure Regulating: Single seat, Direct operated having bronze body and integral strainer.

H. Domestic Water Piping (Domestic Cold, Hot, Recirculation and Lab Hot/Cold water) :
1. 2-1/2 inches and smaller shall be hard drawn Type L copper with wrought or cast copper fittings.
2. 3 inches and larger may be hard drawn Type L copper with roll grooved mechanical couplings.
3. Joints in copper tubing except as otherwise specified herein shall be made according to manufacturer's specifications using sweat fitting and lead free solder and non corrosive flux.
4. Provide galvanized malleable iron unions, with bronze facings conforming to ANSI B16.39 for sizes 2 inch and smaller.
5. Provide copper flanges conforming to ANSI B16.5, standard
6. Pipe Insulation 1” thick fiber glass with vapor jacket.

**1.02 D2020 SANITARY DRAINAGE**

A. General
1. Pipe and fittings shall conform to the latest ANSI, ASTM, NFPA and AWWA Standards including latest amendments.
2. Sanitary Drainage Piping Above Floor (Soil, Waste, Grease Waste and Vent)
3. Piping 2" and larger shall be no-hub service weight cast iron soil pipe except at urinals and cleanouts and joints just prior to exiting the building which shall be service weight hub and spigot with lead and oakum joints. . All cast iron soil pipe and fittings shall conform to the requirements of CISPI Standard

B. Piping 2” and smaller shall be type “L” copper.
1. Couplings for joining no-hub cast iron soil pipe: Couplings shall have a shield constructed of corrugated 304 stainless steel and provide a shield thickness of 0.16 inches or greater.

C. Sanitary Drainage Piping Below Floor (Soil, Waste, Grease Waste and Vent)
1. Piping below floor shall be service weight cast iron hub and spigot.
2. Joints in cast iron soil piping below ground shall be code approved compression type, made with rubber gaskets conforming to ASTM Specification C564

**1.03 STORM DRAINAGE**

A. Piping Above Floor
   1. Piping shall be no-hub service weight cast iron soil pipe except at cleanouts and joints just prior to exiting the building which shall be service weight hub and spigot with lead and oakum joints.
   2. Couplings for joining no-hub cast iron soil pipe: Couplings shall have a shield constructed of corrugated 304 stainless steel and provide a shield thickness of 0.16 inches or greater

B. Piping Below Floor
   1. Piping below floor shall be service weight cast iron hub and spigot.
   2. Joints in cast iron soil piping below ground shall be code approved compression type, made with rubber gaskets conforming to ASTM Specification C564

**1.04 INDOOR GREASE INTERCEPTORS:**

A. Grease Interceptor shall be floor Recessed, Large Capacity equal to Jay r Smith Model 8465 with integral extension. The grease trap shall be PDI labeled and Mass plumbing board approved. The

**1.05 OUTDOOR GREASE INTERCEPTOR:**

A. Precast concrete complying with ASTM C 913. Include rubber-gasketed joints, chamber vent connections, manholes, compartments or baffles, and piping or openings to retain grease and to permit wastewater flow. The grease interceptor shall have a retention capacity of 7500 gallon.

**1.06 GAS/OIL/ SAND INTERCEPTOR**

A. The design and size of oil/sand interceptor shall be as illustrated Massachusetts State plumbing Code 248 CMR 10.22 Figure 15 for a 4" waste.

B. Solid Interceptor:
   1. Equal to MiFab Model Z-1180, large capacity steel interceptor with acid resistant coating.

C. Oil / Water Separator for Elevator

**1.07 TRAP PRIMER**

A. Furnish and install electronic trap primer units to serve multiple floor drains. Provide trap primers to all floor drains as required by 248 CMR Plumbing code.

B. Furnish and install a UL listed electric heat tracing for components for maintaining the water temperature for the non potable hot water piping.

**D2030 PLUMBING FIXTURES**

Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction- LEED- WE Credit 3).

A. Water Conservation: Water conserving fixtures and trim incompliance with the following maximum water use requirements.

   Public lavatories: 0.5 gpm
   Sinks: 1.5 gpm
   Water Closets: 1.28 gallons per flush.
   Urinals: 0.128 gpf

B. Acceptable Manufacturers:
   1. Vitreous China: Eljer, American Standard, Crane, Kohler or equal.
   2. Faucets: Chicago Faucet Co., Kohler or T & S Brass or equal.
   3. Self Closing Faucets: Chicago Faucet Co., Sloan, Kohler, Symmons or equal.
   4. Stainless Steel Sinks: Elkay, Just Manufacturing, Metcraft Inc or equal.
   5. Mop Service Basins: Crane, Fiat , Stern Williams or equal.
   6. Carriers and Supports: Jay R. Smith, Wade, Zurn or equal.
   7. Thermostatic Mixing Valves: Leonard Valve Co., Powers Process Controls, Symmons or equal.
   8. Pressure Regulating Mixing Valves: Lawler Manufacturing, Leonard Valve Co Symmons or equal.
   9. Electric Water Coolers: Filtrine, Halsey Taylor, Haws or equal.
   10. Acrylic Showers: Aquarius, Aquabath, or Crane.
   11. Flush Valves: Sloan, Delany, Zurn or equal.
   12. Stops and Supplies: Chicago Faucet Co., Kohler or McGuire.
   13. P-Traps: McGuire, Sanitary-Dash, or Jameco.
   14. Handicap Lavatory Insulators: McGuire, TCI Products or Truebro.

**2.02 FIXTURE DESCRIPTIONS:**

A. Water Closet (P-1):
   1. Equal to Sloan Model WETS 2050. Vitreous china wall hung, white, elongated wall outlet water closet, 1.28 GPF, 1-1/2" top spud. The Flush valve shall be hardwired sensor activated 1.28 gpf with true Mechanical Override flushometer. Flush valve shall be equal to Sloan valve Royal 111 ESS-BN-TMO-HW.

B. Urinal (P-2):
   1. P-2 Urinal: Wall hung, 0.125 gpf, vitreous china, ¾" top spud, washout flush action urinal equal to American Standard model Washbrook Flowwise 6590.001. The flush valve shall be electric, sensor activated, high efficiency 0.125 gpf flush valve with mechanical override button. The flush valve shall be equal to Sloan 186 ES-.125-DBP-TMO.

C. Lavatory (P-3):
   American Standard Murro Universal Design 0954.00 wall hung lavatory. Sloan Optima System EAF-200 (lead free) electronic sensor activated hand faucet (lead free), 0.35 gpm aerator.

D. Art Room Sink (P-4)
   Just Manufacturing Co. SLX-2231-A-GR, 22" x 31" x 10.5" deep , one compartment, 18 gauge, type 304 18-10 stainless steel insert sink. Interior and top surfaces polished to satin finish, undersides fully coated, sink equipped with self-rimming feature. Chicago No. 50-369-GN2FCCP-E3 deck mounted single sink faucet, gooseneck spout, 369 handles, E3 aerator, GN2A swing gooseneck spout, 1.6 gpm flow control fittings with undersink solids interceptor.

E. Sinks: (P-5)
   Seamlessly drawn, self-rimming minimum 18 gauge, type 302 (18-8) nickel bearing stainless steel with 1-3/4 inch minimum rounded corners, satin finish, and fully undercoated. Faucets: Chrome plated gooseneck spouts interchangeable and convertible rigid/swing type. Handles shall be interchangeable with ADA handle, 1.5 gpm E35 aerator, flow control fittings.

F. 6. Hi-Lo Electric Water Cooler (P-6)
   1. Water Cooler- Halsey Taylor Barrier-Free Water Cooler, Model OVL-II-SER-GRN with hi-lo oval receptors or HTHB-OVLSER-I with bottle filler.

G. Floor Service Sink :
   1. Mop Receptor Fiat precast terrazzo mop basin, 24" x 24" x 12" with 6" drop front, stainless steel threshold, flange on wall sides. Fiat Model TSB-3010.

H. Wall Hung Service Sink (P-8) :
   1. Equal to American Standard Model # 7695.018, Enameled cast iron, 24” X 20-½” complete with rim guard, drilled back on 8” centers and #7798.176 P-trap, 3” outlet, floor support with strainer. Faucet shall be equal Chicago Model 956-RCP with #369 lever handle, 8” centers with vacuum breaker.

GGD Consulting Engineers, Inc.

# HVAC SYSTEM NARRATIVE

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

## 1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2018 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

## 2. DESIGN INTENT

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

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

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

Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

Ventilation air: In all cases ASHRAE guide 62.1-2016 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

## 4. SYSTEM DESCRIPTION

A. System Summary:

Space Heating and Cooling: It is proposed that new high efficiency Air Source Heat Recovery Variable Refrigerant Flow (VRF) systems shall be installed to provide heating and air conditioning to the classrooms, music/art area, administration/nursing area, and media center. Indoor VRF fan coil units shall be connected with refrigeration piping to branch controllers and outdoor roof mounted air cooled VRF heat-recovery units. This system allows for simultaneous heating and cooling capability year-round. The total capacity of the VRF system shall be 140 tons, which shall be composed of (4) 26 ton and (1) 22 VRF condensing unit sections. Supplemental electric radiant heating will be provided along perimeter exterior walls.

Building areas not served by the VRF systems shall generally be heated and cooled by the air handling units serving those areas; refer to the specific sections following in this narrative for a detailed description of HVAC systems serving each area.

Space Ventilation: Tempered (de-humidified, neutral temperature (63ºF-70ºF)) ventilation air shall be provided to all occupied areas of the building served by the VRF system through roof-mounted and indoor-mounted air handling units equipped with a packaged high efficiency air source heat pump condensing units. Supplemental electric heating coils shall be provided in each air handling unit. Air handling units shall also be equipped with variable speed supply and return/exhaust fans equipped with VFDs, MERV-14 supply filters, heat pump DX heating/cooling coils with modulating capacity control, hot gas reheat sections, energy recovery, and C02 demand ventilation control.

B. Classroom Heating, Ventilation, and Air-Conditioning (General Classrooms, Art, Music, & SPED):

***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Each typical classroom is anticipated to require (2) indoor VRF fan coil units varying from 8 MBH to 18 MBH, each, depending on the space heating & cooling loads. The indoor VRF units shall be a combination of ceiling mounted cassette type, wall mounted ductless, floor mounted vertical style units, and ducted fan coil type units with the style selected to provide the best performance and aesthetic for the space served. Supplemental electric radiant heating will be provided along perimeter of exterior walls.

It is proposed that the following roof-mounted air handling units shall be provided to provide ventilation to the spaces served by the VRF system:

(3) 5,000 CFM air handling units each with 18 tons heating/cooling section and 63 kW supplemental electric resistance heating coil shall serve the main classroom wing.

(1) 2,700 CFM air handling unit with 10 tons heating/cooling section and 35 kW supplemental electric resistance heating coil shall serve the administration/nursing area.

(1) 1,200 CFM air handling unit with 5 tons heating/cooling section and 18 kW supplemental electric resistance heating coil shall serve the media center.

(1) 3,500 CFM air handling unit with 13 tons heating/cooling section and 46 kW supplemental electric resistance heating coil shall serve the music/art classrooms.

C. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and adjacent Physical Education areas will be served by (1) one roof-mounted air handling unit of the recirculation design with 100% outside air economizer capability providing displacement ventilation & air conditioning. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to corner-mounted displacement diffusing units. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.

Return air will be drawn back to the air handling unit by ceiling level return air registers. Hot water wall-mounted radiant heating panels will be provided along exterior walls.

The Gymnasium roof-mounted AHU shall have an estimated capacity of 6,500 CFM, 18 ton heating/cooling section and 63 kW supplemental electric resistance heating coil.

D. Auditorium and Stage: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The auditorium and stage area will each be provided with a new air handling unit of the recirculation mixed-air type design providing a fully air-conditioned variable volume displacement ventilation air distribution system. Supply air will be provided to the space through a new insulated, galvanized steel supply duct distribution system and shall be connected to a wall mounted displacement ventilation diffusers located within each space. Return air will be drawn back to the unit by ceiling return air registers located within each space and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system.

It is proposed that the following air handling units shall be provided to serve the auditorium and stage:

(1) 6,700 CFM air handling unit with 19 tons heating/cooling section and 66 kW supplemental electric resistance heating coil shall serve the auditorium.

(1) 2,100 CFM air handling unit with 6 tons heating/cooling section and 21 kW supplemental electric resistance heating coil shall serve the stage.

E. Cafeteria: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Cafeteria area will be provided with a new air handling unit of the recirculation type design providing a fully air-conditioned variable volume displacement ventilation air distribution system. Supply air will be provided to the space through a new insulated, galvanized steel supply duct distribution system and shall be connected to a wall mounted displacement ventilation diffusers located within each space. Return air will be drawn back to the unit by ceiling return air registers located within each space and will be routed back to the air handling unit by an insulated galvanized sheet metal return air ductwork distribution system. The space heating temperature setpoints shall be maintained by perimeter wall-mounted electric resistance panel radiators.

The Cafeteria AHU shall have an estimated capacity of 6,300 CFM, and 18 tons heating/cooling section and 63 kW supplemental electric resistance heating coil

F. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new roof-mounted kitchen exhaust air fan and make-up air indoor air handling unit. The Kitchen MAU have an approximate capacity of 5,000 cfm with 19 ton heat pump heating coil piped to a remote roof-mounted air-source heat pump condenser, 67 kW supplemental electric resistance heating coil and MERV-14 filtration.

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

The Dishwasher shall be ducted directly to a roof-mounted exhaust fan with an airflow capacity of approximately 600 CFM.

G. Kitchen, Kitchen Storage, & Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by an indoor basement-mounted heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 11 ton heat pump heating coil piped to a remote roof-mounted heat pump condenser, 39 kW supplemental electric resistance heating coil and MERV-14 filtration. Storage areas will be heated by electric resistance radiator-type heating equipment. All Custodial closets will be exhausted by exhaust air fan systems.

H. Lobby, Corridor, and Entry Way Heating:

New electric cabinet unit heaters, electric radiant ceiling panels, and electric fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and air conditioned by the VRF system or adjacent Displacement Ventilation system.

I. Utility Areas:

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

The Main Electric Rooms and IDF rooms will be air conditioned by high efficiency ductless AC cooling units.

J. Testing, Adjusting, Balancing & Commissioning:

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

K. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

## 5. TESTING REQUIREMENTS:

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Variable Refrigerant Flow system
- Automatic temperature control and building energy management system

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

## 6. OPERATION MANUALS AND MAINTENANCE MANUALS

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

## 7. RECORD DRAWINGS AND CONTROL DOCUMENTS

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

## 8. COMMISSIONING

The project shall be commissioned per Section of the specifications.

AKAL Engineering Inc.

Lincoln-Eliot Elementary School
Newton, MA

**FIRE PROTECTION SYSTEMS**

**NARRATIVE REPORT**

**RENOVATION/ ADD RENOVATION OR NEW CONSTRUCTION**

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

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

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

3. SYSTEM DESCRIPTION

   A. Building will be served from the new 8" fire service line from the campus hydrant line. Cross connection control shall be provided by use a supervised double check valve assembly backflow preventer on the fire service as it enters the building in the dedicated water room, adjacent to the exterior building wall.

   B. The entire building shall be protected throughout with a wet automatic fire suppression system and fed from an 8" Wet Riser Check Valve. System will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Standpipes meeting the requirements of NFPA 14-2013 shall be provided in the egress stairwells, horizontal exits and in the Stage area.

   D. Each floor will be a sprinkler zone and each wet sprinkler zone will include a control valve assembly. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   E. A fire department Storz pumper connection will be provided at the outside of the fire service entrance or at a location requested by AHJ. The FDC will be wall-mount type. This system shall be designed in accordance with NFPA Standard 13, 2013, the Massachusetts State Building Code, 9th Edition and the City of Newton Fire Department requirements.

   F. Furnish and install all Supervisory Switches, Flow Switches, Pressure Switches, and other Alarm Devices. Install all such devices on the piping and coordinate with the Electrical Subcontractor who shall wire all such devices to the Fire Alarm System. Every shutoff valve installed on this project shall have a supervisory trouble switch wired to the Fire Alarm Panel.

   G. An 8" electric bell will be provided on the exterior.

   H. Hydrant flow test was be performed on 02/10/2022, by at 11 A.M and results are as follows:

      1. Static Pressure: 100 psi

AKAL Engineering Inc.



| | | |
|---|---|---|
| 2. | Residual Pressure: | 95 psi |
| 3. | Flow: | 1,100 GPM |
| 4. | Location: | 147 Jackson St |

Based on the above test results, a fire pump will not be required.

4. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; Stage is considered Ordinary Hazard Group 2; all other areas are considered light hazard.

B. Required Design Densities:
Light Hazard Areas = 0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1 = 0.15 GPM over 1,500 s.f.
Ordinary Hazard Group 2 = 0.20 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):
Light Hazard Areas = 225 s.f.
Ordinary Hazard Areas = 130 s.f.

5. PIPING

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

B. Schedule 40 black steel pipe with threaded fittings for 1-1/2" and smaller and Schedule 10 pipe with grooved fittings for 2" and larger.

6. FITTINGS

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

END OF SECTION

**D40: FIRE PROTECTION**

D4010 – Sprinkler System

*General:*

All materials and equipment furnished under this Subcontract shall be new, unused, first quality of a manufacturer of established reputation. Each valve, fitting, section of pipe, piece of equipment, etc., shall have cast or indelibly stamped thereon the manufacturer's name, pressure rating where applicable, type, etc.

Drains and test connections shall be provided in the systems.

*Sprinkler Pipe and fitting:*

- Schedule 40 black steel pipe with threaded fittings for 1-1/2" and smaller and Schedule 10 pipe with grooved fittings for 2" and larger. All piping shall be galvanized for Dry systems.

- All pipes passing through floors, walls, or partitions shall be provided with sleeves having an internal diameter of approximately one inch larger than the outside diameter of the pipe or insulation on covered lines. Sleeves through floors and through exterior, structural and fire-rated construction shall be hot-dipped galvanized Schedule 40 steel pipe

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

- Welding Materials: Comply, with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
    - Brazing Filter Metals: AWS A5.8, Classification Bag1 (Silver).
    - Solder Filter Metals: ASTM B 32, 95-5 Tin Antinomy.

- Gasket Materials: Thickness, material, and type suitable for fluid or gas to be handled, and design temperatures and pressures.

- Hangers for piping of sizes 4 inches and smaller shall be carpenter & Paterson figure no. 800 adjustable swivel ring, Tolco Company or approved equal, black steel and hanger rods with machine threads.

- Hangers for piping of sizes larger than 4 inches shall be the adjustable clevis hanger type, steel with extension rod to structure, carpenter-Paterson figure no. 100.

*Sprinklers:*

All sprinkler heads shall be quick response type.

- Upright heads with natural bronze finish in areas with no ceilings and out of view. Upright with chrome finish in areas with no ceiling and in view.
- Sidewall heads shall be chrome plated head with escutcheon.
- Concealed pendant heads shall be chrome finish with 1-1/2" adjustment white cover plate. In special areas, as may be noted on the Drawings, provide alternate cover plate finishes.

- Pendent dry sprinkler heads shall be chrome plated with adjustable escutcheon.
- Dry sidewall heads shall be bright chrome plated.

*Fire Standpipe Equipment*

- Fire Department Valves shall be 2-1/2 inch valves fitted with 2-1/2 inch x 1-1/2 inch reducer, caps and chains all conforming to Local Fire Department thread standard. Valves shall be polished chrome plated and shall be mounted in a recessed cabinet.

- Cabinets for the Fire Department Valves shall be fully recessed, solid door, prime painted steel. Include graphic and door catch.

- Provide 32 inch x 32 inch access panels at floor control locations or recessed cabinets as appropriate to the wall construction. Provide graphic.

*Fire Protection System Equipment*

- Double check valve assembly (Back flow Preventer) shall be UL listed FM approved, complete with test kit and spare parts kit. The Double Check Valve Assembly shall consist of two independent tri-link check modules within a single housing, sleeve access port, four test cocks and two drip tight shut-off valves. Tri-link checks shall be removable and serviceable, without the use of special tools. The housing shall be constructed of Schedule 40 stainless steel pipe with groove end connections. Tri-link checks shall have reversible elastomer discs and in operation shall produce drip tight closure against reverse flow caused by backpressure or backsiphonage. This Sub-contractor shall act as the Owner's agent in seeking approval from the Department of Environmental Protection or its designee.

- Gate valves, 2 inches and smaller shall be outside screw and yoke, bronze, rising stem, wedge disc type, threaded, conforming to MSS SP-80. Gate valve 2-1/2 inches and larger shall be iron body, bronze trim, outside screw and yoke, flanged, UL/FM listed conforming to MSS SP-70. All valves shall be UL listed for at least 175 psi working water pressure (wwp).

- Globe and angle valves may be used as auxiliary valves (drain valves, test valves, trim valves and valves on compressed air piping) for diameters not over 2 in. They shall be bronze, rising stem, with bronze disc, threaded, and conforming to MSS SP-80 Class 150.

- Check valves shall be swing type except as noted. Valves 2 inches and smaller shall be bronze, regrinding type with renewable disc, screwed caps, threaded, class 150 conforming to MSS SP-80. Check valves 2-1/2 inches and greater shall be iron body, bronze trim, bolted cover, flanged, conforming to MSS SP-71, UL listed for 175 psi wwp.

- Wet riser check valves shall be approved vertical type for wet systems, complete with drain valve and glycerin filled pressure gauges. Valve internal components shall be replaceable without removing valve from the installed position. UL/FM Global approved.

- Fire Department connection shall be flush mount cast brass 4" Storz type. Polished brass plate lettered with the approved signage. The connection's lettering and threads shall match Local Fire Department requirements. Confirm finish with Architect prior to ordering.

- Fire protection test connection shall be polished brass plate with lettering to read "TEST". Polished brass double female snoot with rigid end N.P.T. x pin lug hose thread swivel, pin lug plug and chain.

- Water Flow Indicators: Vane type waterflow detector, rated to 250 psig; designed for horizontal or vertical installation; have 2-SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 volts DC; complete with factory-set, field-adjustable retard element to prevent false signals, and tamper-proof cover which sends a signal when cover is removed.

- Electric Alarm: Electrically operated, red enameled gong with pressure alarm switch.

- Supervisory Switches: SPST, normally closed contacts, designed to signal valve in other than full open position.

D4090 – Other Fire Protection Systems

Kitchen hood will be protected with a dry agent “Ansul R-102” packaged hood suppression system

*Workmanship and Installation Methods:*

All work shall be installed in a first-class manner consistent with the best current practices.

All piping shall be installed true to line and grade, shall be grouped together, be parallel to each other. Utilize gang hangers wherever feasible. Group all valves together where feasible.

*Cleaning and Protection:*

Protect all materials and equipment during shipment and installation, and properly handle and store at the job site so as to prevent damage, and upon completion of this work, clean all fixtures and equipment and replace damaged parts.

END OF SECTION

- Handicap Lavatory Insulators: McGuire, TCI Products or Truebro.
- Water flow consumption will be monitored at Kitchen area water heater and at least 80% of indoor fixtures through sub-meters for water management.

# D4030 Fire Protection Specialties

## D4030.10 Fire Protection Cabinets

Semi-recessed cylindrical bubble door fire extinguisher cabinets in corridors and other public areas. Larsen's Manufacturing Company, Cameo as basis of design.

## D4030.30 Fire Extinguishers

Multi-purpose dry type, 20A-60BC. Located as required by code and in cooking areas. Wall-mounted fire extinguishers in back-of-house areas.

D4090 – Other Fire Protection Systems

Kitchen hood will be protected with a dry agent "Ansul R-102" packaged hood suppression system

*Workmanship and Installation Methods:*

All work shall be installed in a first-class manner consistent with the best current practices.

All piping shall be installed true to line and grade, shall be grouped together, be parallel to each other. Utilize gang hangers wherever feasible. Group all valves together where feasible.

*Cleaning and Protection:*

Protect all materials and equipment during shipment and installation, and properly handle and store at the job site so as to prevent damage, and upon completion of this work, clean all fixtures and equipment and replace damaged parts.

Lincoln Elliot
Newton, MA
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GGD Consulting Engineers, Inc.

## ELECTRICAL SYSTEMS

## NARRATIVE REPORT

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power, Lighting and Fire Alarm systems additionally, information has been provided regarding the Basis of Design for each system noted. The Electrical Systems shall be designed and constructed in accordance with LEED for Schools V4 where indicated on this narrative.

1. CODES

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

2. DESIGN INTENT

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

   B. Design Parameters:

   - High Voltage: 277/480 volt
   - Low Voltage: 120/208 Volt
   - Phase: 3 Phase
   - Amperage: 1,600 Amps with 2,000Amp rated bussing

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the BMS control system for schedule functions. The controllability shall be in conformance with associated LEED credit in indoor environmental quality.

   B. Automatic control of receptacles based on occupancy will be provided for at least 50% of the receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, individual workstations, and classrooms. Controlled receptacles will be marked per NEC 406.3 (E).

   C. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability. Exterior lights will be addressable and dimmable. Fixtures will be designed and programmed to turn on at dusk utilizing photo sensor input. Fixture shall be turned off based on scheduled preference typically 5AM-6AM. Fixture output shall be scheduled to be reduced by 50% after 12AM. Additional schedule functionality shall be provided based on end user input.

D. Emergency and Exit lighting will be run through life safety panels to be “ON “during normal power conditions, as well as, power outage conditions. The emergency lighting system will have control so that lights are “ON” only when building is occupied with the exception of buildings exit signs which shall remain always on.

4. DESCRIPTION OF THE SYSTEMS

A. Utilities:

1. The new building will be supplied with utility power from the utility company Eversource. The new service will be fed via underground primary duct bank to a pad mounted utility company owned liquid filled transformer.

2. The service electrical transformer will be furnished, installed, owned and maintained by Eversource, and it will be located adjacent to the building as shown on the civil drawings. The transformer will be of the pad- mounted type with a primary voltage of 13.8 kV and a secondary voltage of 480Y/277 volts. The transformer will be sized by the utility company based on the load data provided by The Design team.

3. Concrete pad and grounding grid for the pad-mounted transformer is provided by the Contractor per the Eversource standards.

4. Concrete encased duct bank of the two 4" PVC conduits will be provided by the Electrical Contractor for the primary feeder installation from the utility manhole to the pad-mounted transformer. Pre-cast concrete manholes 12' x 9' will be provided by the Contractor to facilitate the primary cables field installation. The duct bank routing is shown on the civil drawings.

5. Utility company will provide a primary feeder cable from the utility manhole to the pad-mounted transformer via the new manhole and terminate the feeder cable on both ends.

6. Transformer secondary feeder of the copper conductors will be installed underground in the duct bank of five 4" PVC conduits from the pad-mounted transformer to the main electrical switchboard located in the main electrical room. The secondary feeder and terminations at the switchboard side will be provided by the Electrical Contractor, and terminated at the transformer side by Eversource.

7. The Eversource metering CTs will be installed in a CT section of the switch board, the meter will be located at the direction of the utility company.

8. Telephone, Cable TV, and City Fiber will be fed underground into the building’s Main Distribution Frame/Head End Room.

B. Electrical Distribution System:

1. Service ratings for the Main Building are designed for a connected load of 12 watts/s.f. The service capacity will be sized for 1,600 amperes at 277/480 volt, 3∅, 4wire with 100% rated main breaker. The main buss will be sized at 2,000 amperes and will have an available space provision at the end of the gear to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance transient voltage surge protection device (SPD) rated 240 kA and digital metering unit to monitor voltage, current, power factor, demand kW and with a data communication port for interface with BMS. Main switchboard's short circuit rating shall be coordinated with the utility companies available short circuit capacity, but it is estimated to be 65 KAIC.

2. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for all feeders 100 amperes or over excluding the secondary service conductors.

3. The building connected electrical load estimate is based on the preliminary building systems design:

| **Load Type** | **KVA** |
|---|---|
| HVAC Loads (including AHU, Destratification Fans, DCU, Chiller,, UH, VRF, Boilers, FCs, Pumps, RTUs, Exhaust Fans, DCU) | 550.0 KVA |
| Elevator | 30.0 KVA |
| Exterior Lighting | 5.0 KVA |
| Interior Lighting | 55.0 KVA |
| General Power | 220.0 KVA |
| Kitchen | 45.0 KVA |
| Theatrical Lighting Equipment | 45.0 KVA |
| Plumbing/Fire Protection (Pumps, etc.) | 15.0 KVA |
| **Total Connected Load** | **965.0 KVA** |

4. Electrical power distribution equipment will be installed in the main electrical room and in the electrical closets. There is one main electric room that also contains a 2 hour rated emergency electric room for life safety electrical switchgear. The main electric room is located at the basement level of Wing “C”. Sub-panels with shunt trip main breakers will be within shops and labs which require emergency off operation. There are three remote electric rooms throughout the building as follows:

   a. Electric Room #1 First Floor Wing “A”

   b. Electrical Room #2 Second Floor Wing “B”

   c. Electrical Room #3 Second Floor Wing “C”

5. Electrical power distribution equipment in each electrical room or closet will support lighting, power, and HVAC loads in the associated areas.

6. Main electrical room locaed on the basement level of Wing C will be provided with the following equipment:

- Main switchgear consisting of 4 sections (1) main beraker (1) C/T section and (2) distribution sections. (1) pull section
- (1) 400 amp 277/480V panel for power distribution.
- (1) 250 amp 120/208V panel (double tub) panel fed via 75KVA transformer serving mechanical equipment.
- (1) 400 amp automatic transfer switch for optional standby power.
- (1) 400amp 277/480V paenl serving devices on optional standby power.
- (1) 250 amp 120/208V panel fed via 45KVA transformer seving devices requiring optional standby power.
- (1) 250 amp 120/208V (double tub) panel fed via 75KVA transformer serving all general all general power and receptacle circuits.
- (1) 100 amp 277/480V panel serving general lighting.
- Fire Alarm Control Panel
- Automatic lighting control system components.
- (1) 100 amp automatic transfter switch for life safety power located in 2-hour rated closet.
- (1) 100 amp 277/480V panel for life safety lighting circuitry located in 2-hour rated closet.

7. Electric Room #1 located on First Floor Wing “A” shall be provide with the following equipment:
   - (1) 400 amp 277/480V panel for power distribution.
   - (1) 150 amp 120/208V panel fed via 75KVA transformer seving mechanical euiqpment.
   - (1) 250 amp 120/208V (double tub) panel fed via 75KVA transformer serving general power and receptacle loads in the area.
   - (1) 150 amp 120/208V panel fed via 45KVA transformer serving equipment requiring optional standby power.
   - (1) 100 amp 270/488V panel for general lighting.
   - (1) 100A 277/480V panel for life safety lighting located in 2-hour rated closet.

8. Electrical Room #2 located on Second Floor “B” wing shall be provided with the following euipment
   - (1) 400 amp 277/480V panel for power distribution.
   - (1) 150 amp 120/208V panel fed via 75KVA transformer seving mechanical euiqpment.
   - (1) 250 amp 120/208V (double tub) panel fed via 75KVA transformer serving general power and receptacle loads in the area.
   - (1) 150 amp 120/208V panel fed via 45KVA transformer serving equipment requiring optional standby power.
   - (1) 100 amp 270/488V panel for general lighting.
   - (1) 100A 277/480V panel for life safety lighting located in 2-hour rated closet.

9. Electric Room #3 located in Second Floor "C" wing shall be provided with the following equipment:
   - (1) 400 amp 277/480V panel for power distribution.
   - (1) 150 amp 120/208V panel fed via 75KVA transformer seving mechanical euiqpment.
   - (1) 250 amp 120/208V (double tub) panel fed via 75KVA transformer serving general power and receptacle loads in the area.
   - (1) 150 amp 120/208V panel fed via 45KVA transformer serving equipment requiring optional standby power.
   - (1) 100 amp 270/488V panel for general lighting.
   - (1) 100A 277/480V panel for life safety lighting located in 2-hour rated closet.

C. Interior Lighting System:

1. The intent of the lighting design is to provide a visual environment for the students and faculty that is supportive of the educational activities within the building. The lighting system will be designed in compliance with the applicable Energy Code and be eligible for the Utility company rebate program.

2. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2018 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30 FC |
| Science Labs | 40 FC |
| Offices, Conference Rooms, Library | 30 FC |
| Kitchen | 50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30 FC |
| Corridors | 20 FC |
| Utility and Storage Rooms | 20 FC |

3. Classroom lighting fixtures will consist of recessed/surface mounted direct/indirect luminaries with integral LED source and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Two daylight dimming zones will be provided in each classroom.

4. Office lighting fixtures will consist of recessed/surface mounted direct only LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming where lighting within the daylight zone exceeds 150W.

   In general, lighting power density will be 20-40% less than ASHRAE 90.1-2016. The power density reduction relates to associated LEED credit in energy and atmosphere.

5. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with associated LEED credit in indoor environment quality.

6. Gymnasium lighting will be comprised of direct/indirect fixtures with integral LED source and electronic drivers. The fixtures will be provided with poly carbonate lensing. The light level will be designed for approximately 50 foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing where lighting within the daylight zone exceeds 150W. Daylight dimming controls will be similar in operation to classrooms.

7. Corridor lighting will be comprised of recessed mounted linear fixtures with integral LED source and electronic drivers. The Corridor light level will be designed for approximately 20-foot candles. Corridor lighting will be controlled via time schedules during normal business hours and set to occupancy control thereafter.

8. Cafeteria lighting will be a combination of pendant mounted fixtures with direct only and direct/indirect distribution types. All fixtures shall be provided with integral LED source and electronic drivers. The light levels will be designed for approximately 30 foot candles.

9. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be DMX dimmable to black LED and controlled by a theatrical dimming system.

10. Kitchen and Servery lighting will consist of recessed 2'x2' and 2'x4' acrylic lensed gasketed troffers with aluminum frame doors, integral LED source, electronic drivers and NSF rated for food prepation areas. Light levels will be approximately 50 foot candles.

11. Media Center lighting will be a combination of pendant decorative pendant fixtures and recessed fixtures with integral LED source and electronic drivers. The light levels will be designed for approximately 30 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

12. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied. Occupancy sensors will be set to vacancy mode where required by Energy Code.

13. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with associated LEED credit in indoor environmental quality when lighting within the daylight zone exceeds 150W threshold.

14. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights "on and off". Lighting control system will be interfaced with BMS system, and will be demand response capable in accordance with associated LEED credit in Energy and atmosphere.

D. Emergency Stand-by System:

1. An exterior 250 kW, 312.5 kVA diesel fired generator, with sound attenuated enclosures will provide emergency power. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency power.

   Provide a custom weatherproof enclosure with increased sound attenuation to 60dBA at 7 meters walk-in style with stairs and platform. Enclosure shall be equal to Prichard Brown custom enclosures.

2. The generator power system has been sized to support emergency (life safety), and optional standby building loads. The life safety branch of the emergency system will be provided with a manual transfer switch on the emergency line side of the transfer switch in compliance with NEC 700.3(F)

   a. All Exit signs and emergency lighting in the areas listed below are fed by Life Safety Emergency Power (required by code):

      - Corridors
      - Electrical/Mechanical Rooms
      - Gymnasium, Locker Rooms,
      - Cafeteria/Commons
      - Media Center
      - Lobbies
      - Administration areas
      - Health Suite/Nurses office
      - Toilets
      - Auditorium
      - Stage
      - Data rooms “Head End room & IDF Closets
      - Kitchen/Servery
      - Exterior Building mounted lights over doors required for egress lighting
      - Where required by code (egress areas)

   b. Fire Alarm System

c. Optional Standby Equipment:
   - Equipment listed below is fed by Optional Standby Emergency Power:
     - Heat Pumps
     - MDF and IDF Cooling units
     - Refrigeration (Kitchen/Nurse)
   - Strategically located receptacles in administration area.
   - Equipment within the Head End and IDF rooms including (served by UPS):
     - Paging/Intercom System (MDF)
     - Security System (IDF/MDF)
     - Telephone System (MDF)
     - Network electronics (IDF/MDF)
     - Servers (MDF)
     - Clock system (MDF)
     - Building Management System (MDF)

d. Standby power loads:
   - Heating system heat pumps
   - Telephone/ data closets and associated A/C equipment
   - Communication systems (telephone and public address systems)
   - Building BMS system control panels
   - Kitchen refrigeration equipment
   - Lighting and power in the Nurse/Medical area
   - Security system equipment

E. Metering:

1. Measurement devices shall be installed to monitor the electrical energy use for each of the following separately:

   a. Total electrical energy; separate meters for Roof PV system and Parking PV canopy system.

   b. Roof mounted photo-voltaic panels

   c. Photo-votalic panels mounted to exterior parking canopy.

2. Recording and Reporting:

   a. The electrical energy usage for all loads listed above shall be recorded a minimum of every 15 minutes and reported at least hourly, daily, monthly, and annually. The system shall be capable of maintaining all data collected for a minimum of 36 months.

F. Site Lighting System:

3. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 16 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society. Lighting will be designed in accordance with associated LEED credit in sustainable sites.

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

G. Wiring Devices:

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

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

3. Corridors will have a cleaning receptacle at approximately 25-40 foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

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

H. Fire Alarm System:

1. A fire alarm and detection with mass notification system will be provided with 60 hours battery back-up standby, 15 minutes of alarm. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

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

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

4. Speaker/strobes with white and amber colored strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Amber strobes will be initiated during a mass notification event in which a different district message will be played over the speakers.

5. The system will be remotely connected to automatically report alarms to the Fire Department via a digitized master box.

6. The generator status panel will be located at the Fire Alarm Control Panel.

I. Uninterruptible Power Supply (UPS):

1. One (1) three (3) phase centralized UPS systems will be provided with seven minutes of battery back-up.

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

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

J. Lightning Preventor System:

4. A lightning preventor system will be provided which includes the following equipment:

   a. ESE lightning protection air terminal

   b. Mast, complete with base and supports

   c. Down conductors

   d. Grounds

   e. Transient Voltage Surge Suppression

K. Renewable Energy System Provisions:

1. The base project will include:

   a. Electrical provisions will be made for a roof mounted and exterior solar canopy renewable energy system for a grid connected photovoltaic PV system intended to reduce the facilities demand for power.

   b. Conduit provisions for canopy PV systems that will be metered separately.

L. Level 2 AC Dual Electric Vehicle Charging Equipment. (EVSE)

1. Provide three (3) EVSE stations fed with 40 ampere feeders back to a NEMA 3R enclosure with panel and dedicated service meter. Two protective bollards will be installed at each charging station. It is anticipated that the secondary service feed will come from the building transformer.

M. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access. Area of rescue assistance call boxes will be provided at Elevator Lobbies with no grade access. The call boxes connect to a main panel located adjacent to the Fire Alarm annunciator panel.

N. Distribution Antennae System (DAS):

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

5. TESTING REQUIREMENTS

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

- Lighting and power panels for correct phase balance.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Uninterruptible Power System, UPS.
- Lightning protection system.

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

6. OPERATION MANUALS AND MAINTENANCE MANUALS

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

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

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

8. COMMISSIONING

A. The project shall be commissioned per Commissioning Sections 019113 and 260800 of the specifications.

9. PHASING

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

GGD Consulting Engineers, Inc.

## TECHNOLOGY SYSTEMS

## NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. TECHNOLOGY

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

   B. Each classroom will have 2 data outlets for student computers. Two data, one voice with video and audio connections to an LCD monitor will be provided at teacher's station with interconnectivity to a interactive LCD touch screen monitor. A wall phone outlet with 2-way ceiling speaker will be provided for communications with administration. Wireless access points will be provided in all classrooms and other spaces and consist of (2) CAT6A cables.

   C. Classroom Sound reinforcement systems/assistive listening system will be provided in all classrooms and SPED classrooms that will consist of a wireless receiver, handheld microphone, pendant microphone with lanyard, student group speaker wireless pod, and an in-ceiling speaker/amplifier.

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

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

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

   G. Two-way communication call boxes will be provided adjacent to each elevator that is above or below grade level. The base station will be located at a control point on the first floor.

4. TESTING REQUIREMENTS

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

- Telephone and data cabling
- Fiber optic backbone cabling
- Paging system
- Wireless clock system

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

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

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

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

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

7. COMMISSIONING

A. The project shall be commissioned per Section 019113 and Section 270800 of the specifications.

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Newton, MA
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GGD Consulting Engineers, Inc.

## SECURITY SYSTEMS

## NARRATIVE REPORT

The following is the Security Systems narrative, which defines the scope of work and capacities of the Integrated electronic security system (IESS), as well as, the Basis of Design.

1. CODES

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

2. DESIGN INTENT

   A. The work of Section 280000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the IESS work and all items incidental thereto, including commissioning and testing.

3. MAIN ENTRY SEQUENCE OF OPERATIONS

   A. The main entry is controlled by the electronic access control system to allow entry of staff via card access with a credential, scheduled unlocking for morning student arrival and remote control and communications via the security office. The main entry is a covered by CCTV video, and contains a video intercom system for visitor access.

      Sequences:

      Morning Student arrival;
      The doors in the main vestibule both inner and outer will automaticallyunlock at a pre-determined time programmed into the access control system to allow supervised student arrival into the school. CCTV cameras will be recording and school staff will be supervising this process. The doors will then automatically lock at a predetermined time once the students have completed the arrival process and school begins.

      During School hours (Main entry doors both inner vestibule and outer vestibule will be locked)

      Credentialed staff; School Staff will be provided with a card or fob with credentials to allow for electronically unlocking access control doors. A staff member entering the main entry will present their card/fob to the exterior proximity reader to unlock the outer vestibule door. They will then present their card/fob again to the interior card reader to unlock the inner vestibule door. At this point they will have access to the building.
      Visitor; A visitor will utilize the video intercom to communicate with school staff in the security office. The staff member in the security office will then be able to unlock the outer vestibule door to allow the visitor into the vestibule. Once in the vestibule they can communicate directly through glazing with talking holes and sign the visitor in and determine what the next action is where they can either unlock the door to the administration area or unlock the inner vestibule door to allow access to the school.

4. CCTV

A. A Closed Circuit TV system will consist of computer servers with image software, computer monitors, and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

B. The location of the exterior cameras is generally on the building perimeter wich consist of multiple 360 degree panoramic type cameras mounted to the building corners. At each entry with access control a fixed single lens camera will be mounted in the doors vicinity to be able to identify the person entering/exiting the door. The exterior cameras are fixed type. There will be two pole mounted cameras one at each entrance.

C. The location of interior cameras is generally in public spaces and assembly use spaces. All corridors, stairwells, and general assembly spaces will be covered with CCTV cameras.

D. The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

5. INTRUSION SYSTEM

A. An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

B. Two lock down panic buttons will be provided in administrative areas and will trigger lock down sequence.

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

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

6. CARD ACCESS

A. A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. In general access control door locations will be at all building entry points and within the building to partition assembly space use from classroom wings.

B. The alarm condition will also initiate real time recording on the Integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

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

7. OPERATION MANUALS AND MAINTENANCE MANUALS

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

8. RECORD DRAWINGS AND CONTROL DOCUMENTS

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

9. COMMISSIONING

A. The project shall be commissioned per Commissioning Sections 019113 of the specifications.

10. PHASING

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

# E EQUIPMENT AND FURNISHINGS

## E10 EQUIPMENT

### E1010 Vehicle Equipment

Plan for future installation of Electric Vehicle Charging Stations.

### E1030 Commercial Equipment

#### E1030.75 Office Equipment

Not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

#### E1030.80 Foodservice Equipment

A full kitchen will be provided to serve the cafeteria. See floor plans for kitchen layout and equipment layout. Equipment

### E1040 Institutional Equipment

#### E1040.10 Educational and Scientific Equipment

**Library Equipment**

Not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

**Audio-Visual Equipment**

**Projection Screens:** Electrically operated screens with standard reflective fabric face; motor in roller. Located in cafeteria, gymnasium, auditorium.

**Projectors:** Not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

**Arts and Crafts Equipment**

**Kilns:** Electric kiln to be provided by GC.

### E1060 Residential Equipment

#### E1060.10 Residential Appliances

The staff lunchroom and teacher workrooms will include appliances, including refrigerators and microwaves. Include refrigerator in the medical office and lactation room.

# E1070 Entertainment and Recreational Equipment

## E1070.10 Theater and Stage Equipment

**Rigging Systems and Controls:** To be determined - provide allowance.

**Stage Curtains:** Bi-parting main draw curtain with valence and curtain machine at proscenium opening and rear wall of each platform; HEAVY-duty straight track; 26-ounce velour curtain. H & H Specialties Inc. with KM Fabrics as basis of design

## E1070.50 Athletic Equipment

**Gymnasium Equipment:** The gymnasium will be equipped so that it can be used for full-court basketball, volleyball and badminton games utilizing the entire gymnasium, or for 2 practice basketball games. Equipment is as follows:

- Wall Pads: Wall protection pads will be on all walls of the gymnasium and health & wellness room to 7-feet. Porter Athletic, Standard Fire-Retardant Wall Pads as basis of design.
- Basketball Equipment, Gymnasium: Six basketball backstops; ceiling-mounted, forward-fold, front-braced; glass backboard with safety padding; motorized height adjuster; wireless controls. Porter Athletic, 90949000 Ceiling Suspended Forward Fold, Front-Braced Backstop as basis of design.
- Volleyball Equipment: One volleyball net and standards with net antennae and net chain; judge's stand; protective pads; floor sleeves. Porter Athletic, V-1961 Powr-Rib II Competition Volleyball Package as basis of design.
- Badminton Equipment: One badminton net and standards with floor sleeves. Bison, Inc., BM10 Competition Badminton System with BM21 floor sockets as basis of design.

**Interior Scoreboards:** One single-sided LED scoreboard in gymnasium for basketball and volleyball; player number, player fouls and team fouls display; wireless controls. Daktronics, BB-2125 as basis of design.

**Gymnasium Dividers:** One roll-up divider curtain in gymnasium; motorized. Porter Athletic, 90675000 Roll-Up Gymnasium Divider Curtain as basis of design.

# E20 FURNISHINGS

# E2010 Fixed Furnishings

## E2010.10 Fixed Art

**Classroom Graphics:** Allow for 40 unique, cut vinyl graphics mounted at the sidelight of each classroom/special room. Assume 5 SF at each location. Design and material to be determined.

**Wall Graphics:** Allow for five (5) locations for custom wall graphics. Graphics to be digitally printed on Ultraflex Wallscapes Plus Wallcovering or similar. Each location to require Level 5 wall finish. Refer to table below for overall dimensions and square footages:

| Location | Square Footage |
|---|---|
| 1. Main Lobby | 300 SF |
| 2. Wellness Corridor | 300 SF |
| 3. Cafeteria Corridor | 300 SF |
| 4. Media Center | 300 SF |
| 5. Auditorium Lobby | 300 SF |

### E2010.20 Window Treatments

**Window Shades:** Manual light-filtering shade-band roller shades at all rooms with exterior windows. Mechanized light-filtering shade-band roller shades at hard-to-reach locations: Lobb, Gymnasium. MechoShade Systems, Inc. as basis of design. Motorized dual roller shades with light filtering shade and blackout shade in the.

### E2010.30 Fixed Casework

**Educational Facility Casework**

**Plastic Laminate Casework:** Plastic laminate clad panel product cabinets in classrooms, teacher work areas, and staff lunchroom, and mail slots in school offices. Custom grade, flush overlay. Adjustable shelves, heavy-duty drawer slides and key-operated cam locks.

- Musical instrument storage cabinets are not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

**Wood Casework:** Reception desks in school offices, circulation desk in media center, classroom cubbies and benches. Custom grade. Transparent finish - clear urethane varnish.

**Wood and Glass Casework:** Vitrines/ Display cases, Allow 4 locations.

**Countertops:** Quartz solid surfacing countertops throughout

## E2050 Movable Furnishings

### E2050.30 Furniture

Not in contract. Provided by Owner under Furniture, Furnishings and Equipment contract.

# F20 FACILITY REMEDIATION

## F2010 HAZARDOUS MATERIALS REMEDIATION

### F2010.20 Asbestos Abatement

Refer Appendix "C - Hazardous Materials Determination Survey"

ADD: $95,000 for monitoring and air sampling fee

### F2010.30 Lead Remediation

Refer Appendix "C - Hazardous Materials Determination Survey"

### F2010.40 Polychlorinate Biphenyl Remediation

Refer Appendix "C - Hazardous Materials Determination Survey"

# F30 DEMOLITION

## F3030 SELECTIVE DEMOLITION

### F3030.10 Selective Building Demolition

Refer to demolition drawings.

### F3030.30 Selective Interior Demolition

Refer to demolition drawings.

# G SITEWORK

## G10 SITE PREPARATION

### G1010 Site Clearing

Refer to Landscape description by Terraink, under section G2080.

Refer to civil drawings.

### G1020 Site Elements Demolition

#### G1020.10 Utility Demolition

Refer to civil drawings.

#### G1020.50 Selective Site Demolition

Refer to civil drawings.

### G1030 Site Element Relocations

Refer to civil drawings.

### G1070 Site Earthwork

#### G1070.10 Excavation and Fill

In the Geo-environmental Phase IV Remedy Implementation Plan, it is report of potential Imminent Hazard conditions triggered by findings of a concentration of 45 milligrams per kilo arsenic in a near surface soil sample on the property. For full Phase IV report, refer to Appendix "B - Geo-environmental Phase IV Remedy Implementation Plan"

Cut and Fill Analysis: To be provided

#### G1070.35 Erosion and Sedimentation Controls

Refer to civil drawings.

## G20 SITE IMPROVEMENTS

### G2010 Roadways

Refer to roadway improvements, transportation concept drawing on Appendix "E - Transportation concept"

#### G2010.10 Roadway Pavement

Refer to civil drawings.  Refer to drawings.

### G2010.20 Roadway Curbs and Gutters

Refer to civil drawings.

### G2010.40 Roadway Appurtenances

Refer to civil drawings.

## G2020 Parking Lots

Refer to civil drawings.

### G2020.10 Parking Lot Pavement

Refer to civil drawings.

### G2020.20 Parking Lot Curbs and Gutters

Refer to civil drawings.

### G2020.40 Parking Lot Appurtenances

Refer to civil drawings.

# G SITEWORK

## G10 SITE PREPARATION

Site Earthwork to include the redevelopment of the existing parking lot of the Lincoln Eliot School into a turf, multi-use field, and open space. The existing "sledding hill" at the eastern edge of the playfield is to remain part of the site program and shall be graded per the intent shown on the Plan.

*Refer to Civil Engineer section G1010 for the location of dead trees to be cleared, grubbed, and removed completely from the site per the Site Preparation plans.*

*Refer to Geo-technical Engineer section G1050 for locations of contaminated soil and associated remediation scope of work.*

*Refer to Civil Engineer section G1070 for earthwork cut and fill calculations and proposed grading of roads, parking areas, and curbs.*

## G20 SITE IMPROVEMENTS

### G2010 Roadways

#### G2010.10 Roadway and Parking Lot Pavement

*Refer to Civil Engineer section G2010 for bituminous concrete/asphalt paving along roadways and driveways.*

*Refer to Civil Engineer section G2020 for bituminous concrete/asphalt paving at parking lots.*

#### G2010.20 Roadway Curbs

*Refer to Civil Engineer section G2010 for granite or precast curbs along roadways and driveways.*

*Refer to Civil Engineer section G2020 for granite or precast curbs in parking lots.*

### G2030 Pedestrian Plazas and Walkways

#### G2030.10 Pedestrian Pavement

Sidewalks are proposed at the perimeter of the building along and extending from Jackson Road, Waban Street, and Walnut Park, along the parking lot roadway loop, and at the drop-off area as shown on the site plans.

Walkways are located at the entry plaza from Waban Street and Walnut Park. They are also adjacent to the southern side of the building along the two play areas, and mid-site between the play areas and multi-use turf field with connection to the parking lot.

Sidewalks and walkways shall be 4-inch thick, cast-in-place portland cement with welded wire mesh steel reinforcements on an 8-inch gravel base.

Sidewalks and walkways shall have varied scoring patterns, tooled edges, and a medium brush finish.

Entry plazas at the east and west sides of the building shall be 4-inch thick, cast-in-place portland cement with welded wire mesh steel reinforcements on an 8-inch gravel base.

“Outdoor Classroom” area to be bituminous concrete/asphalt flexible pavement: 2-inch binder course, 1-inch wearing course.

“Programmed Outdoor Space” be bituminous concrete/asphalt flexible pavement: 2-inch binder course, 1-inch wearing course.

### G2030.10 Pedestrian Pavement Curbs and Gutters

Pre-cast concrete landscape curbs; 6-inch reveal minimum are proposed within the plaza and walkway areas as shown on the site plans.

Pre-cast concrete landscape curbs; flush reveal minimum are proposed in between site bituminous concrete/asphalt flexible paving, planting beds and the poured-in-place play surface areas as shown on the site plans.

### G2030.30 Exterior Steps and Ramps

Steps with ADA compliant stainless steel tubing handrails on both sides are proposed at the Van Zone drop-off leading to Waban Street and to the Main Entry, at the 3-5-year-old play area nearest the Main Entry, and adjacent to the cafeteria as shown on the site plans. Steps of the same description are also proposed on the east side of the building near the outdoor classroom amphitheater extending from Waban Street and Walnut Park into the new entry plaza.

Stadium steps are proposed between the cafeteria and auditorium plazas.

Accessible ramps with ADA compliant guide curb edges and stainless-steel tubing handrails on both sides are proposed at the Van Zone drop-off, the cafeteria plaza, and the outdoor classroom on the east side of the building.

### G2030.70 Plaza and Walkway Lighting

*Refer to the Electrical section G4050 for site lighting for safety and egress.*

## G2050 Recreational and Playfield Areas

### G2050.30 Recreational Areas

Poured-in-place resilient rubber surfacing (PIP) meeting ASTM standards; depths as specified by play equipment fall heights and play surfacing manufacturers. Layout to be determined by the Owner, Architect, and within the limits indicated on the plans at the outdoor play areas, as delineated on the site plan.

3–5-year-old play area shall include play equipment that is appropriate for this age group and is Universally Accessible and inclusive. Allow for a play structure consisting of a stainless-steel slide, wood composite, and metal play panels. Swings and spinning play elements, as well as steppers and balance elements, will be included.

6–12-year-old play areas shall include play equipment that is appropriate for this age group and is Universally Accessible and inclusive. Allow for a play structure consisting of stainless-steel slide, wood composite, and metal play components. Swings and spinning play elements, as well as climbing elements, will be included. All rope elements will be of the highest quality to resist wear and tear.

To the north of the cafeteria is “programmed open space” surfaced in bituminous concrete/asphalt with a line stripe for a half-court basketball court, (2) four-square markings, and a gaga pit.

*Refer to Civil Engineering section G3030 for underdrain connections at play areas.*

### G2050.50 Playfield Areas

A multi-use lawn area along Jackson Road is an “unprogrammed open space” that will consist of a turf field that will be loamed and seeded with an “athletic seed mix.”

*Refer to Civil/Irrigation Engineering section G2080 for irrigation at the playfield.*

*Refer to Civil Engineering section G3030 for underdrains at the playfield.*

## 2060 Site Development

### G2060.20 Fences and Gates

New 4’ high black vinyl chain link fence on 12-inch-wide mower strip along Jackson Road frontage to prevent ball-roll into the sidewalk and roadway.

The programmed space basketball halfcourt at the cafeteria shall have a 10-foot-high black vinyl chain link fence segment on the west side of the court to deter migration to the lower-level multi-use lawn area.

*Refer to G Building Sitework for Structural Engineering section drawings and details for 10-foot high fence panel footing requirements.*

### G2060.25 Site Furnishings

Site furniture will include benches, litter receptacles, and bicycle racks as requested by the Owner or permitting authorities. Site Furnishings will be made of recyclable content to achieve credits for LEED qualifications.

Allow for (24) bicycle racks; to be “U-shaped,” stainless steel, and embedded with a concrete footing.

Allow for (6) benches; to be metal, powder-coated, with ipe wood slats and surface mounted.

Allow for (4) litter receptacles; to be metal, powder-coated, and surface mounted with optional split litter and recycling bin capacity.

Allow for (8) picnic tables / café tables with integral chairs or benches at outdoor gathering spaces; metal, powder-coated site furnishings, with ipe wood slats.

Allow for (2) raised bed garden plots; 18-inch high pre-cast concrete curb in the Teaching Garden on the east side of the building as shown on the Plans.

### G2060.35 Flagpoles

Allow for (1) 35-foot-tall flagpole, aluminum, powder-coated with an ornamental ball top, spun collar, internal cam cleat, internal halyard, and ground set installation on a concrete footing.

*Refer to G Building Sitework for Structural Engineering section drawings and details for flagpole footing requirements.*

### G2060.60 Retaining Walls

Retaining walls that are 4-feet or less in height will be cast-in-place concrete, footer to 4-foot depth, hand-rubbed finish, shadow line, and chamfered edges.

*Refer to G Building Sitework for Structural Engineering section drawings and details for all structural retaining walls that are greater than 4-feet in height.*

*Refer to G Building Sitework for Structural Engineering section drawings and details for all guard installations on structural retaining walls that are greater than 4-feet in height.*

*Refer to Electrical section G4050 for recessed retaining wall lighting for safety and egress.*

### G2060.80 Site Screening Devices

Dumpster enclosure on concrete pad shall be cedar, 6-foot height with (2) six-foot-wide double swing gates, self-closing latch.

### G2060.85 Site Specialties

18-inch-wide drip strip with an underdrain, filter fabric, and an aluminum edge between the building foundation and the landscape plantings as shown on the plans.

### G2080.10 Planting Irrigation

A multi-use lawn area along Jackson Road is an “unprogrammed open space” of turf field will be loamed and seeded with an “athletic seed mix”. Total square footage for sprinkler irrigation of the turf field is 15,000-square feet.

*Refer to Landscape Architect section G2050.50 for play field description.*

*Base Bid Description*

Domestic water will be provided from the building as the primary water supply for irrigation. The cost of plumbing a separate building domestic service to the irrigation system shall be included by the general contractor, including:

Licensed Trade Project Plumbers Carrying Indoor Irrigation Work

Work must by carried to 10 feet outside building walls per Code

Sewer Abatement (Irrigation) Water Meter for Billing

Reduced Pressure Zone (RPZ) Backflow Preventer

Copper Pipe and Valves

Floor Drains

Winterization

Applying potable water judiciously requires the use of a “smart” irrigation controller that can calculate the correct amount of water to apply based on real time climate conditions (rain, temperature, soil moisture, etc.) and automatically adjust the running time, or suspend daily irrigation if moisture conditions are met, for each customized zone. Irrigation will only be applied to supplement rainfall, not serve as a substitute. Generally, irrigation is applied overnight in the early hours of the morning to prevent irrigation water from staying on plant leaves too long and to not interfere with general maintenance and site operation. Quick coupling valves at-grade will be in lockable valve boxes for various hand-watering and winterization practices. The irrigation system shall have a winterization port to force compressed air through the mainline and laterals in October to prevent pipes cracking from ice. A qualified irrigation service provider is recommended for annual maintenance and commissioning for optimal performance.

Internet-based controls will further enhance system management to notify the end-user on leaks, breaks, faults, and overall water use for commissioning. General contractor shall provide ethernet data to irrigation controller and/or pump station for remote management and system push notifications, emails, and text alerts on flow sensing, automatic system shutdown with leaks and breaks, harvested water versus domestic water consumption, and weather advisories (incoming rain, temperatures, etc.).

General contractor shall only subcontract qualified contractors with experience using these products:

Irrigation Controller

Baseline BaseStation3200 with BaseManager 2.0

Rain Bird ESP-LXD with IQ v4.0

Hunter ACC2 with Centralus

Two-Wire Based System (for Expandability)

Internet Based Controls

Contractor to Purchase Tablet and Stylus for Irrigation Management

PVC Mainline

Stainless Steel Rotor Sprinklers for Athletic Fields

Pressure Regulating Valves and Sprinklers

Electrically, the irrigation controller only requires a 120-Volt, 1-Phase, 20-Amp GFCI Supply. The controller shall be grounded to the building earth ground system. An internal transformer shall convert to 24-Volt AC for direct-burial valve wire in the field. Electrical contractor shall provide power and conduit for irrigation from inside of building to landscape for irrigation contractor to begin work.

*Alternate 1*

It is presumed that downstream of all plumbing equipment such as the backflow preventer, meter, and various valves, a dynamic pressure of 60 pounds per square inch (psi) at 30 gallons per minute (gpm) flow rate can be achieved. If pressure is too low, a booster pump will be required to sufficiently irrigate the athletic fields. The booster pump will require a separate power supply and coordination for space (indoors or outdoors in enclosure).

Booster pump station power at this point is to be determined but currently our assumptions are for a 3-Phase (Voltage to be determine), 2 horsepower booster pump to adequately increase pressure for athletic field irrigation.

*Alternate 2 (No Overlap with Alternate 1)*

At the time of Schematic Design (SD), the project is considering use of harvested rainwater and/or building condensate from mechanical systems to offset domestic water demand from irrigation system as an alternate design and price from the general contractor. Irrigation engineer is only contracted for domestic water irrigation at the time of SD: below are recommendations for coordinating a harvested water system with domestic water only as an automatic backup supply.

*Refer to Civil Engineering section G3030 for Storm Drainage Utilities.*

Harvested water will be used judiciously to minimize or eliminate the consumption of domestic potable water. The general contractor shall carry the cost of a 25,000-gallon underground storage tank.

Purple-colored irrigation equipment at-grade shall be used as a universal designation of non-potable water. Harvested water shall be filtered and disinfected with ultraviolet (UV) light for sprinkler irrigation. All irrigation shall take place overnight to allow for harvested water to infiltrate the soil and minimize human contact.

Irrigation pump station drawing harvested water from tank shall be a prefabricated, skid-mounted system with vandal-proof enclosure. Pump system controls shall include a Variable Frequency Drive (VFD) and Programmable Logic Controller (PLC). System monitors points such as harvesting tank water level, filter and UV status, pump operation, and irrigation water use shall be readily available for the end-user. The submersible pump controlled by the pump station will be set within the 25,000-gallon tank.

Typical manufacturers irrigation engineer will specify and accept:

Watertronics

Precision Pump

Pump station power at this point is to be determined but currently our assumptions are for a 3-Phase (Voltage to be determine), 5 horsepower pump to supply adequate pressure from the cistern for athletic field irrigation.

### G2080.20 Turf and Grasses

Lawn areas shall be provided to compliment the general plantings and the site. Seed mixes will be appropriate to use.

Allow for 6-inches of topsoil in all areas indicated to receive seed turf mix.

Allow (31,932) square feet of general seeded lawn. General lawn seed shall be "**Tall Fescue Blue Mix**" seed as provided by Summit Seed or approved equal.

Allow (37,020) square feet of slope/low-maintenance seeded lawn. Slope/low maintenance seed shall be "**Logro Fescue Mix**" seed as provided by Summit Seed or approved equal.

### G2080.30 Plants

Trees, shrubs, ornamental grass, and perennials will be provided to compliment the site and public areas. Allow for the installation of trees and shrubs as shown on the Plans.

Allow for a 2-inch maximum of hardwood mulch at all plant beds and tree rings within the lawn. Mulch shall be shredded, well-rotted, free of growth or germination inhibiting ingredients.

Allow for 12-inches of planting soil mix in all areas indicated to receive shrub, ornamental grass, and perennial plantings.

Allow for (51) deciduous trees. Parking lot and shade trees shall be single-stem, 2.5-inch to 3-inch caliper, B&B stock. All individual tree planting soil, nutritional amendment, and staking shall be included in the installation cost of the trees.

Allow for (2) deciduous trees. Specimen shade trees shall be single-stem, 3-inch to 3.5-inch caliper, B&B stock. All individual tree planting soil, nutritional amendment, and staking shall be included in the installation cost of the trees.

Allow for (17) ornamental trees. Ornamental trees shall be single-stem, 2-inch to 2.5-inch caliper, B&B stock. All individual tree planting soil, nutritional amendment, and staking shall be included in the installation cost of the trees.

Allow for (273) deciduous shrubs; #3 Container; 18-inch to 24-inch height or spread.
Allow for (86) deciduous shrubs; #5 Container; 24-inch to 30-inch height or spread.
Allow for (11) deciduous shrubs; #7 Container; 30-inch to 36-inch height or spread.
Deciduous shrubs shall be well-shaped, fully branched, container stock as specified.

Allow for (215) evergreen shrubs; #2 Container; 15-inch to 18-inch height or spread
Allow for (44) evergreen shrubs; #5 Container; 24-inch to 30-inch height or spread
Evergreen shrubs shall be well-shaped, fully branched, container stock as specified.

Allow (171) Ornamental Grasses; #2 container; 48-inches on-center spacing.

Allow (453) Perennials; #1 container; 18-inches on-center spacing.
Allow (258) Perennials; #1 container; 24-inches on-center spacing.
Allow (58) Perennials; #1 container; 36-inches on-center spacing.

Dead limbs, debris, root, and trunk suckers 8-feet below the existing tree canopy are to be removed.

Dead, volunteer, or noxious tree and shrub species shall be removed from the site complete, including stumps, before proposed planting activities occur.

The majority of the plant material is to be native species per LEED certification.

### G2080.80 Landscaping Activities

Provide topsoil in the plant bed areas and the turfgrass areas per the specified topsoil preparation and amendment additives. Assume that all topsoil will be imported from off-site sources.

The contractor shall provide maintenance to planting and turfgrass areas for a specified period and then guarantee the plantings for one-year to ensure the health and establishment of all plant materials.

# G SITEWORK

## G10 SITE PREPARATION

Site Earthwork to include the redevelopment of the existing parking lot of the Lincoln Eliot School into a turf, multi-use field, and open space. The existing "sledding hill" at the eastern edge of the playfield is to remain part of the site program and shall be graded per the intent shown on the Plan.

*Refer to Civil Engineer section G1010 for the location of dead trees to be cleared, grubbed, and removed completely from the site per the Site Preparation plans.*

*Refer to Geo-technical Engineer section G1050 for locations of contaminated soil and associated remediation scope of work.*

*Refer to Civil Engineer section G1070 for earthwork cut and fill calculations and proposed grading of roads, parking areas, and curbs.*

## G20 SITE IMPROVEMENTS

### G2010 Roadways

#### G2010.10 Roadway and Parking Lot Pavement

*Refer to Civil Engineer section G2010 for bituminous concrete/asphalt paving along roadways and driveways.*

*Refer to Civil Engineer section G2020 for bituminous concrete/asphalt paving at parking lots.*

#### G2010.20 Roadway Curbs

*Refer to Civil Engineer section G2010 for granite or precast curbs along roadways and driveways.*

*Refer to Civil Engineer section G2020 for granite or precast curbs in parking lots.*

### G2030 Pedestrian Plazas and Walkways

#### G2030.10 Pedestrian Pavement

Sidewalks are proposed at the perimeter of the building along and extending from Jackson Road, Waban Street, and Walnut Park, along the parking lot roadway loop, and at the drop-off area as shown on the site plans.

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# MEMORANDUM

**TO:** Tina T. Soo Hoo, AIA, Senior Associate

**FROM:** Michelle Callahan, PE, LEED AP

**DATE:** May 3, 2022

**RE:** Lincoln Eliot Elementary School

## ADDITION/RENOVATION: LINCOLN ELIOT ELEMENTARY SCHOOL

### Site Utilities

Storm Drainage

New storm drainage systems are proposed to address stormwater quantity (both rate and volume) and quality which would be constructed for the renovation and addition of the school building, as well as parking lot areas and other site impervious areas. The new stormwater system will need to be designed to meet the Massachusetts Department of Environmental Protection Stormwater Standards and the City of Newton stormwater requirements, which will require quantity and quality mitigation measures.

The closed drainage systems in the new parking lots would consist of catch basins to drain manholes with stormwater conveyed via corrugated polyethylene pipes (CPP). The new storm drainage systems for the school and surrounding site would consist of a network of drain manholes and CPP. Roof drains from the new school would connect to the new system. Site drainage around the building would be collected in either area drains or catch basins depending on the size of the catchment areas.

Stormwater from both the new parking lots and school would be directed to a new subsurface infiltration system located underneath the proposed parking lot. The system consists of a galley of high-density polyethylene arch chambers in a bed of crushed stone.

Prior to discharge to the infiltration system the stormwater from the new parking lots will have to be treated to address quality by directing the stormwater through storm water quality units. Stormwater flows from the school and school site, which do not see vehicular traffic, would be considered clean and would not need additional treatment.

An alternate is proposed which would direct roof runoff to an underground rainwater cistern, which would store water to be used on the site for irrigation purposes. A 25,000-gallon tank is currently proposed – further calculations need to be completed to confirm sizing. Overflow from the tank will connect into the on-site closed drainage system.

Areas that cannot be directed to the underground infiltration system will be directed through water quality units prior to discharge. All stormwater is ultimately discharged to the existing culvert which runs along Jackson Road.

Sewer

A new 8-inch sewer service for the addition is proposed. The new sewer service will connect into the existing sewer main on-site which is to be maintained. Flows from the kitchen and cafeteria would be routed through a grease trap system prior to discharge to the existing on-site sanitary sewer.

Water

Preliminary discussions with the City of Newton indicated that a water main loop around the building will not be required.

Existing flow-tests have been provided to the MEP for schematic design analysis. New separate domestic and fire water mains would serve the renovated school. Domestic water would be provided by a new ductile iron main. Fire service would be a new ductile iron main. Sizing of the new services will be determined by the MEP. Additional fire hydrants would be located through the parking and drop-off areas.

Telecommunication/Electric

New underground telecommunication and electric duct banks would serve the new school. The duct banks would be concrete encased and separate duct banks are required for the telecommunications and electric services. The sizing and number of duct banks would be determined by the electrical engineer and utility providers.

LEED

Stormwater management systems are required to treat and manage runoff generated from the limits of the site disturbance, in accordance with the Massachusetts Stormwater Handbook and the City of Newton Stormwater Regulations. The size and scope of the stormwater management system is determined, in part, by the site area.

Based on a review of the LEED V4.1 criteria, the site may be eligible for points relating to 'Rainwater Management' credit under Sustainable Sites Credit. This credit offers one to three points for managing various rainfall events (80$^{th}$, 85$^{th}$ and 90$^{th}$ percentile) for the site as outline below. As stated in LEED V4.1: "In a manner best replicating natural site hydrology processes, retain on site the runoff from the associated percentile of regional or local rainfall events. The percentile event volume must be retained (i.e. infiltrated, evapo-transpirated, or collected and reused) using low-impact development (LID)/green infrastructure (GI) practices. GI and LID strategies can be either structural or non-structural. Points are awarded according to Table 1."

Table 1

| All Projects | Depths* | Points |
|---|---|---|
| 80th Percentile | 0.95" | 1 |
| 85th Percentile | 1.09" | 2 |
| 90th Percentile | 1.33" | 3 |

*Depths pulled for the last 10 years of data from NOAA data at the Jamaica Plain, MA US station.

As stated in the Massachusetts Stormwater Handbook: “Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.” The required recharge volume for the project would be based on the Hydrologic Soil Group rating for the on-site soils. The City of Newton also has a preliminary regulation which requires the infiltration of 2 inches over the site impervious area.

To support this LEED credit, stormwater is proposed to be captured and routed to a stormwater management subsurface infiltration system and bioretention areas. The subsurface system consists of a galley of high-density polyethylene arch chambers in a bed of crushed stone. Because the credit requires that stormwater system capture all runoff from the site, further analysis will be required to confirm if this credit is achievable.

# APPENDICES

# A- GEOTECHNICAL REPORT

**GEOTECHNICAL ENGINEERING REPORT**
**PROPOSED LINCOLN-ELIOT ELEMENTARY SCHOOL EXPANSION**
**150 JACKSON ROAD**
**NEWTON, MASSACHUSETTS**

Prepared for:

Arrowstreet, Inc.
10 Post Office Square
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Prepared by:

**Ransom Consulting, LLC**
50 High Street, Suite 25
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(978) 465-1822
Project 222.01003.002
March 25, 2022


| Heather Dudley-Tatman, P.G.<br>Project Manager | Brian R. Pettingill, P.G.<br>Principal/Senior Project Manager | Jay P. Johonnett P.E.<br>Geotechnical Engineering Consultant |
|---|---|---|

## EXECUTIVE SUMMARY

Ransom Consulting, LLC (Ransom) has prepared this Geotechnical Engineering Report for Arrowstreet, Inc. (Arrowstreet) for the proposed Lincoln-Eliot Elementary School expansion and renovations project, located at 150 Jackson Road in Newton, Massachusetts (the "Site"). This geotechnical report has been prepared in general accordance with our proposed scope of work, dated November 16, 2018, and revised February 17, 2022.

The Site includes a single parcel of land identified by the City of Newton as Property 12003 0004AQ and includes approximately 5.71 acres. The Site is currently developed with a two and three-story brick and concrete building with a small additional lower (basement) level. The school building encompasses an approximate gross building area of 99,451 square feet. The school building was constructed in 1965. The Site is currently occupied by the Newton Early Childhood Program with associated parking areas and recreation areas.

Ransom understands that construction is planned for the existing building including razing the northern wing and constructing a new wing and interior renovations to the remainder of the building, as well as improvements to the parking, playgrounds and the addition of an athletic field.

The geotechnical subsurface exploration program was conducted for the Site on February 24, 2022. The subsurface exploration program consisted of the advancement of four test borings, designated B201 through B204, and ten test pits, designated TP-02 through TP-11. The test pits were excavated to depths up to approximately 10 feet below the ground surface, and the borings to depths up to approximately 19 feet below the ground surface. Surficial geology maps indicate that the area along Jackson Road generally consists of placed fill materials at the ground surface, overlying glacial till. In general, the subsurface explorations encountered surficial layers of asphalt or topsoil, underlain by fill materials, organic materials, glacial till, and bedrock.

Water-saturated soils were encountered at soil boring B202 and test pit TP-3. Saturated soils, inferred to be indicative of groundwater, were observed at depths of approximately 10 and 5 feet below grade at explorations B202 and TP-3, respectively, corresponding to approximate elevations of 28 and 29 feet above mean sea level (MSL). Based on an assumed finished floor elevation of 45 feet above MSL we do not anticipate encountering groundwater in the proposed foundation excavations. The depth to groundwater should be considered when designing the proposed foundations and utilities. Depending on the final design elevations, groundwater may be encountered during excavation for proposed building foundations and utilities.

The inferred bedrock surface was observed at depths ranging from approximately 0.75 to 19 feet below grade, corresponding to elevations ranging from approximately 23.5 feet to 48 feet above MSL. The elevation of bedrock in the area of the proposed school expansion was approximately 29 to 40 feet above MSL. Assuming a finished floor elevation of 45 feet above MSL, bedrock is not anticipated to be encountered in foundation excavations. The depth to bedrock should be considered when designing the proposed building and utilities. Depending on the final design elevations, bedrock may be encountered during excavation for proposed building foundations and utilities. The bedrock surface is likely irregular, and areas of bedrock shallower than the elevations in the Site explorations should be anticipated during construction.

The fill materials and organic materials are considered unsuitable for providing support to the proposed building foundation elements. Unsuitable soils will require removal and replacement with compacted

structural fill within all areas proposed for new buildings/expansions. Unsuitable soils were generally encountered to depths up to approximately 3 to 8 feet below grade. These soils could likely be left in place below areas proposed for parking and play areas, provided that they are found to perform well during proof-rolling activities that should be conducted at the time of construction.

The native glacial till soils are considered to be the uppermost suitable bearing strata at the Site. With proper site preparation, the proposed building foundations could be supported on continuous and spread footings that bear directly on the native glacial till soils and/or compacted structural fill placed above the undisturbed, inorganic, native soils or bedrock. Foundation elements for buildings should be proportioned using a maximum allowable contact pressure of 3,500 pounds per square foot (psf).

Fill materials and organic materials were encountered within the footprint of the proposed building expansion. The fill materials and organic materials have the potential for non-uniform settlement that may exceed tolerable settlement limits. These unsuitable soils within the footprint of proposed structures should be excavated and replaced with compacted structural fill. Floor slabs should be underlain by a minimum of 12 inches of compacted structural fill.

To avoid adverse impacts on existing buildings, any new foundation elements needed to support new structures or building expansions should be located outside the zone of influence of the existing building foundations. For this purpose, the zone of influence should be considered the zone beneath lines extending downward and outward at a slope of one horizontal to one vertical (1H:1V) from the outside edges of the footings. If new footings must be located near or within this zone, the need for possible underpinning of the existing foundations or other special construction considerations should be evaluated.

Conversely, if proposed foundation elements are located at a higher elevation than existing building foundations, they could impose significant lateral loads on the existing foundation walls. We assume that the existing walls were not designed to resist these additional loads, and therefore, adjacent new footings will have to be lower than the existing building foundation walls to avoid application of additional lateral loads to the existing walls.

For the purposes of seismic design, the soil profile constitutes a “stiff soil profile” and we assign a seismic site class of “D” to the Site. It is our opinion that the Site soils are not susceptible to liquefaction.

Ransom should be provided the opportunity to review the final plans and specifications to confirm that the recommendations made in this report were interpreted and implemented as intended.

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

Ransom Consulting, LLC (Ransom) has prepared this Geotechnical Engineering Report for Arrowstreet, Inc. (Arrowstreet) for the proposed Lincoln-Eliot Elementary School expansion/renovation project at the property located at 15 Walnut Park (also known as 150 Jackson Road) in Newton, Massachusetts (the "Site"). This geotechnical report has been prepared in general accordance with our proposed scope of work titled "Proposed Scope of Work and Cost Estimate", dated November 16, 2018, and revised February 17, 2022. The general location of the Site can be seen on Figure 1.

This geotechnical engineering evaluation was performed to obtain site-specific subsurface soil information and to make geotechnical evaluations and recommendations for the proposed expansion. As completed, Ransom's scope of services included the following items:

1. Subcontracting and coordinating with a drilling contractor, excavator, and private utility locator, marking the Site for utility clearance, and contacting the Dig Safe utility clearance system as required by law.

2. Providing technical monitoring for the subsurface explorations, collecting soil samples, and preparing exploration logs.

3. Evaluating the data with respect to the proposed redevelopment and preparing this report of our findings, evaluations, and recommendations for the proposed design and construction.

## 2.0 SITE AND PROJECT DESCRIPTIONS

The Site is currently the location of the Newton Early Childhood Program and includes a single parcel of land located in Newton, Massachusetts. The parcel is identified by the City of Newton as Property 12003 0004AQ and includes approximately 5.71 acres. A Site Location Map and Subsurface Exploration Plan are provided as Figures 1 and 2, respectively.

### 2.1 Existing Conditions

The Site is currently developed with a two and three-story brick and concrete building with a small additional lower (basement) level. The school building encompasses an approximate gross building area of 99,451 square feet. The school building was constructed in 1965. The Site is currently occupied by the Newton Early Childhood Program with associated parking areas and recreation areas.

Site topography generally slopes downward to the west and northwest towards Jackson Road. Based on the Newton, Massachusetts United States Geological Survey (USGS) 7.5-minute Quadrangle and the "Existing Conditions Plan" provided by Nitsch Engineering, dated April 2019, Site elevations vary from approximately 29 feet above Mean Sea Level (MSL) in the northwestern gravel lot to approximately 60 feet above MSL neighboring the easternmost portions of the Site building.

### 2.2 Proposed Redevelopment

Ransom understands that construction is planned for the school building including interior renovations and razing the northern wing and constructing a new wing as well as improvements to the parking, playgrounds and the addition of an athletic field.

At the time of this report, a proposed grading plan had not been developed. We anticipate that the finished floor elevation of the expansion will approximately match the existing grades in the area at elevation 45 feet above MSL. Ransom assumes minor grade cuts and fills may be required for improvements to the parking, playgrounds, and addition of an athletic field.

## 3.0 SUBSURFACE INVESTIGATION

The geotechnical subsurface exploration program was conducted for the Site on February 24, 2022. The subsurface exploration program consisted of the advancement of four test borings, designated B201 through B204, and ten test pits, designated TP-02 through TP-11, as shown on Figure 2. The explorations were not surveyed; their locations and elevations should be considered approximate.

### 3.1 Subsurface Explorations

The test borings were performed by Technical Drilling Services (TDS) of Sterling, Massachusetts, with a track-mounted drill rig using a 2.75-inch, inside-diameter, hollow-stem auger. Split barrel sampling with standard penetration testing (SPT, ASTM D 1586) was conducted using an automatic drive hammer continuously from the ground surface to depths of approximately 6 feet below the ground surface (bgs) and at 5-foot intervals thereafter to the bottom of the borings or as advised by Ransom's field representative.

The test pits were performed by Trident Environmental Group, LLC (Trident) of Norfolk, Massachusetts with a Caterpillar 305C CR mini excavator with a maximum reach of approximately 10 feet. Test pits were completed to the max reach of the excavator or until refusal, whichever came first. All soils removed during the completion of the test pits were returned to the excavations and compacted with the excavator bucket to grade. The two test pits completed in the asphalt paved parking lot (TP-02 and TP-03), were saw cut through the asphalt as to not damage surface conditions outside of the test pit area. Following completion of these test pits, they were backfilled, compacted with the excavator bucket and topped with gravel, at which point asphalt repairs were completed by the Newton Department of Public Works (Newton DPW).

A Ransom representative monitored subsurface exploration activities, prepared exploration logs, and measured the depths to groundwater. Soil samples were placed in sealed containers and returned to Ransom's office for further evaluation. Soil samples were visually classified using modified Burmister Soil Classification System descriptors. Exploration logs are included in Appendix A.

### 3.2 Underground Utility Survey

Prior to conducting the subsurface explorations, Ransom coordinated an underground utility locating survey performed by TPI Environmental (TPI) to confirm the presence or absence of underground utilities in locations proposed for subsurface explorations. Ransom monitored the survey that was performed on February 22, 2022. The survey was completed by TPI using both ground-penetrating radar (GPR) and electromagnetic (EM) conductivity technologies.

## 4.0 SUBSURFACE CONDITIONS

Surficial geology maps indicate that the area along Jackson Road generally consists of placed fill materials at the ground surface, overlying glacial till. Subsurface conditions at the Site were characterized by advancing test borings and test pits into the unconsolidated overburden soil formations at accessible locations at the Site. Figure 2 illustrates the existing Site features and approximate exploration locations.

### 4.1 Subsurface Soils

The explorations were advanced to depths ranging from approximately 2 to 19 feet below grade corresponding to elevations ranging from approximately 23.5 to 48 feet above MSL. Subsurface conditions generally consisted of surficial layers of asphalt or topsoil, underlain by fill materials, organic materials, glacial till, and bedrock.

The general characteristics of the subsurface layers are described below in order of increasing depth encountered below the ground surface.

Surficial Materials

The explorations encountered asphalt pavement at four of the test pit locations. The asphalt was observed to be approximately 2 to 4 inches thick. The asphalt was saw cut prior to the test pit excavations. A layer of topsoil was encountered at each of the test pits and the soil borings with the exception of test pit TP-07 (fill material observed at surface). The topsoil was observed to be approximately 4 to 9 inches thick.

Fill Material

Fill materials were encountered at 9 of the 14 exploration locations, consisting of brown, coarse to fine-grained sand and gravel, with little silt, containing cobbles, brick, ruble, asphalt, metal, and/or slag. The fill materials were generally observed from beneath the surface materials extending to depths ranging from approximately 2 to 7 feet below grade, and generally in a medium dense to dense condition based on SPT testing.

Organic Materials

A layer of organic materials was observed in explorations B203, TP-02, TP-03, TP-05, TP-06, TP-08, and TP-09. The organic material was observed below the fill materials at depths of approximately 3 to 7 feet below grade, with a thickness ranging from approximately 3 inches to 1.5 feet. The organic materials are generally described as dark brown fine sand and silt with organics and varying amounts of cobbles. The presence of organic materials was more common at areas of the Site nearest Jackson Road. We believe the organic layer is likely indicative of the former ground surface prior to filling.

Glacial Till

A native glacial till deposit was encountered directly underlying the fill materials and organic materials (where present) at each exploration location. The glacial till deposit generally consisted of brown to gray, fine to medium sand with some silt and varying amounts of clay and gravel. The glacial till soils were generally observed to be in a medium dense to very dense condition based on SPT testing. The glacial till

deposit is classified as silty sand or silty sand with gravel (SM) in general accordance with the Unified Soil Classification System (USCS).

### 4.2 Refusal/Bedrock

Refusal, the depth at which the drilling or excavating equipment was not able to penetrate the deeper geologic formations, was encountered at each of the test borings at depths ranging from approximately 4 to 19 feet below grade, corresponding to elevations ranging from approximately 29 to 40 feet above MSL. Refusal was encountered at 9 of the 10 test pit locations, at depths ranging from approximately 8 inches to 9.5 feet below grade, corresponding to elevations ranging from approximately 23.5 to 48 feet above MSL. Test pit TP-06 was completed to the extent of the reach of the excavator at 10 feet below grade without refusal. Drilling/excavator refusal is inferred to represent the bedrock surface or large boulders. The observed refusal depths and elevations are presented in the table below.

**Table 1 –Refusal Elevations**

| Test Pit ID | Estimated Ground Surface Elevation (feet) | Approximate Refusal Depth (feet) | Approximate Refusal Elevation (feet above MSL) |
|---|---|---|---|
| B201 | 53 | 15.25 | 37.75 |
| B202 | 48 | 19 | 29 |
| B203 | 45 | 13 | 32 |
| B204 | 44 | 4.3 | 39.7 |
| TP-2 | 33 | 9.5 | 23.5 |
| TP-3 | 34 | 5 | 29 |
| TP-4 | 37 | 5.5 | 31.5 |
| TP-5 | 39 | 6 | 33 |
| TP-6 | 32 | NE (>10) | NE (<22) |
| TP-7 | 35 | 6 | 29 |
| TP-8 | 50 | 9 | 41 |
| TP-9 | 50 | 4 | 46 |
| TP-10 | 50 | 0.75 | 48 |
| TP-11 | 50 | 2.5 | 47.5 |

**Notes:**

1. Estimated ground surface elevations obtained from aerial imagery. Elevations should be considered approximate.
2. NE = Not Encountered.

### 4.3 Groundwater

Water-saturated soils were encountered at soil boring B202 and test pit TP-3. Saturated soils, inferred to be indicative of groundwater, were observed at depths of approximately 10 and 5 feet below grade at

explorations B202 and TP-3, respectively, corresponding to approximate elevations of 28 and 29 feet above MSL.

Groundwater levels at the Site will fluctuate due to season, temperature, precipitation, nearby underground utilities, and construction activity. Therefore, water levels at other times may differ from the observations and measurements made during this evaluation.

## 5.0 ENGINEERING EVALUATIONS

The subsurface explorations encountered surficial layers of topsoil or asphalt overlying fill materials, organic materials, glacial till, and bedrock. The controlling geotechnical features for the development of the Site are:

1. Foundation-Bearing Soils - The naturally-occurring glacial till soils are considered the uppermost suitable bearing stratum for the proposed foundations at the Site. The proposed structures could be supported on conventional, shallow foundation systems of spread and continuous footings that bear on the naturally occurring glacial till or on structural fill placed and properly compacted above these soils or bedrock.

2. Unsuitable Soils. The fill materials and organic materials are considered unsuitable for providing support to the proposed building foundation elements. Unsuitable soils will require removal and replacement with compacted structural fill within all areas proposed for new buildings/expansions. Unsuitable soils were generally encountered to depths of approximately 3 to 8 feet below grade. These soils could likely be left in place below areas proposed for parking and play areas provided that they are found to perform well during proof-rolling activities that should be conducted at the time of construction.

3. Groundwater - Saturated soils were encountered in just two of the explorations, at depths of approximately 5 to 10 feet below grade, corresponding to elevations of approximately 28 to 29 feet above MSL. Based on an assumed finished floor elevation of 45 feet above MSL we do not anticipate encountering groundwater in the proposed foundation excavations. The depth of groundwater should be considered when designing the proposed buildings and utilities.

4. Bedrock - The inferred bedrock surface was observed at depths ranging from approximately 0.75 to 19 feet below grade, corresponding to elevations ranging from 23.5 feet to 48 feet above MSL. The elevation of bedrock in the area of the proposed school expansion was approximately 29 to 40 feet above MSL. Assuming a finished floor elevation of 45 feet above MSL, bedrock is not anticipated to be encountered in foundation excavations. The depth to bedrock should be considered when designing the proposed foundations and utilities. Depending on the final design elevations, bedrock may be encountered during excavation for proposed building foundations and utilities. The bedrock surface is likely irregular, and areas of bedrock shallower than the elevations in the Site explorations should be anticipated during construction.

Geotechnical engineering evaluations for this project are based on the subsurface conditions interpreted from widely spaced subsurface explorations and the project design information currently available. Should differing information become known prior to or during construction, the following evaluations and recommendations should be reviewed by Ransom and modifications to these recommendations may be necessary.

## 6.0 DESIGN RECOMMENDATIONS

Based on the subsurface explorations and our geotechnical evaluations, Ransom presents the following recommendations for the design of the proposed renovations and new construction at the proposed Lincoln-Eliot School expansion/renovation at 150 Jackson Road in Newton, Massachusetts.

### 6.1 Building Foundations

The subsurface conditions generally consist of topsoil or asphalt overlying fill materials, organic materials, glacial till, and bedrock. The native glacial till soils are considered the uppermost suitable bearing strata for foundation elements. Surficial layers, fill materials, and organic materials located within the footprint of proposed buildings/expansions should be excavated and replaced with compacted structural fill. Excavation to remove and replace the unsuitable soils is anticipated to generally be less than 8 feet below grade. With proper site preparation, the proposed building foundations could be supported on continuous and spread footings that bear directly on the native glacial till soils and/or compacted structural fill placed above the undisturbed, inorganic, native soils or bedrock.

Foundation elements for buildings should be proportioned using a maximum allowable contact pressure of 3,500 pounds per square foot (psf). Spread footings should be at least 2 feet wide and continuous footings should be at least 1.5 feet wide. Post-construction total and differential settlements are anticipated to be no more than approximately 1 inch and 0.5 inch, respectively.

Lateral loads may be resisted by friction between the bottoms of footings and supporting subgrades, and by passive earth pressure against the sides of the foundation. A friction coefficient of 0.45 and an equivalent fluid unit weight of 200 pounds per cubic foot (pcf) against the sides of footings should be used.

Exterior footings should be placed a minimum of 4 feet below the lowest existing or proposed adjacent ground surface exposed to freezing. If exposure to freezing is anticipated during or after construction, any interior footings should be lowered to bear 4 feet below the top of the ground floor slab or protected from frost. To avoid adverse impacts on existing buildings, any new foundation elements needed to support new structures or building expansions should be located outside the zone of influence of the existing building foundations . For this purpose, the zone of influence should be considered the zone beneath lines extending downward and outward at a slope of one horizontal to one vertical (1H:1V) from the outside edges of the footings. If new footings must be located near or within this zone, the need for possible underpinning of the existing foundations or other special construction considerations should be evaluated.

Conversely, if proposed foundation elements are located at a higher elevation than existing building foundations, they could impose significant lateral loads on the existing foundation walls. We assume that the existing walls were not designed to resist these additional loads, and therefore, adjacent new footings will have to be lower than the existing building foundation walls to avoid application of additional lateral loads to the existing walls.

### 6.2 Floor Slabs

Fill materials and organic materials were encountered within the footprint of the proposed building expansion. The fill materials and organic materials have the potential for non-uniform settlement that may exceed tolerable settlement limits. These unsuitable soils within the footprint of proposed structures

should be excavated and replaced with compacted structural fill. Floor slabs should be underlain by a minimum of 12 inches of compacted structural fill. With proper Site preparation, conditions are suitable for a slab-on-grade ground floor. A modulus of subgrade reaction of 200 pounds per cubic inch (pci) should be used to proportion the slabs-on-grade constructed on properly compacted structural fill.

Exterior slabs at entrances should be underlain by at least 4 feet of free-draining material, such as structural fill or crushed stone, to reduce the potential for frost heaving. Surrounding grades should be sloped away from the buildings to reduce available moisture for forming frost and ice.

### 6.3 Seismic Considerations

For the purposes of seismic design, the soil profile constitutes a "stiff soil profile" and we assign a seismic site class of "D" to the Site. It is our opinion that the Site soils are not susceptible to liquefaction.

### 6.4 Groundwater and Drainage Issues

Saturated soils were encountered in just two of the explorations, at depths of approximately 5 to 10 feet below grade, corresponding to elevations of approximately 28 to 29 feet above MSL. Based on an assumed finished floor elevation of 45 feet above MSL we do not anticipate encountering groundwater in the proposed foundation excavations. The depth of groundwater should be considered when designing the proposed building and utilities. Depending on the final design elevations, groundwater may be encountered during excavation for proposed building foundations and utilities.

The buildings should be constructed with perimeter foundation drainage systems if the foundation elevations are within 4 feet of the observed groundwater elevation. The perimeter drainage systems should consist of 4-inch-diameter, flexible polyethylene pipe with perforations of ¼ to ½ inch (openings should be oriented downward). The drain lines should be surrounded by a minimum of 6 inches of ¾-inch crushed stone wrapped in a nonwoven geotextile filter fabric (Mirafi 140N or approved equivalent). The foundation drains should be placed adjacent to the exterior sides of the spread footings at a minimum depth of 4 feet below adjacent exterior grades to protect against frost.

Where possible, the foundation drains should be pitched down at a minimum slope of 0.5 percent in the direction of flow. Cleanouts should be provided at every other 90-degree bend in order to provide for future flushing of the system as needed.

The foundation drains should be gravity drained to daylight or to a suitable system outlet. The final outlet of the drainage systems should be designed by the project Civil Engineer in consideration of all applicable municipal, state, and federal regulations.

Roof downspout drains should not be connected to the foundation drain system. Roof downspouts should be separately tight lined to their discharge outlets.

If basement levels are proposed additional moisture control measures such as slab underdrains and/or vapor barriers may be warranted. Ransom should be provided the opportunity to review the final design to reevaluate the need for drainage and moisture control measures at that time.

## 7.0 EARTHWORK AND CONSTRUCTION RECOMMENDATIONS

Based on the subsurface explorations and our geotechnical evaluations, Ransom presents the following recommendations for the construction of the proposed renovations and new buildings for the proposed Lincoln-Eliot School at 150 Jackson Road in Newton, Massachusetts.

### 7.1 Subgrade Preparation

The surficial materials, fill materials, and organic materials are considered to be unsuitable for providing support to the proposed structures. The native glacial till soils are considered to be the uppermost suitable bearing strata at this Site.

All topsoil, unsuitable soils, debris, and loose or disturbed soils should be removed from below the building footprints and foundation bearing zones. These unsuitable materials should be completely removed from foundation bearing zones (to the lateral limits defined by a one horizontal to one vertical (1H:1V) line sloped down and away from the bottom edge of foundations to the top of undisturbed native till soils) and replaced with compacted structural fill.

After site stripping has been completed, the subgrade beneath the building footprints and 10 feet beyond, parking lots, loading areas, and driveways should be compacted with at least four complete passes of a 15-ton vibratory drum roller in directions perpendicular to one another. Silty subgrades which are saturated or are observed to pump and weave during rolling should be rolled statically.

Unstable subgrade areas would be characterized by weaving or rutting of more than one inch during proof rolling. Any unstable areas identified should be undercut at least 12 inches, or to competent soil, and replaced with compacted structural fill, crushed stone, or common fill. The depth of undercutting and type of backfill material should be selected with consideration of proposed use (i.e., building or pavement) and soil and weather conditions encountered during construction.

The contractor is responsible for construction means and methods and should anticipate the need for methods to prevent disturbance, softening, or rutting of subgrades, or damage to overlying soils resulting from construction traffic. Care must be taken to avoid disturbing subgrades by keeping construction traffic off of subgrades during wet conditions and/or inclement weather until a firm fill layer has been placed. Subgrade soils that become unstable should be undercut and replaced with structural fill, crushed stone or common fill, as necessary.

Final foundation subgrade preparation should include re-compaction of bearing surfaces. Care should be taken to limit disturbance to bearing surfaces prior to placement of concrete. Any loose, softened, or disturbed material should be removed and replaced with compacted structural fill prior to placement of concrete. Excavated subgrades should not be left exposed overnight unless the forecast calls for above-freezing, clear conditions.

### 7.2 Temporary Excavations

Construction site safety means and methods, and sequencing of construction activities is the sole responsibility of the contractor. Under no circumstances should the following information be interpreted to mean that Ransom is assuming responsibility for construction site safety, trench protection, or the contractor's responsibilities. Such responsibility is not being implied and should not be inferred.

All temporary excavations should be performed according to Occupational Safety and Health Administration (OSHA) Standards (29 CFR 1926 Subpart P). The fill materials and glacial till soils are OSHA Type C soils and should be cut for temporary unbraced excavations no steeper than 1.5H:1V under dry or dewatered conditions.

### 7.3 Dewatering and Runoff Control

Saturated soils were encountered in the explorations at depths of approximately 5 to 10 feet below grade, corresponding to elevations of approximately 28 to 29 feet above MSL. It is likely that groundwater will be encountered in some excavations for foundations and utilities. The contractor should be prepared to implement water controls as needed.

Surface water runoff should be directed away from excavations to reduce dewatering efforts and to protect subgrades from becoming soft and unstable. The contractor should anticipate the need for controlling runoff during wet periods; pumping from open sumps will likely provide adequate control of water within excavations during construction.

Earthwork should be completed "in the dry" if possible. Subgrade soils that become unstable should be undercut and replaced with structural fill or crushed stone, as necessary. Excavation side slopes should be monitored for potential seepage and maintained to promote stability, accordingly.

Temporary detention ponds, trenches, ditches, and dewatering sumps should not be made in areas to be filled.

### 7.4 Placement of Granular Engineered Fills

Engineered fills may be required to achieve the final design grades in areas of the Site. The table below presents recommended gradation specifications for soils used in engineered fills at the Site. Reference is made to materials, described by the Massachusetts Highway Department (MHD) *Standard Specifications for Highways and Bridges*, as possible alternatives. The different granular fill types should be used as follows:

1. Structural Fill should be used for engineered fills below proposed building and foundation areas.

2. Common Fill should be used for engineered fills below roadway, parking, and other non-structural areas.

| Type | Size or Sieve | % Passing |
|---|---|---|
| Structural Fill<br>MHD M1.03.0a | 6" (150 mm)<br>1/2" (12.5 mm)<br>No. 4 (4.75 µm)<br>No. 50 (300 µm)<br>No. 200 (75 µm) | 100<br>50–85<br>40–75<br>8–28<br>0–10 |
| Common Fill | 8"<br>No. 200 (75 µm) | 100<br>0–15 (when placed within 4 feet of finished grade in paved areas) |

All granular fills should be placed in 12-inch maximum loose lifts and should be compacted to a minimum of 95 percent of the material's maximum dry density, as determined by ASTM D 1557 (modified proctor test) and confirmed through field density testing (ASTM D 6938 or equivalent method). Lift thickness should be a maximum of 6-inch loose lifts when compacted with hand-guided equipment.

Where subgrades become saturated, unstable, and/or difficult to compact, ¾-inch crushed stone (or approved equivalent) should be placed and compacted in lieu of structural fill. Crushed stone, when used, should be wrapped in a geotextile filter fabric, such as Mirafi 140N or equal. At no time should structural fill or common fill be placed over crushed stone that has not been wrapped in a geotextile filter fabric.

### 7.5 Reuse of Site Soils

A preliminary assessment of the suitability of using the unconsolidated soils at the Site in the proposed construction is based on the soil classifications and observations at the Site. The suitability of these materials is summarized below.

1. Topsoils and organic materials are suitable only for reuse in landscaped areas.

2. The naturally-occurring glacial till soils that will be excavated are suitable for reuse only as common fill below non-structural areas and landscaped areas. The high fines content will make reusing this material difficult if the moisture content is not controlled.

3. The existing fill materials that will be excavated might be suitable for reuse as common fill below non-structural areas and landscaped areas following additional evaluations, such as grain size analyses, at the time of construction.

Materials to be used as structural fill may need to be imported to the Site. Representative samples of all proposed fills should be submitted for testing during construction to compare their gradation characteristics to the requirements of the project specifications, and to establish their optimum water contents and maximum dry densities (modified Proctor testing, ASTM D 1557). The geotechnical engineer must approve use and reuse of on-site or borrow soils for structural and common fills. Use of fills assumes that the moisture content of the material will be strictly controlled in order to allow for proper placement and compaction.

### 7.6 Underground Utilities

Bedding placed below utilities should be in accordance with the utility and manufacturer requirements. In general, utilities may be supported directly on a minimum 6-inch-thick layer of compacted structural fill, crushed stone, or other suitable pipe bedding materials. Fill placed as backfill for utilities below building floor slabs should consist of compacted structural fill or crushed stone. Elsewhere, fill placed as backfill for utilities should consist of compacted common fill.

### 7.7 Construction Quality Control

Ransom should be provided the opportunity to review the final design drawings and specifications to ensure our recommendations presented in this report have been properly interpreted and applied. All fills, backfills, and compaction should be inspected and tested by a qualified firm to make sure the proper materials are placed and adequately compacted. Ransom should review all soil inspection and testing

reports. Ransom should be retained to provide construction observation for the following aspects of site redevelopment:

1. Observe the subsurface conditions as they are exposed and confirm that the exposed conditions are as anticipated in this report;

2. Provide geotechnical observation of foundation, floor slab, and pavement subgrade preparations;

3. Confirm that the soils used as fills and backfills conform to the project specifications; and

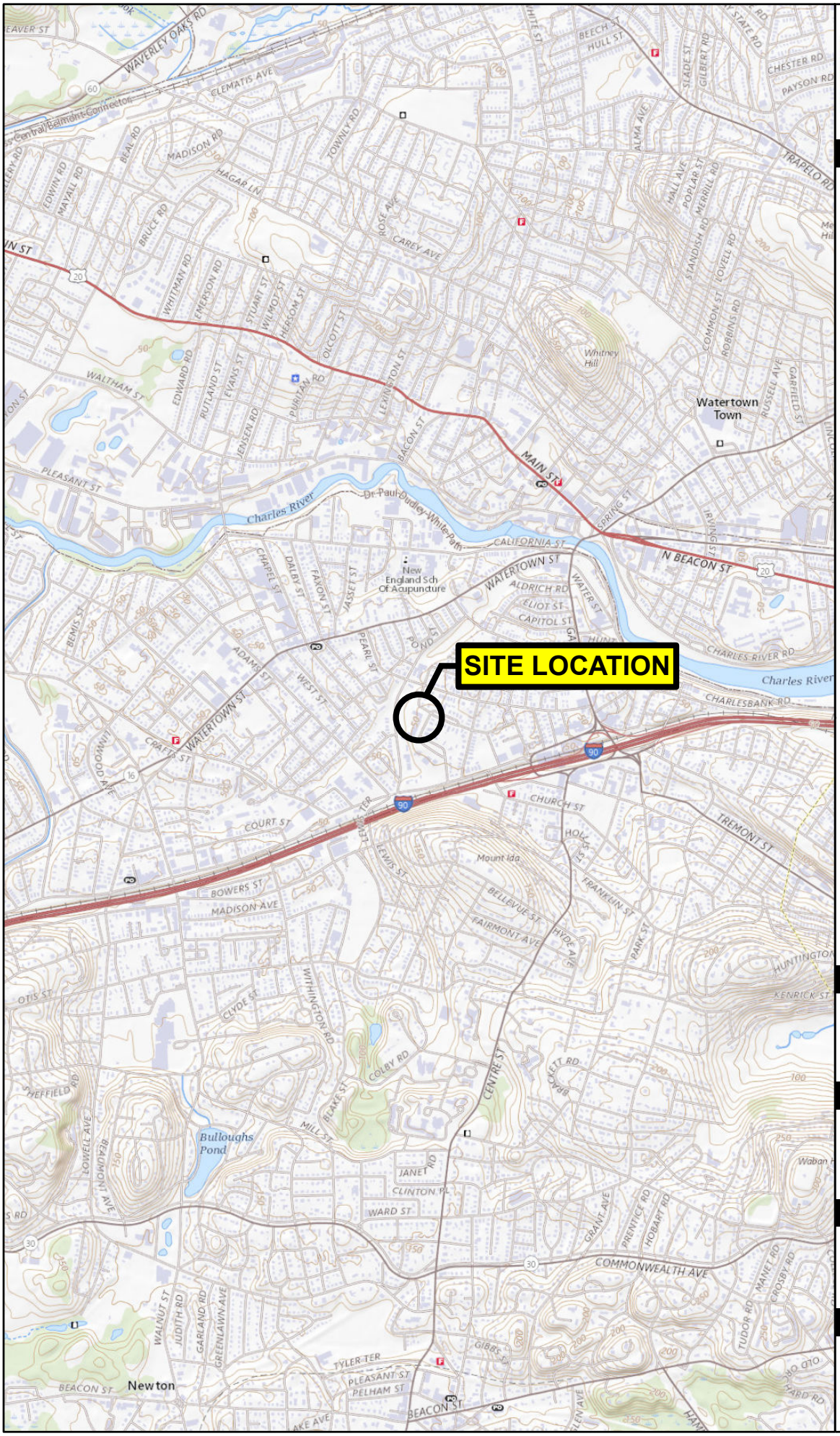
4. Document the preparation of foundation bearing surfaces and other subgrades.

## 8.0 CLOSING COMMENTS

This report has been prepared for specific application to the proposed expansion and renovations of the existing building for the Lincoln-Eliot Elementary School expansion/renovations at 150 Jackson Road in Newton, Massachusetts as understood by Ransom at the time of this report. In the event that material changes in the design or location of the proposed structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless they have been reviewed and modified or verified in writing by Ransom. Our recommendations are based in part upon data obtained from widely spaced explorations. The nature and extent of variations between explorations will not become evident until construction. If significant variations then appear, it may be necessary to reevaluate the recommendations of this report.

We recommend that Ransom be provided the opportunity to review the final design plans and project specifications in order to confirm that the recommendations made in this report were interpreted and implemented as intended.

The findings, recommendations, specifications, and professional opinions contained within this project geotechnical report have been prepared in accordance with generally accepted professional geotechnical engineering practice. No other warranties are implied or expressed.

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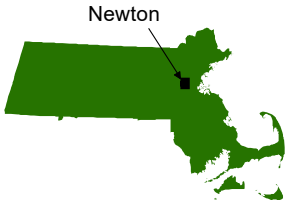
## Regional Locator Map




Notes

1. Data Source: USGS. The National Map
2. USGS Quad Name: Newton, Massachusetts
3. Latitude: 42°21'28.622"N Longitude: 71°11'39.065"W

## Scale and Orientation

0 1,000 2,000

1 inch = 2,000 feet

## Prepared For

Arrowstreet, Inc.
10 Post Office Square
Suite 700N
Boston, Massachusetts

## Site Address

Proposed Lincoln Eliot Elementary School
150 Jackson Road
Newton, MA

222.01003 | March 2022

# Figure 1

Site Location Map

X:\Ransom_NewEngland\Massachusetts\Newton_MA\LincolnEliotElemSchool\LEES_NewtonMA_F1_SLM.mxd


RANSOM Consulting, LLC

## Legend & Notes

- Site Boundary
- Soil Boring
- Test Pit

Notes

1. Site Plan based on MassGIS. USGS Orthos. 2021.
2. Some features are approximate in location and scale
3. This plan has been prepared for Arrowstreet, Inc. . All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

## Scale & Orientation

0 50 100

1 inch = 100 feet

## Prepared For

Arrowstreet, Inc.
10 Post Office Square
Suite 700N
Boston, Massachusetts

## Site Address

Lincoln Eliot Elementary School
150 Jackson Road
Newton, MA

222.01003 | March 2022

# Figure 2

Subsurface Exploration Location Plan

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**APPENDIX A**

Exploration Logs

Geotechnical Engineering Report
Proposed Lincoln-Eliot Elementary School Expansion
150 Jackson Road
Newton, Massachusetts

RANSOM

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-02** | |
| Location: 150 Jackson Road | Ground Elevation: +/-33 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 0830 Time Completed: 0825 |
| Weather: +/-20º, windy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-3′ | S1 | 0-3′ | Brown, coarse SAND and GRAVEL with cobbles, trace silt, moist, some slag and rubble. |
| 3-5′ | S2 | | Brown, silty SAND, some cobbles, little clay, moist. |
| 5-8.5′ | S3 | | Brown, silty CLAY, little gravel and cobbles. Shale fragment at approximately 6-7′, moist, becoming more damp and clayey with depth, but not saturated. |
| 8.5-9.5′ | S4 | | Black, fine SAND with silt and organics, moist. |
| | | | Bucket refusal on boulder/ledge, nearly at reach. End of TP-02 at 9.5′ bgs. Backfilled with native, compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 9.5 | Remarks:<br>Saw cut asphalt (4″ thick).<br>DPW to patch asphalt. |

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# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-03** | |
| Location: 150 Jackson Road | Ground Elevation: +/-34 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 0930 Time Completed: 1010 |
| Weather: +/-20º, windy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-2.5′ | S1 | | Brown, coarse SAND and GRAVEL fill with slag, metal debris, rubble, etc., moist, cobbles. |
| | | | Ledge at 2.5′ in northern extent of test pit, southern portion fragmented and can be broken. |
| 2.5-3.0′ | S2 | | Gray CLAY, large wood debris and ledge cobbles, moist. |
| 5.5′ | | | Becoming wet at 5′, consistency becoming crushed stone intermixed with gray clay ledge/stone appears to be shale/schist based on exposed surfaces with quartz veins/nodes. |
| | | | End of test pit at 5.5′ (ledge with wet clay), backfilled with native and compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 2.5 (north) to 5.6 (south) | Remarks:<br>Saw cut asphalt (4″ thick).<br>DPW to patch asphalt. |

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-04** | |
| Location: 150 Jackson Road | Ground Elevation: +/-37 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 1140 Time Completed: 1210 |
| Weather: +/-20º, windy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-5.5′ | S1 | | Brown, coarse SAND and GRAVEL (fill), moist with brick, rubble, slag and cobbles. Concrete filled pipe (bollard) at approximately 5′. |
| | | | Refusal on ledge/boulder at 5.5′, no groundwater encountered. Backfilled with native and compacted. |
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| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 5.5 | Remarks:<br>Saw cut 2″ asphalt. |

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# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-05** | |
| Location: 150 Jackson Road | Ground Elevation: +/-39 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_Yes__No |
| Capacity/Reach: ≈10 feet | Time Started: 1250 Time Completed: |
| Weather: +/-30º, windy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-1.5′ | | | Black, coarse SAND and GRAVEL, some crushed asphalt (fill). |
| 1.5-6′ | S1 | | Brown, coarse SAND and GRAVEL, some cobbles and organics. Larger boulder fragments 4-6′. |
| | | | Refusal on boulder/ledge at 6′. Backfilled with native and compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 7<br>Width 3<br>Depth 6 | Remarks:<br>Saw cut 2″ asphalt. |

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# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-06** | |
| Location: 150 Jackson Road | Ground Elevation: +/-32 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 1015 Time Completed: 1100 |
| Weather: +/-20º, windy, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-7′ | S1 | | Brown, moist, coarse SAND and GRAVEL with cobbles, brick rubble, slag, little silty clay, large boulder/ledge cobles at 3′. |
| 7-10′ | | | Rusty, light brown, moist, silty fine SAND with trace cobbles and organic matter. Becoming mixed with large, well-rounded cobbles at 8.5-9′. |
| | | | End of test pit 10′ (max reach/sidewalls collapsing). Groundwater not encountered. Backfilled with native and compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 10 | Remarks: |

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-07** | |
| Location: 150 Jackson Road | Ground Elevation: +/-35 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_Yes__No |
| Capacity/Reach: ≈10 feet | Time Started: 1105 Time Completed: 1135 |
| Weather: +/-20º, windy, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 2/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-6′ | S1 | | Brown, coarse SAND and GRAVEL (fill), dry to moist with cobbles, brick rubble and slag. Becoming mixed with large broken cobble/ledge at approximately 3′, less rubble. |
| | | | Refusal on boulder or ledge at 6′, excavator couldn't get through or around. Groundwater not encountered. Backfilled with native and compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 6 | Remarks:<br>Some asphalt and rubble at surface. |

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# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-08** | |
| Location: 150 Jackson Road | Ground Elevation: +/-50 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 1340 Time Completed: 1400 |
| Weather: +/-30º, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-4′ | S1 | | 4″ loamy TOPSOIL, over light to dark brown, silty fine SAND with little gravel and cobbles, moist. |
| 4-9′ | S2 | | Brown, clayey SAND, moist with cobbles, rock fragments and organics. |
| | | | Refusal on boulder/ledge at 9′ 4″. Backfilled with native and compacted. |
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|---|---|
| Pit Dimensions (Feet):<br>Length 8<br>Width 3<br>Depth 9′ 4″ | Remarks: |

RANSOM

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-09** | |
| Location: 150 Jackson Road | Ground Elevation: +/-50 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 1405 Time Completed: 1420 |
| Weather: +/-30º, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-4′ | S1 | | 4″ Loamy TOPSOIL, moist, over brown, clayey SAND and GRAVEL with cobbles (pockets of dark brown, silty sand with woody debris and organic matter, only several observed). |
| | | | Refusal on boulder/ledge at 4′. Backfilled with native and compacted. |
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| | |
|---|---|
| Pit Dimensions (Feet):<br>Length 8<br>Width 3<br>Depth 4 | Remarks: |

RANSOM

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-10** | |
| Location: 150 Jackson Road | Ground Elevation: +/-50 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected __Yes X No |
| Capacity/Reach: ≈10 feet | Time Started: 1420 Time Completed: 1435 |
| Weather: +/-30º, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-2’ | S1 | | Ledge encountered 6″ beneath topsoil. Extended north 3′, same conditions. Extended south approximately 5′, ledge dipping south sightly to max of 2′ bgs. Soil consists of 4″ topsoil underlain by brown, clayey sand, moist with cobbles. No sample collected, same as TP-09-S1. |
| | | | Refusal on ledge 6″ to 2′ bgs. |
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| Pit Dimensions (Feet):<br>Length 14<br>Width 3<br>Depth 6″ to 2′ | Remarks: |

RANSOM

# TEST PIT LOG

| | |
|---|---|
| Project: Proposed Lincoln Eliot School | Project #: 222.01003.001 |
| **TEST PIT IDENTIFICATION: TP-11** | |
| Location: 150 Jackson Road | Ground Elevation: +/-50 feet |
| Client: Arrowstreet | Datum: NAVD |
| Contractor: Trident | Operator: Jack N. |
| Equipment: Caterpillar 305C Excavator | Samples Collected _X_ Yes __ No |
| Capacity/Reach: ≈10 feet | Time Started: 1437 Time Completed: 1450 |
| Weather: +/-30º, cloudy | |
| Logged by: DTC | Date: 2/24/22 |
| Checked by: HED | Date: 3/23/22 |

**TEST PIT INFORMATION**

| Depth of Stratum Change Feet | Sample No. and Type | Sample Depth Feet | Soil Description |
|---|---|---|---|
| 0-2.5’ | S1 | | Ledge encountered approximately 8″ bgs in center of test pit, dips to south to approximately 1′ bgs to refusal. Dips north to max depth of 2.5′ bgs to refusal. Soils encountered above ledge (TP-11-S1) consisted of approximately 4″ topsoil underlain by brown, silty sand with gravel and cobbles. |
| | | | Refusal 8″ to 2.5′ on ledge. Backfilled and compacted. |
| | | | |
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| | | | |
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| | | | |
| | | | |
| | | | |
| Pit Dimensions (Feet):<br>Length 10<br>Width 3<br>Depth 0.75″ to 2′ | | | Remarks: |

# BORING LOG
# B201

| | | |
|---|---|---|
| Project Number: 222.01003.002 | Drilling Company: TDS | Total Depth: 15 Feet, 3 Inches |
| Project: Lincoln Eliot Expansion | Drilling Method: Hollow-stem auger | Datum: NAVD |
| Site Location: 150 Jackson Road | Drilling Equipment: Track-Mounted Rig | Start/Finish Date: 2/24/22 |
| Newton, Massachusetts | Boring Diameter: 8 inches | Logged by: QSH |
| Client: Arrowstreet | Surface Elevation (ft): +/-53 | Reviewed by: JPJ |
| Water Levels: | During Drilling: NE | End of Boring: Date: |

| DESCRIPTION<br>Based on USCS and Modified Burmister Soil Classification System | Soil Profile | SAMPLE* | SAMPLE NUMBER | PENETRATION / RECOVERY | BLOWS (PER 6") | SPT-N VALUE | PID/FID (PPM) | DEPTH (FT.) | WELL CONSTRUCTION |
|---|---|---|---|---|---|---|---|---|---|
| S1 (0-2') TOPSOIL, trace medium gravel. | TOPSOIL | | S1 | 24/7 | 2-3-1-1 | 4 | | 1 | |
| | | | | | | | | 2 | |
| S2 (2-4') Medium dense, brown, fine SAND, some silt, trace fine to medium gravel. | SAND | | S2 | 24/5 | 5-9-14-11 | 23 | | 3 | |
| | | | | | | | | 4 | |
| S3 (4-6') 3" Dense, brown, fine SAND, some silt, trace fine to medium gravel, over 6" tan, fine SAND, little silt, trace fine gravel, over 7" tan/gray, fine to medium SAND, some fine to medium gravel, trace silt. | SAND | | S3 | 24/16 | 2-10-25-42 | 35 | | 5 | |
| | | | | | | | | 6 | |
| Augered to 10'. | | | | | | | | 7 | |
| | | | | | | | | 8 | |
| | | | | | | | | 9 | |
| | | | | | | | | 10 | |
| S4 (10-12') Medium dense, gray/tan, fine to coarse SAND, some fine to medium gravel, trace silt. | SAND | | S4 | 3/0 | 8-12-13-11 | 25 | | 11 | |
| | | | | | | | | 12 | |
| | | | | | | | | 13 | |
| | | | | | | | | 14 | |
| | | | | | | | | 15 | |
| Auger refusal, end of boring 15' 3". | | | | | | | | 16 | |
| | | | | | | | | 17 | |
| | | | | | | | | 18 | |
| | | | | | | | | 19 | |

**Notes:**

**Well Legend:**

| FS | NF | B | BG | C | |
|---|---|---|---|---|---|
| Filter Sand | Native Fill | Bentonite | Bentonite grout | Concrete | PVC Screen |

NA=not applicable; NM=not measured; NE=not encountered
*Sample designated with black fill submitted for laboratory analysis.

# BORING LOG
# B202

| | | |
|---|---|---|
| Project Number: 222.01003.002 | Drilling Company: TDS | Total Depth: 19 Feet |
| Project: Lincoln Eliot Expansion | Drilling Method: Hollow-stem auger | Datum: NAVD |
| Site Location: 150 Jackson Road | Drilling Equipment: Track-Mounted Rig | Start/Finish Date: 2/24/22 |
| Newton, Massachusetts | Boring Diameter: 8 inches | Logged by: QSH |
| Client: Arrowstreet | Surface Elevation (ft): +/-48 | Reviewed by: JPJ |
| Water Levels: | During Drilling: 10-11' End of Boring: | Date: |

| DESCRIPTION<br>Based on USCS and Modified Burmister Soil Classification System | Soil Profile | SAMPLE* | SAMPLE NUMBER | PENETRATION / RECOVERY | BLOWS (PER 6") | SPT-N VALUE | PID/FID (PPM) | DEPTH (FT.) | WELL CONSTRUCTION |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | | | | | | | | |
| S1 (0-2') 9" TOPSOIL, over 9" tan/brown, fine SAND and SILT, trace fine gravel. | | | S1 | 24/18 | 5-5-6-5 | 11 | | 1 | |
| | | | | | | | | 2 | |
| S2 (2-4') Medium dense, tan/brown, fine SAND and SILT, trace fine gravel. | SAND & SILT | | S2 | 24/19 | 6-7-9-20 | 16 | | 3 | |
| Augered through boulder. | | | | | | | | 4 | |
| | | | | | | | | 5 | |
| S3 (5-7') Dense, 3" Crushed ROCK, over 4" brown, fine to medium SAND, some silt, trace fine gravel, over 6" brown, fine to medium SAND and SILT. | SAND & SILT | | S3 | 24/13 | 35-32-16-15 | 48 | | 6 | |
| | | | | | | | | 7 | |
| Augered to 10'. | | | | | | | | 8 | |
| | | | | | | | | 9 | |
| | | | | | | | | 10 | |
| S4 (10-12') 4" loose, brown, fine SAND and SILT, wet (perched), over 2" brown, fine to medium SAND, some silt, over 5" brown, fine to medium SAND and SILT, over 3" crushed ROCK. | SAND & SILT | | S4 | 24/14 | 3-2-3-21 | 5 | | 11 | |
| | | | | | | | | 12 | |
| Augered to 15'. | | | | | | | | 13 | |
| | | | | | | | | 14 | |
| | | | | | | | | 15 | |
| S5 (15-17') No recovery. | | | S5 | 9/0 | 51-100/3" | >100 | | 16 | |
| | | | | | | | | 17 | |
| Augered to 19'. | | | | | | | | 18 | |
| | | | | | | | | 19 | |
| Spoon refusal, end of boring 19'. | | | | | | | | | |

**Notes:**

**Well Legend:**

| FS | NF | B | BG | C | |
|---|---|---|---|---|---|
| Filter Sand | Native Fill | Bentonite | Bentonite grout | Concrete | PVC Screen |

NA=not applicable; NM=not measured; NE=not encountered
*Sample designated with black fill submitted for laboratory analysis.

# BORING LOG
# B203

| | | |
|---|---|---|
| Project Number: 222.01003.002 | Drilling Company: TDS | Total Depth: 13 Feet |
| Project: Lincoln Eliot Expansion | Drilling Method: Hollow-stem auger | Datum: NAVD |
| Site Location: 150 Jackson Road | Drilling Equipment: Track-Mounted Rig | Start/Finish Date: 2/24/22 |
| Newton, Massachusetts | Boring Diameter: 8 inches | Logged by: QSH |
| Client: Arrowstreet | Surface Elevation (ft): +/-45 | Reviewed by: JPJ |
| Water Levels: | During Drilling: NE | End of Boring: Date: |

| DESCRIPTION<br>Based on USCS and Modified Burmister Soil Classification System | Soil Profile | SAMPLE* | SAMPLE NUMBER | PENETRATION / RECOVERY | BLOWS (PER 6") | SPT-N VALUE | PID/FID (PPM) | DEPTH (FT.) | WELL CONSTRUCTION |
|---|---|---|---|---|---|---|---|---|---|
| S1 (0-2') 9" TOPSOIL, over 10" tan, fine SAND, some fine to medium gravel, some silt, over 3" SAND and SILT, little fine to medium gravel. | TOPSOIL<br>SAND & SILT | | S1 | 24/22 | 2-8-17-16 | 25 | | 1<br>2 | |
| S2 (2-4') 12" Very dense, tan, fine SAND and SILT, trace fine to medium gravel, over 12" tan, fine SAND and SILT, some fine to medium gravel. | SAND & SILT | | S2 | 24/24 | 21-59-53-51 | 112 | | 3<br>4 | |
| S3 (4-6') 3" Very dense, dark brown SILT, some fine sand and organics, over 2" crushed ROCK, over 3" tan, fine SAND and SILT, over 2" crushed ROCK, over 6" tan, fine to medium SAND and SILT, some fine to medium gravel. | SAND & SILT | | S3 | 24/16 | 22-29-42-99 | 71 | | 5<br>6 | |
| Augered to 10'. | | | | | | | | 7<br>8<br>9<br>10 | |
| S4 (10-12') 5" Very dense, gray/tan, fine SAND, some silt, some fine gravel (weathered), over 5" fine SAND and SILT, some fine gravel (weathered) over 6" gray, weathered ROCK. | SAND & SILT | | S4 | 24/16 | 6-35-49-26 | 84 | | 11<br>12 | |
| Auger refusal, end of boring 13'. | | | | | | | | 13<br>14<br>15<br>16<br>17<br>18<br>19 | |

**Notes:**

**Well Legend:**

| FS | NF | B | BG | C | |
|---|---|---|---|---|---|
| Filter Sand | Native Fill | Bentonite | Bentonite grout | Concrete | PVC Screen |

NA=not applicable; NM=not measured; NE=not encountered
*Sample designated with black fill submitted for laboratory analysis.

# BORING LOG
# B204

| | | |
|---|---|---|
| Project Number: 222.01003.002 | Drilling Company: TDS | Total Depth: 4 Feet, 3 Inches |
| Project: Lincoln Eliot Expansion | Drilling Method: Hollow-stem auger | Datum: NAVD |
| Site Location: 150 Jackson Road | Drilling Equipment: Track-Mounted Rig | Start/Finish Date: 2/24/22 |
| Newton, Massachusetts | Boring Diameter: 8 inches | Logged by: QSH |
| Client: Arrowstreet | Surface Elevation (ft): +/-44 | Reviewed by: JPJ |
| Water Levels: | During Drilling: NE | End of Boring: Date: |

| DESCRIPTION<br>Based on USCS and Modified Burmister Soil Classification System | Soil Profile | SAMPLE* | SAMPLE NUMBER | PENETRATION / RECOVERY | BLOWS (PER 6") | SPT-N VALUE | PID/FID (PPM) | DEPTH (FT.) | WELL CONSTRUCTION |
|---|---|---|---|---|---|---|---|---|---|
| S1 (0-2') 2" Crushed ASPHALT, over 3" brown fine to medium SAND, some gravel, over 7"gray fine SAND and fine to medium GRAVEL. | ASPHALT<br>SAND<br>SAND & GRAVEL | | S1 | 24/12 | 16-26-38-36 | 64 | | 1 | |
| S2 (2-4') 2" Very dense dark brown fine SAND, trace pieces of asphalt, over 4" gray/tan fine to course SAND and fine to medium GRAVEL. | SAND<br>SAND & GRAVEL | | S2 | 8/6 | 58-<br>>50/2" | >50 | | 2<br>3 | |
| Spoon refusal at 4', auger refusal at 4' 3". | | | | | | | | 4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19 | |

**Notes:**

**Well Legend:**

| FS | NF | B | BG | C | |
|---|---|---|---|---|---|
| Filter Sand | Native Fill | Bentonite | Bentonite grout | Concrete | PVC Screen |

NA=not applicable; NM=not measured; NE=not encountered
*Sample designated with black fill submitted for laboratory analysis.

# B - GEO-ENVIRONMENTAL PHASE IV REMEDY IMPLEMENTATION PLAN

# Phase IV – Remedy Implementation Plan

*for the site:*

Former Aquinas College
15 Walnut Park
Newton, MA

RTN 3-33782

*Prepared For:*

City of Newton
52 Elliot Street
Newton, Massachusetts

_____

*prepared by:*


Oliver P. Leek
Project Manager

Ralph J. Tella, L.S.P.
President

***Lord Environmental Inc.***
1506 Providence Highway, Suite 30
Norwood, MA 02062


Project No. 2437

January 21, 2022

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## FIGURES



## TABLES



## APPENDICES

# 1.0 INTRODUCTION AND SUMMARY

Pursuant to section 310 CMR 40.0850 of the Massachusetts Contingency Plan (MCP), on behalf of the City of Newton, Lord Environmental, Inc. (LEI) is submitting this Phase IV - Remedy Implementation Plan for the former Aquinas College located at 15 Walnut Park in Newton, MA. (the "Site"). A Site Locus is presented as **Figure 1**. Along with figures and other attachments, copies of the appropriate Bureau of Waste Site Cleanup (BWSC) Transmittal Form BWSC 108 is attached following the report text.

The Massachusetts Department of Environmental Protection (DEP) was notified on Wednesday, August 24, 2016 of potential Imminent Hazard conditions triggered by the finding of a concentration of 45 milligrams per kilogram (mg/kg) arsenic in a near surface soil sample within 500 feet of a school, playground, park or residence. Because the area in question is enclosed within a chain-link fence prohibiting general access, DEP determined that conditions did not represent an Imminent Hazard but were otherwise reportable. The likely source of the arsenic and lead has been attributed to the historical application of pesticides to control gypsy moths.

A Release Notification Form (RNF) was submitted on August 29, 2016 for a 120-day reportable condition. The RNF provides information detailing the identification of a 120-day reportable condition of a release of arsenic at 45 mg/kg and lead 200 mg/kg in soil. In accordance with the MCP regulations at 310 CMR 40.0360, the RCS-1 for arsenic is 20 mg/Kg, and 200 mg/kg for lead. The concentrations reported represented the highest identified in six soil samples collected from the area.

RAM activities consisting of the excavation of the top one-foot of soil from the fenced-in RAM area were conducted in August 2016. A total of 653.46 tons of soil was excavated and re-used off-site for daily cover at a state-approved landfill facility in Westminster, Mass. Laboratory analysis of confirmatory soil samples collected after excavation indicated that average arsenic and lead concentrations are below applicable Method 1 S-1 standards in that part of the Site. As there were no other identifiable current exposure points, the Site was classified as a Tier II Disposal Site.

Subsequent Phase II assessment indicated other areas of the Site that have arsenic concentrations above DEP published Imminent Hazard concentrations in soil. These areas have also been fenced-in and therefore no Imminent Hazard condition currently exists at the Site. This plan has been prepared to guide the excavation and off-site disposal of surficial soil from these areas.

# 2.0 SITE DESCRIPTION AND HISTORY

## 2.1 Physical Setting

The Site is the location of the former Aquinas College at 15 Walnut Park in Newton, Massachusetts and is identified by the City of Newton Assessor's Office as parcel 12003 on Map 0004AQ. Its UTM coordinates are: 5214699mN and -7925326mE (Zone: 18). A site locus map is provided as **Figure 1**. The six-acre parcel was developed in 1965 for the College. The 74,443-square foot building which is the subject of this Plan is the former college building. The property was sold to the City of Newton in September of 2015.

The Site is zoned for Municipal Improved Education. The building is three-stories high and features a full basement and boiler room. A fourth story exists in the former convent portion of the building. It appears to be completely masonry (brick) design. The central and southern portion of the building houses the classrooms, auditorium and cafeteria. The convent has 25 individual living spaces, lounge areas, chapel and storage areas.

The building is currently being utilized by City's Newton Early Childhood Care Program (NECP) at limited rooms and heated by fuel oil. The northern portion of the building is currently used for City of Newton storage. It is served by municipal water and sewer.

The area in front of the building to the west is a large, paved parking area. To the north, east and south is grass covered. (see **Figure 2** & Photographs in **Appendix A**).

## 2.2 Site History

In planning for the building renovation, the City was required to complete a polychlorinated biphenyl (PCB) abatement program due to the presence of PCBs in exterior window and door caulk exceeding 50 mg/kg. As part of the EPA approved plan, sampling for PCBs in soil underneath the caulk was completed and determined that reportable concentrations of PCBs existed in the soil. DEP notification was made, and a RAM plan was submitted to DEP. DEP assigned the "release" RTN-3-33384. PCB waste and excavated soil was sent to Model City in New York for disposal. An additional 118.2 tons of PCB impacted soil was transported to the Turnkey Landfill in New Hampshire. A Permanent Solution Statement for the PCB release was submitted to DEP on December 5, 2016.

In order to get approval for off-site disposal, the disposal facility required a full waste characterization of a representative soil sample. In doing those analyses, an elevated concentration of arsenic (28 mg/kg) and lead (280 mg/kg) was identified in the sample. A TCLP analyses did not indicate the lead was leachable. Due to this finding, it was decided to include total lead and arsenic in all post abatement verification sampling. In addition, the City conservatively decided to have representative soil samples collected from the front lawn (east of the Site building) area being considered for a future playground and analyses for PCBs lead and arsenic. Six near-surface soil samples were collected with a hand trowel from just beneath the grass and loam on August 15, 2016. See **Figure 4** for a Site Plan depicting

the sampling locations. While no PCBs were detected in these samples, arsenic was detected at a maximum concentration of 45 mg/kg and average concentration of 31 mg/kg, and lead at a maximum concentration of 200 mg/kg and an average of 127 mg/kg. Based on these concentrations, The City of Newton notified DEP on the 120-day notification requirement on August 29, 2016. A Release Abatement Measure Plan (RAM) Plan was submitted to DEP on August 30, 2016 that described the proposed excavation of the top one-foot of soil across the area where a playground was proposed. A total of 643.56 tons of soil was excavated and trucked to the Westminster Landfill for reuse.

Only lead and arsenic were identified as contaminants of concern, and no other physical evidence of contamination such as staining, odors, debris or suspicious containers was observed in the fill. There is no known source for these findings based on site history. Research has identified that the pesticide, lead arsenate was used to control gypsy moths in Massachusetts up into the mid 1960's before it was banned in 1988. The pesticide was also commonly used in apple orchards and potato fields and was also used to control crabgrass. The college building was constructed in 1965. Prior land use was determined to be "undeveloped" based on historical fire insurance maps and aerial photography.[1]

Use of the pesticide at the property could not be confirmed. However, the general ratio of lead to arsenic in lead arsenate found in soil is approximately 3:1.[2] Soil arsenic and lead concentrations at the Site generally adhere to this ratio.

***2.3.1 Compliance History***

Permits have previously been issued for the underground storage tanks (USTs) at the property from the City of Newton. The current 10,000-gallon No.2 fuel oil UST at the Site is currently used to store oil for heating the Site building.

***2.3.2 Oil and/or Hazardous Materials Use and History***

The current Site building was built in 1967. At that time a 10,000-gallon fuel oil UST was installed outside the boiler room for storage of No. 4 fuel oil.

According to an ASTM Phase I Report prepared for the Site by Ransom Environmental, dated March 3, 2015, approximately 7,500 gallons of No. 4 fuel oil was released to the boiler room floor on April 28, 1990. Clean Harbors responded to this release and removed standing oil from the boiler room as well as removing oil from adjacent sewer drains. The Site is listed on the ERNS database for this spill.

In 1995, the original 10,000-gallon UST was removed and replaced with another 10,000-gallon UST. This UST was a double-walled tank with leak detection to store No. 2 fuel oil.

Based on information gathered by Ransom during their ASTM Phase I investigation, they determined that there was a Recognized Environmental Condition related to the 1990 boiler room spill. Ransom subsequently performed a subsurface investigation in January and February 2015 in and around the boiler room at the Site consisting of the advancement of

[1] ASTM Phase I & II Site Assessment. Ransom Environmental, March 3, 2015.
[2] USEPA Historical Pesticide Research, 2004

several soil borings and the completion of these borings as groundwater monitoring wells. According to the March 2015 Phase I Report, Ransom indicated that they found no evidence of a release to the environment.

The City of Newton purchased the Site property on September 2, 2015. On October 20, 2015, the City of Newton Water Department excavated through a feed line from the UST as they were looking for a water line break. As the building had been vacant prior to the sale to the City, the UST systems were not operating at the time of this incident. A feed line was ruptured and, according to the UST contractor Petroleum Management Systems (PMS) of Wakefield, Massachusetts, less than 5 gallons of fuel oil was released. PMS responded to this release and repaired the feed line. PMS excavated less than 2 cubic yards of impacted soil surrounding the line break. Ralph Tella, LSP of LAI visited the Site on October 21, 2015 to inspect Site conditions. Mr. Tella field-screened the stockpiled soil with a photo-ionization detector (PID). The headspace readings for this soil stockpile were less than 1 part per million by volume (ppmv). Mr. Tella determined that the observed conditions did not require notification to DEP.

On November 2, 2015 Arthur Cabral of the City of Newton Department of Public Buildings called LAI regarding a release of fuel oil to the boiler room floor in excess of 10 gallons. The cause of the release was a loose feed line strainer. Site employees took immediate action to shut off the oil supply line and apply absorbents. Based on this information, Oliver Leek of LAI called DEP to report this potential release. Mr. Leek spoke to Paul Giddings who indicated that he would issue a Release Tracking Number (RTN) for the release if Mr. Tella (LSP) determined there was a release to the environment. PMS responded to the release and applied absorbents and placed booms around the boiler room floor drains. Mr. Tella inspected a catch basin in the parking area adjacent to the boiler room and two sewer manholes for evidence of oil. No evidence of oil was observed in any of these structures. Mr. Tella also inspected the floor drain adjacent to the release. The floor drain was plugged with sweepings and old sediment. Mr. Tella subsequently called and left a message for Mr. Giddings indicating that to his belief, no release to the environment had occurred. Mr. Giddings confirmed to LAI that DEP considered the release to be contained and did not issue a RTN.

In November 2020, approximately 50 gallons of fuel oil spilled from a faulty transfer pump in the boiler room and the fuel oil was released to the concrete floor. Immediate Response Actions were implemented and the fuel oil on the floor was absorbed and cleaned up. DEP assigned RTN 3-36598 to this release. The boiler room was vented and approximately one cubic yard of soil was excavated from where oil had impacted the subsurface. Assessment included sampling soil surrounding the release area, collecting groundwater samples from existing and newly installed wells, and the collection of indoor air samples from within the occupied spaces of the building. Based on remediation and the collection of soil, groundwater, and indoor air samples, LEI prepared and submitted a Permanent Solution Statement without Conditions for the release in March 2021.

The 10,000-gallon No. 2 fuel oil UST at the Site installed in 1995 is currently in use.

## 2.3 Site Hydrogeological Characteristics

Subsurface investigations at the Site have been limited to sampling surficial soil, excavation of arsenic and lead impacted soil, and the advancement of shallow test pits and soil borings. Soils encountered across the Site consisted of fine to coarse sands with gravel. No bedrock was encountered during any of the subsurface investigations and no bedrock outcrops have been observed at the Site. Groundwater was not encountered during any of the soil sampling events.

On August 15, 2016, surficial soil samples were collected in the grassy area to the east of the Site building. These soil samples were designated SF-1 through SF-6. These samples were sent to Alpha Analytical Laboratory (Alpha) in Westborough, Massachusetts for analysis of arsenic and lead. Analytical results indicated the presence of arsenic above applicable S-1 standards in all of the samples with an average of 31.2 mg/kg. Lead was present in all of the samples above laboratory method detection limits but below applicable S-1 standards with the exception of the concentration of lead in SF-1 at 200 mg/kg.

LAI directed the excavation of test pits on August 24, 2016 using a mini excavator. These test pits were located coincidently with select SF samples and were designated TP-1 through TP-3. Composite soil samples were collected at each location from the ground surface to one foot below grade. Laboratory results indicated that arsenic and lead were detected above laboratory method detection limits but below applicable S-1 standards. A summary of this date is provided in **Table 1**.

Laboratory analytical data for shallow soil and test pit samples generally indicate higher arsenic and lead concentrations near the ground surface and decreasing with depth. Average arsenic and lead exposure point concentrations (EPCs) for arsenic and lead in confirmatory soil samples collected after the removal of 12 inches of soil from the excavation area to the east of the Site building in August 2016 are below applicable Method 1 S-1 GW-2/3 standards.

Additional soil samples were collected during test pitting activities on September 6, 2016 southwest of the excavation area and across the concrete walkway to the main entrance to the Site building. These test pits (designated TP-4 through TP-6) were excavated using a mini rubber track-mounted excavator and were dug to a maximum depth of two feet. Composite soil samples were collected from the ground surface to one foot below ground surface. These samples were placed in laboratory-provided glassware and were transported to Alpha for analysis of lead and arsenic.

Laboratory analytical data indicated an average lead concentration of 70.3 mg/kg with a maximum of 120 mg/kg in the test pit samples. The average arsenic concentration was 10.7 mg/kg with a maximum concentration of 17 mg/kg in the test pit samples. A summary of these data is provided as **Table 2**, and copies of the original laboratory reports is provided as **Appendix B**.

Post soil excavation verification sampling was implemented in concert with the plan to excavate all soil impacted at concentrations exceeding the S-1/GW-2/3 cleanup standards.

The plan was to collect a statistically representative number of post-excavation soil samples based on a grid pattern overlaying the Site.

The sampling grid was based on 10' x 10' squares. Samples were collected at each of the square's nodes. An equal volume composite sample was made up from three adjacent squares (eight individual samples). Therefore, a total of 19 composite samples were made for laboratory analyses (designated COMP-1 through COMP-19). See **Figure 5** for a depiction of composite sample areas and pertinent Site features.

Soil samples were collected on September 7 and 8, 2016 using a stainless-steel hand trowel at each point, composited and placed in laboratory prepared sampling jars for transport to the lab under chain-of-custody protocol for total lead and arsenic analyses. As a result of those analyses, it was determined that all post excavation soil sample data for total lead was below the applicable S-1/GW-2 Method 1 cleanup standard of 200 mg/kg. The average total lead concentration was 76 mg/kg, and the maximum concentration was 110 mg/kg. Prior lead TCLP analyses determined that the lead was not leachable.

Three of the nineteen soil samples analyzed for total arsenic exceeded the Method 1 cleanup standard of 20 mg/kg. Therefore 85% of the arsenic data fell below the standard. The average concentration was 14.3 mg/kg, and the maximum concentration was 32 mg/kg. A summary of these data is provided as **Table 2**, and copies of the original laboratory reports is provided as **Appendix B**.

On December 27, 2016, LAI personnel collected soil samples at the Site in order to further delineate the arsenic and lead impacts in landscaped areas. These soil samples (designated B-1 through B-15) were collected with a hand auger at depths of 0-6 inches and 6-12 inches. Sampling locations and other pertinent Site features are included in **Figure 7**. The soil samples were field-screened with a photo-ionization detector (PID) for total organic vapor (TOV). No TOV readings above 0.0 parts per million by volume (ppmv) were observed in any of the soil samples collected. Soil samples were placed in laboratory-provided glassware and the 0-6 inch samples were transported to Alpha under chain-of-custody documentation for analysis of arsenic and lead.

Laboratory results indicated the presence of arsenic and lead in each of the soil samples above laboratory method detection limits. Arsenic concentrations in samples collected from B-1, B-3, B-4, B-6, B-7, B-8, B-9, B-10, B-11, and B-12 were above Method 1 S-1 GW-2/3 standards. Additionally, arsenic concentrations in B-1, B-8, B-9, B-10, and B-11 exceed the "Imminent Hazard" value of 40 mg/kg for soil within a foot of the ground surface. Prior to this assessment, a chain-link fence was present surrounding the area extending from B-10 to B-12. This soil data is summarized in **Table 3**.

Once in receipt of this data, Ralph Tells, LSP phoned the DEP Northeast Regional Office to notify them of this condition on January 9, 2017. Mr. Tella spoke to Chris Bresnahan of DEP and they arranged a Site visit for January 13, 2017. Mr. Bresnahan indicated to Mr. Tella during the Site meeting, that if the areas are surrounded by fencing, then there would not be an "Imminent Hazard" Condition. Arthur Cabral, (City of Newton Building Department representative), present at the Site meeting indicated to DEP that the City would fence in the

two other areas with a concentration of arsenic over 40 mg/kg. The landscaped area surrounding B-1 and the landscaped area surrounding B-8 and B-9 were subsequently fenced in by the City to prevent access.

Subsequent to the Site visit, Mr. Bresnahan sent LAI a letter informing us that the "Imminent Hazard" level for arsenic is slated to be revised to 50 mg/kg (See attached letter in **Appendix A**).

Based on the concentrations of arsenic and lead in the top 6 inches of soil, LAI submitted select 6-12 inch samples to Alpha for analysis. Laboratory analytical data indicated the presence of arsenic and lead in all of the samples above laboratory method detection limits. However, only the lead concentration in LB-2 (230 mg/kg) and the arsenic concentrations in soil collected from LB-11 (54 mg/kg) exceeded the applicable Method 1 S-1 GW-2/3 standard. This soil data is summarized in **Table 4**.

To further delineate the extent of arsenic and lead impacts at the Site, LAI personnel conducted additional soil sampling on February 24, 2017. LAI collected soil samples (designated LB-16 through LB-22 using a hand auger at depths of 0-6 inches and 6-12 inches. Sampling locations and other pertinent Site features are included in **Figure 7**. The soil samples were field-screened with a PID for TOV. No TOV readings above 0.0 ppmv were observed in any of the soil samples collected. Soil samples were placed in laboratory-provided glassware and the 0-6 inch samples were transported to Alpha under chain-of-custody documentation for analysis of arsenic and lead.

Laboratory results indicated the presence of arsenic and lead in each of the 0-6 inch soil samples above laboratory method detection limits. Arsenic concentrations in samples collected from LB-18, LB-19, LB-20, and LB-22 were above Method 1 S-1 GW-2/3 standards. Additionally, the arsenic concentrations LB-22 exceed the "Imminent Hazard" value of 40 mg/kg for soil within a foot of the ground surface. The location of LB-22 was within the fenced-in area surrounding B-8 and B-9, and therefore does not represent an "Imminent Hazard". Lead concentrations in soil collected from the 0-6 inch samples from LB-18, LB-19 and LB-22 (240 mg/kg, 200 mg/kg, and 240 mg/kg, respectively) were above the applicable Method 1 S-1 GW-2/3. This soil data is summarized in **Table 5**.

Based on the concentrations of arsenic and lead in the top 6 inches of soil, LAI submitted all of the 6-12 inch samples collected on February 24, 2017 to Alpha for analysis. Laboratory analytical data indicated the presence of arsenic and lead in all of the samples above laboratory method detection limits. However, only the arsenic concentrations in soil collected from LB-20 (28 mg/kg) and LB-22 (26 mg/kg) exceeded the applicable Method 1 S-1 GW-2/3 standard. This soil data is summarized in **Table 6**.

On July 2, 2020, LEI directed New England Geotech of Jamestown, Rhode Island in the advancement of soil borings on the west side of the Site building with a direct-push rig. Soil borings were designated LB-31 through LB-50 and were advanced to maximum depths of three feet and five feet (in LB-31, LB-35, LB-39, LB-43, and LB-47). All of the soil samples with the exception of LB-36 (collected in the gravel, fenced-in parking area) were advanced through the asphalt surface of the parking area. Soils generally consisted of fine to coarse sand

and gravel with some indications of fill (i.e., trace brick). Soil samples were field-screened with a RAE Systems MiniRAE PID for total organic vapor (TOV). No reading above 3.6 ppmv were observed and no indications of contaminants other than arsenic and lead were observed in the field. TOV readings above 0.0 ppmv were likely due to moisture and/or the presence of asphalt. A summary of soil details is presented in the below table. Soil samples were placed in laboratory-provided glassware and sent under chain-of-custody protocols to Alpha for analysis of arsenic and lead.

| SOIL BORING LOG - FIELD SCREENING<br>BORING METHOD: GEOPROBE® DATE: JULY 2, 2020 | | | | |
|---|---|---|---|---|
| **BORING #** | **DEPTH (FT)** | **RECOVERY ADV/REC (FT)** | **PID READING** | **SOIL DESCRIPTION** |
| LB-31 | 0-5 | 5/4.5 | 0.2 | Fine to Med sand and gravel, trace brick |
| LB-32 | 0-3 | 3/3 | 3.4 | Fine to medium sand |
| LB-33 | 0-3 | 3/2.5 | 3.6 | Fine to medium sand, trace silt |
| LB-34 | 0-3 | 3/2.5 | 1.5 | Fine to coarse sand and gravel, trace brick |
| LB-35 | 0-5 | 5/2.5 | 0.3 | Fine to coarse sand and gravel, trace brick |
| LB-36 | 0-3 | 3/2.5 | 1.1 | Fine to coarse sand and gravel |
| LB-37 | 0-3 | 3/2.5 | 2.3 | Fine to coarse silty sand and gravel fill, trace brick |
| LB-38 | 0-3 | 3/2.5 | 0.7 | Fine to coarse silty sand and gravel fill, trace brick |
| LB-39 | 0-5 | 3/4 | 1.6 | Fine to coarse sand and gravel, trace silt |
| LB-40 | 0-3 | 3/2 | 0.5 | Fine to medium sand and gravel, trace silt |
| LB-41 | 0-3 | 3/2.5 | 0.3 | Fine to coarse sand and gravel |
| LB-42 | 0-3 | 3/1.5 | 1.0 | Fine to coarse sand and gravel |
| LB-43 | 0-5 | 5/3.5 | 1.1 | Fine to coarse silty sand and gravel fill, trace brick |
| LB-44 | 0-3 | 3/2 | 0.0 | Fine to coarse silty sand and gravel fill, trace brick |
| LB-45 | 0-3 | 3/2.5 | 0.0 | Medium to coarse sand and gravel, trace fine sand |
| LB-46 | 0-3 | 3/1.5 | 0.0 | Fine to coarse sand and gravel |
| LB-47 | 0-5 | 5/4.5 | 0.0 | Medium to coarse sand and gravel |
| LB-48 | 0-3 | 3/2.5 | 0.4 | Fine to coarse sand and gravel |
| LB-49 | 0-3 | 3/2.5 | 0.0 | Fine to coarse sand and gravel, trace silt |
| LB-50 | 0-3 | 3/2.5 | 0.0 | Fine to coarse sand and gravel |

Laboratory results indicated the presence of lead and arsenic in all of the soil samples above laboratory method detection limits. Only the concentration of arsenic (25.6 mg/kg) in soil collected from LB-44 from 0-3 feet exceeded the S-2 GW-2/3 Standard. The S-2 standard is appropriate for soil under the asphalt paved parking areas. This soil data is summarized in **Table 7**.

To further delineate the extent of arsenic and lead impacts at the Site, LEI personnel conducted additional soil sampling on July 22, 2021 in the northern portion of the property that is wooded. LEI collected soil samples (designated LB-51 through LB-59 using a hand auger at depths of 0-6 inches and 6-12 inches. Sampling locations and other pertinent Site features are included in **Figure 7**. The soil samples were field-screened with a PID for TOV. No TOV readings above 0.0 ppmv were observed in any of the soil samples collected. Soil samples were placed in laboratory-provided glassware and both the 0-6 inch and 6-12 inch samples were transported to New England Testing Laboratory (NETLAB) under chain-of-custody documentation for analysis of arsenic and lead.

Laboratory results indicated the presence of arsenic and lead in each of the 0-6 inch soil samples above laboratory method detection limits. Arsenic concentrations in samples collected from LB-52, LB-54, LB-55, LB-58, and LB-59 were above Method 1 S-1 GW-2/3 standards. Additionally, the arsenic concentrations LB-55, LB-58, and LB-59 exceed the "Imminent Hazard" value of 40 mg/kg for soil within a foot of the ground surface and within 500 feet of a school.

Laboratory analytical data indicated the presence of arsenic and lead in all of the 6-12 inch samples above laboratory method detection limits. However, only the arsenic concentrations in soil collected from LB-54 (48.8 mg/kg), LB-55 (24.9 mg/kg), and LB-58 (88 mg/kg) exceeded the applicable Method 1 S-1 GW-2/3 standard. Additionally, the arsenic concentrations LB-54, and LB-58 exceed the "Imminent Hazard" value of 40 mg/kg for soil within a foot of the ground surface and within 500 feet of a school. This soil data is summarized in **Table 8.**

The location of LB-51 to LB-59 is within a mostly fenced-in area that is wooded with significant undergrowth. The City of Newton is in the process of making repairs to portions of the fencing that are not secure. The City has also erected some fencing along the southern woods line to further restrict access and prevent an "Imminent Hazard" condition.

# 3.0 ENVIRONMENTAL FATE AND TRANSPORT OF OIL AND/OR HAZARDOUS MATERIAL

## 3.1 Evaluation of Fate & Transport Characteristics of Arsenic and Lead

The primary contaminants of concern at the Site are arsenic and lead. Analytical data obtained to date has been consistent with these findings. Based on Site history, and the general ratio of arsenic to lead, the source of the arsenic and lead is inferred to be from the use of lead arsenate as a pesticide.

Information concerning the fate and transport characteristics of arsenic and lead are readily available in the literature and only briefly reiterated herein as it pertains to the Site. Generally, arsenic found in soil from anthropogenic releases forms insoluble complexes with iron, aluminum and manganese oxides found in soil surfaces. In this form, arsenic is relatively immobile. Arsenic from lead arsenate is not expected to travel vertically more than one foot based on research by the USEPA. Site analytical data for soil samples indicated significantly reduced concentrations of arsenic in 6-12 inch samples compared to 0-6 inch samples. Generally, lead is considered relatively insoluble and immobile in soils, particularly in soils with net negative surface charge such as soils within the United States. TCLP analysis for lead conducted in conjunction with disposal characterization did not indicate that the lead was leachable as the results was not detected above laboratory method detection limits.

### 3.2 Migration Pathways & Exposure Potential

Migration pathways and exposure potential information have been developed from data obtained during the Phase II CSA and from data compiled for the Site during previous investigations. Elements necessary for a migration pathway to exist include a source, a release mechanism, and a medium allowing movement of the contaminant. Exposure potential exists when there are sensitive receptors with the potential to come into contact with the contaminant.

With reference to the release of arsenic and lead at this Site, soil represents the primary media through which contamination may migrate. Based on the relatively shallow depth of contaminant impact, it is unlikely that these contaminants could migrate off-Site. No preferential pathways of contamination such as underground utilities have been identified, and an impact to indoor air is not likely.

An Exposure Assessment that evaluates potential exposure scenarios associated with these identified migration pathways is presented in **Section 5.0**.

## 4.0 NATURE AND EXTENT OF CONTAMINATION

### 4.1 Nature of Contamination

The contaminants of concern at the Site are arsenic and lead. The volume of the original estimated release of contaminants is unknown, but it is suspected that the arsenic and lead impacts to soil are due to the historic use of lead-arsenate pesticide at the Site.

### 4.2 Extent of Soil Impact: Soil Analytical Data

Soil analytical data is presented in the attached **Tables**. Laboratory analytical results indicate arsenic and lead concentrations above applicable S-1 and S-2 GW-2/3 standards in soil samples collected during the various subsurface investigations. Soil impacts above applicable standards for arsenic and lead appear to be limited to within three feet of the ground surface, and generally within the top one foot. As arsenic and lead concentrations in

soil are present across the entire property, the disposal site boundary conservatively encompasses the entire property at 15 Walnut Park. **Figure 6** depicts the entire property and disposal site.

### 4.3 Extent of Groundwater Impact: Groundwater Analytical Data

As the arsenic and lead impacted soil (above Method 1 standards) appears to be surficial (within the top 1 foot, or thereabout), subsurface investigations conducted to date have not encountered groundwater. In addition, TCLP data does not indicate that they are leachable. Consequently, it is not likely that groundwater is impacted with lead or arsenic above applicable Method 1 GW-2/3 standards.

### 4.4 Extent of Impact to Indoor Air

Arsenic and lead are not volatile metals. Additionally, no GW-2 standard exists for these contaminants. Therefore, a Vapor Intrusion Pathway is considered to be unlikely.

### 4.5 Data Validation

All official laboratory analyses of groundwater in support of this ongoing investigation were performed by Alpha Analytical Laboratories of Westborough, Massachusetts. A review of the laboratory data was conducted in order to evaluate its suitability for use within this report. A summary of the official laboratory results has been presented in the attached soil data **Tables** and in **Appendix B** (official laboratory reports). The laboratory analytical reports were reviewed for the Quality Assurance/Quality Control (QA/QC) information such as procedures followed and achievement of performance and acceptance standards.

There were no deficiencies noted within any of the analytical results. Therefore, all data presented is considered a suitable basis for the conclusions of this investigation.

## 5.0 EXPOSURE ASSESSMENT

The Site is currently used as the City of Newton Early Childhood Program, and for storage space. Foreseeable future human receptors include adults and children. Individuals working at or visiting the property are potential human receptors to arsenic and lead impacted soil via dermal contact and incidental ingestion. Ingestion of arsenic and lead impacted soil at the property is possible, but areas that have elevated levels of arsenic in shallow soil are, or have been, fenced-in.

Land bordering the property to the north, east and west are residential. To the south are the Jackson Walnut Park School and the New England Montessori Teacher Education Centre. No institutions (as defined by the MCP) are located within 500 feet of the subject property.

The closest water body is Charles River, approximately 2,300 feet to the north.

A summary of potential human exposure pathways follows.

*Potential for human exposure via:*

- **Inhalation** – Minimal; No known impacts to groundwater and no GW-2 standard for arsenic or lead.

- **Dermal Contact** – Possible; site workers, students and employees could be exposed to impacted soil during normal operational procedures as surface soils are impacted at the Site. Areas with shallow soil concentrations of arsenic that exceed the DEP published "Imminent Hazard" values do not represent an "Imminent Hazard" Condition as they are not accessible due to fencing.

- **Ingestion** – Possible; environmental and/or other workers may be exposed to impacted soil and/or groundwater during any excavation in the immediate vicinity of the release location. Children could possibly ingest impacted soil while finger-mouthing. However, areas with shallow soil concentrations of arsenic that exceed the DEP published "Imminent Hazard" values do not represent an "Imminent Hazard" Condition as they are not accessible due to fencing.

*Potential Environmental Impacts:*

Significant environmental impacts are not considered likely. The Site is located within an urban area not hosting a critical wildlife habitat. No completed environmental exposure pathways have been identified. Groundwater is inferred to not be impacted. Therefore, it is unlikely that contaminated groundwater will discharge to surface water representing a significant environmental risk.

# 6.0 RISK CHARACTERIZATION

## 6.1 Selection of Method

A Method 1 Risk Characterization was completed for the Site on the basis that exposure to Site contaminants is predominantly through contact with soil, and published cleanup standards exist for each contaminant of concern. However, arsenic, and lead to a certain degree, are known to bioaccumulate. Under Method 1, exposure point concentrations are compared to established cleanup standards published in the Massachusetts Contingency Plan at 310 CMR 40.0970.

These Method 1 cleanup standards were determined with consideration of exposure of various groups of human and/or environmental receptors. In addition, there are published "Upper Concentration Limits" for site contaminants, which if exceeded, are described as presenting a significant risk to public welfare. At this Site, no Upper Concentration Limits were exceeded. The UCL for arsenic is 500 mg/kg and the UCL for lead is 6,000 mg/kg.

Use of the Method 1 cleanup standards requires the site-specific categorization of soil and groundwater, where appropriate. A discussion of this categorization follows.

### 6.2 Soil Categorization

Currently, the subject property is used in part as the City of Newton Early Childhood Program. Landscaped areas with accessible soil at the Site have a *frequency of use* for adults and children at the subject property characterized as high with a potential high intensity of use. Another distinct area of the Site has been characterized with soil samples being collected from potentially accessible soil below the asphalt-paved surfaces of the parking area to the west of the Site building. This area has low intensity and frequency by both adults and children.

Soil category S-1 applies to the landscaped areas of the Site and S-2 applies to the soil underneath the asphalt-paved parking area.

### 6.3 Groundwater Categorization

The Site is not located within a groundwater protection area (see **Figure 3** for the DEP Site Assessment Map). Municipal water is available to the Site and to all surrounding properties. GW-2 applies to areas of the Site that are within 30 feet of a building (assuming that groundwater is located within 15 feet of the ground surface). As all groundwater is assumed to eventually discharge to surface water in the Commonwealth, Groundwater Category GW-3 also applies to the Site.

### 6.4 Risk to Human Health, Public Welfare and Environment

*Groundwater Exposure*

Groundwater has not been encountered during subsurface investigations at the Site. Given the relatively shallow nature of the arsenic and lead impacts at the Site and research that indicates that lead and arsenic impacts from lead arsenate applications are not leachable and do not tend to extend vertically more than one foot, groundwater is inferred to not be impacted. Therefore, groundwater exposure is not likely and was not assessed.

*Soil Exposure*

There are currently three distinct areas of the Site that are considered in this risk characterization. The area to the east of the Site building where the top 1 foot of soil has been removed and backfilled with clean imported fill prior to the construction of a playground is one distinct area. Another distinct area is the remaining landscaped and wooded areas where LEI has collected soil samples from 0-6 inches, 6-12 inches, and test pit samples that were a composite from 0-1 feet. A distinct third area of the Site is located under the asphalt-paved parking area. The previously excavated area to the east of the Site building

and the landscaped areas represent S-1 soils where the soils under the asphalt-paved parking represent S-2 soils.

**Table 1** summarizes pre-excavation sampling in the area to the east of the Site building and is therefore not considered in this risk assessment as this area has been excavated to a maximum depth of 1 foot bsg. **Table 2** summarizes post-excavation confirmatory soil sampling for the area to the east of the Site building. As seen in **Table 2**, Average EPCs post excavation are below applicable Method 1 S-1 GW-2/3 standards. The EPC for arsenic is 14.3 mg/kg and the EPC for lead is 76.1 mg/kg. **Tables 3-6 and 8** summarize soil samples collected from landscaped and wooded areas surrounding the Site building with a hand auger at depths of 0-6 inches and 6-12 inches. Soil data presented in **Tables 3-6 and 8** indicates arsenic and/or lead concentrations exceed applicable S-1 standards in several of the sampling locations (B-1, B-3, B-4, B-6 through 12, B-14, LB-18 through 20, LB-22, LB-52, LB-54, LB-55, LB-58, and LB-59). Soil data for the twenty soil sampling locations collected in the area of the Site to the west of the Site building and underneath the asphalt-paved parking area are presented in **Table 7**. Method 1 S-2 standards are applicable to this portion of the Site as soils are potentially accessible, due to asphalt paving. Only the arsenic concentration (25.6 mg/kg) in soil collected from boring LB-44 from 0-3 feet exceeds the applicable standard of 20 mg/kg.

Several soil samples at the Site in landscaped areas have soil arsenic concentrations above 40 mg/kg. Soil sampling locations in this category include B-1, B-8, B-9, B-10, B-11, LB-22, LB-54, LB-55, LB-58, and LB-59. These areas of the Site are currently fenced-in to limit exposure potential, and therefore do not represent an Imminent Hazard condition. They do not, however, represent a condition of No Significant Risk of Harm to Human Health for the foreseeable future use of the property. The City of Newton intends to excavate shallow soil in these areas within the time allowed in the Phased process under the MCP.

### 6.5 Characterization of Risk of Harm to Safety

Safety hazards include the potential for fire or explosion, and physical dangers that may pose a threat of bodily injury to people. Conditions that also constitute a risk of harm to safety include the presence of unconfined materials that exhibit characteristics of corrosivity, reactivity, flammability, or are considered infectious materials.

None of the hazardous material detected at the Site exhibits the characteristics of corrosivity, reactivity, or are considered infectious materials. Based on current and reasonably foreseeable conditions, no applicable or suitable analogous safety standards were identified for hazardous materials detected at the Site or on the subject property.

There are no release-related physical dangers present at the Site. No old or corroded drums, lagoons, pits or other physical hazards associated with the release are present at the Site. Site conditions attributable to the release are limited to residual soil and groundwater contamination. As such, a condition of No Significant Risk of harm to safety exists at the Site.

### 6.6 Conclusion of Risk Characterization

In conclusion of the risk characterization, Site conditions do not represent an Imminent Hazard and exposure to all Substantial Hazards are currently controlled through fencing. As fencing is considered a temporary measure, conditions do not represent "No Significant Risk" of Harm to Human Health for the foreseeable future. As such additional remedial response actions under Phase III of the MCP are required.

## 7.0 PHASE III EVALUATION

The Phase III Identification, Evaluation, and Selection of Comprehensive Response Action Alternatives performance standards specified at 310 CMR 40.0853 states:

1. A Phase III evaluation shall result in:

    - The identification and evaluation of remedial action alternatives which are reasonably likely to achieve a level of "No Significant Risk" considering the oil and hazardous material present, media contaminated, and site characteristics; and,
    - The recommendation of a remedial action alternative that is a Permanent or Temporary Solution, where a Permanent Solution includes measures that reduce, to the extent feasible, the concentrations of oil and hazardous material in the environment to levels that achieve or approach background.

2. The Phase III Remedial Action Plan shall describe and document the information, reasoning, and results used to identify and evaluate remedial action alternatives in sufficient detail to support the selection of the proposed remedial action alternative.

### 7.1 Remedial Action Alternatives

Based on soil data collected at the Site to date, arsenic and lead have been released to shallow soil likely as a result of the application of lead arsenate pesticide to control gypsy moths. It is not possible to know if this application was done in accordance with the products labelling. As such, lead and arsenic concentrations above applicable Method 1 Standards, and in some areas Imminent Hazard concentrations, are present at the Site in shallow soil.

*Excavation and Off-Site Disposal*
Excavation and off-Site disposal of surficial soils at the Site will eliminate all Imminent Hazard conditions related to arsenic concentrations that are currently controlled via fencing. Soil would be excavated with heavy equipment and stockpiled pending disposal characterization. Excavation of this soil will be completed under the direction of an LSP and perimeter air monitoring will be conducted during excavation activities. Site soil analytical data indicates that after removal of soil with concentrations greater than 40 mg/kg of arsenic

from these areas, average EPCs for arsenic will be below applicable S-1 and S-2 Standards, allowing for closure with a Permanent Solution.

Excavation and off-Site disposal of arsenic and lead impacted soil are considered feasible if the technology to be employed by the alternative is reasonably likely to achieve a Permanent or Temporary Solution; and individuals with the expertise needed to effectively implement available solutions would be available, regardless of arrangements for securing their services.

A detailed evaluation pursuant to 310 CMR 40.0857 is not required as this remedial action alternative (a) is proven to be effective in remediating arsenic and lead impacted soil present at the disposal site, based on experience gained at other disposal sites with similar conditions, the remedial action alternative; (b) results in the reuse, recycling, destruction, detoxification, treatment or any combination thereof of the hazardous material present at the disposal site; (c) can be implemented in a manner that will not pose a significant risk of harm to health, safety, public welfare or the environment, as described in 310 CMR 40.1000; and (d) is likely to result in the reduction and/or control of hazardous material at the disposal site to a degree and in a manner such that the requirements of a Permanent Solution as set forth in 310 CMR 40.1000 will be met.

Other remedial alternatives such as chemical fixation and phytoremediation were not considered to be feasibly implemented at this site due to their uncertain effectiveness within the time frame required to achieve a Permanent Solution.

Because excavation of shallow soils with off-Site disposal will result in a Permanent Solution and as the City of Newton plans to conduct this proposed soil excavation work within the time allowed to conduct response actions under the MCP, no further alternatives are presented herein.

# 8.0 SELECTED COMPREHENSIVE REMEDIAL ALTERNATIVE

Because excavation of shallow soils with off-Site disposal will result in a Permanent Solution, excavation with off-Site re-use is the selected Remedial Alternative. The schedule for implementation by the City of Newton has been delayed due to the Covid-19 pandemic as it is contingent on the re-development of another City school that will be the new home to the NECP. Once the NECP moves to 687 Watertown Street in Newton, renovations of the 15 Walnut Park property will commence and will include the excavation and off-site re-use of arsenic-, and lead-impacted soil.

## 8.1 Excavation

The top 12 inches of lead and arsenic impacted soil will be excavated and stockpiled pending full disposal characterization and will be transported off-site to an approved facility. Arsenic-, and lead-impacted soil excavated from the Site in 2016 was transported to Westminster Landfill in Westminster, MA for use as daily cover and grading and shaping material. A similar disposal option will be identified for this final phase of the remediation.

Stockpiled soil will be placed on top of 6-mil polyethylene sheeting and will be covered daily. After excavation, representative confirmatory soil samples will be collected for comparison with applicable Method 1 S-1 soil standards.

### 8.2 Dust Control

During excavation, it is likely that dust will be released into the air. To control the dust, water will be sprayed onto the excavation area as well as loading and stockpiling areas to eliminate visible dust. This will be performed by the use of hand-held hoses as necessary.

### 8.3 Air Monitoring

An air monitoring plan will be implemented as part of the plan to control fugitive dust. As a general rule, if visible dust is controlled fugitive dust emissions are controlled. However, total particulate (PM10) recording monitors will be used along the site perimeter to quantitate dust and alert workers in the event that unacceptable ("action") concentrations are detected.

In the event that action concentrations are exceeded, the Contractor will be issued a verbal notification to stop work and implement additional dust control measures. All monitoring data will be documented in a daily field report.

Real-time monitoring of total dust will be performed using MIE Personal Data Rams (PDRs) aerosol monitors, or similar. These units utilize light-scattering microscopy technology. The lower detection limit for the operating range of these units is 0.001 milligrams per cubic meters (mg/m3). The PDRs will be checked periodically during the work day by an on-site Safety Representative to verify equipment operation and compliance with the target action levels. The units will be set to log a data point every ten minutes in order to create a real time graph that can be used to correlate soil disturbance activities with airborne dust levels. Data will be downloaded into a computer daily and will be available to all project personnel.

The PDRs will be positioned along the excavation fence line at locations most likely to be in the direction of off-site dust migration from the excavation depending on the wind direction on the day and time of work. One PDRs will be placed at a height of five feet on site boundary in the downwind direction to monitor for dust being generated in the excavation and one PDR will be placed upwind of the excavation to measure ambient dust concentrations. Should a third PDR be used, it will be placed or hand held at the discretion of the onsite technician.

The" Action Limit" will be set at 150 ug/$M^3$, based on the daily EPA PM10 National Ambient Air Quality Standard. The OSHA 8-hour workplace Permissible Exposure Limit for arsenic is 10 ug/$M^3$, and 50 ug/$M^3$ for lead. These limits are approximately 7-33% of the Action Limit and believed to be conservative as the highest recorded concentration in soil is 79.9 mg/Kg arsenic and 395 mg/Kg lead, orders of magnitude less than one percent.

### 8.4 Schedule

It is anticipated that the excavation work will begin in early 2023. Based on this timeframe, and as assessment has indicated that there is no Substantial Hazard, a Temporary Solution

will be prepared prior to January 9, 2023. A RAM Plan will then be prepared to conduct the excavation work, post Temporary Solution.

## 9.0 LIMITATIONS

No warranty, either expressed or implied, is given with respect to this report or any opinions expressed herein. It is expressly understood that this report and the opinions presented herein are based upon an interpretation of Site conditions as they existed only at the time this report was prepared.

In preparing this report, Lord Environmental, Inc. has relied upon and presumed accurate certain information about the Site and vicinity provided by governmental agencies, the client, and a contract analytical laboratory. Except as otherwise stated in the report in relation to data obtained from the analytical laboratory, Lord Environmental, Inc. has not attempted to verify the accuracy or completeness of any such information.

This report is intended for the sole use of the client in fulfillment of applicable regulatory requirements established by the Massachusetts Department of Environmental Protection. This report is not intended for use by any party other than the Massachusetts Department of Environmental Protection, the client, and duly appointed entities of the client.

# FIGURES


| | | | |
|---|---|---|---|
| **LORD ASSOCIATES, INC.**<br><br>**1506 Providence Highway, Suite 30**<br>**Norwood, MA 02062-4647**<br>**(781) 255-5554** | **REFERENCE:**<br>USGS TOPOGRAPHIC MAPS<br>Newton QUADRANGLE<br>CONTOUR INTERVAL: 3 METERS | NORTH | **FIGURE 1: LOCATION MAP**<br><br>**15 Walnut Park**<br>**Newton, Massachusetts** |


FIGURE 2

# Aerial Photograph

Former Aquinas College
Walnut Park
Newton, MA

**Lord Associates, Inc.**
1506 Providence Highway, Suite 30

Norwood, MA. 02062

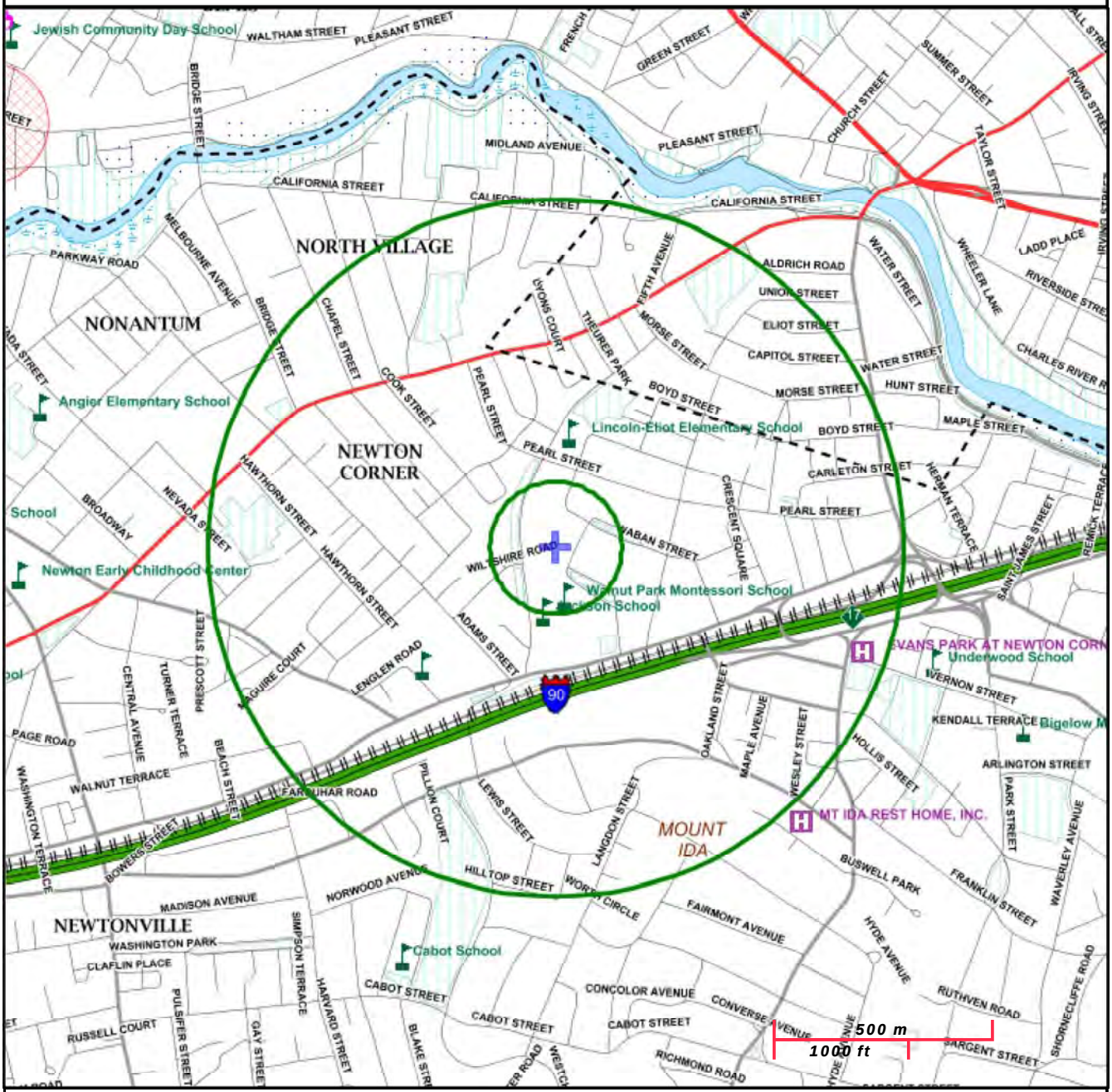
# MassDEP - Bureau of Waste Site Cleanup

## Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

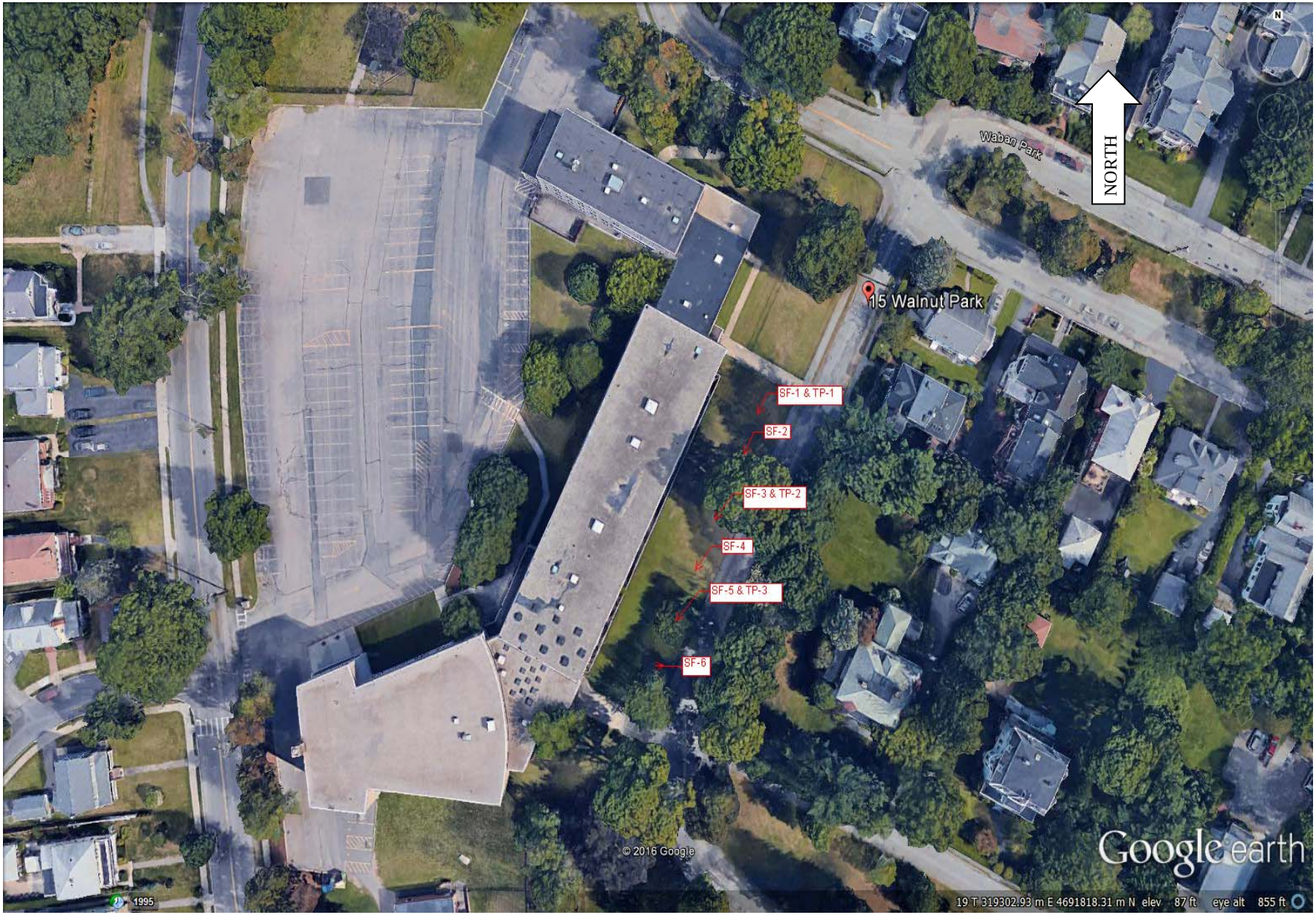
**Site Information:**
FORMER AQUINAS COLLEGE
15 WALNUT PARK NEWTON, MA
NAD83 UTM Meters:
5214699mN , -7925326mE (Zone: 18)
January 25, 2016

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection




Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW,SW, Emerg.,Non-Com.

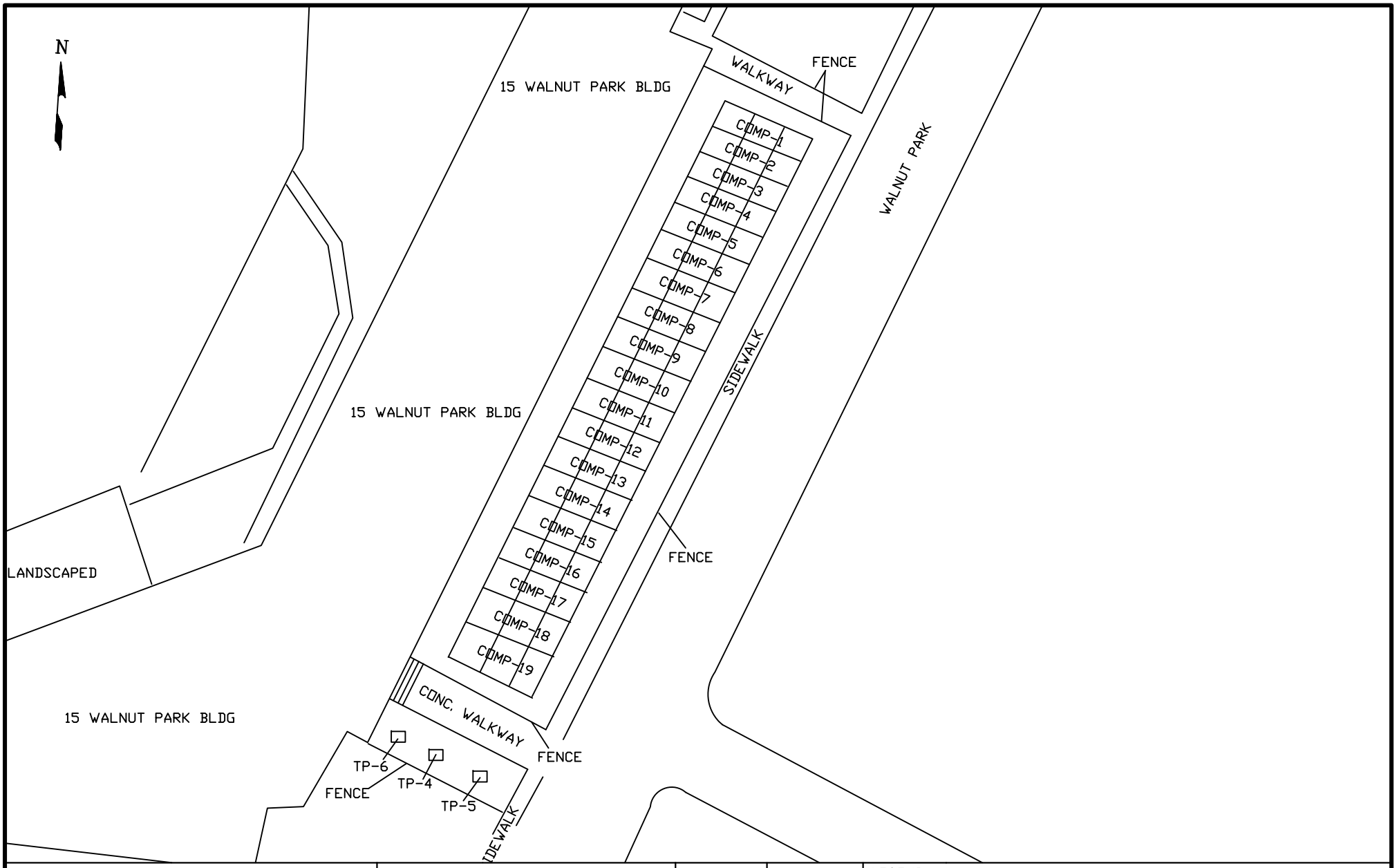



**LORD ASSOCIATES, INC.**

1506 Providence Highway, Suite 30
Norwood, MA 02062-4647
(781) 255-5554

**FIGURE 4: Soil Sampling Locations**

**Former Aquinas College**
**Newton, Massachusetts**




**LORD ASSOCIATES, INC.**
1506 PROVIDENCE HWY #30 (781) 255-5554
NORWOOD, MA FAX (781) 255-5535

SITE:
FORMER AQUINAS COLLEGE
15 WALNUT PARK
NEWTON, MA

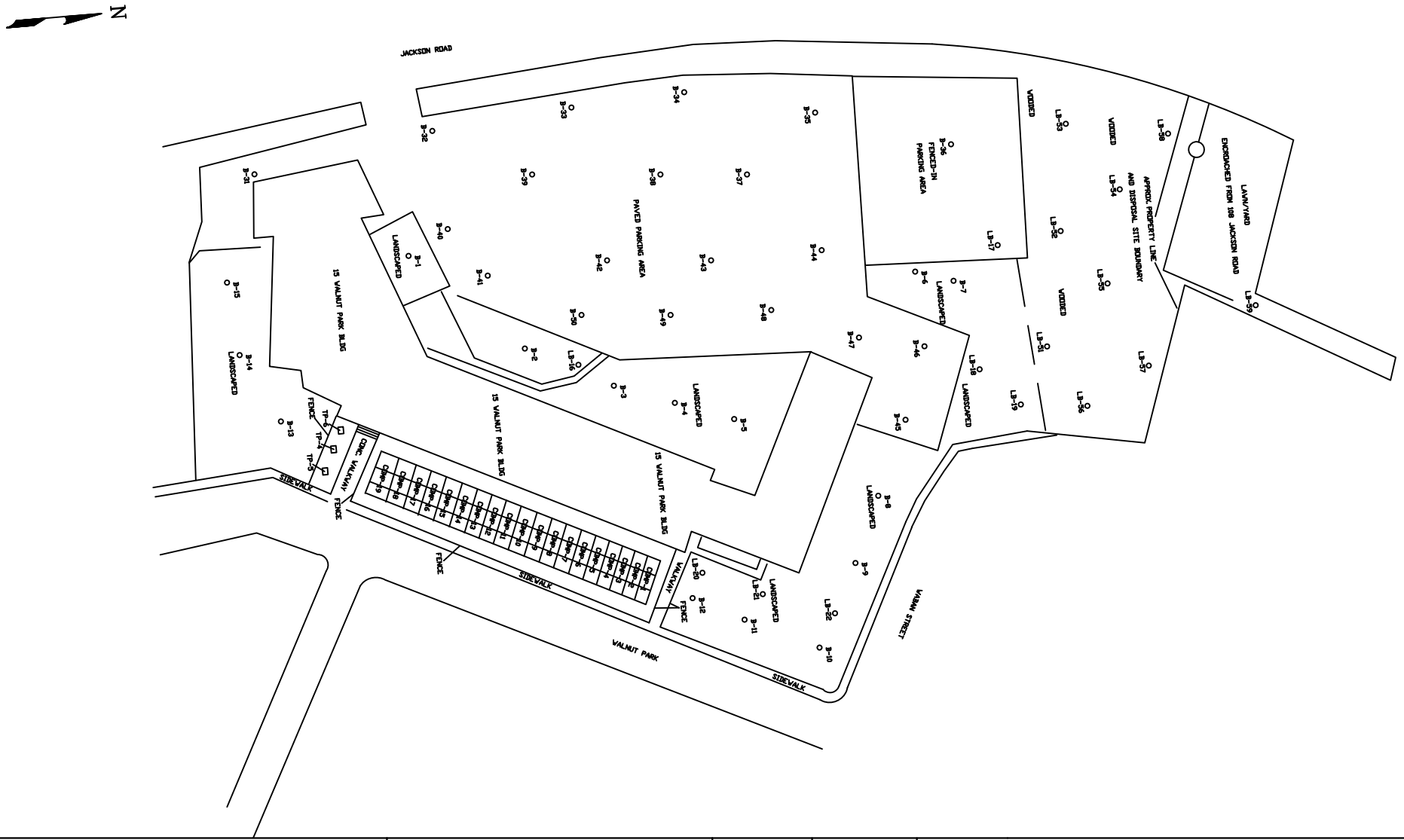
TITLE: SITE PLAN

FILE: FIGURE 5 2437

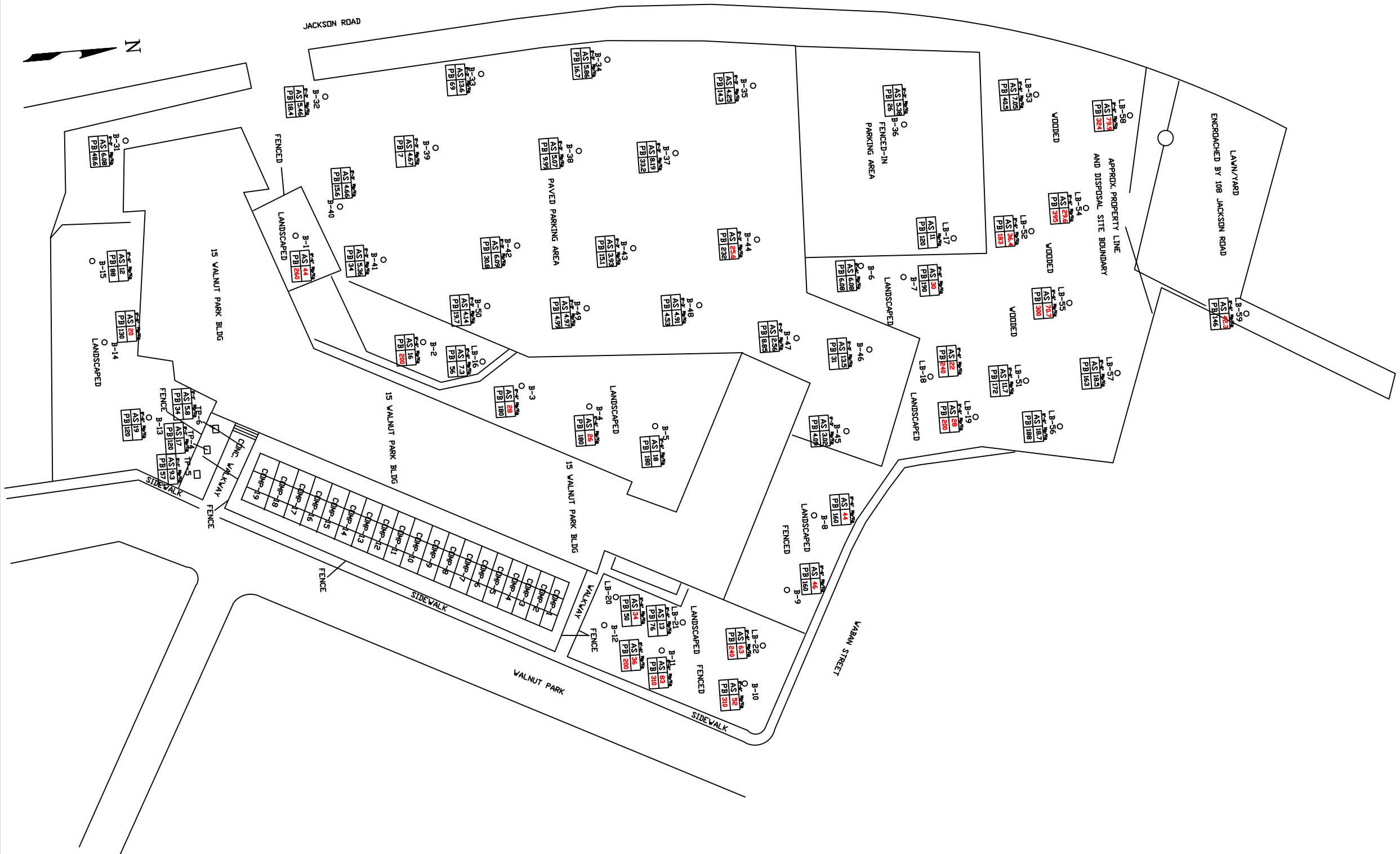
| DRAWN BY: | FIGURE: |
|---|---|
| PL | 5 |
| SHEET: | DATE/REV: |
| 1 of 1 | 10/21/2016 |

**LEGEND:**
NODES REPRESENT SOIL SAMPLING LOCATIONS

**NOTES:**
1. FIGURE TO APPROX. SCALE BASED ON AERIAL PHOTO




| | | | | |
|---|---|---|---|---|
| **LORD ENVIRONMENTAL, INC.**<br>1506 PROVIDENCE HWY #30 (781) 255-5554<br>NORWOOD, MA FAX (781) 255-5535 | TITLE: SITE PLAN | DRAWN BY: PL | FIGURE: 6 | LEGEND:<br>O SOIL SAMPLING LOCATIONS |
| SITE:<br>FORMER AQUINAS COLLEGE<br>15 WALNUT PARK<br>NEWTON, MA | FILE: FIGURE 6 2437 | SHEET: 1 of 1 | DATE/REV: 9/2/2021 | NOTES:<br>1. FIGURE TO APPROX. SCALE BASED ON AERIAL PHOTO |




**LORD ENVIRONMENTAL, INC.**
1506 PROVIDENCE HWY #30 (781) 255-5554
NORWOOD, MA FAX (781) 255-5535

SITE:
FORMER AQUINAS COLLEGE
15 WALNUT PARK
NEWTON, MA

TITLE:
# SITE PLAN
W/ ARSENIC AND LEAD CONC.

FILE:
FIGURE 7 2437

DRAWN BY: □PL

FIGURE: 7

SHEET: 1 of 1

DATE/REV: 9/2/2021

LEGEND:
0 SOIL SAMPLING LOCATIONS
52 CONC. IN RED EXCEEDS APPLICABLE METHOD ! STD.

NOTES:
1. FIGURE TO APPROX. SCALE BASED ON AERIAL PHOTO

# TABLES

**Table 1**
**Summary of Soil Results with Comparison to Cleanup Standards**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLIENT SAMPLE ID** | | | | **SF-1** | | **SF-2** | | **SF-3** | | **SF-4** | | **SF-5** | | **SF-6** | | | |
| **SAMPLING DATE** | | | | **15-AUG-16** | | **15-AUG-16** | | **15-AUG-16** | | **15-AUG-16** | | **15-AUG-16** | | **15-AUG-16** | | | |
| **LAB SAMPLE ID** | | | | **L1625528-01** | | **L1625528-02** | | **L1625528-03** | | **L1625528-04** | | **L1625528-05** | | **L1625528-06** | | **Average** | |
| | **CAS Number** | **S1/G3-14** | **Units** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| **Arsenic, Total** | **7440-38-2** | **20** | **mg/kg** | **45** | | **32** | | **35** | | **28** | | **23** | | **24** | | 31.2 | |
| **Lead, Total** | **7439-92-1** | **200** | **mg/kg** | **200** | | **120** | | **120** | | **120** | | **89** | | **110** | | 126.5 | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| **CLIENT SAMPLE ID** | | | | **TP-1** | | **TP-2** | | **TP-3** | | | | | | | | | |
| **SAMPLING DATE** | | | | **24-Aug-16** | | **24-Aug-16** | | **24-Aug-16** | | | | | | | | | |
| **LAB SAMPLE ID** | | | | | | | | | | | | | | | | | |
| | **CAS Number** | **S1/G3-14** | **Units** | | **Qual** | | **Qual** | | **Qual** | | | | | | | | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| **Arsenic, Total** | **7440-38-2** | **20** | **mg/kg** | **15** | | **17** | | **16** | | | | | | | | 16.0 | |
| **Lead, Total** | **7439-92-1** | **200** | **mg/kg** | **100** | | **120** | | **130** | | | | | | | | 116.7 | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

**Table 2**
**Summary of Post Soil Excavation**

| CLIENT SAMPLE ID | | | | SP-NORTH | | SP-SOUTH | | COMP-1 | | COMP-2 | | COMP-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | | 01-SEP-16 | | 01-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | | |
| LAB SAMPLE ID | | | | L1627967-01 | | L1627967-02 | | L1627967-03 | | L1627967-04 | | L1627967-05 | | | |
| | CAS Number | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | |
| General Chemistry | | | | | | | | | | | | | | | |
| Solids, Total | --- | | % | 95.4 | | 97.1 | | 80.6 | | 85.1 | | 75.9 | | | |
| MCP Total Metals | | | | | | | | | | | | | | | |
| Arsenic, Total | 7440-38-2 | 20 | mg/kg | 12 | | 10 | | 24 | | 28 | | 32 | | | |
| Lead, Total | 7439-92-1 | 200 | mg/kg | 50 | | 41 | | 110 | | 100 | | 110 | | | |

| CLIENT SAMPLE ID | | | | COMP-4 | | COMP-5 | | COMP-6 | | COMP-7 | | COMP-8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | | |
| LAB SAMPLE ID | | | | L1627967-06 | | L1627967-07 | | L1627967-08 | | L1627967-09 | | L1627967-10 | | | |
| | CAS Number | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | |
| General Chemistry | | | | | | | | | | | | | | | |
| Solids, Total | --- | | % | 82.3 | | 83.8 | | 85.8 | | 86.6 | | 86.2 | | | |
| MCP Total Metals | | | | | | | | | | | | | | | |
| Arsenic, Total | 7440-38-2 | 20 | mg/kg | 18 | | 10 | | 12 | | 12 | | 10 | | | |
| Lead, Total | 7439-92-1 | 200 | mg/kg | 97 | | 40 | | 68 | | 60 | | 63 | | | |

| CLIENT SAMPLE ID | | | | COMP-9 | | COMP-10 | | COMP-11 | | COMP-12 | | COMP-13 | | COMP-14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | | 07-SEP-16 | |
| LAB SAMPLE ID | | | | L1628137-01 | | L1628137-02 | | L1628137-03 | | L1628137-04 | | L1628137-05 | | L1628137-06 | |
| | CAS Number | S1/G1-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual |
| General Chemistry | | | | | | | | | | | | | | | |
| Solids, Total | --- | | % | 86.1 | | 89.4 | | 85.8 | | 84.9 | | 87.4 | | 89.2 | |
| MCP Total Metals | | | | | | | | | | | | | | | |
| Arsenic, Total | 7440-38-2 | 20 | mg/kg | 9.7 | | 12 | | 10 | | 11 | | 16 | | 12 | |
| Lead, Total | 7439-92-1 | 200 | mg/kg | 63 | | 71 | | 56 | | 58 | | 83 | | 86 | |

| CLIENT SAMPLE ID | | | | COMP-15 | | COMP-16 | | COMP-17 | | COMP-18 | | COMP-19 | | EPC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | | 07-SEP-16 | | 07-SEP-16 | | 08-SEP-16 | | 08-SEP-16 | | 08-SEP-16 | | Average | Max |
| LAB SAMPLE ID | | | | L1628137-07 | | L1628137-08 | | L1628137-09 | | L1628137-10 | | L1628137-11 | | | |
| | CAS Number | S1/G1-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | |
| General Chemistry | | | | | | | | | | | | | | | |
| Solids, Total | --- | | % | 89.8 | | 87.2 | | 87.5 | | 92.2 | | 90.6 | | | |
| MCP Total Metals | | | | | | | | | | | | | | | |
| Arsenic, Total | 7440-38-2 | 20 | mg/kg | 12 | | 11 | | 12 | | 9.2 | | 11 | | 14.3 | 32 |
| Lead, Total | 7439-92-1 | 200 | mg/kg | 78 | | 71 | | 85 | | 62 | | 84 | | 76.1 | 110 |

Table 2 (cont.)

| Sample Results Comparison with MCP /GW-1 Criteria. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| **CLIENT SAMPLE ID** | | | | **TP-4** | | **TP-5** | | **TP-6** | |
| **SAMPLING DATE** | | | | **06-SEP-16** | | **06-SEP-16** | | **06-SEP-16** | |
| **LAB SAMPLE ID** | | | | **L1627964-01** | | **L1627964-02** | | **L1627964-03** | |
| | **CAS Number** | **S1/G1214** | **Units** | | **Qual** | | **Qual** | | **Qual** |
| | | | | | | | | | |
| **General Chemistry** | | | | | | | | | |
| | | | | | | | | | |
| **Solids, Total** | **---** | | **%** | **92.2** | | **93.6** | | **96.9** | |
| **MCP Total Metals** | | | | | | | | | |
| | | | | | | | | | |
| **Arsenic, Total** | **7440-38-2** | **20** | **mg/kg** | **17** | | **9.3** | | **5.8** | |
| **Lead, Total** | **7439-92-1** | **200** | **mg/kg** | **120** | | **57** | | **34** | |

**TABLE 3**

**Soil Arsenic and Lead Concentrations**

**Former Aquinas College, 15 Walnut Park, Newton, MA**

| CLIENT SAMPLE ID | | | B-1, 0-6" | | B-2, 0-6" | | B-3, 0-6" | | B-4, 0-6" | | B-5, 0-6" | | B-6, 0-6" | | B-7, 0-6" | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | |
| General Chemistry | | | | | | | | | | | | | | | | | | |
| Solids, Total | | % | 67 | | 74 | | 76.1 | | 74 | | 78.2 | | 76.2 | | 78.4 | | | |
| MCP Total Metals | | | | | | | | | | | | | | | | | | |
| Arsenic, Total | 20 | mg/kg | 44 | | 16 | | 28 | | 26 | | 18 | | 32 | | 30 | | | |
| Lead, Total | 200 | mg/kg | 260 | | 200 | | 180 | | 180 | | 170 | | 260 | | 190 | | | |

| CLIENT SAMPLE ID | | | B-8, 0-6" | | B-9, 0-6" | | B-10, 0-6" | | B-11, 0-6" | | B-12, 0-6" | | B-13, 0-6" | | B-14, 0-6" | | B-15, 0-6" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual |
| General Chemistry | | | | | | | | | | | | | | | | | | |
| Solids, Total | | % | 66.2 | | 80.2 | | 69.4 | | 75.6 | | 73.8 | | 75.2 | | 75.2 | | 80.7 | |
| MCP Total Metals | | | | | | | | | | | | | | | | | | |
| Arsenic, Total | 20 | mg/kg | 44 | | 46 | | 52 | | 83 | | 36 | | 19 | | 20 | | 12 | |
| Lead, Total | 200 | mg/kg | 160 | | 180 | | 310 | | 310 | | 200 | | 120 | | 130 | | 88 | |

**TABLE 4**

**Soil Arsenic and Lead Concentrations**

**Former Aquinas College, 15 Walnut Park, Newton, MA**

| CLIENT SAMPLE ID | | | LB-2, 6"-12" | | LB-4, 6"-12" | | LB-6, 6"-12" | | LB-7, 6"-12" | | LB-8, 6"-12" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual |
| General Chemistry | | | | | | | | | | | | |
| Solids, Total | | % | 80.9 | | 86.4 | | 87.6 | | 86.1 | | 78.2 | |
| MCP Total Metals | | | | | | | | | | | | |
| Arsenic, Total | 20 | mg/kg | | | 14 | | 18 | | 15 | | 16 | |
| Lead, Total | 200 | mg/kg | 230 | | | | 110 | | | | | |

| CLIENT SAMPLE ID | | | LB-9, 6"-12" | | LB-10, 6"-12" | | LB-11, 6"-12" | | LB-12, 6"-12" | | LB-14, 6"-12" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | | 27-DEC-16 | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual |
| General Chemistry | | | | | | | | | | | | |
| Solids, Total | | % | | | | | | | | | | |
| MCP Total Metals | | | | | | | | | | | | |
| | | | 83.5 | | 79.7 | | 80.6 | | 83.6 | | 80.9 | |
| Arsenic, Total | 20 | mg/kg | | | | | | | | | | |
| Lead, Total | 200 | mg/kg | | | | | | | | | | |
| | | | 11 | | 14 | | 54 | | 20 | | 17 | |
| | | | | | 96 | | 170 | | 140 | | | |

**TABLE 5**

**Soil Arsenic and Lead Cconcentrations**

**Former Aquinal College, 15 Walnut Park, Newton, MA**

| CLIENT SAMPLE ID | | | LB-16 0-6" | | LB-17 0-6" | | LB-18 0-6" | | LB-19 0-6" | | LB-20 0-6" | | LB-21 0-6" | | LB-22 0-6" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual |
| **General Chemistry** | | | | | | | | | | | | | | | | |
| Solids, Total | | % | 84.7 | | 68.7 | | 78.6 | | 75.6 | | 79.3 | | 80.2 | | 74.6 | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | |
| Arsenic, Total | 20 | mg/kg | 7.3 | | 11 | | 22 | | 28 | | 34 | | 13 | | 63 | |
| Lead, Total | 200 | mg/kg | 56 | | 120 | | 240 | | 200 | | 150 | | 76 | | 240 | |

**TABLE 6**

**Soil Arsenic and Lead Concentrations**

**Former Aquinas College, 15 Walnut Park, Newton, MA**

| CLIENT SAMPLE ID | | | LB-16, 6-12" | | LB-17, 6-12" | | LB-18, 6-12" | | LB-19, 6-12" | | LB-20, 6-12" | | LB-21, 6-12" | | LB-22, 6-12" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLING DATE | | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | | 24-FEB-17 | |
| LAB SAMPLE ID | | | L1712503-01 | | L1712503-02 | | L1712503-03 | | L1712503-04 | | L1712503-05 | | L1712503-06 | | L1712503-07 | |
| | S1/G2-14 | Units | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual | | Qual |
| **General Chemistry** | | | | | | | | | | | | | | | | |
| Solids, Total | | % | 88 | | 82 | | 79.7 | | 79.2 | | 82.9 | | 88 | | 74.4 | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | |
| Arsenic, Total | 20 | mg/kg | 6.6 | | 18 | | 14 | | 13 | | 28 | | 8.2 | | 26 | |
| Lead, Total | 200 | mg/kg | 32 | | 170 | | 120 | | 73 | | 180 | | 48 | | 100 | |

**Soil Sample Results Comparison with MCP S-2/GW-2/3 Criteria.**

**15 Walnut Park, Newton, MA**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLIENT SAMPLE ID** | | | | **LB-31 0-3** | | **LB-31 3-5** | | **LB-32 0-3** | | **LB-33 0-3** | | **LB-34 0-3** | | **LB-35 0-3** | | **LB-35 3-5** | | **LB-36 0-3** | | **LB-37 0-3** | | **LB-38 0-3** | | **LB-39 0-3** | | **LB-39 3-5** | | **LB-40 0-3** | | |
| **SAMPLING DATE** | | | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | |
| **LAB SAMPLE ID** | | | | **L2028605-01** | | **L2028605-02** | | **L2028605-03** | | **L2028605-04** | | **L2028605-05** | | **L2028605-06** | | **L2028605-07** | | **L2028605-08** | | **L2028605-09** | | **L2028605-10** | | **L2028605-11** | | **L2028605-12** | | **L2028605-13** | | |
| | **CAS Number** | **S2/G2-14** | **Units** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** |
| **General Chemistry** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Solids, Total** | **---** | | **%** | **91.3** | | **90.6** | | **87.8** | | **89** | | **92** | | **91** | | **88** | | **92.2** | | **87.3** | | **89.5** | | **90.9** | | **87.7** | | **88.4** | | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Arsenic, Total** | **7440-38-2** | **20** | **mg/kg** | **6.08** | | **4.42** | | **5.46** | | **13.6** | | **5.86** | | **4.25** | | **11.2** | | **5.38** | | **8.19** | | **5.07** | | **4.67** | | **4.79** | | **4.66** | | |
| **Lead, Total** | **7439-92-1** | **600** | **mg/kg** | **48.6** | | **18** | | **18.4** | | **69** | | **16.7** | | **14.3** | | **64.4** | | **26** | | **33.2** | | **9.99** | | **7** | | **11.3** | | **15.6** | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLIENT SAMPLE ID** | | | | **LB-41 0-3** | | **LB-42 0-3** | | **LB-43 0-3** | | **LB-43 3-5** | | **LB-44 0-3** | | **LB-45 0-3** | | **LB-46 0-3** | | **LB-47 0-3** | | **LB-47 3-5** | | **LB-48 0-3** | | **LB-49 0-3** | | **LB-50 0-3** | | | | |
| **SAMPLING DATE** | | | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | **02-JUL-20** | | | | |
| **LAB SAMPLE ID** | | | | **L2028605-14** | | **L2028605-15** | | **L2028605-16** | | **L2028605-17** | | **L2028605-18** | | **L2028605-19** | | **L2028605-20** | | **L2028605-21** | | **L2028605-22** | | **L2028605-23** | | **L2028605-24** | | **L2028605-25** | | | | |
| | **CAS Number** | **S2/G1-14** | **Units** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | **Qual** | | | | |
| **General Chemistry** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Solids, Total** | **---** | | **%** | **90** | | **91.3** | | **91.5** | | **86.2** | | **86.8** | | **90.9** | | **94** | | **95.6** | | **95.7** | | **89.6** | | **89.2** | | **93.1** | | | | |
| **MCP Total Metals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Arsenic, Total** | **7440-38-2** | **20** | **mg/kg** | **5.36** | | **6.09** | | **2.69** | | **3.93** | | **25.6** | | **3.02** | | **13.5** | | **2.56** | | **1.86** | | **4.91** | | **4.97** | | **4.14** | | **Average EPC 6.486** | | |
| **Lead, Total** | **7439-92-1** | **600** | **mg/kg** | **34** | | **30.8** | | **7.38** | | **15.1** | | **232** | | **4.9** | | **31** | | **8.85** | | **4.29** | | **4.53** | | **4.99** | | **19.7** | | **Average EPC 30.00** | | |

**TABLE 8**
**Soil Sample Results Comparison with MCP S-1/GW-2/3 Criteria.**
**15 Walnut Park, Newton, MA**

| NETLAB Case Number: 1G26012 | | LB-51 0-6'' | | LB-51 6-12'' | | LB-52 0-6'' | | LB-52 6-12'' | | LB-53 0-6'' | | LB-53 6-12'' | | LB-54 0-6'' | | LB-54 6-12'' | | LB-55 0-6'' | | LB-55 6-12' | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lab Sample Number:** | | **1G26012-01** | | **1G26012-02** | | **1G26012-03** | | **1G26012-04** | | **1G26012-05** | | **1G26012-06** | | **1G26012-07** | | **1G26012-08** | | **1G26012-09** | | **1G26012-10** | |
| Date Sampled: | | 7/22/2021 13:00 | | 7/22/2021 13:10 | | 7/22/2021 13:20 | | 7/22/2021 13:30 | | 7/22/2021 13:40 | | 7/22/2021 13:50 | | 7/22/2021 14:00 | | 7/22/2021 14:10 | | 7/22/2021 14:20 | | 7/22/2021 14:30 | |
| Parameter | S-1 & GW-2/3 Standard | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit |
| | | | | | | | | | | | | | | | | | | | | | |
| **Total Metals** | | | | | | | | | | | | | | | | | | | | | |
| Arsenic | **20** | **11.7** | 0.71 | **12.4** | 0.6 | **36.4** | 0.71 | **12.7** | 0.64 | **7.05** | 0.5 | **12.5** | 0.54 | **29.6** | 0.63 | **48.8** | 0.66 | **70.7** | 0.79 | **24.9** | 0.62 |
| Lead | **200** | **172** | 0.35 | **131** | 0.3 | **183** | 0.36 | **58.5** | 0.32 | **40.5** | 0.25 | **91.2** | 0.27 | **395** | 0.32 | **488** | 0.33 | **300** | 0.39 | **101** | 0.31 |

| NETLAB Case Number: 1G26012 | | LB-56 0-6'' | | LB-56 6-12'' | | LB-57 0-6'' | | LB-57 6-12'' | | LB-58 0-6'' | | LB-58 6-12'' | | LB-59 0-6'' | | LB-59 6-12'' | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lab Sample Number:** | | **1G26012-11** | | **1G26012-12** | | **1G26012-13** | | **1G26012-14** | | **1G26012-15** | | **1G26012-16** | | **1G26012-17** | | **1G26012-18** | |
| Date Sampled: | | 7/22/2021 14:40 | | 7/22/2021 14:50 | | 7/22/2021 15:00 | | 7/22/2021 15:10 | | 7/22/2021 15:20 | | 7/22/2021 15:30 | | 7/22/2021 15:40 | | 7/22/2021 15:50 | |
| | | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit | Sample Result | Reporting Limit |
| | | | | | | | | | | | | | | | | | |
| **Total Metals** | | | | | | | | | | | | | | | | | |
| Arsenic | **20** | **18.7** | 0.75 | **11.9** | 0.71 | **18.5** | 0.79 | **19.1** | 0.56 | **79.9** | 0.79 | **88** | 0.6 | **42.3** | 0.79 | **11.8** | 0.62 |
| Lead | **200** | **188** | 0.37 | **117** | 0.35 | **163** | 0.39 | **105** | 0.28 | **324** | 0.39 | **349** | 0.3 | **146** | 0.4 | **40.1** | 0.31 |
| | | | | | | | | | | | | | | | | | |

# APPENDIX A

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC 108**

Release Tracking Number
3 - 34034

# COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

**A. SITE LOCATION:**

1. Site Name: CITY OF NEWTON DPW YARD

2. Street Address: 60-80 ELLIOT STREET

3. City/Town: NEWTON 4. ZIP Code: 024640000

☑ 5. Check here if the disposal site that is the source of the release is Tier Classified. Check the current Tier Classification Category:

☐ a. Tier I ☐ b. Tier ID ☑ c. Tier II

**B. THIS FORM IS BEING USED TO:** (check all that apply)

☐ 1. Submit a **Phase I Completion Statement,** pursuant to 310 CMR 40.0484.

☐ 2. Submit a **Revised Phase I Completion Statement,** pursuant to 310 CMR 40.0484.

☐ 3. Submit a **Phase II Scope of Work,** pursuant to 310 CMR 40.0834.

☐ 4. Submit an **interim Phase II Report.** This report does not satisfy the response action deadline requirements in 310 CMR 40.0500.

☐ 5. Submit a **final Phase II Report and Completion Statement,** pursuant to 310 CMR 40.0836.

☐ 6. Submit a **Revised Phase II Report and Completion Statement,** pursuant to 310 CMR 40.0836.

☑ 7. Submit a **Phase III Remedial Action Plan and Completion Statement,** pursuant to 310 CMR 40.0862.

☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement,** pursuant to 310 CMR 40.0862.

☑ 9. Submit a **Phase IV Remedy Implementation Plan,** pursuant to 310 CMR 40.0874.

☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan,** pursuant to 310 CMR 40.0874.

☐ 11. Submit an **As-Built Construction Report,** pursuant to 310 CMR 40.0875.

☐ 12. Submit a **Phase IV Status Report,** pursuant to 310 CMR 40.0877.

☐ 13. Submit a **Phase IV Completion Statement,** pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Permanent or Temporary Solution.

☐ b. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ c. The requirements of a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.

**B. THIS FORM IS BEING USED TO (cont.):** (check all that apply)

☐ 14. Submit a **Revised Phase IV Completion Statement,** pursuant to 310 CMR 40.0878 and 40.0879.

☐ 15. Submit a **Phase V Status Report,** pursuant to 310 CMR 40.0892.

☐ 16. Submit a **Remedial Monitoring Report.** (This report can only be submitted through eDEP.)

a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report

b. Frequency of Submittal: (check all that apply)

☐ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.

☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.

☐ iii. A Remedial Monitoring Report(s) submitted every six months, concurrent with a Status Report.

☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with a Status Report.

c. Status of Site: (check one) ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution

d. Number of Remedial Systems and/or Monitoring Programs: _____

A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

☐ 17. Submit a **Remedy Operation Status,** pursuant to 310 CMR 40.0893.

☐ 18. Submit a **Status Report to maintain a Remedy Operation Status,** pursuant to 310 CMR 40.0893(2).

☐ 19. Submit a **Transfer and/or a Modification of Persons Maintaining a Remedy Operation Status (ROS),** pursuant to 310 CMR 40.0893(5) (check one, or both, if applicable).

☐ a. Submit a Transfer of Persons Maintaining an ROS (the transferee should be the person listed in Section D, "Person Undertaking Response Actions").

☐ b. Submit a Modification of Persons Maintaining an ROS (the primary representative should be the person listed in Section D, "Person Undertaking Response Actions").

c. Number of Persons Maintaining an ROS not including the primary representative: _____

☐ 20. Submit a **Termination of a Remedy Operation Status,** pursuant to 310 CMR 40.0893(6).(check one)

☐ a. Submit a notice indicating ROS performance standards have not been met. A plan and timetable pursuant to 310 CMR 40.0893(6)(b) for resuming the ROS are attached.

☐ b. Submit a notice of Termination of ROS.

☐ 21. Submit a **Phase V Completion Statement,** pursuant to 310 CMR 40.0894.

Specify the outcome of Phase V activities: (check one)

☐ a. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ b. The requirements for a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.

☐ 22. Submit a **Revised Phase V Completion Statement,** pursuant to 310 CMR 40.0894.

☐ 23. Submit a **Temporary Solution Status Report,** pursuant to 310 CMR 40.0898.

☐ 24. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

a. Status of Site: (check one)

☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution

**C. LSP SIGNATURE AND STAMP:**

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> *if Section B indicates that a* ***Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement*** *and/or a* ***Termination of a Remedy Operation Status*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that a* ***Phase II Scope of Work*** *or a* ***Phase IV Remedy Implementation Plan*** *is being submitted,* the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that an* ***As-Built Construction Report,*** *a* ***Remedy Operation Status,*** *a* ***Phase IV, Phase V or Temporary Solution Status Report,*** *a* ***Status Report to Maintain a Remedy Operation Status,*** *a* ***Transfer or Modification of Persons Maintaining a Remedy Operation Status*** *and/or a* ***Remedial Monitoring Report*** *is being submitted,* the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP#: 7473

2. First Name: RALPH J 3. Last Name: TELLA

4. Telephone: 7812555554 5. Ext.: 6. Email:

7. Signature: RALPH J TELLA

8. Date: 1/12/2022
(mm/dd/yyyy)

9. LSP Stamp:

## COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

**D. PERSON UNDERTAKING RESPONSE ACTIONS:**

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person undertaking response actions

2. Name of Organization: NEWTON DEPT OF PUBLIC BUILDINGS

3. Contact First Name: ARTHUR 4. Last Name: CABRAL

5. Street: 52 ELLIOT ST 6. Title: PROJECT & BUDGET MGR

7. City/Town: NEWTON 8. State: MA 9. ZIP Code: 024611605

10. Telephone: 6177961600 11. Ext: 12. Email:

**E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS:** ☐ Check here to change relationship

☑ 1. RP or PRP ☑ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify:

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking Response Actions Specify Relationship:

**F. REQUIRED ATTACHMENT AND SUBMITTALS:**

☐ 1. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☐ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.

☑ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.

☑ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.

☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.

☐ 6. If submitting a Transfer of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for the person making this submittal (transferee) is attached.

☐ 7. If submitting a Modification of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for each new person making this submittal is attached.

☐ 8. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to: BWSC.eDEP@state.ma.us.

☑ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

**G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:**

1. I, ARTHUR CABRAL, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

>*if Section B indicates that this is a* **Modification of a Remedy Operation Status (ROS),** I attest under the pains and penalties of perjury that I am fully authorized to act on behalf of all persons performing response actions under the ROS as stated in 310 CMR 40.0893(5)(d) to receive oral and written correspondence from MassDEP with respect to performance of response actions under the ROS, and to receive a statement of fee amount as per 4.03(3).

I understand that any material received by the Primary Representative from MassDEP shall be deemed received by all the persons performing response actions under the ROS, and I am aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate or incomplete information.

2. By: ARTHUR CABRAL (Signature) 3. Title: PROJECT & BUDGET MGR

4. For: NEWTON DEPT OF PUBLIC BUILDINGS (Name of person or entity recorded in Section D) 5. Date: 1/12/2022 (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street:

8. City/Town: 9. State: 10. ZIP Code:

11. Telephone: 12. Ext.: 13. Email:

**YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.**

Date Stamp (DEP USE ONLY:)

**Received by DEP on 1/12/2022 2:29:58 PM**

**From:** Bresnahan, Chris (DEP)
**To:** Ralph Tella
**Cc:** Arthur F. Cabral; Oliver Leek; Roberson, Stephen (DEP)
**Subject:** FW: Site visit Former Aquinas College property
**Date:** Tuesday, January 17, 2017 9:58:54 AM

---

Ralph J. Tella, CHMM, LSP
Lord Associates, Inc.
Corporate Headquarters
1506 Providence Hwy-Suite 30
Norwood, MA 02062

Mr. Tella;
Thank you for arranging the meeting Friday morning with Mr. Cabral and his associate from the School Department at the former Aquinas College property. Earlier in the week you had notified the Department on behalf of the City of Newton that a condition which Could Pose an Imminent Hazard (CPIH) per 310 CMR 40.0321(2) had been identified at the former Thomas Aquinas college property currently operated by the City of Newton for a variety of uses including a pre-school and playground. You had reported that greater than 40 milligrams per kilogram of arsenic had been detected in soil samples collected from two discrete zones of the property (Z1, and Z2) within twelve inches of the ground surface, at points located within 500 feet of occupied residences, as a school and park area, where access by children is not completely controlled or eliminated by means of bituminous pavement, concrete, a fence or other physical barrier. You also discussed a third discrete zone (Z3), which is completely enclosed by a fence with gates that can be locked to eliminate access by children, where concentrations of up to 86 milligrams per kilogram of Arsenic had been measured in surficial soil samples. We met at the property this morning for the purpose of evaluating existing access controls as well as to discuss the soil data you had obtained.

As I explained, subsequent to your call last Monday, I've been provided new instructions on processing such CPIH notifications. In 2014, the MCP Method 1 standards were revised to incorporate updated toxicity values. The published values at 310 CMR 40.0321(2)(b) of concentrations of 7 hazardous materials in soil that require notification as a release that could pose an IH, however, **were not updated at that time and do not reflect updated toxicity values**. Consequently, until such time that 310 CMR 40.0321(2)(b) is amended to reflect the updated toxicity information, PRPs are required to notify based on those current MCP values.

The table below provides IH concentrations that reflect updated toxicity values.

| Hazardous Material | 2014 Value (mg/g) | Updated 2015 Value(mg/g) | Risk Driver |
|---|---|---|---|
| Arsenic (total) | 40 | 50 | Cancer |
| Cadmium (total) | 60 | 1000 | Non-Cancer |
| Chromium (VI) | 200 | 200 | Dermatitis (ORS) |
| Cyanide | 100 | 100 | One-time Dose (ORS) |
| Mercury | 300 | 400 | Non-Cancer |
| Methyl Mercury | 10 | 90 | Non-Cancer |
| PCB (total) | 10 | 10 | Cancer |

During our meeting I agreed to provide you an e-mail summarizing our discussions and MassDEP's findings. Please see the detail below.

The area of the property I refer to as Z1 is located in the South west section of the property near Jackson Road, adjacent to the entrance of the Pre-School between the pre-School Building and the parking lot. This area is within 150 feet of a school and access to the area by children is not completely controlled or eliminated by means of bituminous pavement, concrete, a fence or other physical barrier. The area is partly fenced. The highest concentration of arsenic identified in a sample of surficial soils collected from this area that you described is 44 milligrams per kilogram. MassDEP does not consider the reported concentration to be an IH based on updated toxicity information and therefore additional response action related to the notification as an IH (IRA Plan, IRA and IRAC/PS Statement) are not required.

The area of the property I refer to as Z2 is located in the North East section of the property adjacent to Waban Street. Z2 is also adjacent to the building on the property that currently houses the Newton Fire Department's Headquarters. This area is within 150 feet of occupied residences and access to the area by children is not completely controlled or eliminated by means of bituminous pavement, concrete, a fence or other physical barrier. The area is partly fenced. The highest concentration of arsenic identified in a sample of surficial soils collected from this area that you described is 46 milligrams per kilogram. MassDEP does not consider the reported concentration to be an IH based on updated toxicity information and therefore additional response action related to the notification as an IH (IRA Plan, IRA and IRAC/PS Statement) are not required.

The area of the property I refer to as Z3 is located in the North East section of the property adjacent to the corner of Waban Street and Walnut Place. Z2 is also adjacent to the building on the property that currently houses the Newton Fire Department's Headquarters as well as the Pre-School. This area is within 150 feet of occupied residences, the pre-school as well as a

playground. Access to the area by children is completely controlled by means of a fence, equipped with gates that can be locked. The highest concentration of arsenic identified in a sample of surficial soils collected from this area that you described is 86 milligrams per kilogram. As access to the area by children is controlled by the existing fence, reporting per 310 CMR 40.0321(2) is not required.

During the notification you provided on January 9, 2-16 on behalf of the City of Newton, I provided the Release Tracking Number 3-0034033 which has been assigned to the release. I will designate this RTN as Less than Reporting Threshold for the purpose of MassDEP's records.

Please feel free to call me if you have any questions relative to this matter.

Sincerely:

Chris Bresnahan

_____

***Chris Bresnahan***
***Environmental Engineer***
***Emergency Response***
***MassDEP-NERO***
***205B Lowell Street***
***Wilmington, MA 01887***
***(978) 694-3377***
***Report Spills @ (888) 304-1133***

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**From:** Ralph Tella [mailto:RTella@lordenv.com]
**Sent:** Tuesday, January 10, 2017 2:00 PM
**To:** Bresnahan, Chris (DEP); Roberson, Stephen (DEP)
**Cc:** Arthur F. Cabral; Oliver Leek
**Subject:** Site visit Former Aquinas College property

Chris, I spoke with Steve and told him that the City is willing to meet on-site later this week with us to discuss these latest findings. Please let us know what date & time works best for you.

Regards, Ralph

Ralph J. Tella, CHMM, LSP

**Lord Associates, Inc.**

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1506 Providence Hwy-Suite 30
Norwood, MA 02062
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***Environmental Consulting & Licensed Site Professional Services***
***www.lordenv.com***

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# APPENDIX B

New England Testing Laboratory, Inc.
(401) 353-3420

# REPORT OF ANALYTICAL RESULTS

## NETLAB Work Order Number: 1G26012
## Client Project: 2437 - 15 Walnut Park

Report Date: 02-August-2021

Prepared for:

Jon Puliafico
Lord Environmental, Inc.
1506 Providence Highway, Suite 30
Norwood, MA 02062

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

## *Samples Submitted :*

The samples listed below were submitted to New England Testing Laboratory on 07/26/21. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 1G26012. Custody records are included in this report.

| Lab ID | Sample | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 1G26012-01 | LB-51 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-02 | LB-51 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-03 | LB-52 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-04 | LB-52 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-05 | LB-53 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-06 | LB-53 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-07 | LB-54 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-08 | LB-54 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-09 | LB-55 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-10 | LB-55 6-12' | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-11 | LB-56 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-12 | LB-56 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-13 | LB-57 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-14 | LB-57 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-15 | LB-58 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-16 | LB-58 6-12" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-17 | LB-59 0-6" | Soil | 07/22/2021 | 07/26/2021 |
| 1G26012-18 | LB-59 6-12" | Soil | 07/22/2021 | 07/26/2021 |

## *Request for Analysis*

At the client's request, the analyses presented in the following table were performed on the samples submitted.

### LB-51 0-6'' (Lab Number: 1G26012-01)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-51 6-12'' (Lab Number: 1G26012-02)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-52 0-6'' (Lab Number: 1G26012-03)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-52 6-12'' (Lab Number: 1G26012-04)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-53 0-6'' (Lab Number: 1G26012-05)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-53 6-12'' (Lab Number: 1G26012-06)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-54 0-6'' (Lab Number: 1G26012-07)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-54 6-12'' (Lab Number: 1G26012-08)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-55 0-6'' (Lab Number: 1G26012-09)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-55 6-12' (Lab Number: 1G26012-10)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |

## *Request for Analysis (continued)*

### LB-55 6-12' (Lab Number: 1G26012-10) (continued)

| Analysis | Method |
|---|---|
| Lead | EPA 6010C |

### LB-56 0-6'' (Lab Number: 1G26012-11)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-56 6-12'' (Lab Number: 1G26012-12)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-57 0-6'' (Lab Number: 1G26012-13)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-57 6-12'' (Lab Number: 1G26012-14)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-58 0-6'' (Lab Number: 1G26012-15)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-58 6-12'' (Lab Number: 1G26012-16)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-59 0-6'' (Lab Number: 1G26012-17)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

### LB-59 6-12'' (Lab Number: 1G26012-18)

| Analysis | Method |
|---|---|
| Arsenic | EPA 6010C |
| Lead | EPA 6010C |

## *Method References*

*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846*, USEPA

**Case Narrative**

## Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

## Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

# Results: Total Metals

## Sample: LB-51 0-6''

**Lab Number: 1G26012-01 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **11.7** | | 0.71 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **172** | | 0.35 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-51 6-12"

**Lab Number: 1G26012-02 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **12.4** | | 0.60 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **131** | | 0.30 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-52 0-6''

**Lab Number: 1G26012-03 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **36.4** | | 0.71 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **183** | | 0.36 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-52 6-12"

**Lab Number: 1G26012-04 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **12.7** | | 0.64 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **58.5** | | 0.32 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-53 0-6''

**Lab Number: 1G26012-05 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **7.05** | | 0.50 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **40.5** | | 0.25 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-53 6-12"

**Lab Number: 1G26012-06 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **12.5** | | 0.54 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **91.2** | | 0.27 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-54 0-6''

**Lab Number: 1G26012-07 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **29.6** | | 0.63 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **395** | | 0.32 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-54 6-12"

**Lab Number: 1G26012-08 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **48.8** | | 0.66 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **488** | | 0.33 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-55 0-6''

**Lab Number: 1G26012-09 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **70.7** | | 0.79 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **300** | | 0.39 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-55 6-12'

**Lab Number: 1G26012-10 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **24.9** | | 0.62 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **101** | | 0.31 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-56 0-6''

**Lab Number: 1G26012-11 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **18.7** | | 0.75 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **188** | | 0.37 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-56 6-12"

**Lab Number: 1G26012-12 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **11.9** | | 0.71 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **117** | | 0.35 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-57 0-6''

**Lab Number: 1G26012-13 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **18.5** | | 0.79 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **163** | | 0.39 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-57 6-12"

**Lab Number: 1G26012-14 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **19.1** | | 0.56 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **105** | | 0.28 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-58 0-6''

**Lab Number: 1G26012-15 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **79.9** | | 0.79 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **324** | | 0.39 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-58 6-12"

**Lab Number: 1G26012-16 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **88.0** | | 0.60 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **349** | | 0.30 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

**Sample: LB-59 0-6''**

**Lab Number: 1G26012-17 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **42.3** | | 0.79 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **146** | | 0.40 | mg/kg | 07/27/21 | 07/29/21 |

# Results: Total Metals

## Sample: LB-59 6-12"

**Lab Number: 1G26012-18 (Soil)**

| Analyte | Result | Qual | Reporting Limit | Units | Date Prepared | Date Analyzed |
|---|---|---|---|---|---|---|
| **Arsenic** | **11.8** | | 0.62 | mg/kg | 07/27/21 | 07/29/21 |
| **Lead** | **40.1** | | 0.31 | mg/kg | 07/27/21 | 07/29/21 |

## Quality Control

### Total Metals

| Analyte | Result | Qual | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| ***Batch: B1G1175 - Metals Digestion Soils*** | | | | | | | | | | |
| **Blank (B1G1175-BLK1)** | | | | | Prepared & Analyzed: 07/27/21 | | | | | |
| Lead | ND | | 0.33 | mg/kg | | | | | | |
| Arsenic | ND | | 0.66 | mg/kg | | | | | | |
| **LCS (B1G1175-BS1)** | | | | | Prepared & Analyzed: 07/27/21 | | | | | |
| Lead | 93.9 | | 0.33 | mg/kg | 100 | | 93.9 | 85-115 | | |
| Arsenic | 19.3 | | 0.66 | mg/kg | 20.0 | | 96.3 | 85-115 | | |

## Notes and Definitions

| Item | Definition |
|---|---|
| Wet | Sample results reported on a wet weight basis. |
| ND | Analyte NOT DETECTED at or above the reporting limit. |

NEW ENGLAND TESTING LABORATORY, INC.
59 Greenhill Street
West Warwick, RI 02893
1-888-863-8522



1 G 2 6012

# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME/LOCATION |
|---|---|
| 2437 | 15 Walnut Park |

CLIENT: Lord Environmental, Inc
REPORT TO: Oliver Leek
INVOICE TO: Oliver Leek, Pam Blidwell

| DATE | TIME | COMP | GRAB | SAMPLE I.D. | AQUEOUS | SOIL | OTHER | NO. OF CONTAINERS | PRESERVATIVE | TESTS** Lead | Arsenic | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/22/21 | 1:00 | | X | LB-51, 0-6" | | X | | 1 | — | X | X | |
| | 1:10 | | | LB-51, 6"-12" | | | | | | | | |
| | 1:20 | | | LB-52, 0-6" | | | | | | | | |
| | 1:30 | | | LB-52, 6-12" | | | | | | | | |
| | 1:40 | | | LB-53, 0-6" | | | | | | | | |
| | 1:50 | | | LB-53, 6-12" | | | | | | | | |
| | 2:00 | | | LB-54, 0-6" | | | | | | | | |
| | 2:10 | | | LB-54, 6-12" | | | | | | | | |
| | 2:20 | | | LB-55, 0-6" | | | | | | | | |
| | 2:30 | | | LB-55, 6-12" | | | | | | | | |
| | 2:40 | | | LB-56, 0-6" | | | | | | | | |
| | 2:50 | | | LB-56, 6-12" | | | | | | | | |
| | 3:00 | | | LB-57, 0-6" | | | | | | | | |
| V | 3:10 | | V | LB-57, 6-12" | | V | | V | V | V | V | |

| Sampled by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
|---|---|---|---|
| | 7/26/21 1013 | | 7/26/21 1013 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | 7/26/21 1445 | | 7/26/21 1445 |
| Relinquished by: (Signature) | Date/Time | Received for Laboratory by: (Signature) | Date/Time |
| | | | |

Laboratory Remarks: 5
Temp. received: _____
Cooled ☐

Special Instructions:
List Specific Detection Limit Requirements:

Turnaround (Business Days)_____

**Netlab subcontracts the following tests: Radiologicals, Radon, Asbestos, UCMRs, Perchlorate, Bromate, Bromide, Sieve, Salmonella, Carbamates, CT ETPH

NEW ENGLAND TESTING LABORATORY, INC.
59 Greenhill Street
West Warwick, RI 02893
1-888-863-8522



# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME/LOCATION |
|---|---|
| 2437 | 15 Walnut Park |

CLIENT: Lord Environmental, Inc.
REPORT TO: Olivier Leek
INVOICE TO: Olivier Leek; Pam Gildwell

| DATE | TIME | COMP | GRAB | SAMPLE I.D. | AQUEOUS | SOIL | OTHER | NO. OF CONTAINERS | PRESERVATIVE | TESTS** Lead | TESTS** Arsenic | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/22/21 | 3:20 | | X | LB-58, 0-6" | | X | | 1 | — | X | X | |
| | 3:30 | | | LB-58, 6-12" | | | | | | | | |
| | 3:40 | | | LB-59, 0-6" | | | | | | | | |
| | 3:50 | | | LB-59, 6-12" | | | | | | | | |

| Sampled by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
|---|---|---|---|
| | 7/26/21 1013 | | 7/26/21 1013 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | 7/26/21 1445 | | 7/26/21 1445 |
| Relinquished by: (Signature) | Date/Time | Received for Laboratory by: (Signature) | Date/Time |

Laboratory Remarks:
Temp. received: _____
Cooled ☐

Special Instructions:
List Specific Detection Limit Requirements:

Turnaround (Business Days)_____

**Netlab subcontracts the following tests: Radiologicals, Radon, Asbestos, UCMRs, Perchlorate, Bromate, Bromide, Sieve, Salmonella, Carbamates, CT ETPH

## MassDEP Analytical Protocol Certification Form

Laboratory Name: New England Testing Laboratory, Inc. Project #: 2437

Project Location: 15 Walnut Park RTN:

**This Form provides certifications for the following data set: list Laboratory Sample ID Number(s): 1G26012**

Matrices: ☐ Groundwater/Surface Water ☒ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

**CAM Protocol** (check all that apply below):

| | | | | | |
|---|---|---|---|---|---|
| 8260 VOC CAM II A ☐ | 7470/7471 Hg CAM III B ☐ | MassDEP VPH (GC/PID/FID) CAM IV A ☐ | 8082 PCB CAM V A ☐ | 9014 Total Cyanide/PAC CAM VI A ☐ | 6860 Perchlorate CAM VIII B ☐ |
| 8270 SVOC CAM II B ☐ | 7010 Metals CAM III C ☐ | MassDEP VPH (GC/MS) CAM IV C ☐ | 8081 Pesticides CAM V B ☐ | 7196 Hex Cr CAM VI B ☐ | MassDEP APH CAM IX A ☐ |
| 6010 Metals CAM III A ☒ | 6020 Metals CAM III D ☐ | MassDEP EPH CAM IV B ☐ | 8151 Herbicides CAM V C ☐ | 8330 Explosives CAM VIII A ☐ | TO-15 VOC CAM IX B ☐ |

***Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status***

| | | |
|---|---|---|
| **A** | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | ☒ Yes ☐ No |
| **B** | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | ☒ Yes ☐ No |
| **C** | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | ☒ Yes ☐ No |
| **D** | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | ☒ Yes ☐ No |
| **E** | VPH, EPH, APH, and TO-15 only<br>a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).<br>b. APH and TO-15 Methods only: Was the complete analyte list reported for each method? | ☐ Yes ☐ No<br>☐ Yes ☐ No |
| **F** | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | ☒ Yes ☐ No |

***Responses to Questions G, H and I below are required for "Presumptive Certainty" status***

| | | |
|---|---|---|
| **G** | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | ☒ Yes ☐ No[1] |

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

| | | |
|---|---|---|
| **H** | Were **all** QC performance standards specified in the CAM protocol(s) achieved? | ☒ Yes ☐ No[1] |
| **I** | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | ☒ Yes ☐ No[1] |

[1] *All negative responses must be addressed in an attached laboratory narrative.*

***I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.***

**Signature**: _____ **Position:** Laboratory Director

**Printed Name:** Richard Warila **Date**: 8/2/2021

# APPENDIX C

**Lord Environmental, Inc.**
*Consulting & Licensed Site Professional Services*

1506 Providence Highway, Suite 30
Norwood, MA 02062-4647

Voice: 781.255.5554
www.lordenv.com

January 21, 2022

Deborah Youngblood, PhD, Commissioner
City Hall Room 107
1000 Commonwealth Avenue
Newton, MA 02459

Mayor Ruthann Fuller
City Hall
1000 Commonwealth Avenue
Newton, MA 02459

**Re: Availability of Phase IV – Remedy Implementation Plan**
**Former Aquinas College**
**15 Walnut Park**
**Newton, MA**
**DEP RTN 3-33782**

Dear Public Officials:

Lord Environmental, Inc. has completed a Phase IV Remedy Implementation Plan for the property located at 15 Walnut Park, Newton, MA. The subject property was listed as a Disposal Site by the MADEP in August 2016 in response to a finding of arsenic and lead in soil. The Site has been classified as Tier II. Remedial activities are ongoing.

Pursuant to section 310 CMR 40.1403(3) of the Massachusetts Contingency Plan, at any time after the MADEP has been notified of a release or threat of release pursuant to 310 CMR 40.0300, the Chief Municipal Officer and Board of Health in the community(ies) in which the site is located shall be notified of the availability of the completion of a Phase IV Report and to provide a copy of the report conclusions. The intention of this letter is to fulfill this legal obligation.

The chosen remedial action is to excavate shallow soils impacted with lead and arsenic for off-Site disposal. As such, additional remedial response actions under the MCP are required.

In addition, 310 CMR 40.1403(3) stipulates that this notification shall include information about how local officials may obtain a copy of the report. A copy of the report can be viewed by scheduling a file review of RTN 3-33782 with the DEP Northeast Regional Office in Wilmington (978) 694-3200 or online at http://public.dep.state.ma.us/SearchableSites2/Search.aspx.

Very truly yours,
**LORD ENVIRONMENTAL, INC.**

Oliver P. Leek
Senior Project Manager

# C - HAZARDOUS MATERIALS DETERMINATION SURVEY

**REPORT**
**FOR**
**HAZARDOUS MATERIALS DETERMINATION**
**SURVEY**
**AT THE**
**EARLY PRE-SCHOOL CHILDHOOD PRE-SCHOOL**
**NEWTON, MASSACHUSETTS**

PROJECT NO: 219 014.00

Survey Dates:
April 20, 2018
February 25, 2019

SURVEY CONDUCTED BY:

**UNIVERSAL ENVIRONMENTAL CONSULTANTS**
**12 BREWSTER ROAD**
**FRAMINGHAM, MA 01702**

UEC universal environmental consultants

March 1, 2019

Ms. Meryl Nistler
Arrowstreet
10 Post Office Square
Boston, MA 02109

Reference: Hazardous Materials Determination Survey
Newton Early Pre-School Childhood Pre-School, Newton, MA

Dear Ms. Nistler:

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

Enclosed please find the report for limited hazardous materials determination survey at the Newton Early Pre-School Childhood Pre-School, Newton, MA.

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

Very truly yours,

Universal Environmental Consultants

_____

Ammar M. Dieb
President

UEC:\219 014.00\Newton Early Pre-School Childhood Pre-School Report.DOC

Enclosure

## 1.0 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 years of experience.

UEC was contracted by Arrowstreet to conduct the following services at the Newton Early Pre-School Childhood Pre-School, Newton, MA:

- Asbestos Containing Materials (ACM) determination inspection and sampling;
- Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures inspection;
- PCB's Caulking Inspection;
- Lead Based Paint (LBP) inspection;
- Mercury in Rubber Flooring inspection and sampling;
- Underground Oil Storage Tank inspection.

The scope of work included the inspection of accessible ACM, collection of bulk samples from materials suspected to contain asbestos, determination and quantities of types of ACM found and cost estimates for remediation. A comprehensive survey per the Environmental Protection Agency (EPA) NESHAP regulation would be required prior to any renovation or demolition activities.

Bulk samples analyses for asbestos were performed using the standard Polarized Light Microscopy (PLM) Method in accordance with EPA standard. Bulk samples were collected by Massachusetts licensed asbestos inspectors Mr. Jason Becotte (AI-034963) and Mr. Leonard J. Busa (AI-030673) and analyzed by Massachusetts licensed laboratories EMSL and Asbestos Identification Laboratory, Woburn, MA.

Samples results are attached.

## 2.0 FINDINGS:

**Asbestos Containing Materials (ACM):**

The regulations for asbestos inspection are based on representative sampling. It would be impractical and costly to sample all materials in all areas. Therefore, representative samples of each homogenous area were collected and analyzed or assumed.

All suspect materials were grouped into homogenous areas. A homogenous area is one in which the materials are evenly mixed and similar in appearance and texture throughout. A homogeneous area shall be determined to contain asbestos based on findings that the results of at least one sample collected from that area shows that asbestos is present in an amount >1% in accordance with EPA 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***

April 20, 2018
Eighty-one (81) bulk samples were collected from the following materials suspected of containing asbestos:

**Type and Location of Material**

1. Generator exhaust insulation at boiler room
2. Generator exhaust insulation at boiler room

3. Generator exhaust insulation at boiler room
4. Tank insulation at boiler room
5. Tank insulation at boiler room
6. Tank insulation at boiler room
7. Boiler exhaust insulation at boiler room
8. Boiler exhaust insulation at boiler room
9. Boiler exhaust insulation at boiler room
10. Hard joint insulation at boiler room
11. Hard joint insulation at boiler room
12. Hard joint insulation at boiler room
13. Generator duct vibration cloth at boiler room
14. Generator duct vibration cloth at boiler room
15. Spray-on ceiling at boiler room
16. Spray-on ceiling at boiler room
17. Spray-on ceiling at boiler room
18. Spray-on ceiling at boiler room
19. Spray-on ceiling at boiler room
20. Rough ceiling plaster at cafeteria storage room closet
21. Rough ceiling plaster at cafeteria storage room closet
22. Rough ceiling plaster at auditorium mechanical room
23. Rough ceiling plaster at auditorium mechanical room
24. Rough ceiling plaster at auditorium mechanical room
25. Textured ceiling plaster at auditorium
26. Textured ceiling plaster at auditorium
27. Textured ceiling plaster at auditorium entry hall
28. Textured ceiling plaster at auditorium entry hall
29. Textured ceiling plaster at auditorium lobby
30. Textured ceiling plaster at auditorium lobby
31. Textured ceiling plaster at auditorium lobby
32. Hard wall plaster at room 101
33. Hard wall plaster at room 104
34. Hard wall plaster at projector room
35. Hard wall plaster at room 204
36. Hard wall plaster at room 301
37. Hard wall plaster at room 306
38. Hard wall plaster at room 307
39. Hard ceiling plaster at projector room
40. Hard ceiling plaster at second floor custodian closet
41. Hard ceiling plaster at third floor custodian closet
42. 2’ x 2’ Suspended acoustical ceiling tile at auditorium side stairwell
43. 2’ x 2’ Suspended acoustical ceiling tile at convent stairwell
44. 1’ x 1’ Acoustical ceiling tile at room 203
45. 1’ x 1’ Acoustical ceiling tile at third floor hallway
46. Joint compound at room 204
47. Joint compound at room 301
48. Science lab counter top at room 204
49. Science lab counter top at room 204
50. Black sink coating at room 201A
51. Black sink coating at library
52. Interior window glazing caulking at library
53. Interior window glazing caulking at second floor hallway
54. Tan 12” x 12” vinyl floor tile at room 101
55. Tan 12” x 12” vinyl floor tile at cafeteria
56. Yellow glue for tan 12” x 12” vinyl floor tile at room 101

57. Yellow glue for tan 12” x 12” vinyl floor tile at cafeteria
58. Green 12” x 12” vinyl floor tile type I at room 110
59. Green 12” x 12” vinyl floor tile type I at room 203
60. Green 12” x 12” vinyl floor tile type II at room 107
61. Green 12” x 12” vinyl floor tile type II at room 107
62. Beige 12” x 12” vinyl floor tile type I at room 201A
63. Beige 12” x 12” vinyl floor tile type I at room 206
64. Yellow glue for beige 12” x 12” vinyl floor tile type I at room 201A
65. Yellow glue for beige 12” x 12” vinyl floor tile type I at room 206
66. White 12” x 12” vinyl floor tile at room 209
67. White 12” x 12” vinyl floor tile at room 209
68. Light grey 12” x 12” vinyl floor tile at room 302
69. Light grey 12” x 12” vinyl floor tile at room 307
70. Black mastic for light grey 12” x 12” vinyl floor tile at room 302
71. Black mastic for light grey 12” x 12” vinyl floor tile at room 307
72. Blue 12” x 12” vinyl floor tile at basement entry
73. Blue 12” x 12” vinyl floor tile at auditorium side stairwell
74. 9” x 9” Vinyl floor tile at room 207
75. 9” x 9” Vinyl floor tile at third floor closet
76. Mastic for 9” x 9” vinyl floor tile at room 207
77. Mastic for 9” x 9” vinyl floor tile at third floor closet
78. Brown 9” x 9” vinyl floor tile at second floor main office closet
79. Brown 9” x 9” vinyl floor tile at convent stairwell
80. Mastic for brown 9” x 9” vinyl floor tile at second floor main office closet
81. Mastic for brown 9” x 9” vinyl floor tile at convent stairwell

***Samples Results***

| **Type and Location of Material** | **Sample Result** |
|---|---|
| 1. Generator exhaust insulation at boiler room | 10% Asbestos |
| 2. Generator exhaust insulation at boiler room | 10% Asbestos |
| 3. Generator exhaust insulation at boiler room | 10% Asbestos |
| 4. Tank insulation at boiler room | 40% Asbestos |
| 5. Tank insulation at boiler room | 40% Asbestos |
| 6. Tank insulation at boiler room | 40% Asbestos |
| 7. Boiler exhaust insulation at boiler room | 40% Asbestos |
| 8. Boiler exhaust insulation at boiler room | 40% Asbestos |
| 9. Boiler exhaust insulation at boiler room | 40% Asbestos |
| 10. Hard joint insulation at boiler room | No Asbestos Detected |
| 11. Hard joint insulation at boiler room | No Asbestos Detected |
| 12. Hard joint insulation at boiler room | No Asbestos Detected |
| 13. Generator duct vibration cloth at boiler room | 90% Asbestos |
| 14. Generator duct vibration cloth at boiler room | 90% Asbestos |
| 15. Spray-on ceiling at boiler room | 55% Asbestos |
| 16. Spray-on ceiling at boiler room | 40% Asbestos |
| 17. Spray-on ceiling at boiler room | 40% Asbestos |
| 18. Spray-on ceiling at boiler room | 40% Asbestos |
| 19. Spray-on ceiling at boiler room | 40% Asbestos |
| 20. Rough ceiling plaster at cafeteria storage room closet | No Asbestos Detected |
| 21. Rough ceiling plaster at cafeteria storage room closet | No Asbestos Detected |
| 22. Rough ceiling plaster at auditorium mechanical room | No Asbestos Detected |
| 23. Rough ceiling plaster at auditorium mechanical room | No Asbestos Detected |
| 24. Rough ceiling plaster at auditorium mechanical room | No Asbestos Detected |

| | |
|---|---|
| 25. Textured ceiling plaster at auditorium | 15% Asbestos |
| 26. Textured ceiling plaster at auditorium | 10% Asbestos |
| 27. Textured ceiling plaster at auditorium entry hall | 15% Asbestos |
| 28. Textured ceiling plaster at auditorium entry hall | 15% Asbestos |
| 29. Textured ceiling plaster at auditorium lobby | No Asbestos Detected |
| 30. Textured ceiling plaster at auditorium lobby | 10% Asbestos |
| 31. Textured ceiling plaster at auditorium lobby | No Asbestos Detected |
| 32. Hard wall plaster at room 101 | No Asbestos Detected |
| 33. Hard wall plaster at room 104 | No Asbestos Detected |
| 34. Hard wall plaster at projector room | No Asbestos Detected |
| 35. Hard wall plaster at room 204 | No Asbestos Detected |
| 36. Hard wall plaster at room 301 | No Asbestos Detected |
| 37. Hard wall plaster at room 306 | No Asbestos Detected |
| 38. Hard wall plaster at room 307 | No Asbestos Detected |
| 39. Hard ceiling plaster at projector room | No Asbestos Detected |
| 40. Hard ceiling plaster at second floor custodian closet | No Asbestos Detected |
| 41. Hard ceiling plaster at third floor custodian closet | No Asbestos Detected |
| 42. 2’ x 2’ Suspended acoustical ceiling tile at auditorium side stairwell | No Asbestos Detected |
| 43. 2’ x 2’ Suspended acoustical ceiling tile at convent stairwell | No Asbestos Detected |
| 44. 1’ x 1’ Acoustical ceiling tile at room 203 | No Asbestos Detected |
| 45. 1’ x 1’ Acoustical ceiling tile at third floor hallway | No Asbestos Detected |
| 46. Joint compound at room 204 | No Asbestos Detected |
| 47. Joint compound at room 301 | No Asbestos Detected |
| 48. Science lab counter top at room 204 | No Asbestos Detected |
| 49. Science lab counter top at room 204 | No Asbestos Detected |
| 50. Black sink coating at room 201A | 2% Asbestos |
| 51. Black sink coating at library | 2% Asbestos |
| 52. Interior window glazing caulking at library | <1% Asbestos |
| 53. Interior window glazing caulking at second floor hallway | <1% Asbestos |
| 54. Tan 12” x 12” vinyl floor tile at room 101 | No Asbestos Detected |
| 55. Tan 12” x 12” vinyl floor tile at cafeteria | No Asbestos Detected |
| 56. Yellow glue for tan 12” x 12” vinyl floor tile at room 101 | No Asbestos Detected |
| 57. Yellow glue for tan 12” x 12” vinyl floor tile at cafeteria | No Asbestos Detected |
| 58. Green 12” x 12” vinyl floor tile type I at room 110 | No Asbestos Detected |
| 59. Green 12” x 12” vinyl floor tile type I at room 203 | No Asbestos Detected |
| 60. Green 12” x 12” vinyl floor tile type II at room 107 | No Asbestos Detected |
| 61. Green 12” x 12” vinyl floor tile type II at room 107 | No Asbestos Detected |
| 62. Beige 12” x 12” vinyl floor tile type I at room 201A | No Asbestos Detected |
| 63. Beige 12” x 12” vinyl floor tile type I at room 206 | No Asbestos Detected |
| 64. Yellow glue for beige 12” x 12” vinyl floor tile type I at room 201A | No Asbestos Detected |
| 65. Yellow glue for beige 12” x 12” vinyl floor tile type I at room 206 | No Asbestos Detected |
| 66. White 12” x 12” vinyl floor tile at room 209 | No Asbestos Detected |
| 67. White 12” x 12” vinyl floor tile at room 209 | No Asbestos Detected |
| 68. Light grey 12” x 12” vinyl floor tile at room 302 | No Asbestos Detected |
| 69. Light grey 12” x 12” vinyl floor tile at room 307 | No Asbestos Detected |
| 70. Black mastic for light grey 12” x 12” vinyl floor tile at room 302 | No Asbestos Detected |
| 71. Black mastic for light grey 12” x 12” vinyl floor tile at room 307 | No Asbestos Detected |
| 72. Blue 12” x 12” vinyl floor tile at basement entry | No Asbestos Detected |
| 73. Blue 12” x 12” vinyl floor tile at auditorium side stairwell | No Asbestos Detected |
| 74. 9” x 9” Vinyl floor tile at room 207 | 6% Asbestos |
| 75. 9” x 9” Vinyl floor tile at third floor closet | 5% Asbestos |
| 76. Mastic for 9” x 9” vinyl floor tile at room 207 | 4% Asbestos |
| 77. Mastic for 9” x 9” vinyl floor tile at third floor closet | 7% Asbestos |
| 78. Brown 9” x 9” vinyl floor tile at second floor main office closet | 10% Asbestos |

| | | |
|---|---|---|
| 79. | Brown 9” x 9” vinyl floor tile at convent stairwell | 8% Asbestos |
| 80. | Mastic for brown 9” x 9” vinyl floor tile at second floor main office closet | 8% Asbestos |
| 81. | Mastic for brown 9” x 9” vinyl floor tile at convent stairwell | 7% Asbestos |

February 25, 2019
Twenty (20) bulk samples were collected from the following materials suspected of containing asbestos:

**Type and Location of Material**

1. Flashing protruding from outside wall
2. Black glue in fiberglass insulated duct at large mechanical room
3. Black glue in fiberglass insulated duct at large mechanical room
4. Linoleum floor covering at room 301
5. Mastic for linoleum floor covering at room 301
6. Linoleum floor covering at room 202
7. Mastic for linoleum floor covering at room 202
8. Old vinyl baseboard at first floor hallway
9. Mastic for old vinyl baseboard at first floor hallway
10. Old vinyl baseboard at second floor hallway
11. Mastic for old vinyl baseboard at second floor hallway
12. 1’ x 1’ Acoustical ceiling tile at second floor hallway
13. 1’ x 1’ Acoustical ceiling tile at first floor kitchen
14. Grey 9” x 9” vinyl floor tile at stairwell by door 11
15. Mastic for grey 9” x 9” vinyl floor tile at stairwell by door 11
16. Soft ceiling plaster at stairwell by room 301
17. Glue daub for 1’ x 1’ acoustical ceiling tile at first floor
18. Glue daub for 1’ x 1’ acoustical ceiling tile at first floor
19. Black paper under hardwood floor at stage
20. Black paper under hardwood floor at stage

***Samples Results***

| | **Type and Location of Material** | **Sample Result** |
|---|---|---|
| 1. | Flashing protruding from outside wall | No Asbestos Detected |
| 2. | Black glue in fiberglass insulated duct at large mechanical room | No Asbestos Detected |
| 3. | Black glue in fiberglass insulated duct at large mechanical room | No Asbestos Detected |
| 4. | Linoleum floor covering at room 301 | No Asbestos Detected |
| 5. | Mastic for linoleum floor covering at room 301 | No Asbestos Detected |
| 6. | Linoleum floor covering at room 202 | No Asbestos Detected |
| 7. | Mastic for linoleum floor covering at room 202 | No Asbestos Detected |
| 8. | Old vinyl baseboard at first floor hallway | No Asbestos Detected |
| 9. | Mastic for old vinyl baseboard at first floor hallway | No Asbestos Detected |
| 10. | Old vinyl baseboard at second floor hallway | No Asbestos Detected |
| 11. | Mastic for old vinyl baseboard at second floor hallway | No Asbestos Detected |
| 12. | 1’ x 1’ Acoustical ceiling tile at second floor hallway | No Asbestos Detected |
| 13. | 1’ x 1’ Acoustical ceiling tile at first floor kitchen | No Asbestos Detected |
| 14. | Grey 9” x 9” vinyl floor tile at stairwell by door 11 | 3% Asbestos |
| 15. | Mastic for grey 9” x 9” vinyl floor tile at stairwell by door 11 | 5% Asbestos |
| 16. | Soft ceiling plaster at stairwell by room 301 | 3% Asbestos |
| 17. | Glue daub for 1’ x 1’ acoustical ceiling tile at first floor | No Asbestos Detected |
| 18. | Glue daub for 1’ x 1’ acoustical ceiling tile at first floor | No Asbestos Detected |
| 19. | Black paper under hardwood floor at stage | No Asbestos Detected |
| 20. | Black paper under hardwood floor at stage | No Asbestos Detected |

***Observations and Conclusions:***
All ACM must be removed by a Massachusetts licensed asbestos abatement contractor under the supervision of a Massachusetts licensed project monitor prior to any renovation or demolition activities that might disturb the ACM.

1. Generator exhaust insulation at boiler room was found to contain asbestos.
2. Tank insulation at boiler room was found to contain asbestos.
3. Boiler exhaust insulation at boiler room was found to contain asbestos.
4. Generator duct vibration cloth at boiler room was found to contain asbestos.
5. Spray-on ceiling at boiler room was found to contain asbestos.
6. Textured ceiling plaster at auditorium area was found to contain asbestos.
7. Black sink coating was found to contain asbestos.
8. Interior window glazing caulking was found to contain <1% asbestos. Per DEP the caulking would have to be disposed as asbestos.
9. Interior caulking within windows in doors was assumed to contain asbestos.
10. 9" x 9" Vinyl floor tile was found to contain asbestos.
11. Mastic for 9" x 9" vinyl floor tile was found to contain asbestos.
12. Brown 9" x 9" vinyl floor tile was found to contain asbestos.
13. Mastic for brown 9" x 9" vinyl floor tile was found to contain asbestos.
14. Multiple layers of flooring exist and old 9" x 9" vinyl floor tile was assumed to contain asbestos.
15. Soft ceiling plaster was found to contain asbestos.
16. Ceramic tiles grout and adhesive were assumed to contain asbestos.
17. Glue holding blackboard was assumed to contain asbestos.
18. Insulation inside old incinerator was assumed to contain asbestos.
19. Insulation inside boilers was assumed to contain asbestos.
20. Exterior window framing and glazing caulking at the vacant portion of the building was previously found to contain asbestos.
21. Exterior door framing caulking at the vacant portion of the building was previously found to contain asbestos.
22. Exterior unit vent grille caulking at the vacant portion of the building was previously found to contain asbestos.
23. Underground sewer pipes were assumed to contain asbestos.
24. Damproofing on exterior and foundation walls was assumed to contain asbestos. The demolition contractor will have to segregate the ACM from non-ACM building surfaces for proper disposal in an EPA approved landfill that does not recycle. A non-traditional abatement plan would have to be prepared and submitted to the DEP for approval.
25. Testing was not performed of the roof to avoid damage. Therefore, roofing was assumed to contain asbestos. However, roofing does not have to be removed by a licensed asbestos abatement contractor. Roofing material does not have to be removed by a licensed asbestos contractor. However, the General 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.
26. All other suspect materials were found not to contain asbestos. Hidden ACM may be found during renovation and demolition activities.

**Polychlorinated Biphenyls (PCB's)-Electrical Equipment and Light Fixtures:**
***Observations and Conclusions:***
Visual inspection of various equipments 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 to contain PCB's. Tubes in light fixtures, thermostats, signs and switches were assumed to contain mercury. It would be very costly to test those equipments and dismantling would be required to access. Therefore, the above mentioned equipments should be considered to contain PCB's and mercury and disposed in an EPA approved landfill as part of the demolition project.

**PCB's in Caulking:**
PCB's are manmade chemicals that were widely produced and distributed across the country from the 1950s to 1977 until the production of PCB's was banned by the US Environmental Protection Agency (EPA) law which became effective in 1978. PCB's are a class of chemicals made up of more than 200 different compounds. PCB's are non-flammable, stable, and good insulators so they were widely used in a variety of products including electrical transformers and capacitors, cable and wire coverings, sealants and caulking, and household products such as television sets and fluorescent light fixtures. Because of their chemical properties, PCB's are not very soluble in water and they do not break down easily in the environment. PCB's also do not readily evaporate into air but tend to remain as solids or thick liquids. Even though PCB's have not been produced or used in the country for more than 30 years, they are still present in the environment in the air, soil, and water and in our food. EPA requires that all construction waste including caulking be disposed as PCB's if PCB's level exceed 50 mg/kg (ppm). An abatement plan might also be required.

***Observations and Conclusions:***
Building materials and caulking were previously found to contain PCB's. Exterior brick was previously tested, and PCB's was found to have leached into the brick.

**Lead Based Paint (LBP):**
***Observations and Conclusions:***
LBP was assumed to exist on painted surfaces in all areas constructed prior to 1978. 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 floor exists in the school.

**Underground Oil Storage Tank:**
***Observations and Conclusions:***
One underground storage oil tank exists. No records were found to review size or condition.

**COST ESTIMATES:**
The cost includes removal and disposal of all accessible ACM and an allowance for removal of inaccessible or hidden ACM that may be found during the demolition or renovation project. **The estimated costs do not include PCB's related work.**

| Location | Material | Approximate Quantity | Cost Estimate ($) |
|---|---|---|---|
| Throughout | 9" x 9" Vinyl Floor Tile and Mastic | 15,000 SF | 75,000.00 |
| | Multiple Layers of Flooring | 3,500 SF | 21,000.00 |
| | Interior Windows | 135 Total | 27,000.00 |
| | Interior Doors with Windows | 125 Total | 25,000.00 |
| | Chalkboards/Tackboards | 290 Total | 72,500.00 |
| | Sinks | 15 Total | 1,500.00 |
| | Hidden and Miscellaneous HAZ MAT | Unknown | 75,000.00 |
| Various Locations | Soft/Textured Ceiling Plaster | 11,000 SF | 220,000.00 |

| Location | Material | Approximate Quantity | Cost Estimate ($) |
|---|---|---|---|
| Kitchen | Old Incinerator | 1 Total | 7,500.00 |
| Boiler Room | Tank Insulation | 120 SF | 3,000.00 |
| | Duct Insulation | 300 SF | 7,500.00 |
| | Generator Exhaust Insulation | 25 LF | 1,000.00 |
| | Vibration Cloth | 16 LF | 700.00 |
| | Fireproofing | 2,200 SF | 44,000.00 |
| | Boilers | 2 Total | 18,000.00 |
| Garage | Fireproofing | 2,000 SF | 40,000.00 |
| Exterior | Windows (Vacant Building) | 235 Total | 70,500.00 |
| | Doors (Vacant Building) | 10 Total | 2,000.00 |
| | Unit Vent Grills (Vacant Building) | 2 Total | 500.00 |
| Exterior | Transite Sewer Pipes | Unknown[1] | 50,000.00 |
| | Roofing Materials | 60,000 SF[2] | 180,000.00 |
| | Damproofing on Exterior/Foundation Walls | Unknown[1] | 675,000.00 |
| | Oil Tank | 1 Total | 25,000.00 |
| Estimated costs for ACM Inspection and Testing Services | | | 17,500.00 |
| Estimated costs for Design, Construction Monitoring and Air Sampling Services | | | 165,800.00 |
| | | **Total:** | **1,825,000.00** |

[1]: Part of total demolition and Excavation.

[2]: Estimated.

## 4.0 DESCRIPTION OF SURVEY METHODS AND LABORATORY ANALYSES:

Asbestos samples were collected using a method that prevents fiber release. Homogeneous sample areas were determined by criteria outlined in EPA document 560/5-85-030a.

Bulk material samples were analyzed using PLM and dispersion staining techniques with EPA method 600/M4-82-020.

## 5.0 LIMITATIONS AND CONDITIONS:

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

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

Inspected By:

Jason Becotte
Asbestos Inspector (AI-034963)

Inspected By:

Leonard J. Busa
Asbestos Inspector (AI-030673)

OrderID: 131802039

131802039

# 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

48-hour TAT

Town/City: Newton, MA Building Name Aquinas School

| Sample | Result | Description of Material | Sample Location |
|---|---|---|---|
| 1 | | Generater exhaust Insulation | Boiler room |
| 2 | | " | " |
| 3 | | " | " |
| 4 | | Tank Insulation | Boiler room |
| 5 | | " | " |
| 6 | | " | " |
| 7 | | Boiler exhaust Insulation | Boiler room |
| 8 | | " | " |
| 9 | | " | " |
| 10 | | Hard Joint Pipe insulation | Boiler room |
| 11 | | " | " |
| 12 | | " | Auditorium mechanical room |
| 13 | | Generater duct vibration cloth | Boiler room |
| 14 | | " | " |
| 15 | | Spray-on ceiling | Boiler room |
| 16 | | " | " |
| 17 | | " | " |
| 18 | | " | " |
| 19 | | " | " |
| 20 | | Rough Plaster | Cafeteria Storage Closet |

Reported By: Jason Becotte Date: 4-20-18 Due Date: ----------

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

REC'D EMSL-BOSTON APR 20 2018

OrderID: 131802039

131802039

# CHAIN OF CUSTODY


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


PLM

Town/City: Newton, MA Building Name Aquinas School

| Sample | Result | Description of Material | Sample Location |
|---|---|---|---|
| 21 | | Rough Plaster | Cafeteria storage closet |
| 22 | | " | Auditorium Mechanical Room |
| 23 | | " | " |
| 24 | | " | " |
| 25 | | Textured ceiling plaster | Auditorium |
| 26 | | " | " |
| 27 | | " | Auditorium entry hall |
| 28 | | " | " |
| 29 | | " | Auditorium Lobby rear exit hallway |
| 30 | | " | " |
| 31 | | " | " |
| 32 | | Hard wall Plaster | Room 101 |
| 33 | | " | Room 104 |
| 34 | | " | Projector room |
| 35 | | " | Room 204 |
| 36 | | " | Room 301 |
| 37 | | " | Room 306 |
| 38 | | " | Room 307 |
| 39 | | Hard ceiling plaster | Projector room |
| 40 | | " | 2nd fl. Custodian closet |

Reported By: Jason Becotte Date: 4-20-18 Due Date: ----------

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

REC'D 11:14:00 EMSL-BOSTON APR 20 2018

OrderID: 131802039

131802039

# CHAIN OF CUSTODY


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


PLM

Town/City: Newton, MA Building Name: Aquinas School

| Sample | Result | Description of Material | Sample Location |
|---|---|---|---|
| 41 | | ~~Hard~~ Hard ceiling Plaster | 3rd fl. Custodian Closet |
| 42 | | 2x2 SAT | Auditorium side stairwell |
| 43 | | " " | Convent Stairwell |
| 44 | | 1x1 AT ceiling | Room 203 |
| 45 | | " " | 3rd fl. Hallway |
| 46 | | Joint Compound | Room 204 |
| 47 | | " " | Room 301 |
| 48 | | Science lab countertop | Room 204 |
| 49 | | " " | Room 204 |
| 50 | | Black sink coating | Room 201A Faculty |
| 51 | | " " | Library |
| 52 | | Interior window glaze | Library |
| 53 | | " " | 3rd fl. Hallway |
| 54 | | Tan 12x12 VFT | Room 101 |
| 55 | | " " | Cafeteria |
| 56 | | Yellow glue | On #54 |
| 57 | | " " | on #55 |
| 58 | | Green 12x12 VFT Type 1 | Room 110 |
| 59 | | " " | Room 203 |
| 60 | | Green 12x12 VFT Type 2 | Room 107 |

Reported By: Jason Beattie Date: 4-20-18 Due Date: ----------

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

REC'D 11:14:00 EMSL-BOSTON APR 20 2018

OrderID: 131802039

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# CHAIN OF CUSTODY


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PLM

Town/City: Newton, MA Building Name: Aquinas School

| Sample | Result | Description of Material | Sample Location |
|---|---|---|---|
| 61 | | Green 12x12 VFT Type 2 | Room 107 |
| 62 | | Beige 12x12 VFT | Room 201 A Faculty |
| 63 | | " " | Room 206 |
| 64 | | Yellow glue | on # 62 |
| 65 | | " " | on # 63 |
| 66 | | White 12x12 VFT | Room 209 |
| 67 | | " " | " |
| 68 | | Light Gray 12x12 VFT | Room 302 |
| 69 | | " " | Room 307 |
| 70 | | Black mastic | on # 68 |
| 71 | | " " | on # 69 |
| 72 | | Blue 12x12 VFT | Basement entry |
| 73 | | " " | Auditorium side stairwell |
| 74 | | White w/colors 9x9 VFT | Room 207 |
| 75 | | " " | 3rd Fl. Dean office closet |
| 76 | | Black mastic | on # 74 |
| 77 | | " " | on # 75 |
| 78 | | Brown 9x9 VFT | 2nd fl. main office closet |
| 79 | | " " | Convent stair well |
| 80 | | Black mastic | on # 78 |
| 81 | | " " | on # 79 |

Reported By: Jason Beattie Date: 4-20-18 Due Date:

Received By: Date:

REC'D 11 14:00 EMSL-BOSTON APR 20 2018

# 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:** | 131802039 |
| **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:** | 04/20/2018 2:00 PM |
| | Framingham, MA 01702 | **Analysis Date:** | 04/23/2018 - 04/24/2018 |
| | | **Collected Date:** | |
| **Project:** | Aquinas School - Newton, MA | | |

## *Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy*

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **% Fibrous** | **% Non-Fibrous** | **% Type** |
| 1<br>*131802039-0001* | Boiler Room - Generator Exhaust Insulation | Pink<br>Fibrous<br>Homogeneous | | 90% Non-fibrous (Other) | 10% Amosite |
| 2<br>*131802039-0002* | Boiler Room - Generator Exhaust Insulation | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 40% Non-fibrous (Other) | 10% Chrysotile |
| 3<br>*131802039-0003* | Boiler Room - Generator Exhaust Insulation | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 40% Non-fibrous (Other) | 10% Chrysotile |
| 4<br>*131802039-0004* | Boiler Room - Tank Insulation | Gray<br>Fibrous<br>Homogeneous | | 60% Non-fibrous (Other) | 40% Chrysotile |
| 5<br>*131802039-0005* | Boiler Room - Tank Insulation | Gray<br>Fibrous<br>Homogeneous | | 60% Non-fibrous (Other) | 40% Chrysotile |
| 6<br>*131802039-0006* | Boiler Room - Tank Insulation | Gray<br>Fibrous<br>Homogeneous | 15% Glass | 45% Non-fibrous (Other) | 40% Chrysotile |
| 7<br>*131802039-0007* | Boiler Room - Boiler Exhaust Insulation | Gray<br>Fibrous<br>Homogeneous | | 60% Non-fibrous (Other) | 40% Chrysotile |
| 8<br>*131802039-0008* | Boiler Room - Boiler Exhaust Insulation | Gray<br>Fibrous<br>Homogeneous | | 60% Non-fibrous (Other) | 40% Chrysotile |
| 9<br>*131802039-0009* | Boiler Room - Boiler Exhaust Insulation | Gray<br>Fibrous<br>Homogeneous | | 60% Non-fibrous (Other) | 40% Chrysotile |
| 10<br>*131802039-0010* | Boiler Room - Hard Joint Pipe Insulation | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 50% Non-fibrous (Other) | None Detected |
| 11<br>*131802039-0011* | Boiler Room - Hard Joint Pipe Insulation | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 50% Non-fibrous (Other) | None Detected |
| 12<br>*131802039-0012* | Auditorium Mechanical Room - Hard Joint Pipe Insulation | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 50% Non-fibrous (Other) | None Detected |
| 13<br>*131802039-0013* | Boiler Room - Generator Duct Vibration Cloth | Gray<br>Fibrous<br>Homogeneous | | 10% Non-fibrous (Other) | 90% Chrysotile |
| 14<br>*131802039-0014* | Boiler Room - Generator Duct Vibration Cloth | Gray<br>Fibrous<br>Homogeneous | | 10% Non-fibrous (Other) | 90% Chrysotile |
| 15<br>*131802039-0015* | Boiler Room - Spray-on Ceiling | White<br>Fibrous<br>Homogeneous | 20% Min. Wool | 25% Non-fibrous (Other) | 50% Amosite<br>5% Chrysotile |
| 16<br>*131802039-0016* | Boiler Room - Spray-on Ceiling | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 10% Non-fibrous (Other) | 40% Amosite |

Initial report from: 04/24/2018 17:07:09

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

**EMSL Order:** 131802039
**Customer ID:** UEC63
**Customer PO:**
**Project ID:**

## *Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy*

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **% Fibrous** | **% Non-Fibrous** | **% Type** |
| 17<br>*131802039-0017* | Boiler Room - Spray-on Ceiling | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 10% Non-fibrous (Other) | 40% Amosite |
| 18<br>*131802039-0018* | Boiler Room - Spray-on Ceiling | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 10% Non-fibrous (Other) | 40% Amosite |
| 19<br>*131802039-0019* | Boiler Room - Spray-on Ceiling | Gray<br>Fibrous<br>Homogeneous | 50% Min. Wool | 10% Non-fibrous (Other) | 40% Amosite |
| 20<br>*131802039-0020* | Cafeteria Storage Closet - Rough Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 75% Quartz<br>25% Non-fibrous (Other) | None Detected |
| 21<br>*131802039-0021* | Cafeteria Storage Closet - Rough Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 75% Quartz<br>25% Non-fibrous (Other) | None Detected |
| 22<br>*131802039-0022* | Auditorium Mechanical Room - Rough Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 75% Quartz<br>25% Non-fibrous (Other) | None Detected |
| 23<br>*131802039-0023* | Auditorium Mechanical Room - Rough Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 75% Quartz<br>25% Non-fibrous (Other) | None Detected |
| 24<br>*131802039-0024* | Auditorium Mechanical Room - Rough Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 50% Quartz<br>50% Non-fibrous (Other) | None Detected |
| 25<br>*131802039-0025* | Auditorium - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | | 40% Ca Carbonate<br>45% Non-fibrous (Other) | 15% Chrysotile |
| 26<br>*131802039-0026* | Auditorium - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | | 20% Ca Carbonate<br>70% Non-fibrous (Other) | 10% Chrysotile |
| 27<br>*131802039-0027* | Auditorium Entry Hall - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | | 20% Ca Carbonate<br>65% Non-fibrous (Other) | 15% Chrysotile |
| 28<br>*131802039-0028* | Auditorium Entry Hall - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | | 20% Ca Carbonate<br>65% Non-fibrous (Other) | 15% Chrysotile |
| 29<br>*131802039-0029* | Auditorium Lobby Rear Exit Hallway - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | 10% Cellulose | 20% Ca Carbonate<br>70% Non-fibrous (Other) | None Detected |
| 30<br>*131802039-0030* | Auditorium Lobby Rear Exit Hallway - Textured Ceiling Plaster | Gray<br>Fibrous<br>Homogeneous | | 20% Ca Carbonate<br>70% Non-fibrous (Other) | 10% Chrysotile |
| 31<br>*131802039-0031* | Auditorium Lobby Rear Exit Hallway - Textured Ceiling Plaster | White<br>Non-Fibrous<br>Homogeneous | | 5% Quartz<br>15% Ca Carbonate<br>80% Non-fibrous (Other) | None Detected |
| 32<br>*131802039-0032* | Room 101 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | | 45% Ca Carbonate<br>12% Gypsum<br>43% Non-fibrous (Other) | None Detected |
| 33-Skim Coat<br>*131802039-0033* | Room 104 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 20% Ca Carbonate<br>55% Gypsum<br>23% Non-fibrous (Other) | None Detected |
| 33-Base Coat<br>*131802039-0033A* | Room 104 - Hard Wall Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 55% Quartz<br>2% Ca Carbonate<br>14% Gypsum<br>29% Non-fibrous (Other) | None Detected |

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**EMSL Order:** 131802039
**Customer ID:** UEC63
**Customer PO:**
**Project ID:**

## *Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy*

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **% Fibrous** | **% Non-Fibrous** | **% Type** |
| 34-Skim Coat<br>*131802039-0034* | Projector Room - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 3% Quartz<br>15% Ca Carbonate<br>54% Gypsum<br>28% Non-fibrous (Other) | None Detected |
| 34-Base Coat<br>*131802039-0034A* | Projector Room - Hard Wall Plaster | Gray<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 58% Quartz<br>17% Ca Carbonate<br>10% Gypsum<br>13% Non-fibrous (Other) | None Detected |
| 35<br>*131802039-0035* | Room 204 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | | 18% Ca Carbonate<br>60% Gypsum<br>22% Non-fibrous (Other) | None Detected |
| 36-Skim Coat<br>*131802039-0036* | Room 301 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | | 12% Ca Carbonate<br>55% Gypsum<br>33% Non-fibrous (Other) | None Detected |
| 36-Base Coat<br>*131802039-0036A* | Room 301 - Hard Wall Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 60% Quartz<br>7% Ca Carbonate<br>18% Gypsum<br>15% Non-fibrous (Other) | None Detected |
| 37<br>*131802039-0037* | Room 306 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 15% Ca Carbonate<br>62% Gypsum<br>23% Non-fibrous (Other) | None Detected |
| 38-Skim Coat<br>*131802039-0038* | Room 307 - Hard Wall Plaster | White<br>Non-Fibrous<br>Homogeneous | | 20% Ca Carbonate<br>70% Gypsum<br>10% Non-fibrous (Other) | None Detected |
| 38-Base Coat<br>*131802039-0038A* | Room 307 - Hard Wall Plaster | Brown/Gray/Tan<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 60% Quartz<br>15% Ca Carbonate<br>25% Gypsum | None Detected |
| 39-Skim Coat<br>*131802039-0039* | Projector Room - Hard Ceiling Plaster | White<br>Non-Fibrous<br>Homogeneous | 4% Cellulose | 20% Ca Carbonate<br>55% Gypsum<br>21% Non-fibrous (Other) | None Detected |
| 39-Base Coat<br>*131802039-0039A*<br>*5* | Projector Room - Hard Ceiling Plaster | Gray<br>Non-Fibrous<br>Homogeneous | | 15% Ca Carbonate<br>60% Gypsum<br>25% Non-fibrous (Other) | None Detected |
| 40<br>*131802039-0040* | 2nd Fl. Custodian Closet - Hard Ceiling Plaster | Gray<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 56% Quartz<br>10% Ca Carbonate<br>25% Gypsum<br>7% Non-fibrous (Other) | None Detected |
| 41-Skim Coat<br>*131802039-0041* | 3rd Fl. Custodian Closet - Hard Ceiling Plaster | White<br>Non-Fibrous<br>Homogeneous | | 30% Ca Carbonate<br>55% Gypsum<br>15% Non-fibrous (Other) | None Detected |
| 41-Base Coat<br>*131802039-0041A* | 3rd Fl. Custodian Closet - Hard Ceiling Plaster | Brown/Gray/Tan<br>Non-Fibrous<br>Homogeneous | | 55% Quartz<br>10% Ca Carbonate<br>30% Gypsum<br>3% Mica<br>2% Non-fibrous (Other) | None Detected |
| 42<br>*131802039-0042* | Auditorium Side Stairwell - 2x2 SAT | Tan/White<br>Fibrous<br>Homogeneous | 50% Cellulose<br>10% Min. Wool | 10% Matrix<br>30% Non-fibrous (Other) | None Detected |
| 43<br>*131802039-0043* | Convent Stairwell - 2x2 SAT | Gray/White<br>Non-Fibrous<br>Homogeneous | 52% Cellulose | 10% Mica<br>38% Non-fibrous (Other) | None Detected |
| 44<br>*131802039-0044* | Room 203 - 1x1 AT Ceiling | Gray<br>Non-Fibrous<br>Homogeneous | 80% Min. Wool | 20% Non-fibrous (Other) | None Detected |
| 45<br>*131802039-0045* | 3rd Fl. Hallway - 1x1 AT Ceiling | Gray<br>Fibrous<br>Homogeneous | 81% Min. Wool | 19% Non-fibrous (Other) | None Detected |

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**Customer ID:** UEC63
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## *Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy*

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **% Fibrous** | **% Non-Fibrous** | **% Type** |
| 46<br>*131802039-0046* | Room 204 - Joint Compound | White/Green<br>Non-Fibrous<br>Heterogeneous | | 75% Ca Carbonate<br>3% Mica<br>7% Matrix<br>15% Non-fibrous (Other) | None Detected |
| 47<br>*131802039-0047* | Room 301 - Joint Compound | Tan/White<br>Non-Fibrous<br>Heterogeneous | | 70% Ca Carbonate<br>12% Mica<br>5% Matrix<br>13% Non-fibrous (Other) | None Detected |
| 48<br>*131802039-0048* | Room 204 - Science Lab Countertop | Tan/Black<br>Fibrous<br>Heterogeneous | 85% Cellulose | 8% Matrix<br>7% Non-fibrous (Other) | None Detected |
| 49<br>*131802039-0049* | Room 204 - Science Lab Countertop | Tan/Black<br>Fibrous<br>Heterogeneous | 80% Cellulose | 10% Matrix<br>10% Non-fibrous (Other) | None Detected |
| 50<br>*131802039-0050* | Room 201A Faculty - Black Sink Coating | Brown/Black<br>Fibrous<br>Homogeneous | | 15% Ca Carbonate<br>60% Matrix<br>23% Non-fibrous (Other) | 2% Chrysotile |
| 51<br>*131802039-0051* | Library - Black Sink Coating | Brown/Black<br>Fibrous<br>Homogeneous | | 15% Ca Carbonate<br>65% Matrix<br>17% Non-fibrous (Other) | 3% Chrysotile |
| 52<br>*131802039-0052* | Library - Interior Window Glaze | Gray/Tan/White<br>Fibrous<br>Homogeneous | 3% Cellulose<br>2% Glass | 45% Ca Carbonate<br>50% Non-fibrous (Other) | <1% Chrysotile |
| 53<br>*131802039-0053* | 3rd Fl. Hallway - Interior Window Glaze | Gray/Tan/White<br>Fibrous<br>Homogeneous | 4% Cellulose<br><1% Glass | 50% Ca Carbonate<br>46% Non-fibrous (Other) | <1% Chrysotile |
| 54<br>*131802039-0054* | Room 101 - Tan 12x12 VFT | Tan/White/Pink<br>Non-Fibrous<br>Homogeneous | 3% Cellulose | 25% Ca Carbonate<br>55% Gypsum<br>17% Non-fibrous (Other) | None Detected |
| 55<br>*131802039-0055* | Cafeteria - Tan 12x12 VFT | Brown/Tan/White<br>Fibrous<br>Homogeneous | 4% Cellulose | 20% Ca Carbonate<br>60% Gypsum<br>16% Non-fibrous (Other) | None Detected |
| 56<br>*131802039-0056* | On #54 - Yellow Glue | Tan/Yellow<br>Fibrous<br>Homogeneous | 2% Cellulose<br><1% Synthetic | 5% Quartz<br>75% Matrix<br>18% Non-fibrous (Other) | None Detected |
| 57<br>*131802039-0057* | On #55 - Yellow Glue | Brown/Gray/Tan<br>Fibrous<br>Homogeneous | 5% Cellulose | 10% Ca Carbonate<br>25% Gypsum<br>60% Non-fibrous (Other) | None Detected |
| 58<br>*131802039-0058* | Room 110 - Green 12x12 VFT Type 1 | White/Green<br>Fibrous<br>Homogeneous | <1% Cellulose | 15% Ca Carbonate<br>65% Gypsum<br>20% Non-fibrous (Other) | None Detected |
| 59<br>*131802039-0059* | Room 203 - Green 12x12 VFT Type 1 | White/Green<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 20% Ca Carbonate<br>70% Gypsum<br>10% Non-fibrous (Other) | None Detected |
| 60<br>*131802039-0060* | Room 107 - Green 12x12 VFT Type 2 | White/Green<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 20% Ca Carbonate<br>65% Gypsum<br>15% Non-fibrous (Other) | None Detected |
| 61<br>*131802039-0061* | Room 107 - Green 12x12 VFT Type 2 | White/Green<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 25% Ca Carbonate<br>60% Gypsum<br>13% Non-fibrous (Other) | None Detected |
| 62<br>*131802039-0062* | Room 201A Faculty - Beige 12x12 VFT | Gray/Tan/White<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 15% Ca Carbonate<br>70% Gypsum<br>15% Non-fibrous (Other) | None Detected |
| 63<br>*131802039-0063* | Room 206 - Beige 12x12 VFT | Gray/Tan/White<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 20% Ca Carbonate<br>65% Gypsum<br>15% Non-fibrous (Other) | None Detected |

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**Customer ID:** UEC63
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**Project ID:**

## *Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy*

| | | | Non-Asbestos | | Asbestos |
|---|---|---|---|---|---|
| **Sample** | **Description** | **Appearance** | **% Fibrous** | **% Non-Fibrous** | **% Type** |
| 64<br>*131802039-0064* | On #62 - Yellow Glue | Tan/Yellow<br>Fibrous<br>Homogeneous | 4% Cellulose | 7% Quartz<br>70% Matrix<br>19% Non-fibrous (Other) | None Detected |
| 65<br>*131802039-0065* | On #63 - Yellow Glue | Tan/Yellow<br>Non-Fibrous<br>Homogeneous | 3% Cellulose | 7% Quartz<br>65% Matrix<br>25% Non-fibrous (Other) | None Detected |
| 66<br>*131802039-0066* | Room 209 - White 12x12 VFT | White<br>Non-Fibrous<br>Homogeneous | | 75% Ca Carbonate<br>25% Non-fibrous (Other) | None Detected |
| 67<br>*131802039-0067* | Room 209 - White 12x12 VFT | White<br>Non-Fibrous<br>Homogeneous | | 72% Ca Carbonate<br>28% Non-fibrous (Other) | None Detected |
| 68<br>*131802039-0068* | Room 302 - Light Gray 12x12 VFT | Gray<br>Non-Fibrous<br>Homogeneous | | 75% Ca Carbonate<br>25% Non-fibrous (Other) | None Detected |
| 69<br>*131802039-0069* | Room 307 - Light Gray 12x12 VFT | Gray<br>Non-Fibrous<br>Homogeneous | | 70% Ca Carbonate<br>30% Non-fibrous (Other) | None Detected |
| 70<br>*131802039-0070* | On #68 - Black Mastic | Black<br>Non-Fibrous<br>Homogeneous | | 50% Matrix<br>50% Non-fibrous (Other) | None Detected |
| 71<br>*131802039-0071* | On #69 - Black Mastic | Black<br>Non-Fibrous<br>Homogeneous | | 55% Matrix<br>45% Non-fibrous (Other) | None Detected |
| 72<br>*131802039-0072* | Basement Entry - Blue 12x12 VFT | Blue<br>Non-Fibrous<br>Homogeneous | | 80% Ca Carbonate<br>20% Non-fibrous (Other) | None Detected |
| 73<br>*131802039-0073* | Auditorium Side Stairwell - Blue 12x12 VFT | Blue<br>Non-Fibrous<br>Homogeneous | | 78% Ca Carbonate<br>22% Non-fibrous (Other) | None Detected |
| 74<br>*131802039-0074* | Room 207 - White w/Colors 9x9 VFT | Tan/White/Green<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 15% Ca Carbonate<br>60% Gypsum<br>17% Non-fibrous (Other) | 6% Chrysotile |
| 75<br>*131802039-0075* | 3rd Fl. Dean Office Closet - White w/Colors 9x9 VFT | Tan/White/Pink<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 20% Ca Carbonate<br>65% Gypsum<br>10% Non-fibrous (Other) | 5% Chrysotile |
| 76<br>*131802039-0076*<br>*Yellow mastic present on Floor Tile. Only black mastic analyzed.* | On #74 - Black Mastic | Black<br>Fibrous<br>Heterogeneous | 2% Cellulose | 10% Quartz<br>65% Matrix<br>19% Non-fibrous (Other) | 4% Chrysotile |
| 77<br>*131802039-0077* | On #75 - Black Mastic | Black<br>Fibrous<br>Homogeneous | 2% Cellulose | 10% Quartz<br>70% Matrix<br>11% Non-fibrous (Other) | 7% Chrysotile |
| 78<br>*131802039-0078* | 2nd Fl. Main Office Closet - Brown 9x9 VFT | Brown/Gray/Tan<br>Non-Fibrous<br>Homogeneous | <1% Cellulose | 25% Ca Carbonate<br>55% Gypsum<br>10% Non-fibrous (Other) | 10% Chrysotile |
| 79<br>*131802039-0079* | Convent Stairwell - Brown 9x9 VFT | Brown/Gray/Tan<br>Non-Fibrous<br>Homogeneous | 2% Cellulose | 20% Ca Carbonate<br>60% Gypsum<br>10% Non-fibrous (Other) | 8% Chrysotile |
| 80<br>*131802039-0080* | On #78 - Black Mastic | Tan/Black<br>Fibrous<br>Homogeneous | 3% Cellulose | 15% Quartz<br>60% Matrix<br>14% Non-fibrous (Other) | 8% Chrysotile |
| 81<br>*131802039-0081* | On #79 - Black Mastic | Tan/Black<br>Fibrous<br>Homogeneous | 2% Cellulose | 15% Quartz<br>65% Matrix<br>11% Non-fibrous (Other) | 7% Chrysotile |

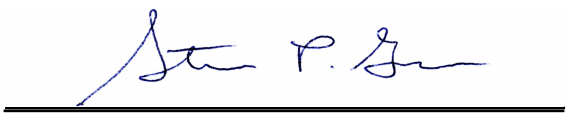
Initial report from: 04/24/2018 17:07:09

**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:** | 131802039 |
| **Customer ID:** | UEC63 |
| **Customer PO:** | |
| **Project ID:** | |

Analyst(s)

*Daniel Clarke (30)*
*Melvin Ramirez (25)*
*Tomas Montes De Oca (32)*



Steve Grise, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported 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. Interpretation and use of test results are the responsibility of the client. 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. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NVLAP Lab Code 101048-10, CA ELAP 2339, NYS ELAP 11469

Initial report from: 04/24/2018 17:07:09

# Asbestos Identification Laboratory

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

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com


**Batch:** 40218

NVLAP®
Lab Code: 200919-0

February 26, 2019

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

**Project Number:**
**Project Name:** NECP School - 150 Jackson Road, Newton, MA
**Date Sampled:** 2019-02-25
**Work Received:** 2019-02-26
**Work Analyzed:** 2019-02-26

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

Dear Ammar Dieb,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project .

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Ammar Dieb for your business.

Michael Manning
Owner/Director

February 26, 2019

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

**Project Number:**
**Project Name:** NECP School - 150 Jackson Road, Newton, MA
**Date Sampled:** 2019-02-25
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**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

| FieldID / LabID | Material | Location | Color | Non-Asbestos % | Asbestos % |
|---|---|---|---|---|---|
| 1 / 445456 | Interior Flashing Protruding from Outside Wal | Large Mech Rm 1st Fl | black | Non-Fibrous 100 | None Detected |
| 2 / 445457 | Black in FG DI | Large Mech Rm 1st Fl | black | Fiberglass 80<br>Cellulose 10<br>Non-Fibrous 10 | None Detected |
| 3 / 445458 | Black in FG DI | Large Mech Rm 1st Fl | black | Fiberglass 80<br>Cellulose 10<br>Non-Fibrous 10 | None Detected |
| 4 / 445459 | Linoleum | Rm 301 | multi | Cellulose 50<br>Non-Fibrous 50 | None Detected |
| 5 / 445460 | Mastic #4 | Rm 301 | brown | Non-Fibrous 100 | None Detected |
| 6 / 445461 | Linoleum | Rm 202 | multi | Cellulose 50<br>Non-Fibrous 50 | None Detected |
| 7 / 445462 | Mastic #6 | Rm 202 | brown | Non-Fibrous 100 | None Detected |
| 8 / 445463 | Old Vinyl Baseboard | 1st Fl Hall | brown | Non-Fibrous 100 | None Detected |
| 9 / 445464 | Mastic #8 | 1st Fl Hall | brown | Non-Fibrous 100 | None Detected |
| 10 / 445465 | Old VBB | 2nd Fl Hall | brown | Non-Fibrous 100 | None Detected |
| 11 / 445466 | Mastic #10 | 2nd Fl Hall | brown | Non-Fibrous 100 | None Detected |
| 12 / 445467 | 1.1 AT | 2nd Fl Hall | white | Mineral Wool 90<br>Cellulose 2<br>Non-Fibrous 8 | None Detected |
| 13 / 445468 | 1.1 AT | 1st Fl Kitchen | white | Mineral Wool 95<br>Non-Fibrous 5 | None Detected |
| 14 / 445469 | 9" Gray VT | Stairwell by Door 11 | gray | Non-Fibrous 97 | **Detected**<br>**Chrysotile 3** |

| FieldID / LabID | Material | Location | Color | Non-Asbestos % | Asbestos % |
|---|---|---|---|---|---|
| 15 / 445470 | Black Mastic #14 | Stairwell by Door 11 | black | Non-Fibrous 95 | **Detected** Chrysotile 5 |
| 16 / 445471 | Soft CP | SW by 301 | white | Non-Fibrous 97 | **Detected** Chrysotile 3 |
| 17 / 445472 | Glue Daub for 1.1 AT | 1st Flr Far End Room | brown | Non-Fibrous 100 | None Detected |
| 18 / 445473 | Glue Daub for 1.1 AT | 1st Flr Far End Room | brown | Non-Fibrous 100 | None Detected |
| 19 / 445474 | Black Paper under Hdwd Floor | Auditorium Stage, Occupied Side | black | Cellulose 70<br>Non-Fibrous 30 | None Detected |
| 20 / 445475 | Bl Paper under Hdwd Fl | Auditorium Stage, Occupied Side | black | Cellulose 70<br>Non-Fibrous 30 | None Detected |

Tuesday 26 February

Analyzed by: Erik Gongas

End of Report

**Batch:** 40218

# CHAIN OF CUSTODY


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


#1 – #18 = vacant side

Town/City: Newton, MA Building Name NECP school - 150 Jackson Road

| Sample | Result | Description of Material (exterior) | Sample Location |
|---|---|---|---|
| 1 | | flashing protruding from outside wall @ Large mech. rm | 1ST FL |
| 2 | | Black in FG (D1) | |
| 3 | | Black in FG (D1) | |
| 4 | | Linoleum | rm 301 |
| 5 | | mastic #4 | rm 301 |
| 6 | | Linoleum | rm 202 |
| 7 | | mastic #6 | rm 202 |
| 8 | | old vinyl baseboard | 1ST FL hall |
| 9 | | mastic #8 | " " |
| 10 | | old VCB | 2nd FL hall |
| 11 | | (m) #10 | " " |
| 12 | | 1.1 [AT] | 2nd FL hall |
| 13 | | 1.1 [AT] | 1ST FL Kitchen |
| 14 | | 9" grey VT | STAIRWELL by Door 11 |
| 15 | | Black (m) #14 | " " " |
| 16 | | soft CP | SW by 301 |
| 17 | | glue daub for 1.1 [AT] | 1st FL far end room |
| 18 | | glue daub for 1.1 [AT] | " " " |
| 19 | | Black paper under hdwd floor | auditorium stage (occupied side) |
| 20 | | BL paper under hdwd fl | " " " |

Reported By: [signature] Date: 2/25/19 Due Date: 24-hr

Received By: [signature] Date: 2/26/19

# D - INITIAL TRAFFIC STUDY & DATA

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

PRINCIPALS
Robert J. Michaud, P.E.
Ronald D. Desrosiers, P.E., PTOE
Daniel J. Mills, P.E., PTOE

# MEMORANDUM

**DATE:** May 23, 2019

**TO:** Ms. Jessica Bessette, AIA, LEED AP BD+C
Arrowstreet
10 Post Office Square, Suite 700N
Boston MA 02109

DRAFT

**FROM:** Daniel J. Mills, P.E., PTOE – Principal
Daniel A. Dumais, P.E. – Senior Project Manager

**RE:** **Proposed Lincoln-Eliot School Relocation and Expansion**
**150 Jackson Road – Newton, MA**

---

MDM Transportation Consultants, Inc. (MDM) has prepared this preliminary traffic and circulation assessment for the proposed relocation of the existing Lincoln-Eliot school (L-E) located at 191 Pearl Street to 150 Jackson Road in Newton, Massachusetts. The location of the proposed site relative to the adjacent roadway network is shown in **Figure 1.** This evaluation documents anticipated traffic generation characteristics and pick-up/drop-off operations for the proposed school relocation to 150 Jackson Road, quantifies incremental traffic increases of project on area roadways, reviews peak parking demands, and identifies recommended site access and circulation features to accommodate school traffic operations.

Key findings of the preliminary assessment are as follows:

- *Proposed Site Programming.* The L-E school proposes to expand its enrollment from 374 students to 465 students and expand from 35 staff to 80 staff. Site programming information for the existing L-E indicate the use of parent vehicles, staff vehicles and school vans. The school currently and will continue to have two critical study periods that include a typical morning drop-off peak hour (7:45 – 8:45 am) and a weekday afternoon peak hour (2:45 – 3:45 pm). Trip generation for the existing school during the critical weekday morning drop-off peak hour was 313 vehicle-trips (164 entering and 149 exiting), including 144 parent/guardian drop-off vehicles, 5 school vans and 15 staff vehicles. The actual number of concurrently vehicles parked onsite during the critical evening pick-up period was observed to be 89 vehicles broken down as follows; 5 vans, 35 staff vehicles, and 49 parent vehicles.

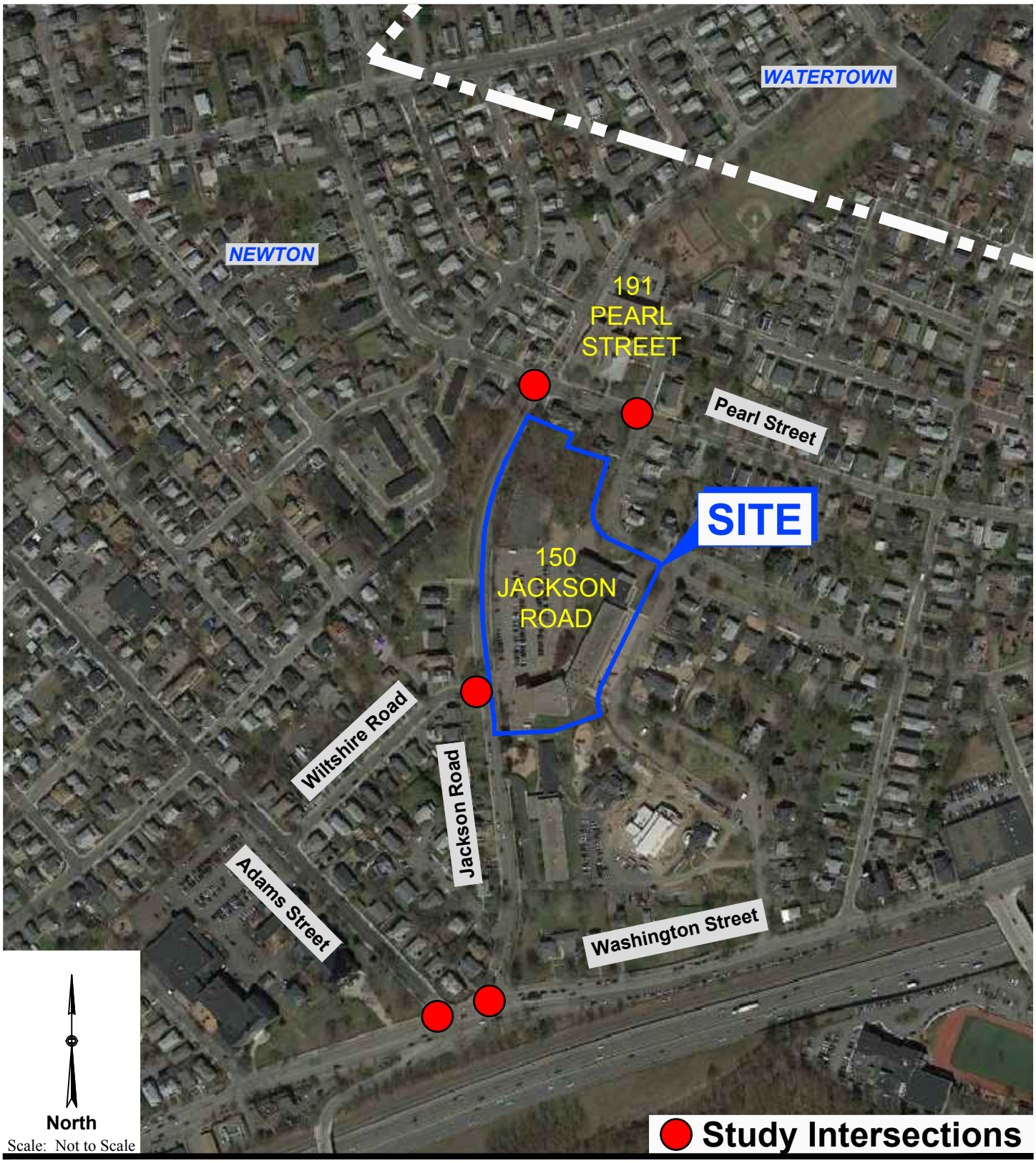


**Figure 1**

**Site Location**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Date: May 2019
Dwg No. 1022 Site Figure 1 - 150 Jackson.dwg
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- *Projected Trip Generation.* Trip generation for the expansion and relocation of the L-E is based on empirical observations conducted at the exiting L-E site (191 Pearl Street). With the proposed relocation and student/staff expansion in place, the projected peak design volumes for school pick-up/drop-off activity (i.e., trips that must be actively managed by L-E) will be 179 parent auto and 5 van trips during the weekday morning drop-off period, 94 parent auto and 5 van trips during the weekday afternoon pick-up period.

- *Site Access and Circulation.* Site access and circulation recommendations should be incorporated into the preliminary site plan to facilitate safe and efficient pedestrian and vehicle operations at the site. MDM recommends that the L-E develop a traffic management plan (TMP) aimed at enhancing school pick-up/drop-off operations, parking activity and site circulation including elements noted in this evaluation. MDM also recommends additions to the TMP plan as outlined under *Site Circulation and Parking Supply*.

- *Peak Parking Demand.* The peak parking demand for the proposed use of the Site is estimated at 142 parked vehicles (80 staff vehicles, 62 parent/guardian vehicles) during the critical evening pick-up period.

In summary, the replacement of the existing Newton Early Childhood Program (NECP) use at 150 Jackson Road with the Lincoln-Eliot school (L-E) use results in a moderate change in intersection volumes within the study area during the 7:45 to 8:45 am drop-off period and 2:45 to 3:45 pick-up period. The project will result in a reduction of trips in the area during the current NECP drop-off/pick-up periods. Peak parking demand for L-E are estimated to be 142 spaces based on observations conducted at the existing L-E facility at 191 Pearl Street with adjustment for projected student and staff increases at the 150 Jackson Road location. The preliminary parking plan utilizing the proposed on-site parking spaces is expected to accommodate the peak parking demands for L-E under typical peak pick-up/drop-off operating conditions.

## PROJECT DESCRIPTION

### Existing Conditions

The Lincoln-Eliot School (L-E) has an existing enrollment of 374± students and 40± staff at its 191 Pearl Street location. The existing operations are as follows:

- *L-E School Operations.* The general hours of operation for the L-E are 8:20 AM to 3:00 PM on Monday, Wednesday, Thursday, and Friday. On Tuesday's the school operates on half days from 8:20 AM to 1:00 PM.

- *Drop-Off Period*. The L-E drop-off period generally occurs between 7:45 AM to 8:30 AM.
- *Pick-Up Periods.* The L-E pick-up period generally occurs between 2:45 PM to 3:30 PM.
- *Staff Levels.* Staff includes approximately 35± total staff members.
- *Bus/Van Drop-Off/Pick-Up.* Approximately 5 vans service the school during the weekday morning drop-off period and afternoon pick-up periods. Traditional yellow school buses do not service the school at this time.

**Proposed Conditions**

Under the proposed development plan, the L-E school proposes to relocate to 150 Jackson Street (Site) from 191 Pearl Street and expand its enrollment to 465 students and 80 staff. The hours of operation and bus/van usage are expected to remain consistent with its existing operation at 191 Pearl Street Jackson Street.

## BASELINE TRAFFIC CHARACTERISTICS

An overview of existing (Baseline) roadway conditions, traffic volume characteristics and existing school operations for the L-E school is provided below.

**Baseline Traffic Data**

Traffic volume data was collected in January 2019 at the study area intersections during the weekday morning (7:00 AM - 9:00 AM) and weekday afternoon (2:00 PM to 4:00 PM) periods to coincide with peak traffic activity of the L-E school and the adjacent streets. Review of MassDOT permanent count station data indicates that January is a below-average traffic month (approximately 9 percent below average month conditions). An adjustment (9% increase) was made to the traffic counts to represent average conditions. The resulting Baseline weekday morning and weekday afternoon peak-hour traffic volumes for the study intersections are depicted in **Figure** 2 and **Figure 3**. Turning movement counts and permanent count station data are provided in the **Attachments**.

**Existing Trip Generation – L-E SCHOOL**

Existing site trips generated by L-E were observed during critical school activity periods including the weekday morning drop-off period and weekday afternoon pick-up period on Thursday, January 31, 2019 between 7:00 AM – 9:00 AM and 2:00 PM – 4:00 PM. A detailed trip generation summary for the site, based on the existing student enrollment of 374± students and approximately 35 staff, including a breakdown of vehicular trips by staff member, student pick-up/drop off and van service is presented in **Table 1** and described below.

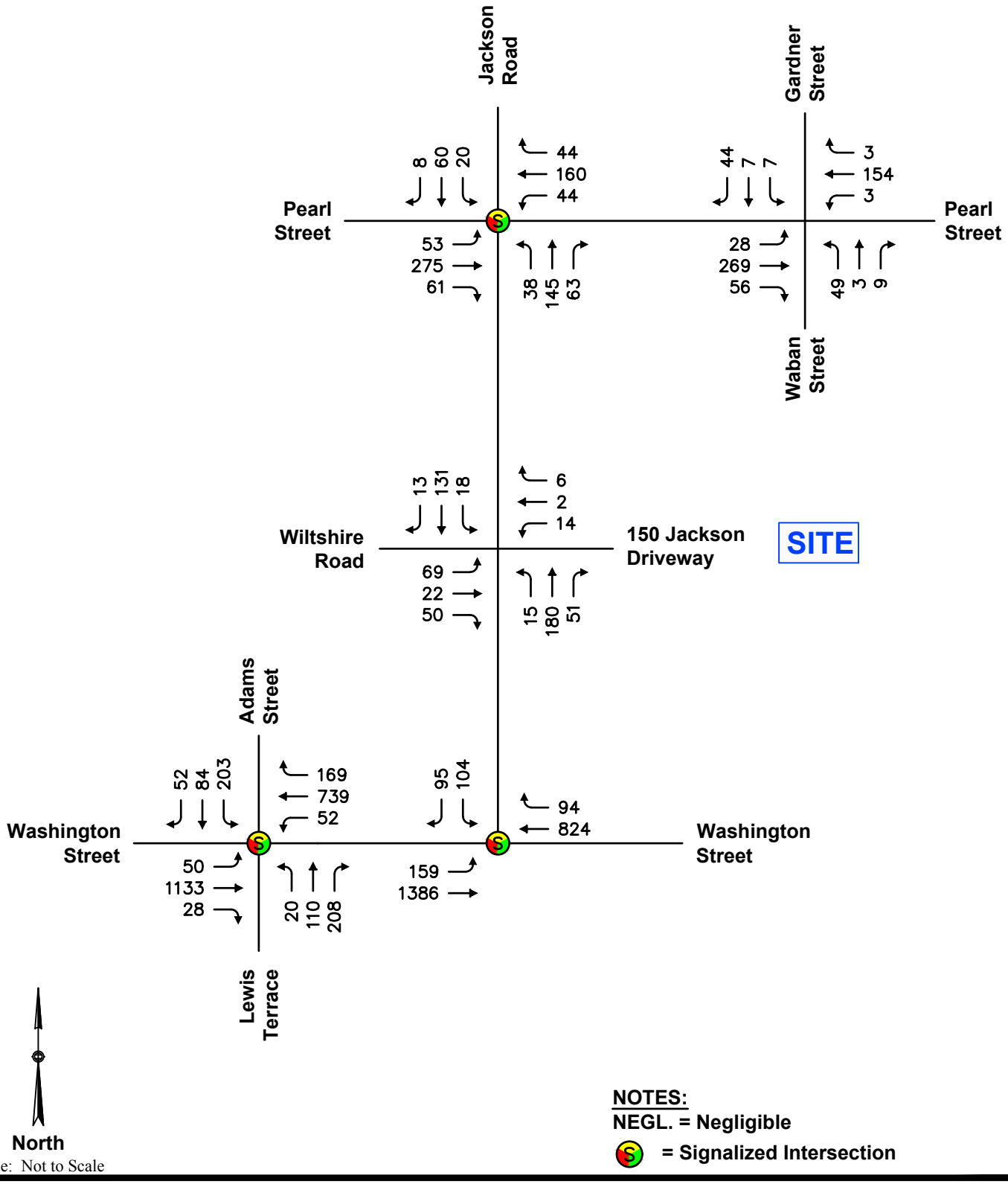


**Figure 2**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**2019 Baseline Conditions**
**Weekday Morning Peak Hour Volumes**
**150 Jackson Road**
**7:45 AM to 8:45 AM**

Date: May 2019
Dwg No. 1022 MR02 - Newton.dwg
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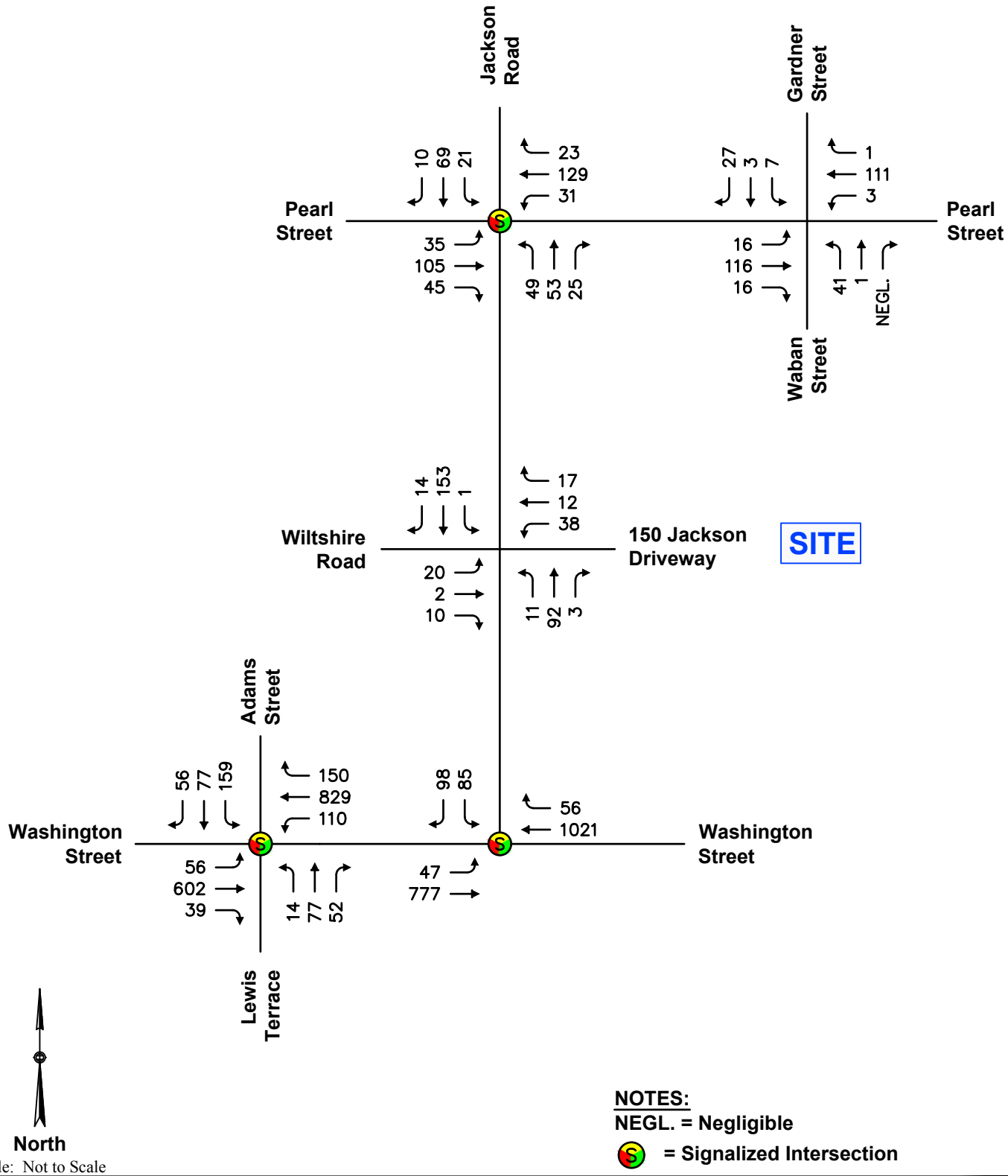


**Figure 3**

MDM TRANSPORTATION CONSULTANTS, INC.
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**2019 Baseline Conditions**
**Weekday Afternoon Peak Hour Volumes**
**150 Jackson Road**
**2:45 PM to 3:45 PM**

Date: May 2019
Dwg No. 1022 MR02 - Newton.dwg
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**TABLE 1**
**OBSERVED L-E SCHOOL TRIP-GENERATION – (191 PEARL STREET)**

| Period | Staff Auto | Student Auto | Van | Total |
|---|---|---|---|---|
| *Weekday Morning Drop-Off Period (7:45-8:45 AM):* | | | | |
| Enter | 15 | 144 | 5 | **164** |
| Exit | -- | 144 | 5 | **149** |
| Total | 15 | 288 | 10 | **313** |
| *Weekday Afternoon Pick-Up Period (2:45-3:45 PM):* | | | | |
| Enter | -- | 76 | 5 | **81** |
| Exit | 19 | 76 | 5 | **100** |
| Total | 19 | 152 | 10 | **181** |

[1]Peak hour trips based on empirical trip generation observed at L-E(191 Pearl Street) in January 31, 2019.

As presented in **Table 1,**

- *Weekday Morning Drop-Off Period.* Trip generation during the critical weekday morning drop-off peak hour was 313 vehicle-trips (164 entering and 149 exiting), including 144 parent/guardian drop-off vehicles, 5 school vans and 15 staff vehicles.

- *Weekday Afternoon Pick-up Period.* Trip generation during the weekday afternoon peak hour was 181 vehicle-trips (81 entering and 100 exiting), including 76 parent/guardian pick-up vehicles, 5 school vans and 19 staff vehicles.

Note that school staff also make trips to the site before, during and after the school day and therefore all staff do not necessarily arrive and depart during the peak traffic periods described above.

## DESIGN YEAR TRAFFIC VOLUMES

Design Year traffic conditions are developed by relocating the existing site trips generated by L-E at 191 Peak Street, including projected increase in staff and student enrollment, estimating likely travel patterns for these trips and adding them to the Baseline traffic networks. In addition, traffic volume for turning movements related to the existing Newton Early Childhood Program (NECP) school were reduced to account for that school's relocation to 687 Watertown Street. Given the future use of 191 Pearl Street as swing space for future school uses during renovations, no trip reduction was taken for the existing use of the 191 Pearl Street school property. Specific methodologies and assumptions used to estimate vehicle trip generation and trip distribution are discussed below.

## Projected Site Trip Generation – L-E SCHOOL

Trip generation (L-E) was projected for the critical school activity periods including the weekday morning drop-off period and weekday afternoon pick-up period. Based on L-E projections, student enrollment will increase to approximately 465 and staffing will increase to 80±. A detailed trip generation summary for the site, including a breakdown of vehicular trips by staff member, student pick-up/drop off and van service is presented in **Table 2** and is described below.

**TABLE 2**
**PROJECTED L-E SCHOOL TRIP-GENERATION (150 JACKSON ROAD)**

| Period | Staff Auto | Student Auto | Van | Total |
|---|---|---|---|---|
| *Weekday Morning Drop-Off Period (7:45-8:45 AM):* | | | | |
| Enter | 34 | 179 | 5 | **218** |
| Exit | -- | 179 | 5 | **184** |
| Total | 34 | 358 | 10 | **402** |
| *Weekday Afternoon Pick-Up Period (2:45-3:45 PM):* | | | | |
| Enter | -- | 94 | 5 | **99** |
| Exit | 43 | 94 | 5 | **142** |
| Total | 43 | 188 | 10 | **241** |

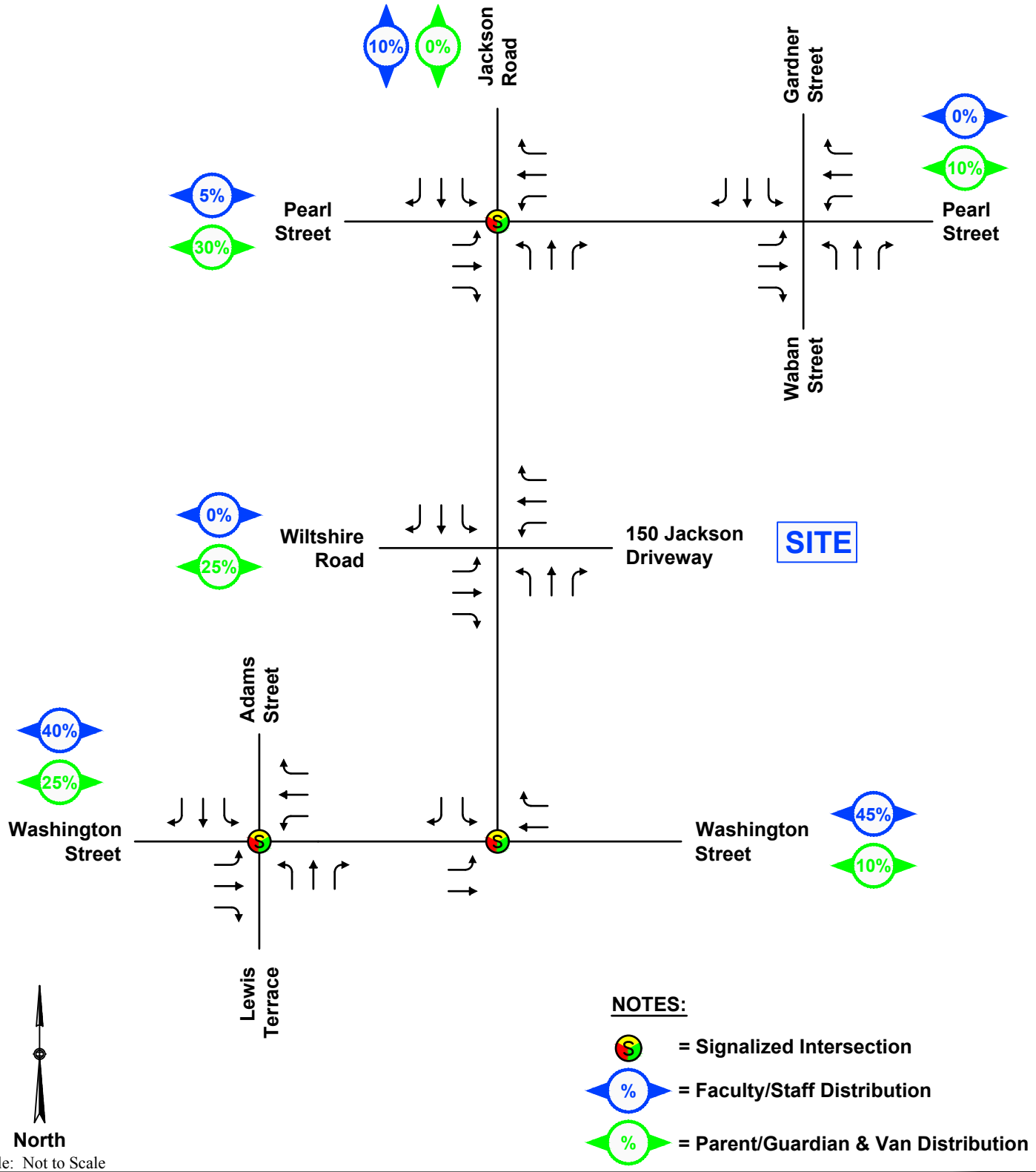
[1]Peak hour trips based on empirical trip generation observed at L-E school on January 31, 2019 with projected increases based on information provided by L-E staff.

As presented in **Table 2,**

- *Weekday Morning Drop-Off Period.* The relocated and expanded L-E school is estimated to generate 402 vehicle-trips (218 entering and 184 exiting) during the critical weekday morning drop-off peak hour.
- *Weekday Afternoon Pick-Up Period.* Trip generation during the weekday afternoon peak hour is estimated at 241 vehicle-trips (99 entering and 142 exiting).

## Trip Distribution

Trip distribution for the relocated and expanded L-E facility was derived by evaluating existing population data from the 2010 Census for the City of Newton which provides a breakdown of population centers by Census tract. The distribution also accounts for the existing roadway network and travel patterns within the area. Trip distribution for school staff are based on zip code information provided by L-E and likely travel routes. The estimated trip distribution pattern for the trips to/from the site are presented in **Figure 4**. Detailed calculations are provided in the **Attachments**.




Scale: Not to Scale

**Figure 4**

**Trip Distribution**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Date: May 2019
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**Design Year Traffic Volumes**

Site-Generated trips for the development were assigned to the roadway network using the trip-generation estimates shown in **Table 2** and the distribution patterns described above. The resulting site-generated traffic generation on area roadways for the weekday morning (drop-off period) and weekday afternoon (pick-up period) peak hours are presented in **Figure 5** and **Figure 6**.

The 2019 Design Year traffic volume networks were developed by reducing traffic volume for turning movements related to the existing NECP school (see **Attachments**) and adding the LE school projected site trips to the Baseline traffic volume networks. The resulting 2019 Design Year traffic volume networks are presented in **Figure 7** and **Figure 8**. Expected increase/decrease in traffic volumes between the propose L-E use and current NECP use are also represented on **Figure 7** and **Figure 8**.

## PARKING EVALUATION

The following parking evaluation includes a survey of existing L-E school parking activity during the weekday (7:00 – 9:00 AM and 2:00 – 4:00 PM) and quantifies the adequacy of the parking supply to meet the projected peak parking demands of L-E school at 150 Jackson Road. L-E currently enrolls approximately 374 students with approximately 35 staff. Based on L-E projections, school will increase to approximately 465 students and 80 staff. Based on the existing site conditions, 150 Jackson Road provides 160± space on-site lot not including the 46± space Newtonville Satellite Parking Lot or parking available in the rear of the school via Walnut Park.

**Existing (Baseline) Parking Observations – Lincoln-Eliot School**

In order to quantify current staff, parent and van parking demands for L-E, a parking accumulation survey was conducted at the existing L-E location (191 Pearl Street) on Thursday, January 31, 2019 (7:00 – 9:00 AM and 2:00 – 4:00 PM) to identify parking trends. The results of the survey are presented in **Table 3**. Detailed parking calculations are provided in the **Attachments**.

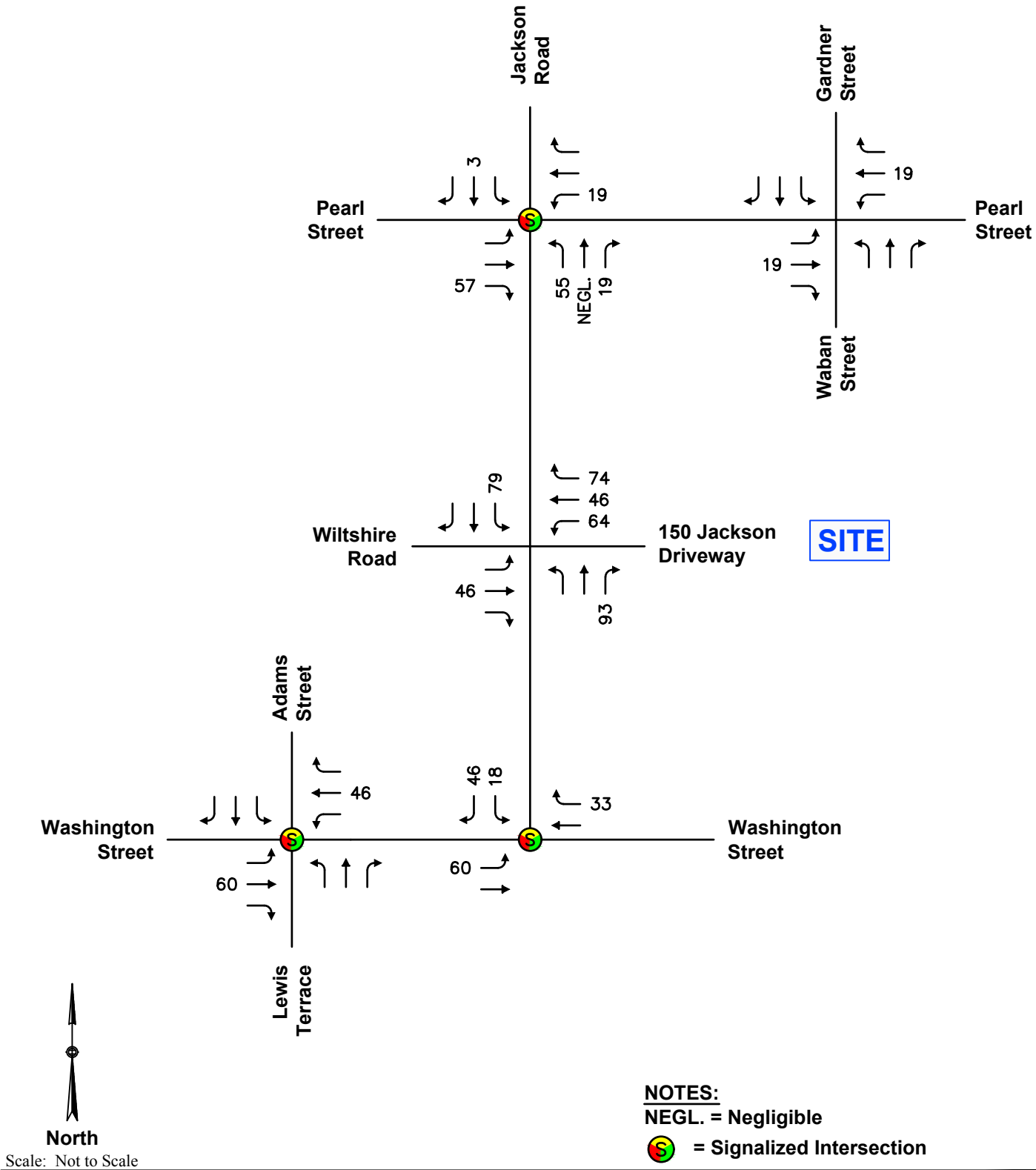


**Figure 5**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**Trip Generation**
**Weekday Morning Peak Hour Volumes**
**150 Jackson Road**
**7:45 AM to 8:45 AM**

Date: May 2019
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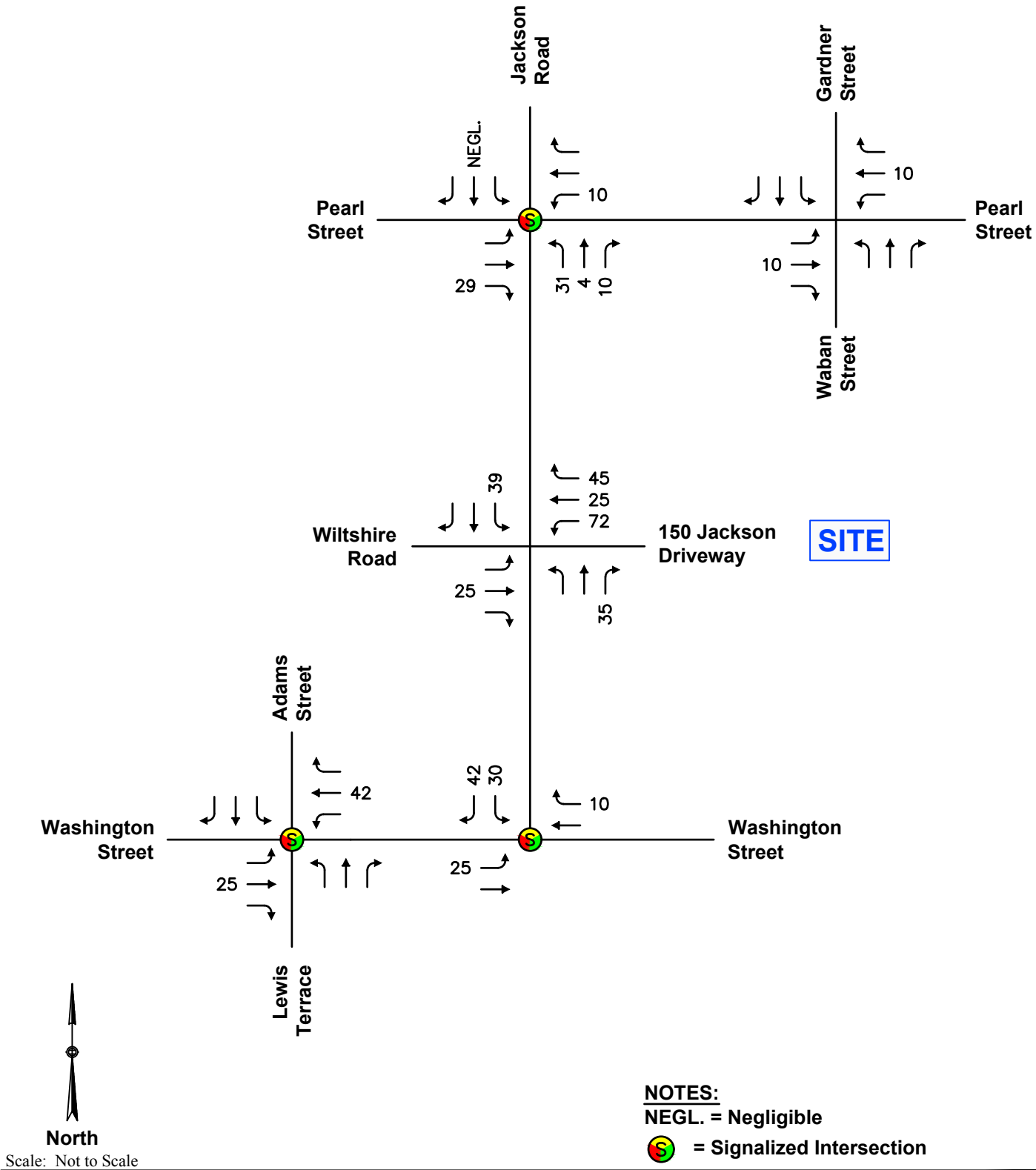


**Figure 6**

MDM TRANSPORTATION CONSULTANTS, INC.
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**Trip Generation**
**Weekday Afternoon Peak Hour Volumes**
**150 Jackson Road**
**2:45 PM to 3:45 PM**

Date: May 2019
Dwg No. 1022 MR02 - Newton.dwg
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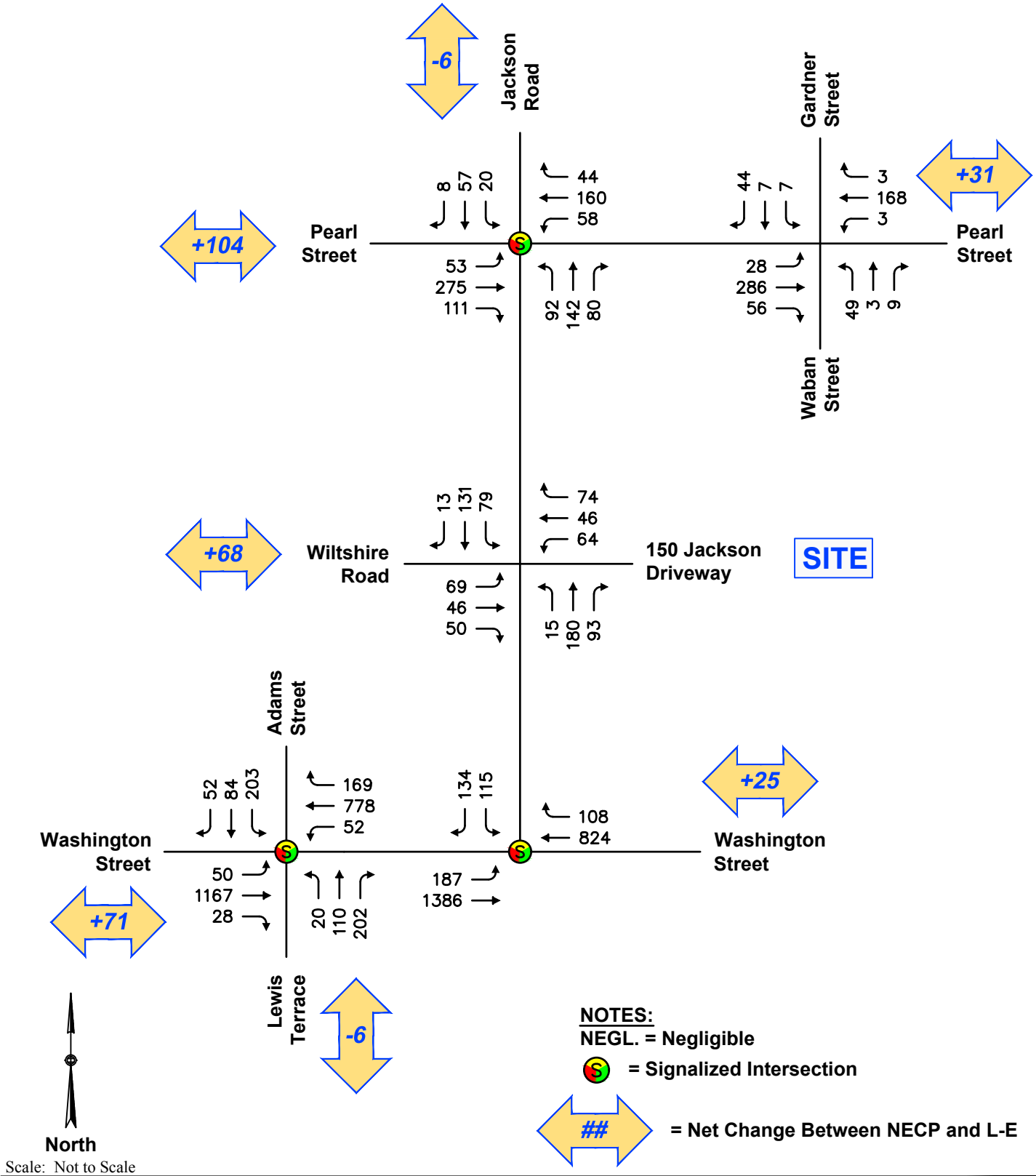


**Figure 7**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**2019 Design Year Conditions**
**Weekday Morning Peak Hour Volumes**
**150 Jackson Road**
**7:45 AM to 8:45 AM**

Date: May 2019
Dwg No. 1022 MR02 - Newton.dwg
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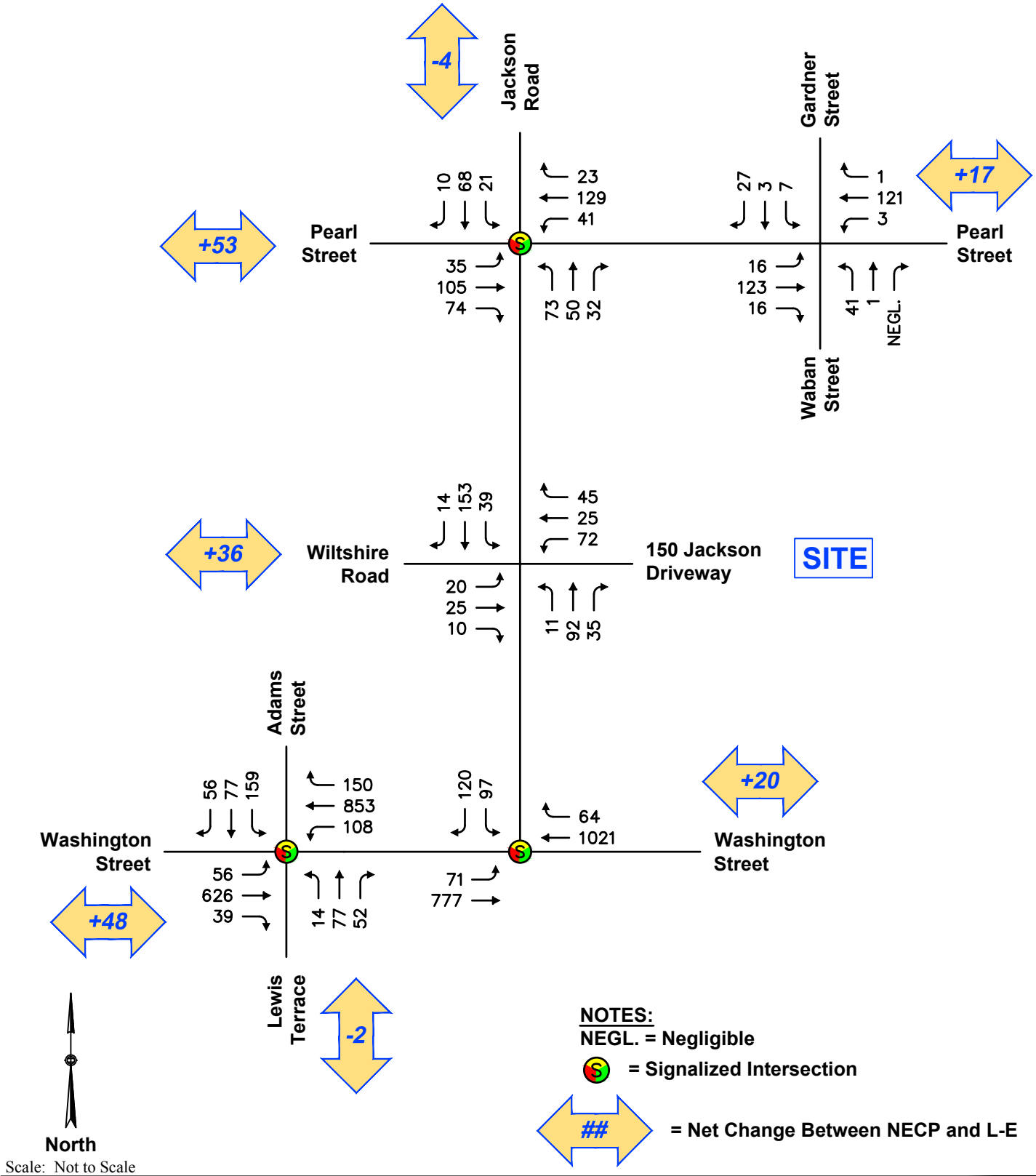


**Figure 8**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**2019 Design Year Conditions**
**Weekday Afternoon Peak Hour Volumes**
**150 Jackson Road**
**2:45 PM to 3:45 PM**

Date: May 2019
Dwg No. 1022 MR02 - Newton.dwg
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**TABLE 3**
**EXISTING PEAK PARKING DEMAND SUMMARY[1]**

| Period | Staff Auto | Student Auto | Van[2] | Total |
|---|---|---|---|---|
| *Weekday Morning Drop-Off Period (7:45 AM – 8:45 AM)* | 35 | 16 | 5 | 56 |
| *Weekday Afternoon Pick-Up Period (2:45 PM – 3:45 PM)* | 35 | 49 | 5 | 89 |

[1]Based on field observations of the existing Newton Early Childhood Program on Thursday, January 31, 2019
[2]Vans are estimated based on L-E data.

As summarized in **Table 3**:

- *Critical Parking Periods.* The critical parking period occurs during the afternoon pick-up period (2:45 PM – 3:45 PM) with 89 parked vehicles (35 staff vehicles and 49 parent/guardian vehicles).

- *Morning Drop-Off Period.* During the morning drop-off period the peak parking demand is 56 parked vehicles (35 staff vehicles, 16 parent/guardian vehicles).

- *Off-Peak Parking.* The L-E school generates a parking demand of approximately 35 staff vehicles outside the critical pick-up and drop-off periods.

**Projected Peak Parking Demand – Lincoln-Eliot School**

Projected peak parking demands for L-E school at 150 Jackson Road 687 Watertown Street was estimated based on observed L-E parking demands at 191 Pearl Street and projected parking demands associated with increased student enrollment and staffing levels. The L-E projected parking demand is presented in **Table 4**.

**TABLE 4**
**PROJECTED PEAK PARKING DEMAND**

| Period | Staff Auto | Student Auto | Van[2] | Total |
|---|---|---|---|---|
| *Weekday Morning Drop-Off Period (7:45 AM – 8:45 AM)* | 80 | 20 | 5 | 105 |
| *Weekday Afternoon Pick-Up Period (2:45 PM – 3:45 PM)* | 80 | 62 | 5 | 147 |

[1]Based on existing L-E peak parking demand (Table 3) with projected increases provided by LE staff.
[2]Vans are estimated based on L-E data.

As summarized in **Table 4**:

- *Critical Parking Periods.* The critical parking period will continue to occur during the afternoon pick-up period (2:45 PM – 3:45 PM) with 142 parked vehicles (80 staff vehicles and 62 parent/guardian vehicles).
- *Morning Drop-Off Period.* Estimated peak parking demand for the morning drop-off period is 100 parked vehicles (80 staff vehicles, 20 parent/guardian vehicles).
- *School Vans*. Note that school vans are expected to queue in a designated aisle on-site and therefore do not necessarily require a marked parking space.
- *Off-Peak Parking.* The L-E school will generate a parking demand of approximately 80 staff vehicles outside the critical pick-up and drop-off periods.

**Projected Parking Supply (150 Jackson Road)**

L-E school parking demand is expected to be accommodated within the 160± space on-site lot not including the 46± space Newtonville Satellite Parking Lot or parking available in the rear of the school via Walnut Park as described below:

- *Faculty and Staff Parking.*
  - 80± on-site parking spaces.
- *Parent/Guardian Pick-Up/Drop-Off.*
  - Morning drop-off period: 20± on-site parking spaces.
  - Afternoon pick-up period: 62± on-site parking spaces.
- *Van Loading and Unloading.*
  - Van loading/unloading will occur on-site within a designated aisle and should provide queue storage for a minimum of 5 vans.

In summary, the critical weekday afternoon pick-up period results in a total on-site parking demand of 142± parking spaces (staff and parent) which can accommodated within the on-site 160 space main parking field.

**SITE ACCESS AND CIRCULATION**

Site access and circulation recommendations should be incorporated into the preliminary site plan to facilitate safe and efficient pedestrian and vehicle operations at the site. MDM recommends that the L-E school develop a traffic management plan (TMP) aimed at enhancing school pick-up/drop off operations, parking activity and site circulation including elements noted in this evaluation. Key aspects of the Site Access and Circulation Plan and TMP should include the following:

- *Parking and Pick-Up/Drop-Off Operations*

  - The parent pick-up/drop-off area should be actively monitored by staff to direct parents to open spaces along within the designated on-site parking area and to discourage vehicles from stopping in undesignated areas on-site and along Jackson Road. It is recommended that the short term parent parking be located as close to the school as possible with the staff parking provided in the more remote parking areas.

  - Staff members should be available to direct students/parents to/from the school building entrances and the drop-off/pick-up areas as required.

  - Van pick-up/drop-off should take place within a dedicated van loading and unloading area.

  - Pedestrians crossing the Site Driveway and Jackson Street should be monitored by a crossing guard or staff during student arrival and dismissal periods. Pedestrian connections between the parking area and main entranceways should be provided. Likewise, a pedestrian connection from the main entranceway to the existing sidewalk system along Jackson Road, Waban Street, and Walnut Park should be provided.

  - Deliveries and trash removal should take place outside of school arrival and dismissal periods.

- *Designated Parking Areas*

  - Designate short-term/visitor parking spaces closest to the school within the on-site parking lot as required.

- 80 staff parking spaces are available on-site. It is recommended that the staff parking in the on-site parking lot arrive and depart outside of the peak periods in order to minimize conflicts during the peak drop-off/pick-up periods.

- All parking spaces should be actively managed to avoid conflicts during peak drop-off/pick-up periods.

□ *Transportation Demand Management Measures*

- Designate a Transportation Coordinator to oversee transportation issues, to provide up-to-date transit information to faculty (if applicable), to direct staff responsible for managing student drop-off/pick-up operations and, if necessary, to adjust the school's transportation policies and procedures.

- Provide on-site accommodations for bicyclists (e.g., storage racks, etc.) to encourage bicycle use by staff and/or student.

## CONCLUSIONS AND RECOMMENDATIONS

MDM finds that the following access and on-site circulation related improvements will enhance traffic operations and/or travel safety for the L-E school:

**Site Access/Pedestrian Accommodations**

□ *Jackson Road at Site Driveways.* MUTCD compliant signs and pavement markings are recommended at the driveway approach to Jackson Road. Signs and pavement markings should including a "STOP" sign (R1-1) and STOP line pavement markings. The driveway corner radii should be designed to accommodate the largest anticipated delivery vehicle, and emergency apparatus (i.e. fire trucks).

□ *Driveway Sight Lines.* Clear sight lines to/from driveways serving the site should be provided at all times. MDM recommends that any new plantings (shrubs, bushes) or physical landscape features (rock wall, etc.) to be located within the driveway sight lines, should also be maintained at a height of 2 feet or less above the adjacent existing roadway grade to ensure unobstructed lines of sight.

□ *Sidewalk Connections.* Pedestrian connections between the parking area and main entranceways should be provided. Likewise, a pedestrian connection from the main entranceway to the existing sidewalk system along Jackson Road, Waban Street, and Walnut Park should be provided.

- *Sign and Pavement Markings*. Review applicability and maintenance of sign and pavement markings, including School Zones, parking restrictions, student drop-off/pick-up designations along Jackson Road, Waban Street, and Walnut Park.

**Parking and Pick-Up/Drop-Off**

- *On-Site Parking.* Staff parking within the on-site parking lot should arrive and depart outside of the peak periods in order to minimize conflict during the peak drop-off/pick-up periods.

- *Van Loading/Unloading.* The van loading area should allow vans to be stacked on-site without on-site circulation or blockage of any pedestrian ways.

In summary, the replacement of the existing Newton Early Childhood Program (NECP) use with the Lincoln-Eliot school (L-E) use results in a moderate change in intersection volumes within the study area during the 7:45 to 8:45 am drop-off period and 2:45 to 3:45 pick-up period. The project will result in a reduction of vehicles in the area during current the NECP drop-off/pick-up periods. Peak parking demand for NECP are estimated to be 142 spaces based on observations conducted at the existing L-E facility at 191 Pearl Street with adjustment for projected student and staff increases at the 150 Jackson Road location. The preliminary parking plan utilizing the proposed on-site parking spaces is expected to accommodate the peak parking demands for L-E under typical peak pick-up/drop-off operating conditions.

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/17/2022**
**Count Technician:**

| | Zone #/ Number of Parked Cars | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | |
| Supply | | | | | | | | | | | |
| **7:30 AM** | | | | | | | | | | | |
| | | | | | | | | | | | |
| **7:45 AM** | 4 | 0 | 2 | 0 | 9 | 2 | 1 | 0 | 3 | 0 | 9 |
| | | | | | | | | | | | |
| **8:00 AM** | 5 | 0 | 4 | 0 | 9 | 5 | 1 | 0 | 3 | 1 | 14 |
| | | | | | | | | | | | |
| **8:15 AM** | 5 | 0 | 6 | 0 | 9 | 2 | 0 | 0 | 3 | 1 | 18 |
| | | | | | | | | | | | |
| **8:30 AM** | 5 | 0 | 5 | 0 | 9 | 2 | 0 | 0 | 4 | 4 | 10 |
| | | | | | | | | | | | |
| **8:45 AM** | 5 | 0 | 5 | 0 | 9 | 2 | 0 | 2 | 4 | 6 | 12 |
| | | | | | | | | | | | |
| **9:00 AM** | 5 | 0 | 5 | 0 | 9 | 2 | 0 | 5 | 10 | 13 | 20 |
| 9:06 AM | 5 | 0 | 5 | 0 | 9 | 2 | 0 | 1 | 10 | 5 | 18 |
| **Max Observed** | 5 | 0 | 6 | 0 | 9 | 5 | 1 | 5 | 10 | 13 | 20 |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle

Walnut Park - Straight Section adjacent to School Site = Walnut Park Pre-Loop
Walnut Park Loop - Full Loop South of Walnut Park

Jackson Road Breakdown:
North = North of Northern property line
At Site = Between Northern Property Line and Existing Southern Site Driveway
South = South of Existing Site Driveway, North of Washington St.

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/17/2022**
**Count Technician:**

| | Zone #/ Number of Parked Cars | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | |
| Supply | | | | | | | | | | | |
| **9:45 AM** | | | | | | | | | | | |
| | | | | | | | | | | | |
| **10:00 AM** | 4 | 0 | 5 | 0 | 9 | 2 | 0 | 0 | 5 | 1 | 7 |
| | | | | | | | | | | | |
| **10:15 AM** | 3 | 0 | 5 | 0 | 9 | 2 | 0 | 0 | 5 | 1 | 6 |
| | | | | | | | | | | | |
| **10:30 AM** | 3 | 0 | 5 | 0 | 9 | 2 | 0 | 1 | 4 | 1 | 7 |
| | | | | | | | | | | | |
| **10:45 AM** | 5 | 0 | 5 | 0 | 9 | 2 | 0 | 1 | 5 | 1 | 6 |
| | | | | | | | | | | | |
| **11:00 AM** | 6 | 0 | 5 | 0 | 9 | 2 | 0 | 1 | 6 | 2 | 7 |
| | | | | | | | | | | | |
| **11:15 AM** | | | | | | | | | | | |
| | | | | | | | | | | | |
| **Max Observed** | 6 | 0 | 5 | 0 | 9 | 2 | 0 | 1 | 6 | 2 | 7 |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle

81 Cars on 150 Jackson Road Site at 10:20 AM

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/17/2022**
**Count Technician:**

| | **Zone #/ Number of Parked Cars** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** | **Any Buses Spotted** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | | ***Note Where and How Many** |
| Supply | | | | | | | | | | | | |
| **2:10 PM** | 8 | 0 | 5 | 0 | 9 | 4 | 0 | 0 | 6 | 2 | 9 | |
| 2:20 PM | 9 | 0 | 5 | 1 | 9 | 4 | 1 | 0 | 7 | 1 | 11 | |
| **2:30 PM** | 8 | 0 | 5 | 1 | 9 | 4 | 2 | 1 | 6 | 5 | 21 | 1 at Walnut Park - Pre-Loop & 1 at Jackson Road - South-East |
| | | | | | | | | | | | | |
| **2:45 PM** | 8 | 0 | 5 | 1 | 8 | 7 | 4 | 2 | 6 | 2 | 10 | 1 at Walnut Park - In The Loop |
| 2:50 PM | 8 | 0 | 6 | 0 | 7 | 2 | 1 | 5 | 6 | 1 | 8 | 1 at Walnut Park - In The Loop |
| **3:00 PM** | 7 | 0 | 3 | 0 | 4 | 3 | 1 | 1 | 7 | 1 | 6 | 1 at Walnut Park - In The Loop |
| | | | | | | | | | | | | |
| **3:15 PM** | 8 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 5 | 1 | 4 | 1 at Walnut Park - In The Loop |
| | | | | | | | | | | | | |
| **3:30 PM** | 7 | 0 | 1 | 0 | 0 | 3 | 1 | 1 | 5 | 1 | 5 | 1 at Walnut Park - In The Loop |
| | | | | | | | | | | | | |
| **3:45 PM** | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Max Observed** | 9 | 0 | 6 | 1 | 9 | 7 | 4 | 5 | 7 | 5 | | |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle

31 Cars on 150 Jackson Road Site at 3:00 PM

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/23/2022**
**Count Technician:**

| | **Zone #/ Number of Parked Cars** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** | **Any Buses Spotted** | **Jackson Road** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | | ***Note Where and How Many** | **West of Lincoln-Eliot School** |
| Supply | | | | | | | | | | | | | |
| **7:30 AM** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **7:45 AM** | 6 | 0 | 0 | 0 | 12 | 4 | 2 | 0 | 5 | 1 | 12 | | |
| | | | | | | | | | | | | | |
| **8:00 AM** | 4 | 0 | 1 | 0 | 12 | 3 | 3 | 0 | 6 | 1 | 14 | | |
| | | | | | | | | | | | | | |
| **8:15 AM** | 3 | 0 | 3 | 0 | 12 | 2 | 1 | 0 | 6 | 0 | 16 | | 8 |
| | | | | | | | | | | | | | |
| **8:30 AM** | 3 | 0 | 1 | 0 | 12 | 2 | 0 | 0 | 7 | 0 | 14 | | 5 |
| | | | | | | | | | | | | | |
| **8:45 AM** | 3 | 0 | 1 | 0 | 12 | 2 | 0 | 0 | 7 | 0 | 7 | | 2 |
| | | | | | | | | | | | | | |
| **9:00 AM** | 3 | 0 | 1 | 0 | 12 | 2 | 0 | 0 | 7 | 0 | 6 | | |
| | | | | | | | | | | | | | |
| **Max Observed** | 6 | 0 | 3 | 0 | 12 | 4 | 3 | 0 | 7 | 1 | | | |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle
12 Vehicles at Site along Jackson Road clearly parked for access to construction of property across street from site

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/23/2022**
**Count Technician:**

| | **Zone #/ Number of Parked Cars** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** | **Any Buses Spotted** | **Jackson Road** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | | ***Note Where and How Many** | **West of Lincoln-Eliot School** |
| Supply | | | | | | | | | | | | | |
| **9:45 AM** | | 0 | 2 | 0 | 14 | 2 | 0 | | | | | | |
| | | | | | | | | | | | | | |
| **10:00 AM** | 8 | 0 | 1 | 0 | 15 | 2 | 0 | 0 | 7 | 1 | 7 | | 2 |
| | | | | | | | | | | | | | |
| **10:15 AM** | 7 | 0 | 1 | 0 | 16 | 3 | 0 | 0 | 7 | 1 | 6 | | |
| | | | | | | | | | | | | | |
| **10:30 AM** | 10 | 0 | 1 | 0 | 17 | 2 | 0 | 0 | 7 | 1 | 5 | | |
| | | | | | | | | | | | | | |
| **10:45 AM** | 9 | 0 | 1 | 0 | 12 | 2 | 0 | 1 | 7 | 1 | 6 | | 2 |
| | | | | | | | | | | | | | |
| **11:00 AM** | 11 | 0 | 2 | 0 | 15 | 2 | 0 | 0 | 7 | 1 | 7 | | 3 |
| | | | | | | | | | | | | | |
| **11:15 AM** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Max Observed** | 11 | 0 | 2 | 0 | 17 | 3 | 0 | 1 | 7 | 1 | | | |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle

Parking Study

Lincoln-Eliot School, Jackson Road and Surrounding Areas, Newton, MA

**Location:** **Lincoln-Eliot School, Jackson Road, Newton**
**Date:** **2/23/2022**
**Count Technician:**

| | Zone #/ Number of Parked Cars | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time** | **JFK Circle** | **Jackson Road** | | | | | | **Waban Road** | **Waban Park** | **Walnut Park Pre-Loop** | **Walnut Park Full Loop** | **Any Buses Spotted** | **Jackson Road** |
| | | **North-West** | **North-East** | **At Site - West** | **At Site - East** | **South-West** | **South-East** | | | | | ***Note Where and How Many** | **West of Lincoln-Eliot School** |
| Supply | | | | | | | | | | | | | |
| **2:15 PM** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **2:30 PM** | 11 | 0 | 3 | 0 | 10 | 7 | 1 | 0 | 5 | 2 | 27 | | 2 Buses |
| | | | | | | | | | | | | | |
| **2:45 PM** | 11 | 0 | 4 | 0 | 10 | 5 | 1 | 0 | 6 | 0 | 7 | 2 Buses at Lincoln-Eliot | 8 |
| 2:50 PM | | | | | | | | | | | | 2 Buses at Lincoln-Eliot | 10 |
| **3:00 PM** | 10 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 4 | 0 | 4 | 2 Buses at Lincoln-Eliot | 16 |
| | | | | | | | | | | | | | |
| **3:15 PM** | 8 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 4 | 1 | 2 | | 1 |
| | | | | | | | | | | | | | |
| **3:30 PM** | 6 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 4 | 1 | 3 | | 0 |
| | | | | | | | | | | | | | |
| **3:45 PM** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Max Observed** | 11 | 0 | 4 | 1 | 10 | 7 | 1 | 0 | 6 | 2 | | | |

Notes:

Construction of property across Jackson Road from our Site - Restricts parking along Jackson Road and along the loop of JFK Circle

At 3:15 PM: Lots of students/some staff outside of montessori school, clearly an after-school program

# MDM Transportation Consultants, Inc.

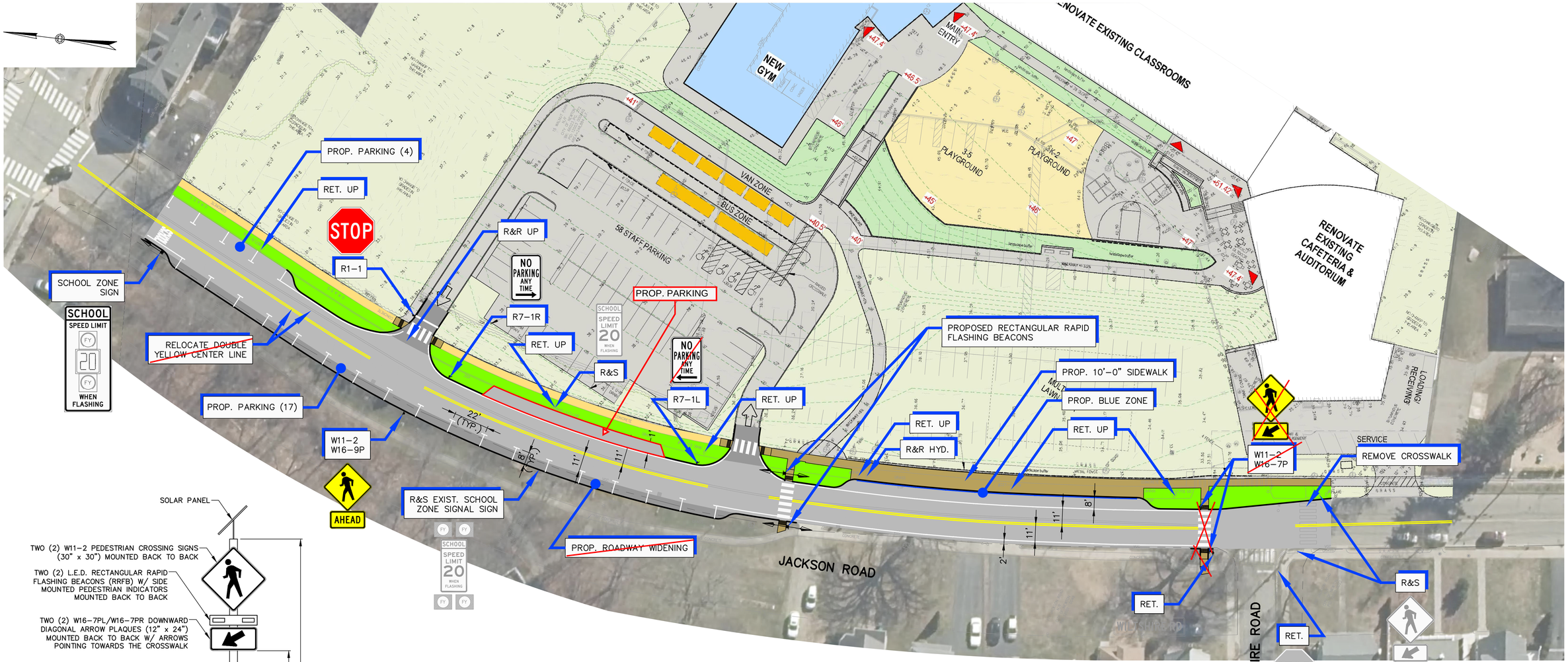
28 Lord Road, Suite 280
Marlborough, MA, 01752

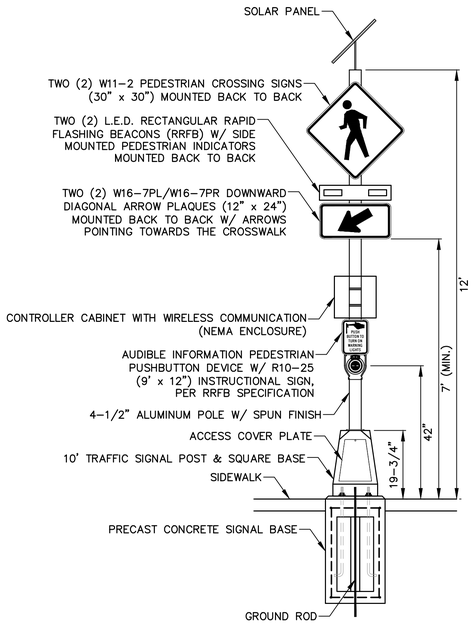
N/S: Jackson Road
North of 150 Jackson Driveway
Newton, MA

Site Code: 1193
Station ID: 1193

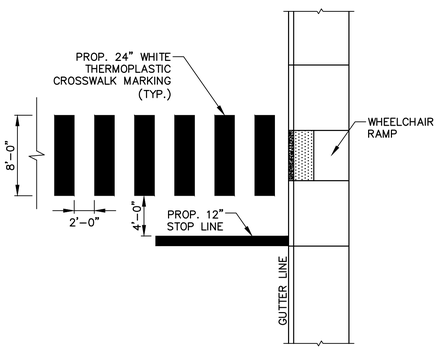
| Start Time | 17-Feb-22 Thu | Northbound Morning | Northbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Southbound Morning | Southbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 1 | 23 | | | 0 | 18 | | | | |
| 12:15 | | 0 | 21 | | | 1 | 17 | | | | |
| 12:30 | | 1 | 21 | | | 0 | 19 | | | | |
| 12:45 | | 0 | 13 | 2 | 78 | 1 | 13 | 2 | 67 | 4 | 145 |
| 01:00 | | 0 | 14 | | | 0 | 18 | | | | |
| 01:15 | | 0 | 19 | | | 1 | 27 | | | | |
| 01:30 | | 1 | 34 | | | 0 | 20 | | | | |
| 01:45 | | 0 | 21 | 1 | 88 | 0 | 18 | 1 | 83 | 2 | 171 |
| 02:00 | | 0 | 28 | | | 0 | 22 | | | | |
| 02:15 | | 1 | 23 | | | 0 | 30 | | | | |
| 02:30 | | 0 | 37 | | | 0 | 18 | | | | |
| 02:45 | | 0 | 39 | 1 | 127 | 1 | 30 | 1 | 100 | 2 | 227 |
| 03:00 | | 0 | 21 | | | 0 | 36 | | | | |
| 03:15 | | 0 | 21 | | | 0 | 23 | | | | |
| 03:30 | | 0 | 29 | | | 0 | 25 | | | | |
| 03:45 | | 0 | 27 | 0 | 98 | 0 | 37 | 0 | 121 | 0 | 219 |
| 04:00 | | 0 | 32 | | | 0 | 27 | | | | |
| 04:15 | | 0 | 22 | | | 0 | 35 | | | | |
| 04:30 | | 0 | 16 | | | 0 | 28 | | | | |
| 04:45 | | 1 | 31 | 1 | 101 | 0 | 37 | 0 | 127 | 1 | 228 |
| 05:00 | | 2 | 39 | | | 2 | 28 | | | | |
| 05:15 | | 2 | 23 | | | 0 | 32 | | | | |
| 05:30 | | 0 | 30 | | | 2 | 33 | | | | |
| 05:45 | | 2 | 31 | 6 | 123 | 3 | 41 | 7 | 134 | 13 | 257 |
| 06:00 | | 4 | 18 | | | 0 | 41 | | | | |
| 06:15 | | 4 | 21 | | | 2 | 19 | | | | |
| 06:30 | | 8 | 23 | | | 10 | 27 | | | | |
| 06:45 | | 11 | 20 | 27 | 82 | 7 | 23 | 19 | 110 | 46 | 192 |
| 07:00 | | 17 | 13 | | | 12 | 16 | | | | |
| 07:15 | | 14 | 10 | | | 21 | 18 | | | | |
| 07:30 | | 25 | 11 | | | 33 | 9 | | | | |
| 07:45 | | 35 | 16 | 91 | 50 | 30 | 5 | 96 | 48 | 187 | 98 |
| 08:00 | | 36 | 7 | | | 41 | 6 | | | | |
| 08:15 | | 55 | 9 | | | 36 | 8 | | | | |
| 08:30 | | 34 | 12 | | | 20 | 13 | | | | |
| 08:45 | | 22 | 13 | 147 | 41 | 35 | 6 | 132 | 33 | 279 | 74 |
| 09:00 | | 38 | 4 | | | 40 | 7 | | | | |
| 09:15 | | 30 | 9 | | | 22 | 8 | | | | |
| 09:30 | | 24 | 5 | | | 23 | 1 | | | | |
| 09:45 | | 24 | 3 | 116 | 21 | 14 | 6 | 99 | 22 | 215 | 43 |
| 10:00 | | 16 | 6 | | | 13 | 6 | | | | |
| 10:15 | | 17 | 1 | | | 23 | 3 | | | | |
| 10:30 | | 16 | 1 | | | 9 | 3 | | | | |
| 10:45 | | 17 | 2 | 66 | 10 | 15 | 2 | 60 | 14 | 126 | 24 |
| 11:00 | | 19 | 4 | | | 24 | 2 | | | | |
| 11:15 | | 18 | 0 | | | 16 | 1 | | | | |
| 11:30 | | 15 | 1 | | | 16 | 2 | | | | |
| 11:45 | | 14 | 0 | 66 | 5 | 14 | 2 | 70 | 7 | 136 | 12 |
| Total | | 524 | 824 | | | 487 | 866 | | | 1011 | 1690 |
| Percent | | 38.9% | 61.1% | | | 36.0% | 64.0% | | | 37.4% | 62.6% |
| Total | | 524 | 824 | | | 487 | 866 | | | 1011 | 1690 |
| Percent | | 38.9% | 61.1% | | | 36.0% | 64.0% | | | 37.4% | 62.6% |
| Combined Total | | 1348 | | | | 1353 | | | | 2701 | |

# E - TRANSPORTATION CONCEPT

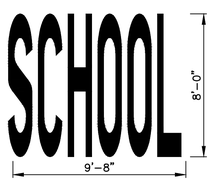



DETAIL FOR RECTANGULAR RAPID FLASHING BEACON (RRFB) W/ SOLAR POWER SOURCE
NOT TO SCALE




CROSSWALK PAVEMENT MARKING DETAIL
NOT TO SCALE




NOTE:
LEGEND = APPROX. 33 S.F. OF AREA

DETAIL FOR SCHOOL LEGEND
NOT TO SCALE

SCALE
0 15 30 60 90 FEET

## NOTES

1. THIS PLAN INTENDED FOR DISCUSSION PURPOSES ONLY; IT IS NOT FOR CONSTRUCTION.
2. FINAL DESIGN IS SUBJECT TO FIELD SURVEY BY OTHERS.
3. PROPERTY LINES AND ACCESS LINE LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DEED AND TITLE RECORDS.
4. BASE PLAN SOURCE: NITSCH ENGINEERING.

# Conceptual Roadway Improvements Plan

PROPOSED LINCOLN-ELIOT ELEMENTARY SCHOOL
JACKSON ROAD
NEWTON, MASSACHUSETTS
PREPARED FOR:
ARROWSTREET
10 POST OFFICE SQUARE, SUITE 700N
BOSTON, MASSACHUSETTS 02109

MDM TRANSPORTATION CONSULTANTS, INC.
PLANNERS & ENGINEERS
28 Lord Road, Suite 280
Marlborough, MA 01752
Tel: (508) 303-0370

| | | |
|---|---|---|
| Project No. 1193 | File: 1193 Concept Plan (2022-03-24).dwg | |
| Date: March 24, 2022 | Scale: As Noted | Sheet 1 of 1 |

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