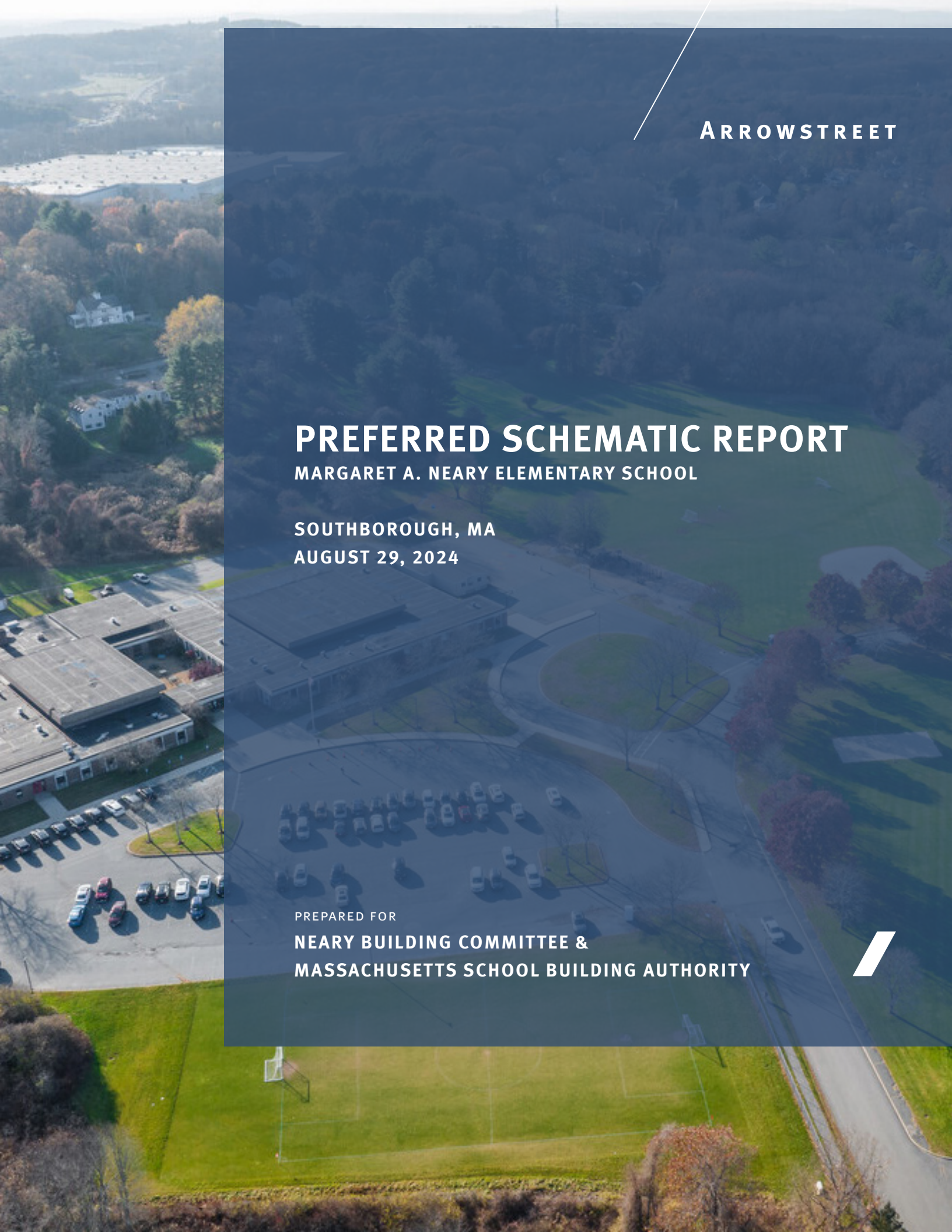


ARROWSTREET

PREFERRED SCHEMATIC REPORT

MARGARET A. NEARY ELEMENTARY SCHOOL

SOUTHBOROUGH, MA
AUGUST 29, 2024

PREPARED FOR
NEARY BUILDING COMMITTEE &
MASSACHUSETTS SCHOOL BUILDING AUTHORITY

SKANSKA

Jim Burrows
Project Director
Skanska USA Building Inc.
101 Seaport Boulevard, Suite 200
Boston, MA 02210

August 29, 2024

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

Margaret A. Neary – FSA – Preferred Schematic Report (PSR) Submission

Dear Ms. Caprigno,

Pursuant to the Module 3 - Feasibility Study requirements and in accordance with Section 8.1.1.2 of the OPM Contract, we have reviewed and coordinated the materials associated with the enclosed Preferred Schematic Report (PSR) Submittal. We certify, to the best of our knowledge, that the information is accurate, complete and in full compliance with the MSBA's Feasibility Study requirements.

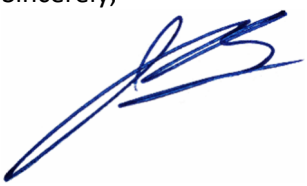
The School Building Committee met to approve the PSR Submittal and made the recommendation to the School Committee, to authorize Skanska USA, the Owner's Project Manager, to submit the PSR Submittal to the Massachusetts School Building Authority on behalf of the School District no later than August 29, 2024.

The 3.3.5 Local Actions and Approvals Certificate, certified meeting minutes and budget statement for the Preferred Schematic Report is included.

The submittal has been attached electronically as requested by the MSBA. We look forward to our next meeting with the MSBA team, to review our progress with the program to date. We are available for a Facility Assessment Subcommittee Presentation (if requested).

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

Sincerely,



Skanska USA Building, Inc.
Jim Burrows
Project Director

Cc: Sy Nguyen, Senior Project Manager, Skanska USA Building, Inc.

ARROWSTREET

MARGARET A. NEARY ELEMENTARY SCHOOL

Preferred Schematic Report
August 29, 2024

Table of Contents

3.3.1 INTRODUCTION

Introduction

In accordance with the requirements of the MSBA's School Building Program Module 3: *Feasibility Study*, the following Preferred Schematic Report (PSR) is being submitted. The report details the work performed by the Neary Elementary School Team since the submission of the Preliminary Design Program (PDP) on May 21, 2024.

Process Overview

This report documents Part Two (Module 3B) of the Feasibility Study for Margaret A. Neary Elementary School and should considered in conjunction with Preliminary Design Program (Module 3A) submitted to the Massachusetts School Building Authority in May 2024.

The report summarizes the process and conclusions of the Preliminary & Final Evaluation of Alternatives and documents the District's selection and recommendation of a Preferred Solution. Since the submission of the Preliminary Design Program (PDP), the Neary Building Committee (NBC) and it's Subcommittees, the Southborough community, Skanska (the OPM), and Arrowstreet with its consultants (the Design Team) have made continued progress in developing a design that best suits the District's educational goals.
The Preferred Schematic Report (PSR) Phase started following the PDP submission on May 21, 2024.

During this phase of the work, the NBC has continued to reach out to the Southborough community through public meetings and community forums. Additionally, this process has included:

- Further development of potential solutions identified in the PDP. After further consideration of the Alternatives submitted in the PDP, the NBC voted to narrow the Alternatives to (3):
  - » Addition/Renovation – 610 Enrollment
  - » New – 305 Enrollment
  - » New – 610 Enrollment
- Met with and discussed the project with Southborough's town departments to review the project.
- Reviewed and discussed sustainability goals.
- Worked with the District to update the Space Summary Template to reflect the District's changes to the Educational Program, resulting in substantial reductions to the overall building area. In addition, the NBC voted to remove the Auditorium from the project.
- Developed a plan to move all students out of the Neary School during construction, including providing two temporary modular classrooms at both the existing Woodward and Finn Schools to accommodate the students during construction.

The Neary project website has been updated with all NBC Agendas and Minutes as well as frequently asked questions (FAQs).

Public Meetings

Since the PDP was submitted to the MSBA, the Project Team has participated in the following:

- (11) Neary Building Committee meetings
- (9) Working Group meetings
- (1) Community Forums

Summary of Updated Project Schedule

An updated Project Schedule, prepared by the Owner's Project Manager, is included under section 3.3.4 Preferred Solution, and includes key milestones such as the MSBA Board of Directors meeting on October 30, 2024 seeking approval to proceed into Schematic Design:

Key Dates

1. MSBA Board meeting for approval of proceed into Schematic Design October 30, 2024
   - » Target: Facility Assessment Subcommittee Presentation on September 11 or 25, 2024

2. MSBA Board meeting for approval of Project Scope and Budget Agreement April 23, 2025
    - » Target: Submission Deadline for Schematic Design Submission to the MSBA February 27, 2025
3. Projected Town votes for approval of Project Scope and Budget Agreement
    - » Special Town Meeting – April 2025
    - » Ballot Question – May 2025
    - » Certify Vote to the MSBA - May 2025
4. Commence with Module 6 - Detailed Design in June 2025
5. Anticipated start of construction - July 2026
6. Target move in date Summer 2028

Summary of Final Evaluation of Existing Conditions

As part of this phase, the team completed additional due diligence on the existing Margaret A. Neary Elementary School site, including:

- Reviewed the environmental regulations for Wetlands and Riverfront setbacks.
- Reviewed potential flooding concerns from the adjacent stream beds.
- Further evaluated underlying soil conditions and authorized additional soil borings took place on August 22, 2024, however the results were not available at the time of PSR submission.
- Reviewed available documentation of the existing septic system and leaching field. Developed a proposed location for a new leaching field and commissioned percolation tests to confirm the soil conditions.
- Reviewed available documentation on the adjacent land fill site which was closed in 1999 and met with the Town's engineering consultant responsible for ongoing testing of the landfill.

Summary of Final Evaluation of Alternatives

The District and the Project Team continued to develop the (12) alternatives identified in the PDP for further evaluation. After consideration of the alternatives presented, the Neary Building Committee voted to select (3) for further development.

While many factors influenced the committee's decision, certain driving factors became essential in the selection process: consolidation of existing schools, construction schedule and student impact, construction cost and meeting the educational plan . The remaining alternatives identified as B.4, C.1, and C.4 are further described below.

B.4 Addition and Renovation

Major renovation of the existing Margaret A. Neary Elementary school and new addition to accommodate an enrollment capacity of 610 students, 103,392 GSF.

C.1 New Construction

All new construction on the existing site to accommodate an enrollment capacity of 305 students, 63,305 GSF.

C.4 New Construction

All new construction on the existing site to accommodate an enrollment capacity of 610 students, 99,564 GSF.

Summary of the Preferred Solution

On August 12, 2024, the Neary Building Committee voted on the preferred solution and selected Alternative C.4 New Construction of a four grade school for 610 students as the Preferred Solution for the Margaret A. Neary Elementary School.

MSBA PDP Review Comments & Response

The MSBA provided review comments to the District on July 11, 2024. The District's written responses to the MSBA's comments were submitted on July 25, 2024, and are included in the Appendix A.

As a result of the MSBA's comments and further consideration by the District and the NBC, the Educational Plan and Space Summary Template was revised to reflect the District's educational goals and the Town's budget consideration. The updated Educational Plan is included in the Appendix B of this report and a redlined copy of the Plan is included in the Appendix C of this Report.

Local Actions and Approvals

- August 12, 2024: Neary Building Committee Meeting
  - » On August 12, 2024, the Neary Building Committee voted their support of Alternative C.4 as the Preferred Schematic Alternative.
- August 26: Neary Building Committee Meeting
  - » The NBC voted on the Motion: To approve the Preferred Schematic Report (PSR) and accept the recommendation of the Neary Building Committee to authorize Skanska USA, the Owner's Project Manager, to submit the ("PSR") to the Massachusetts School Building Authority ("MSBA") on behalf of the Southborough School District no later than August 28,2024

Project Directory

Town of Southborough - Margaret A. Neary Elementary School

Project Directory

Name	Title	Office Phone	E-mail
Owner's Project Manager			
Skanska			
101 Seaport Blvd, Boston, MA 02210			
Dale Caldwell	Principal in Charge		dale.caldwell@skanska.com
Jim Burrows	Project Director		jim.burrows@skanska.com
Sy Nguyen	Project Manager		sy.nguyen@skanska.com
Jessica Mendez	Assistant PM		jessica.mendez@skanska.com
Vincent Vadeboncoeur	Field Rep		vincent.vadeboncoeur@skanska.com
Owner			
Neary Building Committee - Voting Members			
Jason Malinowski	Chair & Capital Planning Rep.		jmalinowski@southboroughma.com
Denise Eddy	Vice Chair & Citizen-at-large		deddy@southboroughma.com
Andrew Pfaff	Clerk & Advisory Comm. Rep.		apfaff@southboroughma.com
Roger Challen	School Comm. Rep.		rchallen@nsboro.k12.ma.us
Kathryn Cook	Select Board Rep.		kcook@southboroughma.com
Mark Davis	Citizen-at-large		mdavis@southboroughma.com
Christopher Evers	Citizen-at-large		cevers@southboroughma.com
Neary Building Committee - Non-Voting Members			
Brian Ballantine	Town Finance Director		bballantine@southboroughma.com
Keith Lavoie	Asst. Superintent of Operations		klavoie@nsboro.k12.ma.us
Gregory Martineau	Superintendent of Schools		gmartineau@nsboro.k12.ma.us
Kathleen Valenti	Neary School Principal		kvalenti@nsboro.k12.ma.us
Steve Mucci	Woodward School Principal		smucci@nsboro.k12.ma.us
Rebecca Pellegrino	School Finance Director		rpellegrino@nsboro.k12.ma.us
Mark Purple	Town Administrator		mpurple@southboroughma.com
Stefanie Reinhorn	Asst. Superintent of Teaching/Learning		sreinhorn@nsboro.k12.ma.us

Town of Southborough - Margaret A. Neary Elementary School

Project Directory

Name	Title	Office Phone	Cell Phone	E-mail
Architect				
Arrowstreet				
10 Post Office Square, Suite 700N, Boston, MA 02109				
Larry Spang	Principal	617.666.7078	617.921.8769	spang@arrowstreet.com
Katy Lillich	Project Manager	617.666.7019		lillich@arrowstreet.com
Tina SooHoo	Project Architect	617.666.7091		soohoo@arrowstreet.com
Andy Rodrigue	Architect	617.666.7032		rodrigue@arrowstreet.com
Architect's Consultants				
Educational Consultant				
MLP INTEGRATED DESIGN				
Mike Pirollo	Educational Consutlant	617.733.0847		
Building Code				
Code Red Consultants				
154 Turnpike Rd., Suite 200, Southborough, MA 01772				
Paul Moan	Principal – Sr Project Manager	617.500.7633		paulm@crcfire.com
Kevin Lynch	Project Manager			klynch@crcfire.com
Accessbility				
KMA				
154 Turnpike Rd., Suite 200, Southborough, MA 01772				
Josh Safdie	Managing Principal			jsafdie@kmaccess.com
J George				jgeorge@kmaccess.com
Hazardous Materials, Geo-Environmental, & Environmental Planning				
PEER Consulting PC				
99 South Bedford Street, Suite 200, Burlington, MA 01803				
David Gorden		(781)238-8880		GordenD@peercpc.com
Geotechnical				
Lahlaf Geotechnical Consulting				
23 McGinness Way, Billerica, MA 01821				
Madjid Lahlaf	Principal Engineer	(978) 330-5912	(781) 771-1933	madjid.lahlaf@lgcinc.net
Survey				
Beals and Thomas, Inc.				
144 Turnpike Road, Southborough, MA 01772				
Mark Benson	Associate	(508) 366-0560	(508) 341-3394	mbenson@bealsandthomas.com
Existing Conditions				
Pointknown				
418 Massachisetts Avenue, Arlington, MA 02474				
Jim Foster				jfoster@pointknown.com
Christina Annunziata		617.575.2222		cannunziata@pointknown.com
Traffic				
MDM Transportation Consultants, Inc				
28 Lord Road, Suite 280, Marlborough, MA 01752				
Robert Michaud, PE	Managing Principal	(508) 303-0370 x1115		rmichaud@mdmtrans.com
Dan Mills	Senior Project Manager			
Civil				
Green International Affiliates, Inc				
100 Ames Pond Drive, Suite 200, Tewksbury, MA 01876				
Danielle H. Spicer, P.E.	Stormwater & Permitting	(978) 843-5218		dspicer@greenintl.com
Justin Macek		(978) 923-0400		jmacek@greenintl.com
Bryan Vachon		(978) 923-0400		bvachon@greenintl.com
Adel Shahin, PE	Senior Vice President	(978) 923-0400		ashahin@greenintl.com
Landscape Architecture				
Terraink				
7 Central Street, Arlington, MA 02476				
Kellie Connelly	Principal	781.316.1595		kconnelly@terraink.com
Jade Cummings	Principal	781.316.1595		jcummings@terraink.com
Kelly Ashton	Landscape Architect/CAD Lead	781.316.1595		kashton@terraink.com
Liz Thompson	Landscape Designer	781.316.1595		ethompson@terraink.com
Halley Murray	Landscape Designer			hmurray@terraink.com

Structural Engineering

Lim Consultants, Inc

6 Pleasant Street, Malden, MA 02148

Christine Ye	Project Principal	781-338-9300 x309	617-628-7728	cye@limconsultants.com
Swinderjit Singh	Structural Engineer		(978) 652-6810	ssingh@limconsultants.com

Mechanical, Electrical, Plumbing, Fire Protection, Tech

GGD Consulting Engineers, Inc.

375 Faunce Corner Road, N. Dartmouth, MA 04727

Chris Garcia	Plumbing & Fire Protection	(508) 998-5700		chris_garcia@g-g-d.com
Walter Araujo	Plumbing & Fire Protection	(508) 998-5700		walter_araujo@g-g-d.com
Dave Pereira	Electrical	(508) 998-5700		david_pereira@g-g-d.com
Tony Dacunha	Electrical	(508) 998-5700		adacunha@g-g-d.com
Dom Puniello	Mechanical	(508) 998-5700		dom_puniello@g-g-d.com
Sean Strassell	Mechanical	(508) 998-5700		sean_strassell@g-g-d.com
Jolie Aranjo	Administrative Assistant	(508) 998-5700		jolie_aranjo@g-g-d.com
Keith Lane	Mechanical/BIM Lead	(508) 998-5700		keith_lane@g-g-d.com

Audio Visual / Acoustical

Cavanaugh Tocci Associates, Inc.

327F Boston Post Road, Sudbury, MA 01776

Alex Bagnall	Principal Consultant	978.639.4129		abagnall@cavtocci.com
Justyna M. Mazierkowska	BIM Lead			jmazierkowska@cavtocci.com
Max Boucher				mboucher@cavtocci.com
Lincoln Berry	Principal Acoustic Consultant	978.443.7871		lberry@cavtocci.com

Specifications

Kalin Associates

21 Eliot Street, Natick, MA 01760

Cynie Linton			617.320.9659	clinton@kalinassociates.com

Food Service

Crabtree McGrath Associates, Inc

161 W. Main Street, Georgetown, MA 01833

John Sousa	Principal	978.352.8500		jsousa@crabtree-mcgrath.com

Door Hardware

Allegion

77 Wexfod Street, Needham Heights, MA 02494

Kevin McIntyre	Specifier		413.537.1870	kevin.mcintyre@allegion.com
Jeff Batick	Regional Manager			jeffrey.batik@allegion.com

Acoustics

Acentech

33 Moulton Street, Cambridge, MA 02138

Rose Mary Su	Principal	(617) 499-8000		rsu@acentech.com
Will Spallino	Consultant			wspallino@acentech.com

Cost Estimating

PM&C

20 Downer Avenue, Suite 1C, Hingham, MA 02043

Peter Bradley	Cost Estimator	781.740.8007		peterbradley@pmc-ma.com
Amy Happ	Office Manager			amyhapp@pmc-ma.com

Sustainability & Energy Modeling

Thornton Tomasetti

27 Wormwood St #200, Boston, MA 02210

Xiaoshu (Sunny) Du	Senior Project Director	+1.207.245.6074		XDu@ThorntonTomasetti.com
Irmak Turan				iturun@thorntontomasetti.com
Vamshi Gooje				VGooje@ThorntonTomasetti.com;

Security

Pamela Perini Consulting, LLC

591 North Avenue, Wakefield, MA 01880

Pamela Perini, PSP	Principal Secuirty Consultant	781-788-6674		pperini@pamelaperiniconsulting.com

3.3.2 EVALUATION OF EXISTING CONDITIONS

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Neary Site

SUMMARY

The existing Neary Elementary School property is the preferred location for the school. As documented in the PDP, there is limited Town-owned land within the District that would be of sufficient size to support a new school.

As part of the Preferred Schematic phase, the project team further investigated the existing site to identify potential conditions that would need to be addressed by the proposed building project. Additionally, the design team used the Resilient Mass Action Team (RMAT) Climate Resilience Design Standards Tool to better asses any risks within the selected site. The report of these findings can be found in Appendix I.

Geo-environmental Subsurface Investigation

During the Preliminary Design Program (PDP) phase, an Environmental Site Assessment (ESA) was conducted for the property by PEER Engineering. No detectable amounts were found of VOC's, SVOC's,or miscellaneous /biological elements. Metals, PCB's TPHs, pesticides, herbicides were all within acceptable thresholds. Please refer to the PDP for a copy of the full report.

PRELIMINARY SUBSOIL ASSESSMENT

On April 15,2024, Lahlaf Geotechnical Consulting performed (4) borings to investigate the subsurface soil conditions of the site. The boring locations were identified based on the potential location for a new building located on the adjacent athletic field. This preliminary round of borings is intended to highlight the major soil strata. Additional borings will be performed during subsequent phases of the project.

Existing conditions include the following strata:

- The sampled topsoil ranged between 0.8 and 1.2 feet in depth.
- A layer of fill was encountered beneath the topsoil at the two borings in the play field north of the school. The fill at these locations extended to depths of about 6 feet beneath the ground surface. The samples in this layer were described as mostly silty sand.
- A third sample location on the southwest of the play field encountered subsoil at 2 feet below the ground surface and is described as poorly graded sand with silt.

These initial borings indicate that the infilled soil will need to be removed to a depth of approximately 6 feet and replaced with structural fill to support any new construction. Topsoil should be removed from the entire construction area, including the building footprint and the paved areas. Sampled soils show that the soil is less than RCS-1 criteria and does not show any detection for pesticides, herbicides, gasoline and/ or diesel.

Through discussions with the Neary Building Committee, and due to the high cost of removing large amounts of soil, the proposed location of new construction has shifted to coincide with the location of the existing Neary School building.

Since the initial borings were located on the area of the current play fields, and to have a better understanding of the geotechnical subsoil conditions in the new location, additional borings have been scheduled to be performed on August 22. For full report, refer to Appendix E: Geotechnical Preliminary Report.

SITE DRAINAGE

The existing site drainage system was installed during the original building construction. Two drain lines run on either side of the building and extend to two existing outfalls in the adjacent streams to the north and east of the school.

The District reported localized flooding near the catch basins in the pavement to the south and northwest of the building after storm events, suggesting the existing drainage system is under-performing and may be damaged or in need of cleaning. Additional explorations will be scheduled in the next phase of the project. It is anticipated that the proposed project will install an all-new site drainage system.

Regulatory Requirements

WETLANDS & RIVERFRONT PROTECTION REQUIREMENTS

The site is bounded to the north by a waterway and wetlands area. There are also wetlands to the east of the building, between the parking area and the park. The wetlands are identified on the town's GIS maps. The Design Team met with the Town's Conservation Agent on site to perform a preliminary review of the wetlands and waterways requirements.

Based on the wetlands boundary defined on the GIS maps, the Design Team establish an initial 100' setback limit and included an additional 25' to the boundary as an approximate location until such time as the edges of the wetlands are more definitively located.

The stream to the north of the school is identified as a Perennial Stream, so a 200' Riverfront setback has been located on the northern edge of the site. See diagram below for location of the regulatory boundaries of the site.

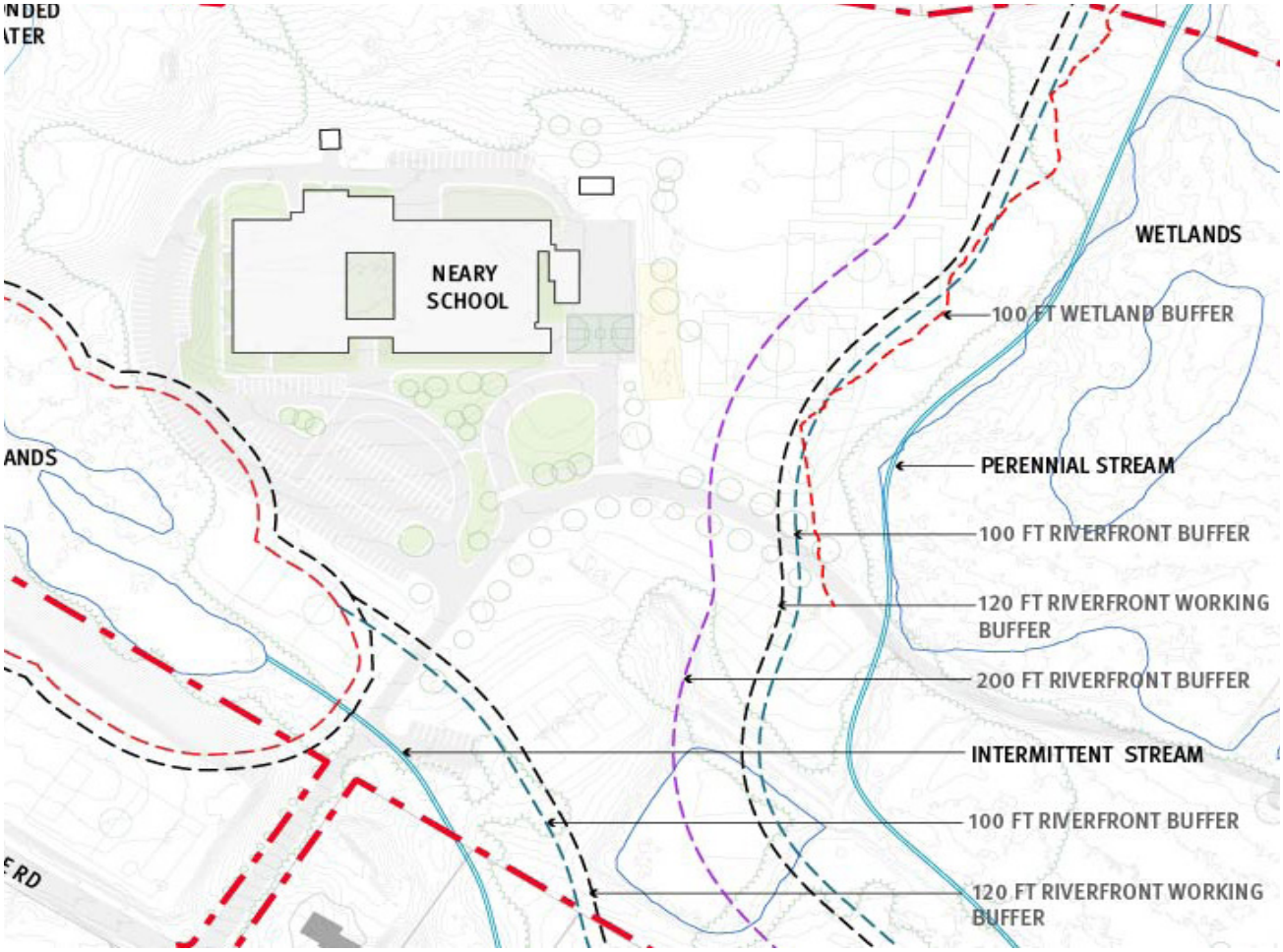
GROUNDWATER

High groundwater was documented across the site, evidenced by groundwater present in all four test borings at depths ranging between 2 feet and 4.2 feet beneath the ground surface.

To address the high groundwater, the project estimate includes perimeter foundation drains and subsurface drainage under the playground and playing fields.

FLOODING

FEMA maps indicate intermittent flooding along the existing perennial stream on the northern boundary



Regulatory Diagram

of the site and near the intermittent stream that runs northerly towards the Trottier Middle School.

The FEMA map indicates a floodplain elevation of approximately 268'. The finished floor elevation of the existing building is 274'.

The finished floor elevation of the proposed building will take the floodplain level into account and will locate the finished floor at or above the existing finish floor elevation of 274'.

SEPTIC SYSTEM

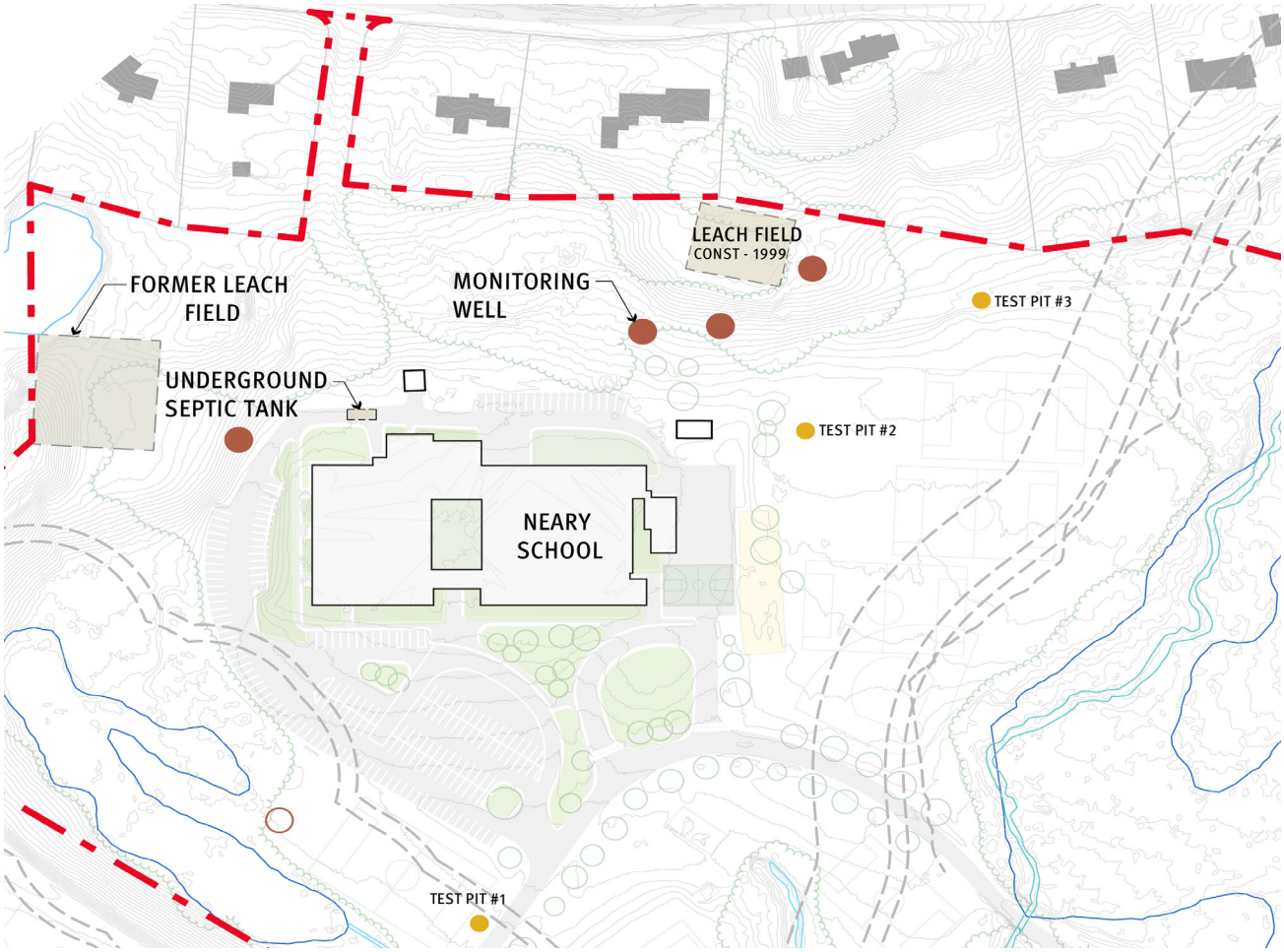
The original building septic system and leach field was located to the south of the existing building.

The septic system was replaced in 1997 and a new leach field was constructed to the west of the building on an elevated slope and a new tank was constructed adjacent to the existing tank. This system is approaching the end of usable service so it is likely that a new leach field will need to be constructed.

In anticipation of a new septic system and leaching field, percolation tests were performed at three locations on July 24, 2024 by McCarty Companies. The pits were dug by the DPW and the testing was witnessed by the local sanitation inspector.

Two of the test pits received passing percolation results (#2 and #3 in the diagram below). Test pit #1 revealed fill material and groundwater was present where it transitioned to native soil, so a percolation test was unable to be performed. Due to the presence of high groundwater, the area around pit #1 is not viable for a new leaching field.

Please refer to Appendix F for a copy of the percolation test report.



Septic Diagram

LANDFILL

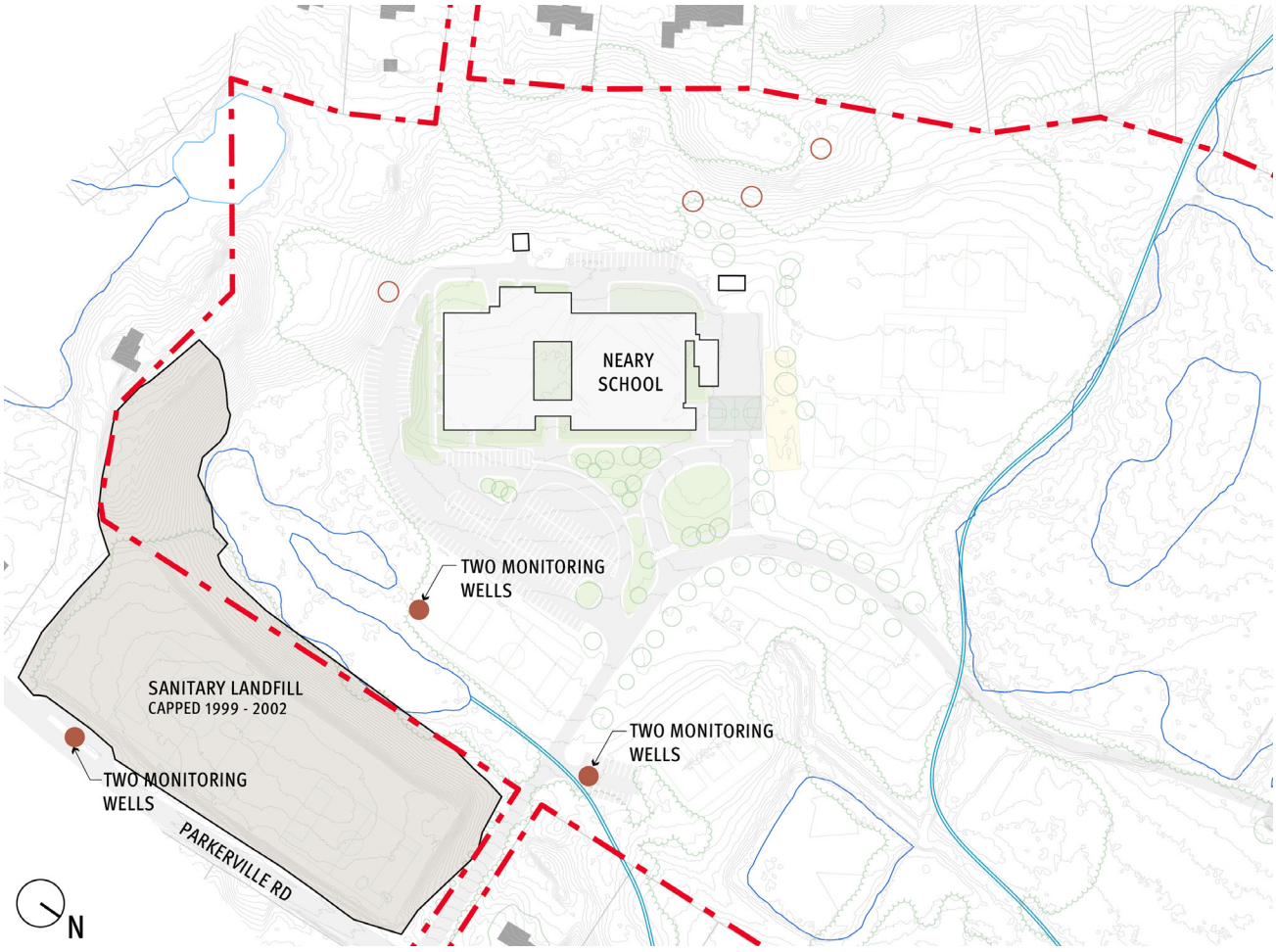
The site is adjacent to the Parkerville Road Landfill which operated from the late 1930's through the mid-1970's. The site was closed and capped between 1999 and 2002. Closure activities consisted of waste consolidation and cap construction and stabilization in accordance with MassDEP regulations.

The town performs annual sampling of surface water, groundwater and soil gas at three pairs of monitoring wells around the landfill, two of which are located on the school site. See locations shown in the diagram below.

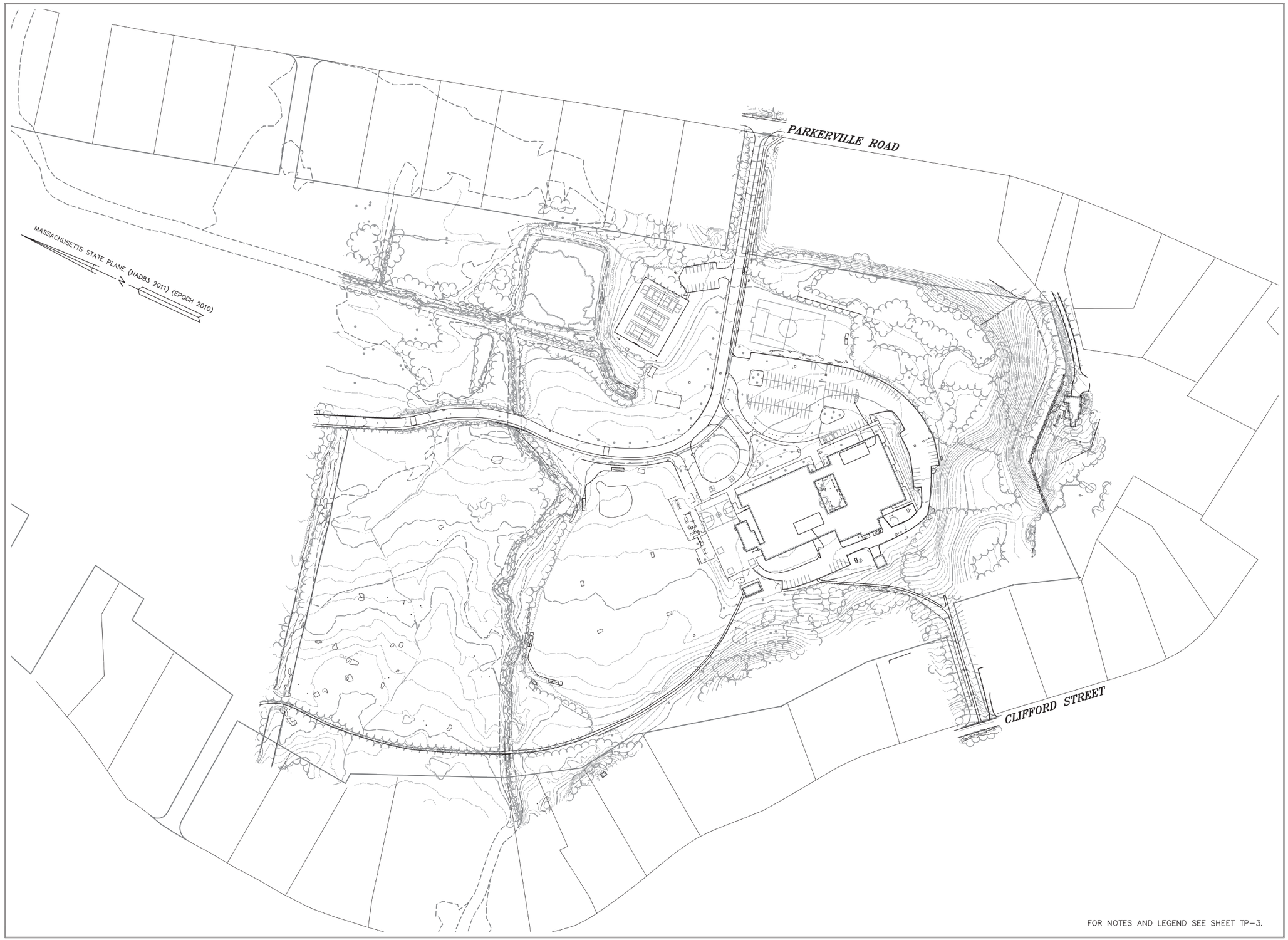
According to the latest report by Pare Engineering dated December 1, 2023, "Overall, the results of water quality sampling during Round 22 continue to indicate impacts, albeit minor impacts, on water quality from organic and inorganic parameters commonly associated with municipal landfills. With respect to inorganic parameters, there have been very limited and only slight exceedances of MCLs for various heavy metals in the past; no metals were present in excess of the MCL or RCGW-1 at any groundwater monitoring wells during this monitoring round."

According to MassDEP requirements, monitoring of the landfill should continue for 30 years from the time of capping. The Neary Building Committee discussed with the Town and MassDEP and have agreed to continue the monitoring program beyond the 30 year standard.

The project will continue to evaluate potential impacts of the landfill on the proposed project. The PSR estimate includes costs for an underslab vapor barrier and vapor relief system to mitigate potential future gas infiltration.



Landfill Diagram



PREPARED FOR:

ARROWSTREET, INC.

10 POST OFFICE SQUARE
SUITE 700N
BOSTON, MA 02109

RECORD OWNER:

TOWN OF SOUTHBOROUGH

4813/316
PLAN BOOK 313 PLAN 86
[45-18]

5		
4		
3		
2		
1		
0	03/22/2024	INITIAL ISSUE
ISSUE	DATE	DESCRIPTION

IMS	MEB	LBP	MEB
FLD	CALC	DWN	CHK'D

COMMONWEALTH OF MASSACHUSETTS
MARK E. BENSON
No. 48416
PROFESSIONAL LAND SURVEYOR

Mark E. Benson
3/22/2024

TOPOGRAPHIC PLAN

NEARY ELEMENTARY SCHOOL
SOUTHBOROUGH, MA
(WORCESTER COUNTY)

PREPARED BY:

BEALS AND THOMAS

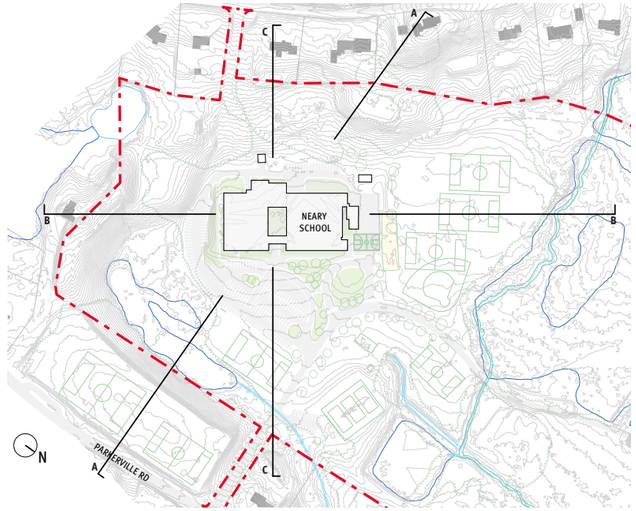
BEALS AND THOMAS, INC.
144 Turnpike Road, Suite 210
Southborough, Massachusetts 01772-2104
T 508.366.0560 | www.bealsandthomas.com

DATE: MARCH 22, 2024

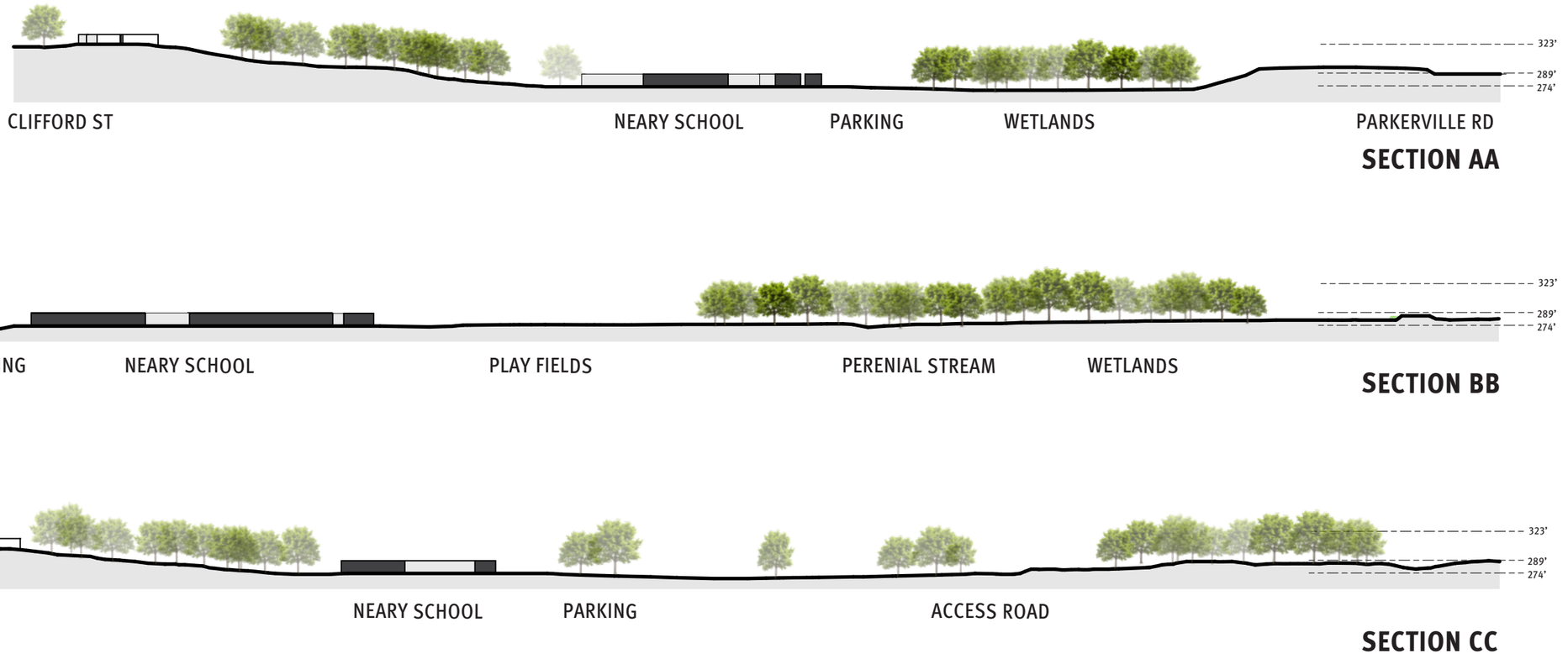
SCALE: 1"=100'

B+T JOB NO. 3506.00	TP-1
B+T PLAN NO. 350600P001A-001	
SHEET No. 1 OF 5	

Existing Site Survey



Site Section Key



Existing Neary Site Sections

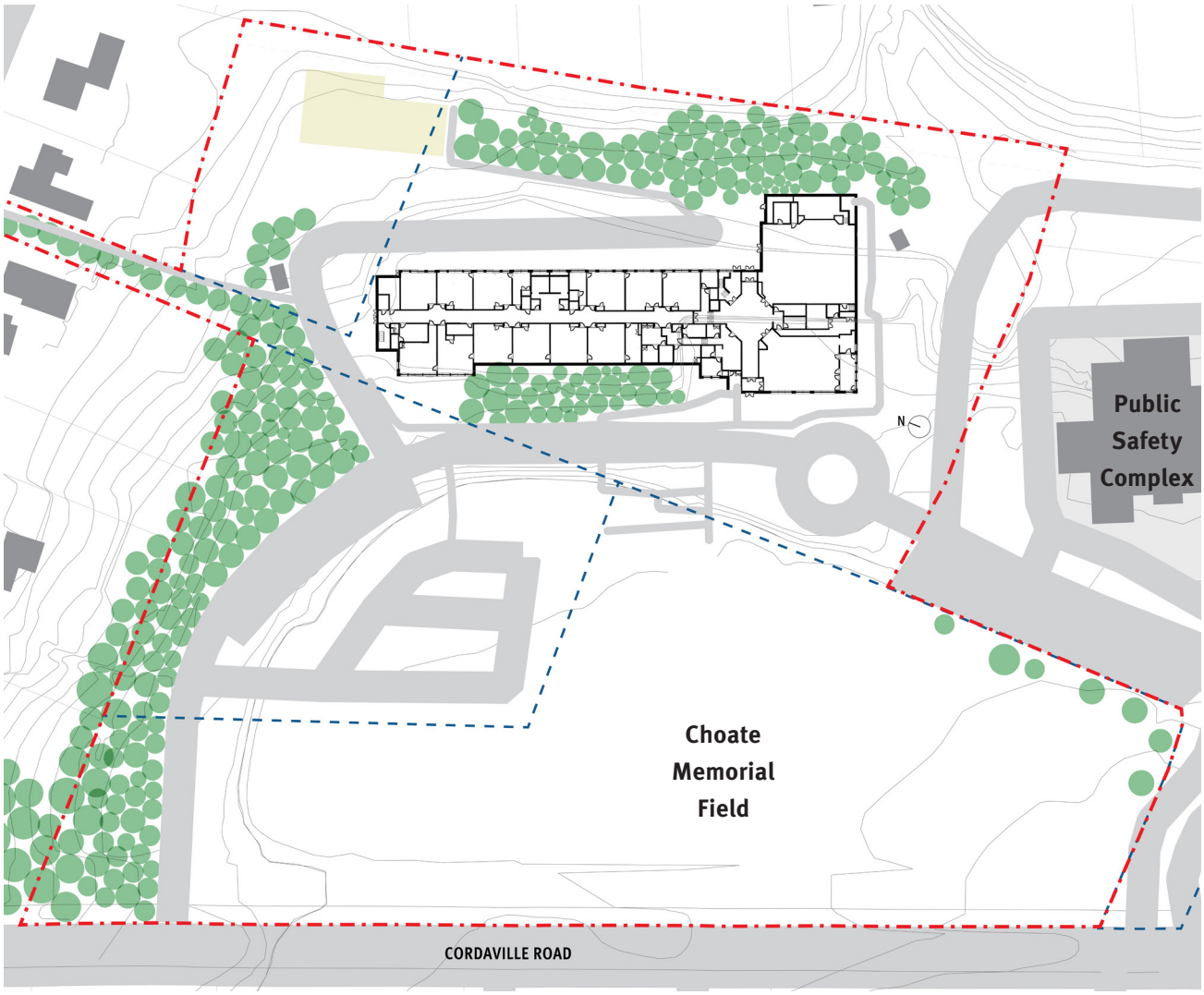
Woodward Site

SUMMARY

The existing Albert S. Woodward Elementary School property is located at 28 Cordaville Road in Southborough. The school is accessed by a drive running perpendicular to Cordaville Road, with parking along one side of the drive. The adjacent Choate field runs parallel to Cordaville Road and is located at a lower elevation than the school building.

The Choate field property was given to the Town in 1954 by Charles F. Choate and has a deed restriction which limits the use of the land to 'playground purposes' for the use of 'all the children of 'Southborough'.

The land to the South of the school (to the right of the diagram below) is occupied by the Public Safety Complex constructed in 2020. Buses arriving to the Woodward School access the building through the Public Safety Building parking lot.



Woodward Site Plan

EXISTING CONDITIONS

The building was constructed in 2004, so it is the newest building in the Southborough School District. The building is in good repair and has been well maintained. The interior spaces, including the classrooms, corridors, gym and cafeteria are overall in good to excellent condition and the building is ADA compliant. The District is in the process of commissioning a feasibility study to add air conditioning to the building in the future.

No substantial building system deficiencies were reported by the District. However, since the systems are approximately 20 years old, the Southborough Public Schools Capital Plan for the next five years targets the following improvements: Energy Management System upgrade, roof replacement, playground upgrade, landscaping at the front of the building and security system upgrades.

Woodward Main Entry

Exterior Views Of The Existing Woodward School

Top: Front Entrance

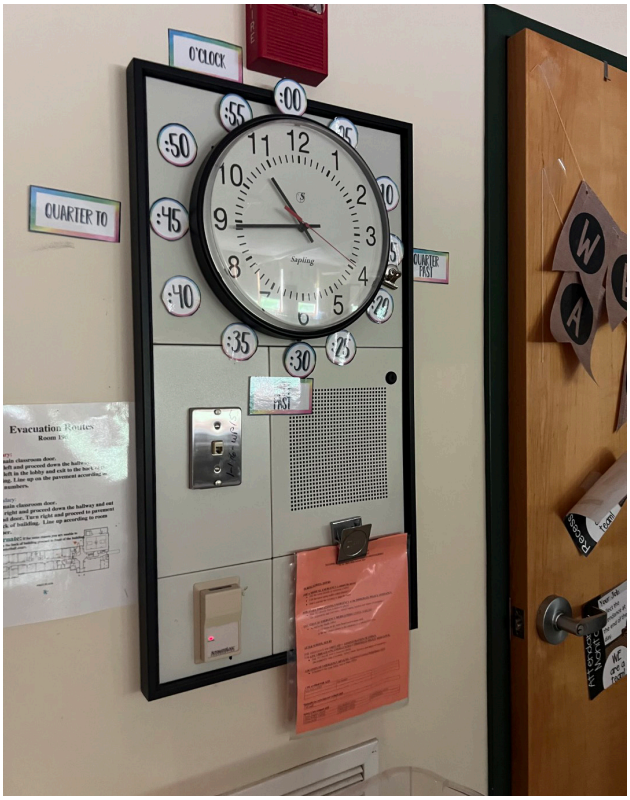
Middle: Front (West) Elevation Facing Choate Field

Bottom: Rear (East) Elevation Facing Play Area

Entry Lobby

Typical Classroom

Typical Corridor



Typical Classroom Clock and Speaker

Interior at Main Entrance & Lobby

Gymnasium & Stage

Typical Bathrooms

Roof Level Mechanical Room

Kitchen

ARROWSTREET
ARCHITECTURE & DESIGN

PROJECT NAME/ NUMBER:	Margaret A. Neary Elementary School / 23072	VISIT DATE/TIME:	7/30/2024
BUILDING NAME:	Albert S. Woodward Elementary School	ACCOMPANIED BY:	Bryan Fantony - Facilities
BUILDING ADDRESS:	28 Cordaville Road, Southborough MA 01772	YEAR BUILT:	2002
BUILDING USE:	Elementary School	YEAR OF MAJOR RENO:	
DEPARTMENT:		CONSTRUCTION TYPE:	2C
SQUARE FEET	76,000	ADDITIONAL NOTES:	

		CONDITION	GOOD	ADEQUATE	MARGINAL	REPLACE	COMMENTS
SITE	G2020	PARKING	X				
	G2050	LANDSCAPING		X			Upgrades noted in Capital Plan
	G2030	SIDEWALKS	X				
		PLAYGROUND		X			Upgrades noted in Capital Plan
EXTERIOR	A1010	FOUNDATIONS	X				
	B1020	ROOF		X			Original construction, some leaking has been observed. Noted in Capital Plan.
	D2040	GUTTERS/DOWNSPOUTS	X				
	B2010	WALLS	X				
	B2020	WINDOWS	X				
	B2030	DOORS	X				
		SEALANTS & JOINTS	X				
		OTHER					
INTERIOR	C3020	FLOORS	X				
	C3010	WALLS	X				
	C3030	CEILINGS	X				
	C20	STAIRS	X				
	D1010	ELEVATORS & LIFTS	X				
		OTHER					
PLUMBING	D2010	FIXTURES	X				
	D2020	WATER DISTRIBUTION	X				
	D2030	SANITARY WASTE	X				
		OTHER					
ELEC	D5010	SERVICE/DISTRIBUTION	X				
	D5020	LIGHTING/POWER	X				
	D5030	COMMS & SECURITY	X				
		EMERGENCY POWER	X				
		OTHER					
HVAC	D30	SUPPLY & GENERATION		X			District is beginning Feasibility Study.
	D3040	DISTRIBUTION		X			
	D3060	CONTROLS		X			Energy Management System Upgrades noted in Capital Plan.
		OTHER					
FIRE	D4010	SPRINKLERS	X				

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3.3.3 FINAL EVALUATION OF ALTERNATIVES

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Introduction

As outlined in the Preliminary Design Program (PDP), (12) design alternatives and (2) potential sites were considered and evaluated. After review of the alternatives with the Neary Building Committee, nine of the schemes were eliminated from consideration and (3) schemes were selected for further study; (1) addition and renovation alternative, and (2) all new construction alternatives. Further detail of the process is outlined below.

During the Preferred Schematic phase, the Working Group met regularly to review the Alternatives, including site considerations, enrollment options, and project requirements. On June 03, 2024, the Neary Building Committee (NBC) met to review the design alternatives and priority criteria. At this meeting, the NBC voted to eliminate some of schemes from consideration.

Alternatives Outlined in the PDP:

- A.1 - Base Repair (Neary)
- A.2 - Base Repair (Woodward)
- B.1 - Add/Reno (Neary 305 Enrollment)
- B.2 - Add/Reno (Neary 450 Enrollment)
- B.3 - Add/Reno (Woodward 450 Enrollment)
- B.4 - Add/Reno (Neary 610 Enrollment)
- B.5 - Add/Reno (Woodward 610 Enrollment)
- C.1 - New Construction (Neary 305 Enrollment)
- C.2 - New Construction (Neary 450 Enrollment)
- C.3 - New Construction (Woodward 450 Enrollment)
- C.4 - New Construction (Neary 610 Enrollment)
- C.5 - New Construction (Woodward 610 Enrollment)

In general, some alternatives were eliminated for the following reasons:

- The Base Repair alternatives did not address the District's educational program and goals for an improved Neary School.
- As documented in the PDP, the cost of the Add/Reno schemes were similar to or exceeded the cost of new construction.
- The existing Woodward opened in 2003 and is in very good condition. However, expansion of the building is constrained by existing site conditions, as further described below.
- The 450-enrollment alternatives were eliminated by the NBC due to the impact on the District's educational goals. In each of the 450-enrollment alternatives, the Finn School would need to remain open for a single grade, isolating that grade level from other grades and creating operational inefficiencies.

Descriptions of schemes eliminated by the NBC and additional rational for their elimination can be found under "Eliminated Alternatives" on page 36.

Retained Alternatives:

- B.1 - Add/Reno (Neary 610 Enrollment)
- C.1 - New Construction (Neary 305 Enrollment)
- C.4 - New Construction (Neary 610 Enrollment)

The Project Team further developed the remaining three alternatives for consideration by the District and the NBC. Descriptions of the schemes retained and further developed can be found under "Final Alternatives" on page 41.

Following consideration of the opportunities, constraints and costs of the remaining three alternatives, the NBC voted on August 12, 2024 to select alternative C.4 - New Construction as the final Preferred Solution.

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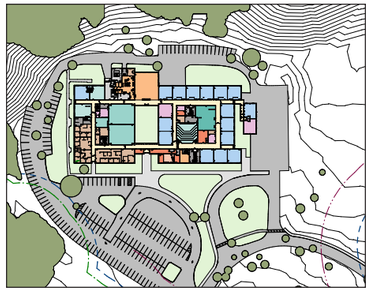
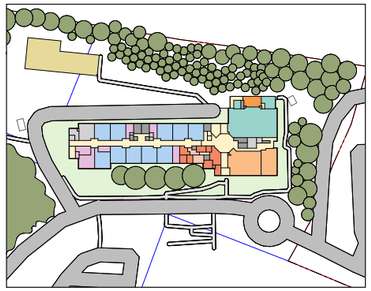
PDP Alternatives

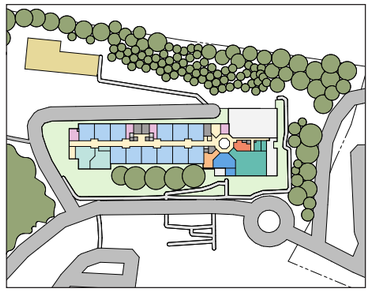
A.1: BASE REPAIR NEARY SITE (305 ENROLLMENT)



FIRST FLOOR

A.2: BASE REPAIR WOODWARD SITE (305 ENROLLMENT)

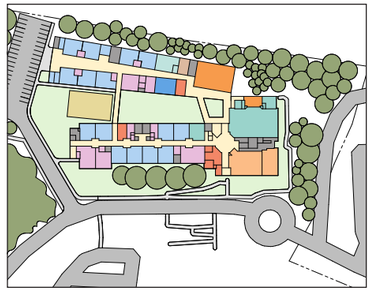


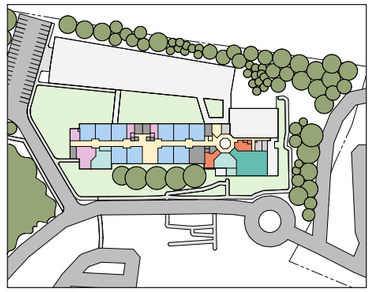


B.1: ADD/RENO NEARY SITE (305 ENROLLMENT)

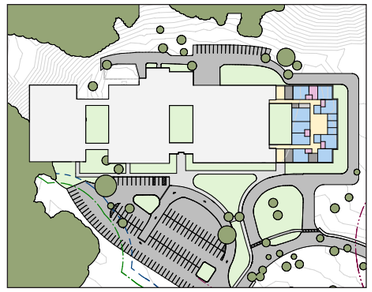
B.2: ADD/RENO NEARY SITE (450 ENROLLMENT)

B.3: ADD/RENO WOODWARD SITE (450 ENROLLMENT)





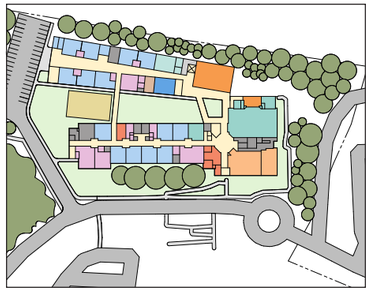
B.4: ADD/RENO NEARY SITE (610 ENROLLMENT)



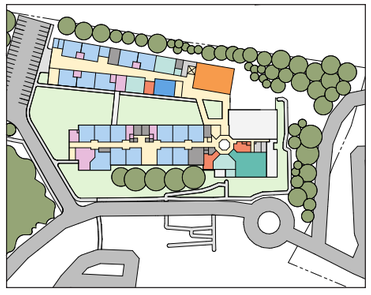
SECOND FLOOR

PDP Alternatives - Cont.

B.5: ADD/RENO WOODWARD SITE (610 ENROLLMENT)



FIRST FLOOR

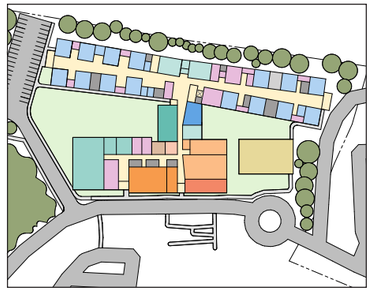


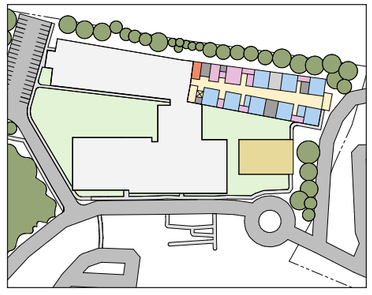
SECOND FLOOR

C.1: NEW CONSTRUCTION NEARY SITE (305 ENROLLMENT)

C.2: NEW CONSTRUCTION NEARY SITE (450 ENROLLMENT)

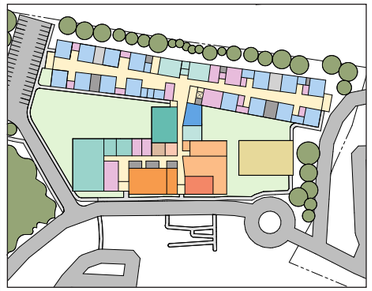
C.3: NEW CONSTRUCTION WOODWARD SITE (450 ENROLLMENT)

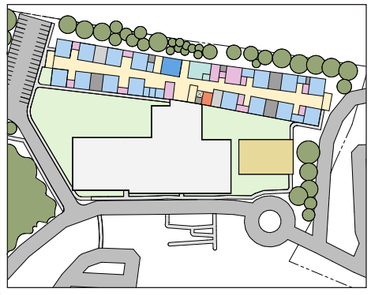




C.4: NEW CONSTRUCTION NEARY SITE (610 ENROLLMENT)

C.5: NEW CONSTRUCTION WOODWARD SITE (610 ENROLLMENT)





Site Evaluation

As part of the Preferred Schematic Report, the Project Team and the Neary Building Committee further evaluated both the existing Neary and Woodward sites. The following is a summary of the considerations by the NBC for each site.

WOODWARD SITE

The existing Woodward School is located at 28 Cordaville Road in the center of Southborough, adjacent to the recently constructed Public Safety Building and across the street from the Town Offices. Between the road and the school is a large field which is deeded for recreational purposes and unavailable for consideration as part of a school addition or replacement project.

Expansion of the Woodward School is limited to a small area behind the existing school currently used as a playground. The terrain slopes up from the building, so the playground is located approximately one story above the ground floor of the existing building.

Upon further consideration of the Alternatives located at the Woodward School, the NBC eliminated the site for the following reasons:

- There is limited space behind the existing building for new construction. An addition would need to be located at the second floor of the existing building, creating circulation difficulties within a new or expanded school.
- Site circulation is already constrained and would become more difficult in either of the expanded enrollment alternatives.
- The recreational field in front of the building is deed restricted and not available for parking, driveways or building construction.

Additional considerations are provided for each of the Alternatives further described on page 36.

NEARY SITE

The existing Neary School site at 53 Parkerville Road is centrally located within the town, located less than .5 miles north of Route 9. The site makes up approximately 32.6 acres of a single, 80.7-acre site (parcel ID 43-0000-18-0), shared with the P. Brent Trottier Middle School to the north.

A single driveway from Parkerville Road provides access to both schools, though there is an emergency vehicle only access to the Trottier School from Deerfoot Street to the west. The surrounding context is mostly open space and wooded areas with the Sudbury Reservoir to the east. A residential neighborhood surrounds the property to the south and west of the school with the majority of nearby commercial properties located along Route 9.

Although the town owned parcel is quite large, the NBC and the Project Team have established a limit of work that includes the southern portion of the parcel, divided by a perennial stream to the north of the existing school, residences to the south and east, and Parkerville Road to the west. See page 32 for site boundary diagram.

A single access road from Parkerville Road connects both the Neary Elementary and Trottier Middle schools. The road is located directly north from the Neary School building and is considered the development boundary as it is the only access in and out of the property.

Building Location

The existing building is situated near the southwest corner of the parcel, at the base of an incline to the residential abutter's properties. There is a large open space to the north of the existing building that is currently used for athletic fields.

The athletic fields were initially considered as a potential site for new construction. However, investigation of the subsurface soil conditions and regulatory setbacks made this area less feasible for the building location. Given the condition of the soil beneath the playing fields, the Design Team and the District investigated moving students out of the

existing Neary building and using that site for new construction. Therefore, the Preferred Schematic alternative is located on the footprint of the existing building. Further investigations of the existing subsurface soil conditions were performed on August 22, 2024, however the results have not been compiled at the time of PSR submission.

Topography & Soils

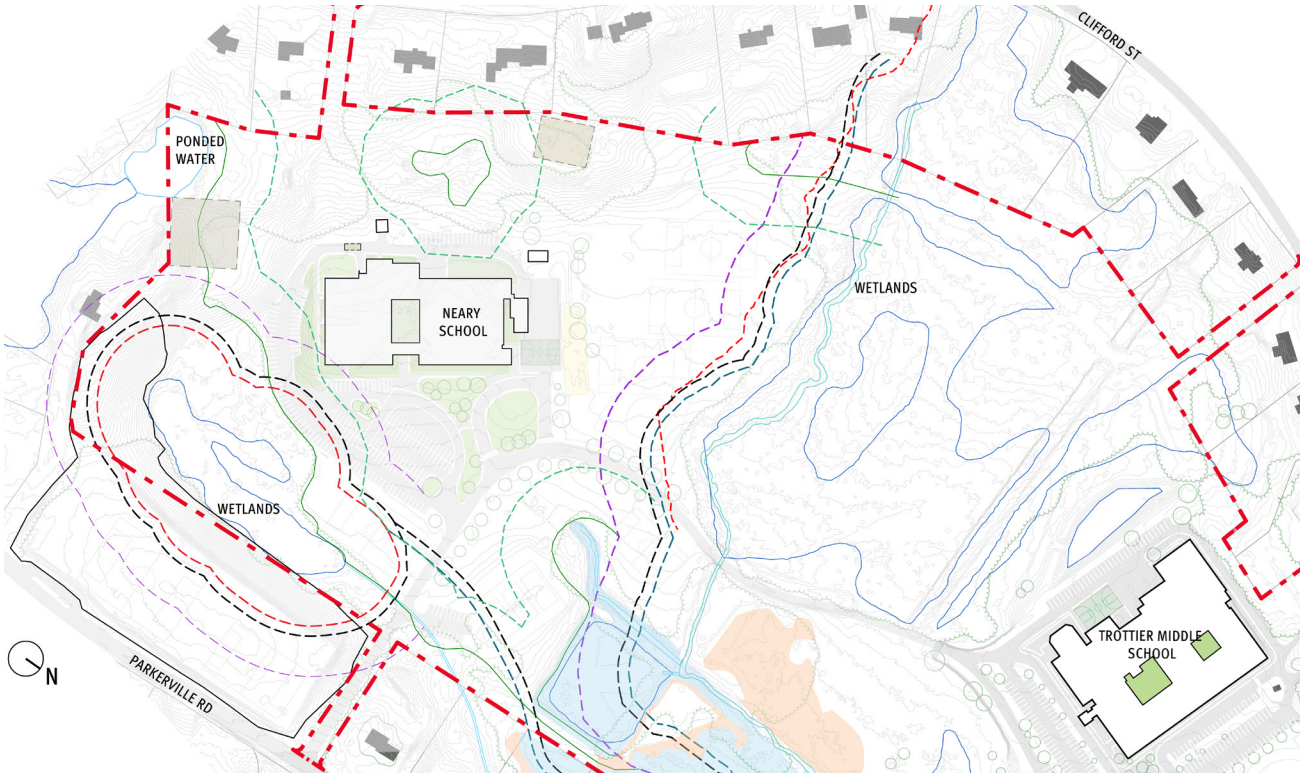
The existing topography of the site slopes approximately 25-feet from the high point near the southeast corner of the property line to a low point at the perennial stream along the northern boundary of the site. From this point, the site slopes back up approximately 25-feet towards Parkerville Road. The steepest grade change occurs beyond the southeast corner of the existing school building, where the hight point of elevation 290' slopes to elevation 270'. The ground around the existing building was graded to approximately elevation 274' to allow for positive drainage around the foundation.

From the building to the perennial stream to the north and west, the grade slopes more gently. Given the District's desire to maintain the existing playing fields as much as possible, limiting construction to the area at and around the existing building would reduce the need for soil removal and site work.

The site is located at a low point of the surrounding wooded and residential areas. Please see Section 3.3.2 of this PSR for further description of the regulatory restrictions on the site due to the proximity of wetlands and FEMA defined Flood Hazard zones. In addition to the natural limitations present on the site, there are several playing fields located to the north of the existing building that the district has emphasized a desire to maintain for community use.

HISTORIC CONSIDERATIONS

A Project Notification Form (PNF) was submitted to MHC on July 12, 2024 and is currently under review.



Existing Conditions & Property Boundaries (Refer to Preferred Scheme Drawings for enlarged drawings)

Pending further input from MHC, the District does not anticipate an adverse impact from any proposed alternation or demolition of the existing Neary or Woodward schools given the ages of the buildings and lack of historic significance.

CIRCULATION, PARKING, DROP OFF & PEDESTRIAN ZONES

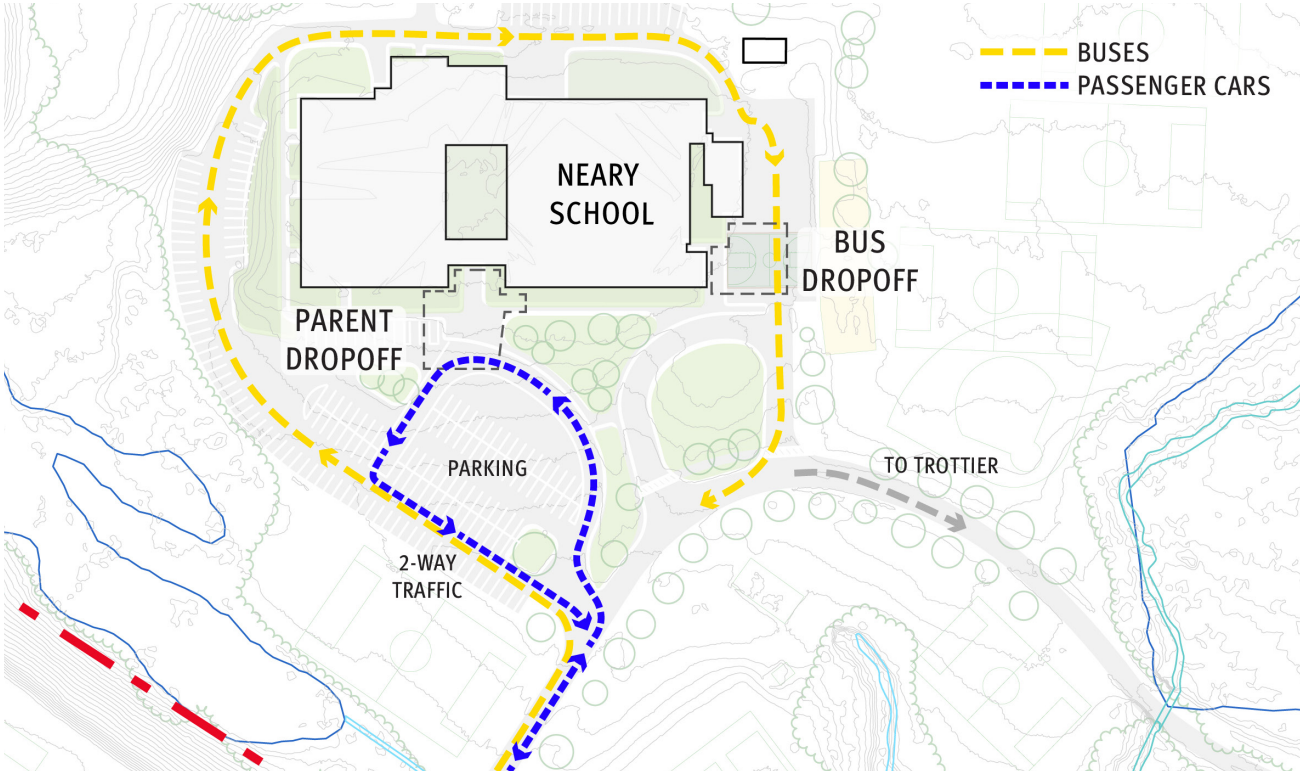
The town of Southborough currently operates a town-wide bus system. Bus service for the individual schools within the town are grouped; buses serve the middle school and high school students first, then are separated into 2 tiers. 8 buses serve the Neary/ Woodward School together, and the remaining 7 buses serve the Finn School. The system requires each school to have a slightly different schedule to accommodate staggered arrival and dismissal times.

Neary Site

At the existing Neary building, all traffic arrives at the building from the access drive off Parkerville Rd. Car and buses both turn left into the parking lot and split into separate drive lanes. Cars enter to the right near the front entrance. Buses continue along the outer lane, loop around behind the building, and drop off at the basketball court to the north of the existing modular classroom. See diagram on previous page.

The District reported conflicts from the current circulation routes at the intersection of the departing cars and incoming buses as well as from teachers and staff crossing the parking lot.

The proposed site improvements will seek to alleviate conflicts by providing separate lanes for bus and car traffic and to increase efficiency and improve safety for walkers and bikers who access the school by utilizing the sidewalks along Parkerville and the access drive.



Current Arrival/Dismissal Traffic Pattern - Neary Elementary

Woodward Site

Access driveways and parking are limited at the Woodward site. Currently, buses arrive through gated access from the adjacent Public Safety Building parking lot and access driveway. The buses drop students in front of the building along the teacher parking lot before exiting the site via the main entry drive. Families dropping off or picking up students enter the small lower-level lot adjacent to Chaote Field before turning around and exiting through the same entry drive. There is no parking behind the existing building.

CONSTRUCTION PHASING

The new construction alternatives described in the PDP anticipated constructing a new building adjacent to the existing Neary School on the existing athletic field. This would allow the existing school to remain in operation until the new building is constructed and operational, then the existing building would be demolished and site improvements completed.

Following further evaluation, the District and the NBC have determined that it would benefit the project to move students off the site during construction, for the following reasons:

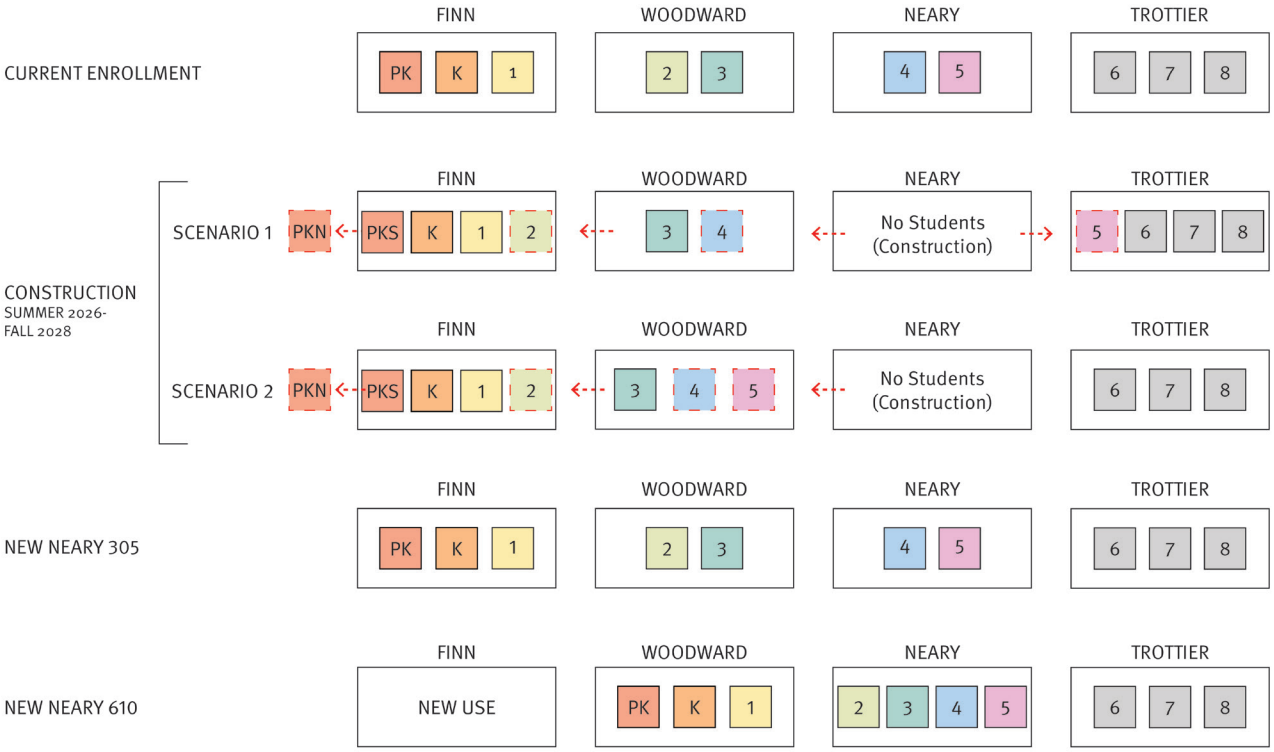
- The work to prepare the existing athletic fields for new construction is substantial. Approximately six feet of filled soil under the existing field needs to be removed and new structural fill provided to support a new building. The PDP cost estimate included approximately $1.5 million for that effort.
- Due to wetlands and riverfront buffer conditions along the northern edge of the playing fields, the new school would need to be constructed near to the existing building, increasing the impact of construction on students and faculty.
- The movement of construction traffic and worker parking would create site circulation difficulties with both the Neary School and the Trottier Middle School.
- The longer project schedule to phase construction, demolition and site improvements would increase the overall construction cost substantially.

Based on these considerations, the District has developed a plan to temporarily relocate the 4th and 5th grade population to the other District schools for the anticipated two year construction period. The diagram on the following page outlines two possible relocation strategies:

- Scenario 1 would have 3rd grade students remain at the Woodward Elementary (currently 2nd and 3rd) and relocating 4th grade from Neary, while the 5th grade students would be relocated to the nearby Trottier Middle School (currently 6th-8th grade).
- Scenario 2 temporarily relocates 3rd, 4th and 5th grade students to Woodward Elementary and 2nd grade students would relocate to the Finn School. Both schools would need two additional modular classrooms to support the increased school population.

During the next phase of the project, the District will further evaluate the relocation plans to take into account projected enrollment, staffing needs and operational efficiencies.

The availability of usable swing space will reduce enabling and construction phases, providing a significant cost-savings to the town and improving student experience by not being in the middle of a construction site.



"Swing Space" and Student Placement Before, During, and After Construction w/ Enrollment Options

Eliminated Alternatives

As noted in the Introduction to this Section, the two base repair alternatives as well as alternatives that focused on the existing Woodward Elementary building and site were eliminated by the NBC from consideration. Alternatives that focused on a 3-grade, 450 student enrollment were also eliminated.

The main disincentive to the 450-student enrollment scenario is the final grade configuration would leave one grade level "stranded" at the Finn School. This scenario would be inefficient for the district as a whole and inconvenient to students, staff, and parents.

All alternatives on the existing Neary site take into consideration the relocation of the current district offices housed in the building to another location.

ALTERNATIVE A.1 - BASE REPAIR (NEARY)

As required under the MSBA Module 3: Feasibility Study, the design team developed a code upgrade of the existing Neary Elementary that would consist of repairing or replacing existing building systems and performing code-mandated upgrades and improvements. In addition to these repairs, this alternative would also replace the existing roof and allow for remediation of hazardous materials found in building materials and finishes.

Scope of Work

The scope of work required under this base repair alternative would include but not be limited to a new fire suppression and alarm system, upgraded code signage, life and safety lighting at the interior and exterior of the building, accessibility upgrades to entries, classrooms, and toilet rooms, and remediation of asbestos containing materials around windows, doors, and finishes throughout the building. In addition, the base repair includes replacement of the existing mechanical system including ventilation, replacement of plumbing fixtures, water heaters, electrical systems, including panels, distribution and lighting, the addition of a new security system, master clock and public address system. Finally, a full replacement of the roof, existing doors and windows and upgrades to the building envelope are necessary to meet current energy code requirements. It is estimated that the construction cost for this work would total approximately $45.6 million with a total project cost of approximately $62 million.

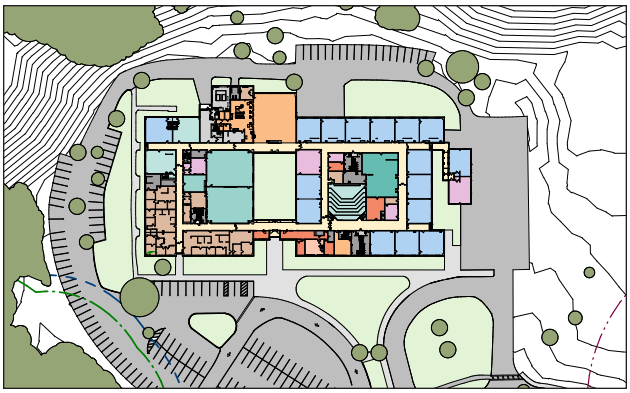
While this alternative would meet the space requirements, it is inefficient in its current configuration and does not solve the programmatic needs or educational goals of the district.

Advantages

- Reuse of existing structure

Disadvantages

- Doesn't meet the needs of the Educational Plan.
- (2) Undersized gymnasiums instead of one properly sized space.
- Classrooms are slightly undersized and cannot achieve the district's wish to group grade configurations into "neighborhoods."
- Cost of upgrades and repairs is significant.



Alternative A.1 - Programming Plan

ALTERNATIVE A.2 - BASE REPAIR (WOODWARD)

The current Woodward School was newly constructed in 2002 and remains in relatively good condition. The scope of work required is less than that of the Neary building, but would still be classified as a Level 2 alteration and would not help to increase the current enrollment capacity beyond 250 students.

Scope of Work

To comply with the current energy code requirements, existing walls and roof would need to be upgraded, including but not limited to new smart vapor retarder, insulation, and triple-glazed, thermally-broken windows. In addition to envelope improvements, upgrades to the current mechanical system, all electrical, controls, data, and security systems would also be required. It is estimated that the construction cost for the work outlined would total approximately $49.6 million with a total project cost of approximately $66 million.

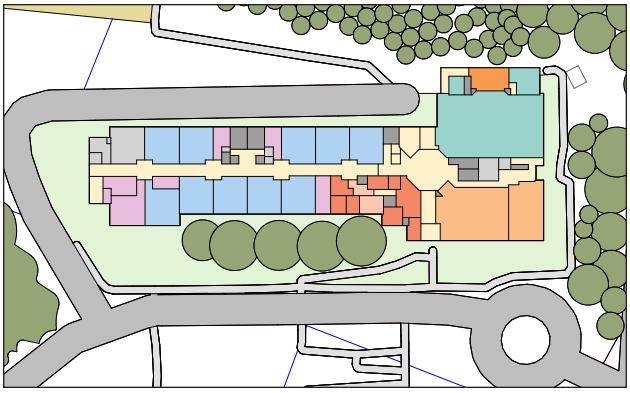
Base repairs and upgrades for this building would not solve the spacial and programmatic needs of the school. More significant renovations would need to be considered to meet the minimum student enrollment of 305 students.

Advantages

- Reuse of existing building

Disadvantages

- Doesn't meet the needs of the Educational Plan.
- Projected student enrollment exceeds available space in the existing building.
- Plan layout and configuration is not conducive to the required programmatic and educational goals of the district.
- Layout does not allow for special education spaces to be co-located within educational neighborhoods.



Alternative A.2 - Programming Plan

ALTERNATIVES B.1 & B.2 - ADD/RENO (NEARY)

Alternatives B.1 and B.2 both evaluated complete renovation of the existing Neary building and include new additions to accommodate either the 305 or 450 student enrollment. While each alternative provides necessary improvements and facility upgrades, neither fully addresses the educational and programmatic needs of the District.

In a 305-student enrollment alternative, the addition of the gymnasium and auditorium creates space to allow the media center to be reconfigured and provides room for new support spaces. However, it does not allow the school to group grade levels into common "neighborhoods," a driving factor in the educational program.

The 450-student enrollment alternative, despite from providing more space for core academic program than the 305-enrollment, still leaves much of the existing school plan in place, and only allows for the educational programing goals to be addressed in a new classroom wing.

Scope of Work

Alternative B.1 would require a complete renovation of the existing building, a 22,000 sf addition of a gymnasium and auditorium, as well as full replacement and upgrades to mechanical systems, plumbing, electrical service, lighting, communication, fire suppression and alarms, building security and technology upgrades.

Alternative B.2 includes the same scope as alternative B.1, but with the addition of a 2-story, 36,000 sf classroom wing.

Project Budget & Construction Costs
B.1 Construction Cost: $82.4 million
B.1 Project Cost: $107 million

B.2 Construction Cost: $99.4 million
B.2 Project Cost: $129 million

Advantages
- Reuse of existing building

Disadvantages
- Neither alternative fully addresses the district's educational goals or programming needs
- Renovations would include costly structural upgrades. Additions to south of the building would require costly site work.
- Both alternatives adhere to an already inefficient plan layout, creating additional segregation of core learning spaces

Alternative B.2 - Programming Plan

ALTERNATIVES B.3 & B.5 - ADD/RENO (WOODWARD)

Alternatives B.3 and B.5 are both full renovations and additions to the existing Woodward Elementary School building for either a 450-student enrollment and a 610-student enrollment. As previously stated, the Woodward building is the newest of the three elementary schools, built in 2002. Both enrollment counts would require new additions to an already constrained site. Additionally, the existing core-academic spaces are undersized by current standards.

Scope of Work
Both alternatives would require significant renovations to existing core-academic spaces and building system upgrades to meet the current energy stretch code. Each alternative would require an addition to the west of the existing building; 1-story, 26,000 sf wing for a 450-student enrollment and 2-story, 56,000 sf wing for 610.

Project Budget & Construction Costs
B.3 Construction Cost: $95.2 million
B.3 Project Cost: $124 million

B.5 Construction Cost: $113.4 million
B.5 Project Cost: $147 million

Advantages
- Reuse of existing building
- Existing building is newer than the other schools and code upgrades may not be as extensive.

Disadvantages
- Neither alternative fully addresses the district's educational goals or programming needs
- Available space for new construction on the site is limited due to the topography and current building placement.

Alternative B.5 - Programming Plan, Level 1

ALTERNATIVE C.2 - NEW CONSTRUCTION (NEARY)

Alternative C.2 proposes all-new construction on the Neary site for a 450-student enrollment. This alternative was originally presented as a way to allow for new construction adjacent to the existing building with minimal disruption to school operation.

The proposed 100,200 sf of new construction would be situated over the existing playing fields, adjacent to the wetlands which would require replacing the existing soil with structural fill in order to accommodate new foundations.

Project Budget & Construction Costs

C.2 Construction Cost: $99.1 million

C.2 Project Cost: $129 million

Advantages

- New construction would meet the district's goals as described in the Education Plan.
- Improved site circulation.

Disadvantages

- Higher cost per square foot.
- Costly site soil prep.

Alternative C.2 - Programming Plan, Level 1

ALTERATIVES C.3 & C.5

Alternatives C.3 and C.5 propose all-new construction on the current Woodward site for a 450-student and 610-student enrollments.

Project Budget & Construction Costs

C.3 Construction Cost: $98.4 million
C.3 Project Cost: $128 million

C.5 Construction Cost: $111.7 million
C.5 Project Cost: $145 million

Advantages

- New construction would fully meet the district's goals as laid out in the Education Plan.
- Improved site circulation.

Disadvantages

- Higher cost per square foot.
- Demolition of the newest building in the school district.

Alternative C.5 - Programming Plan, Level 1

DISTRICT FEEDBACK

On June 03, 2024, the NBC reviewed all of the alternatives presented in the PDP and voted to eliminate alternatives based on the following:

High Cost Estimates:

The NBC decided that alternatives A.1 and A.2 presented a high cost to repair and upgrade to meet current building codes. With estimates being similar to some of the add/reno or new construction alternatives,it was decided that it did not make economic sense to spend the money if the outcome does not meet the desired educational program goals of the district. Additionally, alternative B.1 was eliminated by the NBC due to the high costs associated with an alternative that would not meet the District's educational goals.

Student Enrollment:

One of the main motivations for the District is the potential to consolidate two out of three elementary schools currently in operation. While options to maintain the current number of schools have been under consideration, alternatives designed for three grade levels (450 students) would inevitably leave one grade level "stranded in one of the remaining schools. In order to avoid this scenario, the NBC eliminated alternatives B.2, B.3, C.2, and C.3.

Woodward:

The NBC decided that any new construction on the existing Woodward site would not be well-received by the community citing that new construction alternatives would be costly and would require the demolition of the newest of the three schools. Additionally, while add/reno alternatives were considered, the high cost associated with a Woodward add/reno was comparable to an all-new construction alternative on the existing Neary site. This decision therefore eliminated alternatives B.5 and C.5.

Final Alternatives

Following consideration of the limitations of the alternatives previously outlined, the Neary Building Committee voted on June 03, 2024 to eliminate those alternatives from consideration and reduce the alternatives under consideration to:

- B.4 - Addition/Renovation (610 Enrollment - Neary Site)
- C.1 - New Construction (305 Enrollment)
- C.4 - New Construction (610 Enrollment)

The NBC further voted on July 22, 2024 to eliminate the auditorium from any alternatives considered. The decision was made due discussions with the music faculty about the need for an auditorium, the additional project costs for an auditorium, and the understanding that an auditorium would not be eligible for MSBA reimbursement.

ALTERNATIVE B.4 - ADDITION/RENOVATION

The only add/reno alternative considered, B.4 retains a majority of the existing building footprint and facade. A new, 2-story classroom wing is added at the north side of the building, connected off the corridors at the east and west, creating a second courtyard to be utilized as outdoor learning space.

For the Preliminary Design Report, this alternative was shown with a 2-story classroom wing to the north, and a new gymnasium . The driving factor for the second addition was to attempt program separation between the more public programs (gymnasium, cafeteria, etc.), from the private, educational programs. As part of the further development of this alternative since the PDP, new construction has been consolidated. This revised layout is also more affordable, reducing the scope of the revised alternative adds the new, full-size gymnasium to the west of the new classroom wing with no addition to the south. Additional "public" program areas such as the cafeteria and admin offices are provided in the renovated portion of the building.

During the Preferred Schematic phase, the design team worked with the district to study how to best utilize the existing building with as little changes as possible to the envelope and floor plan. The solution was to maintain existing classrooms and admin areas in their current locations. The main entrance to the school would also remain in its current location and the traffic loops for buses and cars would have access along this entrance.

The location of the existing kitchen would remain and would be renovated with the necessary upgrades. However, the existing cafeteria would be renovated for a new media center allowing for views to the northeast. The existing gymnasiums, located to the west of the kitchen, would be renovated for a new, larger cafeteria which would better accommodate a doubled student enrollment. This change would require structural modifications to allow for the larger, open area. Lastly, the area containing the existing library and band room would be completely renovated to accommodate classroom support spaces and learning commons for 2nd and 3rd grade.

Finally, the new, 2-story classroom wing to the north will accommodate 4th and 5th grade student classrooms, special ed classrooms, and support spaces. A new gymnasium would be constructed to the west of the classrooms. Although removed from other "public-facing" program, the proposed location would be available for after-hours use while still allowing for secure separation from the rest of the building.

Schedule & Phasing

Enabling Phase: Approximately 1 month

- Site preparation, construction lay down and fencing.
- Demolition of modular classroom
- Selected demolition of original building facade (at addition), existing roof, interior finishes, ceilings, and existing MEP systems

Construction Phase: Approximately 30 Months

- Renovation of existing interior spaces, full gut renovation of existing library and band room
- Structural upgrades at new cafeteria
- Construct new addition
- Site work for parking lots and landscape

Potential Construction Impact
Per the request of the district, construction will be limited to a single renovation and construction phase. Students will be relocated by the school district to available space in nearby schools while construction is underway to limit disruption to students, teachers and staff.

Structural & MEP Systems
Please refer to page 50 for the structural systems narrative. Refer to page 55 through page 127 for the MEP system narratives.

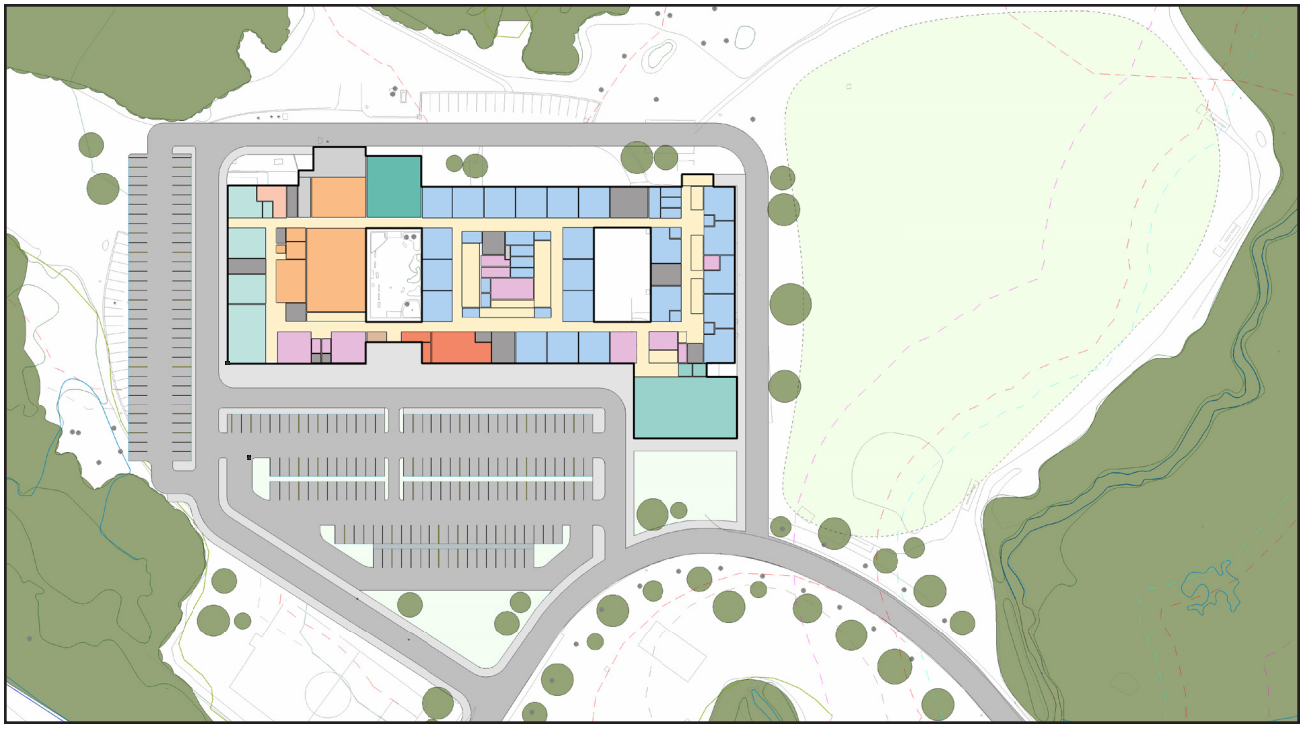
Utilities
Please refer to page 128 for the civil narrative of the anticipated storm water scope and utility capacity analysis. Refer to the Existing Conditions section for a description of utility work planned to be under taken by the Town prior to the start of this project.

Project Budget & Construction Cost
The estimated cost for this alternative was updated in the Cost Estimate update for this phase. Please refer to Appendix H. PSR Cost Estimates for document dated August 12, 2024.

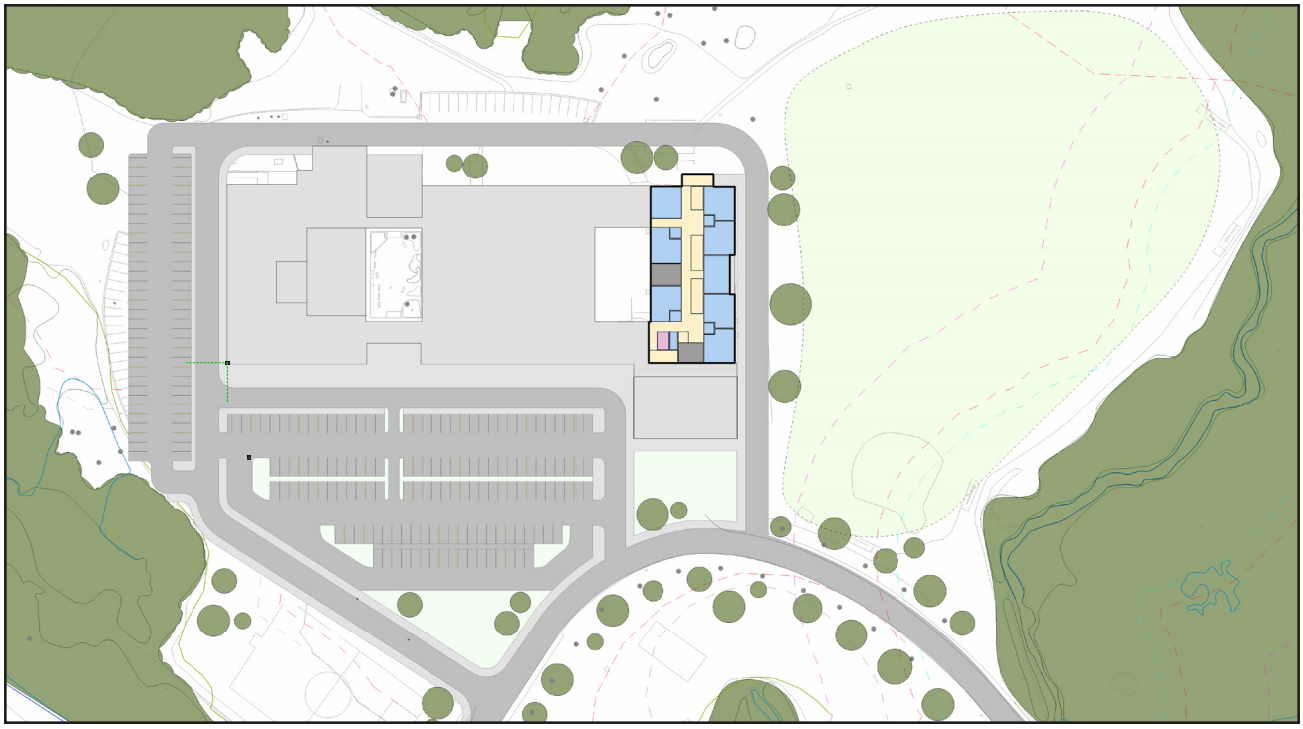
The construction cost is estimated at $90 million. The total project cost for this alternative is estimated at $113.6 million.

Permitting Requirements
A review of MEPA permitting thresholds indicate that no thresholds are anticipated to be triggered. The following is a list of known permits/approvals and reviews to be undertaken for this alternative:

- Southborough Historical Commission
- Massachusetts Historical Commission PNF
- Southborough Tree Protection
- Southborough Stormwater Management
- Land Disturbance Permit
- Post Construction Stormwater Management Permit
- NPDES construction general permit - EPA & Stormwater Pollution Prevention Plan



Alternative B.4 - Addition/Renovation - Level 1



Alternative B.4 - Addition/Renovation - Level 2

ALTERNATIVE C.1 - NEW CONSTRUCTION

All new construction, this alternative is best described as a full-replacement of the current school and grade configuration. As with all three alternatives, C.1 would be placed over the existing school footprint following a complete demolition of the existing school building. Alternative C.1 presents a clear solution to the district's need to upgrade the current facility without significant changes to student enrollment across the three elementary schools. It does not however, allow the district to consolidate schools, which has been one of the driving factors of the feasibility study.

As C.1 proposes complete replacement of the existing building, the design team was able to work with the district to explore how a new facility would best meet the educational needs for Neary Elementary. The building is organized simply by dividing the school's shared, public-facing program areas such as the gymnasium, cafeteria, and media center from the more private program areas such as core-academic spaces and student learning commons. This is accomplished with a 2-story classroom wing at the north of the building, with a 1-story wing to the south, allowing for double-height spaces such as the gym and cafeteria.

The arrival to the site does not change much from the original plan, as the main entrance to the school remains located along the west facade of the building, off the dropoff/pickup zone. Parking and traffic loops are reconfigured slightly to allow for a more efficient traffic flow through the site at peak hours. The current parking layout, which is more than the school currently needs, is reduced to allow for more porous, natural materials to better help drainage along the site.

This alternative also reduced the overall footprint required and is the smallest footprint of all three alternatives. This reduction allows for more outdoor learning and play space, which can be accessed directly off the cafeteria or the classroom wing.

Schedule & Phasing

Enabling Phase: Approximately 1 month

- Site preparation, construction lay down and fencing.
- Demolition of existing building.

Construction Phase: Approximately 24 Months

- Construct new building.
- Site work for parking lots and landscape.

Potential Construction Impact

The potential construction impact for this alternative is the same as for B.4. Please refer to the B.4 narrative.

Structural & MEP Systems

Please refer to page 50 for the structural systems narrative. Refer to page 55 through page 127 for the MEP system narratives.

Utilities

Please refer to page 128 for the civil narrative of the anticipated storm water scope and utility capacity analysis. Refer to the Existing Conditions section for a description of utility work planned to be under taken by the Town prior to the start of this project.

Project Budget & Construction Cost

The estimated cost for this alternative was updated in the Cost Estimate update for this phase. Please refer to Appendix H. PSR Cost Estimates for document dated August 12, 2024.

The construction cost is estimated at $67 million. The total project cost for this alternative is estimated at $83.1 million.

Permitting Requirements

The anticipated permitting requirements for this alternative are the same as for B.4 Please refer to the Alternative B.4 narrative.

Alternative C.1 - New Construction - Level 1

Alternative C.1 - New Construction - Level 2

ALTERNATIVE C.4 - NEW CONSTRUCTION

Like alternative C.1, alternative C.4 is an all-new construction scheme placed over as much of the existing building's footprint as possible. This alternative responds to all of the same programmatic needs outlined by the district, but is designed to accommodate four grade levels instead of two.

Schedule & Phasing

Enabling Phase: Approximately 1 month

- Site preparation, construction lay down and fencing.
- Demolition of existing building.

Construction Phase: Approximately 30 Months

- Construct new building
- Site work for parking lots and landscape

Potential Construction Impact

The potential construction impact for this alternative is the same as for B.4. Please refer to the B.4 narrative.

Structural & MEP Systems

Please refer to page 50 for the structural systems narrative. Refer to page 55 through page 127 for the MEP system narratives.

Utilities

Please refer to page 128 for the civil narrative of the anticipated storm water scope and utility capacity analysis. Refer to the Existing Conditions section for a description of utility work planned to be undertaken by the Town prior to the start of this project.

Project Budget & Construction Cost

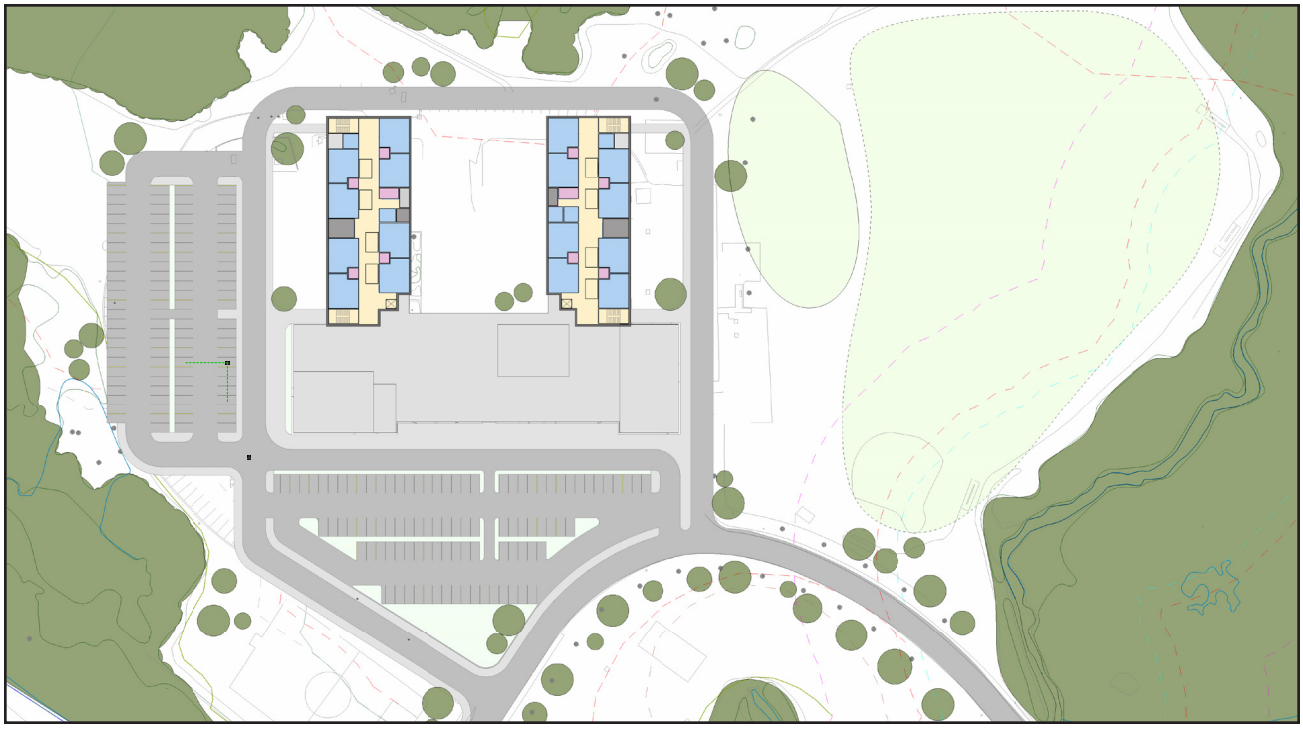
The estimated cost for this alternative was updated in the Cost Estimate update for this phase. Please refer to Appendix H. PSR Cost Estimates for document dated August 12, 2024.

The construction cost is estimated at $92 million. The total project cost for this alternative is estimated at $113.4 million.

Permitting Requirements

The anticipated permitting requirements for this alternative are the same as for B.4 Please refer to the Alternative B.4 narrative.

Alternative C.4 - New Construction - Level 1



Alternative C.4 - New Construction - Level 2

Final Comparison and Selection

On August 12, 2024 the Neary Building Committee met to review the final alternatives under consideration. The committee discussed various aspects of the Alternatives including educational considerations, site restrictions, modernization and budgetary constraints.

A fundamental consideration for the District was the consolidation of schools. Currently, students attend each school for two years, so every year, they are either arriving or leaving, and the educators have identified the impact on students' adjustment. Additionally, the current busing plan employs the same buses for all three schools. The fleet of buses is separated to support Neary/Woodward together, and Finn has its own group of buses. Logistics would be greatly improved with a consolidated scenario.

Educational methods have changed since the original building was constructed and the students would benefit from the configuration and amenities of a modern space.

In considering a two-grade or four-grade configuration, the NBC evaluated the higher cost for the C.4 alternative versus the costs to maintain and operate the existing Finn School, including investment necessary to upgrade the Finn School in 5-10 years.

The various site restrictions were noted, such as riverfront and wetland setbacks, proximity to the landfill and soil assessment. The committee feels that they have an understanding of these limitations at this stage of the project.

Budget is a prime consideration for the Town and considerable effort went into evaluating the financing of the new school project. The meeting began with a presentation by the Finance Committee forecasting Capital spending for the upcoming years. It was noted that the cost of the Add/Reno Alternate B.4 was not a significant savings over the New Construction C.4.

Summary of Preliminary Pricing

PM+C performed preliminary cost estimate on the alternatives, dated August 12, 2024. See below for a summary of pricing.

The estimates indicated that the two Alternates for 610 enrollment were very close in value and that there is not a significant savings for pursuing the B.4 Add/Reno alternative.

While the C.1 alternative was less costly, it does not achieve consolidation or leverage the economy of scale of the larger alternatives.

The District continues to study various HVAC system options so that they may understand and decide on the best solution for the school. The estimate

Preliminary Design Pricing Table - Margaret A. Neary Elementary School

Option (Description)	Total Gross Square Feet	Square Feet of Renovated Space ($*/SF)	Square Feet of New Construction ($*/SF)	Site, Building Takedown, Haz Mat Etc. ($*)	Estimated Total Construction** ($*)	Estimated Total Project Costs ($)
B.4 - Add/Reno (610 Enrollment)	103,392 sf	60,285 sf $ 683.64 $/sf	43,107 sf $ 683.64 $/sf	$ 19,260,013	$ 89,942,620 $ 869.92 $/sf	$ 113,600,000
C.1 - New Construction (305 Enrollment)	63,305 sf	- sf $ - $/sf	63,305 sf $ 777.45 $/sf	$ 17,596,413	$ 66,812,605 $ 1,055.41 $/sf	$ 83,100,000
C.4 - New Construction* (610 Enrollment)**	99,564 sf	- sf $ - $/sf	99,564 sf $ 742.67 $/sf	$ 17,738,944	$ 91,682,184 $ 920.84 $/sf	$ 113,400,000

* Marked Up Construction Costs
** Does not include Construction Contingency
*** **District's Preferred Schematic**

included alternate pricing for a geothermal system for future consideration explored in Schematic Design phase.

The detailed cost estimate can be found in Appendix H: PSR Cost Estimates.

Building Systems Narratives

The following pages include building system narratives describing scope required for the (3) alternatives under consideration provided by the Design Team's Engineering and Landscape Architecture consultants. The systems narratives include Structural, HVAC, Electrical, Plumbing, and Fire Protection systems as well as narratives for Civil and Utilities and Landscape design.

Structural Systems Narrative

Three structural options, B.4, C.1, and C.4, have been evaluated. Option B.4 includes the renovation of the existing building and the construction of a new addition. Options C.1 and C.4 are new constructions to replace the existing school building.

Option B.4 – Add / Reno for 610 Enrollment [103,392 gsf]

Option B.4 will repair and renovate the existing school building. The two playrooms adjacent to the courtyard will be combined and converted into a new cafeteria. The interior space of the media center and music room will be demolished. A new two-story building will be added to the northwest face of the existing structure.

The proposed structural work includes three types: 1) repair of the existing structure, 2) alteration of the existing structure to support the proposed architectural and MEP/FP improvements, and 3) construction of a new addition.

1) **Repair of the Existing Structure**

   Structural defects of the existing building, including those documented in the Existing Condition Evaluation report, will be repaired. The known defects include spalling of the precast concrete band beam facing the courtyard and cracks in exterior brick masonry walls.

   Additional defects may be discovered during construction as more structure is exposed. It is recommended that a contingency budget be carried for the repair work.

2) **Alteration of the Existing Structure**

   The existing building's gravity load supporting members (slabs, beams, columns, and walls) will be reinforced where necessary to support the increased loads imposed by the proposed architectural and MEP systems. For conversion of the gymnasium to a cafeteria, the existing CMU wall separating the current two playrooms will be replaced with new steel beams, columns, and footings. The lateral load path and the lateral load support system will be re-evaluated and reinforced due to the CMU wall removal.

   The proposed renovation will likely be classified as Level 2 Alteration. The structure will be re-evaluated for lateral loads and steel brace frames/moment frames will be added to replace the existing shear walls. Any change in occupancy of the existing building will require reinforcement of floor members.

   In case a Level 3 Alteration is triggered when the reconfigured space exceeds 50% of the total area of the existing building, the masonry bearing and partition walls will be tied to the floor

structure with positive connections to resist out-of-plane earthquake loads. These seismic ties or clips will be added at the top of the CMU/Brick walls at approximately 5’ spaces along the length of the walls.

The total area of the altered structures will need to remain under 30% of the total area of the building to avoid a full seismic upgrade of the existing building.

3) Addition

The addition to the northwest of the existing building will be structurally independent from the remaining existing building.

The addition will be a two-story structure consisting of steel framed upper structure supported on conventional concrete spread footing foundation. The structural system will be similar to those of Option C.1 and Option C.4. A detailed description of the proposed structural system is included in the next section of this narrative.

Option C.1 and Option C.4 – New Construction

Option C.1 proposes a two-story building to be constructed on the site of the existing school building, after the existing building is demolished. The proposed building will be 63,305 GSF.

Option C.4 proposes a two-story building to be constructed on the site of the existing school building, after the existing building is demolished. The building will be 99,564 GSF.

Based on the proposed building layouts, a steel-framed upper structure is considered the most efficient system for both Options. The foundation system will likely be a conventional spread footing system based on the foundation of existing building. The structural system of the new construction will be as follows.

1) **Foundation and Ground Floor**

Foundation: According to the "PRELIMINARY GEOTECHNICAL GUIDELINES REPORT" prepared by Lahlaf Geotechnical Consulting, Inc. dated May 2024, the proposed building foundation will consist of conventional spread footings over natural soil or compacted structural fill. The bottom of exterior wall footings and footings in unheated areas will be placed at a minimum of 4'-0" below the finished grade for frost protection. The bottom of interior footings in heated areas will be placed at approximately 3'-6" below the ground floor slab. Reinforced concrete walls and column pilasters will be constructed along the perimeter of the building.

First Floor: Typical first floor slab on grade will be concrete slab-on-grade of 5" thick. The slab-on-grade will be constructed over properly prepared sub-grade materials and will be reinforced with welded wire fabric. Saw-cut control joints will be cut into the slab at column grids and a maximum of 15' in each direction.

2) **Superstructure**

General: The primary structure will be structural steel beams and columns supporting a non-composite metal deck roof and concrete composite metal deck floors.

Floor and Roof Framing: The typical girders will be steel wide flanges sections (W-shapes) that span 25' to 30', and typical steel beams will be W-shapes spanning approximately 30' at 8' to 10' spacing. Steel beams for landing and stringers of monumental stairs will be rectangular tube steel shapes. Typical columns will be 12" deep steel W-shapes. Columns at exposed locations will be rectangular or round tube steel shapes. Gymnasium roof will be supported by 50" deep steel open web joists spaced at approximately 5' on centers.

Connections: A typical beam to beam, beam to girder, and a typical beam/girder to column connection will be a double angle connection with bearing type bolts. Connections for the

lateral load resisting moment frames will be shop and field welded. Connections for lateral load resisting braced frames will be shop and field welded or slip critical bolted.

AESS: Steel framing, including connections, exposed to view will meet the requirements of Architecturally Exposed Structural Steel (AESS).

Floor Assembly: The slabs of second floor and third floor will consist of 3.5" thick normal-weight concrete over 3" deep galvanized composite steel deck (6.5" total thickness). A minimum of one row of stud shear connectors, 3/4 inch in diameter and 5" long, will be welded over the top of each supporting beam at an interval of not more than one foot.

Roof Assembly: Typical roof will be of 3" deep galvanized steel roof deck. The gymnasium roof will be 3.5" deep dovetail acoustical steel roof deck.

Exterior Walls: The exterior walls will mostly be cold-formed metal frame stud backed cavity wall with a metal panel. The steel studs will likely be 6" deep and span between floor slabs.

Lateral Load Resisting System: The building will be stabilized against wind and seismic forces by concentric steel braced frames and moment frames in both orthogonal directions at locations permitted by the architectural design.

Steel Quantity: For the purpose of schematic design quantity estimate, the structural steel weight is assumed to be 16 PSF. This weight will include steel beams, girders, columns, framing for stairs and elevators, relieving angles, plates, hangers, diagonal bracings, etc., but exclude equipment screens, dunnage, shear studs, composite steel floor deck and steel roof deck.

LEED Certification: The use of structural steel and steel deck, which are substantially comprised of recycled material, and the addition of ground granulated blast furnace slag, a cementitious waste product of steel manufacturing, to the concrete mix will contribute to the goal of LEED certification.

Design Loads & Parameters for New Construction

The proposed building structure will be designed in accordance with the 10th Edition draft of the Massachusetts State Building Code. The design loads and parameters are as follows:

Floor Live Loads:

1. First floor & public space ……..100 PSF
2. Corridors above first floor ……...80 PSF
2. Classrooms ……..…..50 PSF
3. Light Storage ……..125 PSF

Dead Loads:

1. Mechanical Units: ……..... Actual Weights
2. Roofing and Insulation…….. 5 PSF
3. PV Panels and Ballast ……..... 10 PSF
4. Services and Ceiling ……..... 10 PSF
5. Structure ……..…Estimated Actual Weights

Roof Snow Loads:

1. Ground Snow Load Pg = 40 PSF
2. Exposure Factor Ce = 0.9
3. Thermal Factor Ct = 1.0
4. Importance Factor I = 1.1
5. Minimum Flat Roof Snow Load P_f = 35 PSF
   (Basic snow load will be adjusted for drift, roof slope, sliding.)

Wind Loads:

1. Basic Wind Speed V_{ult} = 128 mph , Risk Category III
2. Exposure: B

Earthquake Loads:

1. Risk Category: III
2. Seismic Importance Factor: I = 1.25
3. Mapped Spectral Response Acceleration at Short Period: S_s = 0.237g
4. Mapped Spectral Response Acceleration at 1 second: S_1 = 0.062g
5. Site Class: D (Per Preliminary Geotech Report)
6. Seismic Design Category: B
7. Lateral Load Resisting System: Ordinary Steel Braced Frame
8. Response Modification Factor: R = 3
9. Analysis Procedure: Equivalent Lateral Force Analysis

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HVAC SYSTEM

NARRATIVE REPORT

Add-Reno (Option B.4)

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 Commonwealth of Massachusetts Adopted Building Codes (IBC, IMC, IECC latest Adopted Editions with MA amendments), Massachusetts Municipal Opt-In Specialized Stretch Energy Code 2023, and all local, 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.

The HVAC narrative below provides as summary of options in section 4 below, and further defines the proposed preferred HVAC system under section 5 followed by three Alternate HVAC systems in sections 6, 7 and 8, which shall also be studied as part on a life cycle cost analysis (LCCA). Sections 3, and 7 through 12 are general requirements and pertain to all options. Sections 10 only applies to Add-Reno Option C.2.

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 7 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 Air-conditioned areas (Administration, Nurses Office, Guidance, Cafeteria).

78-80 deg. F +/- 2 deg. F (55% RH) for partial Air-conditioned areas (Classrooms, Teacher Support, Gym).

Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the International Mechanical Code (latest adopted editions) as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. **HVAC SYSTEM OPTIONS:** As part of a life cycle cost analysis (LCCA), different HVAC systems shall be compared against a code compliant baseline system to determine the system with the overall greatest savings over a 50 year study period.

   By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year-round temperature control and comfort at a possible marginal increase in capital cost. The following HVAC systems are proposed to be studied as part of the life cycle cost analysis (LCCA) during the Schematic Design phase of the project.

5. **HVAC SYSTEM OPTION 1 – Geothermal Water Source Heat Recovery Heat Pump Chiller and Heating Plant with VAV Displacement System**

   A. General: A central geothermal ground source water to water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

   B. Geothermal Heating and Cooling Plant:

      1. Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including a modular ground water source to water simultaneous heating/cooling heat recovery heat pump chillers with six (7) 50 nominal ton modules, with two (2) of the modules for heating/cooling backup purposes. The estimated peak heating load is 230 tons. The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with ground source condenser water from approximately (45) closed loop type quad-loop ground source geothermal wells approximately 600-650 feet deep and spaced a minimum of 20-25' apart from one-another, based on a capacity of 5 tons/well. The final well quantity, depth and distances shall be determined by the geothermal design consultant.

      2. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The plant shall supply a maximum hot water temperature of 130°F on a design heating day. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

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

   Entry areas and stairwells shall be provided with cabinet unit heaters. Utility rooms and storage areas with exterior exposures shall be provided with unit heaters. Corridors and areas with extensive exterior exposure areas shall be provided with fin tube radiation heating or radiant ceiling panels.

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

C. Ventilation air handling equipment: It is proposed that a new air-conditioning displacement ventilation system shall be provided to provide air-conditioning and ventilation to the occupied areas of the building.

1. New rooftop air handling units with 100% outside air operation capability, supply and return air fans with VFDs, energy recovery wheels, hot water heating coil with modulating valve, chilled water cooling coil, hot water re-heat coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classroom will typically be provided with two individual wall mounted displacement diffusing units between 250 and 400 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant ceiling panels will be provided along exterior walls that shall be interlocked with space enthalpy sensors that shall modulate the control valve of the coil closed when the space enthalpy is above dewpoint conditions.

Preliminary AHU Quantities, zones and airflow capacities are as follows:

AHU-1, 2, 3, & 4 – Classrooms – 32,000 CFM Total (Each unit @ 8,000 CFM Avg.)
AHU-5 – Gym – 6,500 CFM
AHU-6 – Media Center, Administration, Main Entry, Central core areas – 12,000 CFM
AHU-7 – Cafeteria – 6,500 CFM
MAU-1 Kitchen (Make-Up Air) – 2,500 CFM

D. The ERV units shall be designed to provide air conditioning or partial air conditioning (dehumidification) to the majority of building areas. The Administration, Media Center and Cafeterias areas shall be provided with "full" air conditioning to maintain 75 deg F on a design cooling day, whereas the Gym and Classroom and related Teacher support areas shall be designed for partial air conditioning to maintain a temperature of 78-80 deg F on a design cooling day.

E. It is proposed that building addition and new construction Classrooms and adjacent teacher support and circulation areas, Administration Areas, Cafeteria and Gym Areas are served by a displacement ventilation air system which consists of low wall supply displacement air diffusers and ceiling mounted return/exhaust air registers with supplemental chilled water radiant cooling and heating ceiling panels. Spaces within renovated portions of the existing building would be provided with over-head delivery ventilation systems in-lieu of displacement, as the renovation envelope improvements and the existing spatial availability may not support the use of a displacement system.

F. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

G. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

H. New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork. New VAV (variable air volume) terminal boxes with temperature and demand control ventilation shall be provided for each classroom, teacher support room and the office areas. Enthalpy controls shall be provided to shut down mechanical cooling systems when operable windows are opened during hot and humid outdoor air conditions.

I. Unitary type hot and chilled water terminal units shall be provided to serve IT server rooms and closets.

J. Domestic hot water heating systems shall be pre-heated by the building hot water heating loop and a ground source heat pump system shall be utilized to provide additional heating of DHW heating. The DHW storage tank heat exchangers and heat pumps shall be by Plumbing.

K. A new direct digital automatic temperature control (ATC) and building energy management system (BMS). The new ATC/BMS system shall be web accessible, include energy metering, and shall be capable of being integrated into the City-wide energy management system.

6. **HVAC SYSTEM OPTION 2 - Air Source Heat Pump Heat Recovery Chiller/Heater**

A. General: A central air source to hydronic hot and chilled water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant ceiling heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.

B. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that includes (14) modular air source to water heat pump chillers with heat recovery and a capacity of 30 nominal cooling tons each (approximately 25 tons heating per module). The heat pump chiller heater shall consist of 2 banks of 7 modules manifolded together, with each bank having 1 backup module. The air cooled heat pump chiller units will be grade, or roof, mounted on minimum 24" high structural support stands within a protected enclosure that allows adequate airflow. The unit shall be capable of providing 130ºF heating hot water supply at a 4ºF ambient temperature condition. A large outdoor location for the air cooled heat pump chillers will be required. Provide pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. Primary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

A supplemental backup electric boiler shall also be provided to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

The heat pump chiller plant will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully air conditioned areas of the building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Primary Chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new chilled water accessories including air separators, expansion and buffer tanks shall be provided.

C. Air Handling (HVAC) System:

New air handling units shall have hot water heating, chilled water cooling, supply fans with VFD drives, MERV-14 filters, and energy recovery where code required. New return air fans with VFD drives shall also be provided. New air handling unit and return fan controls shall be provided. The air handling units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The ductwork system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods.

Refer to Section 5.C. Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a fully air conditioned variable volume displacement ventilation air distribution system with supplemental chilled water radiant cooling and heating panel system.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment: Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all general classroom, lobby and office areas of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors, entryways. Hot water unit heaters shall be provided for all utility rooms. Hot and chilled water terminal units shall be provided to serve Elevator machine rooms, and IT and MDF Server rooms

7. **HVAC SYSTEM OPTION 3 - Air Source Variable Refrigerant Flow (VRF)**

A. General: Air source VRF (variable refrigerant flow) heat recovery heat pump units shall be connected to a combination of indoor ducted and ductless VRF indoor air handling units. Packaged Dedicated Outdoor Air System (DOAS) Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilation (ERV) and back-up electric heat shall provide the ventilation requirements for the majority of building areas. Backup heating shall be provided in areas of the building with extensive exterior exposures via perimeter electric resistance radiant heating panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Air source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

B. Central Heating and Cooling Plant:

Under this option, a high-efficiency Air Source Variable Refrigerant Flow (VRF) heat recovery system shall provide simultaneous heating and cooling capabilities to all regularly occupied spaces via a combination of fan coil, ductless wall and/or ductless ceiling cassette type VRF terminal air handling units. Air conditioning will be generated by outdoor grade, or roof, mounted heat recovery type air source heat pump condensing units that shall be connected to indoor air handling units or terminal heating and cooling units. The HVAC system terminal heating/cooling systems (excluding supplemental AC and electric resistance heating systems) shall have a total estimated capacity of 500 tons based on the peak heating loads). The outdoor VRF heat pump condensing units will be sized and located according to AHU and terminal equipment zones capacity requirements and VRF system piping length limitations. Therefore, multiple VRF outdoor heat pump condensing units shall be required.

C. Air Handling (HVAC) Ventilation Systems:

Ventilation shall be provided to building areas via dedicated outdoor air system (DOAS) air handling unit as described below. Air handling units shall be provided with split cooling/heating coils connected to high efficiency air source heat pump unit. Remote condenser heat pump sections will include inverter-based compressor technology similar to the VRF system for improved energy efficiency.

The DOAS units shall be provided with MERV 13 filters, heat pump cooling/heating coil section (split air source heat pump condensers for indoor units), supply and exhaust fans with variable frequency drives or EC motors, supplemental electric heating coils, total energy recovery wheel, and a sensible reheat wheel or hot gas re-heat coil for dehumidification. The DOAS units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow

from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The DOAS system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods if unoccupied space set points are not maintained.

Refer to Section 5.C Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a neutral air variable volume overhead ventilation air distribution system with utilizing the VRF terminal units for supplemental heating or cooling.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork. New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment:

Heating for Entryways, Storage Rooms, Toilet Rooms, Janitor Closets, etc and support areas will be generated by a combination of electric unit heaters, convectors, radiant panels, and fin tube radiation.

G. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

8. **COMMON REQUIREMENTS FOR ALL HVAC OPTIONS:**

A. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and 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 dehumidified by the displacement ventilation systems. For HVAC Option 3 VRF System – Electric terminal heating equipment shall be provided.

B. Utility Areas:

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

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

C. Testing, Adjusting, Balancing & Commissioning:

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

D. 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 (electric, water). The new DDC/ATC system shall be a BACNet open protocol system that is capable of being integrated into the City Wide Central energy management system.

9. **ADD-RENO PROJECT ADDITIONAL HVAC SCOPE:**

A. Demolish and remove all existing HVAC systems and equipment.

B. Blank off & seal all existing unit ventilator outdoor air intake grilles and restore the envelope in each of these locations to maintain code-required thermal heat transfer resistance.

10. **ADD-RENO PROJECT - TEMPORARY HEATING OF EXISTING BUILDING SCOPE OF WORK:**

A. Hot Water Plant: A temporary or rental heating hot water boiler shall be provided to back feed the existing hot water heating system. The boiler size shall approximately 1,500 MBH input. provide a 200 deg F HWS when Outdoor air temperature is 0 deg F. For a gas fired boiler, temporary gas line service and piping shall be provided. For oil fired boilers, a temporary or rental oil tank and fuel oil piping shall be provided. A temporary prefabricated or rental truck flat-bed mounted boiler enclosure shall be provided. Hot water pumps (primary & standby), expansion tank and air separator accessories, and boiler plant controls shall be provided.

B. Hot Water Piping: The existing 4" hot water supply and return piping should be valves and capped at an accessible location where the existing lines can be removed, and new temporary HWS&R lines can connect to the existing lines. Existing lines should be internally cleaned and flushed. Temporary insulated 4" size hot water supply and return piping shall be provided to connect the temporary or rental boil plant to the existing hot water supply lines. New and existing hot water lines should be filled and vented.

C. Testing & Balancing: Existing heating units shall be testing and balanced for proper hot water flow.

D. Electrical: Provided temporary electric power wiring for the temporary or rental boiler plant equipment (boilers, pumps, controls, etc.).

E. Temporary ATC Controls: Temporary heating and ventilation system controls shall be provided for the existing building.

11. **TESTING REQUIREMENTS:**

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:
- Heat pump chiller plant system
- Condenser (Ground-Source) water plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Variable Refrigerant Flow and Ductless AC Systems
- 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.

12. **OPERATION MANUALS AND MAINTENANCE MANUALS**

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

13. **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.

14. **COMMISSIONING**

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

Neary Elementary School
Southborough, MA
J#630 046 00.00
L#90058/Page 1/ August 09, 2024

HVAC SYSTEM

NARRATIVE REPORT

New Construction (Option C.1)

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 Commonwealth of Massachusetts Adopted Building Codes (IBC, IMC, IECC latest Adopted Editions with MA amendments), Massachusetts Municipal Stretch Energy Code 2023, and all local, 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.

The HVAC narrative below provides as summary of options in section 4 below, and further defines the proposed preferred HVAC system under section 5 followed by three Alternate HVAC systems in sections 6, 7 and 8, which shall also be studied as part on a life cycle cost analysis (LCCA). Sections 3, and 7 through 12 are general requirements and pertain to all options. Sections 10 only applies to Add-Reno Option C.2.

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 7 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 Air-conditioned areas (Administration, Nurses Office, Guidance, Cafeteria).

78-80 deg. F +/- 2 deg. F (55% RH) for partial Air-conditioned areas (Classrooms, Teacher Support, Gym).

Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the International Mechanical Code (latest adopted editions) as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. **HVAC SYSTEM OPTIONS:** As part of a life cycle cost analysis (LCCA), different HVAC systems shall be compared against a code compliant baseline system to determine the system with the overall greatest savings over a 50-year study period.

   By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year-round temperature control and comfort at a possible marginal increase in capital cost. The following HVAC systems are proposed to be studied as part of the life cycle cost analysis (LCCA) during the Schematic Design phase of the project.

5. **HVAC SYSTEM OPTION 1 – Geothermal Water Source Heat Recovery Heat Pump Chiller and Heating Plant with VAV Displacement System**

   A. General: A central geothermal ground source water to water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

   B. Geothermal Heating and Cooling Plant:

      1. Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including a modular ground water source to water simultaneous heating/cooling heat recovery heat pump chillers with six (5) 50 nominal ton modules, with two (2) of the modules for heating/cooling backup purposes. The estimated peak heating load is 150 tons. The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with ground source condenser water from approximately (30) closed loop type quad-loop ground source geothermal wells approximately 600-650 feet deep and spaced a minimum of 20-25' apart from one-another, based on a capacity of 5 tons/well. The final well quantity, depth and distances shall be determined by the geothermal design consultant.

      2. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The plant shall supply a maximum hot water temperature of 130°F on a design heating day. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

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

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

C. Ventilation air handling equipment: It is proposed that a new air-conditioning displacement ventilation system shall be provided to provide air-conditioning and ventilation to the occupied areas of the building.

1. New rooftop air handling units with 100% outside air operation capability, supply and return air fans with VFDs, energy recovery wheels, hot water heating coil with modulating valve, chilled water cooling coil, hot water re-heat coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classroom will typically be provided with two individual wall mounted displacement diffusing units between 250 and 400 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant ceiling panels will be provided along exterior walls that shall be interlocked with space enthalpy sensors that shall modulate the control valve of the coil closed when the space enthalpy is above dewpoint conditions.

Preliminary AHU Quantities, zones and airflow capacities are as follows:

AHU-1, 2, 3, & 4 – Classrooms – 24,000 CFM Total (Each unit @ 8,000 CFM Avg.)
AHU-5 – Gym – 6,500 CFM
AHU-6 – Media Center, Administration, Main Entry, Central core areas – 6,500 CFM
AHU-7 – Cafeteria – 6,500 CFM
MAU-1 Kitchen (Make-Up Air) – 2,500 CFM

D. The ERV units shall be designed to provide air conditioning or partial air conditioning (dehumidification) to the majority of building areas. The Administration, Media Center and Cafeterias areas shall be provided with "full" air conditioning to maintain 75 deg F on a design cooling day, whereas the Gym and Classroom and related Teacher support areas shall be designed for partial air conditioning to maintain a temperature of 78-80 deg F on a design cooling day.

E. It is proposed that building Classrooms and adjacent teacher support and circulation areas, Administration Areas, Cafeteria and Gym Areas are served by a displacement ventilation air system which consists of low wall supply displacement air diffusers and ceiling mounted return/exhaust air registers.

F. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

G. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

H. New insulated galvanized sheetmetal ductwork shall be provided to connect the ERV units supply and return ductwork to each space. New VAV (variable air volume) terminal boxes with temperature and demand control ventilation shall be provided for each classroom, teacher support room and the office areas. Enthalpy controls shall be provided to shut down mechanical cooling systems when operable windows are opened during hot and humid outdoor air conditions.

I. Unitary type hot and chilled water terminal units shall be provided to serve IT server rooms and closets.

J. Domestic hot water heating systems shall be pre-heated by the building hot water heating loop and a ground source heat pump system shall be utilized to provide additional heating of DHW heating. The DHW storage tank heat exchangers and heat pumps shall be by Plumbing.

K. A new direct digital automatic temperature control (ATC) and building energy management system (BMS). The new ATC/BMS system shall be web accessible, include energy metering, and shall be capable of being integrated into the City-wide energy management system.

6. **HVAC SYSTEM OPTION 2 - Air Source Heat Pump Heat Recovery Chiller/Heater**

A. General: A central air source to hydronic hot and chilled water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant ceiling heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.

B. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that includes (10) modular air source to water heat pump chillers with heat recovery and a capacity of 30 nominal cooling tons each (approximately 25 tons heating per module). The heat pump chiller heater shall consist of 2 banks of 5 modules manifolded together, with each bank having 1 backup module. The air cooled heat pump chiller units will be grade, or roof, mounted on minimum 24" high structural support stands within a protected enclosure that allows adequate airflow. The unit shall be capable of providing 130ºF heating hot water supply at a 4ºF ambient temperature condition. A large outdoor location for the air cooled heat pump chillers will be required. Provide pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. Primary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

A supplemental backup electric boiler shall also be provided to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

The heat pump chiller plant will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully air conditioned areas of the building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Primary Chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary chilled water pumps (Quantity of 2 in a

primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new chilled water accessories including air separators, expansion and buffer tanks shall be provided.

C. Air Handling (HVAC) System:

New air handling units shall have hot water heating, chilled water cooling, supply fans with VFD drives, MERV-14 filters, and energy recovery where code required. New return air fans with VFD drives shall also be provided. New air handling unit and return fan controls shall be provided. The air handling units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The ductwork system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods.

Refer to Section 5.E. Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a fully air conditioned variable volume displacement ventilation air distribution system with supplemental chilled water radiant cooling and heating panel system.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all general classroom, lobby and office areas of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors, entryways. Hot water unit heaters shall be provided for all utility rooms. Hot and chilled water terminal units shall be provided to serve Elevator machine rooms, and IT and MDF Server rooms.

7. **HVAC SYSTEM OPTION 3 - Air Source Variable Refrigerant Flow (VRF)**

A. General: Air source VRF (variable refrigerant flow) heat recovery heat pump units shall be connected to a combination of indoor ducted and ductless VRF indoor air handling units. Packaged Dedicated Outdoor Air System (DOAS) Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilation (ERV) and back-up electric heat shall provide the ventilation requirements for the majority of building areas. Backup heating shall be provided in areas of the building with extensive exterior exposures via perimeter electric resistance radiant heating panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Air source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

B. Central Heating and Cooling Plant:

Under this option, a high-efficiency Air Source Variable Refrigerant Flow (VRF) heat recovery system shall provide simultaneous heating and cooling capabilities to all regularly occupied spaces via a combination of fan coil, ductless wall and/or ductless ceiling cassette type VRF terminal air handling units. Air conditioning will be generated by outdoor grade, or roof, mounted heat recovery type air source heat pump condensing units that shall be connected to indoor air handling units or terminal heating and cooling units. The HVAC system terminal heating/cooling systems (excluding supplemental AC and electric resistance heating systems) shall have a total estimated capacity of 300 tons based on the peak heating loads). The outdoor VRF heat pump condensing units will be sized and located according to AHU and terminal equipment zones capacity requirements and VRF system piping length limitations. Therefore, multiple VRF outdoor heat pump condensing units shall be required.

C. Air Handling (HVAC) Ventilation Systems:

Ventilation shall be provided to building areas via dedicated outdoor air system (DOAS) air handling unit as described below. Air handling units shall be provided with split cooling/heating coils connected to high efficiency air source heat pump unit. Remote condenser heat pump sections will include inverter-based compressor technology similar to the VRF system for improved energy efficiency.

The DOAS units shall be provided with MERV 13 filters, heat pump cooling/heating coil section (split air source heat pump condensers for indoor units), supply and exhaust fans with variable frequency drives or EC motors, supplemental electric heating coils, total energy recovery wheel, and a sensible reheat wheel or hot gas re-heat coil for dehumidification. The DOAS units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The DOAS system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods if unoccupied space set points are not maintained.

Refer to Section 5.E Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a neutral air variable volume overhead ventilation air distribution system with utilizing the VRF terminal units for supplemental heating or cooling.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork. New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment:

Heating for Entryways, Storage Rooms, Toilet Rooms, Janitor Closets, etc and support areas will be generated by a combination of electric unit heaters, convectors, radiant panels, and fin tube radiation.

G. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

8. **COMMON REQUIREMENTS FOR ALL HVAC OPTIONS:**

A. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and 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 dehumidified by the displacement ventilation systems. For HVAC Option 3 VRF System – Electric terminal heating equipment shall be provided.

B. Utility Areas:

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

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

C. Testing, Adjusting, Balancing & Commissioning:

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

D. 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 (electric, water). The new DDC/ATC system shall be a BACNet open protocol system that is capable of being integrated into the City Wide Central energy management system.

9. **TESTING REQUIREMENTS:**

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:
- Heat pump chiller plant system
- Condenser (Ground-Source) water plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Variable Refrigerant Flow and Ductless AC Systems
- 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.

10. **OPERATION MANUALS AND MAINTENANCE MANUALS**

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

11. **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.

12. **COMMISSIONING**

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

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Southborough, MA
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HVAC SYSTEM

NARRATIVE REPORT

New Construction (Option C.4)

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 Commonwealth of Massachusetts Adopted Building Codes (IBC, IMC, IECC latest Adopted Editions with MA amendments), Massachusetts Municipal Stretch Energy Code 2023, and all local, 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.

The HVAC narrative below provides as summary of options in section 4 below, and further defines the proposed preferred HVAC system under section 5 followed by two Alternate HVAC systems in sections 6 and 7, which shall also be studied as part on a life cycle cost analysis (LCCA). Sections 3, and 8 through 12 are general requirements and pertain to all options.

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 2 deg. F, Summer 86 deg. F DB 72 deg. F WB

Inside: 70 deg. F +/- 2 deg. F for Heating, 75 deg. F +/- 2 deg. F (55% RH) for Air-conditioned areas (Administration, Nurses Office, Guidance, Cafeteria).

78-80 deg. F +/- 2 deg. F (55% RH) for partial Air-conditioned areas (Classrooms, Teacher Support, Gym).

Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the International Mechanical Code (latest adopted editions) as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. **HVAC SYSTEM OPTIONS:** As part of a life cycle cost analysis (LCCA), different HVAC systems shall be compared against a code compliant baseline system to determine the system with the overall greatest savings over a 50-year study period.

   By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year-round temperature control and comfort at a possible marginal increase in capital cost. The following HVAC systems are proposed to be studied as part of the life cycle cost analysis (LCCA) during the Schematic Design phase of the project.

5. **HVAC SYSTEM OPTION 1 – Geothermal Water Source Heat Recovery Heat Pump Chiller and Heating Plant with VAV Displacement System**

   A. General: A central geothermal ground source water to water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

   B. Geothermal Heating and Cooling Plant:

      1. Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including a modular ground water source to water simultaneous heating/cooling heat recovery heat pump chillers with six (7) 50 nominal ton modules, with two (2) of the modules for heating/cooling backup purposes. The estimated peak heating load is 230 tons. The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with ground source condenser water from approximately (45) closed loop type quad-loop ground source geothermal wells approximately 600-650 feet deep and spaced a minimum of 20-25' apart from one-another, based on a capacity of 5 tons/well. The final well quantity, depth and distances shall be determined by the geothermal design consultant.

      2. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The plant shall supply a maximum hot water temperature of 130°F on a design heating day. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

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

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

C. Ventilation air handling equipment: It is proposed that a new air-conditioning displacement ventilation system shall be provided to provide air-conditioning and ventilation to the occupied areas of the building.

1. New rooftop air handling units with 100% outside air operation capability, supply and return air fans with VFDs, energy recovery wheels, hot water heating coil with modulating valve, chilled water cooling coil, hot water re-heat coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classroom will typically be provided with two individual wall mounted displacement diffusing units between 250 and 400 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant ceiling panels will be provided along exterior walls that shall be interlocked with space enthalpy sensors that shall modulate the control valve of the coil closed when the space enthalpy is above dewpoint conditions.

Preliminary AHU Quantities, zones and airflow capacities are as follows:

AHU-1, 2, 3, & 4 – Classrooms – 32,000 CFM Total (Each unit @ 8,000 CFM Avg.)
AHU-5 – Gym – 6,500 CFM
AHU-6 – Media Center, Administration, Main Entry, Central core areas – 12,000 CFM
AHU-7 – Cafeteria – 6,500 CFM
MAU-1 Kitchen (Make-Up Air) – 2,500 CFM

D. The ERV units shall be designed to provide air conditioning or partial air conditioning (dehumidification) to the majority of building areas. The Administration, Media Center and Cafeterias areas shall be provided with "full" air conditioning to maintain 75 deg F on a design cooling day, whereas the Gym and Classroom and related Teacher support areas shall be designed for partial air conditioning to maintain a temperature of 78-80 deg F on a design cooling day.

E. It is proposed that building Classrooms and adjacent teacher support and circulation areas, Administration Areas, Cafeteria and Gym Areas are served by a displacement ventilation air system which consists of low wall supply displacement air diffusers and ceiling mounted return/exhaust air registers.

F. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

G. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

H. New insulated galvanized sheetmetal ductwork shall be provided to connect the ERV units supply and return ductwork to each space. New VAV (variable air volume) terminal boxes with temperature and demand control ventilation shall be provided for each classroom, teacher support room and the office areas. Enthalpy controls shall be provided to shut down mechanical cooling systems when operable windows are opened during hot and humid outdoor air conditions.

I. Unitary type hot and chilled water terminal units shall be provided to serve IT server rooms and closets.

J. Domestic hot water heating systems shall be pre-heated by the building hot water heating loop and a ground source heat pump system shall be utilized to provide additional heating of DHW heating. The DHW storage tank heat exchangers and heat pumps shall be by Plumbing.

K. A new direct digital automatic temperature control (ATC) and building energy management system (BMS). The new ATC/BMS system shall be web accessible, include energy metering, and shall be capable of being integrated into the City-wide energy management system.

6. **HVAC SYSTEM OPTION 2 - Air Source Heat Pump Heat Recovery Chiller/Heater**

A. General: A central air source to hydronic hot and chilled water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant ceiling heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Hot and chilled water terminal units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.

B. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that includes (14) modular air source to water heat pump chillers with heat recovery and a capacity of 30 nominal cooling tons each (approximately 25 tons heating per module). The heat pump chiller heater shall consist of 2 banks of 7 modules manifolded together, with each bank having 1 backup module. The air cooled heat pump chiller units will be grade, or roof, mounted on minimum 24" high structural support stands within a protected enclosure that allows adequate airflow. The unit shall be capable of providing 130ºF heating hot water supply at a 4ºF ambient temperature condition. A large outdoor location for the air cooled heat pump chillers will be required. Provide pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. Primary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

A supplemental backup electric boiler shall also be provided to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

The heat pump chiller plant will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully air conditioned areas of the building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Primary Chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new chilled water accessories including air separators, expansion and buffer tanks shall be provided.

C. Air Handling (HVAC) System:

New air handling units shall have hot water heating, chilled water cooling, supply fans with VFD drives, MERV-14 filters, and energy recovery where code required. New return air fans with VFD drives shall also be provided. New air handling unit and return fan controls shall be provided. The air handling units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The ductwork system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods.

Refer to Section 5.E. Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a fully air conditioned variable volume displacement ventilation air distribution system with supplemental chilled water radiant cooling and heating panel system.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all general classroom, lobby and office areas of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors, entryways. Hot water unit heaters shall be provided for all utility rooms. Hot and chilled water terminal units shall be provided to serve Elevator machine rooms, and IT and MDF Server rooms.

7. **HVAC SYSTEM OPTION 3 - Air Source Variable Refrigerant Flow (VRF)**

A. General: Air source VRF (variable refrigerant flow) heat recovery heat pump units shall be connected to a combination of indoor ducted and ductless VRF indoor air handling units. Packaged Dedicated Outdoor Air System (DOAS) Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilation (ERV) and back-up electric heat shall provide the ventilation requirements for the majority of building areas. Backup heating shall be provided in areas of the building with extensive exterior exposures via perimeter electric resistance radiant heating panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Air source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

B. Central Heating and Cooling Plant:

Under this option, a high-efficiency Air Source Variable Refrigerant Flow (VRF) heat recovery system shall provide simultaneous heating and cooling capabilities to all regularly occupied spaces via a combination of fan coil, ductless wall and/or ductless ceiling cassette type VRF terminal air handling units. Air conditioning will be generated by outdoor grade, or roof, mounted heat recovery type air source heat pump condensing units that shall be connected to indoor air handling units or terminal heating and cooling units. The HVAC system terminal heating/cooling systems (excluding supplemental AC and electric resistance heating systems) shall have a total estimated capacity of 500 tons based on the peak heating loads). The outdoor VRF heat pump condensing units will be sized and located according to AHU and terminal equipment zones capacity requirements and VRF system piping length limitations. Therefore, multiple VRF outdoor heat pump condensing units shall be required.

C. Air Handling (HVAC) Ventilation Systems:

Ventilation shall be provided to building areas via dedicated outdoor air system (DOAS) air handling unit as described below. Air handling units shall be provided with split cooling/heating coils connected to high efficiency air source heat pump unit. Remote condenser heat pump sections will include inverter-based compressor technology similar to the VRF system for improved energy efficiency.

The DOAS units shall be provided with MERV 13 filters, heat pump cooling/heating coil section (split air source heat pump condensers for indoor units), supply and exhaust fans with variable frequency drives or EC motors, supplemental electric heating coils, total energy recovery wheel, and a sensible reheat wheel or hot gas re-heat coil for dehumidification. The DOAS units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The DOAS system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods if unoccupied space set points are not maintained.

Refer to Section 5.E Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

D. Air Distribution Systems:

The building areas are to be served by a neutral air variable volume overhead ventilation air distribution system with utilizing the VRF terminal units for supplemental heating or cooling.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork. New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements.

E. Exhaust Air Fan Systems:

1. Code required exhaust for the majority of building areas, including toilet rooms, shall be provided through the localized energy recovery ventilation (ERV) systems.

2. Dedicated exhaust air fan systems shall be provided for Kitchen exhaust air (if provided) and Janitor's closet areas.

F. Terminal Heating & Cooling Equipment:

Heating for Entryways, Storage Rooms, Toilet Rooms, Janitor Closets, etc and support areas will be generated by a combination of electric unit heaters, convectors, radiant panels, and fin tube radiation.

G. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

8. **COMMON REQUIREMENTS FOR ALL HVAC OPTIONS:**

A. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and 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 dehumidified by the displacement ventilation systems. For HVAC Option 3 VRF System – Electric terminal heating equipment shall be provided.

B. Utility Areas:

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

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

C. Testing, Adjusting, Balancing & Commissioning:

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

D. 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 (electric, water). The new DDC/ATC system shall be a BACNet open protocol system that is capable of being integrated into the City Wide Central energy management system.

9. **TESTING REQUIREMENTS:**

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

- Heat pump chiller plant system
- Condenser (Ground-Source) water plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Variable Refrigerant Flow and Ductless AC Systems
- 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.

10. **OPERATION MANUALS AND MAINTENANCE MANUALS**

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

11. **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.

12. **COMMISSIONING**

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

ELECTRICAL SYSTEMS

OPTION B.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

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 DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   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 and will be “ON” during normal power conditions, as well as power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when the building is occupied.

4. DESCRIPTION OF THE SYSTEMS

   A. Utilities:

      1. The new building will be supplied with utility power from the utility company National Grid. The new service will be fed via underground primary duct bank to a pad mounted utility company owned liquid filled transformer. The service will utilize overhead 3-phase service form Clifford Street.

2. The service electrical transformer will be furnished, installed, owned and maintained by National Grid, 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 National Grid 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 a utility pole to the pad-mounted transformer. Pre-cast concrete manholes 5' x 5' 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 copper conductors will be installed underground in the duct bank of six 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 National Grid. The new service will be metered at the transformer secondary voltage.

7. National Grid 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. Communication services will come from Clifford Street. Overhead utility distribution then transition to below grade once on the site.

9. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for feeders 100 amperes or over.

10. 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)	784 KVA
Elevator	31.7 KVA
Exterior Lighting	2.0 KVA
Interior Lighting	49 KVA
General Power	196 KVA
Kitchen	112 KVA
EV Charging	18 KVA
Plumbing/Fire Protection (Pumps, etc.)	150 KVA
Total Connected Load	**1,432.7 KVA**

B. Electrical Distribution System:

1. Service ratings for the building are designed for a connected load of 1,432.4 KW. The service capacity will be sized for 2,000 Amperes with a 80% rated main breaker. The main bus will be sized at 2,500 Amperes and will have an available breaker space provision at the end of the switchboard to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance surge protection device (SPD) rated at 240 kA and a 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 will be coordinated with the Utility Company but will be rated for 65 KAIC.

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

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 2021 energy allowances and LEED for Schools control requirements.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Classrooms	30 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 IECC 2021. 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 preparation 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 Lighting System

1. An exterior 400KW, 500KVA (diesel fired emergency generator with sound attenuated enclosure and base tank with alarms will be provided. An integral resistive load bank will be provided for generator testing under load. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator 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. Emergency (life safety) Power Loads as required by the Code:
      - Emergency exit and egress lighting (interior and building exterior at the exits)
      - Fire alarm system

   b. Standby Power Loads:
      - Heating system with associated heat pumps and controls
      - Telephone/ data closets and associated A/C equipment
      - Communication systems (telephone and public address systems)
      - Building DDC system control panels
      - Kitchen refrigeration equipment
      - Lighting and power in the nurse/medical area
      - Security system equipment

E. Site Lighting System: ***LEED Credit SSC8***

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

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

F. Wiring Devices:

1. New classrooms 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. Existing classrooms shall keep existing receptacles and have new, surface mounted receptacles provided in quantities equal to new classrooms.

2. New 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.

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

7. All receptacles will be of the tamper resistant type.

G. Fire Alarm System with Mass Notification:

1. A fire alarm/mass notification system and detection system will be provided with 60-hour battery back-up. The system will be of the addressable type where each detection device will be identified at the control panel and remote annunciators by device type and location to facilitate search for origin of alarms. The notification system will be in conformance with NFPA 72 Chapter 24 emergency communications systems.

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 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.

5. Manual pull stations will be provided at exit discharge doors.

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

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

H. Metering:

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

   a. Total electrical energy

   b. Sub-metering in accordance with ASHRAE 90.1 paragraph 8.4.3

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.

I. Uninterruptible Power Supply (UPS):

1. One (1) 24 kW, three phase centralized UPS system 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 Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof main conductors and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

K. Renewable Energy System Provisions:

1. Electrical provisions will be made for a roof mounted renewable energy system consisting of a grid (location on Roof of Addition) connected photovoltaic PV system intended to reduce the facilities demand for power.

L. 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.

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

1. Provide provisions for eight (8) dual port EVSE stations fed with 40 ampere feeders back to a EVSE panel. Two protective bollards will be installed at each charging station.

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

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

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical 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 lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

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

9. PHASING

A. Cut cap and make safe existing building for demolition by Demolition Contractor.

Neary Elementary School
Southborough, MA
J#630 046 00.00
L#90005/Page 1/August 9, 2024

ELECTRICAL SYSTEMS

OPTION C.1

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

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 DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   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 and will be “ON” during normal power conditions, as well as power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when the building is occupied.

4. DESCRIPTION OF THE SYSTEMS

   A. Utilities:

      1. The new building will be supplied with utility power from the utility company National Grid. The new service will be fed via underground primary duct bank to a pad mounted utility company owned liquid filled transformer. The service will utilize overhead 3-phase service from Clifford Street.

TEL 508-998-5700 FAX 508-998-0883 email: info@g-g-d.com

2. The service electrical transformer will be furnished, installed, owned and maintained by National Grid, 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 National Grid 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 a utility pole to the pad-mounted transformer. Pre-cast concrete manholes 5' x 5' 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 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 National Grid. The new service will be metered at the transformer secondary voltage.

7. National Grid 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. Communication services will come from Clifford Street. Overhead utility distribution and transition to below grade once at the site.

9. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for feeders 100 amperes or over.

10. 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)	520 KVA
Elevator	31.7 KVA
Exterior Lighting	2.0 KVA
Interior Lighting	32.5 KVA
General Power	130 KVA
Kitchen	75 KVA
EV Charging	108 KVA
Plumbing/Fire Protection (Pumps, etc.)	130 KVA
Total Connected Load	**1,029.2 KVA**

B. Electrical Distribution System:

1. Service ratings for the building are designed for a connected load of 1,029.2 KW. The service capacity will be sized for 1,600 Amperes with a 80% rated main breaker. The main bus will be sized at 2,000 Amperes and will have an available breaker space provision at the end of the switchboard to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance surge protection device (SPD) rated at 240 kA and a 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 will be coordinated with the Utility Company but will be rated for 65 KAIC.

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

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 2021 energy allowances and LEED for Schools control requirements.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Classrooms	30 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 IECC 2021. 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 preparation 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 Lighting System

1. An exterior 350KW,437.5KVA (diesel fired emergency generator with sound attenuated enclosure and base tank with alarms will be provided. An integral resistive load bank will be provided for generator testing under load. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator 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. Emergency (life safety) Power Loads as required by the Code:
      - Emergency exit and egress lighting (interior and building exterior at the exits)
      - Fire alarm system

   b. Standby Power Loads:
      - Heating system with associated heat pumps and controls
      - Telephone/ data closets and associated A/C equipment
      - Communication systems (telephone and public address systems)
      - Building DDC system control panels
      - Kitchen refrigeration equipment
      - Lighting and power in the nurse/medical area
      - Security system equipment

E. Site Lighting System: ***LEED Credit SSC8***

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

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

F. Wiring Devices:

1. New classrooms 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. Existing classrooms shall keep existing receptacles and have new, surface mounted receptacles provided in quantities equal to new classrooms.

2. New 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.

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

7. All receptacles will be of the tamper resistant type.

G. Fire Alarm System with Mass Notification:

1. A fire alarm/mass notification system and detection system will be provided with 60-hour battery back-up. The system will be of the addressable type where each detection device will be identified at the control panel and remote annunciators by device type and location to facilitate search for origin of alarms. The notification system will be in conformance with NFPA 72 Chapter 24 emergency communications systems.

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 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.

5. Manual pull stations will be provided at exit discharge doors.

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

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

H. Metering:

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

   a. Total electrical energy

   b. Sub-metering in accordance with ASHRAE 90.1 paragraph 8.4.3

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.

I. Uninterruptible Power Supply (UPS):

1. One (1) 24 kW, three phase centralized UPS system 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 Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof main conductors and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

K. Renewable Energy System Provisions:

1. Electrical provisions will be made for a roof mounted renewable energy system consisting of a grid (location on Roof of Addition) connected photovoltaic PV system intended to reduce the facilities demand for power.

L. 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.

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

1. Provide provisions for eight (8) dual port EVSE stations fed with 40 ampere feeders back to a EVSE panel. Two protective bollards will be installed at each charging station.

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

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

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical 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 lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

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

9. PHASING

A. Cut cap and make safe existing building for demolition by Demolition Contractor.

Neary Elementary School
Southborough, MA
J#630 046 00.00
L#90006/Page 1/August 9, 2024

ELECTRICAL SYSTEMS

OPTION C.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

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 DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   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 and will be “ON” during normal power conditions, as well as power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when the building is occupied.

4. DESCRIPTION OF THE SYSTEMS

   A. Utilities:

      1. The new building will be supplied with utility power from the utility company National Grid. The new service will be fed via underground primary duct bank to a pad mounted utility company owned liquid filled transformer. The service will utilize overhead 3-phase service form Clifford Street.

TEL 508-998-5700 FAX 508-998-0883 email: info@g-g-d.com

2. The service electrical transformer will be furnished, installed, owned and maintained by National Grid, 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 National Grid 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 a utility pole to the pad-mounted transformer. Pre-cast concrete manholes 5' x 5' 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 copper conductors will be installed underground in the duct bank of six 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 National Grid. The new service will be metered at the transformer secondary voltage.

7. National Grid 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. Communication services will come from Clifford Street. Overhead utility distribution then transition to below grade once on the site.

9. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for feeders 100 amperes or over.

10. 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)	784 KVA
Elevator	31.7 KVA
Exterior Lighting	2.0 KVA
Interior Lighting	49 KVA
General Power	196 KVA
Kitchen	112 KVA
EV Charging	18 KVA
Plumbing/Fire Protection (Pumps, etc.)	150 KVA
Total Connected Load	**1,432.7 KVA**

B. Electrical Distribution System:

1. Service ratings for the building are designed for a connected load of 1,432.4 KW. The service capacity will be sized for 2,000 Amperes with a 80% rated main breaker. The main bus will be sized at 2,500 Amperes and will have an available breaker space provision at the end of the switchboard to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance surge protection device (SPD) rated at 240 kA and a 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 will be coordinated with the Utility Company but will be rated for 65 KAIC.

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

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 2021 energy allowances and LEED for Schools control requirements.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Classrooms	30 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 IECC 2021. 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 Lighting System

1. An exterior 400KW, 500KVA (diesel fired emergency generator with sound attenuated enclosure and base tank with alarms will be provided. An integral resistive load bank will be provided for generator testing under load. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator 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. Emergency (life safety) Power Loads as required by the Code:
      - Emergency exit and egress lighting (interior and building exterior at the exits)
      - Fire alarm system

   b. Standby Power Loads:
      - Heating system with associated heat pumps and controls
      - Telephone/ data closets and associated A/C equipment
      - Communication systems (telephone and public address systems)
      - Building DDC system control panels
      - Kitchen refrigeration equipment
      - Lighting and power in the nurse/medical area
      - Security system equipment

E. Site Lighting System: ***LEED Credit SSC8***

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

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

F. Wiring Devices:

1. New classrooms 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. Existing classrooms shall keep existing receptacles and have new, surface mounted receptacles provided in quantities equal to new classrooms.

2. New 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.

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

7. All receptacles will be of the tamper resistant type.

G. Fire Alarm System with Mass Notification:

1. A fire alarm/mass notification system and detection system will be provided with 60-hour battery back-up. The system will be of the addressable type where each detection device will be identified at the control panel and remote annunciators by device type and location to facilitate search for origin of alarms. The notification system will be in conformance with NFPA 72 Chapter 24 emergency communications systems.

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 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.

5. Manual pull stations will be provided at exit discharge doors.

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

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

H. Metering:

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

   a. Total electrical energy

   b. Sub-metering in accordance with ASHRAE 90.1 paragraph 8.4.3

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.

I. Uninterruptible Power Supply (UPS):

1. One (1) 24 kW, three phase centralized UPS system 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 Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof main conductors and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

K. Renewable Energy System Provisions:

1. Electrical provisions will be made for a roof mounted renewable energy system consisting of a grid (location on Roof of Addition) connected photovoltaic PV system intended to reduce the facilities demand for power.

L. 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.

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

1. Provide provisions for eight (8) dual port EVSE stations fed with 40 ampere feeders back to a EVSE panel. Two protective bollards will be installed at each charging station.

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

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

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical 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 lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

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

9. PHASING

A. Cut cap and make safe existing building for demolition by Demolition Contractor.

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PLUMBING SYSTEMS

OPTION B.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

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

   B. The building will be serviced by Municipal water and Septic 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. The system runs from 10 feet outside the 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 through 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 grease interceptor is provided under Division 33 scope.

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

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

E. In existing buildings, existing drainage piping may be reused if adequately sized for intended use. The integrity of existing piping will be confirmed via video inspection.

5. WATER SYSTEM

A. A new 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer, if required, will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating for the Kitchen will be provided with an electric storage tank type water heater (36 kW input), with a storage capacity of 500 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. Domestic hot water heating for the Toilet Core areas shall be provided with an electric storage tank type water heater (9 kW input), with a storage capacity of 30 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

E. A pump will re-circulate hot water at the Kitchen and Toilet Core piping systems. The water temperature will be 120 deg. to serve general use fixtures.

F. Remote plumbing fixtures requiring hot water will be served with electric, point-of-use, instantaneous water heaters (8.3 kW, 208 volts, 1 phase each).

G. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. FIXTURES ***LEED v4***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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

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

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

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

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

7. DRAINS

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

8. VALVES

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

9. INSULATION

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

10. CLEANOUTS

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

11. ACCESS DOORS

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

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PLUMBING SYSTEMS

OPTION C.1

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

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

   B. The building will be serviced by Municipal water and Septic 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. The system runs from 10 feet outside the 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 through 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 grease interceptor is provided under Division 33 scope.

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

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

E. In existing buildings, existing drainage piping may be reused if adequately sized for intended use. The integrity of existing piping will be confirmed via video inspection.

5. WATER SYSTEM

A. A new 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer, if required, will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating for the Kitchen will be provided with an electric storage tank type water heater (36 kW input), with a storage capacity of 500 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. Domestic hot water heating for the Toilet Core areas shall be provided with an electric storage tank type water heater (9 kW input), with a storage capacity of 30 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

E. A pump will re-circulate hot water at the Kitchen and Toilet Core piping systems. The water temperature will be 120 deg. to serve general use fixtures.

F. Remote plumbing fixtures requiring hot water will be served with electric, point-of-use, instantaneous water heaters (8.3 kW, 208 volts, 1 phase each).

G. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. FIXTURES ***LEED v4***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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

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

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

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

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

7. DRAINS

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

8. VALVES

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

9. INSULATION

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

10. CLEANOUTS

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

11. ACCESS DOORS

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

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PLUMBING SYSTEMS

OPTION C.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

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

   B. The building will be serviced by Municipal water and Septic 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. The system runs from 10 feet outside the 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 through 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 grease interceptor is provided under Division 33 scope.

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

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

E. In existing buildings, existing drainage piping may be reused if adequately sized for intended use. The integrity of existing piping will be confirmed via video inspection.

5. WATER SYSTEM

A. A new 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer, if required, will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating for the Kitchen will be provided with an electric storage tank type water heater (36 kW input), with a storage capacity of 500 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. Domestic hot water heating for the Toilet Core areas shall be provided with an electric storage tank type water heater (9 kW input), with a storage capacity of 30 gallons. System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

E. A pump will re-circulate hot water at the Kitchen and Toilet Core piping systems. The water temperature will be 120 deg. to serve general use fixtures.

F. Remote plumbing fixtures requiring hot water will be served with electric, point-of-use, instantaneous water heaters (8.3 kW, 208 volts, 1 phase each).

G. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. FIXTURES ***LEED v4***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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

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

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

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

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

7. DRAINS

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

8. VALVES

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

9. INSULATION

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

10. CLEANOUTS

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

11. ACCESS DOORS

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

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FIRE PROTECTION SYSTEMS

OPTION B.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The school building will be served by a new 8-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick-response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen and storage rooms are considered Ordinary Hazard Group 1; 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.

D. A flow test shall be performed to determine whether there is an adequate water supply to serve the project without a fire pump.

6. DOUBLE CHECK VALVE ASSEMBLY

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

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

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

7. PIPING

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

8. FITTINGS

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

9. JOINTS

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

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10. SPRINKLERS

A. All sprinklers to be used on this project shall be Quick Response type.

B. Furnish spare heads of each type installed located in a cabinet along with special sprinkler wrenches. The number of spares and location of cabinet shall be in complete accord with NFPA 13-2013.

C. Sprinklers shall be manufactured by Tyco, Victaulic, Viking, or equal.

D. Upright sprinkler heads in areas with no ceilings shall be Tyco Model "TY-FRB" Quick Response, upright natural brass finish heads. Include heavy duty sprinkler guards in all mechanical rooms and storage rooms.

E. Sidewall heads shall be Tyco Model "TY-FRB" Quick Response with white polyester head and escutcheon.

F. Pendent wet sprinkler heads shall be Tyco Model "TY-FRB" Quick Response recessed adjustable escutcheon, white polyester finish.

G. Concealed heads shall be Tyco Model "RFII" Quick Response concealed type, 1-1/2 inch adjustment white cover plate. In special areas, as may be noted on the Drawings, provide alternate cover plate finishes.

H. Use of flexible stainless steel hose with fittings for fire protection service that connect sprinklers to branch lines in suspended ceilings is acceptable. Flexible hoses shall be UL/FM approved and shall comply with NFPA 13 standards. Hose assemblies shall be type 304 stainless steel with minimum 1-inch true-bore internal hose diameter. Ceiling bracket shall be galvanized steel and include multi-port style self-securing integrated snap-on clip ends that attach directly to the ceiling with tamper resistant screws.

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FIRE PROTECTION SYSTEMS

OPTION C.1

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The school building will be served by a new 8-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick-response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen and storage rooms are considered Ordinary Hazard Group 1; 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.

D. A flow test shall be performed to determine whether there is an adequate water supply to serve the project without a fire pump.

6. DOUBLE CHECK VALVE ASSEMBLY

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

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

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

7. PIPING

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

8. FITTINGS

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

9. JOINTS

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

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10. SPRINKLERS

A. All sprinklers to be used on this project shall be Quick Response type.

B. Furnish spare heads of each type installed located in a cabinet along with special sprinkler wrenches. The number of spares and location of cabinet shall be in complete accord with NFPA 13-2013.

C. Sprinklers shall be manufactured by Tyco, Victaulic, Viking, or equal.

D. Upright sprinkler heads in areas with no ceilings shall be Tyco Model "TY-FRB" Quick Response, upright natural brass finish heads. Include heavy duty sprinkler guards in all mechanical rooms and storage rooms.

E. Sidewall heads shall be Tyco Model "TY-FRB" Quick Response with white polyester head and escutcheon.

F. Pendent wet sprinkler heads shall be Tyco Model "TY-FRB" Quick Response recessed adjustable escutcheon, white polyester finish.

G. Concealed heads shall be Tyco Model "RFII" Quick Response concealed type, 1-1/2 inch adjustment white cover plate. In special areas, as may be noted on the Drawings, provide alternate cover plate finishes.

H. Use of flexible stainless steel hose with fittings for fire protection service that connect sprinklers to branch lines in suspended ceilings is acceptable. Flexible hoses shall be UL/FM approved and shall comply with NFPA 13 standards. Hose assemblies shall be type 304 stainless steel with minimum 1-inch true-bore internal hose diameter. Ceiling bracket shall be galvanized steel and include multi-port style self-securing integrated snap-on clip ends that attach directly to the ceiling with tamper resistant screws.

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FIRE PROTECTION SYSTEMS

OPTION C.4

NARRATIVE REPORT

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

1. CODES

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

2. DESIGN INTENT

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

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The school building will be served by a new 8-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick-response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

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

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B. Required Design Densities:

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

C. Sprinkler spacing (max.):

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

D. A flow test shall be performed to determine whether there is an adequate water supply to serve the project without a fire pump.

6. DOUBLE CHECK VALVE ASSEMBLY

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

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

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

7. PIPING

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

8. FITTINGS

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

9. JOINTS

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

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10. SPRINKLERS

A. All sprinklers to be used on this project shall be Quick Response type.

B. Furnish spare heads of each type installed located in a cabinet along with special sprinkler wrenches. The number of spares and location of cabinet shall be in complete accord with NFPA 13-2013.

C. Sprinklers shall be manufactured by Tyco, Victaulic, Viking, or equal.

D. Upright sprinkler heads in areas with no ceilings shall be Tyco Model "TY-FRB" Quick Response, upright natural brass finish heads. Include heavy duty sprinkler guards in all mechanical rooms and storage rooms.

E. Sidewall heads shall be Tyco Model "TY-FRB" Quick Response with white polyester head and escutcheon.

F. Pendent wet sprinkler heads shall be Tyco Model "TY-FRB" Quick Response recessed adjustable escutcheon, white polyester finish.

G. Concealed heads shall be Tyco Model "RFII" Quick Response concealed type, 1-1/2 inch adjustment white cover plate. In special areas, as may be noted on the Drawings, provide alternate cover plate finishes.

H. Use of flexible stainless steel hose with fittings for fire protection service that connect sprinklers to branch lines in suspended ceilings is acceptable. Flexible hoses shall be UL/FM approved and shall comply with NFPA 13 standards. Hose assemblies shall be type 304 stainless steel with minimum 1-inch true-bore internal hose diameter. Ceiling bracket shall be galvanized steel and include multi-port style self-securing integrated snap-on clip ends that attach directly to the ceiling with tamper resistant screws.

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Green International Affiliates, Inc. (Green), has completed an assessment of site options B.4, C.1, and C.4, proposed by Arrowstreet. The Neary Building Committee has selected option C.4 as the preferred option.

The following sections provide a general overview of the site alternatives and highlight necessary construction components for the corresponding site. Please review the Site Feasibility Analysis, which was previously prepared by Green, for pertinent information related to the existing site conditions.

Project Description

Option B.4-Addition/Renovation

Option B.4 involves the renovation of and addition to the existing Neary Elementary School building. This option includes an addition to the northwest portion of the building. There will be parking on the eastern side and south side of the building. The parking for the site includes approximately 195 spaces. The proposed layout includes two looped drop off areas, a parent drop off in the front and a bus drop off looping around the building. The building and parking lot reconfiguration associated with this option would require reconstruction of the site utility infrastructure. This option includes 610 students and 100 staff members for a total of 710 occupants.

Option C.1-New Construction

Option C.1 involves demolishing the existing Neary Elementary School building and installing a new building in a similar location. This option changes the building shape to an L shaped building instead of a rectangular shaped building. There will be parking on the eastern and south side of the building. The parking for the site includes approximately 181 spaces. The proposed layout includes two looped drop off areas, a parent drop off in the front and a bus drop off looping around the building . The building and parking lot reconfiguration associated with this option would require reconstruction of the site utility infrastructure. This option includes 305 students and 50 staff members for a total of 355 occupants.

Option C.4-New Construction (Preferred Option)

Option C.4 involves demolishing the existing Neary Elementary School building and installing a new building in a similar location. This option changes the building shape to a “u-shape” instead of a rectangular shaped building. There will be parking on the eastern and south sides of the building. The parking for the site includes approximately 195 spaces. The proposed layout includes two looped drop off areas, a parent drop off in the front and a bus drop off looping around the building. The building and parking lot reconfiguration associated with this option would require reconstruction of the site utility infrastructure. This option includes 610 students and 100 staff members for a total of 710 occupants.

Water

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The existing water main is 8" asbestos cement and loops around the west side of the building. The new water main will be an 8" cement lined ductile iron pipe. There will be a fire protection service line and domestic water line feeding the building off the 8" water main. Hydrants will be provided every 500 feet and will be coordinated with the fire department.

The addition of the building for B.4 and the new building for C.1 & C.4 will conflict with the existing main. Since there is a conflict with the building, it is anticipated that a new water main will be installed within the limit of work (shown in the figures prepared by Arrowstreet) connecting to the existing main within the driveway and to the existing main behind the building. The new water main will follow the proposed roadway looping around the east and south side of the building. The new water main will also provide a new connection to the existing main that continues up the driveway toward the high school.

Option B.4-Add Reno

The assumed quantities needed for the water upgrades include:

1400 LF of 8" CLDI water main to loop around the building and tie into existing mains at the driveway and back of the building
3 new hydrants
30 LF of 6" CLDI water lines for hydrant connections
30 LF of 4" CLDI domestic water connection to school
30 LF of 8" CLDI fire water connection to school
10 water gate valves

Option C.1-New Construction

The assumed quantities needed for the water upgrades include:

1000 LF of 8" CLDI water main to loop around the building and tie into existing mains at the driveway and back of the building
2 new hydrants
20 LF of 6" CLDI water lines for hydrant connections
30 LF of 4" CLDI domestic water connection to school
30 LF of 8" CLDI fire water connection to school
7 water gate valves

Option C.4- New Construction (Preferred Option)

The assumed quantities needed for the water upgrades include:

1100 LF of 8" CLDI water main to loop around the building and tie into existing mains at the driveway and back of the building
2 new hydrants

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20 LF of 6" CLDI water lines for hydrant connections
20 LF of 4" CLDI domestic water connection to school
20 LF of 8" CLDI fire water connection to school
6 water gate valves

Wastewater

The existing building discharges wastewater out of the southwest side of the building. The existing wastewater system includes 15,000-gallon septic tank, fast filtration unit, 10,000-gallon pump chamber, and a leach field. The existing leach field was designed for 522 people. The existing system is almost 30 years old and is reaching the end of its anticipated operating life span. Therefore, the existing system will be replaced under the proposed conditions.

Option B.4-Add Reno

The proposed wastewater system is based on 710 occupants anticipated for Option B.4. It is assumed that there will be a cafeteria and a gym.

The assumed quantities needed for the wastewater system upgrades include:

6,000-gallon grease trap (assume cafeteria, gym, 710 occupants)
15,000-gallon septic tank - 2 compartment (710 occupants)
Fast Filtration Unit with piping and blower unit
10,000-gallon pump station with submersible duplex pumps, valve manhole, vent, and power
1,200 LF 4" SDR-26 Force main
50 LF 4" Sch 80 PVC
60 LF 6" Sch 80 PVC
21,515 sf Leach Field (710 occupants)
4 sewer manholes

Option C.1-New Construction

The proposed wastewater system is based on 355 occupants anticipated for Option C.1. It is assumed that there will be a cafeteria and a gym.

The assumed quantities needed for the wastewater system upgrades include:

3,000-gallon grease trap (assume cafeteria, gym, 355 occupants)
7,500-gallon septic tank (355 occupants)
Fast Filtration Unit with piping and blower unit
10,000-gallon pump station with submersible duplex pumps, valve manhole, vent, and power
1,200 LF 4" SDR-26 Force main
50 LF 4" Sch 80 PVC

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60 LF 6" Sch 80 PVC
10,760 sf Leach field (355 occupants)
4 sewer manholes

Option C.4- New Construction (Preferred Option)

The proposed wastewater system is based on 710 occupants anticipated for Option C.4. It is assumed that there will be a cafeteria and a gym.

The assumed quantities needed for the wastewater system upgrades include:

6,000-gallon grease trap (assume cafeteria, gym, 710 occupants)
15,000-gallon septic tank - 2 compartment (710 occupants)
Fast Filtration Unit with piping and blower unit
10,000-gallon pump station with submersible duplex pumps, valve manhole, vent, and power
1500 LF 4" SDR-26 Force main
50 LF 4" Sch 80 PVC
60 LF 6" Sch 80 PVC
21,515 sf Leach Field (710 occupants)
4 sewer manholes

Stormwater

A new closed drainage system is anticipated to accommodate the proposed parking and building layout. The closed drainage system will collect runoff from the proposed parking areas and from the roof drains for the building. The closed drainage system will follow existing drainage patterns and discharge to the existing drainage system at the limit of work (shown in the figures prepared by Arrowstreet). The existing site does not have any stormwater best management practices (BMPs) to provide stormwater treatment. The proposed project will result in a net increase in impervious areas. Therefore, stormwater BMPs will be proposed to mitigate peak rates and provide stormwater treatment. The following is a summary of the stormwater BMPs we anticipate for the project.

For the closed drainage system, we anticipate providing deep sump catch basins with hoods. These catch basins when installed offline instead of basin-to-basin connections achieve 25% TSS removal. This can be used to meet our pretreatment goals. The deep sumps and hoods remove trash, debris, and sediment from stormwater runoff.

For stormwater treatment, we anticipate providing subsurface chamber system. This consists of underground chambers that are designed to temporarily store stormwater. The site has a high groundwater table which may not allow for groundwater infiltration. Therefore, it is assumed that the chamber system will be lined with an underdrain. The chamber system will provide peak rate mitigation and stormwater treatment.

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For pretreatment, we anticipate providing water quality units (WQU). The WQU are proprietary hydrodynamic separators that can provide over 80% TSS removal. These units will be used to provide pretreatment for the subsurface chamber system.

Option B.4-Add Reno

The proposed conditions will result in 94,360 sf of building and 109,347 sf of paved areas. We anticipate a subsurface chamber system located under the parking lot northeast of the building. This subsurface system will require an approximate volume of 51,000 cf. We anticipate a second subsurface chamber system under the roadway west of the building. This subsurface system will require an approximate volume of 17,000 cf. The volume is assumed that the subsurface chamber systems will need to provide at least 1-inch times the post construction impervious area to meet water quality requirements. The subsurface chamber system will also be used for peak rate mitigation. Therefore, to be conservative, we approximate the storage to be approximately four times the required water quality volume.

The assumed quantities needed for the stormwater upgrades include:

11-15 drainage manholes
10-15 catch basins
2-4 double catch basins
2 water quality units
2 outlet control structures
1,300 LF 12” HDPE drain lines
Two subsurface chamber systems with storage of 17,000 cf and 51,000 cf

Option C.1-New Construction

The proposed conditions will result in 48,185 sf of building and 107,092 sf of paved areas. We anticipate a subsurface chamber system located under the parking lot northeast of the building. This subsurface system will require an approximate volume of 39,000 cf. We anticipate a second subsurface chamber system under the roadway west of the building. This subsurface system will require an approximate volume of 13,000 cf. The volume is assumed that the subsurface chamber systems will need to provide at least 1-inch times the post construction impervious area to meet water quality requirements. The subsurface chamber system will also be used for peak rate mitigation. Therefore, to be conservative, we approximate the storage to be approximately four times the water quality volume.

The assumed quantities needed for the stormwater upgrades include:

12-15 drainage manholes
10-15 catch basins
2-4 double catch basins
2 water quality units
2 outlet control structures

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1,500 LF 12" HDPE drain lines
Two subsurface chamber systems with storage of 13,000 cf and 39,000 cf

Option C.4- New Construction (Preferred Option)

The proposed conditions will result in 69,664 sf of building and 78,260 sf of paved areas. We anticipate a subsurface chamber system located under the parking lot northeast of the building. This subsurface system will require an approximate volume of 37,000 cf. We anticipate a second subsurface chamber system under the roadway west of the building. This subsurface system will require an approximate volume of 12,500 cf. The volume is assumed that the subsurface chamber systems will need to provide at least 1-inch times the post construction impervious area to meet water quality requirements. The subsurface chamber system will also be used for peak rate mitigation. Therefore, to be conservative, we approximate the storage to be approximately four times the water quality volume.

The assumed quantities needed for the stormwater upgrades include:

11-15 drainage manholes
15-20 catch basins
3-5 double catch basins
2 water quality units
2 outlet control structures
1,750 LF 12" HDPE drain lines
Two subsurface chamber systems with storage of 12,500 cf and 37,000 cf

Date: 09 August 2024

Project: Neary Elementary School

Location: Southborough, MA

The purpose of this narrative is to outline our preliminary thoughts regarding the general site considerations and the landscape programming/materials as they relate to the three current building and site configuration options: 1) B.4, 2) C.1, and 3) C.4.

It is important to note that the existing school site maintains significant natural resources, which serve the community in several ways; including, but not limited to, open space, proximity to wetlands, natural topography, mature existing trees, habitat and wildlife species diversity, and inherent beauty.

Given the sensitivity and/or impact of the existing natural resource areas throughout the project site, the project will need to be reviewed by the Town of Southborough's permitting authorities (i.e.: Conservation Commission, etc.) to ensure that the project adheres to all environmental regulations and code mandates, per the State and the Town's Bylaw Rules and Regulations. It is our understanding that, upon final design approval, the project team will arrange a preliminary discussion with all relevant permitting authorities to understand the overall building, site, and submission requirements which will ultimately drive the overall schematic design and process for the development of the school.

I. General Site Considerations

A. For all three building and site configuration options, outlined below are our recommendations for the general site conditions that would need to be considered regarding the existing site features and landscaping:

1. Careful analysis of the existing ADA / Universal Accessibility conditions throughout the site would need to be completed by an ADA / MAAB professional consultant. Accessibility along all circulation routes, to building egress points, and throughout all outdoor active and passive recreation areas would need to be achieved. Improvements shall involve vehicular driveway, pedestrian walkway, playground surfacing, playground equipment, athletic fields, site furnishing and amenities, handrail, detectable surface warning strip(s), etc., and upgrades throughout the project site.
2. All site circulation design options include two separate routes for bus and parent drop-off. Additionally, each option addresses emergency vehicle access and appropriate quantities of parking required (with necessary allotment of ADA and EV spaces, for further review with Civil and Traffic Engineers).
3. Parking lot tree-islands (quantity and size based on Town Zoning requirements) shall be included within all parking lots to mitigate stormwater run-off and urban heat island effect. In addition to providing traffic calming, safety, and aesthetics.
4. The existing site grading and drainage will need to be evaluated to be certain that the site does not experience any drainage issues (to be coordinated with the civil engineer).
5. A licensed arborist will need to evaluate the condition of the existing trees to determine their safety and long-term viability to be certain that they will not suffer decline during any site improvements; thereby resulting in limb-drop or early decline that could impact the site users. In addition, the existing plantings deemed for preservation would need to be selectively pruned to ensure longevity.
6. The existing site lighting system would need to be evaluated to be certain that all required photometric safety levels are met throughout the site.

7. Reconfigured driveway, parking, and service zones would need to be repaired and replaced for safety and clarity.
8. Wayfinding signage throughout the site would need to be upgraded for directional and safety clarity.
9. Opportunities for snow storage and/or removal will need to be identified.
10. Several memorial amenities onsite, including site furnishings and plantings, shall be inventoried for careful storage and re-installation or replication where applicable. It is most likely all plants located in *"Linda's Garden"* shall be removed and reinstalled; or, dependent upon the likelihood of survivability based on time of season during construction, replicated in-kind elsewhere onsite.
11. It is our understanding that the "*Patricia A. Richardson Memorial Tennis Courts"* shall be protected to remain.
12. It will be imperative to understand from the School and Community which (if any) athletic programmatic uses shall be preserved/replicated and how they are to be accessed and used; (.i.e. little league on weekends, high school games during the evening, etc.); the site is currently host to the following: (1) softball field, (1) baseball field, (2) soccer fields, (1) full court basketball court, (1) beach volleyball sand court.
13. If desired, the existing storage facility with shade structure, drinking fountain, and picnic tables shall be replicated elsewhere onsite in-kind.
14. Site designs for all options shall include connections to the existing trail system at the site perimeter and will encourage access to nearby wetlands for nature learning opportunities.
15. Site designs for all options shall be sensitive to wetland buffers and proper screening of property abutters (especially the residential properties to the southeast) using a combination of privacy fences and plantings.
16. All options will discourage any development on the existing landfill and will create a cohesive site circulation connection to the nearby Trottier Middle School located to the northwest, perhaps utilizing similar design language for further continuity (. i.e. materiality, lighting, signage, furnishings, etc.).
17. New playgrounds and outdoor classrooms will be introduced; overall size/student capacity and types of equipment to be included shall be driven by the program requirements of the school users and community.

II. Option B.4

A. Opportunities:
   1. The building location and configuration for Option B.4 presents opportunities relative to minimal overall site disturbance due to the building location remaining close to where it currently exists onsite, additionally, the site access will come from Parkerville Road, as it does currently.
   2. The floor plan of building Option B.4 presents some exciting opportunities for enclosed courtyard spaces adjacent to classrooms and the cafeteria (further discussed in Site Design below).
   3. The location of the school gymnasium presents a wonderful opportunity for easy access to the outdoor open space, proposed active recreation and playground spaces to the east of the site.

B. Constraints:
   1. The vehicular road spans around the entire perimeter of the building, this can create some challenges for pedestrian safety; especially when students are crossing the roadway to access outdoor amenities and fields.
   2. Although the proposed building location is almost in its current location, there will still be some significant site manipulation to adjust the site topography and introduce new roadways and parking lots. This will result in the elimination of several existing trees and relocation of site furnishings, amenities, utilities and a re-working of the entire site drainage system.
   3. Courtyard spaces within the building facades will receive very little sunlight, thus will need to be comprised of hardscape as most plant material (especially grass) will not survive in these conditions.

C. Site Design
   1. For the B.4 option, we envision that the following elements would be located throughout the site:
      a. Bituminous concrete vehicular drop-off and pick-up zone(s) with traffic calming and wayfinding elements throughout.
      b. For pedestrian/vehicular safety, a series of crash-rated bollards, or site elements that serve as a crash-rated bollard equivalent, would be placed throughout any drop-off and pick-up zones where students typically gather.
      c. The drop-off lanes would, ideally, abut a planted median that would maintain hardy deciduous street trees that would be salt and urban condition(s) tolerant for shade and space delineation.

d. (1) flagpole would be in proximity to the main entrance.
e. Building Entrance Arrival (2 locations):
    i. Concrete unit pavers.
    ii. Granite curbing.
    iii. Benches with backs and arms (6 total).
    iv. Litter/recycling receptacles (2 total).
    v. Bicycle racks (12 total – to be confirmed with Client and Zoning/LEED requirements, if applicable).
    vi. Low perennial beds with vertical granite curbs.
    vii. Deciduous shade trees.
    viii. Low voltage lighting (photometrics to be confirmed with Lighting/Electrical Consultants).
    ix. Irrigation at all lawn areas.
f. Walkways: Cast-In-Place Concrete (ADA Accessible).
g. (2) Play Areas (one south of gymnasium, one located within field space to the east):
    i. Playground Equipment (per appropriate age requirements).
    ii. 4'-0" High black vinyl chain link fence with (2) 8'-0" wide double gates.
    iii. Benches with backs and arms (6 total).
    iv. Litter/recycling receptacles (1 total).
    v. Poured-in-place resilient rubber play surfacing (with underdrains by Civil Engineer).
h. (1) Outdoor Classroom/Performance Courtyard (space between classrooms):
    i. Paved walkways within and to classrooms from the building.
    ii. Synthetic Lawn (with underdrains by Civil Engineer).
    iii. Synthetic lawn mounds with monolithic granite amphitheater seat walls.
    iv. Imaginative play elements (per appropriate age requirements).
    v. Movable tables and chairs (5 total).
    vi. Boulder seating (12 total).
    vii. Benches with backs and arms (6 total).
    viii. Litter/recycling receptacles (2 total).
    ix. Raised garden beds with precast concrete curbs (8 standard height; 3 at 24" height for ADA access).
    x. STEM site furnishings (learning apparatus, movable whiteboard, water tables, rainwater harvesting barrels, etc.).
i. (1) Outdoor Dining Courtyard (space adjacent to cafeteria):
    i. Concrete Unit Pavers.
    ii. Movable tables/chairs (15 total).
    iii. Litter/recycling receptacles (4 total).
    iv. Overhead Shade Structures fastened to the building facade.
    v. Benches with backs and arms (10 total).
    vi. Movable cube seats (12 total).
j. Service Areas (to be coordinated with the Architecture and Civil Engineer Teams):
    i. Vehicular concrete paving (8" minimum).
    ii. Dumpster pads.
    iii. Bollard protection and fence enclosures to screen dumpsters, gas meters, transformers, generators, etc.
k. Plantings
    i. Deciduous trees throughout for shade and to provide a vegetative buffer to the abutters.
    ii. Dense evergreen planting at the service zones.
    iii. Perennial beds at the building entrances for seasonal interest; low maintenance.
    iv. Small shrubs (deciduous and evergreen) at building facades.
    v. Raised garden beds: herbs, vegetables, low-maintenance perennials.
l. Athletic/Recreational Amenities
    i. (1) Softball Field with new bases, chain link backstop, line striping and (2) player's benches
    ii. (1) Baseball Field with new bases, chain link backstop, line striping and (2) player's benches
    iii. Line-striping for (2) soccer fields (size to match existing onsite)
    iv. Beach sand and net for (1) volleyball court (size to match existing onsite)
    v. Play-surfacing and line-striping for (1) full size basketball court with (2) basketball hoops
    vi. Play-surfacing and line-striping for (3) 4-square and (2) hopscotch layouts

vii. Irrigation at all sports fields
viii. 6'-0" wide stabilized stonedust path to bring students to nearby hiking trails and loop around open field space for walking/running
ix. Granite mile markers along walking/running path to delineate distances (5 total)

III. Option C.1:

A. Opportunities:
1. The building location and configuration for Option C.1 (like the above, Option B.4) presents opportunities relative to minimal overall site disturbance due to the building location remaining close to where it currently exists onsite, additionally, the site access will come from Parkerville Road, as it does currently.
2. The floor plan of building Option C.1 creates one large expanse of open space adjacent to the northeast corner of the building facades for direct access from the cafeteria and classrooms.
3. This option includes the smallest parking lot at the front of the school, thus allowing for the largest green space at the front arrival of the school (as compared to the other two options). This creates an exciting opportunity for an aesthetic arrival. Also, for creative solutions to stormwater management that can be implemented for outdoor learning.

B. Constraints:
1. The vehicular road spans around the entire perimeter of the building, this can create some challenges for pedestrian safety; especially when students are crossing the roadway to access outdoor amenities and fields.
2. Although the proposed building location is almost in its current location, there will still be some significant site manipulation to adjust the site topography and introduce new roadways and parking lots. This will result in the elimination of several existing trees and relocation of site furnishings, amenities, utilities and a re-working of the entire site drainage system.
3. It is beneficial to have one large expanse of open space within proximity to the building, however, it will take some creative solutions to separate the entire space for multiple programmatic elements: including outdoor classrooms, playground, and outdoor dining/performance.
4. The location of the gymnasium to the far west of the building prevents easy access to the fields and open space to the far east of the site.
5. The linear green spaces between the parking lot and front building façade will be challenging to utilize due to the safety concerns so close to vehicular activity.

C. Site Design
1. For the C.1 option, we envision that the following elements would be located throughout the site:
a. Bituminous concrete vehicular drop-off and pick-up zone(s) with traffic calming and wayfinding elements throughout.
b. For pedestrian/vehicular safety, a series of crash-rated bollards, or site elements that serve as a crash-rated bollard equivalent, would be placed throughout any drop-off and pick-up zones where students typically gather.
c. The drop-off lanes would, ideally, abut a planted median that would maintain hardy deciduous street trees that would be salt and urban condition(s) tolerant for shade and space delineation.
d. (1) flagpole would be in proximity to the main entrance.
e. Building Entrance Arrival (1 location):
i. Concrete unit pavers.
ii. Granite curbing.
iii. Benches with backs and arms (6 total).
iv. Litter/recycling receptacles (2 total).
v. Bicycle racks (12 total – to be confirmed with Client and Zoning/LEED requirements, if applicable).
vi. Low perennial beds with vertical granite curbs.
vii. Deciduous shade trees.
viii. Low voltage lighting (photometrics to be confirmed with Lighting/Electrical Consultants).
ix. Irrigation at all lawn areas.
f. Walkways: Cast-In-Place Concrete (ADA Accessible).
g. (2) Play Areas (one located at the far east of the open space adjacent to the building at the northeast corner, one located within field space to the east):
i. Playground Equipment (per appropriate age requirements).

ii. 4’-0” High black vinyl chain link fence with (2) 8’-0” wide double gates.
iii. Benches with backs and arms (6 total).
iv. Litter/recycling receptacles (1 total).
v. Poured-in-place resilient rubber play surfacing (with underdrains by Civil Engineer).

h. (1) Outdoor Classroom/Performance Terrace (adjacent to the north facing façade of the classrooms):
i. Paved walkways within and to classrooms from the building.
ii. Synthetic Lawn (with underdrains by Civil Engineer).
iii. Synthetic lawn mounds with monolithic granite amphitheater seat walls.
iv. Imaginative play elements (per appropriate age requirements).
v. Movable tables and chairs (5 total).
vi. Boulder seating (12 total).
vii. Benches with backs and arms (6 total).
viii. Litter/recycling receptacles (2 total).
ix. Raised garden beds with precast concrete curbs (8 standard height; 3 at 24” height for ADA access).
x. STEM site furnishings (learning apparatus, movable whiteboard, water tables, rainwater harvesting barrels, etc.).

i. (1) Outdoor Dining Terrace (adjacent to cafeteria):
i. Concrete Unit Pavers.
ii. Movable tables/chairs (17 total).
iii. Litter/recycling receptacles (5 total).
iv. Overhead Shade Structure (1 Shade Sail with Concrete Footings).
v. Benches with backs and arms (13 total).
vi. Movable cube seats (15 total).

j. Service Areas (to be coordinated with the Architecture and Civil Engineer Teams):
i. Vehicular concrete paving (8” minimum).
ii. Dumpster pads.
iii. Bollard protection and fence enclosures to screen dumpsters, gas meters, transformers, generators, etc.

k. Plantings
i. Deciduous trees throughout for shade and to provide a vegetative buffer to the abutters.
ii. Dense evergreen planting at the service zones.
iii. Perennial beds at the building entrances for seasonal interest; low maintenance.
iv. Small shrubs (deciduous and evergreen) at building facades and within outdoor gathering areas.
v. Raised garden beds: herbs, vegetables, low-maintenance perennials.

l. Athletic/Recreational Amenities
i. (1) Softball Field with new bases, chain link backstop, line striping and (2) player’s benches
ii. (1) Baseball Field with new bases, chain link backstop, line striping and (2) player’s benches
iii. Line-striping for (2) soccer fields (size to match existing onsite)
iv. Beach sand and net for (1) volleyball court (size to match existing onsite)
v. Play-surfacing and line-striping for (1) full size basketball court with (2) basketball hoops
vi. Play-surfacing and line-striping for (3) 4-square and (2) hopscotch layouts
vii. Irrigation at all sports fields
viii. 6’-0” wide stabilized stonedust path to bring students to nearby hiking trails and loop around open field space for walking/running
ix. Granite mile markers along walking/running path to delineate distances (5 total)

IV. Option C.4:

A. Opportunities:
1. The building location and configuration for Option C.4 (like both options above) presents opportunities relative to minimal overall site disturbance due to the building location remaining close to where it currently exists onsite, additionally, the site access will come from Parkerville Road, as it does currently.
2. The floor plan of building Option C.4 creates three separated courtyard opportunities; at the far west of the building an outdoor dining and performance space can be accessed directly from the cafeteria

and kitchen; centered within the building, an outdoor learning courtyard can be accessed from multiple classrooms and the media center to the south, finally; a play/recreation space at the far east of the building allows for direct access from the gymnasium to the south and the open space/athletic fields to the east.

B. Constraints:
   1. As in the above options, the vehicular road spans around the entire perimeter of the building, this can create some challenges for pedestrian safety; especially when students are crossing the roadway to access outdoor amenities and fields. The two outermost courtyards are directly adjacent to roadway so safety measures in these locations will be prudent (crash-test rated fencing, security bollards, etc.).
   2. Although the proposed building location is almost in its current location, there will still be some significant site manipulation to adjust the site topography and introduce new roadways and parking lots. This will result in the elimination of several existing trees and relocation of site furnishings, amenities, utilities and a re-working of the entire site drainage system.
   3. This option provides the largest expanse of parking lot at the front entry, thus the smallest amount of green space at arrival, as compared to the other two options. Measures shall be considered to soften the arrival aesthetically and manage stormwater and urban heat island effect with the amount of hardscape.
   4. Courtyard spaces within the building facades will receive very little sunlight, thus will need to be comprised of hardscape as most plant material (especially grass) will not survive in these conditions.

C. Site Design
   1. For the C.4 option, we envision that the following elements would be located throughout the site:
      a. Bituminous concrete vehicular drop-off and pick-up zone(s) with traffic calming and wayfinding elements throughout.
      b. For pedestrian/vehicular safety, a series of crash-rated bollards, or site elements that serve as a crash-rated bollard equivalent, would be placed throughout any drop-off and pick-up zones where students typically gather.
      c. The drop-off lanes would, ideally, abut a planted median that would maintain hardy deciduous street trees that would be salt and urban condition(s) tolerant for shade and space delineation.
      d. (1) flagpole would be in proximity to the main entrance.
      e. Building Entrance Arrival (1 location):
         i. Concrete unit pavers.
         ii. Granite curbing.
         iii. Benches with backs and arms (6 total).
         iv. Litter/recycling receptacles (2 total).
         v. Bicycle racks (12 total – to be confirmed with Client and Zoning/LEED requirements, if applicable).
         vi. Low perennial beds with vertical granite curbs.
         vii. Deciduous shade trees.
         viii. Low voltage lighting (photometrics to be confirmed with Lighting/Electrical Consultants).
         ix. Irrigation at all lawn areas.
      f. Walkways: Cast-In-Place Concrete (ADA Accessible).
      g. (2) Play Areas (one located at the far east open courtyard directly north of the gym and one located within field space to the east):
         i. Playground Equipment (per appropriate age requirements).
         ii. 4’-0” High black vinyl chain link fence with (2) 8’-0” wide double gates.
         iii. 4’-0” High Steel Crash-Test Rated security fence (along perimeter of courtyard adjacent to roadway, three sides tied into building) with (1) 6’-0” wide double gate.
         iv. Benches with backs and arms (3 total).
         v. Litter/recycling receptacles (1 total).
         vi. Poured-in-place resilient rubber play surfacing (with underdrains by Civil Engineer).
      h. (1) Outdoor Classroom Courtyard (at center of building):
         i. 4’-0” High Steel Crash-Test Rated security fence (at north end of courtyard space adjacent to roadway, tied into building) with (1) 6’-0” wide double gate.
         ii. Paved walkways within and to classrooms from the building.
         iii. Synthetic Lawn (with underdrains by Civil Engineer).
         iv. Synthetic lawn mounds with monolithic granite amphitheater seat walls.

v. Imaginative play elements (per appropriate age requirements).
vi. Movable tables and chairs (9 total).
vii. Boulder seating (15 total).
viii. Benches with backs and arms (9 total).
ix. Litter/recycling receptacles (3 total).
x. Raised garden beds with precast concrete curbs (8 standard height; 3 at 24" height for ADA access).
xi. STEM site furnishings (learning apparatus, movable whiteboard, water tables, rainwater harvesting barrels, etc.).

i. (1) Outdoor Dining/Performance Courtyard (north of cafeteria):
   i. 4'-0" High Steel Crash-Test Rated security fence (at three sides of courtyard space, adjacent to roadway, tied into building) with (2) 8'-0" wide double gates.
   ii. Concrete Unit Pavers.
   iii. Movable tables/chairs (17 total).
   iv. Litter/recycling receptacles (5 total).
   v. Overhead Shade Structure tied into building (2 total).
   vi. Benches with backs and arms (15 total).
   vii. Movable cube seats (17 total).

j. Service Areas (to be coordinated with the Architecture and Civil Engineer Teams):
   i. Vehicular concrete paving (8" minimum).
   ii. Dumpster pads.
   iii. Bollard protection and fence enclosures to screen dumpsters, gas meters, transformers, generators, etc.

k. Plantings
   i. Deciduous trees throughout for shade and to provide a vegetative buffer to the abutters.
   ii. Dense evergreen planting at the service zones.
   iii. Perennial beds at the building entrances for seasonal interest; low maintenance.
   iv. Small shrubs (deciduous and evergreen) at building facades.
   v. Raised garden beds: herbs, vegetables, low-maintenance perennials.

l. Athletic/Recreational Amenities
   i. (1) Softball Field with new bases, chain link backstop, line striping and (2) player's benches
   ii. (1) Baseball Field with new bases, chain link backstop, line striping and (2) player's benches
   iii. Line-striping for (2) soccer fields (size to match existing onsite)
   iv. Beach sand and net for (1) volleyball court (size to match existing onsite)
   v. Play-surfacing and line-striping for (1) full size basketball court with (2) basketball hoops
   vi. Play-surfacing and line-striping for (3) 4-square and (2) hopscotch layouts
   vii. Irrigation at all sports fields
   viii. 6'-0" wide stabilized stonedust path to bring students to nearby hiking trails and loop around open field space for walking/running
   ix. Granite mile markers along walking/running path to delineate distances (5 total)

3.3.4 PREFERRED SOLUTION

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Selection of Preferred Alternative

The District's preferred alternative is C.4, an all-new construction for 4-grade, 610 student enrollment on the existing Neary site. This alternative was selected for the following reasons:

- Consolidation of schools
- Modernized learning environment and amenities
- Economy of scale with larger building resulting from 4 grade enrollment.
- Advantages of more efficient building envelope of new construction, resulting in reduced yearly energy costs.
- Simplified busing logistics as a result of consolidation.

Educational Program

The District has updated the Educational Program to reflect changes to their space needs and provide responses to comments received from the MSBA.

Please refer to Educational Plan in Appendix B. Educational Plan (Clean) and for reference a red-lined copy of the PDP Educational Program in Appendix C Educational Plan (Red-Lined).

Space Summary

After the submission of the PDP, the District reduced the overall size of the building, as follows:

- General Classrooms were reduced from 950 sf to 900 sf based on the understanding that some of the activities that were originally planned to occur in the classrooms can be better served in the adjacent Breakout spaces and Learning Centers in each classroom neighborhood. Other classrooms such as World Language were also decreased to 900 sf for consistency across the building and for future flexibility.
- With assistance from the Educational Planner, the District viewed sample floor plans and visited recently constructed schools to gain a deeper understanding of how they might potentially use spaces that do not currently exist in the existing facility. As a result of increased understanding they were able to optimize room sizes for several spaces (e.g. Teacher Collaboration).
- During PDP phase, the District was exploring the possibility of incorporating an Auditorium space to provide space for their enhanced music program. After further discussions with the music teachers and other faculty, the District concluded that an Auditorium was not the best solution for the District educationally or from a budget standpoint since this space would not be reimbursable.
- In the PDP comments, a few spaces were noted as being larger than the MSBA guidelines by 10sf or less (Media Center, Dining & Food Service, Administration & Guidance, Custodial & Maintenance) and spaces in Health & Physical Education and Other also exceeded guidelines. These spaces have been adjusted in alignment with the MSBA guidelines.

Core Academic

The proposed project contains 32,400 SF of core academic space. This is 6,750 SF above the MSBA guidelines of 25,650 SF.

The existing building currently contains 7 classrooms per grade (14 general education classrooms), plus (1) dedicated science classroom. Class sizes average between 18-22 students.

For all general education classrooms, the number of classrooms per grade remains the same, but with a doubled student enrollment, the number of classrooms increases to (28) classrooms.

As noted above, the District elected to reduce each classroom by 50 SF to better take advantage of the proposed Breakout Spaces and Learning Centers. Breakout spaces will be provided with each pair of classrooms to align with the District's educational goals: allowing for more student interaction with specialists, increased student autonomy for small group and independent learning opportunities, and provide better flexibility for teachers and support staff.

STEM classrooms have been removed from the program as there is no current or future plan for staffing these spaces. Science curriculum will be conducted in the Learning Commons, which will be centrally located in each grade neighborhood.

The District and design team toured several newly constructed schools to experience example of Learning Commons in use. As a result of these tours the District was able to reduce the size of these spaces.

Since the PDP, this category has reduced by 5,050 SF. This reduction is due to the following:

- Reduced area of the General Classrooms
- The removal of (2) STEM Classrooms
- Reduced size of the Learning Commons

Special Education
The proposed project contains 6,640 SF of special eduction space. This is 910 SF below the MSBA guidelines of 7,550 SF.

This variation is due to the Educational Plan developed by the District. There is no current need to have a dedicated Special Education classroom per grade level. Instead, the District proposes (2) full-size, self-contained classrooms to accommodate both the CASTLE and TLP programs. These rooms will be grouped with and supported by secondary spaces such as Small Group Rooms, Resource Rooms, Calming Rooms, Speech and Language Offices, OT and PT/Adaptive PE rooms, Office Space for support staff, and space for team meetings and student/parent conferences.

This allotment of program space provides a net increase in available, flexible learning spaces which allows specialists and paraprofessionals greater access to the students they support.

This category has decreased by 4,200 SF since the PDP due to the reduction in area of the (2) classrooms and the Learning Centers listed above. Other reductions include combining the PT and Adaptive PE rooms to a single space and reducing the overall area alloted for OT and PT. Lastly, Testing Spaces and Small Group Rooms were removed from the Student Support Suite.

Art & Music
The proposed project contains 4,750 SF of Art & Music space. This is 25 SF below the MSBA guidelines of 4,775 SF and has been reduced since the PDP.

This includes a single Art Room with Storage (one fewer than the MSBA guideline), and a single Music Room with (2) Practice/Ensemble Rooms.

Since the PDP, the District chose to remove (1) Art Room and (1) Music Room to allow for larger Practice/Ensemble Rooms.

Health & Physical Education
The proposed project contains 6,300 SF of health & physical education space. This is in line with the MSBA guidelines of 6,300 SF.

This includes a full sized gymnasium and support spaces. Since the PDP, the gym storeroom was slightly reduced in size to align with MSBA guidelines.

Media Center
The proposed project contains 3,415 SF of Media Center space. This is consistent with MSBA guidelines and has not changed since the PDP.

Dining & Food Service
The proposed project contains 8,141 SF of dining and food service space. This is consistent with MSBA guidelines and has not changed since the PDP.

Medical
The proposed project contains 610 SF of medical space. This is consistent with MSBA guidelines of 610 SF and has not changed since the PDP.

Administration & Guidance
The proposed project contains 1,910 SF of administration and guidance space. This was reduced from 2,595 SF in the PDP and is 685 SF lower than the MSBA guidelines.

The overall reduction is due to the removal of the Assistant Principal's office, Guidance Offices, and a reduction in size of the Principal's Office. Based on their operational needs, the District decided these spaces would be underutilized.

Custodial & maintenance
The proposed project contains 2,210 SF of custodial and maintenance space. This is consistent with MSBA guidelines of 2,210 SF and has not changed since the PDP.

Other

During PDP, space was alloted for an Extended Day Office and Storage, totaling 500 SF. The District has decided to locate these spaces elsewhere in the District.

Non-Programmed Space

During the PSR, the (2) Instrument Storage Rooms and the Extended Day Program Storage Room were recategorized as Non-Programmed Space per MSBA's comments on the PDP. The total area for these spaces is 450 SF.

Gross and Net

The proposed project contains 66,376 SF of net space. This is 5,130 SF above the MSBA guidelines of 61,246 SF. This includes the following:

- Core academic spaces, such as the Learning Commons, World Language Rooms, and similar spaces that are not specifically addressed in the Space Summary Template
- Special Education spaces not specifically addressed in the Space Summary Template
- More small breakout rooms to support the District's Educational Plan
- Enlarged Music Room to accommodate the larger sized band and orchestra classes (up to 75 students) in support of the District's Educational Plan

The overall net area of the building has decreased by 14,335 SF since the PDP. Please see the above sections for description of the individual changes.

The proposed gross square footage of the project is 99,564 GSF. This is 11,114 GSF more than the MSBA guidelines of 88,450 GSF. This has been decreased by 21,503 GSF since the PDP was submitted.

Proposed Space Summary - Elementary School

Date: 08/28/24 Preferred Schematic Report

Margaret A. Neary Elementary School Southborough, MA	EXISTING CONDITIONS			PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
				EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
CORE ACADEMIC			**14,340**			**0**			**32,400**			**32,400**			**6,750**			**25,650**	STE Guidelines Policy
(List rooms of different sizes separately)																			
General Classrooms	890	14	12,460			0	900	28	25,200	900	28	25,200	-50	1	-450	950	27	25,650	900 NSF (minimum size) - 1,000 NSF (maximum size); Minimum of (2) sinks required per General Classroom
Science, Technology, Engineering (STE) Room	1,000	1	1,000			0	1,080	0	0	1,080	0	0	0	0	0	1,080	0	-	1,080 NSF (minimum size); Refer to the 2018 STE Guidelines for additional information.
STE Storage Room (if applicable)			0			0	120	0	0	120	0	0	0	0	0	120	0	-	Minimum of (1) 120 NSF STE Storage Room required per STE Room; Refer to the 2018 STE Guidelines for additional information.
Learning Commons (Breakout)			0			0	900	4	3,600	900	4	3,600	750	4	3,600				
English Language Development Office			0			0	200	2	400	200	2	400	200	2	400				
Instructional Suite (Reading, Math)	880	1	880			0	200	4	800	200	4	800	200	4	800				
World Language			0			0	900	2	1,800	900	2	1,800	900	2	1,800				
Health / Wellness Classroom			0			0	0	0	0	0	0	0	0	0	0				
Teacher Collaboration Room						0	300	2	600	300	2	600	300	2	600				
SPECIAL EDUCATION			**3,360**			**0**			**6,640**			**6,640**			**-910**			**7,550**	Special Education spaces require DESE review and approval.
(List rooms of different sizes separately)																			
Self-Contained Special Education Classroom			0			0	900	2	1,800	900	2	1,800	-50	-3	-2,950	950	5	4,750	900 NSF (minimum size) - 1,300 NSF; equal to the size of the proposed General Classrooms that serve the same student population.
Self-Contained Special Education Toilet Room			0			0	75	2	150	75	2	150	15	-3	-150	60	5	300	
Learning Center (Resource Room)	1,110	1	1,110			0	200	4	800	200	4	800	-300	1	-700	500	3	1,500	1/2 size of a General Classroom
Small Group Room			0			0	100	15	1,500	100	15	1,500	-400	13	500	500	2	1,000	1/2 size of a General Classroom
Calming Room (adjacent to SCSEC)			0			0	120	2	240	120	2	240	120	2	240				
Office for Speech & Language			0			0	200	1	200	200	1	200	200	1	200				
OT	495	1	495			0	500	1	500	500	1	500	500	1	500				
PT						0	600	0	0	600	0	0	600	0	0				
OT PT Storage						0	100	1	100	100	1	100	100	1	100				
PT / Adaptive PE	590	1	590			0	750	1	750	750	1	750	750	1	750				
Student Support Services	1,165	1	1,165			0	0	0	0	0	0	0	0	0	0				
Office (School Psych, Team Chair, Behavior Specialist)						0	150	2	300	150	2	300	150	2	300				
Small Group Room						0	200	0	0	200	0	0	200	0	0				
Testing spaces						0	100	0	0	100	0	0	100	0	0				
Special Ed Team Chair Office						0	150	0	0	150	0	0	150	0	0				
SPED Conference Room						0	300	1	300	300	1	300	300	1	300				
Public Day Education Spaces (List rooms separately below)																			
[Enter room type here]			0			0			0	0	0	0	0	0	0				
Collaborative Program Spaces (List rooms separately below)																			
[Enter room type here]			0			0			0	0	0	0	0	0	0				
ART & MUSIC			**4,055**			**0**			**4,750**			**4,750**			**-25**			**4,775**	
Art Classroom (25 seats)	1,000	1	1,000			0	1,000	1	1,000	1,000	1	1,000	0	-1	-1,000	1,000	2	2,000	Assumed schedule: 2 times per week per student
Art Workroom with Storage and Kiln			0			0	150	1	150	150	1	150	0	-1	-150	150	2	300	
Music Classroom / Large Group (50-75 seats)	1,895	1	1,895			0	1,800	1	1,800	1,800	1	1,800	600	-1	-600	1,200	2	2,400	Assumed schedule: 2 times per week per student
Music Practice / Ensemble	1,160	1	1,160			0	900	2	1,800	900	2	1,800	825	1	1,725	75	1	75	
Music Practice						0	150	0	0	150	0	0	-25	0	0	175	0	-	
HEALTH & PHYSICAL EDUCATION			**4,960**			**0**			**6,300**			**6,300**			**0**			**6,300**	Excess Physical Education Spaces Policy
Gymnasium	2,480	2	4,960			0	6,000	1	6,000	6,000	1	6,000	0	0	0	6,000	1	6,000	

Margaret A. Neary Elementary School Southborough, MA	EXISTING CONDITIONS			PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
				EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
Gym Storeroom			0			0	150	1	150	150	1	150	0	0	0	150	1	150	
Health Instructor's Office with Shower and Toilet			0			0	150	1	150	150	1	150	0	0	0	150	1	150	
MEDIA CENTER			**2,590**			**0**			**3,415**			**3,415**			**0**			**3,415**	
Media Center / Reading Room	2,590	1	2,590			0	3,415	1	3,415	3,415	1	3,415	0	0	0	3,415	1	3,415	
DINING & FOOD SERVICE			**5,000**			**0**			**8,141**			**8,141**			**0**			**8,141**	
Cafeteria / Dining	3,135	1	3,135			0	4,575	1	4,575	4,575	1	4,575	0	0	0	4,575	1	4,575	Based on 2 lunch seatings - 15 NSF per seat
Stage			0			0	1,000	1	1,000	1,000	1	1,000	0	0	0	1,000	1	1,000	
Chair / Table / Equipment Storage			0			0	403	1	403	403	1	403	0	0	0	403	1	403	
Kitchen	1,410	1	1,410			0	1,910	1	1,910	1,910	1	1,910	0	0	0	1,910	1	1,910	1,600 NSF for first 300 students + 1 NSF per additional student
Staff Lunch Room	455	1	455			0	253	1	253	253	1	253	0	0	0	253	1	253	20 NSF per student
MEDICAL			**440**			**0**			**610**			**610**			**0**			**610**	
Medical Suite Toilet			0			0	60	1	60	60	1	60	0	0	0	60	1	60	
Nurses' Office / Waiting Room	440	1	440			0	250	1	250	250	1	250	0	0	0	250	1	250	
Examination Room / Resting			0			0	100	3	300	100	3	300	0	0	0	100	3	300	
ADMINISTRATION & GUIDANCE			**1,900**			**0**			**1,910**			**1,910**			**-685**			**2,595**	
General Office / Waiting Room with Toilet	550	1	550			0	455	1	455	455	1	455	0	0	0	455	1	455	
Teachers' Mail and Time Room			0			0	100	1	100	100	1	100	0	0	0	100	1	100	
Copy Room			0			0	150	1	150	150	1	150	0	0	0	150	1	150	
Records Room			0			0	110	1	110	110	1	110	0	0	0	110	1	110	
Principal's Office with Conference Area	180	1	180			0	200	1	200	200	1	200	-175	0	-175	375	1	375	Conference room shared with Asst Principal
Principal's Secretary / Waiting			0			0	125	1	125	125	1	125	0	0	0	125	1	125	
Assistant Principal's Office			0			0	120	0	0	120	0	0	0	-1	-120	120	1	120	
Supervisory / Spare Office			0			0	120	1	120	120	1	120	0	0	0	120	1	120	
Conference Room	390	1	390			0	250	1	250	250	1	250	0	0	0	250	1	250	
Guidance Office	210	1	210			0	150	0	0	150	0	0	0	-2	-300	150	2	300	
Guidance Storeroom			0			0	35	0	0	35	0	0	0	-1	-35	35	1	35	
Teachers' Work Room	570	1	570			0	100	4	400	100	4	400	-355	3	-55	455	1	455	
CUSTODIAL & MAINTENANCE			**1,949**			**0**			**2,210**			**2,210**			**0**			**2,210**	
Custodian's Office						0	150	1	150	150	1	150	0	0	0	150	1	150	
Custodian's Workshop	1,378	1	1,378			0	375	1	375	375	1	375	0	0	0	375	1	375	
Custodian's Storage	571	1	571			0	375	1	375	375	1	375	0	0	0	375	1	375	
Recycling Room / Trash			0			0	400	1	400	400	1	400	0	0	0	400	1	400	
Receiving and General Supply			0			0	**303**	1	303	303	1	303	0	0	0	303	1	303	
Storeroom			0			0	**407**	1	407	407	1	407	0	0	0	407	1	407	
Network / Telecom Room			0			0	200	1	200	200	1	200	0	0	0	200	1	200	
OTHER			**555**			**0**			**0**			**0**			**0**			**0**	
(List rooms separately below)																			
			6,135																
Extended Day Program Office			0			0	200	0	0	200	0	0	200	0	0				
						0						0							
District Office	5,465	1	5,465			0			0	0	0	0	0	0	0				
District Office Storage	490	1	490			0						0							
Office	180	1	180			0						0							
Quiet Corner	125	1	125			0						0							
After - School	250	1	250			0						0							

Proposed Space Summary - Elementary School

Date: 08/28/24 Preferred Schematic Report

Margaret A. Neary Elementary School Southborough, MA	EXISTING CONDITIONS			PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
				EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
Zen Den	180	1	180			0			0	0	0	0	0	0	0				
Total Building Net Floor Area (NFA)			**39,149**			**0**			**66,376**			**66,376**			**5,130**			**61,246**	**Total Building Net Floor Area (NFA)**
Proposed Student Capacity / Enrollment																# of Grades	4	**610**	**Total Enrollment (Enter Design Enrollment)**
																K	0	**0**	Kindergarten Enrollment
																Grade 1	0	**153**	Lower Elementary School Enrollment (Grades 1-2)
																Grade 2	1	**458**	Upper Elementary School Enrollment (Grades 3-6)
																Grade 3	1		
																Grade 4	1		
																Grade 5	1		
																Grade 6	0		
NON-PROGRAMMED SPACES					% of GFA	**0**		% of GFA	**33,188**		% of GFA	**33,188**							Complete this category with Schematic Design Submittal
Other Occupied Rooms (List rooms separately below)																			
Instrument storage			0			0	150	2	300	150	2	300	-25	2	300	175	0	-	
Extended Day Program Storage			0			0	150	1	150	150	1	150	150	1	150				
Unoccupied MEP / FP Spaces				-	#DIV/0!		-	0.0%		-	0.0%	0							
Unoccupied Closets, Supply Rooms, and Storage Rooms				-	#DIV/0!		-	0.0%		-	0.0%	0							
Toilet Rooms				-	#DIV/0!		-	0.0%		-	0.0%	0							
Circulation (corridors, stairs, ramps and elevators)				-	#DIV/0!		-	0.0%		-	0.0%	0							
Remaining[3]			23,607	-	#DIV/0!	**0**	-	32.9%	**32,738**	-	32.9%	**32,738**							
Total Building Gross Floor Area (GFA)[2]			**62,756**			**0**			**99,564**			**99,564**			**11,114**			**88,450**	**Total Building Gross Floor Area (GFA)[2]**
Grossing Factor (GFA / NFA)			**1.60**			**#DIV/0!**			**1.50**			**1.50**			**0.06**			**1.44**	**Grossing Factor (GFA / NFA)**

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

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

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

Architect Certification

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

Name of Architecture Firm: Arrowstreet Inc.

Name of Principal Architect: Lawrence Spang, AIA

Signature of Principal Architect:

Date: August 29, 2024

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29 August 2024

Ms. Maria Caprigno
Project Coordinator
Massachusetts School Building Authority
40 Broad Street, Suite 50
Boston, MA 02109

Southborough / 23072

Town of Southborough
Margaret A. Neary Elementary School
Southborough, Massachusetts

Dear Ms. Caprigno,

This is an acknowledgement that the Town of Southborough has identified a goal of 4% additional reimbursement from the MSBA High Efficiency Green School Program. As their Designer, I have submitted a completed LEED for Schools checklist showing all prerequisites and attempted credits, which will be further evaluated and developed in subsequent phases of the project to meet that goal. This is achieved via an additional 3% reimbursement for meeting the energy code requirements described in the Specialized Energy Code, and 1% for providing a minimum of 5 points in the LEED indoor air quality requirements.

The scope of work for this project will include construction elements and performance tasks to achieve that goal, and all subsequent documents, including but not limited to, specifications, drawings, and cost estimates will match the scope of work to the LEED requirements outlined in the submitted checklist.

Sincerely,

ARROWSTREET

Laurence Spang, AIA, LEED AP
Principal

Sustainability

Green Building Rating System

The MSBA's Green Schools Program was updated in June 2023. The new policy requires all MSBA projects to register and achieve the Silver certification level of the most recent version of LEED BD+C Schools (LEED-S) or Verified certification for NE-CHPS. In addition, specific credits from each of the rating systems related to indoor air quality and materiel health are required. Lastly, the project must meet the minimum energy efficiency requirements of the 225 CMR 23 MA Stretch Energy Code. The district has selected to follow the LEED BD+C Schools rating system for this project. The Town of Southborough is a Stretch Code community.

The updated 2023 Green Schools policy provides incentives to a district to increase the energy efficiency and sustainability for new construction and major renovation/addition projects. For an additional 3% reimbursement, projects must meet the minimum energy efficiency requirements of the Massachusetts Opt-in Specialized Energy Code. For an additional 1% reimbursement, projects must achieve a minimum of 5 of 7 points in the LEED indoor air quality category or 8 of 10 in the NE-CHPS indoor air quality category. This project is targeting both strategies for 4% additional reimbursement.

LEED BD+C Schools Rating System

The current applicable LEED rating system is LEED v4 Building Design and Construction: Schools. Points from LEED v4.1 will be substituted as relevant to the project. For a LEED BD+C Schools Silver design, a project must satisfy all prerequisites and earn a minimum of 50 points of 110 points. The LEED Schools rating system is appropriate for buildings made up of core and ancillary learning spaces on K-12 school grounds. LEED BD+ C Schools certifications are awarded according to the following scale:

Certified 40—49 points, Silver 50—59 points, Gold 60—79 points, Platinum 80—110 points

The LEED Green Building Rating Systems address these topics:

- Integrative Progress
- Location and Transportation
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation
- Regional Priorities

Optimize Energy Performance

The Commonwealth of Massachusetts approved an update to the Stretch Energy Code which took affect July 1, 2023. This updated code included new thresholds. As Southborough is a Stretch Code Community, the project will meet the new updated Stretch Energy Code as a required baseline. In addition, the Neary Building Committee Sustainability Subcommittee prefers that the project comply with requirements for the Massachusetts Opt-In Specialized Code through the All-electric path for an additional 3% reimbursement. The committee has proposed the building explore net-zero energy, which is an all-electric building with all energy use offset by renewable energy, further during Schematic Design.

Through the sustainability workshop with the Sustainability Subcommittee, several all-electric options for mechanical systems were reviewed. The following is a ranking of options in order of preference:

1. Ground-water heat pump chiller/ heating plant with displacement ventilation (this option would achieve net zero as defined by achieving an EUI of 25 or less.
2. Air-water heat pump chiller heating plant with displacement ventilation

3. VRF with overhead ventilation. It was noted that this option might achieve net zero. Solar would be required. Further study and agreements are needed.

The Design Team also presented available Mass Save and Federal Investment Tax Credit incentives, to understand how the incentives correlate to different energy systems and reduction targets. After reviewing this information, the Sustainability Subcommittee decided to study net zero in greater detail during Schematic Design phase of the project. In Schematic Design, the Design Team will perform an energy model and engineering economic assessment for the project as well as develop more detailed site and building analysis.

Additional Building Performance Goals

Through the sustainability workshop with the School Building Committee, several sustainable, wellness, and resilience goals were identified. These include designing for Wellness, Energy, Equitable Community, Ecology, and Change.

The LEED Schools rating system will be used to help provide standards for meeting these goals. See appendices for the preliminary LEED Schools Checklist.

To minimize site impacts, the building was sited to provide maximum distance to wetland set backs and minimize the necessity for soil removal. The geotechical evaluation determined existing soil has a high organic content and does not have sufficient bearing capacity. Massing for the building is compact and rectilinear lending itself to simple construction.

For resiliency, the building will be sited outside of the FEMA flood zones and at or above the current floor elevation. All of the building materials will be designed and fastened to sustain the 125 MPH winds in risk category II for Southborough listed in 780 CMR Table 1604.11. All of the MEP options considered will have an emergency generator to provide power for required life safety systems.

Preferred Scheme Drawings

Drawings and Diagrams on the following pages.

PROJECT SCHEDULE

A proposed project schedule can be found on page 170.

LEED v4/4.1 for BD+C: Schools

Project Checklist

all credits will follow v4.1 criteria unless otherwise noted

Project Name: Southborough Neary School

Date: 7/11/2024 Prepared By: Arrowstreet

Y	?	N			Possible
	1		Credit 1	Integrative Process	1

2	5	8	**Location and Transportation**		15
		na	Credit 1	LEED for Neighborhood Development Location	15
1			Credit 2	v4 Sensitive Land Protection	1
	2		Credit 3	v4 High Priority Site	2
	2	3	Credit 4	v4 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

6	3	3	**Sustainable Sites**		12
Y			Prereq 1	Construction Activity Pollution Prevention	Required
Y			Prereq 2	Environmental Site Assessment	Required
1			Credit 1	v4 Site Assessment	1
		2	Credit 2	Protect or Restore Habitat	2
	1		Credit 3	v4 Open Space	1
1	1	1	Credit 4	Rainwater Management	3
2			Credit 5	v4 Heat Island Reduction	2
1			Credit 6	v4 Light Pollution Reduction	1
	1		Credit 7	Site Master Plan	1
1			Credit 8	Joint Use of Facilities	1

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

14	15	2	**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
6			Credit 1	Enhanced Commissioning	6
8	6	2	Credit 2	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

6	3	4	**Materials and Resources**		13
Y			Prereq 1	Storage and Collection of Recyclables	Required
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required
2	1	2	Credit 1	Building Life-Cycle Impact Reduction	5
1		1	Credit 2	Building Product Disclosure and Optimization - EPDs	2
	1	1	Credit 3	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit 4	Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit 5	v4 Construction and Demolition Waste Management	2

9	5	2	**Indoor Environmental Quality**		16
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke Control	Required
Y			Prereq 3	Minimum Acoustic Performance	Required
2			Credit 1	Enhanced Indoor Air Quality Strategies	2
2	1		Credit 2	Low-Emitting Materials	3
1			Credit 3	Construction Indoor Air Quality Management Plan	1
1	1		Credit 4	Indoor Air Quality Assessment	2
	1		Credit 5	Thermal Comfort	1
1		1	Credit 6	Interior Lighting	2
1	1	1	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: EPDs	1
1			Credit 1.2	Pilot Credit: Composting	1
1			Credit 1.3	Innovation: Design for Active Occupants	1
1			Credit 1.4	Innovation: Green Building Education	1
1			Credit 1.5	Innovation: TBD	1
1			Credit 2	LEED Accredited Professional	1

2	2		**Regional Priority**		4
1			Credit 1	Optimize Energy Performance Threshold 8pt	1
1			Credit 2	Building Life-Cycle Impact Reduction Threshold 2pt	1
	1		Credit 3	Renewable Energy Threshold 2pt	1
	1		Credit 4	Outdoor Water Use Reduction	1

49	39	22	**TOTALS**	Possible Points:	110

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

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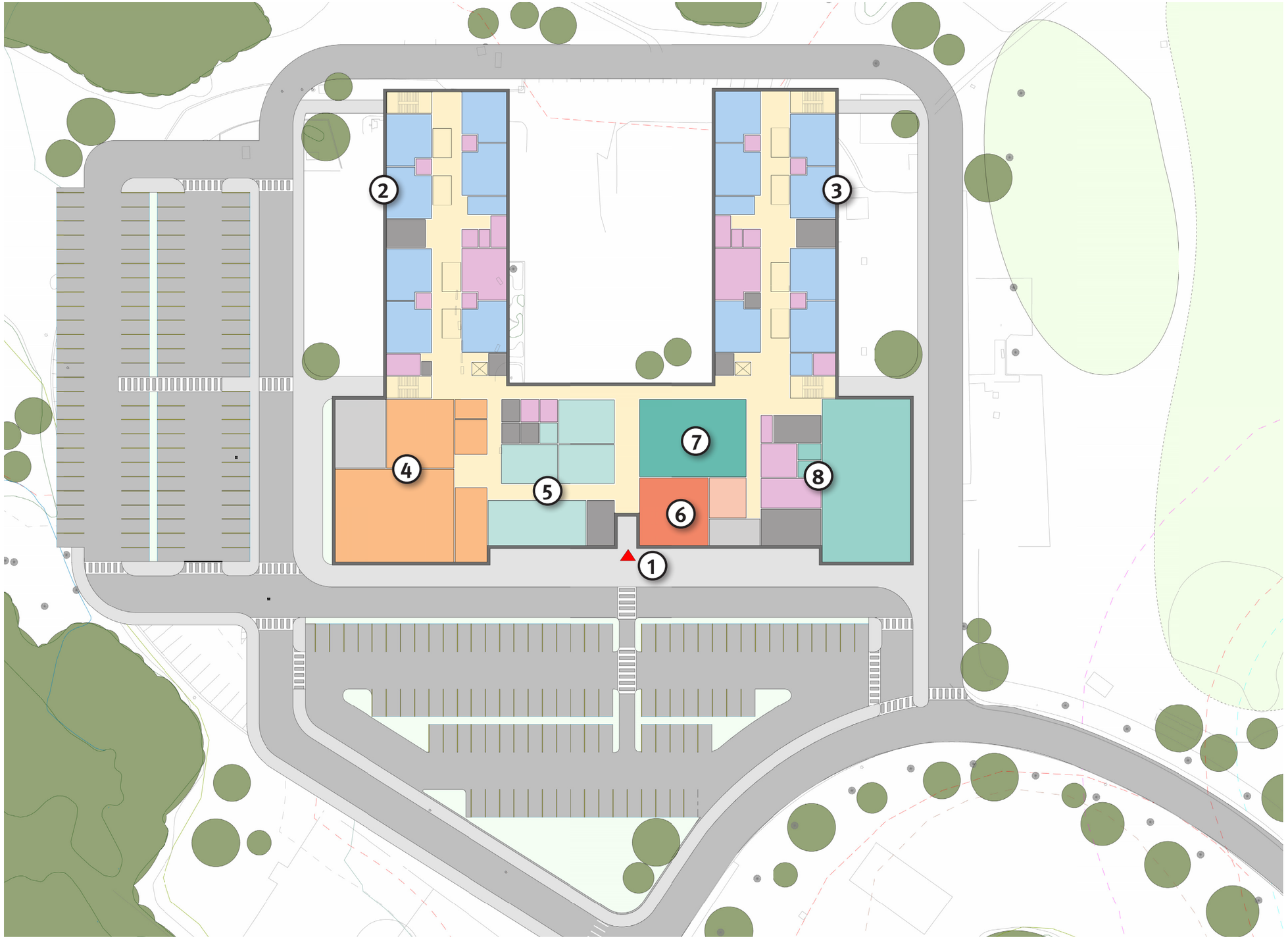
C.4 Conceptual Site Plan and Boundaries

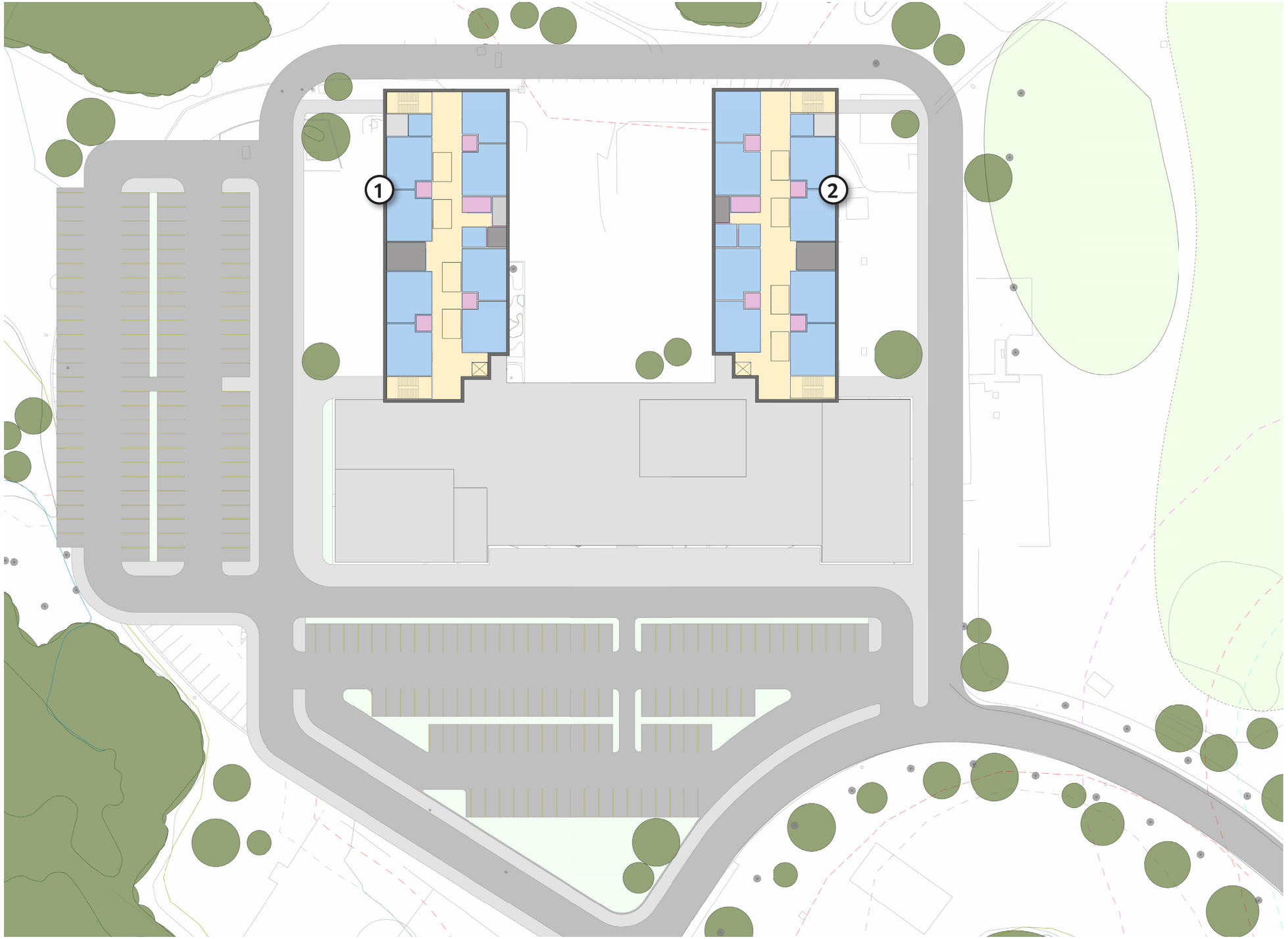


CORE ACADEMIC
SPECIAL EDUCATION
ART & MUSIC
HEALTH & PHYS ED
MEDIA CENTER
DINING AND FOOD SERVICE
ADMIN
MEDICAL
CUSTODIAL & MAINTENANCE
NON-PROGRAMMED
CIRCULATION

KEY PROGRAM AREAS:

1. MAIN ENTRY
2. SECOND GRADE WING
3. THIRD GRADE WING
4. CAFETORIUM & KITCHEN
5. ART & MUSIC
6. MAIN OFFICE & ADMIN
7. MEDIA CENTER
8. GYMNASIUM & OT/PT

C.4 Programming Plan & Site Plan - Level 1

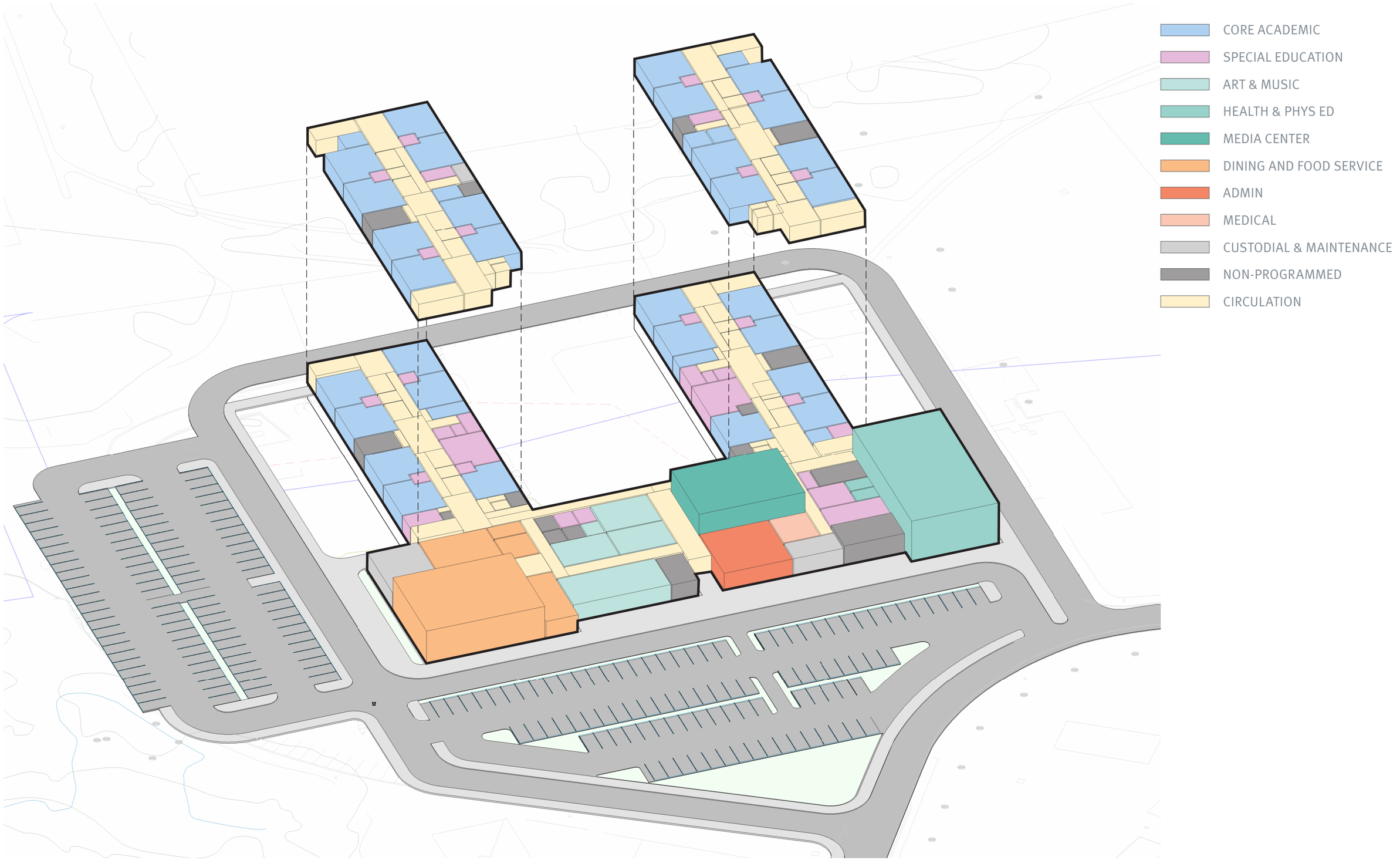


CORE ACADEMIC
SPECIAL EDUCATION
ART & MUSIC
HEALTH & PHYS ED
MEDIA CENTER
DINING AND FOOD SERVICE
ADMIN
MEDICAL
CUSTODIAL & MAINTENANCE
NON-PROGRAMMED
CIRCULATION

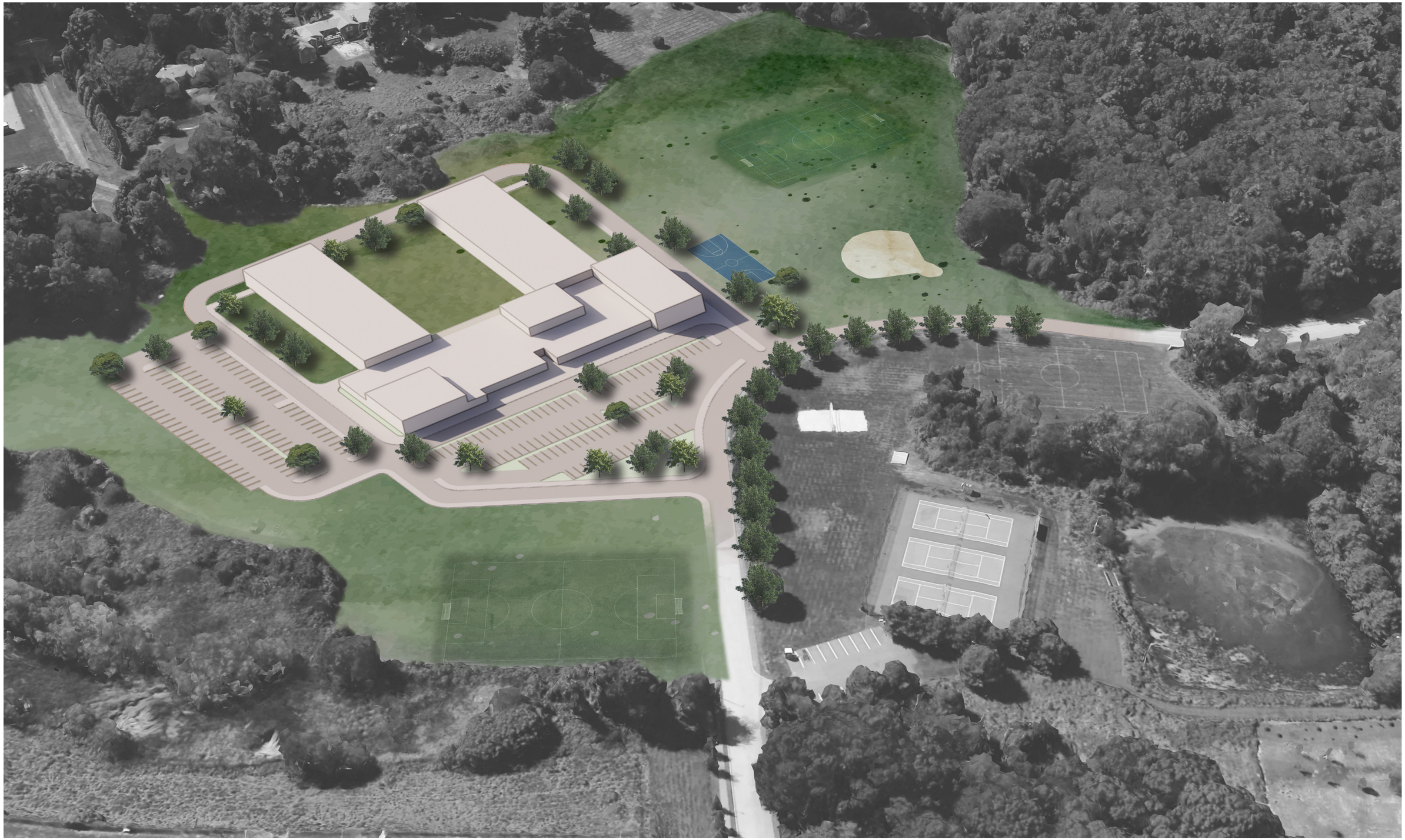
KEY PROGRAM AREAS:

1. THIRD GRADE WING
2. FOURTH GRADE WING

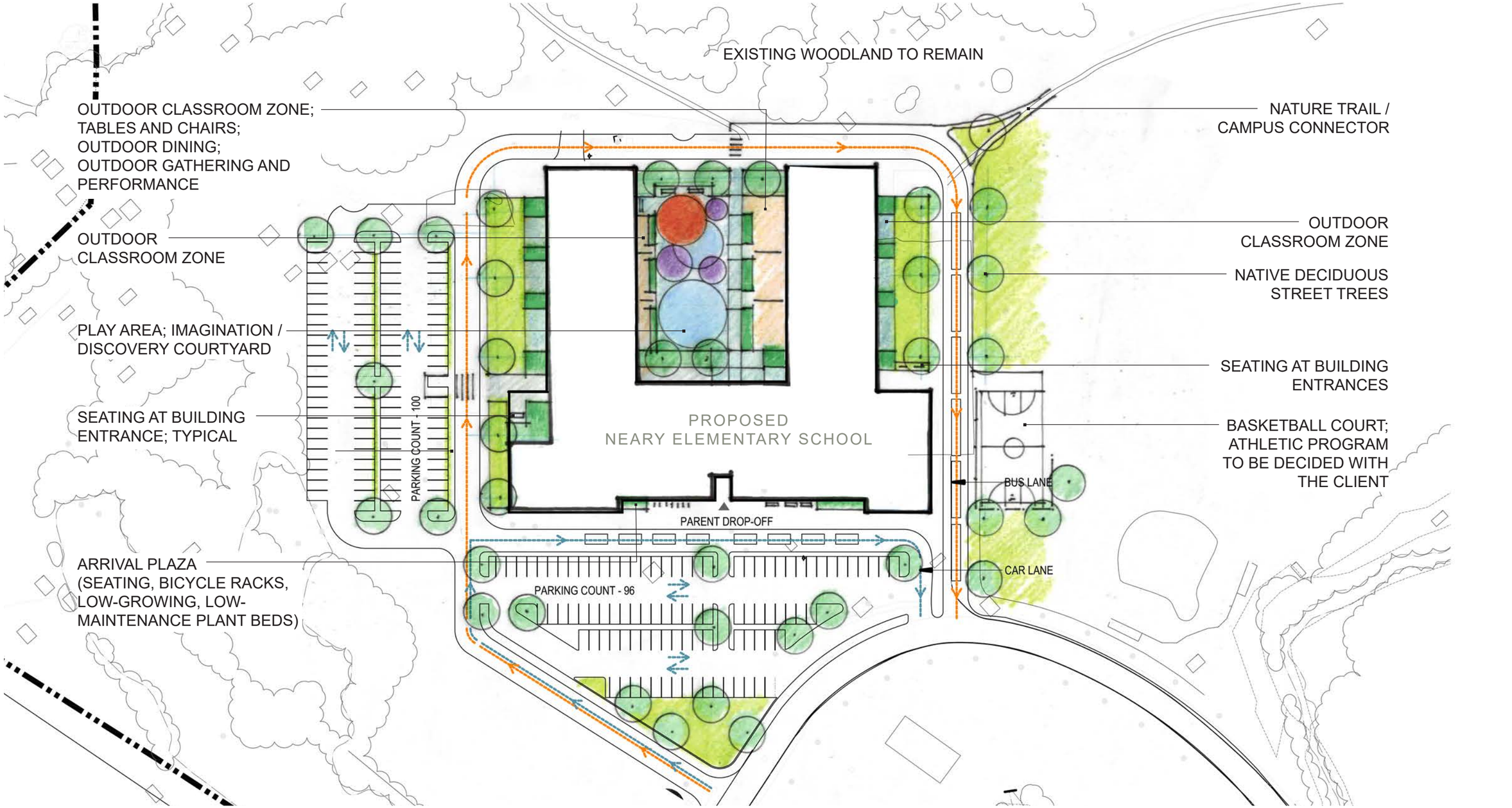
C.4 Programming Plan - Level 2



C.4 Programming Axon



C.4 Conceptual Massing Axon



terraink landscape architecture

MARGARET A. NEARY ELEMENTARY SCHOOL — SITE DESIGN CONCEPT

NOT TO SCALE. ILLUSTRATIVE IMAGERY FOR TEAM COORDINATION . NOT FOR CONSTRUCTION.

NORTH

Southborough . Massachusetts
Feasibility Phase
August 2024

C.4 Conceptual Landscape Plan

C.4 Conceptual Site Circulation Diagram

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Town of Southborough

TOWN HOUSE · 17 COMMON STREET · SOUTHBOROUGH, MASSACHUSETTS 01772-1662
(508) 485-0710

August xx, 2024

Project Coordinator
Massachusetts School Building Authority
40 Broad Street – 5th Floor
Boston, MA 02109

RE: Capital Budget Statement

UPDATE W/ SIGNED COPY

The following narrative of the Town of Southborough fiscal condition and purposed plan for the financing and construction expense of a new elementary school project

Town Not-To-Exceed Total Budget
The Neary School Building Committee voted and approved Option C.1, New Construction Neary, 610 Enrollment, as the district's Preferred Option with a vote on August 12, 2024. The cost breakdown (all estimated) of the preferred option is:

Total Budget: $113,400,000
Construction Budget: $92,000,000
Town Share: $83,400,000
MSBA Share: $30,000,000

Not to Exceed Budget: $113,400,000

Outstanding Debt:
At the end of Fiscal Year 2023, the Town of Southborough had total bonded debt outstanding of over $26.7 million. Of this amount approximately $24.0 million represents debt of the governmental activities and approximately $2.7 million represents debt of business-type activities.

The Town's total debt balance, including unamortized bond premiums, decreased by over $2.9 million. During the fiscal year the Town made regular scheduled maturities of governmental activities and business-type activities debt totaled approximately $2.6 million and $0.4 million, respectively. The remaining changes relate to unamortized bond premiums.

Remaining debt principal as of 6/30/24 is projected to be:

Septic Fund	$177,365
General Fund Town	$22,480,000
General Fund School	$731,008
Community Preservation Fund	$2,830,000
Water Enterprise Fund	$2,983,582

*Note: some other funds are used to offset general fund debt, most notably ambulance receipts that are used to offset fire and some police debt, typically in the range of $400-600K annually.

Bond Anticipation Notes Outstanding Due 6-12-25:

Neary School Feasability Study	$570,000
Town House Renovations (CPA Funded)	$500,000

The feasibility study was authorized for $950,000. The Town will permanently finance the BANs upon completion of the project. The total Town commitment will likely be approximately $570,000.

The Town maintains a bond rating of “AAA” as set by Standard and Poor’s for general obligation debt.

At the Annual Town Meeting in March 2024 the Town authorized a total of $2,186,000 for Town debt related to Town capital equipment.

State statutes limit the amount of general obligation debt a governmental entity may issue to 5.0% percent of its total assessed valuation. The current debt limitation for the Town is approximately $152 million, which is in excess of the Town’s outstanding general obligation debt. See below:

UPDATE W/
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DEBT STATEMENT
of the
Town of Southborough, Massachusetts

(A) Equalized valuation under G.L. c.58, s.10C as of January 1, 2022		$3,033,118,400
(B) Debt limit (5%)		$ 151,655,920
Total outstanding debt	$ 29,132,365	
Debt authorized but not yet incurred, including this issue	$ 6,508,000	
(C) Gross debt	$ 35,640,365	
(D) Amount of outstanding debt which is outside the debt limit	$ 5,080,365	
(E) Amount of authorized but not yet incurred debt which is outside the debt limit (Itemized on page 2)	$ 700,000	

(F) Outstanding debt outside the debt limit plus authorized but not yet incurred debt outside the debt limit (D plus E)	$ 5,780,365	
(G) Net debt subject to the debt limit (C minus F)		$ 29,860,000
Remaining borrowing capacity under debt limit (B minus G)		$ 121,795,920

List of Other Capital Projects:

List of other Town Projects Underway: There are no other major capital projects concurrent with this School project. The next major Town project will be a possibly Library project which if approved will require issuing long term debt that would begin payments in FY28/FY29.

Description of the Local Process for Authorization and Funding of the Proposed Project:

The Neary School Building Committee has voted to support the submission of this project for approval by the MSBA. Upon MSBA's approval of a schematic design and funding, the Town will consider its options for local approval of this project pursuant to MA General Laws Chapter 59, Section 21C.

UPDATE W/

Tax Impact:

Based on an assumption of a project cost to the Town or $83,400,000 (amount from Town's share above) and borrowing for 30 years, the impact to the tax rate of covering that debt service would be $1.45 or an annual increase of approximately $1,290 for the average single family home.

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Please advise if we can be of further assistance.

Budget Statement for Preferred Schematic - Expenditures

As reported on the school district's most recent three end of year information, please updated to the 3 latest fiscal year periods and complete the fields below.													
	2021-2022		2022-2023		2023-2024		Change from Previous Year		Post-Constuction Budget		New Facility vs. Current	
	FY2022		FY2023		FY2024							
Category	Staff (FTE)	Budget	Staff (FTE)	Budget	Staff	Budget	Staff (FTE)	Budget	Staff	Budget	Staff (FTE)	Budget
Salaries												
Administration												
Admin. Secretary	13.00	456,411	13.00	474,674	13.00	488,286	0.00	13,612	13.00	566,057	0.00	77,771
Assistant Principal	1.00	113,322	1.00	117,580	1.00	123,168	0.00	5,588	1.00	142,785	0.00	19,617
Business Office	6.00	152,914	6.00	159,164	6.00	161,376	0.00	2,212	6.00	187,079	0.00	25,703
Curriculum Director/Coord.	6.00	250,667	6.00	262,562	6.00	234,339	0.00	(28,223)	6.00	271,663	0.00	37,324
Custodians/Maintenance Staff	11.00	601,313	11.00	619,228	11.00	634,510	0.00	15,282	11.00	735,571	0.00	101,061
Executive Secretary	1.00	27,830	1.00	28,861	1.00	29,502	0.00	641	1.00	34,201	0.00	4,699
Facilities Manager	1.00	81,522	1.00	84,815	1.00	88,458	0.00	3,643	1.00	102,547	0.00	14,089
Guidance	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Adjustment Counselor	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Guidance Counselors	3.00	286,048	3.00	306,904	3.00	322,622	0.00	15,718	3.00	374,007	0.00	51,385
Guidance Director	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Legal	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Nurse	5.00	384,862	5.00	392,460	5.00	411,818	0.00	19,358	6.00	477,410	1.00	65,592
Other	8.00	248,116	8.00	289,554	8.00	305,033	0.00	15,479	9.00	353,617	1.00	48,584
Principal	4.00	507,953	4.00	527,037	4.00	538,896	0.00	11,859	4.00	624,728	0.00	85,832
Special Education Admin	4.00	139,708	4.00	146,973	4.00	150,730	0.00	3,757	4.00	174,737	0.00	24,007
Superintendent/Asst. Superintendent	3.00	142,602	3.00	149,790	3.00	157,966	0.00	8,176	3.00	183,126	0.00	25,160
Transportation	1.00	17,629	1.00	18,900	1.00	19,325	0.00	425	1.00	22,403	0.00	3,078
Treasurer	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Total Administration	**67.00**	**3,410,897**	**67.00**	**3,578,502**	**67.00**	**3,666,029**	**0.00**	**87,527**	**69.00**	**4,249,931**	**2.00**	**583,902**
Instruction - Teaching Services												
Arts	3.00	236,405	3.00	250,422	3.00	258,356	0.00	7,934	3.00	299,505	0.00	41,149
Business	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Communications	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Coping Instructor	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Culinary Arts	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
ELL	5.00	458,056	5.00	460,536	5.00	460,783	0.00	247	6.00	534,174	1.00	73,391
English Language	6.00	587,892	6.00	607,199	6.00	648,425	0.00	41,226	6.00	751,702	0.00	103,277
Family Consumer Services	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Foreign Language	4.00	348,832	4.00	364,827	4.00	388,728	0.00	23,901	6.00	625,642	2.00	236,914
Health Services	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
History & Social Science	5.00	474,487	5.00	450,947	5.00	476,049	0.00	25,102	5.00	551,871	0.00	75,822
Instructional Assistant/Paraprofessionals	58.00	1,634,389	63.00	1,853,462	60.00	1,847,053	-3.00	(6,409)	60.00	2,141,241	0.00	294,188
Library/Media	4.00	315,915	4.00	326,290	4.00	393,921	0.00	67,631	4.00	456,662	0.00	62,741
Mathematics	5.00	481,641	5.00	500,531	5.00	527,376	0.00	26,845	5.00	611,373	0.00	83,997
MCAS	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Music	6.00	535,236	6.00	556,649	6.00	576,459	0.00	19,810	6.00	688,274	0.00	111,815
Other	44.00	4,186,430	47.00	4,355,143	46.00	4,564,300	-1.00	209,157	46.00	5,291,275	0.00	726,975
Physical Education	5.00	515,300	5.00	525,586	5.00	542,713	0.00	17,127	5.00	629,153	0.00	86,440
Reading	4.00	382,679	4.00	417,068	4.00	409,408	0.00	(7,660)	4.00	474,616	0.00	65,208
School Adjustment Counselor	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Science	5.00	507,047	5.00	464,462	5.00	438,564	0.00	(25,898)	5.00	508,416	0.00	69,852
Biology	0.00	-	0.00		0.00		0.00	-	0.00	-	0.00	-
Botany	0.00	-	0.00		0.00		0.00	-	0.00	-	0.00	-
Chemistry	0.00	-	0.00		0.00		0.00	-	0.00	-	0.00	-
Geology	0.00	-	0.00		0.00		0.00	-	0.00	-	0.00	-
Physics	0.00	-	0.00		0.00		0.00	-	0.00	-	0.00	-
Special Education	42.00	3,031,311	46.00	3,300,335	52.00	3,591,952	6.00	291,617	52.00	4,164,057	0.00	572,105
Substitute Teachers	50.00	129,665	50.00	129,665	50.00	130,368	0.00	703	50.00	151,132	0.00	20,764
Technology	4.00	374,120	3.00	322,131	3.00	306,056	0.00	(16,075)	3.00	354,803	0.00	48,747
Vocational Tech.	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Total Instruction - Teaching Services	**250.00**	**14,199,405**	**261.00**	**14,885,253**	**263.00**	**15,560,511**	**2.00**	**675,258**	**266.00**	**18,233,896**	**3.00**	**2,673,385**
Total Salaries Administration & Instruction	**317.00**	**17,610,302**	**328.00**	**18,463,755**	**330.00**	**19,226,540**	**2.00**	**762,785**	**335.00**	**22,483,827**	**5.00**	**3,257,287**

Budget Statement for Preferred Schematic - Expenditures

Category	2021-2022 FY2022 Staff (FTE)	2021-2022 FY2022 Budget	2022-2023 FY2023 Staff (FTE)	2022-2023 FY2023 Budget	2023-2024 FY2024 Staff	2023-2024 FY2024 Budget	Change from Previous Year Staff (FTE)	Change from Previous Year Budget	Post-Constuction Budget Staff	Post-Constuction Budget Budget	New Facility vs. Current Staff (FTE)	New Facility vs. Current Budget
Employee Benefits												
All employee-related fringe (health insurance, retirement etc)		-		-		-		-		-		-
Materials & Services												
Materials												
Audio-Visual Materials		7,750		7,750		7,750		-		8,984		1,234
Culinary Arts Materials		-		-		-		-		-		-
General Office Supplies		87,050		77,050		78,950		1,900		91,525		12,575
Information technology		-		-		-		-		-		-
Hardware		113,585		170,399		128,670		(41,729)		149,164		20,494
Software		64,887		67,091		43,611		(23,480)		50,557		6,946
Library Materials		17,400		18,900		14,700		(4,200)		17,041		2,341
Non info-tech equipment		11,450		13,450		14,950		1,500		17,331		2,381
Testing Materials & Supplies		2,500		2,500		2,500		-		2,898		398
Textbooks		66,583		57,783		16,150		(41,633)		18,722		2,572
Vocational Program Materials		-		-		-		-		-		-
Total Materials		**371,205**		**414,923**		**307,281**		**(107,642)**		**356,222**		**48,941**
Services												
Athletics		33,209		33,209		33,209		-		38,498		5,289
Attendance		500		500		500		-		500		-
Food Service		-		-		-		-		-		-
Health Services		6,300		6,300		6,300		-		7,303		1,003
Other Student Activities		23,645		23,395		28,650		5,255		33,213		4,563
Psychological Services		74,000		111,800		88,000		(23,800)		102,016		14,016
School Security		-		-		-		-		-		-
Student Transportation		390,312		840,036		1,009,350		169,314		1,249,636		240,286
Total Services		**527,966**		**1,015,240**		**1,166,009**		**(18,545)**		**1,431,166**		**265,157**
Total Material & Services		**899,171**		**1,430,163**		**1,473,290**		**(126,187)**		**1,787,388**		**314,098**
Facility Costs & Capital Improvements												
Facility Costs												
Custodial Supplies		47,400		50,500		51,500		1,000		63,760		12,260
Electricity		279,500		279,500		359,000		79,500		444,463		85,463
Heating Oil		50,000		50,000		50,000		-		61,903		11,903
Maintenance												
Building Security Maintenance		-		-		-		-		-		-
Elevator		-		-		-		-		-		-
Equipment Maintenance		63,650		48,400		48,400		-		59,922		11,522
Exterminating		-		-		-		-		-		-
Facility Maintenance		152,000		181,500		179,470		(2,030)		222,195		42,725
Fire Alarm		-		-		-		-		-		-
Fire Extinguisher Inspection		-		-		-		-		-		-
Generator		-		-		-		-		-		-
HVAC Maintenance		-		-		-		-		-		-
Other		500		500		500		-		619		119
Site Maintenance (Grouds)		16,500		18,500		18,500		-		22,904		4,404
Technology		-		2,352		2,352		-		2,912		560
Trash Removal		20,000		20,000		20,000		-		24,761		4,761
Natural Gas		118,500		118,500		118,500		-		146,710		28,210
Snow Removal		-		-		-		-		-		-
Telephone		30,000		30,000		30,000		-		37,142		7,142
Water/Sewer		58,700		65,400		60,500		(4,900)		74,903		14,403
Total Facility Costs		**836,750**		**865,152**		**938,722**		**73,570**		**1,162,194**		**223,472**
Captial Improvements												

Budget Statement for Preferred Schematic - Expenditures

Category	2021-2022 FY2022 Staff (FTE)	2021-2022 FY2022 Budget	2022-2023 FY2023 Staff (FTE)	2022-2023 FY2023 Budget	2023-2024 FY2024 Staff	2023-2024 FY2024 Budget	Change from Previous Year Staff (FTE)	Change from Previous Year Budget	Post-Constuction Budget Staff	Post-Constuction Budget Budget	New Facility vs. Current Staff (FTE)	New Facility vs. Current Budget
Captial Improvements		-		-		-		-		-		-
Total Facility Costs & Capital Improvements		836,750		865,152		938,722		73,570		1,162,194		223,472
Debt Service												
Short-term		-		-		-		-		-		-
Long-term		-		-		-		-		-		-
Total Debt Service		-		-		-		-		-		-
Total Budget & Staff	317.00	19,346,223	328.00	20,759,070	330.00	21,638,552	2	710,168	335	25,433,409	5	3,794,857

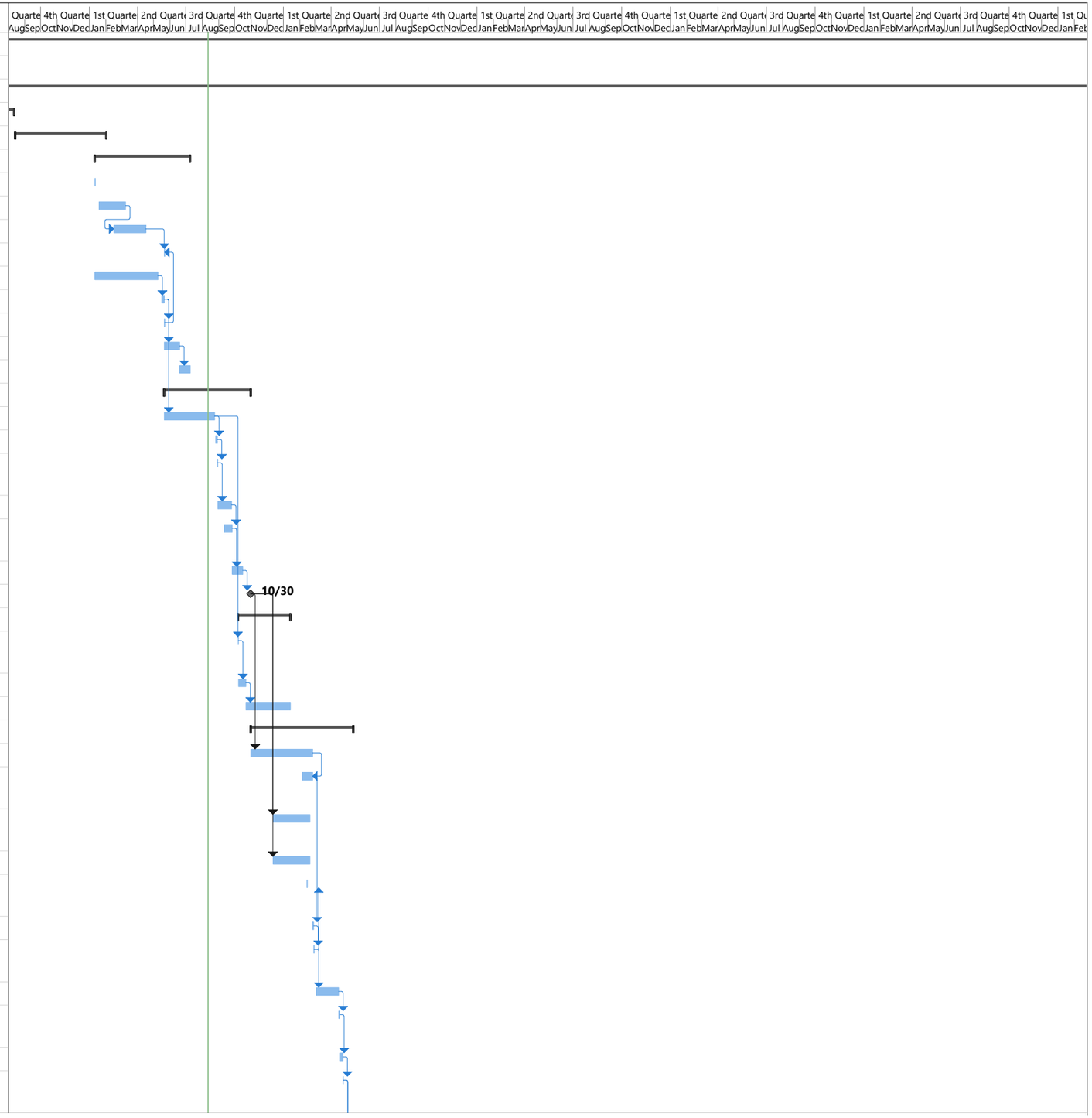
Budget Statement for Preferred Schematic - Revenue

As reported on the school district's most recent three End of Year Pupil and Financial Reports schedule 1, please update to the 3 latest fiscal year periods and report sources of revenue in the fields below.

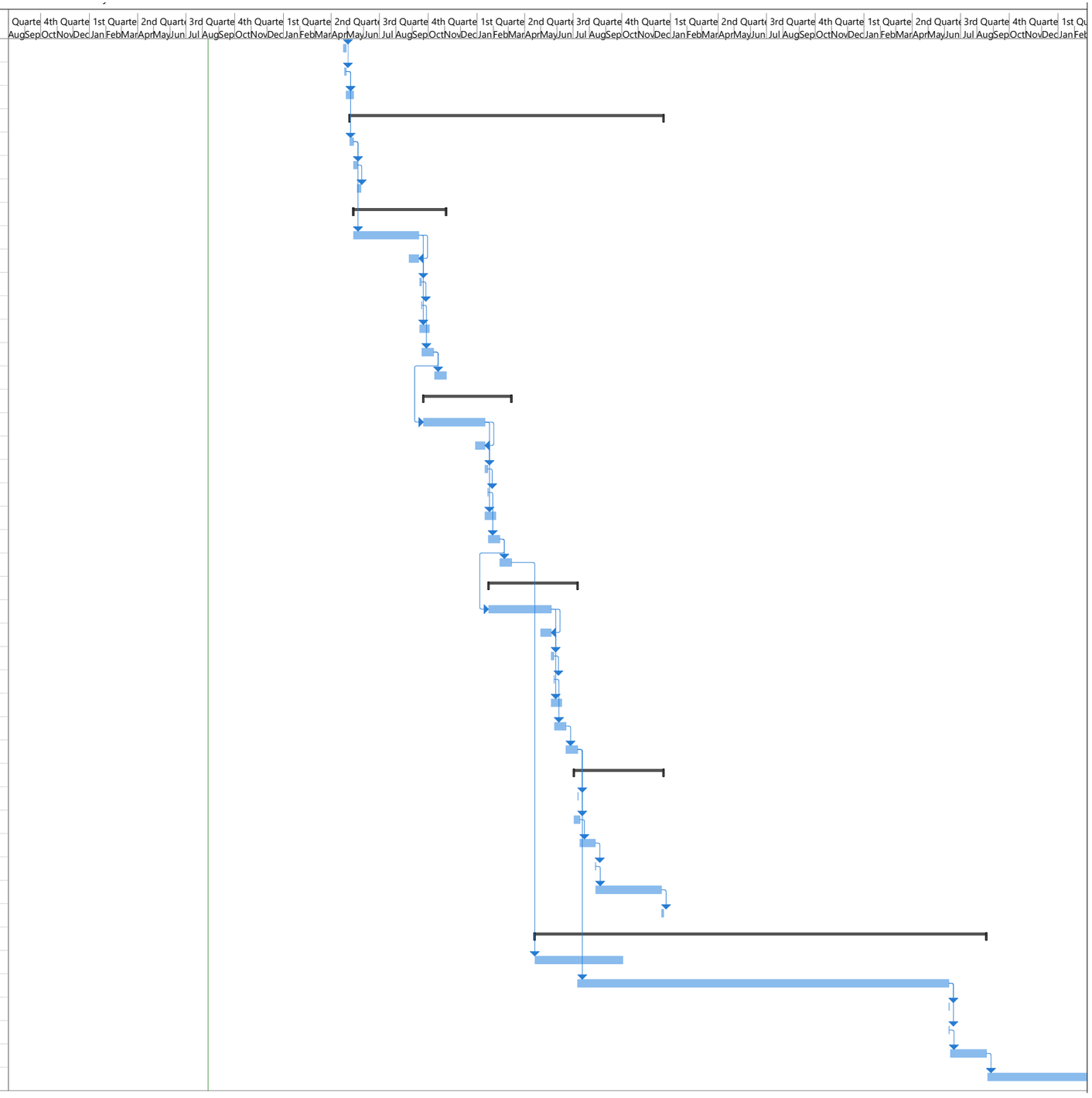
	FY21 End of Year Financial Report							FY22 End of Year Financial Report							FY23 End of Year Financial Report						
	Regular Day	Special Education	C74 Occupational Day	Adult Education	Other Programs	Un-distributed	Total	Regular Day	Special Education	C74 Occupational Day	Adult Education	Other Programs	Un-distributed	Total	Regular Day	Special Education	C74 Occupational Day	Adult Education	Other Programs	Un-distributed	Total
A. Revenue from Local Sources																					
Assessments received by Regional Schools	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E&D Fund Appropriations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuition from Individuals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuition from Other Districts in Comm.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuition from Districts in Other States	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Year Unexpended Encumbrances (Carry Forward)	-	-	-	-	-	31,572	31,572	-	-	-	-	-	13,627	13,627	-	-	-	-	-	2,229	2,229
Transportation Fees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Earnings on Investments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental of School Facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Revenue	-	-	-	-	-	49,149	49,149	-	-	-	-	-	-	-	-	-	-	-	-	113	113
Medical Care and Assistance	-	45,039	-	-	-	-	45,039	-	114,638	-	-	-	-	114,638	-	80,684	-	-	-	-	80,684
Non Revenue Receipts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue From Local Sources	**-**	**45,039**	**-**	**-**	**-**	**80,721**	**125,760**	**-**	**114,638**	**-**	**-**	**-**	**13,627**	**128,265**	**-**	**80,684**	**-**	**-**	**-**	**2,342**	**83,026**
B. Revenue from State Aid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
School Aid (Chapter 70)	-	-	-	-	-	2,986,051	2,986,051	-	-	-	-	-	3,020,731	3,020,731	-	-	-	-	-	3,091,171	3,091,171
Mass School Building Authority - Construction Aid	-	-	-	-	-	1,141,873	1,141,873	-	-	-	-	-	1,075,656	1,075,656	-	-	-	-	-	920,943	920,943
Pupil Transportation (Ch. 71, 71A,71B,74)	-	-	-	-	-	531	531	-	-	-	-	-	15,929	15,929	-	-	-	-	-	34,909	34,909
Charter Tuition Reimbursements & Charter Facilities Aid	-	-	-	-	-	938	938	-	-	-	-	-	26,808	26,808	-	-	-	-	-	-	-
Circuit Breaker	-	1,066,136	-	-	-		1,066,136	-	1,250,617	-	-	-	-	1,250,617	-	1,236,699	-	-	-	-	1,236,699
Foundation Reserve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue From State Aid	**-**	**1,066,136**	**-**	**-**	**-**	**4,129,393**	**5,195,529**	**-**	**1,250,617**	**-**	**-**	**-**	**4,139,124**	**5,389,741**	**-**	**1,236,699**	**-**	**-**	**-**	**4,047,023**	**5,283,722**
C. Revenue from Federal Grants																					
ESE Administered Grants	-	-	-	-	-	283,080	283,080	39,000	-	-	-	-	211,904	250,904	-	-	-	-	-	198,312	198,312
Direct Federal Grants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Federal Grants	**-**	**-**	**-**	**-**	**-**	**283,080**	**283,080**	**39,000**	**-**	**-**	**-**	**-**	**211,904**	**250,904**	**-**	**-**	**-**	**-**	**-**	**198,312**	**198,312**
D. Revenue from State Grants																					
ESE Administered Grants	-	-	-	-	-	37,300	37,300	-	-	-	-	-	7,555	7,555	104,610	-	-	-	-	-	104,610
Other State Grants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue From State Grants	**-**	**-**	**-**	**-**	**-**	**37,300**	**37,300**	**-**	**-**	**-**	**-**	**-**	**7,555**	**7,555**	**104,610**	**-**	**-**	**-**	**-**	**-**	**104,610**
E. Revenue - Revolving & Special Funds																					
School Lunch Receipts	-	-	-	-	-	346,210	346,210	-	-	-	-	-	514,538	514,538	-	-	-	-	-	576,134	576,134
Athletic Receipts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuition Receipts - School Choice	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuition Receipts - Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	950,325	950,325
Other Local Receipts	-	-	-	-	-	53,297	53,297	-	-	-	-	-	181,819	181,819	-	-	-	-	-	162,364	162,364
Private Grants	-	-	-	-	-	-	-	-	-	-	-	-	11,050	11,050	-	-	-	-	-	6,956	6,956
Total Revenue Revolving & Special Funds	**-**	**-**	**-**	**-**	**-**	**399,507**	**399,507**	**-**	**-**	**-**	**-**	**-**	**707,407**	**707,407**	**-**	**-**	**-**	**-**	**-**	**1,695,779**	**1,695,779**
Total Revenue All Sources	**-**	**1,111,175**	**-**	**-**	**-**	**4,930,001**	**6,041,176**	**39,000**	**1,365,255**	**-**	**-**	**-**	**5,079,617**	**6,483,872**	**104,610**	**1,317,383**	**-**	**-**	**-**	**5,943,456**	**7,365,449**

Project Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Neary Project**	**1585 days**	**Mon 4/3/23**	**Fri 4/27/29**	
2		**Module 1 - Eligibility Period**	**22 days**	**Mon 4/3/23**	**Tue 5/2/23**	
5		**Module 2 - Forming the Project Team**	**1563 days**	**Wed 5/3/23**	**Fri 4/27/29**	
6		**Owners Project Manager Selection**	**73 days**	**Wed 5/3/23**	**Fri 8/11/23**	
10		**Designer Selection**	**124 days**	**Mon 8/14/23**	**Thu 2/1/24**	
29		**Module 3.1: Feasibility Study - Preliminary Design Progr**	**128 days**	**Thu 1/11/24**	**Mon 7/8/24**	
30		Kick-off Meeting (District/Project Team and MSBA)	1 day	Thu 1/11/24	Thu 1/11/24	26
31		Educational Planner: Visioning Sessions	36 days	Fri 1/19/24	Fri 3/8/24	
32		Update Educational Plan for MSBA/DESE Review	42 days	Fri 2/16/24	Mon 4/15/24	31FS-16 days
33		Submit Education Plan to MSBA	1 day	Tue 5/21/24	Tue 5/21/24	32,36FF
34		PDP Submittal Development	85 days	Thu 1/11/24	Wed 5/8/24	26
35		**Approval of PDP (SBC Meeting)**	3 days	Thu 5/16/24	Mon 5/20/24	34
36		PDP Submittal to MSBA	1 day	Tue 5/21/24	Tue 5/21/24	35
37		MSBA Review of PDP	21 days	Tue 5/21/24	Tue 6/18/24	35
38		Address PDP Comments (14 Days to Respond)	14 days	Wed 6/19/24	Mon 7/8/24	37
39		**Module 3.2: Preferred Schematic Report**	**117 days**	**Tue 5/21/24**	**Wed 10/30/24**	
40		PSR Submittal Development	69 days	Tue 5/21/24	Fri 8/23/24	35
41		**Approval of PSR (SBC Meeting)**	3 days	Mon 8/26/24	Wed 8/28/24	40
42		PSR Submittal Date to MSBA (no sooner than 8 weeks after PDP) (Need to submit by 8/29 for 10/30)	1 day	Thu 8/29/24	Thu 8/29/24	41
43		MSBA Review of PSR	18 days	Fri 8/30/24	Tue 9/24/24	42
44		Facility Assessment Subcommittee Presentation - either 9/11 or 9/25	11 days	Wed 9/11/24	Wed 9/25/24	43FS-10 days
45		Address MSBA PSR Comments (14 Days to Respond)	14 days	Thu 9/26/24	Tue 10/15/24	44
46		MSBA Board Meeting - PSR Approval	1 day	Wed 10/30/24	Wed 10/30/24	45
47		**Project Delivery Method**	**71 days**	**Mon 10/7/24**	**Mon 1/13/25**	
48		Project Delivery Method options presentation to SBC and vote	1 day	Mon 10/7/24	Mon 10/7/24	40FS+30 days
49		If CM At-Risk, OPM submit applications to Office of Ins	2 wks	Tue 10/8/24	Mon 10/21/24	48
50		OIG review (up to 60 days)	60 days	Tue 10/22/24	Mon 1/13/25	49
51		**Module 4 - Schematic Design (SD)**	**138 days**	**Thu 10/31/24**	**Mon 5/12/25**	
52		SD Preparation	83 days	Thu 10/31/24	Mon 2/24/25	46
53		SD Documents for Cost Estimate/Reconciliation/VE if Required	14 days	Wed 2/5/25	Mon 2/24/25	52FF
54		Designer Proposal - Develop, Review and Finalize with District	50 days	Thu 12/12/24	Wed 2/19/25	46FS+30 days
55		OPM Proposal - Develop, Review and Finalize with Dist	50 days	Thu 12/12/24	Wed 2/19/25	46FS+30 days
56		OPM SD Notification email to MSBA 10 days prior to SD Submission	1 day	Fri 2/14/25	Fri 2/14/25	58FS-10 days
57		**Approval of SD and Budget (Joint Meeting SBC and S(**	2 days	Tue 2/25/25	Wed 2/26/25	53
58		SD Submittal to MSBA (must submit by 2/27 for 4/23 Board Date)	1 day	Thu 2/27/25	Thu 2/27/25	57
59		MSBA SD Review	30 days	Tue 3/4/25	Mon 4/14/25	58FS+2 days
60		MSBA Project Scope & Budget Conference w/ District - Date TBD	2 days	Tue 4/15/25	Wed 4/16/25	59
61		Address MSBA SD Review Comments	4 days	Thu 4/17/25	Tue 4/22/25	60
62		MSBA Board Meeting - Project Scope & Budget (PS&B) Approval - 120 calendar days for Town 's approval of PS&B	1 day	Wed 4/23/25	Wed 4/23/25	61



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
63		MSBA Send PS&B Agreement	3 days	Thu 4/24/25	Mon 4/28/25	62
64		**Town Meeting (April 26, 2025)**	1 day	Sat 4/26/25	Mon 4/28/25	62FS+2 days
65		PS&B Agreement Executed	10 days	Tue 4/29/25	Mon 5/12/25	64
66		**Module 6 - DD/CD**	**424 days**	**Tue 5/6/25**	**Fri 12/18/26**	
67		SBC Vote to Amend OPM and Designer Contracts	5 days	Tue 5/6/25	Mon 5/12/25	64FS+5 days
68		Send amended OPM and Designer Contracts to MSBA	5 days	Tue 5/13/25	Mon 5/19/25	67
69		Schedule MSBA Kick-off Meeting	5 days	Tue 5/20/25	Mon 5/26/25	68
70		**Design Development Phase**	**125 days**	**Tue 5/13/25**	**Mon 11/3/25**	
71		DD develoment	89 days	Tue 5/13/25	Fri 9/12/25	67
72		100% DD to estimators	14 days	Tue 8/26/25	Fri 9/12/25	71FF
73		Approval of 100% DD (SBC Meeting)	3 days	Mon 9/15/25	Wed 9/17/25	72
74		100% DD to MSBA	1 day	Thu 9/18/25	Thu 9/18/25	73
75		Commissioning Agent Comments on 100% DD	14 days	Mon 9/15/25	Thu 10/2/25	71
76		MSBA Reviews 100% DD comments (21 days)	16 days	Fri 9/19/25	Fri 10/10/25	74
77		Address 100% DD Review Comments (21 days)	16 days	Mon 10/13/25	Mon 11/3/25	76
78		**60% CD Phase**	**120 days**	**Mon 9/22/25**	**Fri 3/6/26**	
79		60% CD development	84 days	Mon 9/22/25	Thu 1/15/26	76FS-15 days
80		60% CD to estimators	14 days	Mon 12/29/25	Thu 1/15/26	79FF
81		Approval of 60% CD (SBC Meeting)	3 days	Fri 1/16/26	Tue 1/20/26	80
82		60% CD to MSBA	1 day	Wed 1/21/26	Wed 1/21/26	81
83		Commission Agent Comments on 60% CD	14 days	Fri 1/16/26	Wed 2/4/26	79
84		MSBA Reviews 60% CD comments (21 days)	16 days	Thu 1/22/26	Thu 2/12/26	82
85		Address 60% CD Review Comments (21 days)	16 days	Fri 2/13/26	Fri 3/6/26	84
86		**90% CD Phase**	**120 days**	**Fri 1/23/26**	**Thu 7/9/26**	
87		90% CD development	84 days	Fri 1/23/26	Wed 5/20/26	84FS-15 days
88		90% CD to estimators	14 days	Fri 5/1/26	Wed 5/20/26	87FF
89		Approval of 90% CD (SBC Meeting)	3 days	Thu 5/21/26	Mon 5/25/26	88
90		90% CD to MSBA	1 day	Tue 5/26/26	Tue 5/26/26	89
91		Commissioning Agent Comments on 90% CD	14 days	Thu 5/21/26	Tue 6/9/26	87
92		MSBA Reviews 90% CD comments (21 days)	16 days	Wed 5/27/26	Wed 6/17/26	90
93		Address 90% DD Review Comments (21 days)	16 days	Thu 6/18/26	Thu 7/9/26	92
94		**100% CD/ Bid Package Activities**	**121 days**	**Fri 7/3/26**	**Fri 12/18/26**	
95		100% CD to CM	1 day	Fri 7/10/26	Fri 7/10/26	93
96		Advertisement for Filed Sub-Trades	7 days	Fri 7/3/26	Mon 7/13/26	93FS-5 days
97		Filed Sub-Trade Bidding	21 days	Tue 7/14/26	Tue 8/11/26	96
98		Filed Sub-Trade Bids due	1 day	Wed 8/12/26	Wed 8/12/26	97
99		Establish GMP and Finalize GMP	88 days	Thu 8/13/26	Mon 12/14/26	98
100		SBC approval of final GMP	4 days	Tue 12/15/26	Fri 12/18/26	99
101		**Module 7 Construction (assume CM at Risk)**	**610 days**	**Mon 4/20/26**	**Fri 8/18/28**	
102		Early Bid Packages	120 days	Mon 4/20/26	Fri 10/2/26	85FS+30 days
103		Construction	500 days	Fri 7/10/26	Thu 6/8/28	93
104		Substantial Completion	1 day	Fri 6/9/28	Fri 6/9/28	103
105		TCO	1 day	Fri 6/9/28	Fri 6/9/28	103
106		Move-In	50 days	Mon 6/12/28	Fri 8/18/28	105
107		Module 8 Close-Out	180 days	Mon 8/21/28	Fri 4/27/29	106



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3.3.5 LOCAL ACTIONS AND APPROVALS

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Please find the certified Local Actions and Approvals Certification on the following pages. The Neary Building Committee (NBC) membership has not changed. The meeting minutes for all Neary Building Committee Meetings that have occurred since the submission of the PDP are included in Appendix J.

In addition to the Neary Building Committee Meetings, subsets of the NBC, including the Working Group, the Sustainability Subcommittee, the Finance Subcommittee, and the Communications Subcommittee, met weekly during the development of the Preferred Schematic Report phase (PSR).

Finally, a community forum was held on June 25. A second community forum is to be scheduled after the submission of the PSR.

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TOWN OF SOUTHBOROUGH

TOWN HOUSE · 17 COMMON STREET · SOUTHBOROUGH, MASSACHUSETTS 01772-1662
(508) 485-0710

August 27 2024
Mr. Michael McGurl
Director of Capital Planning
40 Broad Street
Boston, MA 02109

Dear Mr. McGurl:

At its meeting on Monday August 26th, 2024 the Neary School Building Committee voted the following:

The Neary School Building Committee voted unanimously to authorize Skanska to submit the Preferred Schematic Report to the Massachusetts School Building Authority on behalf of the Neary School Building Committee.

Motion by: Jason Malinowski
Second by: Denise Eddy

Roll call:
For: Roger Challen, Kathryn Cook, Mark Davis, Denise Eddy, Christopher Evers, Andrew Pfaff, Jason Malinowski
Opposed: None
Abstained: None

Respectfully submitted:

Jason Malinowski, Chair
Neary School Building Committee

MELANIE OTSUKA
Notary Public
Commonwealth of Massachusetts
My Commission Expires
April 1, 2027

Town of Southborough

TOWN HOUSE · 17 COMMON STREET · SOUTHBOROUGH, MASSACHUSETTS 01772-1662
(508) 485-0710

Module 3 Local Actions and Approval Certification

August 26, 2024

Mr. Michael McGurl
Director of Capital Planning
40 Broad Street
Boston, Massachusetts 02109

Dear Mr. Gurl:

The Town of Southborough Margaret Neary Elementary School Building Committee ("NBC") has completed its review of the Feasibility Study Preferred Schematic Report (PSR) for the Margaret Neary Elementary School project (the "Project"), and on August 26, 2024, the NBC voted to approve and authorize the Owner's Project Manager to submit the Feasibility Study PSR related materials to the MSBA for its consideration.

A certified copy of the NBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, are attached.

Please find below a complete list of the Margaret Neary Elementary School Building Committee meetings held to discuss and/or present to the public material related to the Project. Most meetings were held Remotely with Zoom Technology and in person and all notices posted by the Margaret Neary Elementary School NBC on their website:

https://www.southboroughma.gov/AgendaCenter

Since the last submission on May 21, 2024, the NBC has held **11** meetings regarding the proposed project, in compliance with the state Open Meeting Law. Additionally, the NBC held **1** virtual community public forum. These meetings include:

June 03, 2022, Remote Zoom Technology at 7:00pm – MEETING #1

- Subcommittee Reports
  - Finance Subcommittee
  - Communications Subcommittee
  - Sustainability Subcommittee
- Skanska / Arrowstreet Updates
  Review of PSR Process

Overview of schedule /decision points

- Committee votes and discussion on which scenarios to further study
    - Base repair
        - Jason Malinowski moved, Kathryn Cook seconded, and it was unanimously voted by roll call, "To remove options A1 and A2 base repair at the Neary School and Woodward School for future consideration."
    - New Construction – Woodward
        - Jason Malinowski moved, Andrew Pfaff seconded, and it was unanimously voted by roll call, "To remove options C3 and C5, which is the 450 and 610 student population, for New Construction at the Woodward School."
    - Add/renovation at Neary including cost/benefit discussion
        - Jason Malinowski moved, Kathryn Cook seconded, and voted 6-0-0 by roll call, "To remove options B2, 450 student expansion or renovation at Neary School, B3, 450 addition or renovation at Woodward School, and C2, 450 new construction at Neary School."
    - New construction at Neary with 305, 450, and 610 enrollment
        - Jason Malinowski moved, Mark Davis seconded, and it was unanimously voted by roll call, "To remove B1, 305 student addition or renovation at Neary School, and B5, addition or renovation for 610 students at Woodward School."
    - Woodward – analysis of using for Pre-K through 2 (or some combination thereof), if three or four grade school at Neary
        - The Committee has removed the three-grade option at Neary School. The Arrowstreet team will provide estimated costs for Neary School to have a four-grade configuration.
- Arrowstreet – Review of Square Footage and Space Summary Templates
- Skanska/Arrowstreet – Discussion of process to finalize program

June 17, 2022, Remote Zoom Technology at 7:00pm – MEETING #2

- Subcommittee Reports
    - Finance Subcommittee
    - Communications Subcommittee
    - Sustainability Subcommittee
- Skanska / Arrowstreet Updates
    - Space Summary / Square Footage Update
    - Site Review
        - Regulatory Requirements
        - Septic
        - Underground Exploration (Geotech/Geoenvironmental/Water)
        - Landfill
- Open Forum Update and Plans

June 24, 2024: Remote Zoom Technology at 6:00pm – MEETING #3

- Subcommittee Reports
    - Finance Subcommittee
    - Communications Subcommittee
- Sustainability Subcommittee Presentation and update from meetings
    - Site Studies – Follow-up from prior meeting
    - Swing space availability

    - Woodward Concept Studies
    - Update program requirements
    - Schedule review/update
- Skanska / Arrowstreet Updates
- Open Forum Planning

July 8, 2024, Remote Zoom Technology at 7:00pm – MEETING #4

- Subcommittee reports
    - Finance Subcommittee
    - Communications Subcommittee
    - Sustainability Subcommittee
- Debrief from Open Forum
- Skanska/Arrowstreet Updates
    - Site Analysis
    - Review of latest program requirements and square footage
    - Cost estimate updates
    - Update on Neary contingency plans during construction
    - Updated planning studies of add/reno and new construction themes
    - Schedule review and next steps

July 15, 2024, Remote Zoom Technology at 7:00pm – MEETING #5

- Subcommittee Reports
    - Finance Subcommittee
    - Communications Subcommittee
    - Sustainability Subcommittee
- Presentation from School Administration on plans for Neary students during construction. Keith Lavoie, Assistant Superintendent of Operations, presented the Neary Relocation Proposal. It has been clear that the entire Neary School site will be required for the project from June 2026 to August 2028. The relocation of the Superintendent's Office is still unknown.
- Skanska/Arrowstreet Updates
    - Site Analysis
    - Review of latest program requirements and square footage
    - Cost estimate updates
    - Updated Planning studies of add/reno and new construction themes
    - Schedule review and next steps

July 18, 2024, Remote Zoom Technology at 7:00pm – MEETING #6

- Subcommittee Reports
    - Finance
    - Communication Subcommittee
    - Sustainability Subcommittee
- Skanska/Arrowstreet Updates
    - Site Analysis
    - Review of latest program requirements on square footage
    - Cost estimate updates
    - Update planning studies of add/reno and new construction themes including feedback from school administration

July 22, 2024, Remote Zoom Technology at 9:00am - MEETING #7 – Joint meeting with Southborough K-8 School Committee

- Project update presentation to Southborough K-8 School Committee
- Superintendent Martineau presented on the relocation plan for the Neary School during construction. He mentioned that the school administration leadership team prefers not to have any on-site presence during the construction project. The plan is to relocate students to Finn School and Woodward School and the Northborough preschool students will be relocated back to Northborough.
    - Motion to support relocation plan by Southborough K-8 School Committee
    - Chelsea Malinowski moved, Laura Kauffmann seconded, and it was unanimously voted by roll call, "The Southborough School Committee supports the relocation plan as presented by the school administration."

July 22, 2024, Remote Zoom Technology at 7:30pm - MEETING #8 – Joint meeting with Southborough K-8 School Committee and Board of Health

- Tim Thies with Pare Corporation presented on the Parkerville landfill. Mr. Thies stated that since the closure of the landfill in the 1990's, the Town has conducted and will continue to conduct the required monitoring and inspections. Mr. Thies mentioned that the locations around the landfill that they have been monitoring, particularly for landfill gas, have shown almost entirely non-detect results. William Cundiff, Department of Public Works Superintendent, stated that DPW allocates an annual operating budget for a consultant to conduct the post-closure monitoring and inspections.
- Skanska/Arrowstreet Updates
    - The latest program requirements and square footage were reviewed. Superintendent Martineau and Stefanie Reinhorn, Assistant Superintendent of Teaching and Learning, presented on the potential space adjustments.
    - Andrew Plumb, Arrowstreet, reviewed the C.4.A – New Construction, 610 enrollment option and compared this option with the C.4.B option.
    - Arrowstreet presented on the updated planning studies of add/reno and new construction options.
- Vote on options to send for cost estimation
    - Jason Malinowski moved, Kathryn Cook seconded, and it was voted 4-3-0 (Kathryn Cook, Mark Davis, and Roger Challen Opposed), "to direct Arrowstreet to cost out the two story configuration."
    - Mark David moved, Roger Challen seconded, and it was unanimously voted by roll call, "To eliminate the auditorium for any consideration of cost estimating and allow the design team, if they need to make slight modifications to solidify the design, without the auditorium, they can do that."
    - Jason Malinowski moved, Kathryn Cook seconded, and it was unanimously voted by roll call, "for the purposed of cost estimating option C4.B is in bravo."

August 12, 2024: Southborough Public Safety Facility – 32 Cordaville Road, First Floor Training Room at 6:00pm – MEETING #9

- Financial Cost Presentation
    - The project costs for the three options were presented. The three options were B.4 – Additional/Renovation, 610 enrollment, C.1 – New Construction two-grade 305 enrollment, or C.4 – New Construction four-grade configuration 610 enrollment. Kathryn Cook reviewed the estimated five-year budget for the Town of Southborough.
- Deliberation and vote on preferred schematic design to put forth to MSBA. Jason Malinowski asked for a discussion and a vote.
    - Motion to approve preferred schematic design to put forth to MSBA.

- Kathryn Cook moved, Roger Challen seconded, and it was unanimously voted by roll call, "To bring forth to the MSBA the new four-grade school option C.4."

August 19, 2024: Remote Zoom Technology at 7:00pm – MEETING #10
The Neary School Building Committee reviewed the draft Preferred Schematic Report and provided their comments to provide feedback to the Skanska and Arrowstreet team. The team will return another draft to the Committee.

August 26, 2024: Remote Zoom Technology at 8:00am – MEETING #11
The Neary School Building Committee voted unanimously to authorize Skanska to submit the Preferred Schematic Report to the Massachusetts School Building Authority on behalf of the Neary School Building Committee.

Public Forum on June 25, 2024 (Live and recording posted on website)
Virtual at 8:00pm via Zoom
Topics of discussion:

- Status Update of Project and Respond to Questions

In addition to the NBC meetings listed above, the district held additional public meetings, which were posted in compliance with the state Open Meeting Law, at which the Project was discussed. These meetings include:

Sustainability Subcommittee on June 5, 2024 at 1:00pm: Remote Zoom Technology
Arrowstreet presented on LEED verse CHPS certification for the project. The subcommittee discussed and decided to bring the recommendation of adopting LEED certification for the project back to the Neary School Building Committee. Arrowstreet also presented on the certification requirements by the MSBA, and code compliance pathway.

Sustainability Subcommittee on June 14, 2024 at 10:00am: Remote Zoom Technology
Arrowstreet presented on four HVAC systems options for the Specialized Code Compliance 3% reimbursement from the MSBA. The subcommittee decided to proceed with option one, Ground – Water Heat Pump Chiller Heating Plant, for the HVAC system and keep option four, Air-Water Heat Pump Chiller / Heating Plant, as backup.

Finance Subcommittee on May 29, 2024 at 7:30pm: Remote Zoom Technology
All the financial aspects of potential site remediation costs and debt financing were discussed.

Finance Subcommittee on June 26, 2024 at 1:15pm: Remote Zoom Technology
All the financial aspects of the proposed project including estimated Town budget impact, impact of potential site remediation costs, and debt financing were discussed.

Finance Subcommittee on August 9, 2024 at 1:00pm: Remote Zoom Technology

- All the financial aspects of the proposed project including current estimate project costs for all three scenarios – B.4, C.1, and C.4 were discussed.
- Estimated impact of the estimated cost of the three scenarios on all aspects of the Town budget including the projected impact on the real estate levies for the next five fiscal years were discussed.

Communications Subcommittee on June 10, 2024 at 10:30am: Remote Zoom Technology

- It was discussed and agreed that the initial press release will include all project options.
- Protocols for committee members making statements/updates other boards.

    - Motion moved by Jason Malinowski, Denise Eddy seconded and it was unanimously voted by roll call to approve The Communication Subcommittee recommend that for member updates to other boards or Committees, a prepared statement from the Communication Subcommittee be used for purposes of that discussion to ensure consistency and/or a posted meeting of the Neary Building Committee and/or Communication Subcommittee depending upon the member makeup be posted for the same reason."
- Review of new FAQs for posting.
    - Motion moved by Jason Malinowski, Roger Challen seconded and it was unanimously voted by roll call, "The Subcommittee authorizes the chair to post, as a response to a frequently asked question, the statement that was read early in the meeting. With the understanding that it will be updated upon further action by the School Committee or School Committee Capital Committee".

Communications Subcommittee on July 26, 2024 at 9:00am: Remote Zoom Technology

- The communication plans for the August 12th vote and after the August 12th vote were discussed.
- Jason Malinowski will create a survey with the school administration on the survey for the 2 verse 4 grade school cost. The survey will be distributed to the community through social media and by providing paper copies in various locations.

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§ 18-25 and 940 CMR 29 *et seq*.

If you have any questions or require any additional information, please contact Jason Malinowski, Chair of Neary School Building Committee jmalinowski@southboroughma.com.

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: Mark Puyple

Title: Chief Executive Officer

Date: 8/26/2024

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: Gregory Martineau

Title: Superintendent of Schools

Date: 8.26.24

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: Chelsea Malinowski

Title: Chair of the School Committee

Date: 8/26/24

Arrowstreet inc.
10 post office square
suite 700n
boston ma 02109
617.623.5555

arrowstreet.com