

# Horace Mann Elementary School

Schematic Design Phase

## DRC / SBC Meeting

March 13, 2024





# Agenda

## Final Schematic Design Summary:

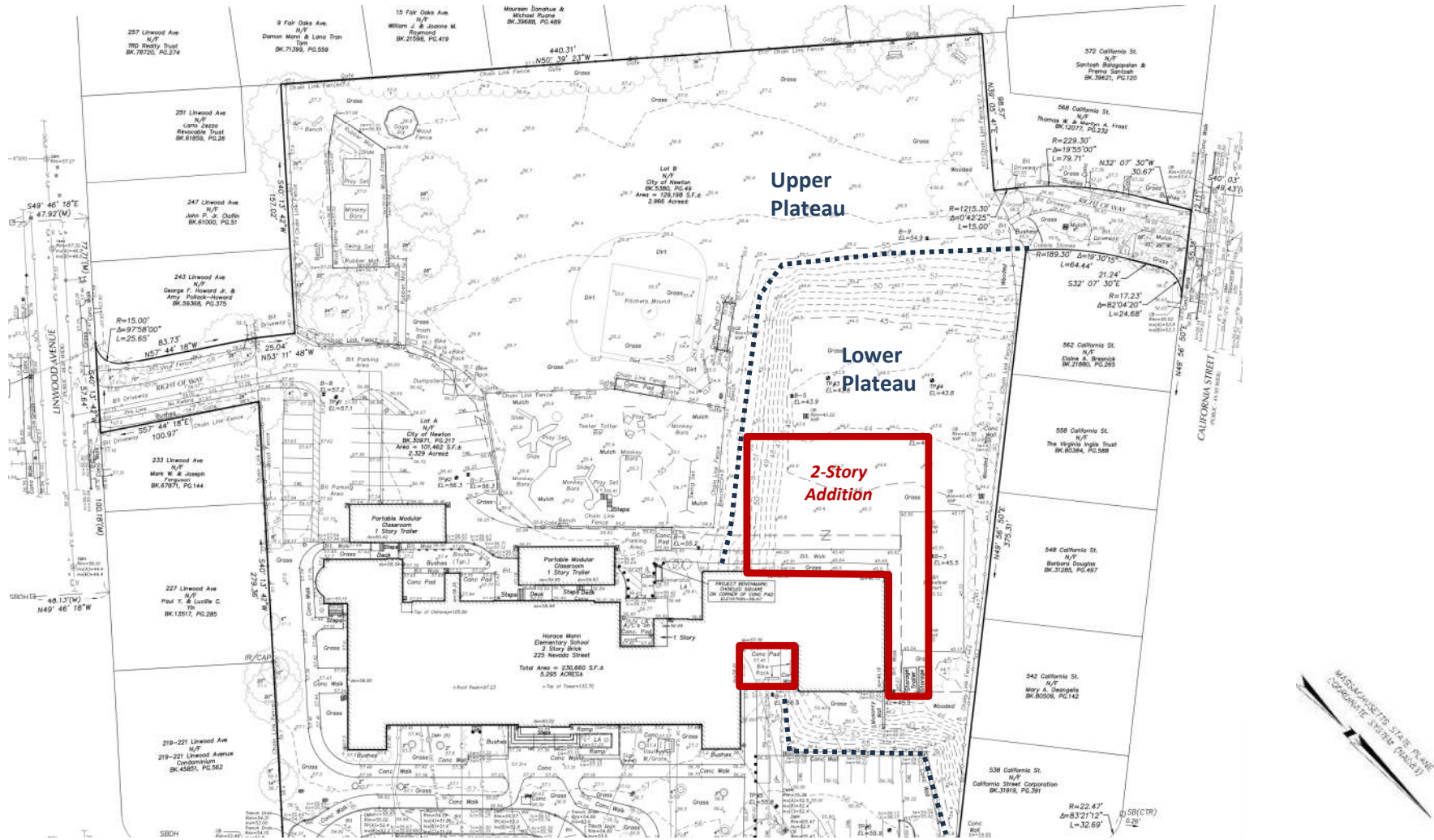
- **Programming & Design**
  - Space Program
  - Massing
- **Site Improvements**
  - Access, Parking and Traffic
  - Stormwater
  - Exterior Lighting
  - Accessibility
- **Building Systems**
  - Structural & Geotechnical
  - Building Envelope & Sustainability
  - MEP Systems



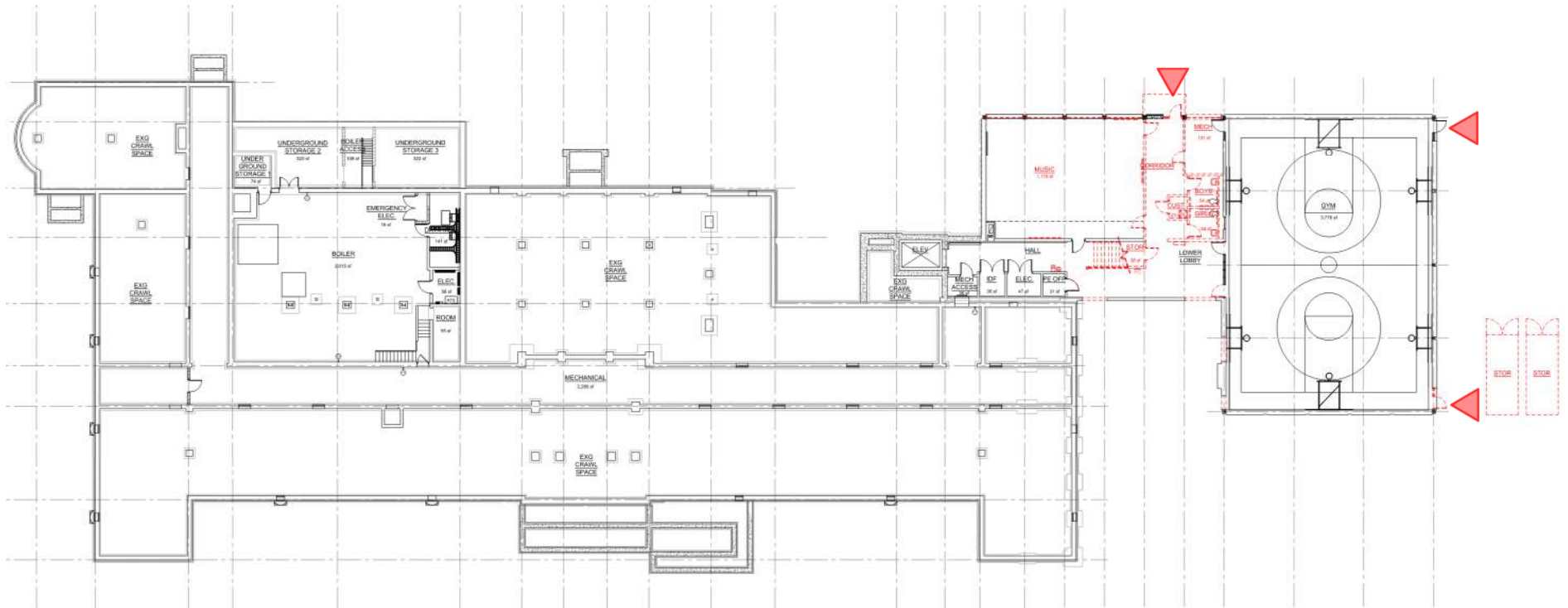
# Programming & Design



## Existing Site Conditions



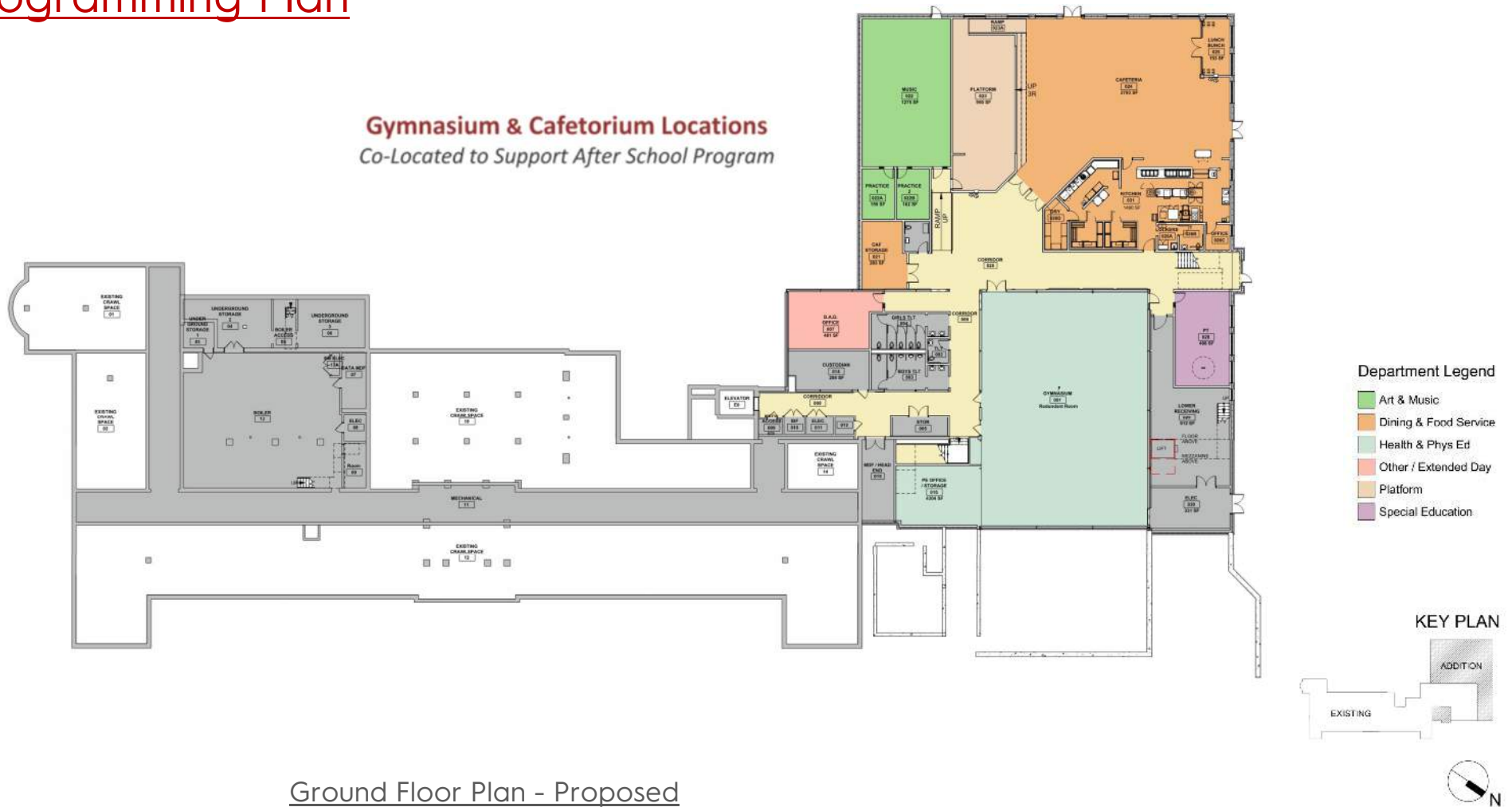
## Existing Conditions / Demolition



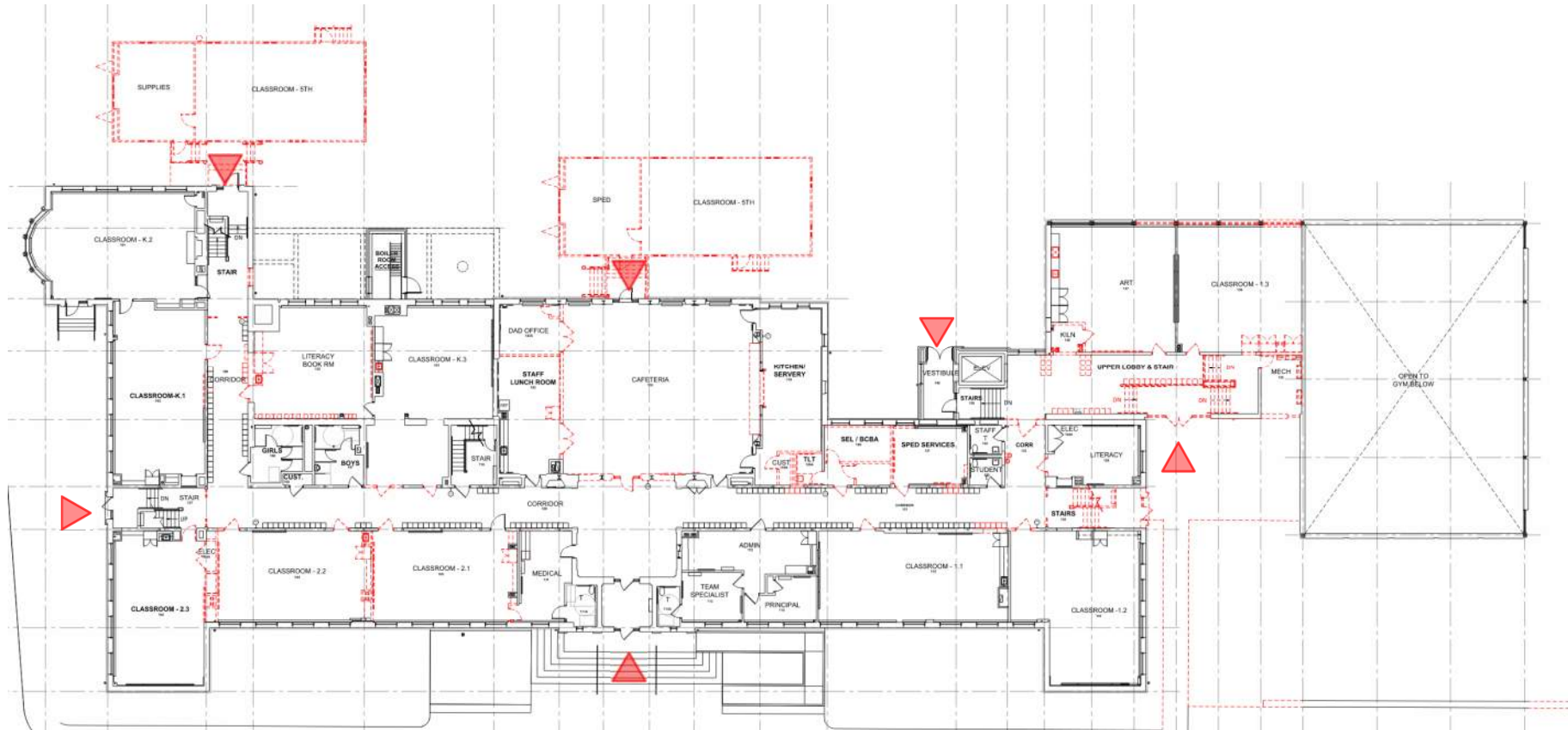
Ground Floor Plan

# Ground Floor Programming Plan

## **Gymnasium & Cafetorium Locations** *Co-Located to Support After School Program*



## Existing Conditions / Demolition

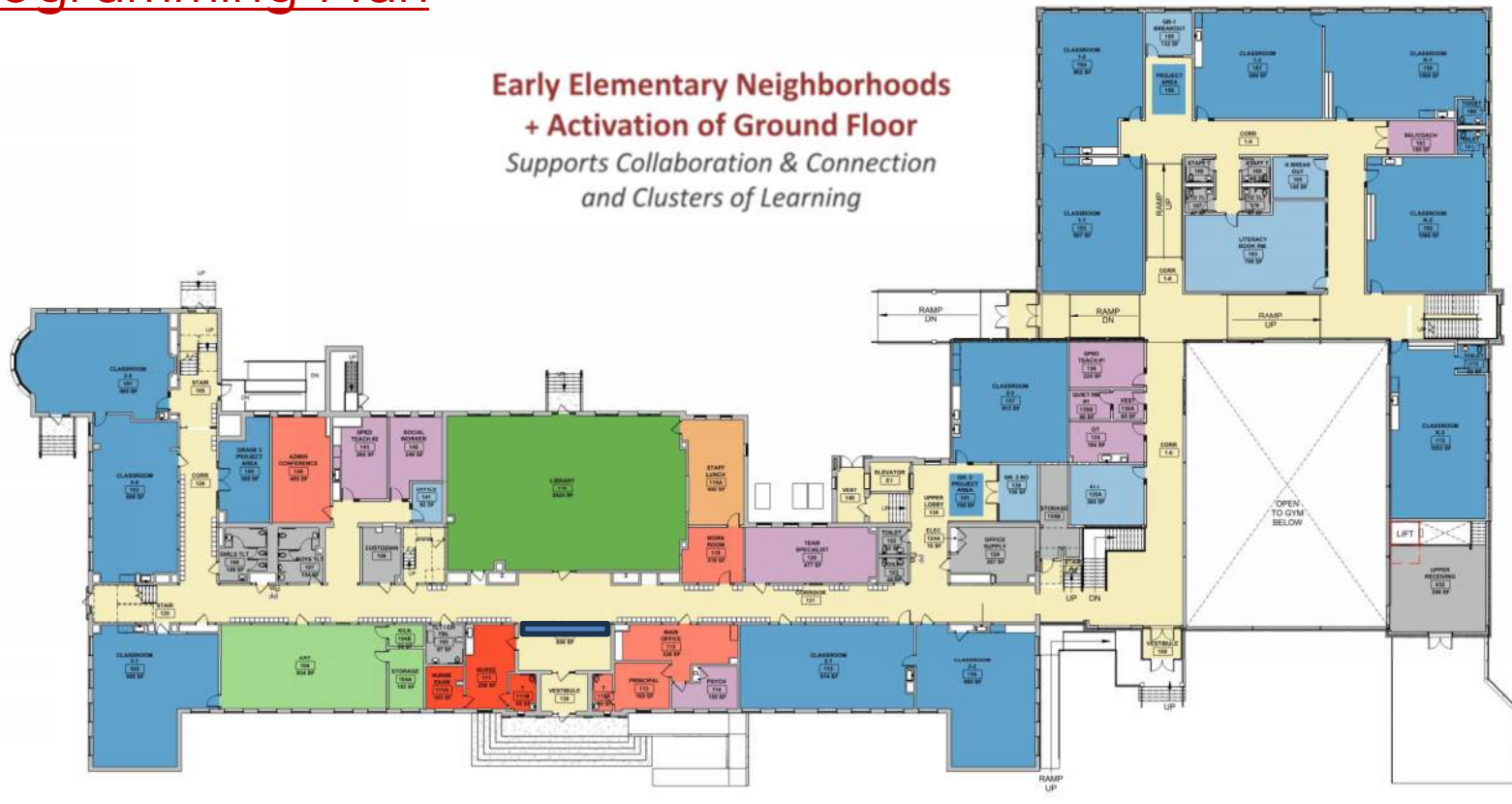


First Floor Plan



# First Floor Programming Plan

**Early Elementary Neighborhoods  
+ Activation of Ground Floor**  
*Supports Collaboration & Connection  
and Clusters of Learning*



## Department Legend

- Admin & Guidance
- Art & Music
- Core Academic Spaces
- Dining & Food Service
- Media Center
- Medical
- Special Education
- Support Services

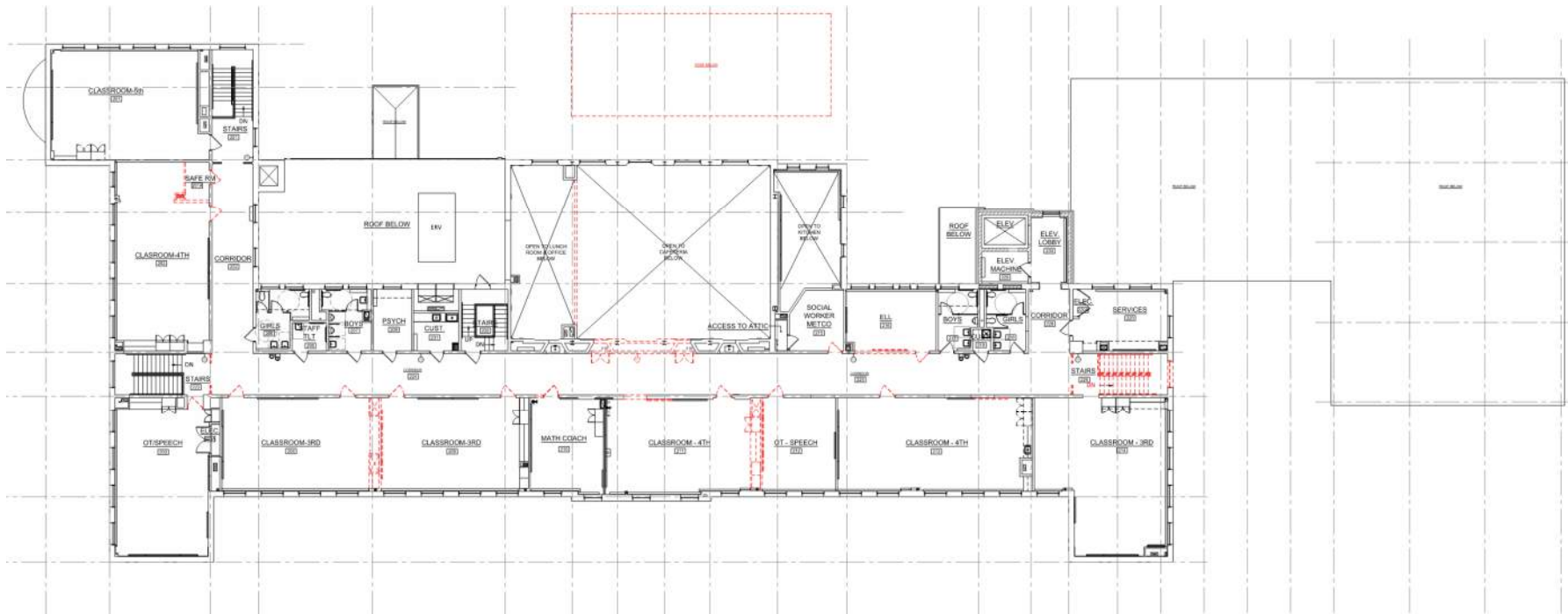
## KEY PLAN



**New Entry & Early Elementary Neighborhood**  
*Supports Welcoming Arrival*

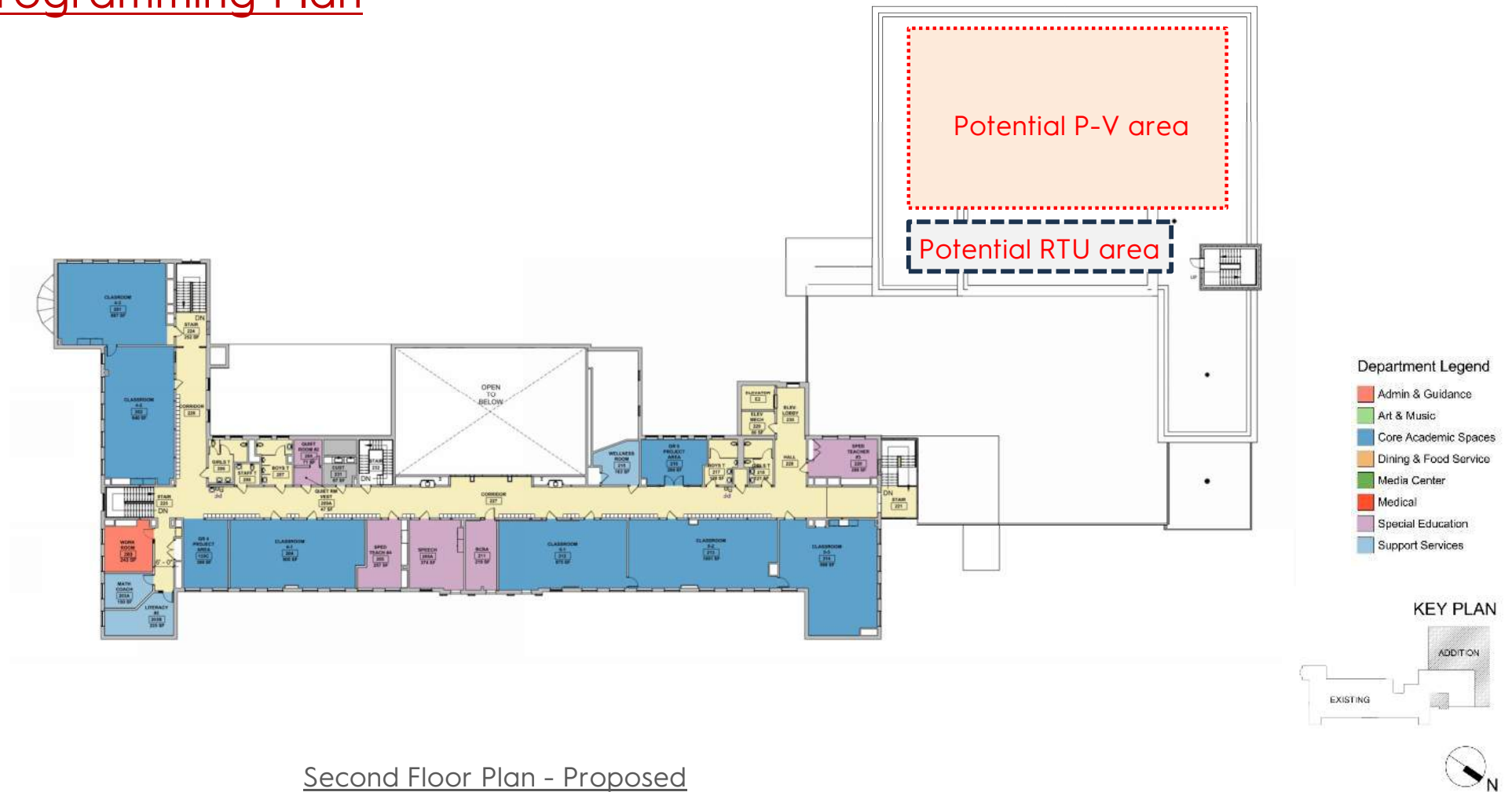
First Floor Plan - Proposed

## Existing Conditions / Demolition



## Second Floor Plan

## Second Floor Programming Plan



Second Floor Plan - Proposed

Horace Mann		Existing Conditions					SD Option D.9.3		
	ROOM TYPE	Location	ROOM NFA <sup>1</sup>	# OF RMS	Area Totals		DESIGN PROGRAM	Final Location	Square Footage at Completion

**LITERACY CENTER / BOOK ROOM** - While the space as shown at 766sf is below the target value of 900sf, this was discussed with and approved by the HM team. The smaller size is partially offset by the slightly oversized Literacy Specialist space which is 222sf versus the 175sf goal.

Literacy #1: Literacy Center / Book Room	Rm 142	704	1	704	900	Addition	766
Literacy #2: Literacy Specialist	Rm 124	269	1	269	175	Exist. Library	222

**GYMNASIUM** - This was something we discussed early and often. Mark and his team felt that the gym was adequate, but that additional storage and a PE office would be needed. You'll see that we were generous with the PE office/storage at 474sf which is larger than what we have at Angier, Zervas, Cabot, Countryside, Franklin, and Lincoln-Eliot.

<b>HEALTH &amp; PHYSICAL EDUCATION</b>				3,776	6,300		4,250
Gymnasium	Rm 001	3,776	1	3,776	6,000		3,776
Gym Storeroom	n/a	—			175	Small Addition	474
Health Instructor's Office	Rm 012	—			125	included in above	

**CAFETERIUM** - The cafe is shown at 2,793sf, but lunch bunch at 153sf should be added to this size for comparison to the MSBA size recommendations. The total cafe size of 2,946sf for HM compares to the MSBA target of 2,970sf.

This wasn't done to shortchange HM by 24sf, but rather to align the cafe dimensions with the rest of the addition. We strived to maintain the cafe as close to the 2,970sf as possible because the gym is on the smaller end so that it can host large events.

<b>DINING &amp; FOOD SERVICE</b>				2,756	6,200		6,069
Cafeteria / Dining	Rm 118	1,838	1	1,838	2,970	Addition	2,793
Lunch Bunch	n/a	—			150	Addition	153

**PRINCIPAL'S OFFICE** - In the MSBA space guideline, this space is called "Principal's Office with Conference Area." This is why the space would normally be 375sf-425sf. For HM, you'll notice that while the Principal's Office is 169sf, the conference room is 180% oversized at 405sf which helps make this plan work. This was reviewed with Mark and he is supportive.

<b>ADMINISTRATION &amp; GUIDANCE</b>				1,172	1,713		2,199
Principal's Office	Rm 114	155	1	155	375	Rm 113	169
Conference Room	n/a	—			225	Rm 120 - 121	405

Like all Newton projects, the numbers will change slightly as we move the design forward. This means that we have the flexibility to refine the design and space sizes as we advance the design. We will keep the SC updated as the design advances through the various stages.



## Front Accessible Entrance to Stair Addition





## Front Accessible Entrance to Stair Addition





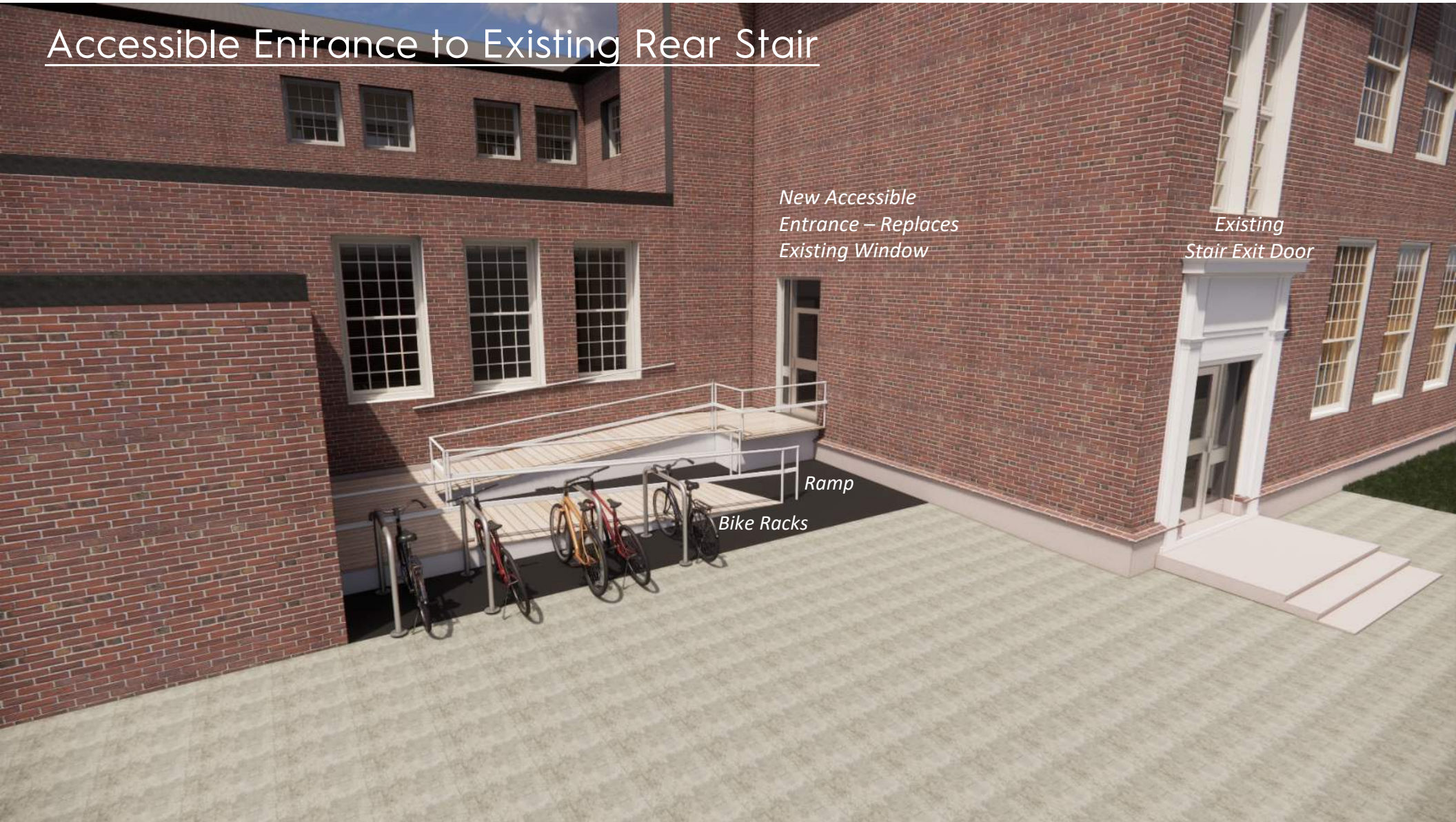
## Accessible Entrance to Existing Rear Stair

*New Accessible  
Entrance – Replaces  
Existing Window*

*Existing  
Stair Exit Door*

*Ramp*

*Bike Racks*





## Rear Entrance to Addition



## Rear Entry Ramp





## Cafeteria





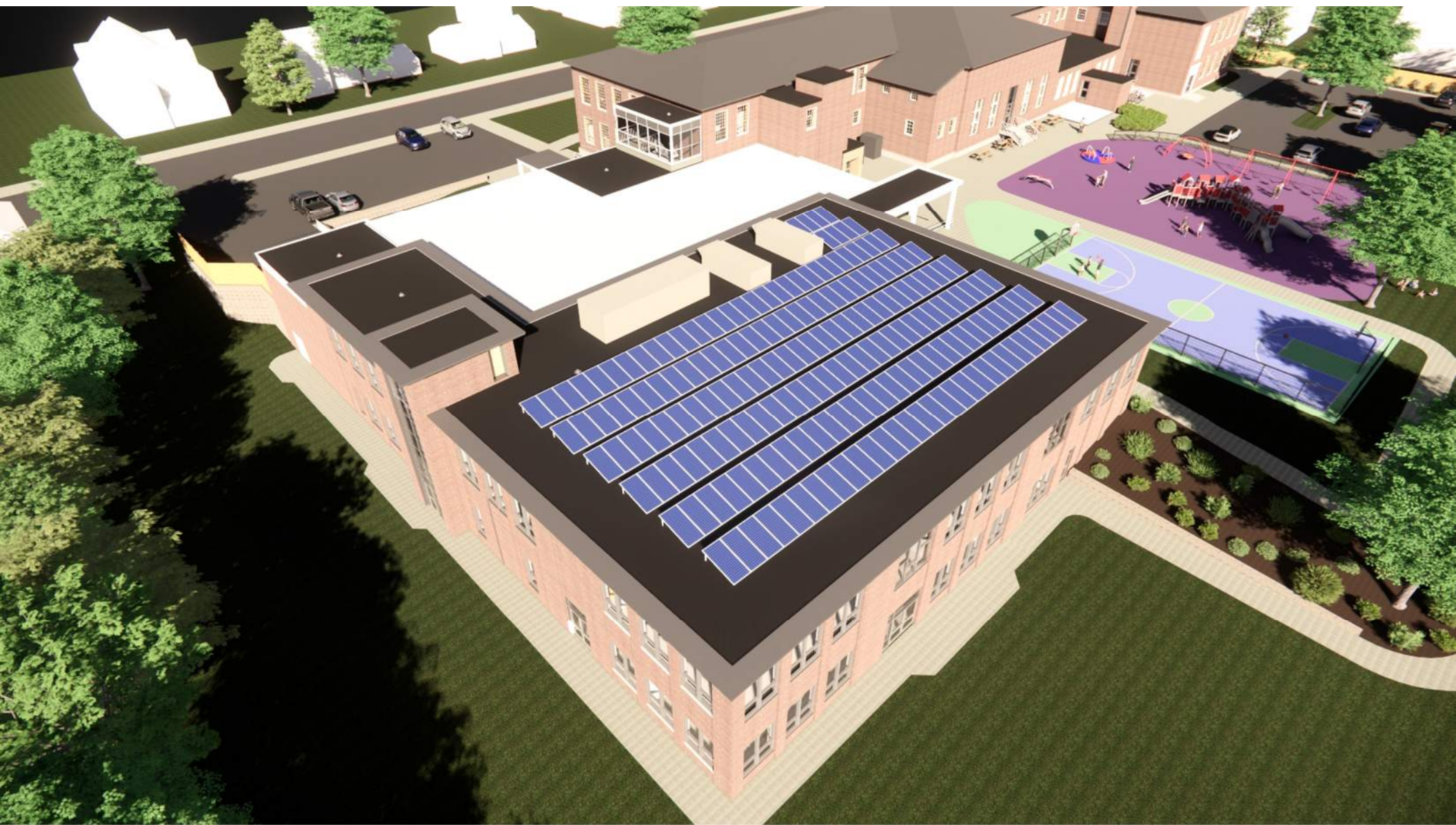
# Cafeteria













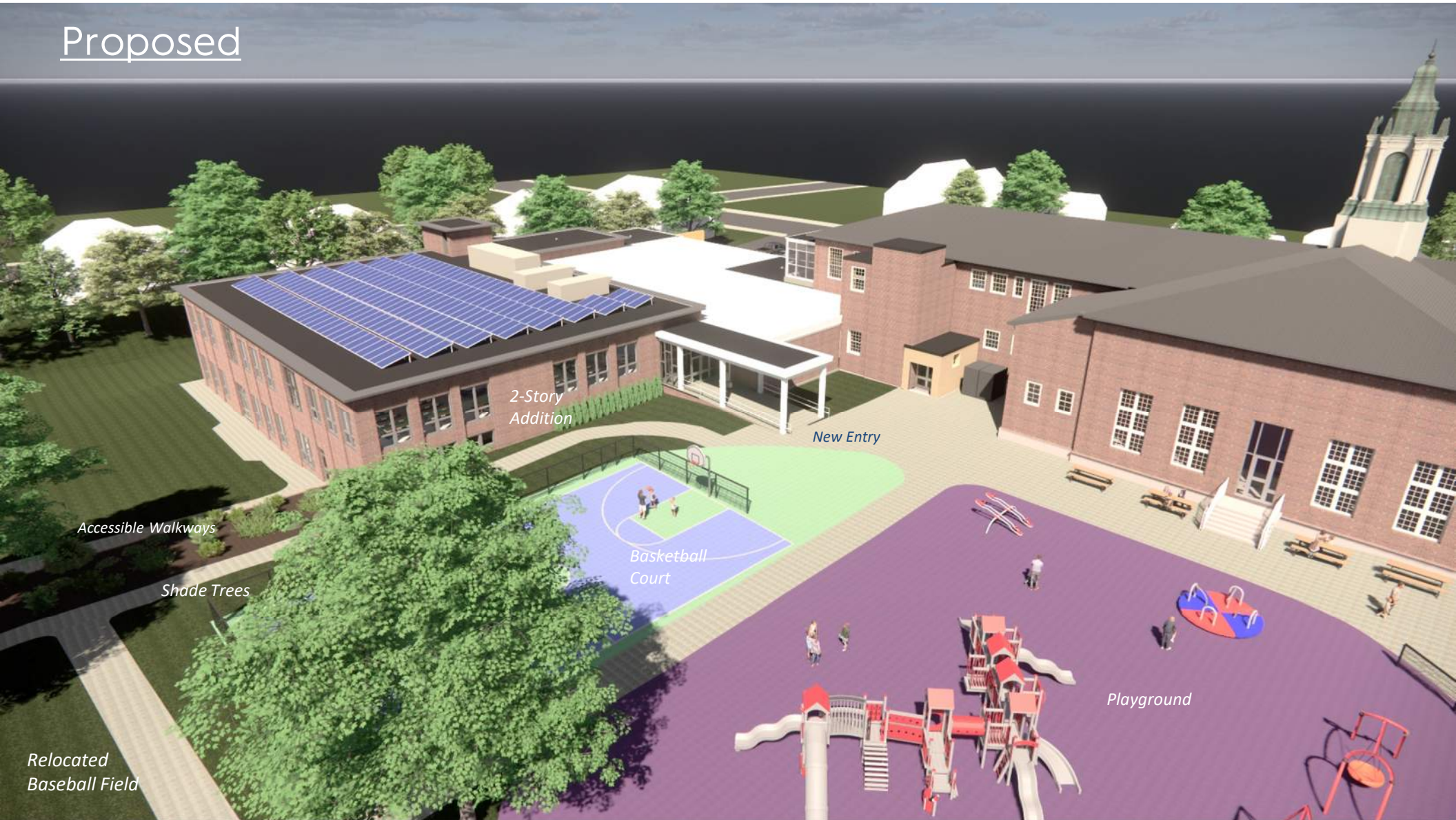
Existing



225 Nevada St



# Proposed





## Site Design / Site Plan Approval

Access, Parking and Traffic

Stormwater

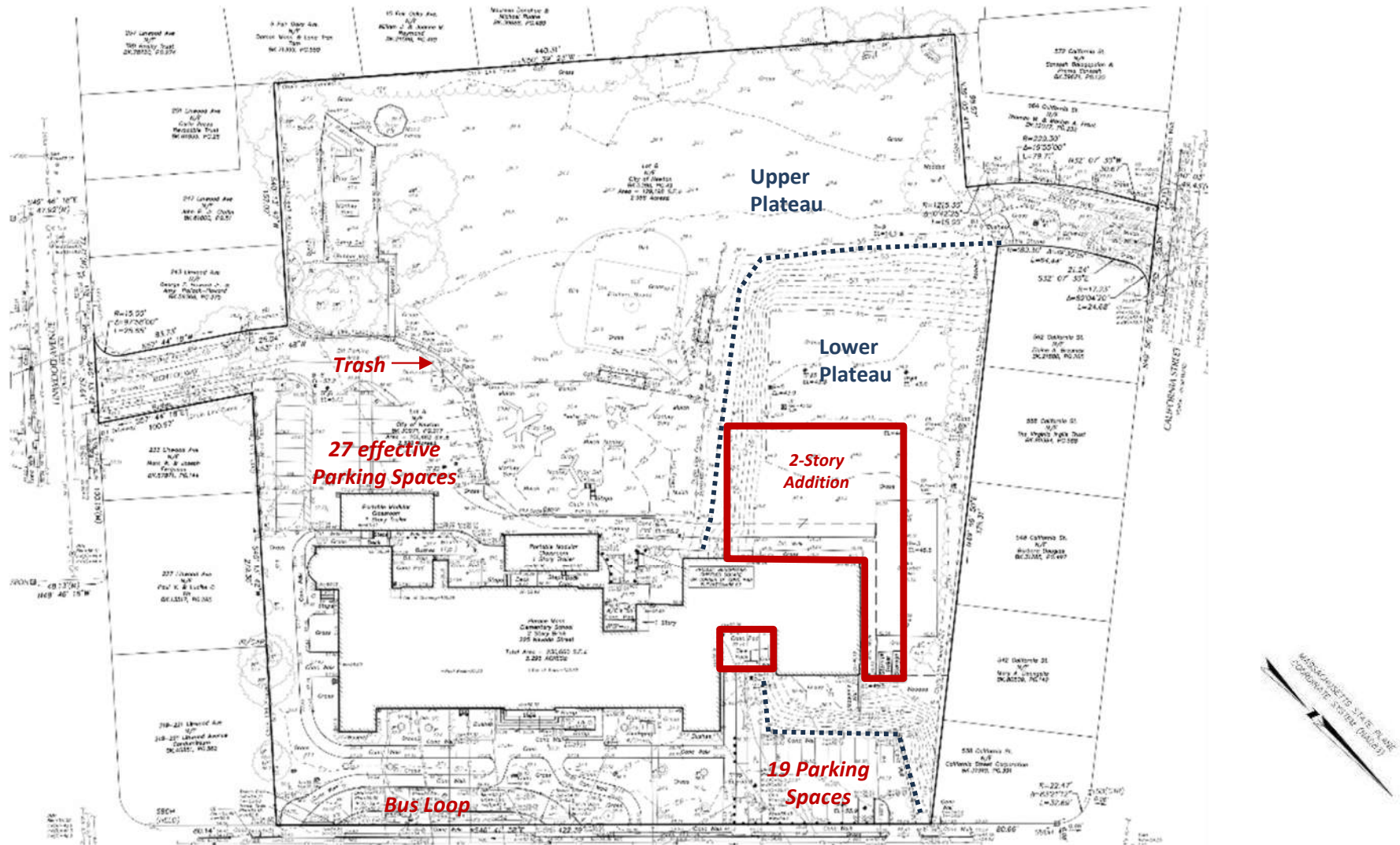
Exterior Lighting

Massing

Building Envelope & Sustainability

Accessibility

# Existing Conditions



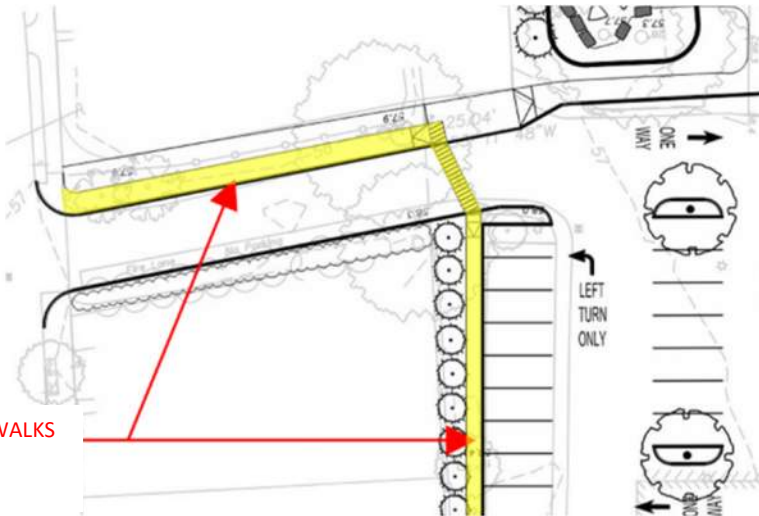
## Site Improvements



- Emergency Access
- On-Site Parking (no net loss)
- Exterior Lighting
- New PIP Playground
- Hardsurface Play
- Relocated BB Field
- Retained Sledding Hill
- Accessibility
- Trees & Vegetation



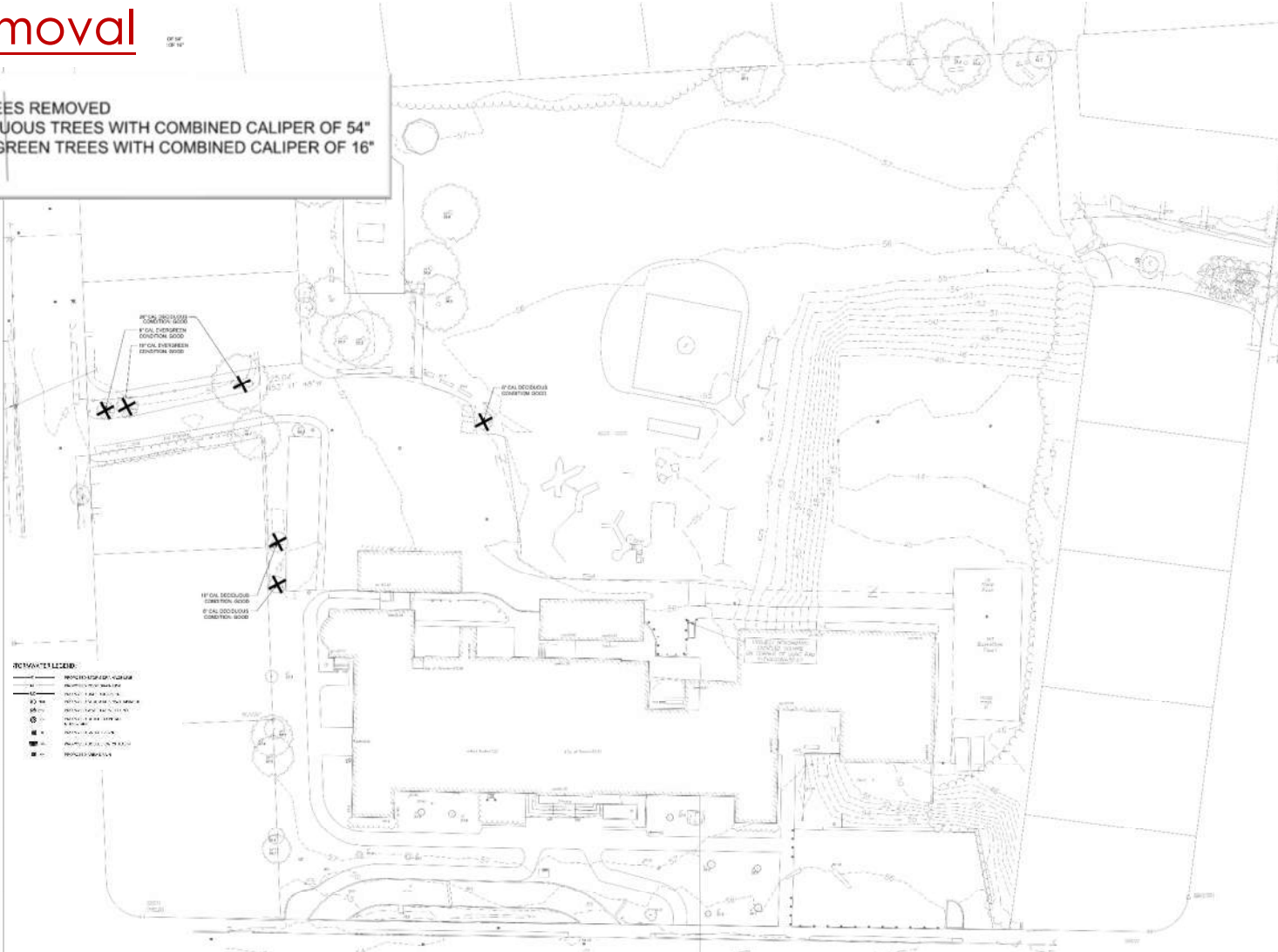
## NEW SIDEWALKS



# Tree Removal

## (6) TOTAL TREES REMOVED

- (4) DECIDUOUS TREES WITH COMBINED CALIPER OF 54"
- (2) EVERGREEN TREES WITH COMBINED CALIPER OF 16"

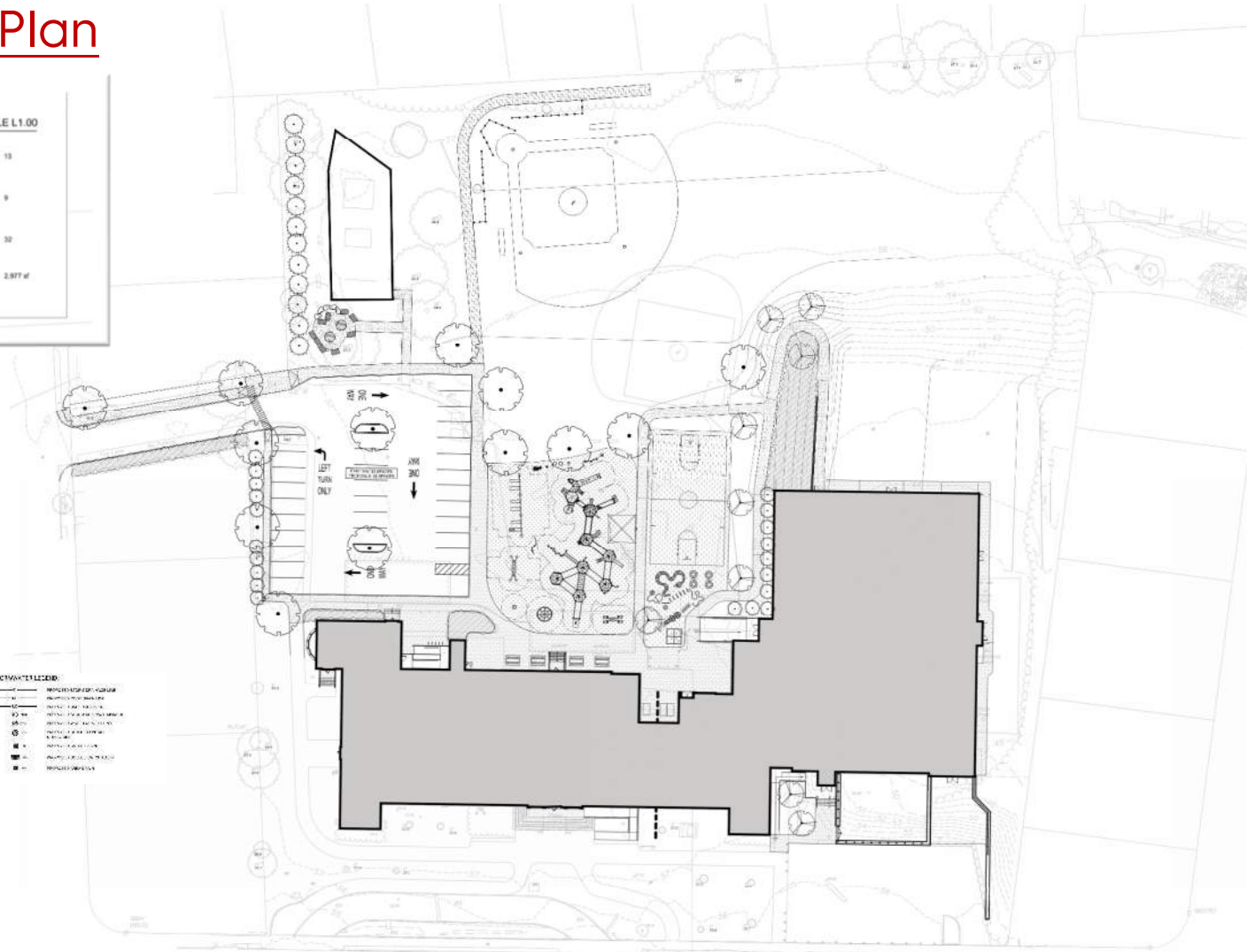




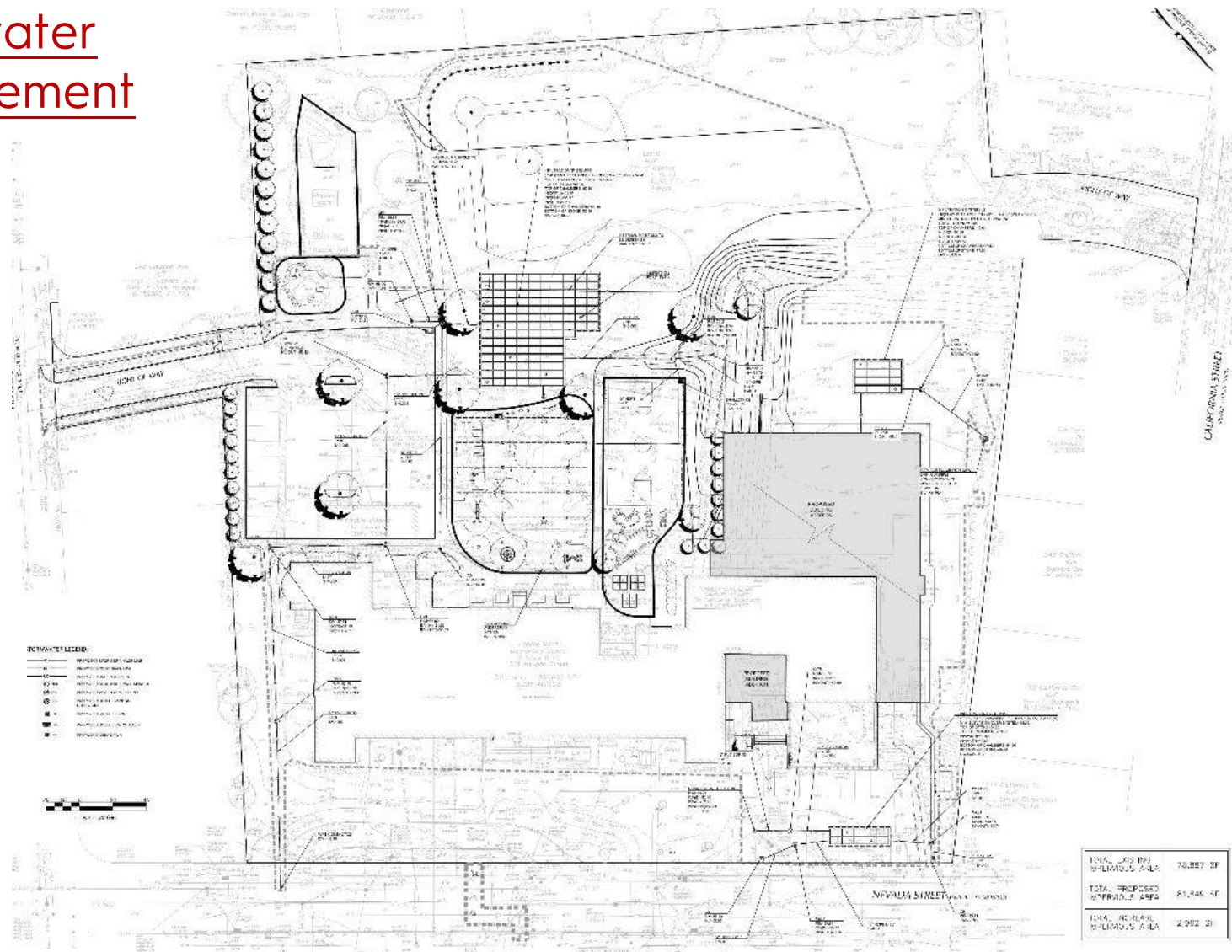
# Planting Plan

CONCEPT PLANT SCHEDULE L1.00		
	LARGE SHADE TREE	13
	SMALL DECIDUOUS TREE	9
	LARGE EVERGREEN	32
	SHRUB MASSING	2,977 sf

NOTATION LEGEND	
	PROPERTY LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE
	PROPOSED LOT LINE



# Stormwater Management



# Building Systems

Structural Systems  
Building Envelope & Sustainability Goals  
MEP Systems

## STRUCTURAL SYSTEMS

**Renovation Area:**

- Code Implications
- Level II Alterations



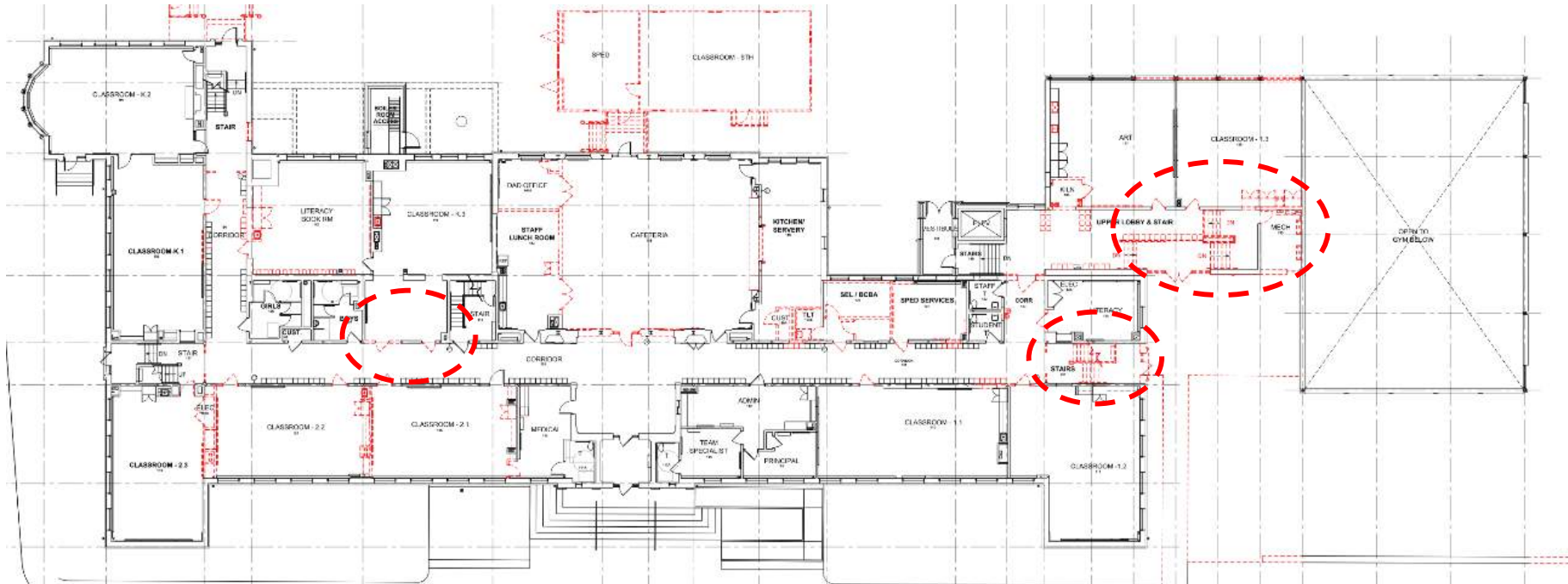
### Modify Existing Openings



### Stair Demo & Infill



### Stair Demo & Infill



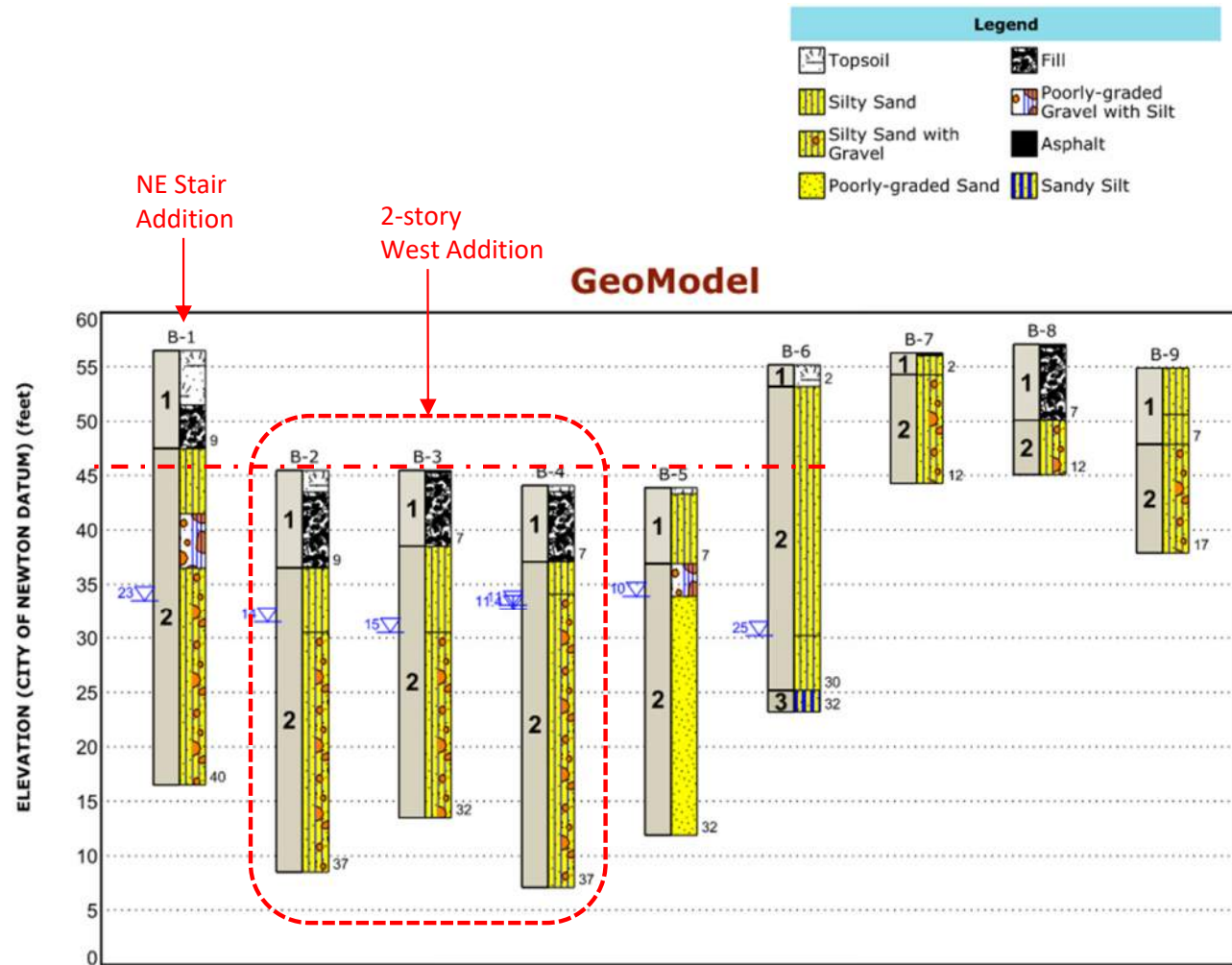
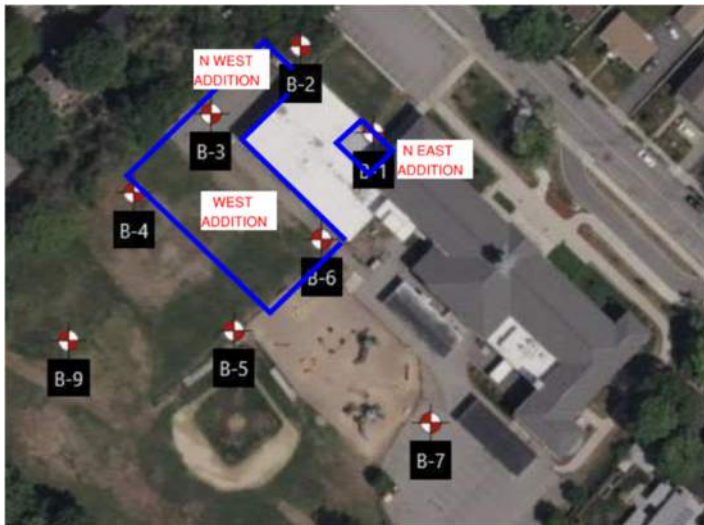
## First Floor Demo Plan



# STRUCTURAL SYSTEMS

## New Work / Additions:

- Geotechnical Findings



**New Work / Additions:**

- [illegible]

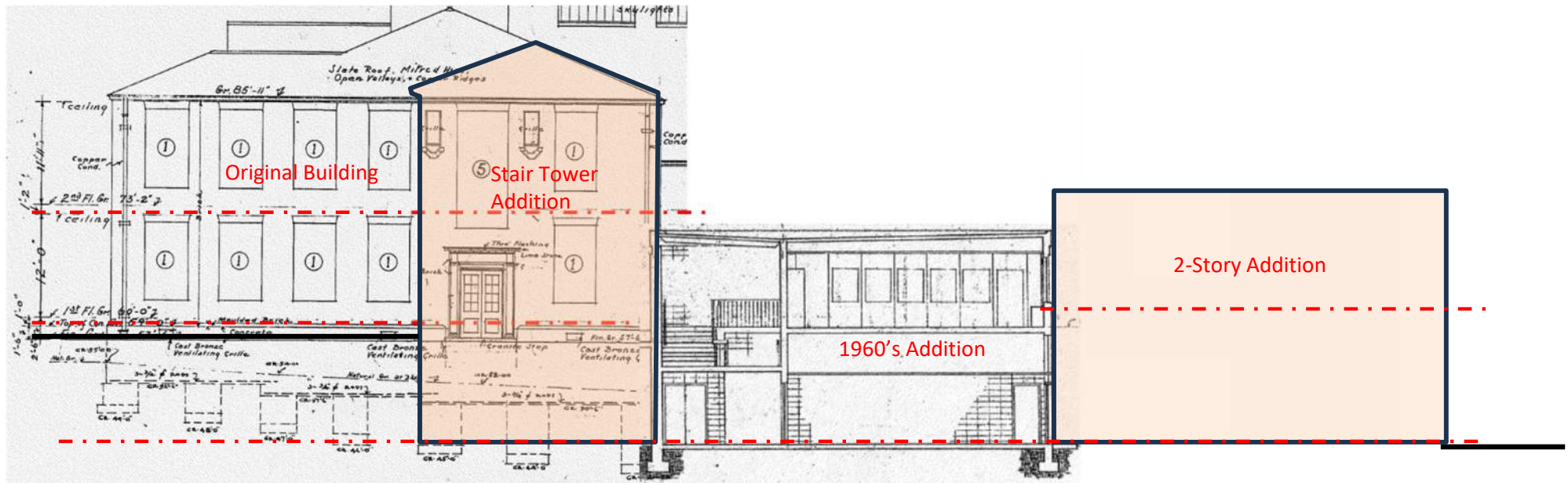




## STRUCTURAL SYSTEMS

### New Work / Additions:

- Sustainability
- Foundations / Underpinning
- Floor Framing



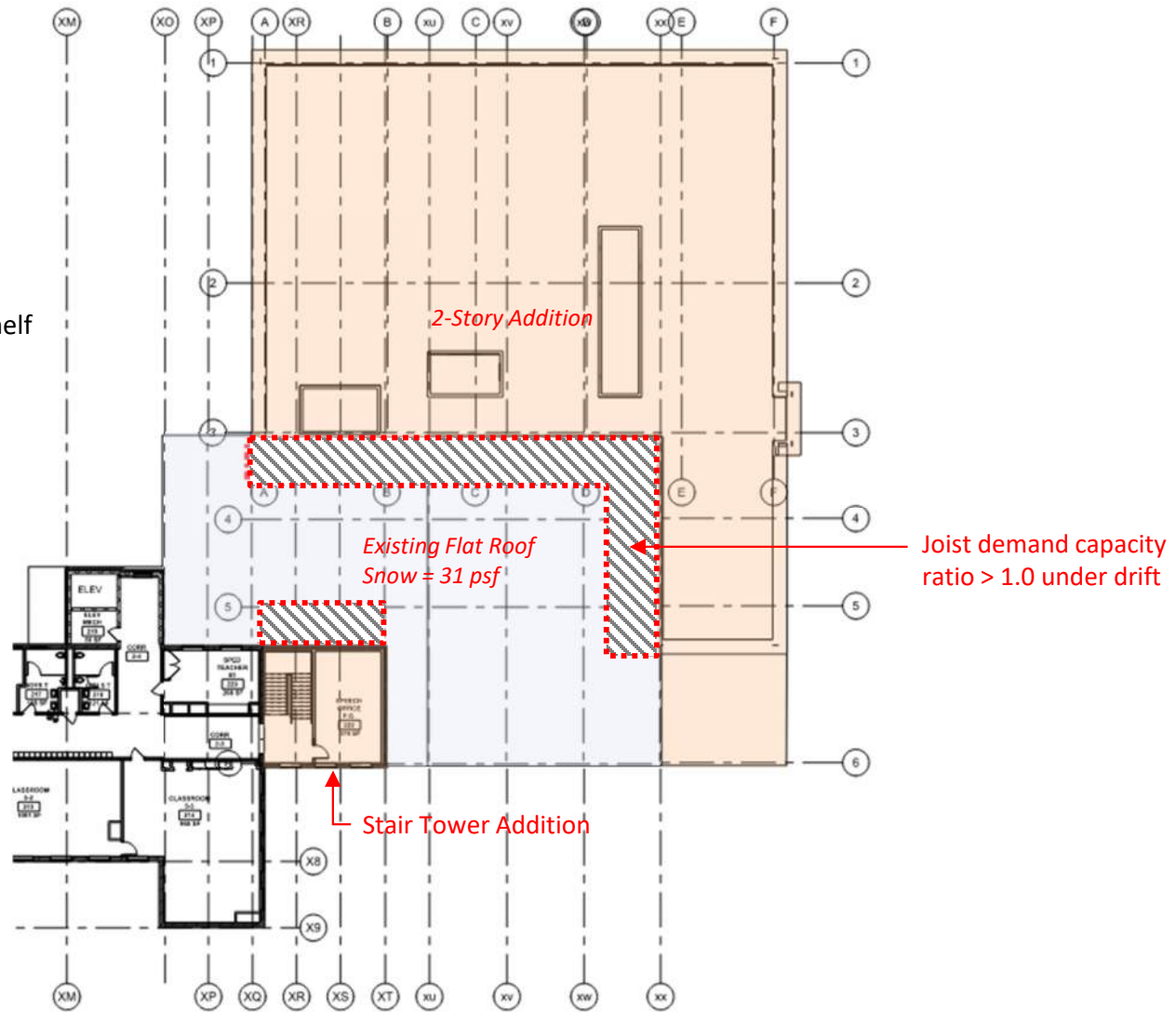
Building Section

## STRUCTURAL SYSTEMS

**New Work / Additions:**

- Roof Framing
- Snowdrift

### Proposed Cantilevered Shelf



### Snow Drift Analysis



# Sustainability Goals & Requirements

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1. Massachusetts Stretch Code and Specialized Code Community
2. Newton's Approach to Sustainable School and Municipal Buildings
3. LEED for Schools



## Specialized Code

Municipalities must vote to opt in to the Specialized Code. The code takes effect 6-11 months after adoption.

• • • • •

IECC 2021  
+ MA amendments  
+ Stretch Code amendments  
+ Specialized Code appendices

**Thornton Tomasetti**

# MA Energy Stretch and Specialized Code

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## 1. New Construction Addition: Stretch Code and Specialized Code

- Targeted Performance Compliance pathway or Passive House certification
  - $\approx$ R-50 roof,  $\approx$ R-25 wall, minimize thermal bridging, triple glazing, low air leakage,  $\approx$ 80% effective air-to-air energy recovery
- Code minimum envelope via “Component Performance Alternative”
- C406 Additional Efficiency Requirements – 15 credits
- Specialized Code 3 pathways:
  - Zero Energy
  - All-Electric
  - Mixed Fuel

## 2. Existing Building Renovation: Stretch Code only

- Code minimum prescriptive requirements for altered portions only

TO Raymond Design Associates, Inc.

FROM Thornton Tomasetti

DATE August 7, 2023

RE Horace Mann Elementary School MA Energy Stretch and Specialized Code Preliminary Assessment

## New Construction Addition

To meet the energy efficiency requirements, the addition portion of the project will be required to comply with either the C401.2.1 Targeted Performance Compliance pathway or C401.2.2 Passive House Compliance pathway.

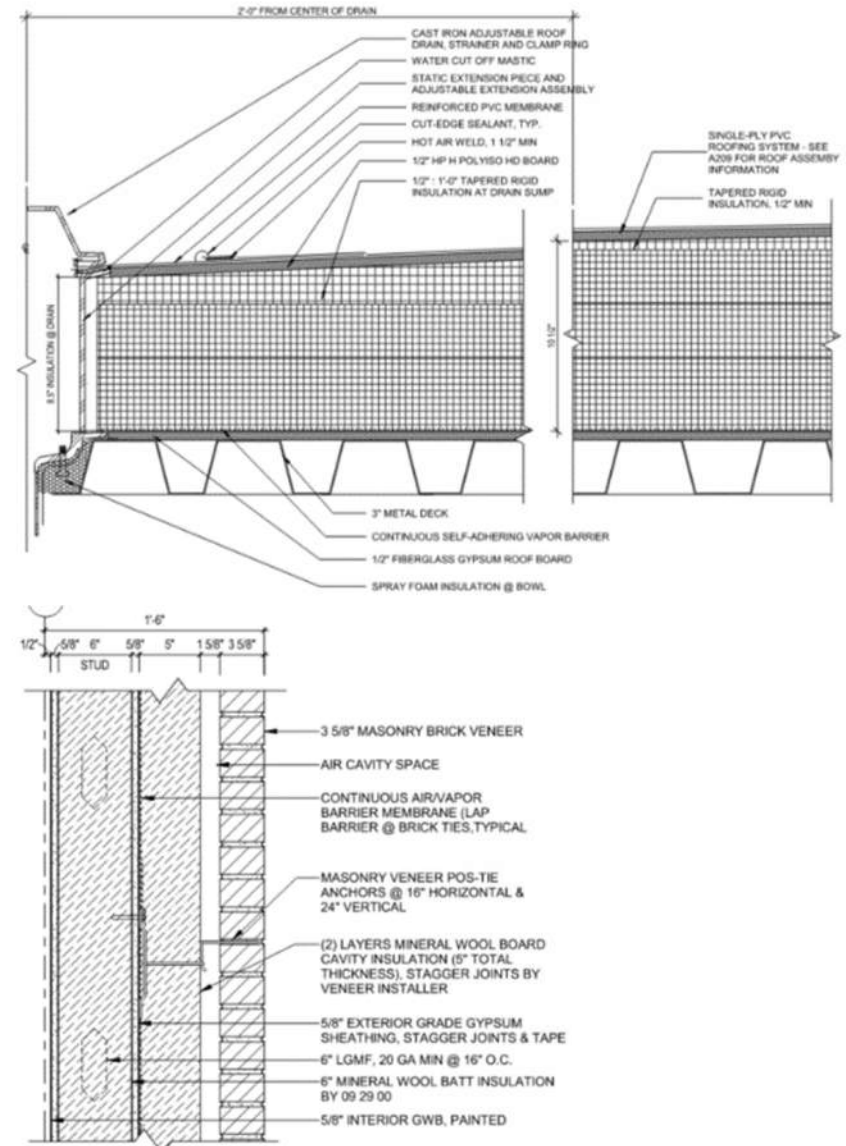
**C401.2.1 Targeted Performance Compliance pathway:** This pathway is required for schools larger than 20,000 ft<sup>2</sup> and have an average ventilation at full occupancy of 0.5 cfm/ft<sup>2</sup> or less. The heating thermal energy demand intensity (TEDI) target is 2.4 kBtu/ft<sup>2</sup>/yr and the cooling TEDI target is 20 kBtu/ft<sup>2</sup>/yr. To meet these stringent performance targets, we recommend the design team to target the following design parameters:

- ≈R-50 roof – this will mean a roof thickness of not less than 10 inches. Additional roof thickness may be required to provide slope to drain.
- ≈R-25 wall – This will result in approximately 6 inches of continuous mineral wool insulation in the wall cavity.
- Triple glazing windows – The project should also consider a double low-e coating on the triple glazing.
- Energy recovery ventilator (≈80% effectiveness) providing ventilation for all spaces
- Heat recovery for kitchen exhaust (≈50% effectiveness)
- Building envelope infiltration (air leakage) of 0.10 cfm/ft<sup>2</sup> at 75 Pa – This will require close attention to details between adjacent systems both in the design and construction process.

Please note the above parameters are not prescriptive for compliance; they are suggested preliminary recommendations to guide early design decisions in the feasibility phase. An energy model is required to confirm the actual performance required for compliance.

## Existing Building Renovation

For the renovation portion of the project, the Stretch Code requires altered portions of an existing building to comply with requirements of Section 503 (of 2021 IECC) and the prescriptive sections C402 (envelope), C403 (mechanical), C404 (water heating) and C405 (electrical) without requiring unaltered portions of an existing building to comply. The renovation does not require an energy model.





## HVAC SYSTEMS

### Scope of Work Summary:

#### Renovation Area:

- Reuse & renovate existing system
- Heating: HW Boiler plant (2013) serves radiation heating
- Ventilation: Heated ventilation air (w/o cooling) via ERV unit (2013) & overhead ducted systems
- Air Conditioning: Air source VRF (2019)
- ATC Controls: Delta Controls DDC System (2013, 2019)
- Provide HVAC modifications for Renovation areas
  - For Renovation Walls - Ductwork and piping relocations
  - Perimeter fin tube reconfigured for new room layouts.



*Hot Water Boiler Plant*



*Perimeter FTR Heating*



*Rooftop Ventilation Unit*



*Attic - Ventilation Ductwork*



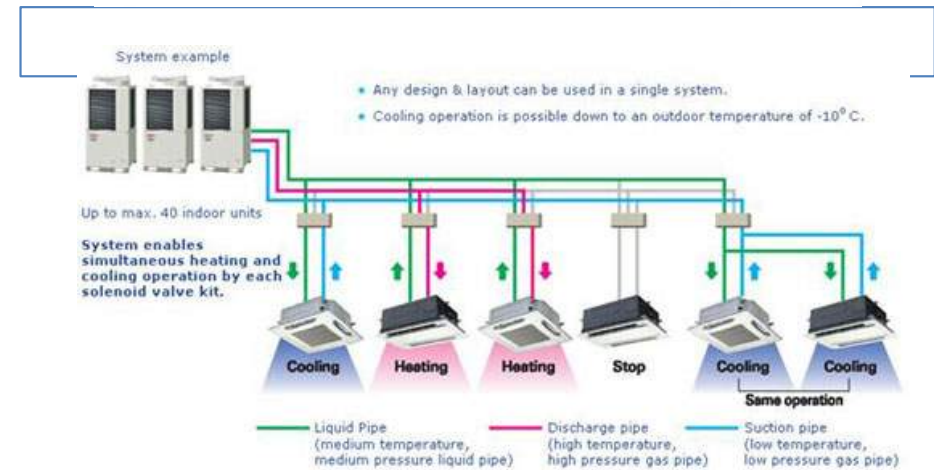
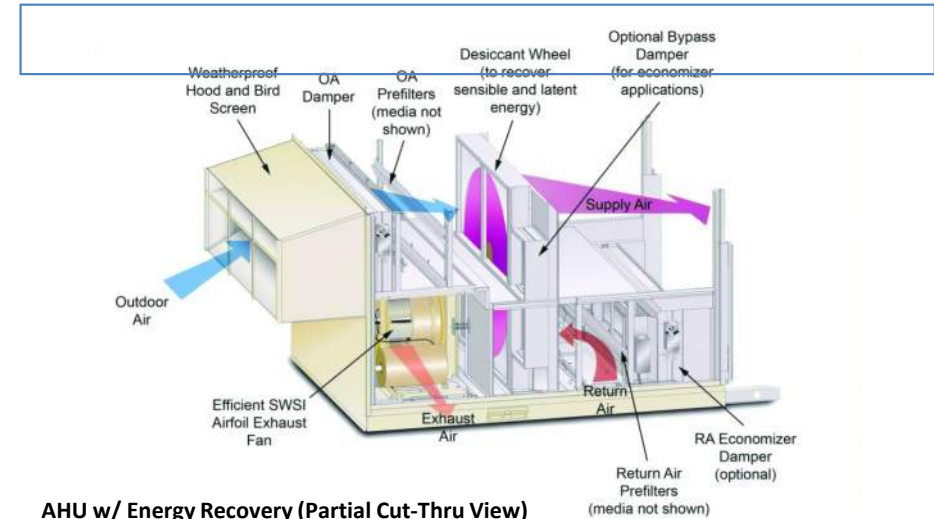
*VRF Heat Pump Units (Typical Indoor Units @ Left & Outdoor Units @ Center & Right)*

## HVAC SYSTEMS

Scope of Work Summary:

### Addition:

- Heating & Air Conditioning: Air Source Heat Pump VRF System
  - Indoor VRF units (combination ducted & ductless)
  - Minimize use of supplemental electric heat
- Ventilation: AHUs w/ Air Source Heat Pump heating cooling & supplemental (back up) electric heat and Energy Recovery:
  - VAVs for Demand Ventilation Control
  - New Units
    - Admin/Classrooms
    - Cafeteria
    - Gym
- Controls
  - Connect to existing BMS



Air Source VRF Diagram

# ELECTRICAL SYSTEMS OVERVIEW

- New electrical service and distribution equipment with back-feed to the existing building service equipment.
- New diesel generator with sound-attenuated enclosure.
- High-efficiency lighting system and networked Automated Lighting Control System
- Expansion of existing fire alarm system
- New Public Safety Radio Distributed Antenna System (DAS) to support addition and existing building.
- Electric Vehicle Charging Equipment (EVSE) stations.



*New Utility Transformer*



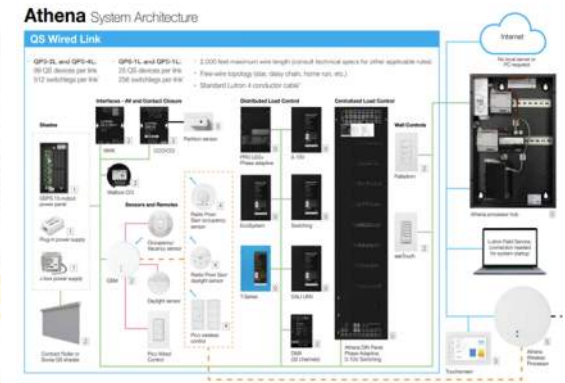
### New Service Equipment



### New Diesel Generator



## New Lighting



### *New Automated Lighting Control System*



## FIRE PROTECTION SYSTEMS

### Existing Building

- modify existing fire protection

### Addition

- extend existing fire protection system



*Existing Sprinkler Zone Control Valves*



*Existing Sprinkler Service Valves*

## PLUMBING SYSTEMS

### Existing Building

- modify existing sanitary, vent, water, and storm piping

### Addition

- new storm, sanitary, & kitchen shall be provided. Cold water shall connect to existing.



*Manual Flush Valve  
1.28 gpf Water Closet*



*Manual Flush Valve  
0.125 gpf Urinal*



*Battery Sensor Faucet  
0.07 Gallons per cycle*



*Drinking fountain  
w/bottle filler*

# Questions & Comments

