Horace Mann Elementary School

Design Development Phase

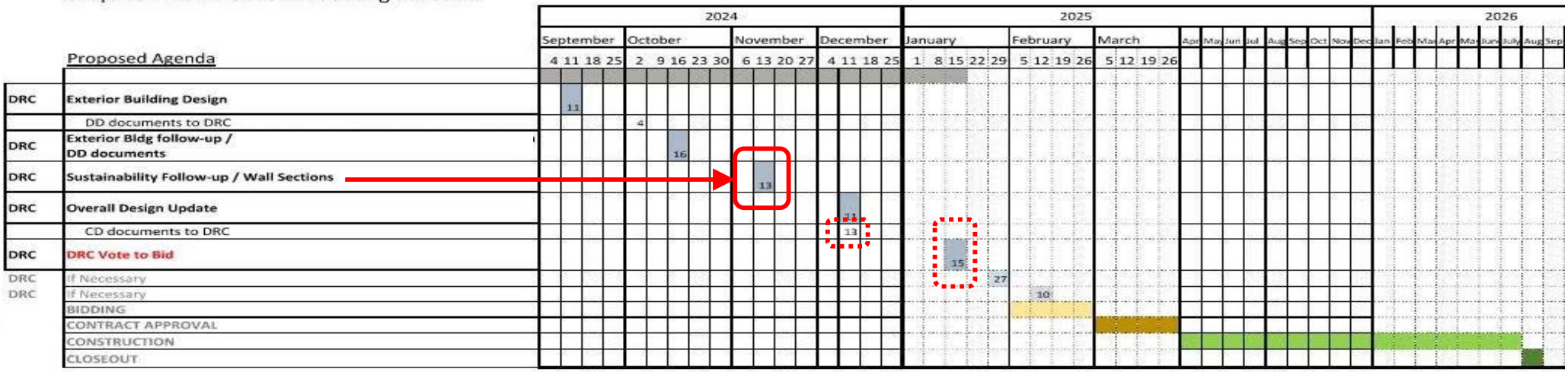
DRC / SBC Meeting

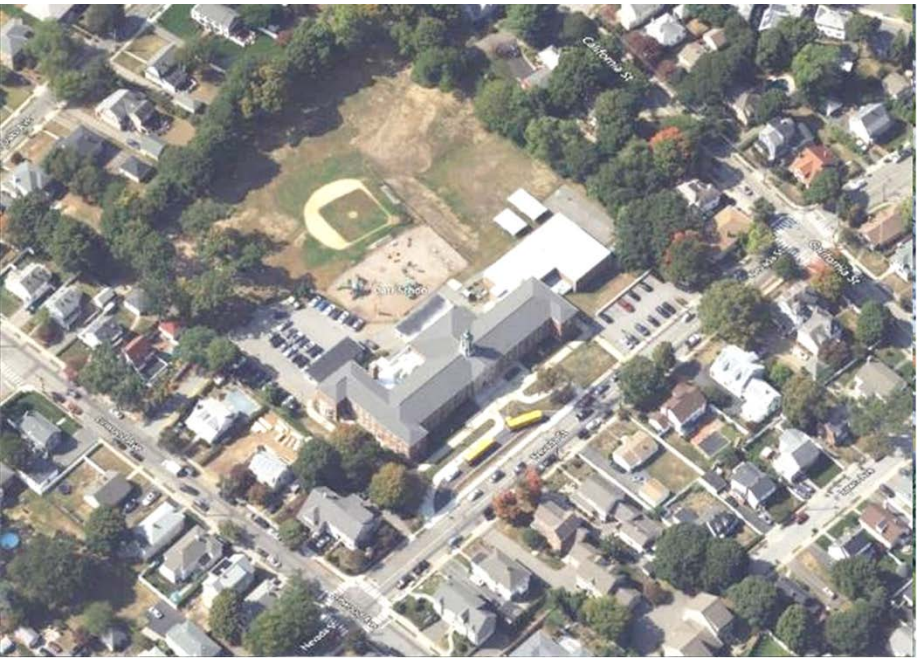
November 13, 2024

Raymond
Design Associates

Horace Mann Elementary School

Proposed Horrace Mann Meeting Schedule



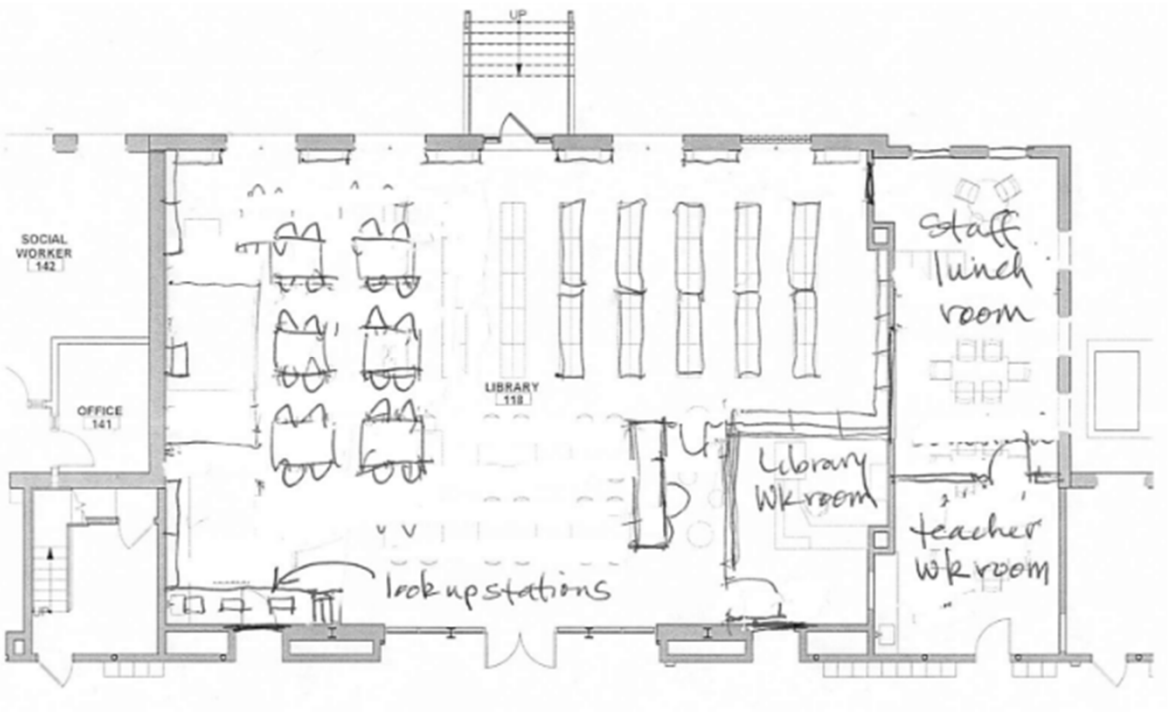


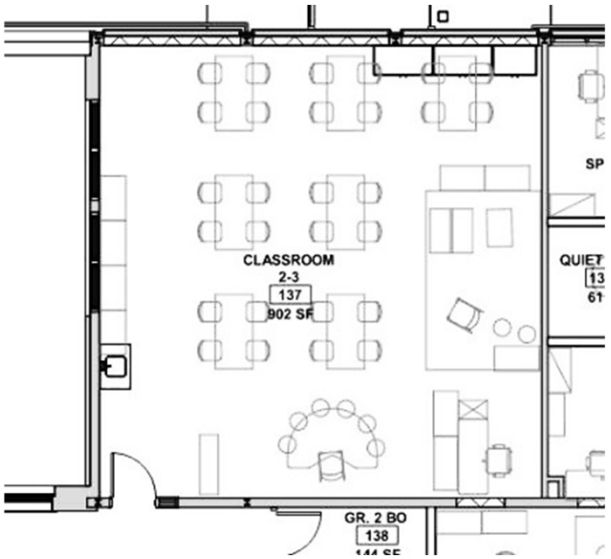
Agenda

- General Design Updates
  - Miscellaneous Plan Revisions Following Staff Meetings
  - Envelope Details / Wall Sections
- Design Development Review Comments / Response

General Design Updates

Staff Review Meetings

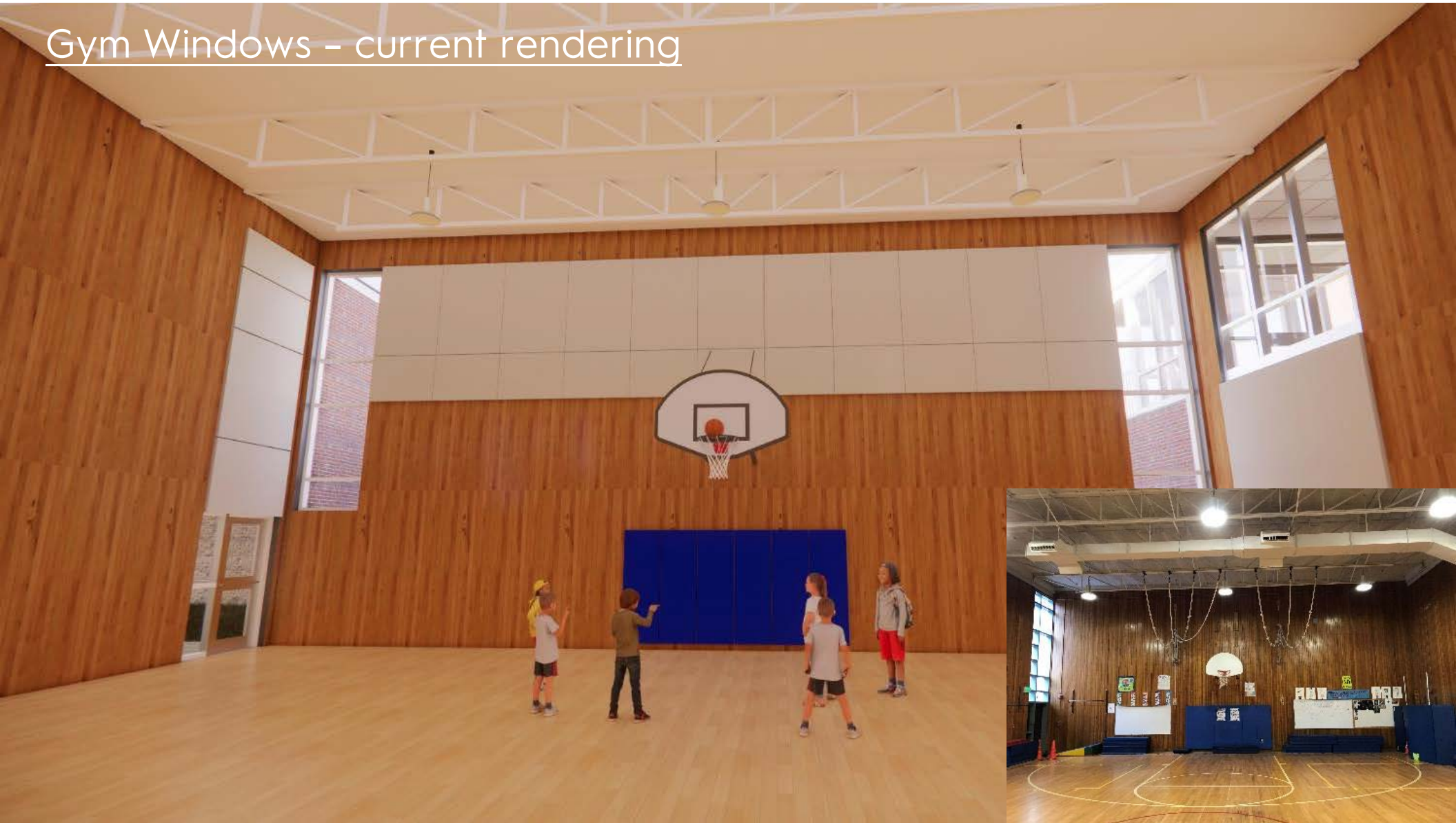




Gym Windows – previous rendering

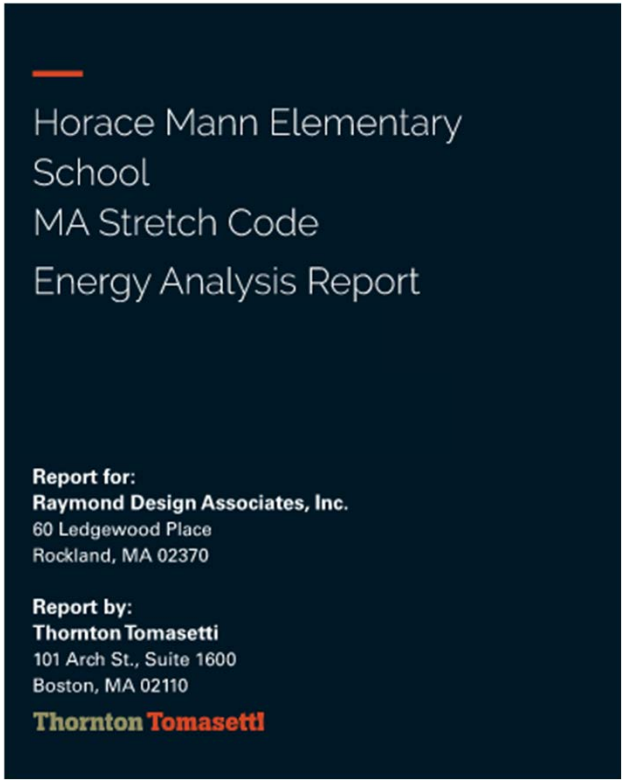
Gym Windows – current rendering

Gym Windows – current rendering



Envelope Details / Wall Sections

Energy Code



As per C401.2.1, the project follows the Relative Performance Compliance path as it is a school building over 20,000 ft², but with an average ventilation at full occupancy greater than 0.5 cfm/ft². Under the Relative Performance Compliance path, this project must demonstrate a 49% reduction in Regulated Energy (translated from a Building Performance Factor (BPF) of 0.51 for 'all others' type) compared to ASHRAE 90.1-2019 Appendix G. Please note only the new addition is required to follow the Relative Performance Compliance path; the existing portions of the project are covered under IECC 2021 Chapter 5.

Note: This project is eligible for the Relative Performance Compliance path due to high ventilation rates, which is atypical of K-12 school projects. But because the energy analysis is only required for the new addition portion of the school, which includes the kitchen and cafeteria, the average ventilation rate for the modeled area is much higher than typical.

Table 1. Energy Use Intensity by End Use and PEI

Energy End Use	ASHRAE 90.1-2019 (kBtu/ft²/yr)	Basis of Design (kBtu/ft²/yr)
Internal Lighting	10.9	3.6
Exterior Lighting	0.3	0.3
Elevators	0.0	0.0
Misc Equip	12.7	12.7
Space Heating Fossil Fuel	25.0	0.0
Space Heating Electricity	0.0	4.7
Space Cooling	4.5	3.4
Heat Rejection	0.0	0.0
Pumps	0.0	0.0
Vent Fans	12.6	5.6
Domestic Hot Water Fossil Fuel	5.6	0.0
Domestic Hot Water Electricity	0.0	3.8
Total Electricity	41.0	34.1
Total Natural Gas	30.6	0.0
Total Energy	**71.6**	**34.1**
Performance Energy Index	0.60	0.48
		Pass

Envelope Analysis

Thornton Tomasetti

Horace Mann Elementary School
225 CMR 23 MA Commercial Stretch Energy Code
Table 1: Component Performance Alternative

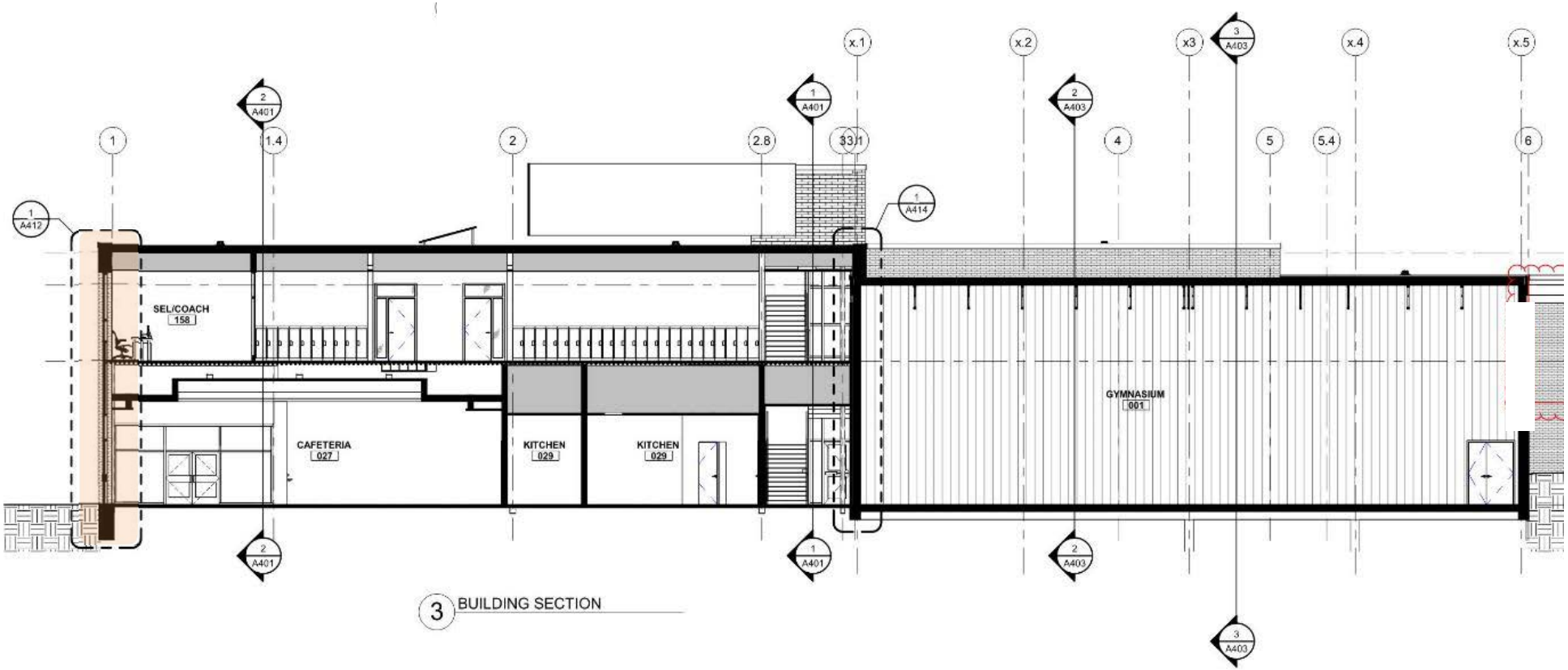
	Component Tag	Reference Drawing	Component Description	Area (ft^2)	U-value ($Btu/h \cdot ft^2 \cdot °F$)
Vertical Exterior Non-Glazed Wall System Components	EW1		Brick veneer, 5" ROCKWOOL cavityrock, 6" ROCKWOOL cavity	11,296	0.032
			Window Type 1 EFCO 325x Fixed	1,422	0.19
			Window Type 2 EFCO 325x Operational	765	0.3
			Curtainwall Type 1 EFCO 5600x	1,056	0.24
			Curtainwall Doors EFCO D502	224	0.57
			FRP Doors	116	0.29
Total Glazed Wall System Area				**3,583**	
Total Vertical Exterior Area				**14,879**	
Glazed Wall System %				**24%**	

	Component Tag	Reference Drawing	Component Description	Length (ft)	Psi-value ($Btu/h \cdot ft \cdot °F$)
Linear Thermal Bridges			1a. Curtain Wall Sill - Brick Veneer no angle	46	0.143
			1b. Curtain Wall Sill - Brick Veneer w/ angle	26	0.240
			2. Curtain Wall Jamb - Brick Veneer	186	0.104
			3a. Window Head	311	0.141
			3b. Curtain Wall Head	104	0.136
			5a.1 Roof Deck to Vertical Wall	183	0.097
			5b. Window Sill	311	0.202
			5c. Roof Deck to Curtain Wall Sill	37	0.044
			7. Roof Edge @ Brick Veneer	526	0.022
			8. Typical Foundation Detail	437	0.200
			9b. Slab Bypass- No angle, no window	329	0.046
			11. Window Jamb - Brick Veneer	725	0.113
			12. Curtain Wall Head at Roof Edge	50	0.320
			Cantileverd framing- point transmissance	7	0.136
			Connections to existing: Old masonry to new curtainwall tota	66	0.250
			Connections to existing: Old masonry to new masonry	14	0.250
			Connections to existing: Old to New Roof	87	0.250
			Connections to existing: Old low roof to new wall	136	0.250
			Point thermal bridge where our HSS posts are located 4' o.c a	131	0.860
Derated area-weighted U-value				**0.124**	Pass

Results

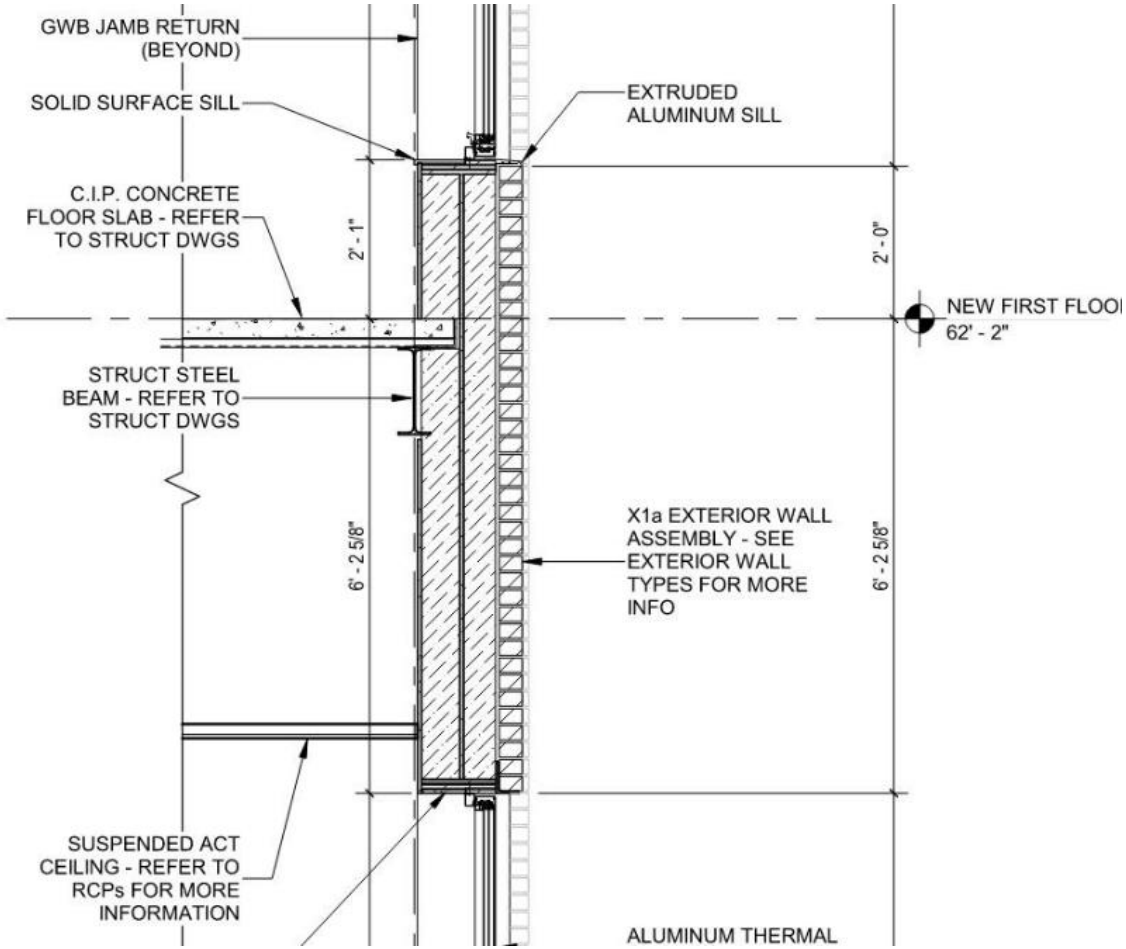
The proposed design is a low glazed wall system building. As per C402.1.5.1, the area-weighted U-value of the exterior vertical envelope must be equal to or below U-0.1285, and the vision glass used in the glazed wall system shall have a maximum whole assembly U-factor of U-0.25. The full component performance alternative weighted calculations are shown in Table 1 of this memo. The current building envelope meets the requirements with an area-weighted U-value of U-0.124.

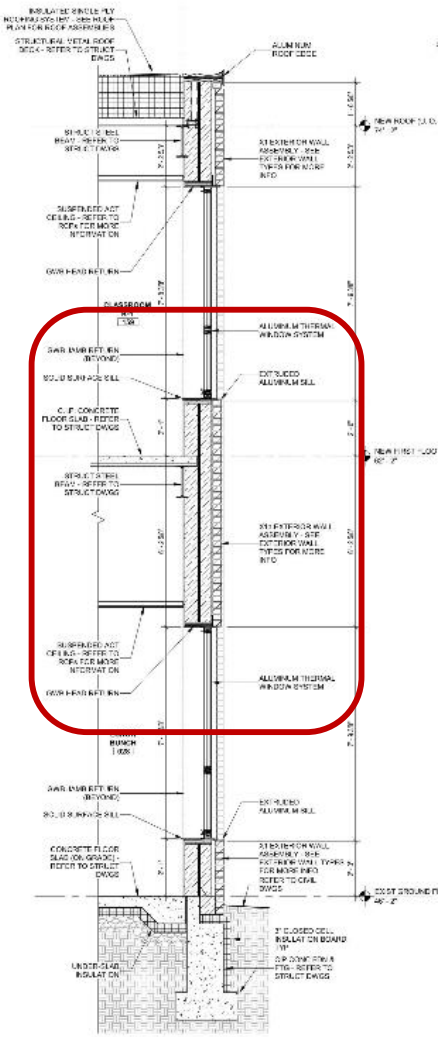
Building Section



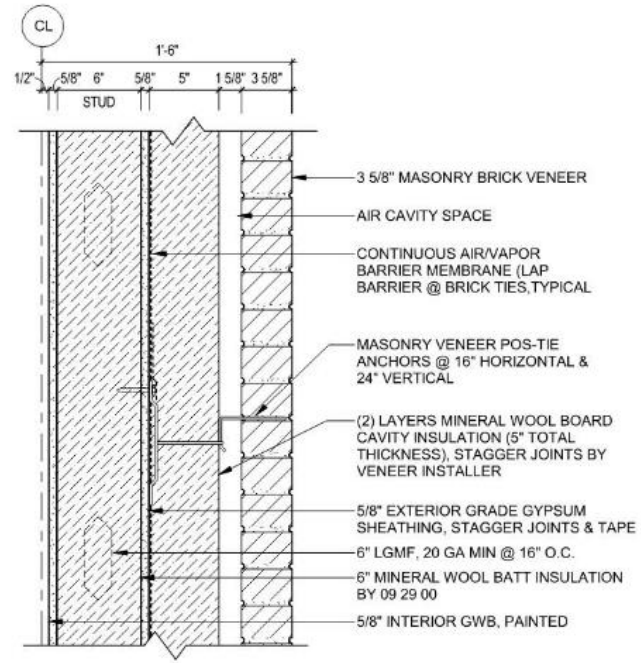
3 BUILDING SECTION

Wall Sections



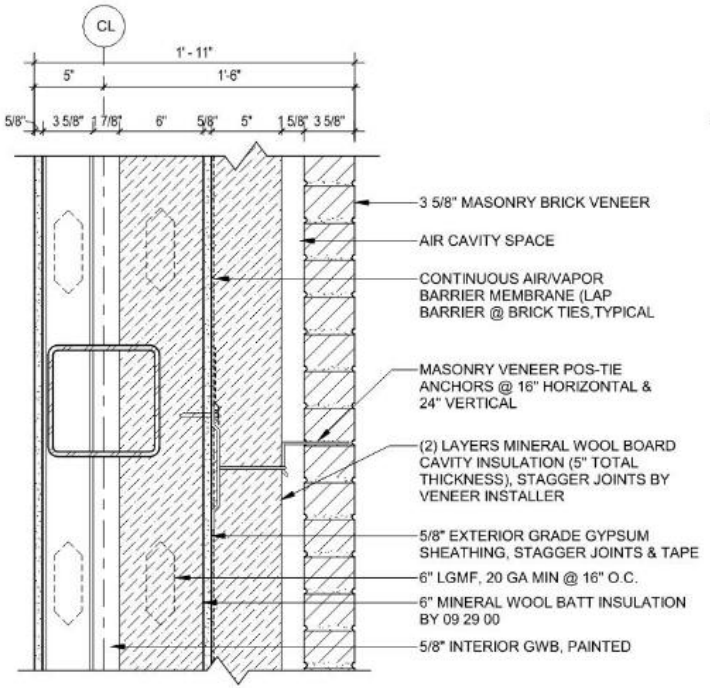


Typical Wall Sections



MASONRY BRICK VENEER & METAL STUD BACK UP W/ INTERIOR FINISH

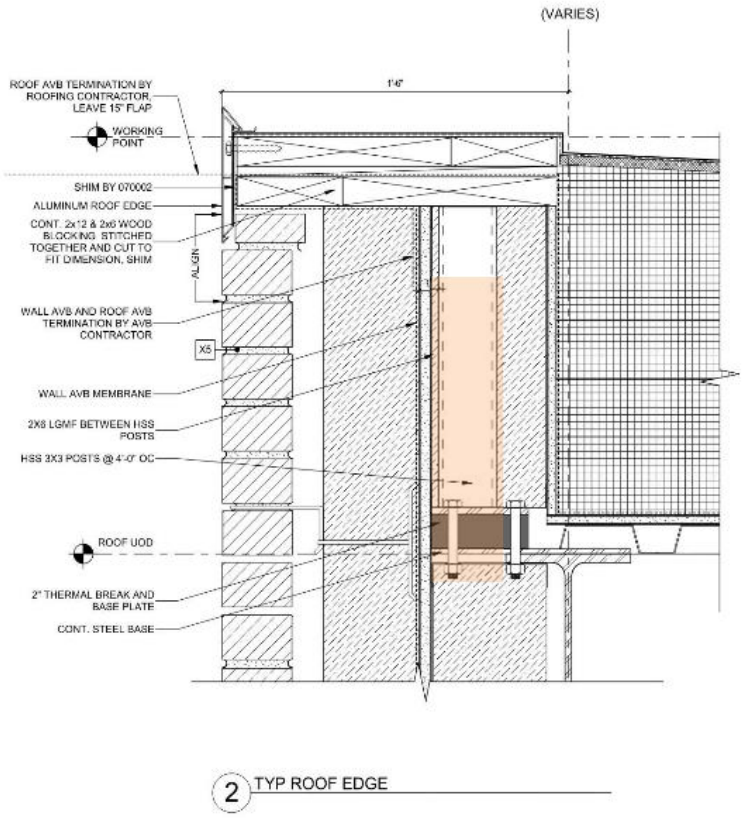
X1



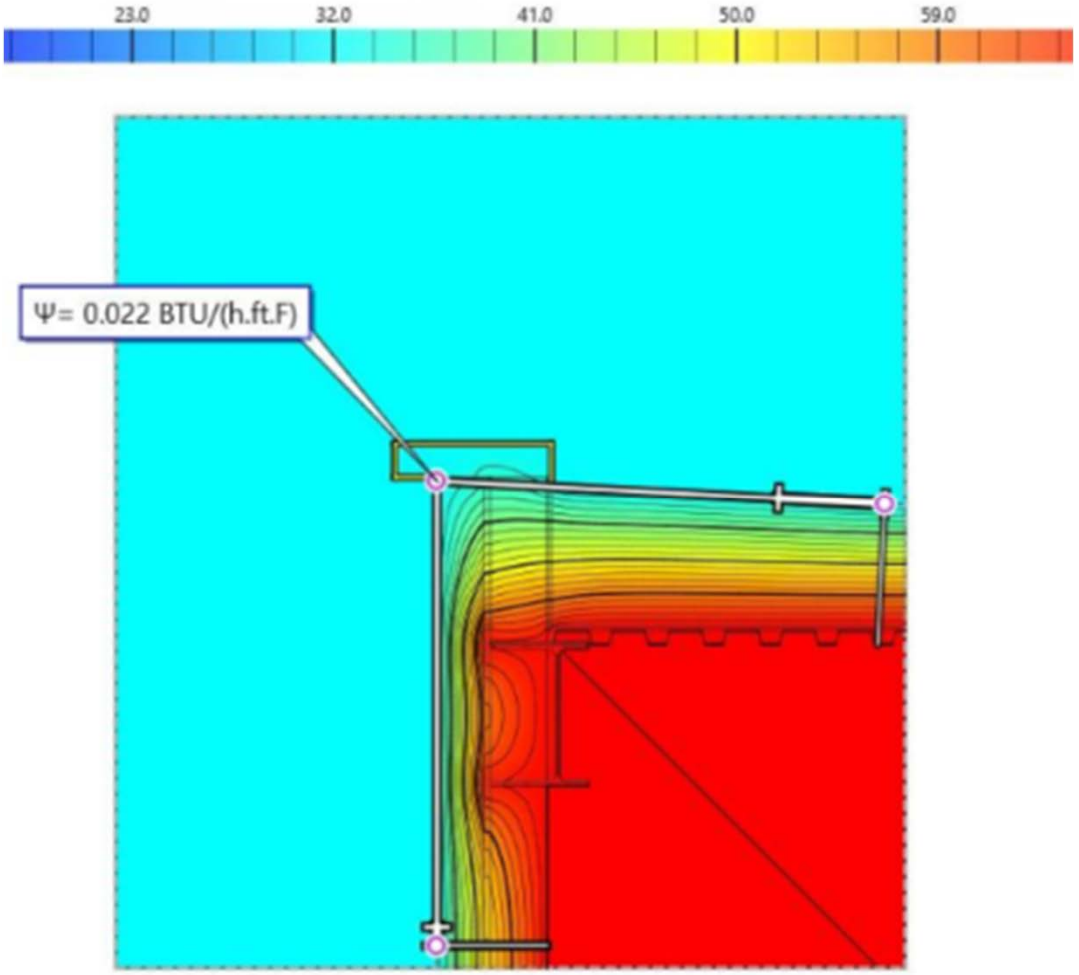
MASONRY BRICK VENEER & METAL STUD BACK UP W/ INTERIOR FINISH @ BRACE

X2

Typical Roof Edge Detail



2 TYP ROOF EDGE



Design Development Review

Design Development Review

P107	move VTR at Col 4 out of solar panel perimeter	PB	10/14/2024	Will move VTR out of solar panel perimeter.
M2.0	Cafeteria and cafeteria office show electric radiant panel heating. Confirm with Newton that this is actually needed. (Note cafeteria has continuous diffusers along exterior wall.) If electric radiant panel is actually needed in either place, replace current control sequence on M4.0 with a sequence tied to OAT and room occupied status.	PB	10/14/2024	We are removing the electric radiant panels as the linear diffusers are providing perimeter heat..
M2.0	Apparently water fin tube shown in two places. Check with Newton, would electric serve better in long term?	PB	10/14/2024	Hot water fin tube will be used in renovated areas close to the addition where the hot water piping infrastructure is in place. There is considerable modification/re-piping in the renovation areas due to new demising walls interrupting existing lengths of fin tube, with re-piping to restore zoning
M2.2	Check distance between kitchen exhaust fan and air intake ERV-1. (I could not tell: location of ERV-1 air intake not shown on roof plan.)	PB	10/14/2024	Will verify clearance.
M3.0	Show VFD on kitchen exhaust fan in schedule and on E302. (And/or clarify who provides VFD)	PB	10/14/2024	Will coordinate with the kitchen consultant on VFD responsibility to ensure compatibility with the kitchen hood energy management system.
M4.0	Sequence for VAV box control does not match the application in most rooms. In most rooms temperature control is provided by heat pump system, and VAV control is only for ventilation.	PB	10/14/2024	Will correct VAV box sequence of control to reflect only demand control ventilation.
M4.1	Control point chart and schematic diagram for MAU-1 Kitchen unit erroneously show a return air duct and damper, but such return is not described in sequence or shown on plans.	PB	10/14/2024	Will revise sequence. MAU-1 also provides unoccupied heating and cooling for the kitchen, so a return damper is needed for recirc when the hood is not operating.
M4	Provide operating sequence for ERV-1	PB	10/14/2024	Will further develop ERV-1 sequence of control.
E104, 105	Confirm no more exterior lighting needed on building or in parking lot.	PB	10/14/2024	No additional exterior lighting will be required.

Horace Mann Elementary

Additions and Renovations

225 Nevada Street, Newton Massachusetts

Design Development Estimating Set
October 4, 2024

EXTERIOR RENDERING

LOCATION PLAN NO SCALE

RAYMOND DESIGN ASSOCIATES, INC. • ARCHITECT

60 LEDGEWOOD PLACE, ROCKLAND, MA 02370 TEL: 781. 421. 3480

CITY OF NEWTON
1000 COMMONWEALTH AVE
NEWTON CENTRE, MA 02459
OWNER

NV5
70 FARGO ST SUITE 800
BOSTON, MA 02210
OWNERS PROJECT MANAGER

TERRACON CONSULTANTS INC
77 SUNDAIL AVE, SUITE 401W
MANCHESTER, NH 03103
GEOTECHNICAL ENGINEER

LORD ENVIROMENTAL
1506 PROVIDENCE HIGHWAY - SUITE 30
NORWOOD, MA 02062
GEOENVIROMENTAL ENGINEERING

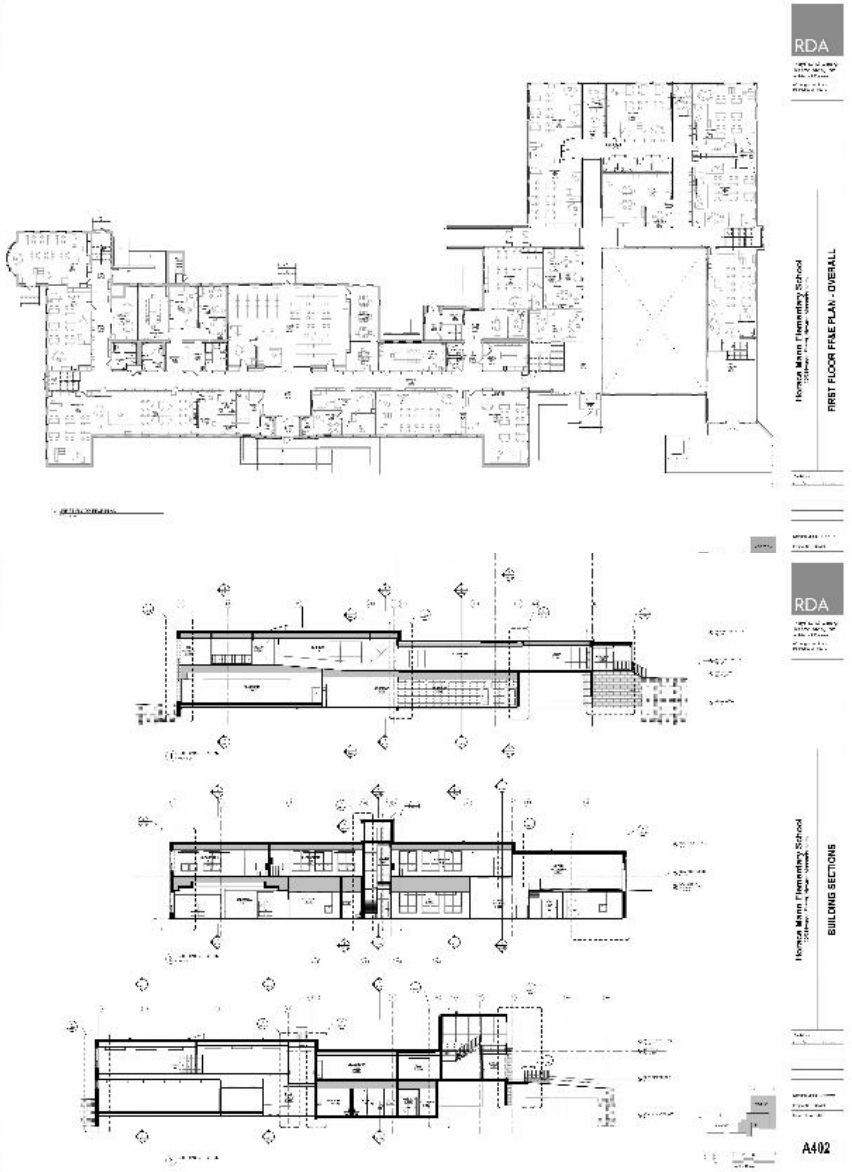
SAMIOTES CONSULTANTS INC.
20 A STREET
FRAMINGHAM, MA 01701
CIVIL ENGINEERING

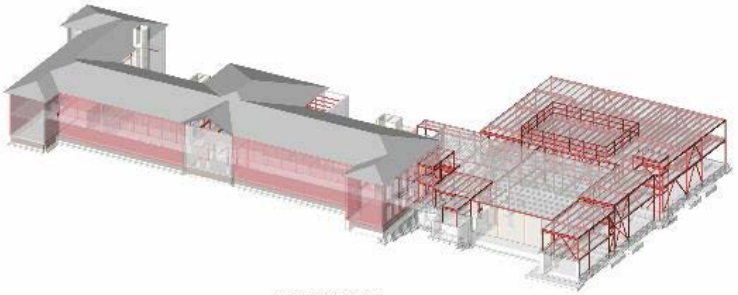
TRAVERSE
10 CHESTNUT STREET, 4TH FLOOR
PROVIDENCE, RI 02903
LANDSCAPE ARCHITECTURE

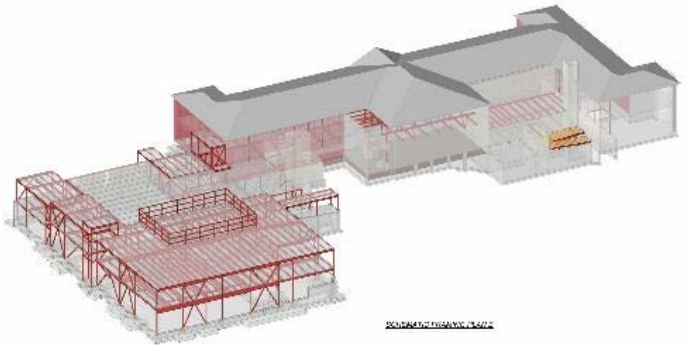
GGD CONSULTING ENGINEERS, Inc.
375 FAUNCE CORNER ROAD, SUITE D
DARTMOUTH, MA 02747
HVAC / ELECTRICAL / PLUMBING / FIRE PROTECTION

PM&C
20 DOWNER AVE. SUITE 5
HIGHNAM MA 02045
COST ESTIMATING

BUILDING FIRE & ACCESS, INC
17 BRIAN ROAD
LANCASTER, MA 01523
CODE & ACCESSIBILITY CONSULTANT







SCHEMATIC FRAMING DIAGRAM

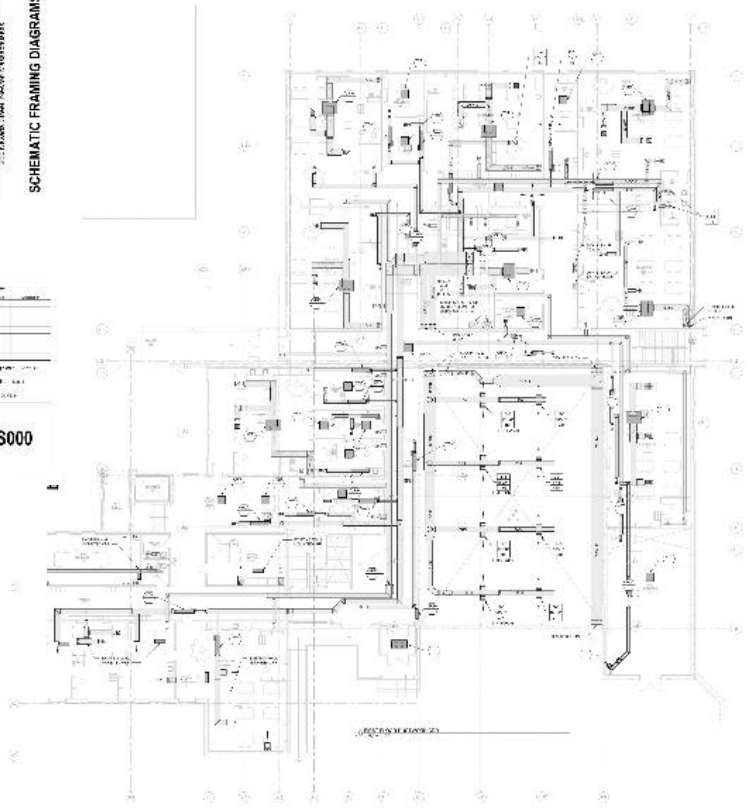
PROGRESS SET

RDA

Horace Mann Elementary School

SCHEMATIC FRAMING DIAGRAMS

S000



RDA

HORACE MANN ES

HVAC - FIRST FLOOR DUCTWORK PLAN

M1.3

Questions
&
Comments

Raymond
Design Associates