



# **Concord Middle School Project**

## **Project Manager Report**

### **December 2022**





## **CONCORD MIDDLE SCHOOL PROJECT**

### **PROJECT MANAGER'S REPORT DECEMBER 2022**

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# Executive Summary



# Town of Concord

## Concord Middle School Project



### Executive Summary

This Project Manager's Report for the Concord Middle School Project is submitted by **Hill International** (Hill) and covers activities for the month of **December 2022**.

### Project Progress

Project related meetings are being held in a hybrid format both via Zoom Video Conferencing and in person at various locations in Concord, MA.

The Project Team continued advancing permitting tasks, the general contractor/subcontractor prequalification process, and the design through the CD phase. Hill and SMMA attended a Concord Middle School Building Committee (CMSBC) meeting on December 15<sup>th</sup>. Hill scheduled and facilitated weekly Leadership Team meetings on December 13<sup>th</sup> and 20<sup>th</sup> and facilitated prequalification committee meetings on December 12<sup>th</sup> and 14<sup>th</sup>. Hill and SMMA attended an SDA coordination meeting on December 12<sup>th</sup> and an on-site meeting at the Sanborn Middle School to discuss salvage items on December 19<sup>th</sup>. Hill and SMMA also met weekly for design and project coordination meetings.

### Milestones

The following milestones were achieved during the month of **December 2022**:

- Prequalification Progress: In December 2022, Hill collected and began reviewing and evaluating 95 Statements of Qualifications (SOQ's) from prospective General Contractors and Filed Sub Bidders from 15 trades seeking to be prequalified for the Concord Middle School project. The Elevator filed sub trade was readvertised due to insufficient responsiveness from prospective contractors.
  - Structural Peer Review: Hill solicited proposals for an independent Structural Peer Review from five (5) firms using sound business practice. Hill analyzed proposals, created a proposal summary sheet, and ultimately recommended the selection of Souza True & Partners based on having the most advantageous proposal. With the approval by the Town Manager's office and CMSBC concurrence, Hill prepared a contract for Souza True and Partners to be a direct subconsultant.
  - Final 60% CD Report: The final 60% CD report was transmitted to the CMSBC in December 2022.
  - December 15<sup>th</sup> CMSBC meeting: Hill presented an updated Design and Bid schedule with updated dates:
    - Finalize 90% estimate set: 12/16/22
    - 90% CD submission to CMSBC: 1/13/23
    - 100% CD Package to CMSBC: 2/27/23
    - Advertise: 3/2/23
    - Documents available: 3/8/23
    - Pre-Bid conference: 3/15/23
    - Filed Sub-bid due: 4/4/23
    - General Bid due: 4/19/23
    - Contract Award/NTP: 4/20/23
- Hill further presented an updated cost recap based on the 60% estimate:
- Special Town Meeting budget: \$102,815,697
  - 60% CD Estimate + Accepted VM: \$108,666,582
  - Special Town Meeting Warrant Article 2023: \$110,000,000

# Town of Concord

## Concord Middle School Project



Committee members and project professionals engaged in discussion regarding deduct alternates.

The CMSBC voted to accept five (5) deduct alternates:

- Eliminate remaining wood-look ceilings: (\$189,422)
  - Remove bleachers in gym: (\$84,240)
  - Remove outdoor classroom construction: Cost TBD
  - Omit field scope: (\$1,502,271)
  - Omit landscaping (\$300,000)
- 90% CD Estimate Plans/Specs: On December 16<sup>th</sup>, the 90% CD estimate set was finalized and submitted to the project cost estimators for their use in estimating as well as Hill and AKF/SGH for their review and comment.

### ***Milestones projected for the coming months are:***

- Formalize Deduct Alternate List
- Final Prequalification Report
- Special Town Meeting/vote

### ***Issues & Challenges***

- The 60% CD estimate is over budget due to current construction market cost conditions.
- Construction budget alignment prior to Bid Phase

### ***Schedule***

Major milestones are as follows:

- |  |  |
|--|--|
| ■ OPM Selection                                      | Completed Aug. 28 <sup>th</sup> , 2019     |
| ■ Designer Selection                                 | Completed Nov. 18 <sup>th</sup> , 2019     |
| ■ Feasibility Study                                  | Completed April 29 <sup>th</sup> , 2021    |
| ■ Schematic Design                                   | Completed December 9 <sup>th</sup> , 2021  |
| ■ Town Hearing                                       | Completed December 16 <sup>th</sup> , 2021 |
| ■ Special Town Meeting                               | Completed January 20 <sup>th</sup> , 2022  |
| ■ Town Vote  | Completed February 3 <sup>rd</sup> , 2022  |
| ■ Design Development                                 | Completed June 30 <sup>th</sup> , 2022     |
| ■ 60% Contract Documents                             | Completed October 19 <sup>th</sup> , 2022  |
| ■ 90% Contract Documents                             | Started October 20 <sup>th</sup> , 2022    |
| ■ Special Town Meeting (Additional Funding)          | January 19 <sup>th</sup> , 2023            |
| ■ Town Vote (Additional Funding)                     | February                                   |
| ■ 100% Contract Documents                            | See attached schedule                      |
| ■ Bidding  | See attached schedule                      |
| ■ Construction                                       | See attached schedule                      |
| ■ Substantial Completion (New Building)              | See attached schedule                      |
| ■ Demolition of Existing Building and Add New Fields | See attached schedule                      |
| ■ Closeout   |  |

# Town of Concord

## Concord Middle School Project



### ***Budget***

In January 2022, the Town of Concord held a Special Town Meeting to present the Middle School Building Project and held an in-person vote on a not-to-exceed project budget \$104,316,000 to be reflected on the ballot at the February 3<sup>rd</sup> Town Vote.

In February 2022, the Town of Concord voted by ballot to approve debt authorization amounting to \$102,816,000 for the new Concord Middle School project bringing the total project budget including Feasibility and Schematic Design Phase to \$104,316,000.

In June 2022, the Design Development estimate was presented at \$5,332,865 over the construction budget of \$80,772,447. However, the Concord Middle School Building Committee voted to proceed with Contract Document design preparation at the June 30, 2022 CMSBC Meeting with the idea that value management and budget alignment must happen no later than October 2022 at the 60% CD estimate phase.

In August 2022, the Town of Concord executed the contract for AKF+SGH for Commissioning Services in the amount of \$158,310, which is now shown as committed costs in the total project budget.

In October 2022, the 60% Contract Document estimate was presented at \$86,455,680, remaining over the construction budget of \$80,772,447 by a total of \$5,683,233. The CMSBC continued to work towards budget alignment by continuing the process of value management while also continuing the Town process of seeking additional funding.

### ***Cash Flow***

Total project budget is \$104,316,000.

Total encumbered to date is \$12,862,885.00

Total spent on construction to date is \$0.00.

Total spent to date is \$5,424,388 which is 42% of total encumbered.

### ***Project Team Summary***

Awarding Authority	Town of Concord (ToC)
Client	Town of Concord / Concord Public Schools
Owner's Project Manager	Hill International, Inc. (Hill)
Commissioning Agent	AKF Group / Simpson Gumpertz and Heger (AKF/SGH)
Designer	SMMA
General Contractor	TBD



# Project Dashboard



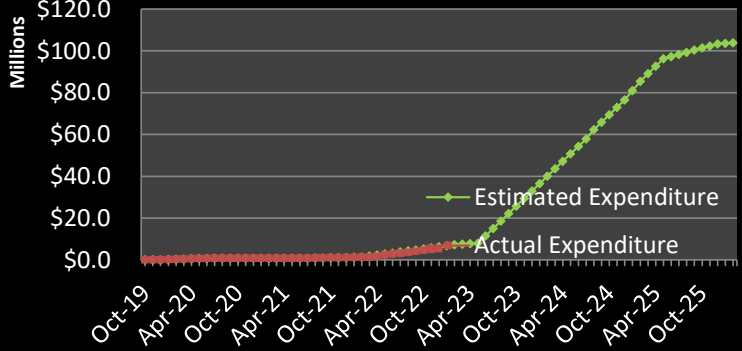
Town of Concord  
Concord Middle School

Project Dashboard

December 31, 2022

EXECUTIVE SUMMARY



Project Accomplishments this Month					Current Issues & Areas of Focus				Current Progress Photos							
<p>In December Hill procurred a Structural Peer Review firm through sound business practice to provide comment and independent calculations of the Structural Design for the project. Souza True &amp; Partners was selected for this role and will be a subconsultant to Hill International.</p> <p>On December 5th, Hill received 95 Statements of Qualification from prospective General Contractors and the 15 Filed Sub Bid trades relevant to the Concord Middle School project for prequalification. Three contractors were disqualified for failing to provide the required documentation or late submissions. The Elevator filed sub trade was readvertised due to insufficient responsiveness.</p> <p>At the December 15th CMSBC meeting possible Deduct Alternates were discussed. The CMSBC voted to accept five (5) potential deduct alternates but did not specify their specfic order. Four (4) of the deduct alternates amounted to \$2,075,933, with one of the accepted deduct alternates needing to be priced out by cost estimators on the 90% CD estimate.</p>					Budget alignment thru approval of additional funding prior to bidding											
Projected Major Tasks next Month					Diversity Compliance				<div>Project Cash Flow - Plan vs Actual</div> 							
90% CD Reconciled Estimate Final Prequalification Committee Report Special Town Meeting and Special Town Election					Metric								Target		Actual	
Schedule Summary - Upcoming Milestones					Designer's WBE/MBE								TBD		TBD	
Designer Procurement	9/25/2019	11/18/2019	9/25/2019	12/9/2019	Contractor's WBE/MBE								TBD		TBD	
Feasibility/Schematic Design	11/19/19	7/1/2020	11/19/19	12/9/2021												
Special Town Meeting	12/17/21	12/17/21	1/20/22	1/20/2022												
Town Vote	2/3/22	2/3/22	2/3/22	2/3/22												
Design Development / Contract Documents	2/7/22	2/22/23	2/7/22													
Bidding	10/24/22	4/23/23														
Construction	5/9/23	12/10/24														
Punch List & Move-in	12/11/24	4/11/25														
Demolition Existing Building	4/15/25	9/12/25														
Closeout	9/12/25	1/15/26														
PROJECT FINANCIAL OVERVIEW													Scope changes from the Original Scope			
Description	BUDGET				COST				CASH FLOW		N/A					
	Baseline	Budget	Authorized Changes	Approved Budget	Committed Costs	Uncommitted Costs	Forecast Costs	Total Project Costs	Expenditures to Date	Balance To Spend						
Site Acquisistion	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	N/A					
Construction	\$ 80,000,000	\$ 772,477	\$ 80,772,477	\$ 80,772,477	\$ -	\$ 80,772,477	\$ -	\$ 80,772,477	\$ -	\$ 80,772,477						
Design Services	\$ 8,281,000	\$ 936,347	\$ 9,217,347	\$ 9,217,347	\$ 8,937,347	\$ 280,000	\$ -	\$ 9,217,347	\$ 4,649,527	\$ 4,567,819						
Administrative	\$ 4,279,595	\$ 485,948	\$ 4,765,543	\$ 4,765,543	\$ 3,925,538	\$ 840,005	\$ -	\$ 4,765,543	\$ 774,861	\$ 3,990,683						
FF&E	\$ 2,677,500	\$ (52,500)	\$ 2,625,000	\$ 2,625,000	\$ -	\$ 2,625,000	\$ -	\$ 2,625,000	\$ -	\$ 2,625,000						
SUBTOTAL	\$ 95,238,095	\$ 2,142,272	\$ 97,380,367	\$ 97,380,367	\$ 12,862,885	\$ 84,517,482	\$ -	\$ 97,380,367	\$ 5,424,388	\$ 91,955,979	Project Budget Transfers					
Construction Contingency (Hard Cost)	\$ 4,000,000	\$ 38,927	\$ 4,038,927	\$ 4,038,927	\$ -	\$ 4,038,927	\$ -	\$ 4,038,927	\$ -	\$ 4,038,927						
Owner's FFE Contingency	\$ -	\$ 2,019,312	\$ 2,019,312	\$ 2,019,312	\$ -	\$ 2,019,312	\$ -	\$ 2,019,312	\$ -	\$ 2,019,312						
Owner's Contingency (Soft Cost)	\$ 761,905	\$ 115,489	\$ 877,394	\$ 877,394	\$ -	\$ 877,394	\$ -	\$ 877,394	\$ -	\$ 877,394						
SUBTOTAL	\$ 4,761,905	\$ 2,173,728	\$ 6,935,633	\$ 6,935,633	\$ -	\$ 6,935,633	\$ -	\$ 6,935,633	\$ -	\$ 6,935,633						
PROJECT TOTAL	\$ 100,000,000	\$ 4,316,000	\$ 104,316,000	\$ 104,316,000	\$ 12,862,885	\$ 91,453,115	\$ -	\$ 104,316,000	\$ 5,424,388	\$ 98,891,612						



# Budget Update



December 31, 2022

Town of Concord  
Concord Middle School  
Project Budget and Cost Summary



A	C	D (Bud. Adj. Tab)	E (C+D)	F (Com. Cost tab)	G (E-F)	H (Forecast. tab, >G)	I (F+G+H)	J (Invoice Tab)	K (I-J)
Description	BUDGET			COST				CASH FLOW	
	Intial Budget	Authorized Changes	Approved Budget	Committed Costs	Uncommitted Costs	Forecast Costs	Total Project Costs	Expenditures to Date	Balance To Spend
20 Construction									
Construction	\$80,000,000	\$772,477	\$80,772,477	\$0	\$80,772,477	\$0	\$80,772,477	\$0	\$80,772,477
Subtotal	\$80,000,000	\$772,477	\$80,772,477	\$0	\$80,772,477	\$0	\$80,772,477	\$0	\$80,772,477
30 Architectural & Engineering									
Designer - Basic Services	\$6,590,600	\$589,400	\$7,180,000	\$7,180,000	\$0	\$0	\$7,180,000	\$3,453,000	\$3,727,000
Schematic Design	\$889,400	\$232,447	\$1,121,847	\$1,121,847	\$0	\$0	\$1,121,847	\$1,121,847	\$0
Geotechnical Engineering CA	\$250,000	-\$45,000	\$205,000	\$205,000	\$0	\$0	\$205,000	\$36,926	\$168,074
Geoenvironmental Engineering-allowance	\$51,000	\$134,000	\$185,000	\$185,000	\$0	\$0	\$185,000	\$0	\$185,000
Site Survey	\$50,000	-\$30,000	\$20,000	\$10,000	\$10,000	\$0	\$20,000	\$0	\$20,000
Survey of Existing Conditions / Wetlands	\$50,000	-\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hazardous Materials	\$100,000	\$45,000	\$145,000	\$145,000	\$0	\$0	\$145,000	\$1,338	\$143,662
A&E Sub Consultants	\$0	\$70,500	\$70,500	\$70,500	\$0	\$0	\$70,500	\$36,322	\$34,178
Other Reimbursable Costs	\$100,000	-\$80,000	\$20,000	\$20,000	\$0	\$0	\$20,000	\$95	\$19,905
Printing (Over the Minimum)	\$50,000	-\$30,000	\$20,000	\$0	\$20,000	\$0	\$20,000	\$0	\$20,000
Testing & Inspections	\$150,000	\$100,000	\$250,000	\$0	\$250,000	\$0	\$250,000	\$0	\$250,000
Subtotal	\$8,281,000	\$936,347	\$9,217,347	\$8,937,347	\$280,000	\$0	\$9,217,347	\$4,649,527	\$4,567,819
40 Administrative Costs									
Owner's Project Manager Basic Services	\$3,200,000	\$443,580	\$3,643,580	\$3,383,575	\$260,005	\$0	\$3,643,580	\$375,778	\$3,267,803
OPM Feasibility Study	\$299,800	\$78,353	\$378,153	\$378,153	\$0	\$0	\$378,153	\$378,153	\$0
OPM Cost Estimates	\$0	\$5,500	\$5,500	\$5,500	\$0	\$0	\$5,500	\$5,500	\$0
Advertising	\$29,795	\$205	\$30,000	\$0	\$30,000	\$0	\$30,000	\$0	\$30,000
Other Administrative Costs	\$50,000	\$0	\$50,000	\$0	\$50,000	\$0	\$50,000	\$0	\$50,000
Other Project Costs (Moving)	\$150,000	\$50,000	\$200,000	\$0	\$200,000	\$0	\$200,000	\$0	\$200,000
Utility Fees	\$300,000	\$0	\$300,000	\$0	\$300,000	\$0	\$300,000	\$0	\$300,000
Legal	\$50,000	-\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Commissioning Agent	\$200,000	-\$41,690	\$158,310	\$158,310	\$0	\$0	\$158,310	\$15,430	\$142,880
Subtotal	\$4,279,595	\$485,948	\$4,765,543	\$3,925,538	\$840,005	\$0	\$4,765,543	\$774,861	\$3,990,683



December 31, 2022

Town of Concord  
Concord Middle School  
Project Budget and Cost Summary



A	C	D (Bud. Adj. Tab)	E (C+D)	F (Com. Cost tab)	G (E-F)	H (Forecast. tab, >G)	I (F+G+H)	J (Invoice Tab)	K (I-J)
	BUDGET			COST				CASH FLOW	
Description	Intial Budget	Authorized Changes	Approved Budget	Committed Costs	Uncommitted Costs	Forecast Costs	Total Project Costs	Expenditures to Date	Balance To Spend
50 Furniture, Fixtures and Equipment									
Furniture, Fixtures and Equipment	\$1,225,000	\$140,000	\$1,365,000	\$0	\$1,365,000	\$0	\$1,365,000	\$0	\$1,365,000
Security	\$227,500	-\$227,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Technology	\$1,225,000	\$35,000	\$1,260,000	\$0	\$1,260,000	\$0	\$1,260,000	\$0	\$1,260,000
Subtotal	\$2,677,500	-\$52,500	\$2,625,000	\$0	\$2,625,000	\$0	\$2,625,000	\$0	\$2,625,000
Project Sub-Total	\$95,238,095	\$2,142,272	\$97,380,367	\$12,862,885	\$84,517,482	\$0	\$97,380,367	\$5,424,388	\$91,955,979
70 Project Contingency									
Construction Contingency	\$4,000,000	\$38,927	\$4,038,927		Current Contingency	Potential Risk	Potential Contingency		
Owner's Bid Contingency	\$0	\$2,019,312	\$2,019,312		\$4,038,927	\$0	\$4,038,927		\$4,038,927
Owner's Contingency	\$761,905	\$115,489	\$877,394		\$2,019,312	\$0	\$2,019,312		\$2,019,312
Subtotal	\$4,761,905	\$2,173,728	\$6,935,633		\$877,394	\$0	\$877,394		\$877,394
					\$6,935,633	\$0	\$6,935,633		\$6,935,633
Project Total	\$100,000,000	\$4,316,000	\$104,316,000	\$12,862,885	\$91,453,115	\$0	\$104,316,000	\$5,424,388	\$98,891,612
*Includes \$1.5M from Feasibility and Schematic Design Phase									
Construction Cost Estimates	Date	Amount	Gross Square Feet	Cost Per SF		Budget Revisions Summary		Date	Amount
Schematic Design Estimate	11/03/21	\$82,512,622	143,510	\$574.96					
Design Development	06/29/22	\$86,105,512	142,704	\$603.39					
Construction Documents (60%)	10/19/22	\$86,455,680	142,513	\$606.65					
Construction Documents (90%)									
Finalized GC Contract									



December 15, 2022

# Concord Middle School Estimated Project Cash Flow



	Month		OPM + Commissioning	Designer & Consultants	FF&E & Misc. Admin.	Construction	Contingency	Estimated Expenditures	Actual Expenditures	Estimated Cumulative Expenditures	Actual Cumulative Expenditures
Feasibility Study	1	Oct-19	\$25,110					\$25,110	\$25,110	\$25,110	\$25,110
	2	Nov-19	\$34,595					\$34,595	\$34,595	\$59,705	\$59,705
	3	Dec-19	\$20,660					\$20,660	\$20,660	\$80,365	\$80,365
	4	Jan-20	\$12,565	\$75,645				\$88,210	\$88,210	\$168,575	\$168,575
	5	Feb-20	\$16,445	\$151,290				\$167,735	\$167,735	\$336,310	\$336,310
	6	Mar-20	\$25,890	\$75,645				\$101,535	\$101,535	\$437,845	\$437,845
	7	Apr-20	\$34,480	\$75,645				\$110,125	\$110,125	\$547,970	\$547,970
	8	May-20	\$50,035	\$50,430				\$100,465	\$100,465	\$648,435	\$648,435
Pause	9	Jun-20	\$33,130	\$40,344				\$73,474	\$73,474	\$721,909	\$721,909
	10	Jul-20	\$15,520					\$15,520	\$15,520	\$737,429	\$737,429
	11	Aug-20	\$3,785					\$3,785	\$3,785	\$741,214	\$741,214
	12	Sep-20	\$720					\$720	\$720	\$741,934	\$741,934
	13	Oct-20	\$2,590					\$2,590	\$2,590	\$744,524	\$744,524
	14	Nov-20						\$0	\$0	\$744,524	\$744,524
Restart Feasibility Study	15	Dec-20	\$16,798					\$16,798	\$16,798	\$761,322	\$761,322
	16	Jan-21						\$0	\$0	\$761,322	\$761,322
	17	Feb-21						\$0	\$0	\$761,322	\$761,322
	18	Mar-21						\$0	\$0	\$761,322	\$761,322
	19	Apr-21						\$0	\$0	\$761,322	\$761,322
Schematic Design	20	May-21						\$0	\$0	\$761,322	\$761,322
	21	Jun-21		\$2,400				\$2,400	\$2,400	\$763,722	\$763,722
	22	Jul-21		\$69,318				\$69,318	\$69,318	\$833,040	\$833,040
	23	Aug-21		\$69,318				\$69,318	\$69,318	\$902,358	\$902,358
	24	Sep-21		\$69,318				\$69,318	\$69,318	\$971,676	\$971,676
	25	Oct-21		\$73,918				\$73,918	\$73,938	\$1,045,594	\$1,045,614
	26	Nov-21		\$57,765				\$57,765	\$57,765	\$1,103,359	\$1,103,379
Town Proce	27	Dec-21	\$18,016	\$42,361				\$60,377	\$60,377	\$1,163,736	\$1,163,756
	28	Jan-22	\$78,353	\$7,202				\$85,555	\$78,357	\$1,249,291	\$1,242,113
Design Development & Construction Documents	29	Feb-22	\$53,017					\$53,017	\$7,950	\$1,302,308	\$1,250,063
	30	Mar-22	\$53,017	\$436,495				\$489,512	\$62,018	\$1,791,820	\$1,312,081
	31	Apr-22	\$53,017	\$436,495				\$489,512	\$382,447	\$2,281,332	\$1,694,528
	32	May-22	\$53,017	\$436,495				\$489,512	\$733,550	\$2,770,844	\$2,428,078
	33	Jun-22	\$47,017	\$436,495				\$483,512	\$347,075	\$3,254,356	\$2,775,153
	34	Jul-22	\$107,867	\$424,658	\$16,667			\$549,191	\$473,965	\$3,803,547	\$3,249,117
	35	Aug-22	\$56,117	\$424,658	\$16,667			\$497,441	\$409,340	\$4,300,989	\$3,658,457
	36	Sep-22	\$52,165	\$424,658	\$16,667			\$493,489	\$494,049	\$4,794,478	\$4,152,506
	37	Oct-22	\$52,165	\$424,658	\$29,795			\$506,618	\$407,003	\$5,301,095	\$4,559,509
	38	Nov-22	\$52,165	\$424,658	\$7,143			\$483,965	\$462,832	\$5,785,061	\$5,022,341
	39	Dec-22	\$96,165	\$424,658	\$7,143			\$527,965	\$402,048	\$6,313,026	\$5,424,388
	40	Jan-23	\$59,815	\$424,658	\$7,143			\$491,615	\$0	\$6,804,641	
Bid	41	Feb-23	\$54,778	\$424,665	\$7,143			\$486,585	\$0	\$7,291,227	
	42	Mar-23	\$64,988	\$127,350	\$7,143			\$199,481	\$0	\$7,490,708	
	43	Apr-23	\$103,938	\$127,350	\$7,143			\$238,431	\$0	\$7,729,138	
	44	May-23	\$77,588	\$96,200	\$7,143			\$180,931	\$0	\$7,910,069	
Use 1 (New School)	45	Jun-23	\$96,088	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,574,062	\$0	\$11,484,131	
	46	Jul-23	\$97,578	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,575,552	\$0	\$15,059,683	
	47	Aug-23	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$18,629,495	
	48	Sep-23	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$22,199,307	
	49	Oct-23	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$25,769,119	
	50	Nov-23	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$29,338,931	
	51	Dec-23	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$32,908,743	
	52	Jan-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$36,478,555	
	53	Feb-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$40,048,367	
	54	Mar-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$43,618,178	
	55	Apr-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$47,187,990	

December 15, 2022

**Concord Middle School**  
**Estimated Project Cash Flow**



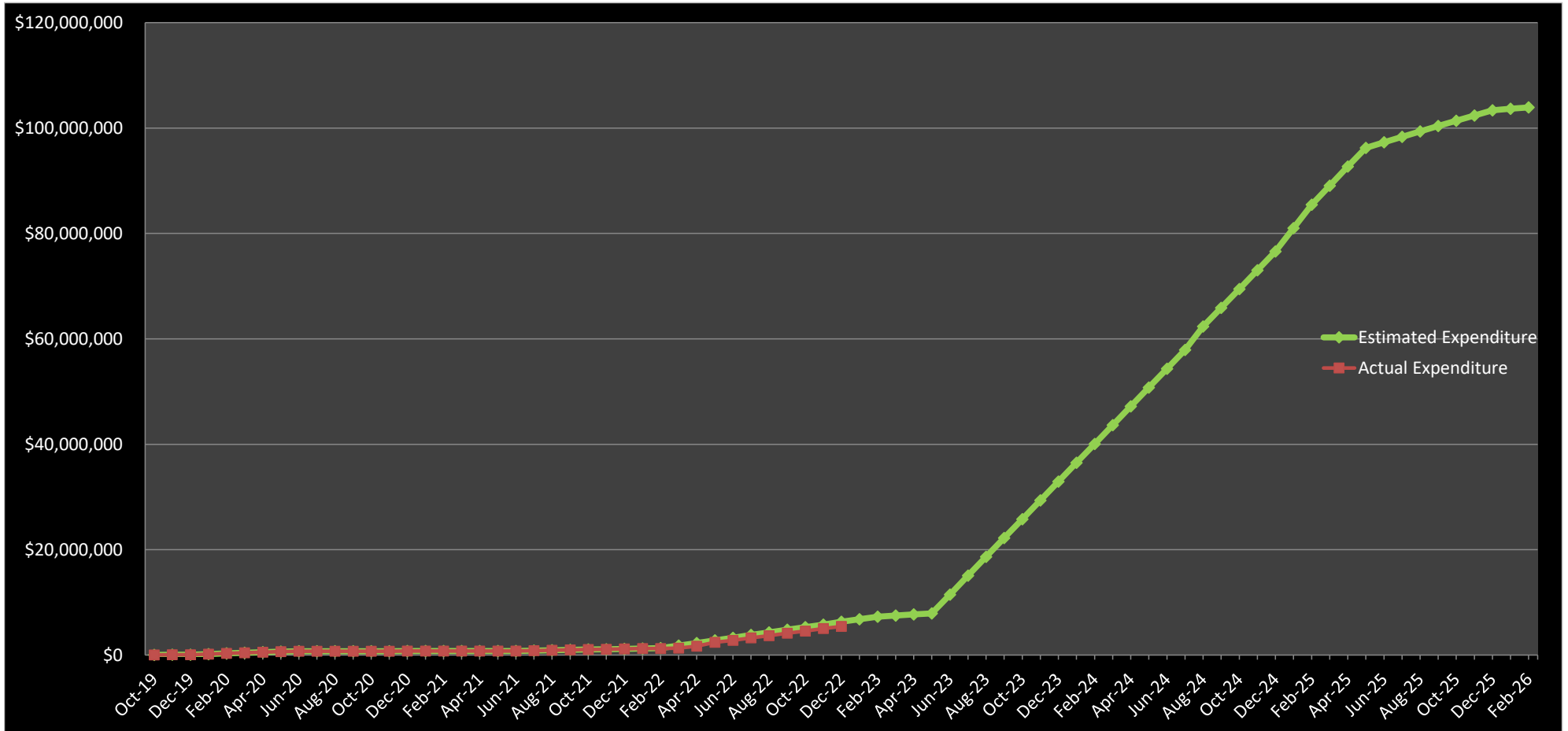
	Month	OPM + Commissioning	Designer & Consultants	FF&E & Misc. Admin.	Construction	Contingency	Estimated Expenditures	Actual Expenditures	Estimated Cumulative Expenditures	Actual Cumulative Expenditures
Construction Phase	56 May-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$50,757,802	
	57 Jun-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$54,327,614	
	58 Jul-24	\$91,838	\$96,200	\$8,333	\$3,094,687	\$278,753	\$3,569,812	\$0	\$57,897,426	
	59 Aug-24	\$78,338	\$96,200	\$887,500	\$3,094,687	\$278,753	\$4,435,479	\$0	\$62,332,905	
	60 Sep-24	\$78,338	\$96,200	\$12,500	\$3,094,687	\$278,753	\$3,560,479	\$0	\$65,893,383	
	61 Oct-24	\$78,338	\$96,200	\$12,500	\$3,094,687	\$278,753	\$3,560,479	\$0	\$69,453,862	
	62 Nov-24	\$78,338	\$96,200	\$12,500	\$3,094,687	\$278,753	\$3,560,479	\$0	\$73,014,340	
	63 Dec-24	\$78,338	\$96,200	\$12,500	\$3,094,687	\$278,753	\$3,560,479	\$0	\$76,574,819	
	64 Jan-25	\$78,338	\$96,200	\$887,500	\$3,094,687	\$278,753	\$4,435,479	\$0	\$81,010,298	
	65 Feb-25	\$78,338	\$96,200	\$887,500	\$3,094,687	\$272,669	\$4,429,394	\$0	\$85,439,692	
Phase 2 (Demo & Fields)	66 Mar-25	\$78,338	\$96,200	\$87,500	\$3,094,687	\$272,669	\$3,629,394	\$0	\$89,069,086	
	67 Apr-25	\$78,338	\$96,200	\$87,500	\$3,094,687	\$272,669	\$3,629,394	\$0	\$92,698,480	
	68 May-25	\$78,338	\$57,143	\$12,500	\$3,094,687	\$272,669	\$3,515,337	\$0	\$96,213,817	
	69 Jun-25	\$78,338	\$57,143	\$58,538	\$857,143	\$34,388	\$1,085,550	\$0	\$97,299,366	
	70 Jul-25	\$74,738	\$57,143		\$857,143	\$34,388	\$1,023,412	\$0	\$98,322,778	
	71 Aug-25	\$74,738	\$57,143		\$857,143	\$34,388	\$1,023,412	\$0	\$99,346,190	
	72 Sep-25	\$74,738	\$57,143		\$857,143	\$34,388	\$1,023,412	\$0	\$100,369,601	
	73 Oct-25	\$65,758	\$57,143		\$857,143	\$34,388	\$1,014,432	\$0	\$101,384,033	
	74 Nov-25	\$57,213	\$57,143		\$857,143	\$34,388	\$1,005,887	\$0	\$102,389,919	
	75 Dec-25	\$53,013	\$41,667		\$857,143	\$34,388	\$986,210	\$0	\$103,376,130	
Closeout	76 Jan-26	\$47,705	\$41,667		\$166,667	\$29,180	\$285,218	\$0	\$103,661,348	
	77 Feb-26	\$41,855	\$41,667		\$166,667		\$250,188	\$0	\$103,911,536	
	78 Mar-26	\$38,355	\$41,667		\$166,647		\$246,668	\$0	\$104,158,205	
	79 Apr-26	\$28,407	\$41,667				\$70,074	\$0	\$104,228,278	
	80 May-26	\$25,060	\$41,667				\$66,727	\$0	\$104,295,005	
	81 Jun-26	\$20,995					\$20,995	\$0	\$104,316,000	
	82 Jul-26						\$0	\$0	\$104,316,000	
	83 Aug-26						\$0	\$0	\$104,316,000	
	84 Sep-26						\$0	\$0	\$104,316,000	
	Subtotal for FY '19	\$252,910	\$468,999	\$0	\$0	\$0	\$721,909			
	Subtotal for FY '20	\$39,413	\$2,400	\$0	\$0	\$0	\$41,813			
	Subtotal for FY '21	\$355,454	\$2,135,180	\$0	\$0	\$0	\$2,490,634			
	Subtotal for FY '22	\$873,839	\$3,844,367	\$138,128	\$3,094,687	\$278,753	\$8,229,775			
	Subtotal for FY '23	\$1,107,796	\$1,154,401	\$100,000	\$37,136,249	\$3,345,038	\$42,843,483			
	Subtotal for FY '24	\$953,556	\$1,076,286	\$2,966,871	\$34,898,704	\$3,076,335	\$42,971,752			
	Subtotal for FY '25	\$602,575	\$535,714	\$0	\$5,642,837	\$235,507	\$7,016,634			
	TOTAL	\$4,185,543	\$9,217,347	\$3,205,000	\$80,772,477	\$6,935,633	\$104,316,000			



Town of Concord  
Concord Middle School  
Estimated Project Cash Flow Graph



December 15, 2022





# Schedule Update



Concord Middle School  
Project Schedule UPDATE  
December 12, 2022



ID	Task Name	Duration	Start	Finish	
1	Design & Pre-Construction Phases	945 days	Wed 8/14/19	Wed 5/17/23	33%
2	OPM Selection	15 days	Wed 8/14/19	Wed 9/4/19	100%
7	Designer Selection	62 days	Tue 8/20/19	Mon 11/18/19	100%
21	Feasibility Study	521 days	Tue 11/19/19	Thu 12/16/21	99%
38	Schematic Design	155 days	Thu 5/6/21	Thu 12/16/21	0%
48	Town Actions	77 days	Mon 10/18/21	Fri 2/4/22	0%
60	Design Development	102 days	Mon 2/7/22	Fri 7/1/22	0%
69	Commissioning Agent Selection	126 days	Tue 2/22/22	Fri 8/19/22	0%
84	Construction Documents	164 days	Tue 7/5/22	Mon 2/27/23	0%
85	60% Construction Documents	77 days	Tue 7/5/22	Fri 10/21/22	0%
94	90% Construction Documents	65 days	Thu 10/20/22	Mon 1/23/23	0%
95	90% Construction Documents- Pricing Set	40 days	Thu 10/20/22	Fri 12/16/22	0%
96	Finalize 90% CD Estimate Set	0 days	Fri 12/16/22	Fri 12/16/22	12/16
97	OPM & CxA review 90% CD	10 days	Mon 12/19/22	Fri 12/30/22	0%
98	90% CD Cost Estimate	17 days	Mon 12/19/22	Tue 1/10/23	0%
99	90% CD Cost Reconciliation	3 days	Wed 1/11/23	Fri 1/13/23	0%
100	90% CD submission to CMSBC	0 days	Fri 1/13/23	Fri 1/13/23	1/13
101	Complete 90% CD Report	15 days	Mon 1/2/23	Mon 1/23/23	0%
102	100% Construction Documents	29 days	Tue 1/17/23	Mon 2/27/23	0%

Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline



Concord Middle School  
Project Schedule UPDATE  
December 12, 2022



ID	Task Name	Duration	Start	Finish	
103	100% Construction Documents	29 days	Tue 1/17/23	Mon 2/27/23	
104	100% CD Package to CMSBC / Bid Package Complete	0 days	Mon 2/27/23	Mon 2/27/23	
105	Permitting	201 days	Mon 8/1/22	Wed 5/17/23	
106	ZBA Plan Review & Approval	95 days	Mon 8/1/22	Thu 12/15/22	
107	Submit plans for review (i) Site Plan Review (ii) Special Permit for Ground Water Conservancy (iii) Building Height Waiver	0 days	Mon 8/1/22	Mon 8/1/22	
108	Plan Review by DPW / Engineering / Water / CMLP / ZBA / Planning Board	31 days	Mon 8/1/22	Tue 9/13/22	
109	Planning Board Meeting Date	0 days	Tue 9/13/22	Tue 9/13/22	
110	ZBA Meeting Date	0 days	Mon 11/14/22	Mon 11/14/22	
111	Special Permit Recommendations to ZBA from Planning Board	0 days	Mon 11/14/22	Mon 11/14/22	
112	ZBA - 20 Day Appeal (Filed by Town Clerk)	20 days	Thu 11/17/22	Thu 12/15/22	
113	ZBA Issues Approval & Order of Conditions	0 days	Thu 12/15/22	Thu 12/15/22	
114	Tree Protection and Removal Permit by Planning Board	35 days	Tue 2/28/23	Tue 4/18/23	
115	Septic System Approval by Health Division	84 days	Wed 9/7/22	Thu 1/5/23	
116	Building Permit	10 days	Thu 5/4/23	Wed 5/17/23	
117	GC Submit Application/Plan Review by Town	10 days	Thu 5/4/23	Wed 5/17/23	
118	GC pulls Building Permit (Upon Contract Award / Issuance of NTP)	0 days	Wed 5/17/23	Wed 5/17/23	
119	Town Process	85 days	Mon 10/17/22	Thu 2/16/23	
120	Open Warrant	0 days	Mon 10/17/22	Mon 10/17/22	

Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

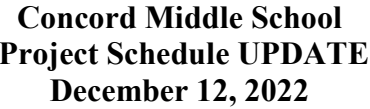


Concord Middle School  
Project Schedule UPDATE  
December 12, 2022



ID	Task Name	Duration	Start	Finish	2020	2021	2022	2023	2024	2025	2026	2027
121	Close the Warrant	0 days	Fri 10/28/22	Fri 10/28/22				10/28				
122	Select Board Meeting: Vote for \$110M Warrant Article	0 days	Mon 10/31/22	Mon 10/31/22				10/31				
123	Joint Finance Committee & CMSBC Meeting	0 days	Thu 11/3/22	Thu 11/3/22				11/3				
124	Finance Committee Public Hearing	0 days	Thu 11/17/22	Thu 11/17/22				11/17				
125	Warrant Posted & Mailed to Households	0 days	Mon 11/14/22	Mon 11/14/22				11/14				
126	Finance Comm Report	0 days	Thu 12/8/22	Thu 12/8/22				12/8				
127	Motions Posted for Special Town Meeting	0 days	Tue 1/17/23	Tue 1/17/23				1/17				
128	Special Town Meeting	0 days	Thu 1/19/23	Thu 1/19/23				1/19				
129	Town Vote	0 days	Thu 2/16/23	Thu 2/16/23				2/16				
130	GC and Subs Contractor Prequalifications	84 days	Tue 10/18/22	Wed 2/15/23				0%				
131	Draft RFQ and Advertising	12 days	Tue 10/18/22	Wed 11/2/22				0%				
132	Posted Advertisement	0 days	Wed 11/9/22	Wed 11/9/22				11/9				
133	Receive SOQ's	17 days	Wed 11/9/22	Mon 12/5/22				0%				
134	Review Submissions / Prequal Committee Meetings	48 days	Mon 12/5/22	Thu 2/9/23				0%				
135	Final Report to CMSBC	0 days	Thu 2/9/23	Thu 2/9/23				2/9				
136	Notification of Prequalification to Contractors	5 days	Thu 2/9/23	Wed 2/15/23				0%				
137	Bidding	43 days	Thu 3/2/23	Wed 5/3/23				0%				
138	Advertise on Central Register	0 days	Thu 3/2/23	Thu 3/2/23				3/2				
139	Posted on Central Register / Documents Available	0 days	Wed 3/8/23	Wed 3/8/23				3/8				

Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline



Critical		Split		Finish-only		Baseline Milestone		Manual Summary		Inactive Task	
Critical Split		Task Progress		Duration-only		Milestone		Project Summary		Inactive Milestone	
Critical Progress		Manual Task		Baseline		Summary Progress		External Tasks		Inactive Summary	
Task		Start-only		Baseline Split		Summary		External Milestone		Deadline	





Concord Middle School  
Project Schedule UPDATE  
December 12, 2022



ID	Task Name	Duration	Start	Finish	
159	Fields Ready for Use	0 days	Tue 9/1/26	Tue 9/1/26	

Critical

Critical Split

Critical Progress

Task

Split

Task Progress

Manual Task

Start-only

Finish-only

Duration-only

Baseline

Baseline Split

Baseline Milestone

Milestone

Summary Progress

Summary

Manual Summary

Project Summary

External Tasks

External Milestone

Inactive Task

Inactive Milestone

Inactive Summary

Deadline

# Schedule Recap - Design

Task Name	Duration	Start	Finish
<b>90% Construction Documents</b>	<b>65 days</b>	<b>Thu 10/20/22</b>	<b>Mon 1/23/23</b>
90% Construction Documents- Pricing Set	40 days	Thu 10/20/22	Fri 12/16/22
Finalize 90% CD Estimate Set	0 days	Fri 12/16/22	Fri 12/16/22
OPM & CxA review 90% CD	10 days	Mon 12/19/22	Fri 12/30/22
90% CD Cost Estimate	17 days	Mon 12/19/22	Tue 1/10/23
90% CD Cost Reconciliation	3 days	Wed 1/11/23	Fri 1/13/23
90% CD submission to CMSBC	0 days	Fri 1/13/23	Fri 1/13/23
<b>100% Construction Documents</b>	<b>29 days</b>	<b>Tue 1/17/23</b>	<b>Mon 2/27/23</b>
100% Construction Documents	29 days	Tue 1/17/23	Mon 2/27/23
100% CD Package to CMSBC / Bid Package Complete	0 days	Mon 2/27/23	Mon 2/27/23



# Schedule Recap - Bidding

Task Name	Duration	Start	Finish
<b>Bidding</b>	<b>43 days</b>	<b>Thu 3/2/23</b>	<b>Wed 5/3/23</b>
Advertise on Central Register	0 days	Thu 3/2/23	Thu 3/2/23
Posted on Central Register / Documents Available	0 days	Wed 3/8/23	Wed 3/8/23
Pre-Bid Conference	0 days	Wed 3/15/23	Wed 3/15/23
FSB Duration	20 days	Wed 3/8/23	Tue 4/4/23
GC Duration	30 days	Wed 3/8/23	Wed 4/19/23
Filed Sub-bid Due	0 days	Tue 4/4/23	Tue 4/4/23
General Bid (DBB)	0 days	Wed 4/19/23	Wed 4/19/23
Contract Award / NTP	10 days	Thu 4/20/23	Wed 5/3/23



# Schedule Recap – Town Process

Task Name	Duration	Start	Finish
<b>Town Process</b>	<b>85 days</b>	<b>Mon 10/17/22</b>	<b>Thu 2/16/23</b>
Open Warrant	0 days	Mon 10/17/22	Mon 10/17/22
Close the Warrant	0 days	Fri 10/28/22	Fri 10/28/22
Select Board Meeting: Vote for \$110M Warrant Article	0 days	Mon 10/31/22	Mon 10/31/22
Joint Finance Committee & CMSBC Meeting	0 days	Thu 11/3/22	Thu 11/3/22
Finance Committee Public Hearing	0 days	Thu 11/17/22	Thu 11/17/22
Warrant Posted & Mailed to Households	0 days	Mon 11/14/22	Mon 11/14/22
Finance Comm Report	0 days	Thu 12/8/22	Thu 12/8/22
Motions Posted for Special Town Meeting	0 days	Tue 1/17/23	Tue 1/17/23
Special Town Meeting	0 days	Thu 1/19/23	Thu 1/19/23
Town Vote	0 days	Thu 2/16/23	Thu 2/16/23



Hill International



# Structural Peer Review



Hill International, Inc.  
75 Second Avenue, Suite 300  
Needham, MA 02494  
Tel: 617-778-0900  
www.hillintl.com

December 12, 2022

Ms. Kerry Lafleur  
Town Manager  
Town of Concord  
22 Monument Square  
Concord, MA 01742

**Re: Concord Middle School Project  
Recommendation for Structural Engineering Peer Review**

Dear Ms. Lafleur,

On November 16, 2022, Hill issued a Request for Services (RFS) for a structural engineering peer review using sound business practices consistent with Massachusetts public procurement laws.

We received the attached proposals on or before December 1, 2022 from the following firms (1) Goldstein-Milano, (2) EDG, (3) DM Berg Consultants, (4) Foley and Buhl, and (5) Souza True and Partners. We have worked with all of these firms in the past and have had positive experiences.

On behalf of the Town, Hill has reviewed and evaluated these proposals and we have summarized results in the attached proposal comparison form. We found that all five proposals were responsive to the RFS and included confirmation of scope, qualifications, and the associated cost of services. Given our history with their firm, coupled with their proposal which exhibited a great understanding of the scope of services, **Hill recommends award to Souza True and Partners in the amount of \$8,500.00.**

Upon your concurrence with our recommendation, we will prepare a contract amendment for Hill International to include these structural engineering peer review services.

Should you have any questions, please reach out to me directly at 917.562.7028.

Sincerely,

A handwritten signature in black ink, appearing to read "Ian Parks".

Ian Parks  
Project Director

**DELIVERING THE  
INFRASTRUCTURE  
OF CHANGE**

## Concord Middle School Project - Structural Peer Review

### Proposal Comparisons

12/2/2022

<b>Firms:</b>	<b>Souza True and Partners</b>	<b>Goldstein-Milano</b>	<b>EDG</b>	<b>DM Berg Consultants</b>	<b>Foley Buhl Roberts &amp; Associates</b>
<b>Fee:</b>	Lump Sum - \$8,500	Stipulated Sum - \$8,500	Lump Sum - \$9,500	Lump Sum - \$4,400	Fixed Fee - \$8,000
<b>Schedule:</b>	<b>Souza True and Partners</b>	<b>Goldstein-Milano</b>	<b>EDG</b>	<b>DM Berg Consultants</b>	<b>Foley Buhl Roberts &amp; Associates</b>
Comments incorporated in 90% CD package	X	X	X	X	X
Comments incorporated in 100% CD package	X	X	X	X	X
<b>Services Acknowledged:</b>	<b>Souza True and Partners</b>	<b>Goldstein-Milano</b>	<b>EDG</b>	<b>DM Berg Consultants</b>	<b>Foley Buhl Roberts &amp; Associates</b>
Review of the structural design loads	X	X	X	X	X
Review of the structural design criteria for the structure and foundations	X	X	X	X	X
Review of the structural load paths for the gravity and lateral loads;	X	X	X	X	X
Review of the geotechnical report to confirm recommendations for foundation design and seismic coefficient	X	X	X	X	X
Verification that the structure is conceptually correct;	X	X	X	X	X
Independent calculations to confirm the adequacy of a representative number of structural systems, members, and details	X	X	X	Did not specifically identify	X
Review of major structural details	X	X	X	X	X
Review of the structural specification sections for the primary structure;	X	X	X	X	X
Contact with the Structural Engineer of Record to discuss the design approach and any issues which may arise during the review	X	X	X	X	X
Preparation of a letter stating whether or not the structural design shown on the drawings and specifications conform to the structural and foundation requirements of 780 CMR, Commonwealth of Massachusetts State Building Code - Ninth Edition	X	X	X	X	X

Hill Comments:	Souza True and Partners	Goldstein-Milano	EDG	DM Berg Consultants	Foley Buhl Roberts & Associates
	Supplemental scope sheet, identified all scope requirements, will issue report to building official.	No scope sheet, cited MA state building code, 780 CMR and compliance with Section 105.9 of 780 CMR, and AIA C-401 as basis for structural peer review. Incorrectly cited the size/structure of building identified on RFS, did not recognize available drawings. Attached relative project experience.	No scope sheet, cited MA state building code, 780 CMR and compliance with Section 105.9 of 780 CMR as basis for structural peer review. Identified dates and noted they try to engage in meetings with EOR, emphasized importance of communication	Very detailed separate scope sheet, would like a second opinion on services offering. Attending meetings not included in scope, hourly rates defined for undefined scope of services	Identified the individuals conducting the Peer Review, one of whom is one of the Partners of the firm. Identified scope detailed in RFS and cited MA state building code, 780 CMR and compliance with Section 105.9 of 780 CMR. Not expenses are included in proposed fee.





265 Winter Street, Third Floor  
Waltham, Massachusetts 02451  
Telephone: (617) 926-6100  
Email: [souzatrue@souzatrue.com](mailto:souzatrue@souzatrue.com)

**SOUZA, TRUE**  
AND PARTNERS, INC.  
STRUCTURAL ENGINEERS

TERRY A. LOUDERBACK, PE  
JEROME A. YURKOSKI, PE  
LISA A. BOHLIN, PE  
TODD P. BLAKE, PE, SE

**November 23, 2022**

**Hill International**  
75 Second Avenue, Suite 300  
Needham, MA 02494

**Attention:** Mr. John Cutler

**Reference:** Independent Structural Peer Review  
Concord Middle School  
Concord, MA

**Dear Mr. Cutler:**

In response to your request for a fee proposal, we would be pleased to offer our services as your structural engineering consultant to perform a structural peer review of the structural design of the new Concord Middle School. The structural peer review will be performed per the requirements of the 9<sup>th</sup> Edition of the Commonwealth of Massachusetts State Building Code. We understand that the proposed project will consist of the following:

- New middle school located in Concord, MA adjacent to the Sanborn Middle School.
- The new school will include a two story area that will include the gymnasium, auditorium, and media center.
- The new school will also have a three story academic wing.
- The total square footage of the building will be approximately 142,537 sf.
- The foundation is a soil supported slab on grade. Foundations are soil supported shallow concrete footings.
- Lateral resisting system consists of steel braced frames and/or moment frames.
- This review will be conducted in two phases. The first phase will be high level review only on the 90% Construction Documents available on December 19, 2022. No calculations are expected to be completed on this initial review and a stamped peer review letter is not required to be submitted. A second review will be the official peer review on revised 90% set set to be issued in January of 2023. This review will include the final stamped letter.
- The first review is required to be completed so that any high level comments has an opportunity to be incorporated into a final 90% CD set to be issued to the owner on January 6, 2023. The second review must completed so that comments can be incorporated in a 100% CD set to be issued February 27, 2023.

Our structural review would follow the requirements in accordance with the guidance document found at [www.mass.gov/dps](http://www.mass.gov/dps) with excerpts indicated below:

**Mr. John Cutler**

**Concord Middle School – Structural Peer Review Proposal**

November 23, 2022

Page 2

**INDEPENDENT STRUCTURAL ENGINEERING REVIEW GUIDANCE**

*The purpose of this file is to provide guidance to those performing an independent structural engineering review in accordance with the building code (Code), specifically Section 780 CMR 105.9.*

**Primary Structure:** For the purposes of the independent structural engineering review required in 780 CMR 105.9, the primary structure shall be defined as the structural frame, the load supporting parts of floors, roofs, and walls, and the foundations. Cladding, cladding framing, stairs, equipment supports, ceiling supports, non-load bearing partitions, and railings are excluded from this definition of primary structure.

**Reviewing Engineer Qualifications:** The reviewing engineer shall be engaged by the owner and shall be a Massachusetts registered professional engineer with structural design training and experience on structures similar to that covered by the building permit application. The engineer shall be impartial, and independent of the architect of record, structural engineer of record, and contractors and suppliers involved with the structure.

**Review Criteria:** The reviewing engineer shall review the plans and specifications submitted with the building permit application for compliance with the structural and foundation design provisions of the Code including the following tasks:

1. Check to assure that design loads conform to the Code;
2. Check that other design criteria and assumptions conform to the Code and with accepted engineering practice;
3. Confirm that the structural design incorporates pertinent results and recommendations of geotechnical and other engineering investigations.
4. Check that the organization of the structure is conceptually correct; and
5. Make independent calculations for a representative fraction of systems, members, and details to check their adequacy. The number of representative systems, members, and details shall be sufficient to form a basis for the reviewer's conclusions.

**Review of Structural Calculations:** The structural calculations prepared by the structural engineer of record shall be submitted to the reviewing engineer, upon request, for reference only. The reviewing engineer is not obligated to review or check these calculations. The structural engineer shall also provide a statement with the design criteria and design assumptions if they are not shown on the drawings or in the calculations.

**Structural Responsibility:** The structural engineer of record shall retain sole responsibility for the structural design. The activities and reports of the reviewing engineer shall not relieve the structural engineer of record of this responsibility.

**Review Report and follow-up:**

1. The reviewing engineer shall prepare a report to the building official stating whether or not the structural design shown on the drawings and in the specifications conforms with the structural and foundation requirements of the Code, based on the review as

**Mr. John Cutler**

**Concord Middle School – Structural Peer Review Proposal**

November 23, 2022

Page 3

- prescribed in this guidance document, and shall include a summary of all deficiencies, if any, which cannot be resolved with the structural engineer of record.
2. The structural engineer of record shall review the report of the reviewing engineer and notify the building official in writing of agreement or of dispute with the conclusions and recommendations of the reviewing engineer.
  3. Unresolved disputes between the structural engineer of record and the reviewing engineer shall be submitted by the building official, the owner, the structural engineer of record or the reviewing engineer to the Board of Building Regulations and Standards for resolution.
  4. Any changes to the structural design subsequent to the original submission of the plans and specifications shall be shown on revised drawings and specifications, submitted with an amendment to the application for permit. The reviewing engineer shall review the changes on the revised drawings and specifications, and, if the original reviewing engineer report does not account for the changes in said drawings and specifications, a supplementary report relating to the changes and prepared by the reviewing engineer shall be made to the building official.

We propose to provide a single structural peer review in accordance with the requirements stipulated in the guidance document of the Massachusetts State Building Code, Ninth Edition, based on the following schedule of services:

<b>Initial High Level Review (No calcs, No stamped letter):</b>	<b>\$1,500.00</b>
<b>Peer Review of the Revised 90% CD Package:</b>	<b>\$7,000.00</b>
<b>Total Fee:</b>	<b>\$8,500.00</b>

In addition to the structural drawings, we will require a copy (PDF's) of the geotechnical engineering report for the proposed work, structural specifications, and the architectural design documents for our review and coordination. It is not necessary for the structural engineer-of-record to submit structural calculations. Calculations will only be required if information presented on the Contract Documents requires justification or additional explanation.

Please understand that while we request copies of the geotechnical report and architectural design documents, these documents will only be used for reference. We will not perform a peer review on any portion of the geotechnical recommendations nor any portion of the architectural scope.

For a project of this size, we generally require approximately two weeks to complete our review once we receive notice to proceed and we receive all required information.

Any additional structural engineering services, if any, (beyond the general scope of this proposal), which is highly unlikely, will be billed separately on an hourly rate basis in accordance with our following current billing rates:

Senior Principals	\$ 225.00 per hour
Principals	\$ 190.00 per hour
Associates	\$ 160.00 per hour
Engineers	\$ 145.00 per hour

**Mr. John Cutler**

**Concord Middle School – Structural Peer Review Proposal**

November 23, 2022

Page 4

CAD Operators

\$ 95.00 per hour

Please note that additional services, if necessary, will only be executed following written authorization from you.

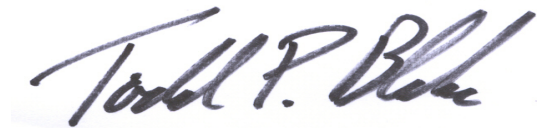
We thank you for considering and requesting a proposal from Souza, True and Partners, Inc. for this peer review project. Kindly countersign and return the enclosed copy of this letter, if this proposal is acceptable to you.

Please contact me if you have any questions or if you require additional information.

**Sincerely,**

**SOUZA, TRUE AND PARTNERS, INC.**

**Hill International**

A handwritten signature in dark ink, appearing to read "Todd P. Blake", is written over a horizontal line.

**Todd P. Blake, P.E.**  
Principal

\_\_\_\_\_  
**Authorized Signature**



# Prequalification

# Prequalification Update

## Summary of SOQs Received

- 95 received
- 3 disqualified (missing documents or late submissions)
- 1 package has been re-advertised – Elevators



General Contractor	HVAC	Painting	Tile
Agostini Bacon Construction Companies	E. Amanti & Sons, Inc.	Bello Painting	Ayotte & King For Tile, Inc.,
Brait Builders Corporation	General Mechanical Contractors, Inc.	Color Concepts Inc.	Capital Carpet & Flooring Specialists, Inc.
CTA Construction	Harold Brothers	Dandis Contracting Inc.	Joseph Cohn & Son Tile & Terrazzo, LLC
Fontaine Bros., Inc.	N.B. Kenney Company, Inc	Drizos Contracting	Pavilion Floors
W.T. Rich Company	William F Lynch Co, Inc.	Homer Contracting Inc.	Roman Tile Co.
		JB Painting	The Jantile Group
		John W. Egan Co.	
Acoustical Tile	Masonry	Keltic Painting LLC	Waterproofing
Central Ceilings, Inc.	Costa Brothers Masonry	King Painting	Acme Waterproofing Co., Inc
H. Carr & Sons	Empire Masonry	New Generation Painting, Inc.	Beacon Waterproofing & Restoration
K&K Accoustical Ceilings	Fernandes Masonry, Inc.	VP Decor, Inc.	Folan Waterproofing & Construction, Co., Inc.
	Lighthouse Masonry, Inc.		P.J. Spillane Co., Inc.
Electrical	Marmelo Bros Construction	Plumbing	Superior Caulking and Waterproofing Co., Inc.
Annese Electrical Services		Araujo Bros. Plumbing & Heating, Inc.	The Waterproofing Company
Brothers Electrical Corp	Metal Windows	E. Amanti & Sons, Inc.	
LeVangie Electric	A & A Window Products, Inc..	Grasseschi Plumbing	<b>Disqualified - missing mandatory docs</b>
System Contracting	Chandler Architectural Products, Inc.	Harold Brothers	<b>Fire Protection</b>
Wayne J. Griffin Electric, Inc.	G.V.W., Inc.	Kneeland Plumbing & Heating, Inc.	Johnson Controls
Elevators*	Kapiloff's Glass, Inc.	N.B. Kenney Company, Inc	
Delta Beckwith Elevator Company	Lizotte Glass	Pinnacle Construction Services	<b>Disqualified - late submission</b>
	Lockheed Architectural Solutions, Inc	William F Lynch Co, Inc.	<b>Masonry</b>
	R&R Window Contractor, Inc.		Commercial Masonry Corporation
Fire Protection		Resilient Floors	<b>Waterproofing</b>
Covenant Fire Protection		Ayotte & King For Tile, Inc.,	Commercial Masonry Corporation
Hampshire Fire Protection	Misc Ornamental Iron	Capital Carpet & Flooring Specialists, Inc.	<b>Misc Ornamental Iron</b>
Xcel Fire Protection	Avid Ironworks	CJM Services, Inc.	V&G Iron Works, Inc.
Yankee Sprinkler Company	L&L Contracting	Pavilion Floors	
	Quinn Bros. Of Essex, Inc.		
Glass & Glazing	Roman Iron Works, Inc.		
A & A Window Products, Inc..	SMJ Metal Co., Inc./Ralph's Blacksmith Shop	Roofing & Flashing	<b>*Readvertised - Insufficient SOQs received</b>
Aluminum & Glass Concepts, Inc.	The Berlin Steel Construction Co.	Capeway Roofing	Elevators
Chandler Architectural Products, Inc.	Tim's Fabricators, Inc.	Gibson Roofs, Inc.	
G.V.W., Inc.	United Steel	Greenwood Industries Inc.	
Kapiloff's Glass, Inc.		Rockwell Roofing, Inc.	
Lizotte Glass		Silktown Roofing, Inc.	
Lockheed Architectural Solutions, Inc		Stanley Roofing Company, Inc.	
R&R Window Contractor, Inc.			



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# Prequalification Update

## Timeline & Next Steps

Task Name	Duration	Start	Finish
<b>GC and Subs Contractor Prequalifications</b>	<b>84 days</b>	<b>Tue 10/18/22</b>	<b>Wed 2/15/23</b>
Draft RFQ and Advertising	12 days	Tue 10/18/22	Wed 11/2/22
Posted Advertisement	0 days	Wed 11/9/22	Wed 11/9/22
Receive SOQ's	17 days	Wed 11/9/22	Mon 12/5/22
Review Submissions / Prequal Committee Meetings	48 days	Mon 12/5/22	Thu 2/9/23
Final Report to CMSBC	0 days	Thu 2/9/23	Thu 2/9/23
Notification of Prequalification to Contractors	5 days	Thu 2/9/23	Wed 2/15/23



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# Deduct Alternates

# Cost Recap

January - February 2022 Estimated Cost for Warrant Article / Special Town Meeting	
Description	Warrant Article Cost
<b>20 Construction</b>	
Schematic Design Reconciled Estimate	\$82,512,622
VM Accepted in Schematic Design (Dec 2021)	-\$1,740,145
SD Construction Estimate with VM Accepted	\$80,772,477
<b>30 Architectural &amp; Engineering</b>	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
Printing (Over the Minimum)	\$20,000
Testing & Inspections	\$250,000
Subtotal	\$8,095,500
<b>40 Administrative Costs</b>	
Owner's Project Manager Basic Services	\$3,643,580
Commissioning Agent	\$280,000
Advertising	\$30,000
Other Administrative Costs	\$50,000
Other Project Costs (Moving)	\$200,000
Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
<b>50 Furniture, Fixtures and Equipment</b>	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
<b>70 Contingency</b>	
Construction Contingency (5% Hard Costs)	\$4,038,624
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$4,799,828
<b>Sub-Total</b>	<b>\$100,796,385</b>
Owner's Bid Contingency (2.5% Hard Costs)	\$2,019,312
<b>Total</b>	<b>\$102,815,697</b>
Note: **Excludes \$1.5M initial funding for Feasibility and SD Phase	

November 2022 60% CD Estimate + VM	
CURRENT COST	
Description	60% CD Estimate Projection
<b>20 Construction</b>	
60% CD Reconciled Estimate	\$86,455,680
VM Accepted 10/27 SBC Meeting (Revised 11/17 SBC Mtg)	-\$110,931
60% CD Construction Estimate	<b>\$86,344,749</b>
<b>30 Architectural &amp; Engineering</b>	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
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Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
<b>50 Furniture, Fixtures and Equipment</b>	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
<b>70 Contingency</b>	
Construction Contingency (5% Hard Costs)	\$4,317,237
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$5,078,441
<b>Sub-Total</b>	<b>\$106,647,270</b>
Owner's Bid Contingency	\$2,019,312
<b>Total</b>	<b>\$108,666,582</b>
Note: **	

STM Budget, Jan 2022

\$102,815,697

60% CD Estimate + VM Accepted  
November 2022

\$108,666,582

STM Warrant, Jan 2023

\$110,000,000



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# Deduct Alternate Discussion

## Purpose of Deduct Alternates

- To identify scope that can be removed from the project if necessary
- Provide additional “safety net” for a potential bid overrun beyond the \$1,333,418 (difference from the current estimate to \$110M Warrant Article)
- Deduct Alternates to be priced by the estimators with the 90% estimate starting 12/19/22
- SMMA needs to document these deduct alternates for the 100% CD/Bid Package due 2/27/23

## Feasible for Deduct Alternate Consideration

- Eliminate remaining wood-look ceilings @ \$189,422
- Remove bleachers in gym @ \$84,240
- Remove outdoor classroom construction @ Cost TBD
- Rough in speakers in classrooms (deferred scope) @ \$125,874
- Reduce landscaping @ \$300,000
- Remove athletic fields; replace with typical lawn sections @ \$1,502,271



### Court Booth Input

- Remove outdoor classroom construction, rely on natural spaces, common practice
- Seek savings in sub-surface of athletic fields, place savings in irrigation if necessary
- Remove \$100,000 band room AV, band instruments will not need amplification
- Move computers to FFE

### SMMA/Hill Response

Ok to pursue.

Savings realized?

Schedule Impact/Not Feasible

No savings realized.

### Heather Bout Input

- My thought on alt deducts is that we should consider the fields (and possibly other outdoor elements if absolutely necessary)

Ok to pursue.

### Charlie Parker Input

			Source
14	Eliminate remaining woodlook ceiling	\$ 189,422	10/27 VE Log
71	Bleachers	\$ 84,240	10/27 VE Log
74	Rough in speakers in classrooms	\$ 125,874	10/27 VE Log
	Reduce landscaping	\$ 300,000	SMMA
	Reduce band & chorus & gym sound systems by 50%	\$ 194,300	PM&C 60%
	Reduce auditorium & cafeteria AV by 50%	\$ 334,900	PM&C 60%
	Reduce auditorium performance lighting by 50%	\$ 155,872	PM&C 60%
	Reduce auditorium stage curtains, and rigging by 50%	\$ 61,418	PM&C 60%
32	Revise athletic fields plan	\$ 1,502,271	10/27 VE Log
		<b>\$ 2,948,297</b>	

Included on deduct Alt list

Included on deduct Alt list

Ok to pursue.

Recommended on 11/17

Schedule Impact/Not Feasible

Schedule Impact/Not Feasible

Schedule Impact/Not Feasible

Schedule Impact/Not Feasible

Recommended on 11/17



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# Meeting Minutes



# Concord Middle School Building Committee

Dawn Guarriello, Co-Chairperson Pat Nelson, Co-Chairperson

## Meeting Minutes Thursday, December 15<sup>th</sup>, 2022

### Call to Order:

- P. Nelson called the meeting to order at 7:33am.
- The recording of this meeting: [Concord Middle School Building Committee Meeting - Zoom](#)

Name	Present	Name	Present	Name	Present
<b>CONCORD MIDDLE SCHOOL BUILDING COMMITTEE:</b>					
Alexa Anderson*	P	Peter Fischelis*	P	Pat Nelson*	P
Robert Conry	P	Russ Hughes	P	Chris Popov*	P
Court Booth*	P	Dawn Guarriello*	P	Charlie Parker*	P
Heather Bout*	P	Jon Harris	P	Matt Root*	P
Frank Cannon*	P	Laurie Hunter*	P	Steven Stasheski*	P
Justin Cameron	P	Matt Johnson*	P		
Gail Dowd	P	Kerry Lafleur	NP		
<b>Hill International</b>					
Peter Martini	P	Ian Parks	P	Susan McCann	P
John Cutler	P				
<b>SMMA / Ewing Cole</b>					
Lorraine Finnegan	P	Matthew Rice	NP	Keith Fallon	NP
Will Smarzewski	NP	Phil Poinelli	NP	Saul Jabbawy	NP
Chase Gibson	NP	Michael Dowhan	P	Jen Soucy	NP

P=Present, NP= Not Present \*=Voting Member

### Approval of Meeting Minutes

- CMSBC meeting minutes from October 27<sup>th</sup> and November 17<sup>th</sup>.

<b>Motion:</b>	<b>Approve 10/27 and 11/17 CMSBC meeting minutes as written.</b>
Motioned by	M. Johnson
Seconded by	C. Booth
Y = approve (12) N = reject Motion carries to approve the meeting minutes unamended by unanimous vote. Note: One member of the CMSBC was not present at this point in the meeting.	

### Correspondence/Communication

- The CMSBC received 5 emails since the last meeting:
  - One email about changing the date for the Special Town meeting
    - The Select Board changed the date of the Special Town Meeting to January 19<sup>th</sup>.
  - One email about plans to hard wire tel/data in the school with a follow up.
  - One email about the presentation slide deck which had since been uploaded to the project site and school website.
- Several “coffee hours” have been held as community outreach events with great turnout.
- A January 12<sup>th</sup> outreach to the Council on Aging members is scheduled.
- Working on scheduling a specific outreach to Parent Teacher Group (PTG).



## Concord Middle School Building Committee

Dawn Guarriello, Co-Chairperson

Pat Nelson, Co-Chairperson

### Meeting Minutes

Thursday, December 15<sup>th</sup>, 2022

#### OPM Update

- *Cashflow update:*
  - In the month of December project expenditures which consisted of Hill, SMMA, and AKF+SGH invoices was \$402,048. Total expenditures on the project to date total \$5,424,388.
- *Schedule recap:*
  - Hill presented updated project schedule dated 12/12/22, which included the following highlights for related to the 90% CD phase and bid phase of the project
    - Finalize 90% CD Estimate set: 12/16/22
    - 90% CD Estimate to CMSBC: 1/13/23
    - 100% CD /Bid Package Complete: 2/27/23
    - Advertise on Central Register: 3/2/23
    - Documents Available to Bidders: 3/8/23
    - Pre-Bid Conference: 3/15/23
    - Filed Sub-bids due: 4/4/23
    - General Contractor Bids due: 4/19/23
    - Contract Award/NTP: 4/20/23 through 5/3/2023
- *Structural Peer Review*
  - Hill reached out to 5 prospective Structural Peer Review firms for proposals using sound business practice.
  - Hill reviewed and evaluated each proposal and selected Souza True and Partners based on having the most favorable proposal.
    - Hill will prepare a contract amendment for Souza True to be a subconsultant to Hill and will have them begin their peer review when the 90% CD set becomes available.
- *Prequalification Update:*
  - Hill received 95 Statement of Qualifications
    - 3 contractors were disqualified for missing documents or late submissions.
      - Johnson Controls (missing mandatory docs)
      - Commercial Masonry (late submission)
      - V&G Iron Works (late submission)
    - 1 trade (Elevators) was readvertised due to insufficient responsiveness.
  - Prequalification schedule:
    - Review submissions: 12/5/22 - 2/9/23
    - Final Report to CMSBC: 2/9/23
    - Notification to Contractors: 2/9/23 – 2/15/23
    - This timeline may be adjusted and improved as the process continues.
- *Cost Recap:*
  - Special Town Meeting budget as of Jan 2022: \$102,815,697
  - 60% CD Estimate + Accepted VM: \$108,666,582 (Current Cost Estimate in Nov 2022)
  - Special Town Meeting Warrant Article Jan 2023: \$110,000,000
- *Deduct Alternates:*
  - Purpose: to identify scope that can be removed from the project if necessary



## Concord Middle School Building Committee

Dawn Guarriello, Co-Chairperson

Pat Nelson, Co-Chairperson

### Meeting Minutes

Thursday, December 15<sup>th</sup>, 2022

- Purpose: provide additional “safety net” for a potential bid overrun beyond the \$1,333,418 (difference from the current estimate to \$110M Warrant Article)
- Any deduct alternates need to be priced by the estimators with the 90% CD estimate
- SMMA needs to document these deduct alternates for the 100% CD/Bid package due 2/27/23.
- Potential deduct alternates for consideration:
  - Eliminate remaining wood-look ceilings: \$189,422
  - Remove bleachers in gym: \$84,240
  - Remove outdoor classroom construction: Cost TBD
  - Rough in speakers in classrooms (deferred scope): \$125,874
  - Reduce landscaping: \$300,000
  - Remove athletic fields; replace with typical lawn sections: \$1,502,271
- Hill reviewed CMSBC input received via email from C. Booth, H. Bout, and C. Parker and the SMMA/Hill responses.
- Hill reviewed the list of feasible deduct alternates:
  - Eliminate remaining wood-look ceilings @ \$189,422.
  - Remove bleachers in gym @ \$84,240.
  - Remove outdoor classroom construction, rely on natural spaces, common practice. Cost TBD.
  - Rough in speakers in classrooms (deferred scope) @ \$125,874.
  - Reduce landscaping @ \$300,000, but maintain bioswale landscaping.
  - Remove athletic fields; replace with typical lawn sections @ \$1,502,271.
- SMMA emphasized that deduct alternates should impact as few trades as possible to be an effective method of reducing bids in the event of a bid overage.
- SMMA detailed the impact of removing the outdoor classrooms, one of the CMSBC members recommendation:
  - Remove outdoor seating
  - Remove hardscape and walkway
    - Material is currently concrete and could be removed and replaced with lawn.
  - Grading through the entire area would need to be adjusted and SMMA recommended a stone dust pathway to maintain handicap accessibility.

Deduct Alternates	Vote to accept 4 deduct alternates in no particular order
Motion	Accept the removal of the remaining wood-look ceilings, removal of the bleachers, reduction in landscaping, and removal of the athletic fields as deduct alternates in an order to be determined at a future CMSBC meeting.
Motioned by	S. Stasheski
Seconded by	A. Anderson
Motion was <b>accepted</b> by a unanimous vote.	





## Concord Middle School Building Committee

Dawn Guarriello, Co-Chairperson

Pat Nelson, Co-Chairperson

### Meeting Minutes Thursday, December 15<sup>th</sup>, 2022

<b>Deduct Alternates</b>	Vote to accept an additional deduct alternate.
Motion	Accept the removal of the outdoor classrooms and regrade the area as an accessible stone dust path as a deduct alternate.
Motioned by	M. Johnson
Seconded by	C. Booth
Motion was <b>accepted</b> by a unanimous vote.	

<b>Deduct Alternates</b>	Vote to accept an additional deduct alternate.
Motion	Accept as a deduct alternate, the rough in of the speakers in the classroom (defers wiring and speaker scope).
Motioned by	M. Johnson
Seconded by	C. Booth
Motion was <b>rejected</b> by a vote of 11 “no” to 1 “yes”. This item was not added to the deduct alternate list.	

- *Cost analysis for bid scenarios*
  - Hill reviewed the cost analysis for bid scenarios that was first presented at the 11/17/22 CMSBC meeting:
  - The maximum bid the project budget allows for in different scenarios.
    - Based on the 60% CD estimate: **\$86,071,088**
    - Based on the acceptance of the \$110M warrant article: **\$87,691,850**
    - Based on the acceptance of the warrant article and applying the bid contingency: **\$89,711,162**
    - Based on warrant article, utilizing bid contingency, and applying deduct alternates: approximately **\$91,513,433** (note: this value does not include the savings associated with removing the outdoor classroom)

#### Public Comment

- Town resident D. Banfield commented that he felt the advanced irrigation system was unnecessary. He further noted that if the CMSBC is looking to upgrade the fields he recommended using the additional funds to install sod so the fields would be available sooner.

#### Next Steps / Meeting

- The Special Town meeting will be held Thursday, January 19<sup>th</sup>, 2023 at 7:00pm.
- The next CMSBC meeting will be held on Friday, January 14<sup>th</sup>, 2023 at 7:30am
  - The project team will present the reconciled 90% CD estimate at this meeting.

#### Adjourn

- Co-Chair P. Nelson adjourned the meeting at 9:47am.



# **Final 60% CD Report**



SMMA

*60% Construction Document Report*

## **Concord Middle School**

835/1231 Old Marlboro Rd.  
Concord, MA 01742

November 11, 2022  
Revision 11/21/2022



## Acknowledgements

### *Concord Middle School Building Committee*

Dawn Guarriello, Co-Chair – Community Volunteer

Pat Nelson, Co-Chair – Community Volunteer

Alexa Anderson - School Committee Representative

Court Booth – School Committee Representative

Heather Bout – School Committee Representative

Justin Cameron – Concord Middle School Principal

Frank Cannon – Community Volunteer

Peter Fischelis – Community Volunteer

Jon Harris - Concord Budget Director

Russ Hughes - Facilities Director, CPS/CCRSD

Laurie Hunter - Superintendent of Schools, CPS/CCRSD

Matt Johnson – Concord Select Board Representative

Amanda Kohn – Director of Sustainability

Kerry Lfleur – Concord Interim Town Manager

Charlie Parker - Community Volunteer

Chris Popov - Community Volunteer

Matt Root - Community Volunteer

Robert Conry – Assistant Superintendent of Finance and Operations, CPS/CCRSD

Stephen Stasheski – Community Volunteer

### *Owners Project Manager*

Hill International

### *Commissioning Agent*

AKF with SGH

## Design Team

<i>Principal-in-Charge</i>	<i>Project Manager</i>	<i>Project Architect</i>	<i>Design Architect</i>
SMMA Lorraine Finnegan	SMMA Lorraine Finnegan	SMMA Jennifer Soucy	EwingCole Saul Jabbawy
<i>Civil Engineering / Environmental Permitting</i>	<i>Landscape Architecture</i>	<i>Structural Engineering</i>	<i>Educational Programming</i>
Nitsch Steven Ventresca	SMMA Michael Dowhan	SMMA Paul Livernois	SMMA Philip J. Poinelli
<i>Fire Protection / Plumbing Engineering</i>	<i>HVAC Engineering</i>	<i>Electrical / Lighting</i>	<i>Data / Communications</i>
SMMA Luis Moreno	SMMA Charles Gibson	SMMA Anthony Jimenez	3si Aaron DiBari
<i>Geotechnical Consultant</i>	<i>Geoenvironmental Engineering</i>	<i>Hazardous Materials</i>	<i>Traffic Consultant</i>
McArdle Gannon Assoc. Wayne McArdle	Nobis Engineering (MBE) Tim Andrews	Nobis Engineering (MBE) Jeffery Brunelle	Bryant Associates Todd Brayton
<i>Kitchen / Food Service Consultant</i>	<i>Acoustical Consultant</i>	<i>Specifications Consultant</i>	<i>Library / Media</i>
Schiavone Designs, LLC (WBE) Joanne Schiavone	Acentech. Rose Mary Su	SMMA Kristin Norwood	SMMA Sarah Long
<i>Technology / Audio Visual Consultant</i>	<i>Furniture, Fixtures and Equipment Consultant</i>	<i>Sustainable / Green Design / Renewable Energy Consultant</i>	<i>Passive House Consultant</i>
Acentech. Liz Lamour Croteau	Stefura Associates Inc Marcy Stefura	SMMA Martine Dion	Steven Winter Associates, Inc. Lois Arena
<i>Code Consultant</i>	<i>Site Survey</i>	<i>Cost Estimating</i>	<i>Auditorium Consultant</i>
Building, Fire & Access Robert Carasitti	Nitsch Engineering (WBE) Denis Seguin	A.M. Fogarty Peter Timothy	Theater Design Michael Mell

## 60% Construction Document Report

**Concord Middle School**  
835/1231 Old Marlboro Rd  
Concord, MA 01742

*Prepared by:*

SMMA  
1000 Massachusetts Avenue  
Cambridge, MA 02138  
www.smma.com

# Table of Contents

- Cover
- Acknowledgements

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1. Basic Project Information
2. Project Budget Compliance

## 6B.2 OPM Deliverables

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- A. OPM Certification, Review, and Recommendations
- B. OPM Designer Submission Review
- C. Commissioning Consultant Review

### *6B.2.2 Project Schedule*

- A. Updated OPM Master Project Schedule

### *6B.2.3 Project Scope and Budget*

- A. Project Scope and Budget, Cost Estimates, and Reconciliation
- B. Updated Project Budget
- C. Early-Bid Packages
- D. Value Engineering

## 6B.3 Designer Deliverables

### *6B.3.1 General Requirements*

1. Updated Work Plan
2. Updated and Expanded Basis of Design Narratives
  - a. Architectural
  - b. Structural
  - c. Civil
  - d. MEP/FP
  - e. DATA/Comms/Security
3. Updated Building Code Analysis
4. Updated List of Proprietary Items Under Consideration

5. Updated Interior Color Theory Statement
6. Updated Structural Calculations and Required Floor Loads
7. Independent Structural Peer Review
8. Updated Energy Model Calculations
9. Updated Life Cycle Cost Analysis for Energy & Water Devices
10. Updated Heat Gain and Loss Calculations for HVAC
11. Updated Electrical Load Calculations
12. Updated Security and Visual Access Requirements
13. Updated Facility and Maintenance Requirements
14. Updated Quality Control Narratives

#### ***6B.3.2 Space Summary***

1. Updated Space Program and Signed Certification
2. Comparison of Current Design with Final Educational Program
3. DESE Approved SPED Spaces
4. DESE Approved Public Day Education Spaces (not applicable)
5. DESE Approved Chapter 74 Program Spaces

#### ***6B.3.3 Project Approvals***

1. Status of Approvals
2. Confirmation of Receipt (or Status) of All Necessary Approvals
3. State reviews or approvals prior to construction bids
4. Schedule for Local Zoning Approvals, Testing and Permits
5. Certification of Utility Official Notification

#### ***6B.3.4 Cost Estimate***

1. Designer Cost Estimate

#### ***6B.3.5 Drawings***

#### ***6B.3.6 Project Manual***

#### ***6B.3.7 Project Coordination***

## 6B.1 Summary

### 1. Basic Project Information

The all-new Concord Middle School is a public middle school that will be located at 835 Old Marlboro Road (indicated as Parcel 3010-2-1, Map 12D, Block 3010 by the Concord Tax Assessors Office) in Concord Massachusetts, on the site of the existing Sanborn Middle School. The parcel is located within the Residence AA zoning district on the Concord Zoning Map. It will support grades 6-8 with an enrollment of 700 students.

The building is organized in two parts. The western wing houses the Administration, Media Center, Cafeteria, Auditorium, Music Rooms, and OT/PT on the first floor, with Art and Word Language on a partial second floor. The eastern wing of the building is a three-story academic wing housing many of the core classrooms, Team Commons, and special education spaces. The building totals 142,513 gross square feet.

The site measures 31.29 acres, made up of one contiguous lot, a large portion of which is heavily wooded with adjacent wetlands (the buffer zone is outside of the project limit of work). The site is bordered to the east and south by a wetland complex associated with Dugan Brook and a Town of Concord public drinking water supply well, to the west by single-family residences on Captain Miles Lane, and to the north by single-family residences on the opposite side of Old Marlboro Road. Topographically, the developed northwest portion of the site (building, septic field, circulation and parking, athletic fields) along Old Marlboro Road is relatively flat, with approximately ten (10) feet of topographic change from Old Marlboro Road towards the interior of the site through the developed area. The south and southeastern portion of the site is steeply sloped and wooded with mature native pine/oak/maple forest cover. There is approximately forty (40) feet of topographic change from the edge of the developed area to the base of slope to the south and southeast. Beyond the base of the slope at the southeasternmost area of the site is another flat area of the site that contains additional athletic fields. A small portion of the site is within a buffer zone for a resource area associated with Dugan Brook.

The site development includes approximately 150 dedicated parking spaces, paved outdoor areas, MIAA regulation-sized boys' baseball and girls' softball fields, and a MIAA regulation-sized overlay soccer pitch. Dedicated bus lanes and parent drop off/pick up are designed to alleviate the current traffic congestion and safety concerns. The building is being designed as an all-electric building, to achieve Net Zero Ready when open. Solar PV is being designed by Solar Design Associates (SDA) and procured through a separate contract by the Town/Concord Municipal Light.

The current total project budget is \$104,316,000, which combines the \$1,500,000 appropriation for the Feasibility and Schematic Design phases with the approved additional funding of \$102,816,000 at the Town Meeting on January 20, 2022.

This total project budget includes a bidding contingency of \$2,019,312 for a potential bid overrun due to the uncertainty and volatility of the current construction market.

The project will be delivered through Design Bid Build, which was approved by the School Building Committee at their April 15, 2021, meeting.

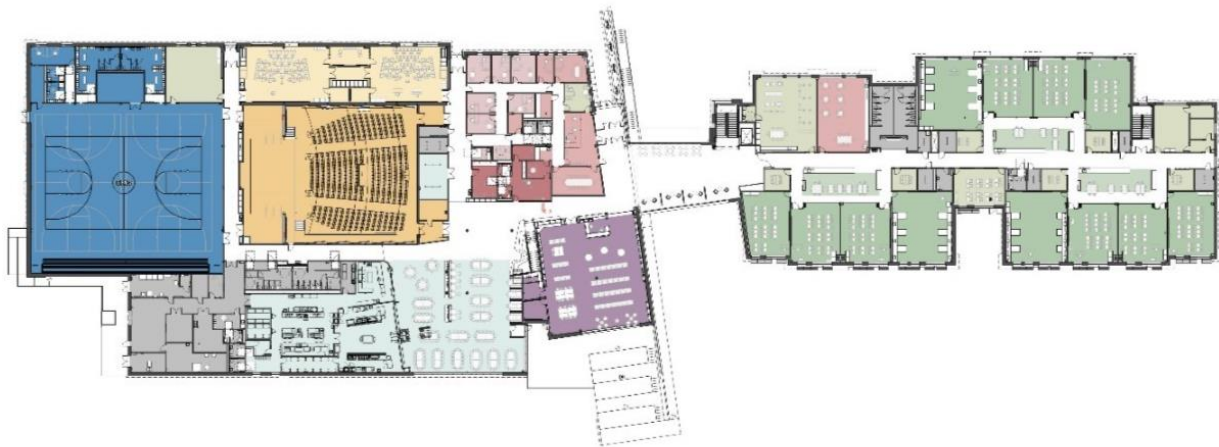




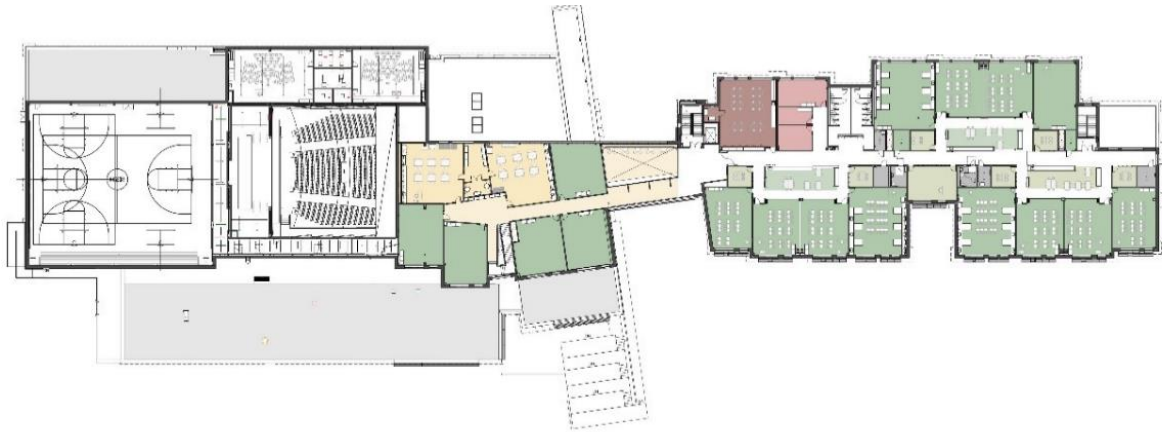
Site Plan



Lower-Level Program Plan



Ground Level Program Plan



Upper-Level Program Plan



Aerial View from Northeast





View of Entry from Bus Zone



View of Entry from Bus Zone



View of Lobby Looking toward Athletic Fields



View of Cafeteria looking South



View of Cafeteria looking North





View of Team Learning Commons



View between Academic Wing (left) and Entry (right)

## 2. Project Budget Compliance

The reconciled estimated construction cost is \$86,455,680. The construction budget is \$80,772,447. The 60% CD estimate is currently \$5,683,233 over the construction budget.



## 6B.2 OPM Deliverables

### *6B.2.1 OPM Submittal Review & Coordination*

#### **A. OPM Certification, Review, and Recommendations**

Hill International has participated in and has managed, on behalf of the Town of Concord, the 60% CD Phase of the Concord Middle School Project. We have reviewed the 60% CD submission prepared by SMMA Architects and their Consultants and have found that all comments and feedback given through various meetings such as the School Building Committee and Local and State Regulatory groups have been addressed and have been incorporated into the design. The 60% CD Phase progressed all areas of the project design and includes 8 proprietary specifications as approved by the School Building Committee. The current design also incorporated value management items as accepted by the School Building Committee during the Design Development Phase. Since the Design Development Phase value management was extended through the end of the 60% CD Phase, the majority of value management was incorporated into the design, with the exception of 5 items, which will be accounted for in the 60% CD estimate, but will not be fully incorporated into the design until the 90% CD Phase.

Our comprehensive review included the 60% CD Drawings and Specifications. We found them to be technically accurate and coordinated at a level consistent with what is expected at this phase of design. Hill's design review comments are attached for reference.

In addition, the 60% CD package was reviewed, and cost estimates were prepared by two estimators: AM Fogarty, retained by SMMA Architects, and PM&C, hired by Hill International. These estimates were reconciled at an all-day meeting on October 18, 2022. The estimate summary and detail are attached for reference. In summary, the reconciled estimated construction cost is \$86,455,680 for the current design. The construction budget as established by the Town Meeting and voter approval in January/February 2022 is \$80,772,447. Therefore, the estimated cost for construction is \$5,683,233 over the construction budget at this time. This overrun is attributed to drastic increases in construction market labor and materials in 2022 as well as projected escalation into 2023. Please also note that the approved Total Project Budget includes a bidding contingency of \$2,019,312 that could be utilized for a cost overrun at the time of bidding in March/April 2023.

In parallel with the 60% CD Phase, Hill International and SMMA Architects facilitated extensive value management with the School Building Committee over the span of (5) meetings from August 4, 2022, to September 22, 2022. These meetings resulted in the School Building Committee acceptance of \$1,879,261 worth of value management and rejection of \$9,781,029 worth of value management. The School Building Committee considered large scope cuts such as a reduction in size of the gymnasium and auditorium, as well as other changes that would impact the Education Plan, but ultimately decided to maintain major scope decisions made during the Feasibility and Schematic Design Phases of the project and maintain programming and function as established by the Education Plan. Attached is the final Design Development value management log summary for review as well as a cost comparison chart reporting on the current overall project cost projection of \$106,441,949 including value management accepted during the Design Development phase.

Additional value management for the 60% CD phase was reviewed and voted on by the School Building Committee at the October 27, 2022, meeting. \$384,592 worth of savings was accepted as shown on the attached 60% CD value management log. However, some of this scope was further reviewed by the School Building Committee at the November 17, 2022, meeting and two items were moved to deduct alternate scope. This vote by the committee added wood look ceilings and gymnasium bleachers back into the scope for the 90% CD set, to be documented at deduct alternates. The estimated value of these two items is \$273,662. The final 60% CD value management total is \$110,931 as shown on the attached cost comparison summary. With this accepted value management, the estimated construction cost is \$86,344,749.

Hill International presented a path to budget alignment at both the July 28, 2022, and August 18, 2022, School Building Committee meetings, which included a two-pronged approach: value management and proceeding with a Special Town Meeting in late 2022/early 2023 to increase the budget. The School Building Committee voted and passed a motion to proceed with planning a Special Town Meeting with a warrant article that includes a \$115M budget at the August 18, 2022, School Building Committee meeting. This recommendation from the School Building Committee was reviewed by the Select Board at an October 28, 2022, meeting and the Select Board voted to utilize a NTE \$110M value for the warrant article. The warrant article process was initiated on this date.

Furthermore, the School Building Committee voted to authorize SMMA Architects to proceed with the 90% and 100% CD completion at the September 29, 2022, School Building Committee meeting. The general contractor and subcontractor prequalification process was reviewed by Hill International at the same meeting and the committee was supportive of proceeding with this process as planning from November 2022 to early February 2023 as shown on the September 26, 2022, project schedule update.

In summary, it is anticipated that budget alignment with the Design Development phase scope of the project will be achieved in early 2023 prior to proceeding with the bidding phase.

## **B. OPM Designer Submission Review**

Please see attached design review comments prepared by Hill International.

60% CD Review

Item	Drawing	Reference	Comments	Response Date	Response
<b>General</b>					
1			A number of plans in the plan set are titled "Construction Plan". Not sure if that is needed. Contractors will find Civil, Structural, MEP plans more helpful. Can these be re-classified?	10/19/2022	This is SMMA standard nomenclature
<b>Code Summary</b>					
2	G-010		On the "Exit Table" provide the worst case distances to confirm code compliance.	10/19/2022	These are noted (or will be) noted on the Plans as there are different distances per floor
3	G-010		The plan view on the left side of the plan is not legible.	10/19/2022	This will be removed from the 90% drawings (these are the foundations for the ground floor level above
4	G-010		The Egress Path line looks more like the Limit of Work line.	10/19/2022	LOW line will be deleted from the legend as this is not applicable
5	G-100		Delete the table identifying the Value Engineering SF reduction.	10/19/2022	This will be deleted on the final Construction Drawings
<b>Site/ Civil</b>					
6	C-111		Are there any Town permits related to the removal of trees?	10/19/2022	Yes. The permit required is the Tree Protection and Removal Permit, issued through the Planning Board.
7	C-112		The plan should identify the shaded areas.	10/19/2022	The Legend is shown on Sheet C-111, with a note on C-112 referencing it.
8	C-113		There are some shaded areas that are not included in the Legends.	10/19/2022	We will review and revise as necessary for the 90% CD submission.
9	C-131		The ground slope behind the school is 50% - very steep.	10/19/2022	The grading design at the south side of the building incorporates a maximum 3:1 slope, suitable for seeding and maintenance. We will review all areas for conformance to the 3:1 slope and will revise as necessary for the 90% CD submission.
10	C-140		Some notes on the plan are TBD.	10/19/2022	We will review and revise as necessary for the 90% CD submission.
11	C-141		Septic system component notes are missing.	10/19/2022	All septic system component notes are located on Sheets C-143 and C-144. This was done for legibility purposes.
12	C-141		Consider adding profile views for the proposed drainage lines.	10/19/2022	We will review and incorporate profiles if necessary for the 90% CD submission.
13	C-142		Identify the proposed septic system leaching field.	10/19/2022	All septic system component notes are located on Sheets C-143 and C-144. This was done for legibility purposes. We will review if a call out for clarification should be included on this sheet.
14	C-143		This plan should focus on the wastewater line exiting the building, the grinder pump and the force main.	10/19/2022	We will review and revise as necessary for the 90% CD submission.
15	C-501 C-507 and C-510		If this is the final list of details, consider increasing the size of the details.	10/19/2022	Detail sheets are developed with extra space to allow for incorporation of additional details if necessary for future submissions.
16	C-504		Perimeter french drain - the note "Exterior Wall" should be changed to "Interior Wall".	10/19/2022	We will revise for the 90% CD submission.
17	C-505		Bituminous paving detail - It is difficult to properly place a 1 inch thick paving course - consider a 1 1/2" thickness.	10/19/2022	The wearing course depth for walks is consistent with MASS DOT specifications. We will review the depth and revise if necessary for the 90% CD submission.
18	C-510		On the shrub detail, define the distance X.	10/19/2022	We will revise for the 90% CD submission.
19	C-511		Are there two proposed septic tanks in the scope of work ?	10/19/2022	There are two tanks shown on the plans. The 13,000 gallon tank is the Primary Tank. The 6,500 gallon tank is the Aeration Tank.

60% CD Review

Item	Drawing	Reference	Comments	Response Date	Response
<b>Structural</b>					
20	General Note		Some divisions seem out of order. For example, foundation details are after brace framing.		This is typically how we organize the drawings.
21	S-001		No abbreviations on notes and schedules page.		Noted
22	S-001		Notes run into one another. Accent headings between sections (foundations, reinforcing steel, etc.)		Noted
23	S100 c-101b	typical comments	Match lines not identified.		Noted
24	S100 c-101b		Very few elevations on TOF, TOP. Should they be listed on all locations?		Foundation elevations are typical unless otherwise noted. We will add more where needed.
25	101c-104a	typical comments	No reference to web stiffeners. Are none required?		Stiffeners where required are shown in details.
26	104a		Typo in title box.		Noted
27	200's		No base plate anchorage detail, just a note.		To be included in 90% set.
28	200's		No anchor rod embedment schedule.		To be included in 90% set/
29	200's		No shear lug detail. Not certain if it is required, but accustomed to seeing it in this area.		Not required.
30	300's		Appear to be in progress.		Correct
31	400's		Appear to be in progress.		Correct
<b>Architectural</b>					
32	General Note		Structural is before architectural. We are accustomed to seeing architectural first.		This is per US National CAD Standards
33	A002		The amount of key values seems low.		More keynotes will be populated as detailing continues.
34	A003		Is there insulation in exterior stud wall of building? Appears only insulation on exterior of building. Unclear in wall assemblies.	10/19/2022	There is currently no insulation between exterior studs, only insulation outside exterior sheathing.
35	A003		Please confirm if there are only 7 wall types. Seems low.	10/19/2022	There are 8 wall types shown on A-003, with EWA-6 and EWA-6a combined on one drawing. With VE after the estimate set, there will be one more wall type added on the final 60% CD set.
36	A004		Is impact resistant gypsum board being used anywhere on this project? Not clarified/identified in partition types.		Schedule of GWB types and locations are listed in the 09 29 00 Spec
37	AD101		Demo plan is minimal. More detail should be included including information regarding slab and foundation removals.		We will provide more detail on the 90% Drawings
38	A100-103c	typical comments	Inconsistent standards: dimensions between grid lines, presence of shade legend, dimensions on partitions (example: landing doors along a wall), page lines identified, no keynote text, no general notes (102a).		This will be addressed for the 90% set
39	102b		Typo -double lines on grid Ma/12a		This will be revised on the 90% Set
40	A102c		New set of general notes are different from others, referencing millwork. Should these be included elsewhere.?		These notes referencing millwork will be deleted
41	A103		Grid lines are present, but not on previous overall plans. Which is correct?		This will be corrected for the 90% Set
42	A103a		Crickets are very dark preventing legible reading of notes in those areas.		This will be corrected for the 90% Set
43	A103b		Typo -double lines on grid Ma/12a		This will be corrected for the 90% Set
44	A103b		Lines overlap numbers, preventing legible reading.		This will be corrected for the 90% Set
45	AR-102a		No notes of any kind. Are these in progress?		This will be corrected for the 90% Set
46	AR-102b		Typo- notes overlap drawing.		This will be corrected for the 90% Set
47	A200		Black and white drawings are too dark and have little definition.		These will be PDF-ed in color for the 90% submission
48	A202-207	typical comments	No key plan to identify elevations. Any rooftop top units, etc. visible. Nothing shown above roofline.	10/19/2022	We will review and revise as necessary for 90% CD submission.
49	A202-207	question	Cannot locate any sunshade details. Should they be in this section? Cannot locate any exterior penetration details; lights, alarms, etc. Should they be in this section?	10/19/2022	This section is for elevations. Sunshades have been shown and keynoted on elevations. Sunshade Details will be provided for final 60% CD set on A-500s drawings. There are some exterior devices shown on elevations but they are not keynoted and coordinated. Exterior devices will be keynoted and coordinated on elevations for 90% CD set.
50	A210,A211		Appear to be in progress.	10/19/2022	The drawings are in progress
51	A251-A265	question	Jumps to interior elevations. We are accustomed to seeing interior and exterior drawings grouped together. Should this be grouped with other interior elements?	10/20/2022	SMMA standard allots for sheets 200-249 to be exterior and 250-299 to be focused on interior elevations. (SAL)
52	A251-A265	typical comments	No key plan, limited cross sections notes, key values are scarce, accustomed to be on all details. Little or no dimensions.	10/20/2022	Key plans are typically not shown for interior elevation sheets. Dimensions and details are in progress and will be further developed for the 90% CD submission. (SAL)
53	A251		Black and white drawings are too dark and have little definition.(example: G5, G8)	10/20/2022	We will review and revise as necessary for 90% CD submission. (SAL)
54	A301-A303	typical comments	Absent of any cross sections or enlarged areas. Accustomed to seeing them in these sections. No key values.	10/19/2022	Call-outs for wall sections provided for final 60% CD.
55	A403		Review cross sections in this area. (example: A3 reaches forward to A1/A303. but there is no detail there.)		This will be corrected for the 90% Set
56	A503-540	typical comments	Appear to be in progress. Missing or little keynote legend items, key values, dimensions. Roof details have only 6 detail drawings.	10/19/2022	The details are in progress and they will be complete at 100% CD set. We will review roof details and add/revise as necessary for 90% CD submission.
57	A561	typical comments	Appear to be in progress. Not centered, different size fonts, etc.		Ceiling details are in progress and will be complete for the 100% CD set. (SAL)
58	A564 -566	typical comments	Millwork appear to be in progress. Not centered, different size fonts, etc. Only 6 details.	10/20/2022	Millwork details are in progress and will be complete for the 100% CD set. (SAL)

60% CD Review

Item	Drawing	Reference	Comments	Response Date	Response
59	A620		CMU and brick types seems to be out of sequence. Middle of windows and doors.	10/19/2022	We will review and reivse as necessary for 90% CD submission.
60	700's	typical comments	In progress		Drawings are in progress. (SAL)
61	800's	typical comments	In progress		Drawings are in progress. (SAL)
62	900's	typical comments	In progress		Drawings are in progress. (SAL)

60% CD Review

Item	Drawing	Reference	Comments	Response Date	Response
<b>Fire Protection</b>					
63	F-001		Notes #6 and #9 reference building demolition.	10/19/2022	Notes were removed. LFM
64	F-100c		These F plans appear to be sprinkler plans. The plan title should be Fire Protection. The proposed sprinklers should be identified on the plans.	10/19/2022	"F" series drawings are Fire Protection. LFM
65	F-100c		There should be a legend on the plan identifying sprinkler heads and water lines.		Sprinkler head Schedule is on F-001. LFM
66	F-501		On Detail H1, identify the pipe diameter and pipe material.		We will review and revise as necessary for 90% CD submission. LFM
67	F-501		Detail E4 needs to be reviewed for completeness.		We will review and revise as necessary for 90% CD submission. LFM
<b>Plumbing</b>					
68	P-100c		Plans should identify both water supply piping and wastewater piping.		Plans were updated for 60% (Ongoing). We will be updating for 90% CD Submission. LFM
69	P-101c		Confirm all abbreviations are on Plan P-001.		Plan will be review and be completed for 90% CD submission. LFM
70	P-103a		Piping needs to be labeled.		Plans were updated for 60% (Ongoing). We will be updating for 90% CD Submission. LFM
71	P-103c		There are proposed items on the plan that are not identified.		All plumbing items on P-103c are labeled. LFM
<b>Mechanical</b>					
72	M-100c		The plan title should be Mechanical.	10/18/2022	We do not list the trade in any plan titles. "M" series drawings are Mechanical. CKG
73	M-100c		There is considerable piping/ductwork on the plan with very little description of the system components.	10/18/2022	System components are tagged and reference schedule sheets. Extended description of components can be found in details, schedules, and controls drawings and the specifications. CKG
74	M-502		Detail G7: can a minimum vertical distance between the hood and the floor be added?	10/18/2022	Distance has been added. CKG
75	M-505		Detail B5: do the struts need to be galvanized steel on the roof ?	10/18/2022	Yes. CKG
<b>Electrical/ Technology</b>					
76	T002		There are 24 security cameras in the 2 parking lots. With a viewing distance of 75 feet, are all the cameras necessary?		Yes. These locations have been reviewed with the client. These may need to be adjusted more once the PV design has progress and footing/column locations are located which could provide obstructions for camera
77	EF101c		Do all classrooms require a smoke detector ?		No, fully sprinkler covered spaces do not require a smoke detector. They are being added to the engineering and science classrooms for additional coverage. General classrooms will not be receiving them. AJ

60% CD Review

Item	Drawing	Reference	Comments	Response Date	Response
<b>Specifications</b>					
78	312000	1.03.B & D	Building projects typically follow ASTM testing standards.		We will review further and determine if this is required for the 90% submission
79	312000	2.01.E.4	The first sieve size should be a number.		Noted
80	33000	2.11.F	Add a paragraph on entrained air requirements tested to ASTM 143: Aggregate Size      Air Content, % 1 1/2"                  4 - 7 3/4"                    5 - 8 3/8"                    6 - 9		Section 2.11F is correct as shown. 3 inch slump range is too much of a variation.
81	33000	2.11.2 & 3	Allowable slump ranges should be 3 inches to be fair to the concrete supplier.		Allowable slumps are as noted. 3 inch range is too high.
82	33000	2.12.I & K	Typos "psi at"		Noted
83	42000	2.13	Add minimum mortar compressive strengths to assist the QC firm: Type M    2,500 psi minimum Type S    1,800 psi minimum Type N    750 psi minimum		We will review further and determine if this is required for the 90% submission
84	42000	3.13.G	Consider adding additional mortar tests for quality control, 1 per week.		We will review further and determine if this is required for the 90% submission



## **C. Commissioning Consultant Review**

Please see attached design review comments prepared by the Commissioning Consultant, AKF Group and their Building Envelope Commissioning Consultant, Simpson Gumpertz & Heger (SGH).

## Commissioning Design Review Comments



No.	Date	By	Trade	Reference Document (Dwg/Spec)	Equip/Item	Design Review Comment	Design Team Response	AKF Follow Up	Status	Design Team Response to F/U & Date
1	6/17/2022	LB	00-Gen	Owner's Project Requirements	General	The owner's project manager is requested to work with the owner to develop an owner's project requirement (OPR) document that meets the minimum requirements of LEED v4. Subsequent Cx reviews will consider the OPR.	(Hill Int'l is developing the OPR with input from the design team and the town.)	-	Open	
2	6/17/2022	LB	00-Gen	Combined drawing PDF	PDF	The PDF bookmarks are not complete (e.g., few sheets for architectural, only one sheet for technology) and not fully functional (e.g., no links for plumbing and electrical). Please provide future sets with organized bookmarks to all sheets for easy navigation through the ~300 drawing sheets.	This will be reviewed and coordinated for the 60% submission	-	Closed	
3	6/17/2022	LB	00-Gen	Drawings	Floor plans - ground level and upper level	Please develop a consistent handling of match lines between parts of these levels. Arch plans and some others show the matchline dashed, whereas plumbing shows a light line, AV has no line, technology shows the adjacent sheet numbers, etc.	This will be reviewed and coordinated for the 60% submission	Plumbing has a solid line while all others have dashed matchlines	Open	Matchline fixed 10/19/2022
4	6/17/2022	LB	08-Arch	Drawings	Floor plans	Review room numbering with owner prior to finalizing construction documents to avoid renumbering during construction.	Room numbering was reviewed and agreed upon by the Principal, Superintendent, and Fire Department during the Design Development phase	-	Closed	
5	6/17/2022	LB	08-Arch	A-102a	Roof access	Is a ladder and hatch acceptable means of access to the low roof? Is an exterior ladder adequate for access to the high roof, such as for transporting filters and other service materials to ERUs? Consider extending one stair to the high roof level.	An alternating tread stair and roof hatch will provide access to the lower roof, and one of the enclosed stairs does extend to the high roof. An additional roof hatch and davit will be provided to the high roof. This was all reviewed and agreed upon by CMS Facilities group during the Design Development phase	-	Closed	
6	6/17/2022	LB	11-FP	F-100c	Floor plans	We assume the rooms on F-102c are indicative of the level of detail to be shown in a subsequent drawing set throughout, including pipe diameters and head locations/types.	Yes thats correct	-	Closed	
7	6/17/2022	CJ	11-FP	F-100c	FVCAs	FCVA to also include Tamper switch and Waterflow alarm as per NFPA requirements. Drain piping from test section of the FCVA to be shown.	Will show at 60% submission	Not shown yet	Open	Sprinkler drain piping at stairwell showing in drawings for 60% submittal 10/19/2022
8	6/17/2022	LB	12-Plbg	P-100c	Floor plans	We understand that piping is a work in progress and assume that pipe diameter will be specified in a future drawing set.	Yes all mains, branches and drops will be shown at 60% submittal	-	Closed	
9	6/17/2022	LB	12-Plbg	P-101a	A147	Please show fire pump on the plumbing plan.	Will be shown for 60%, currently shows in FP drawings	Not shown yet	Open	Fire Pump Added to plumbing drawing 10/19/2022
10	6/17/2022	LB	12-Plbg	P-601	Plumbing fixture schedule	Review whether thermostatic mixing valves are required for lavatories.	Will review	No change. Please advise if not required.	Open	Lavatory faucet with above deck mixing 10/19/2022

## Commissioning Design Review Comments



11	6/17/2022	LB	12-Plbg	P-601	Schedules	Please provide missing information in the next drawing set and remove any inapplicable schedules	Schedules will be shown with all the information at 60% submittal	Work in progress.	Open	Mop Receptor, exterios drinking fountain and Shower added to schedule 10/19/2022
12	6/17/2022	NC	12-Plbg	P-100c	Floor plan, west side	Where do the plumbing lines on the left side of the page (column line 8b & Ab) go to?	Some pipes like sanitary and lab waste wil cross under the bridge. Other pipes like water mains will cross at the ceiling of the bridge	These lines should be identified.	Open	Lines are identified and scope box was adjusted to match drawing continuation 10/19/2022
13	6/17/2022	CJ	12-Plbg	Drawings	Riser diagrams	Please provide Plumbing piping riser diagrams for each system with pipe sizes	Riser diagrams will be provided for 90% submittals	-	Open	Riser Diagrams in progress as notted before they will be complete for 90%
14	6/17/2022	CJ	12-Plbg	Drawings	General	Please advise on storm water management, if any	No storm water management	-	Closed	
15	6/17/2022	CJ	12-Plbg	P-001c	Plan west near elevator	Please show where the Sanitary and Lab Waste lines from P-001b tie into S and LW lines.	This will be reviewed and coordinated for the 60% submission	-	Closed	
16	6/17/2022	CJ	12-Plbg	P-001c	Ejector pumps	Please advise on construction details for ejector pumps, if any - such as metal grating or cover over the pit, the dimensions of the pit.	This will be fully design and coordinated for 60% submittal	-	Closed	
17	6/17/2022	CJ	12-Plbg	P-101a	TP-1	Please show piping to Trap Primer, show lines to the served drains, and provide pitch requirements if any. Comment applies to all TP in Part A.	All pipes will be shown for 60% submittal	Piping to TP-1 not shown.	Open	Pipes to TP-1 for fire pump room and water room are in the drawings 10/19/2022
18	6/17/2022	CJ	12-Plbg	P-101a	A146.6	Please which equipment will need a floor drain and coordinate/consolidate.	All equiptment requiring floor drain will be coordinated for 60% submittal	-	Closed	
19	6/17/2022	CJ	12-Plbg	P-101a	A146.6	Please identify the tank next to DBP-1.	Tank will be removed not needed for 60% submittal	Tank still shown and unidentified.	Open	Tank was removed from the plan 10/19/2022
20	6/17/2022	CJ	12-Plbg	P-101a	RPBP	Please indicate piping on which RPRB is installed in the Water serv/booster room, with drains piped to floor drain (condensate drain could be included in details section of device)	All pipe design will be fully detail and coordinated for 60% submittal	Piping modified but comment unresolved. This room may warrant an enlarged part plan.	Open	Enlarged Plan will be added for next submission. 10/19/2022
21	6/17/2022	CJ	12-Plbg	P-101a	Floor plans	Please provide DCW connection to EWC (applicable to all parts on all floors)	All pipes will be shown for 60% submittal	-	Closed	
22	6/17/2022	CJ	12-Plbg	P-101c	Condensate piping	Condensate piping or other drain piping to the Janitor's closet to be indicated along pitch requirements.	All condensate pipes from HVAC will be coordinated, Drains discharging on janitors closet will be shown for next submittal	Tracked in HVAC comment.	Closed	
23	6/17/2022	CJ	12-Plbg	P-601	Schedules	LEED prerequisites to be considered for Plumbing equipment.	All LEED for water reduction are being considered	-	Closed	
24	6/17/2022	BCM	14-HVAC	DD Report pg. 27	VRF Control	Ensure control system can provide occupied/unoccupied setpoints as related to desired occupancy schedule.	BMS recieves occupancy from both schedule and sensors.	-	Closed	
25	6/17/2022	BCM	14-HVAC	DD Report pg. 27	Kitchen DCV	Ensure means of control are provided so that kitchen exhaust and makeup only operate during kitchen use schedule.	Agreed. Specifying a Melink System (or similar)	-	Closed	

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26	6/17/2022	BCM	14-HVAC	DD Report pg. 26	DOAS Units	Ensure DOAS unit controls modulate wheel speed as necessary so that outside air is not overheated or overcooled requiring unnecessary use of VRF coil to compensate.	Agreed. Will review Energy recovery control sequence.	-	Closed	
27	6/17/2022	BCM	14-HVAC	DD Report pg. 42	Energy Model Inputs	Provide schedule and setpoints utilized for energy model.	These will be provided for 60% review	60%CD draft report General Requirements energy model section does not describe schedule of use assumptions.	Open	The setback temperature runs from Midnight to 5am. There is a 1-hr warm-up period. Set-point temperatures run from 6am to 7pm. The setback temperature then resumes until midnight. Heating: - Setpoint: 70degF - Setback: 65degF Cooling: - Setpoint: 75degF - Setback: 80degF
28	6/17/2022	BCM	14-HVAC	Drawings/Specs	Demand Control Ventilation	Ensure DCV airflow setpoints allow for low/no airflow to unoccupied spaces as permitted by the applicable version of ASHRAE 62.1.	Will review setpoints and minimums for DCV system.	Classroom ACU SOO ventilation control is responsive to CO2, not occupancy sensors. VAV minimums are approximately 33%. Additional savings could be achieved by reducing to zero when a room is vacant (though ERU minimum flow would need to be addressed somehow).	Open	Will review with client dropping box minimums when unoccupied but as IAQ was a top client priority we designed minimums to be roughly 1 AC/hour.
29	6/17/2022	BCM	14-HVAC	Drawings/Specs	Building Pressurization	Provide air balance of building under modes of operation to ensure that building remains positively pressured at all times.	Agreed.	ERU SOO Air Balance Control provides for pressurization.	Closed	
30	6/17/2022	BCM	14-HVAC	Drawings/Specs	DCV	Ensure enough room CO2 sensors are provided to meet code requirements for DCV.	CO2 sensors will be in all large spaces and per VAV box.	-	Closed	
31	6/17/2022	BCM	14-HVAC	Drawings/Specs	Standby Temp Control	Consider integrating temperature control with lighting occupancy sensors to control to standby temperatures when spaces as sensed to be vacant during scheduled occupied periods.	Will review.	Lighting control integration is required by 230993. However, it is not leveraged for HVAC control.	Open	Lighting control is integrated for ease of owner control. We are exploring the best way to leverage for control.
32	6/17/2022	LB	14-HVAC	M-100c	Electric room transfer fans	Add wire mesh screen at fan outlet for personnel safety	Will add note for WMS.	-	Closed	
33	6/17/2022	LB	14-HVAC	M-101a	Perimeter locker rooms	Do perimeter locker rooms require heat?	Yes, will provide heat in perimeter spaces as design progresses.	FTR added in locker rooms.	Closed	
34	6/17/2022	LB	14-HVAC	M-101a	A146.7A	Electric room transfer fan serving emer. elec.: show tstat.	Will add Tstat.	-	Closed	
35	6/17/2022	LB	14-HVAC	M-401	Part plan	Plumbing equipment and piping is shown on mechanical drawings. Hide.	Will hide.	-	Closed	

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36	6/17/2022	LB	14-HVAC	M-602	ACU schedule	Please indicate form factor (wall/cassette/ducted) in addition to model number.	Will review.	-	Closed	
37	6/17/2022	LB	14-HVAC	M-701	Controls general	AKF will review controls in the next submission	Noted.	-	Closed	
38	6/17/2022	NC	14-HVAC	M-001	Piping plans	Are piping plans going to be provided for VRF system? A layout would help with coordination before construction.	Ductwork and Piping will be shown on the same plans. RS/RL plans are shown for sample classrooms. Condensate and more Refrigerant lines will be shown as the drawings progress.	RS/RL added to drawings. Condensate lines not added to drawing.	Closed	
39	6/17/2022	NC	14-HVAC	General	Piping plans	HVAC plans (piping if applicable) should show condensate piping with pitch requirements	Condensate will be show at 60%.	Not shown yet for most ACUs.	Open	Have added Condensate to most ACUs, will have everything connected for 90%.
40	6/17/2022	NC	14-HVAC	M-100c	Electric room transfer fans	Electric room transfer fans (C027 as example): Wall is 2 hour fire rated per LS plans. Review whether FD is required.	Will review wall ratings and FD requirements.	-	Closed	
41	6/17/2022	NC	14-HVAC	M-101a	VAV-1-01	VAV is in a fire rated wall, consider relocating	Will relocate.	-	Closed	
42	6/17/2022	NC	14-HVAC	M-101a	Locker rooms	Any ventilation air needed for locker rooms?	Will review ventilation requirements. Code only requires exhaust.	-	Closed	
43	6/17/2022	NC	14-HVAC	M-101b	Records B100.4	Wall is 1 hour fire rated; review whether FD is required	Will review wall ratings and FD requirements.	-	Closed	
44	6/17/2022	NC	14-HVAC	M-101b	ACU-B-27,28	Where are T-stats located? Controlled by one tstat or two?	Will update Tstats.	-	Closed	
45	6/17/2022	NC	14-HVAC	M-101c	C132 suite	Indicate HVAC equipment serving the space	A ACU will serve this space.	-	Closed	
46	6/17/2022	NC	14-HVAC	M-102b	VAV-2-05,06,07	Can VAVs be relocated to corridor? It would be easier to perform maintenance without intruding a class. Noise of the damper modulating can be distracting as well. But please ensure a straight run of 2-3 times of the VAV size at the inlet to the unit.	Generally we try to locate VAVs in corridors. We will review all locations for clearance and inlet conditions.	-	Closed	
47	6/17/2022	NC	14-HVAC	M-102c	EVAV-2-16	Can VAV be relocated to outside of toilet room? It constrains when maintenance personnel are allowed in space. But please ensure a straight run of 2-3 times of the VAV size at the inlet to the unit.	Generally we try to locate VAVs in corridors. We will review all locations for clearance and inlet conditions.	-	Closed	
48	6/17/2022	NC	14-HVAC	M-601	Schedules	Please fill in missing schedule information, or remove if not applicable	Schedules will be updated as design progresses.	Work in progress.	Open	Schedules are mostly filled it, will be complete for 90%.
49	6/17/2022	CJ	14-HVAC	M-100c	Electric room transfer fans	Provide SOO	SOO are in specification section 230993.	-	Closed	
50	6/17/2022	CJ	14-HVAC	M-101a	Electric room transfer fans	If SOO is based on temp, please indicate location of tstat (e.g. A142)	Will show Tstats	-	Closed	
51	6/17/2022	CJ	14-HVAC	M-102a	AHUs	Verify if any penetration for the AHUs, is through fire rated wall. If yes, verify installation of FSD.	Noted.	-	Closed	
52	6/17/2022	CJ	14-HVAC	M-103b	ERU-1	Provide duct dimensions.	Will update Duct dimentions.	-	Closed	
53	6/17/2022	CJ	14-HVAC	M-103c	ERU-2, ERU-3	Provide duct dimensions.	Will update Duct dimentions.	-	Closed	
54	6/17/2022	CJ	14-HVAC	M-701	Controls general	Provide SOO for system operation.	SOO are in specification section 230993.	-	Closed	

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55	6/17/2022	BCM	15-Elec	DD Report pg. 31	PV Metering	Consider providing provisions for future PV system metering tied into and logged by the BMS for ongoing performance monitoring of renewable energy production system investment.	Noted. Will confirm with PV designer and provide required infrastructure.	-	Closed	
56	6/17/2022	HJ	15-Elec	E-001	One Line Diagram Symbols	Missing DM and GFI symbols as applicable for MSB switchboard.	Noted. Will update.	-	Closed	
57	6/17/2022	HJ	15-Elec	E-001	One Line Diagram Symbols	Include symbol/abbreviation for static trip units (LSIG).	Noted. Will update.	Not added yet	Open	LSIG is added under general abbreviations. It is not used as schematic symbol for electrical one-line diagram, so it does not need to be added to the legend. Specifications owns LSIG for the appropriate equipment/breakers.
58	6/17/2022	HJ	15-Elec	E-001	Project Notes	Recommended to indicate that the contractor is responsible for testing & Cx support as well as provide required testing equipment, if not clearly stated in specs.	Language is within specifications. 26 05 00 1.03H, refers to 01 91 13 "General Commissioning Requirements"	-	Closed	
59	6/17/2022	HJ	15-Elec	EP101a	MSB	Switchgear is not labeled	Noted. Will update.	-	Closed	
60	6/17/2022	HJ	15-Elec	EP601	MSB	Is the main a draw out type breaker? If so, correct the symbol to indicate. Recommended to utilize draw out type breaker for proper isolation during maintenance and repairs.	Intent will be for all breakers to be fixed, including the main breaker. We typically do not provide drawout type circuit breakers for school designs. The isolation and maintenance benefits do not justify the cost increase of the equipment. The main will remain as fixed mounted, as noted in specifications.	-	Closed	
61	6/17/2022	HJ	15-Elec	EP601	MSB	Confirm if the Main is LSIG type breaker. Recommended to have adjustable LSIG breaker.	Confirmed. Refer to specifications 26 24 16, 2.02 C.3	-	Closed	
62	6/17/2022	HJ	15-Elec	EP601	MSB	Confirm and indicate where necessary that the OCPD device(s) in the switchboard has ARMS switch for arc reduction as per spec section 262413, 2.02A.5 and 262416, 2.02E.4 2. Indicate if the branch devices on this board are adjustable static trip unit.	Confirmed. The specification sections noted provide sufficient information on when ARMS will be provided for the panelboard and switchboard. Static trip units are not required on this distribution system.	-	Closed	
63	6/17/2022	HJ	15-Elec	EP601	ATs	Calculate and indicate KAIC rating	Refer to specifications. ATS will have a withstand rating of 42,000 Amps.	-	Closed	
64	6/17/2022	HJ	15-Elec	EP601	Gen SWBD	Indicate if the breakers are to LSI capable	Confirmed, as noted in specifications.	-	Closed	

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65	6/17/2022	HJ	15-Elec	EP601	Gen SWBD	Recommended to utilize kirk-key for the Load Bank breaker operation	No. The load bank can be utilized as supplemental load for maintaining a minimum load on the power source, when required. Assuming the intent of your comment is to avoid a scenario when the load bank is used with the output breaker, however that is the intent. Refer to specifications.	-	Closed	
66	6/17/2022	HJ	15-Elec	EP601	Generator	Confirm that the fuel type is Gas and correct in the spec 263214, 1.03D accordingly	Confirmed.	-	Closed	
67	6/17/2022	HJ	15-Elec	EP603	Switchboard MSB and other DP panels	Confirm that KAIC ratings indicated for these panels are based on the actual calculated short circuit ratings	All KAIC ratings currently shown are a placeholder for pricing. Ones not shown are TBD. Calculations will be done as the design progresses.	-	Closed	
68	6/17/2022	HJ	15-Elec	EP603	Distribution Panels General	Calculate and indicate the A.I.C ratings for the all distribution equipment (panelboards, disconnect switches etc..)	All KAIC ratings currently shown are a placeholder for pricing. Ones not shown are TBD. Calculations will be done as the design progresses.	-	Closed	
69	6/17/2022	HJ	15-Elec	EP610	Mechanical Equipment Schedule	Recommended to include a column to indicate calculated KAIC ratings at the controllers where applicable, so appropriately rated KAIC controllers are bought and installed	Noted, however we will rely on specifications and mechanical/electrical coordination for this.	-	Closed	
70	6/17/2022	LB	15-Elec	EL100c	Keyed note 2	Please provide lighting control sequence key in the next drawing set for Cx review.	Key note 2 refers to EL501 / A8 where the sequence is shown. The design will be more developed and detailed in the next submission.	Key note needs to be updated to refer to the right detail. In the 60% set, it is D8.	Open	Noted. Sequence and details will be updated for next submission.
71	6/17/2022	LB	15-Elec	EP101a	Power plans	Review exterior receptacle requirements. None are shown.	Noted, they will be added.	-	Closed	
72	6/17/2022	LB	15-Elec	EP101a	Fire pump	Fire pump is not tagged	Noted, will update.	Correct tag from FP to FP-1	Open	has been addressed.
73	6/17/2022	LB	15-Elec	EP101a	Power plans	Recommend showing all keyed notes on all applicable sheets rather than having to flip to sheet EP-100c.	Acknowledged, but no. We will keep the "refer to" notes on drawings for keyed notes.	-	Closed	
74	6/17/2022	LB	15-Elec	EP101b	Power plans	Show all mech equipment (e.g., EF-A serving Elec A142)	Noted, coordination is on going. Will be more complete for next submission.	-	Closed	
75	6/17/2022	LB	15-Elec	EP101b	Power plans	Is occupancy-sensor based control of receptacles required for this project?	Mixture of occupancy and time clock receptacle control will be implemented for 75% of all outlets. Will be more detailed in next submission.	-	Closed	
76	6/17/2022	LB	15-Elec	EP103c	Roof plan	Provide convenience receptacle near ACCU-04	Noted, will update.	None provided yet. Now tagged ACCU-07.	Open	has been addressed.
77	6/17/2022	LB	15-Elec	EP103c	Roof plan	WP receptacles should be GFCI	Refer to legend. Devices shown on roof are GFCI.	-	Closed	
78	6/17/2022	LB	15-Elec	E-401	Kitchen power	Show mechanical equipment (e.g., ACU-A04) in kitchen area	Noted, coordination is on going. Will be more complete for next submission.	-	Closed	
79	6/17/2022	LB	15-Elec	EP610	Mechanical equipment schedule	Coordinate power requirements with mechanical. Some ACUs are listed as 480V.	Noted, coordination is on going. Will be more complete for next submission.	-	Closed	

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80	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	Candela rating not included throughout floorplan	Noted. Will be more complete for next submission. Please note legend indicates 75cd unless otherwise noted. However, corridors and specific areas will utilize different ratings (15,30,110 etc.)	Understood. Candela rating not yet updated on floorplans.	Open	Will be completed for next submission.
81	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	No duct smoke detectors shown on any floorplans. Ensure DSDs are accessible and installed in accordance with manufacturers recommendation. Typically recommended with laminar flow	Noted, coordination is on going. Locations will be owned for next submission. Please note DSD scope is currently owned via EP611 and mechanical drawings.	Understood. Some DSDs added to floorplans, however many shown on mechanical drawings have not yet been included.	Open	Ongoing.
82	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	No magnetic door holders shown on drawing	Will review requirements with architecture	Understood. No door holders shown.	Open	Will be coordinated for next submission
83	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	No control module shown on drawings for elevator rooms, mechanical rooms, or fire pump room	Noted, will be shown for next submission. Scope is currently owned in specifications.	No elevator room or mechanical room control modules added. Mechanical modules added to fire pump room.	Open	elevator control room is showing a control module
84	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	No FSDs included on floorplan	Noted, coordination is ongoing. If not required for this job, reference will be removed from legend.	Understood. Please update for next set if required.	Open	Will be completed for next submission.
85	6/17/2022	MV	15-Elec	E-001	Fire alarm symbols	No heat detectors shown on drawing; will any be required?	Noted. Will review requirements as design progresses.	-	Closed	
86	6/17/2022	MV	15-Elec	EF100c	BH-01 hallway elevator lobby These two devices are very	These two devices are very close together and may be redundant. Only one SD is labeled for elevator, both are in elevator lobby.	Concur. Smoke will be removed.	-	Closed	
87	6/17/2022	MV	15-Elec	EF100c	Offices C002,003,004,005	Offices C002,003,004,005 do not show many devices. Confirm if additional devices are required. This level of detail may be intentional for this DD set.	Speaker/strobes will not be provided for private offices. Will review further as design progresses.	-	Closed	
88	6/17/2022	MV	15-Elec	EF100c	Stair	FCVA not shown on drawing, confirm if TS/FS required	Will review requirements with Fire Protection Engineer.	-	Closed	
89	6/17/2022	MV	15-Elec	EF100c	C016, C017	No SD shown in these rooms. Typical comment throughout DD set is for rooms that may be missing devices.	Will review providing in C017. Typically do not provide SD in Janitor Closets.	-	Closed	
90	6/17/2022	MV	15-Elec	EF100c	FA plans	Are door releases required for any egress corridors? None shown on this drawing. Coordinate with security consultant, architect, and others	Will review.	Understood. Please provide if required.	Open	Will be coordinated for next submission
91	6/17/2022	MV	15-Elec	EF100c	Elevator	No elevator monitoring sensors devices in elevator control room. Does this project require elevator recall?	Will review.	Understood. Please provide feedback on comment.	Open	Will be coordinated for next submission
92	6/17/2022	MV	15-Elec	EF101a	Elec A142	"FAP" nomenclature not captured on fire alarm symbols legend. Is this referring to annunciator panel FAA?	FAP is intended to indicate sub panels, for termination, and additional amplifiers/batteries. Will review and update legend/drawings accordingly.	Understood. FAP replaced with FATC. Please update legend with new nomenclature.	Open	Will do.



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93	6/17/2022	MV	15-Elec	EF101a	Stage A149	Coordinate PA system FA override or stage sound control if required by AHJ	Will review.	Understood. Please provide if required.	Open	Both are likely required, but will review and coordinate for next submission. CM's will be added as required.
94	6/17/2022	MV	15-Elec	EF101a	Horn symbol, gym	This symbol with the WG and H notes is not shown on symbol legend	Noted, will update.	Please update legend with new nomenclature.	Open	has been addressed.
95	6/17/2022	MV	15-Elec	EF101a	Fire Pump A147	No annunciators or SD shown in	Noted, will update for next submission.	Not yet updated	Open	Will be coordinated for next submission
96	6/17/2022	MV	15-Elec	EF101a	Fire Pump A147	MM devices on fire pump assumed for "start/stop" and "status". Confirm no other signals required at FACP for AHJ.	Noted, will review.	Additional points added in room.	Closed	
97	6/17/2022	MV	15-Elec	EF101a	Elec Rm A146.7	FACP located in electrical closet; confirm this meets code compliance for fire department access.	Confirmed - location was requested by fire dept.	-	Closed	
98	6/17/2022	MV	15-Elec	EF101a	FA plans	No smoke purge panel shown on plans. Confirm if post fire smoke purge is required by project	Not required for this project.	-	Closed	
99	6/17/2022	MV	15-Elec	EF101b	FA plans	Confirm if door releases required for code compliance on egress corridors or for any smoke control/purge requirements	Will review.	Understood. Please provide if required.	Open	Not required for this project.
100	6/17/2022	MV	15-Elec	EF101c	Second elevator lobby	These two devices are very close together and may be redundant. Only one SD is labeled for elevator, both are in elevator lobby	Noted, will review and remove redundant device.	-	Closed	
101	6/17/2022	MV	15-Elec	EF102a	FA plans	No devices shown on drawing EF102a	Will review requirements for auditorium and gym. South of Plan is lower roof - duct smokes will be shown when coordinated.	-	Closed	
102	6/17/2022	MV	15-Elec	EF102a	Exterior FA devices	Consider including requirements for spacing and locations for exterior fire alarm white beacon device. Not many of these devices are shown on plans	Only two are required for the entire job, per FD request.	-	Closed	
103	6/17/2022	MV	15-Elec	EF102c	Second floor elevator lobby	Lobby possibly needs two SD as shown on first floor	Second device in lobby is behind match line. Graphics will be cleaned for next submission.	-	Closed	
104	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	Is the intention for FA riser to not show all devices? Consider including all devices for clarity on design	Tier 2 drawings will own a one-line with all devices, at the completion of the project. Project one-line will be intended to outline intent and major components/loops/etc,	-	Closed	
105	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	Booster panel location & quantities not included on design. Consider including an estimate of quantity and a recommended location for reference	FAP is intended to indicate terminal cabinets/booster panels, etc. drawings will be updated for additional clarity on next submission.	-	Closed	
106	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	Fire fighter radio system amplifier not shown on floorplans	Noted, will be located in 2nd floor electrical room, wing C.	-	Closed	
107	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	FA shutdown relays not shown for HVAC integration	Will review and coordinate with HVAC.	Understood. Please provide if required.	Open	Do not think this is required. If it is, it will be coordinated for next submission
108	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	Multiple of these exterior devices shown on floorplans. Ensure proper quantity provided	Noted, will review.	-	Closed	

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109	6/17/2022	MV	15-Elec	EF601	Fire alarm riser detail B7	Overall fire alarm sequence of operations not provided on drawing	Sequence of operations will be owned in specifications and Fire Protection Narrative.	Understood. SOO not yet reviewed.	Open	will be coordinated and close to final for next submission
110	6/17/2022	MV	15-Elec	EF601	Duct smoke detail F7	Smoke detected by DSD does not send alarm to FACP. Confirm this is acceptable by AHJ	Noted. Will review with AHJ.	Understood. Please provide feedback on comment.	Open	will be coordinated and close to final for next submission
111	6/17/2022	MV	15-Elec	EF601	Duct smoke detail F7	Does FA interface to BMS provide shutdown command via BMS? Confirm AHJ will accept BMS shutdown and not hard wired modules at each HVAC fan	Will review.	Understood. Please provide feedback on comment.	Open	will be coordinated and close to final for next submission
112	6/17/2022	MV	15-Elec	EF601	Duct smoke detail F7	Consider including airflow direction for proper installation per manufacturers guidelines	Will review.	Please provide if required.	Open	not required. means and methods. HVAC diagrams will depict air flow direction.
113	6/17/2022	MV	15-Elec	EF601	Duct smoke detail F7	Line #7 for fan shutdown contradicts SOO notes.	Will reiev.	-	Closed	
114	6/17/2022	CJ	15-Elec	E-001	Switching Designations	Confirm legend for the Lighting Control device ie- Occupancy, Vacancy sensor.	Refer to EL501.	-	Closed	
115	6/17/2022	CJ	15-Elec	E-001	Switching Designations	Please consider using daylight harvesting sensors in perimeter spaces to conserve energy	They are shown on plans as Sensor Type D. Will review locations as design progresses.	-	Closed	
116	6/17/2022	CJ	15-Elec	EL501	Lighting details (general)	Provide details for interconnection of light fixtures, drivers and control devices.	Noted, will be added for next submission.	-	Closed	
117	6/17/2022	LB	16-Tech	T-100	Cable routing plans	The utility of sheets T-100, T-101, and T-102 is unclear.	These are cable routing drawings. These will be advanced for the 60% submission	-	Closed	
118	6/17/2022	LB	16-Tech	T-101A	Tech plans	Show master intercom station in Cust. Office (A146.2) and Assistant Principal per BOD.	A VMS (Visitor's Master Station) will not be added to the Custodian's Office	-	Closed	
119	6/17/2022	LB	16-Tech	T-101B	Tech plans	Show additional VMSs in Principal (B100.3) and Assistant Principal per BOD.	A VMS will be added to the Assistant Principal's Office	-	Closed	
120	6/17/2022	LB	16-Tech	T-101B	Tech plans	Show master intercom station in Principal (B100.3) and Assistant Principal per BOD.	A VMS is already shown in the Principal's Office B100.3	(BOD lists VMS and master intercom as though they are different items)	Closed	
121	6/17/2022	LB	16-Tech	T-101B	B100	Will the VMS in B100 serve as the "access control system workstation, video management workstation, visitor management workstation, and master video intercom" described in the BOD?	Access control and video management workstations will be procured as part of the FF&E package.	-	Closed	
122	6/17/2022	DC	19-AV	AV Drawings	AV Device Locations	Indicate mounting height and centerline alignment for all AV devices including wall-mounted speakers, AV receptacle panels, cameras, etc. Coordinate with architect.	This will be reviewed and coordinated for the 60% submission	Elevations are to scale but have few mounting heights dimensioned.	Open	will be coordinated and close to final for next submission
123	6/17/2022	DC	19-AV	AV Drawings	AV conduit and device box detail	Indicate all AV conduit and device box trade sizes. Example: 1-1/4" conduit; 2-gang box, etc.	This will be reviewed and coordinated for the 60% submission	-	Closed	
<b>No.</b>	<b>Date</b>	<b>By</b>	<b>Trade</b>	<b>Reference Document (Dwg/Spec)</b>	<b>Equip/Item</b>	<b>Design Review Comment</b>	<b>Design Team Response</b>	<b>Response By</b>	<b>Response Date</b>	<b>Status</b>
124	10/14/2022	LB	12-Plbg	General	Domestic Water Heating	Were heat pump water heaters considered? Consider providing space for a large preheat tank that could be heated by a heat pump (including the VRF ACCUs) as a retrofit if not during initial construction.	Heat pump was considered during Design Development, but was eliminated due to initial cost and maintenance requirements	LFM	10/19/2022	New

## Commissioning Design Review Comments



125	10/14/2022	LB	12-Plbg	Drawings	Not-potable Hot Water	Please provide a detail for non-potable water heating and recirculation.	Detail will be added for next submission	LFM	10/19/2022	New
126	10/14/2022	LB	12-Plbg	P-501	Detail A6	Detail shows 140F return but not 110F return. The 140F return should go through the heat source as shown, whereas the 110F return should connect to the cold side of the MMV.	Detail will be reviewed and updated for next submittal	LFM	10/19/2022	New
127	10/14/2022	LB		P-502	HW Schematic	The 140F return should not connect to the cold side of MMV-1 as shown.	Detail will be reviewed and updated for next submittal	LFM	10/19/2022	New
128	10/14/2022	LB		P-502	HW Schematic	Add thermometers at each recirc pump.	Thermometers will be added for next submittal	LFM	10/19/2022	New
129	10/14/2022	LB		P-502	HW Schematic	Ensure there is at least one pressure gauge in the	Pressure gauge will be added to diagram for next submittal	LFM	10/19/2022	New
130	10/14/2022	CJ	14-HVAC	M-100c	Ductwork	Drawings note that there is a shaft partition that is 2-hr rated between SM group C025 and 7th grade storage C035 while penetrating ductwork do not have any FD/FSD. Please clarify. If FSDs are added, access doors to be provided.	Designed with the rating at the floor, will confirm design intent with architecture.	CKG	10/19/2022	New
131	10/14/2022	CJ	14-HVAC	M-100c	Ductwork	EF-A Electric Room C026: Please clarify access door will be provided for FD in ductwork	Will add note for Access door. Access door is also shown on details.	CKG	10/19/2022	New
132	10/14/2022	CJ	14-HVAC	M-100c	Ductwork	Please clarify intent of 12x12 ductwork into the electrical room C026. Is it connected to a riser?	Transfer air with low duct- not a riser.	CKG	10/19/2022	New
133	10/14/2022	CJ	14-HVAC	M-100c	Ductwork	Drawings note that there is a shaft partition that is 2 hr rated partition near Janitor pump room C016 while penetrating ductwork do not have any FD/FSD. Please clarify. If FSDs are added, access doors to be provided.	FD/SD are shown on the M-401 drawings.	CKG	10/19/2022	New
134	10/14/2022	CJ	14-HVAC	M-100c	EVAV-03 and EVAV-05	Consider placing units in hallway for easier access to unit for maintenance than in rooms.	Will review VAV locations.	CKG	10/19/2022	New
135	10/14/2022	CJ	14-HVAC	M-100c	CO2 Sensor	VAV-018 is tied to 2 CO2 sensors. Please clarify SOO to enable ventilation for the unit if either sensor is above CO2 limit.	Added SOO for VAV boxes with 2 CO2 sensors.	CKG	10/19/2022	New
136	10/14/2022	CJ	14-HVAC	M-100C	Ductwork	Please clarify how air is exhausted from room SM Group C029 as no exhaust or transfer duct is shown.	Small group rooms have 75 CFM or less of air coming in and would be transferred under the door. We will look into if a transfer is needed.	CKG	10/19/2022	New
137	10/14/2022	CJ	14-HVAC	M-101A	Ductwork	Please clarify intent of 12x12 ductwork into the electrical room A142. Is it connected to a riser?	Transfer air with low duct- not a riser.	CKG	10/19/2022	New
138	10/14/2022	CJ	14-HVAC	M-101A	Sensors	Consider swapping T/CO2 sensors for VAV-1-01 and VAV-1-02 serving the Auditorium A138 taking the location of the diffusers into consideration.	Corrected.	CKG	10/19/2022	New
139	10/14/2022	CJ	14-HVAC	M-101A	Sensors	ACU-01 and ACU-02 in Electrical room A146.7, are they both tied into the same temp sensor?	Added second T-stat.	CKG	10/19/2022	New
140	10/14/2022	CJ	14-HVAC	M-101A	Gymnasium A148 SOO	Gym has 4 fans and 2 VAVs (VAV-1-08 and 1-09). Please clarify SOO of the fans as the included note only provides SOO for 1 fan and it is tied to VAV-1-08.	Fans are tied to a switch on the wall. VAVs are controlled by T-stat and CO2 sensors.	CKG	10/19/2022	New
141	10/14/2022	CJ	14-HVAC	M-101A	Ductwork	Please clarify exhaust from toilet rooms can be exhausted via EVAV/ERU and not a dedicated toilet exhaust system.	There is no recirculation and less than 0.5% cross contamination of exhaust so return/exhaust can be combined.	CKG	10/19/2022	New

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142	10/14/2022	CJ	14-HVAC	M-101B	Ductwork	Please clarify if Office rooms B-141.2 through B141.8 will have transfer ducts in the rooms.	Rooms with 75 CFM or less of air coming in and would be transferred under the door. We will look at each room to see if a transfer is needed.	CKG	10/19/2022	New
143	10/14/2022	LB	14-HVAC	Plans	Branch controllers	Review whether BCs require condensate. Typically they generate little or no condensate, but some manufacturers require condensate drains.	Trane (Basis) requires condensate drains.	CKG	10/19/2022	New
144	10/14/2022	LB	14-HVAC	M-101b	VAV-1-11	This VAV supplies a combination of cassette ACUs, supply diffusers, and ducted ACUs. The intended Will the terminations at the ACUs and varying ACU fan speed cause the ventilation airflow to vary unintentionally? A detail showing the ventilation inlet for the ACUs would be helpful.	TAB will work to balance the ACUs inlet and Diffusers.	CKG	10/19/2022	New
145	10/14/2022	LB	14-HVAC	M-101b	ACU-B-13	ACU is shown connected to CO2. How is this CO2 input used?	CO2 has been removed.	CKG	10/19/2022	New
146	10/14/2022	LB	14-HVAC	M-101b	B133.2	Room, called Small Group Room, is supplied by the VAV-1-33, which also serves the media center. Based on CO2 control for VAV, this room may be under-ventilated at times. Recommend adding a CO2 sensor and having VAV respond to whichever indication is higher.	CO2 sensor has been added.	CKG	10/19/2022	New
147	10/14/2022	LB	14-HVAC	M-101b	ACU-B-01, 02	Ventilation airflow is not defined.	CFM added.	CKG	10/19/2022	New
148	10/14/2022	LB	14-HVAC	M-101b	ACU-B-29	Thermostat appears to be exposed to sunlight. Recommend relocating on the north side of the same corner.	Thermostat moved.	CKG	10/19/2022	New
149	10/14/2022	LB	14-HVAC	M-102c	EVAV-2-04	Volume dampers are shown for each stall. Ceiling is gypsum. Review provisions for access and consider grille with integral damper.	Will review.	CKG	10/19/2022	New
150	10/14/2022	LB	14-HVAC	230993	3.03 Warmup	Review options for warmup of VRF systems to limit electrical demand and improve efficiency by staggering setpoint changes (e.g., only a portion of ACUs on an ACCU at a time).	3.03,A,2 notes to stagger the starts. Added additional information.	CKG	10/19/2022	New
151	10/14/2022	LB	14-HVAC	230993	3.04 Emergency Power Heating	In 3.04-2.a, clarify whether "three units" refers to ACCUs or ACUs. It seems that the intent is that all ACCUs can operate, each with (3) ACUs online.	Clarified- 3 ACCUs.	CKG	10/19/2022	New
152	10/14/2022	LB	14-HVAC	230993	3.04 Emergency Power Heating	As an alternative to the provided SOO, some if not most VRF systems can be given a demand limit and allowed to dispatch load automatically.	Will review.	CKG	10/19/2022	New
153	10/14/2022	LB	14-HVAC	230993	3.04 Emergency Power Heating	In 3.04-2.b, how will the "selected" terminal heating equipment be identified?	Units serving zones with external faces shall be on the generator. Units in completely interior spaces will not.	CKG	10/19/2022	New
154	10/14/2022	LB	14-HVAC	230993	3.06 Ducted ACU	3.06-A.3 would be clearer if it said, "This sequence is <i>also</i> applicable to non-classroom spaces..." as 3.06-A.1 indicated that this sequence is applicable to classrooms.	Clarification added.	CKG	10/19/2022	New
155	10/14/2022	LB	14-HVAC	230993	3.06, 3.07 ACUs	ACU fan speed control is not mentioned. Please include direction for how ACU fans are to be controlled.	Fan speed note added.	CKG	10/19/2022	New

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156	10/14/2022	LB	14-HVAC	230993	3.06, 3.07 ACUs	Please clarify whether the ERU supply air reset is required to poll "all the ACU zones...served by an ERU" or just all the zones with ducted ACUs. The reset is outlined in 3.06 (ducted) and not mentioned in 3.07 (cassette).	We will clarify the ERU supply air reset sequence in the ERU portion and remove from ACU sequences.	CKG	10/19/2022	New
157	10/14/2022	LB	14-HVAC	230993	3.08 ERUs	Clarify to which ERUs the optimum start applies. It seems inapplicable to the classroom ERUs based on the warmup sequence (3.03).	sequence updated.	CKG	10/19/2022	New
158	10/14/2022	LB	14-HVAC	230993	3.09 Split AC Units	Fan control in paragraph A is atypical for this type of unit. Typically they require the fan to run constantly when in cooling mode. AKF recommends "auto" speed control mode, which requires very little fan power when cooling demand is low/zero.	sequence updated.	CKG	10/19/2022	New
159	10/14/2022	LB	14-HVAC	230993	3.10 Unit Heaters	Provide limitation on vestibule heating per the IECC: heated only to 60F (adj.), disabled when OAT>45F (adj.).	Added line for vestibules.	CKG	10/19/2022	New
160	10/14/2022	LB	14-HVAC	230993	3.11 FTR	Although adjustable, the initial heating setpoint of 72F seems unnecessarily high for this electric-resistance heating source.	Changed to 68F.	CKG	10/19/2022	New
161	10/14/2022	LB	14-HVAC	230993	3.13 Kiln Exhaust	Correct <i>or</i> to <i>and</i> in paragraph 3.13-2-c. The fan should be off only when both of those conditions are true.	Corrected.	CKG	10/19/2022	New
162	10/14/2022	LB	14-HVAC	230993	Spec Numbering	This specification is inconsistent between using capital letters or not, e.g., 3.13 starts with 1, and 3.14 starts with A.	Corrected numbers/letters throughout.	CKG	10/19/2022	New
163	10/14/2022	LB	14-HVAC	230993	3.17 VAVs	There is no mention in this section of the electric reheats for VAVs so equipped.	Will add electric reheat to specifications.	CKG	10/19/2022	New
164	10/14/2022	LB	14-HVAC	230993	3.21-I DW Booster	Add trend logging for booster pump.	Added trend data to specification.	CKG	10/19/2022	New
165	10/14/2022	MV	15-Elec	EF102A	HVAC Duct Detector	(1) Duct detector shown for each HVAC unit. Please review if additional DD required.	Quantity currently shown coordinated with HVAC. Will continue to be coordinated as HVAC design finalizes.	AJ	10/19/2022	New
166	10/14/2022	MV	15-Elec	EF102A	HVAC Duct Detector	Duct detector shown for each HVAC unit does not include test switch. Please review if required.	has been addressed.	AJ	10/19/2022	New
167	10/14/2022	MV	15-Elec	EF101A	A146.6 Water Serv Booster Room	No detectors or horn/strobe in room. Please review if required.	has been addressed.	AJ	10/19/2022	New
168	10/14/2022	MV	15-Elec	E-001	Kitchen Equipment	Coordinate any special AHJ requirements for kitchen area.	will review.	AJ	10/19/2022	New
169	10/14/2022	MV	15-Elec	QT-100	Stage AV Drawings	No Fire Alarm scope or coordination delineated in project documents. Ensure any FA scope or requirements are captured.	local sound system override will be required. will coordinate this scope, as well as any other requirements needed.	AJ	10/19/2022	New
170	10/14/2022	MV	15-Elec	T001	Security / IT / Technology	No Fire Alarm scope or coordination delineated in project documents. Ensure any FA scope or requirements are captured.	local sound system override will be required. will coordinate this scope, as well as any other requirements needed.	AJ	10/19/2022	New
171	10/14/2022	MV	15-Elec	FS-101	Food Services	No Fire Alarm scope or coordination delineated in project documents. Ensure any FA scope or requirements are captured.	will review.	AJ	10/19/2022	New

## Commissioning Design Review Comments



172	10/14/2022	HJ	15-Elec	EP601	Equipment Floors	Please indicate floor levels on the single line drawings.	the 1st number in the room number indicates the floor. Also, each room is listed with the floor right below the room name/number. This is sufficient for one-line identification.	AJ	10/19/2022	New
173	10/14/2022	HJ	15-Elec	Spec Section 260574, 3.03	Fault Current Study	Consider including language to capture all distribution equipment (panels, disconnects, VFDs, controllers etc.).	See notes 6,7,8 on E-001 under installation coordination notes. This scope is covered and should be clear for the electrical contractor.	AJ	10/19/2022	New
174	10/14/2022	HJ	15-Elec	EP601	Static Trip Unit Circuit Breakers	Recommended to indicate on drawings if/where the breakers are supposed to be LSI/G capable throughout the distribution.	We do not typically show this level of detail in the one-line. specific breaker information is covered in the specifications, with the exception of GFI circuit breakers.	AJ	10/19/2022	New
175	10/14/2022	HJ	15-Elec	EP601	Distribution Equipment	Is the KAIC ratings indicated on panel schedules still a placeholder for pricing? Please confirm. If not please calculate and indicate KAIC ratings for rest of the distribution equipment.	ratings will be finalized in next submission.	AJ	10/19/2022	New
176	10/14/2022	HJ	15-Elec	EP601	Generator	Will the load bank be utilized as supplemental load when needed for the generator to maintain minimum load?	yes. See 26 32 14 2.09 (L)	AJ	10/19/2022	New
177	10/14/2022	HJ	15-Elec	EP610, EP611	Mechanical Equipment Schedule	As previously noted, at appropriate design phase, it is recommended to include a column to indicate calculated KAIC ratings at the controllers where applicable, so appropriately rated KAIC controllers are bought and installed.	Noted, but will not be incorporated. HVAC specifications, as well as electrical review of equipment selection and shop drawings will cover this coordination.	AJ	10/19/2022	New
178	10/14/2022	HJ	15-Elec	Spec Section 142100	Elevator Sequence	Recommended to include elevator sequence during an outage and post outage scenario when the ATS-2 transferd between sources.	Will review	AJ	10/19/2022	New
179	10/14/2022	LB	15-Elec	EP101a	Elec Rm	Tag for detail A7/E-402 is obscured. Please relocate.	has been addressed.	AJ	10/19/2022	
180	10/14/2022	LB	15-Elec	EF103	Title	Sheet is called Roof Power Plan, but the EP103 series is power, and this sheet is fire alarm.	has been addressed.	AJ	10/19/2022	
181	10/14/2022	LB	15-Elec	EL100c	Workshop Clrm. C018	Review devices in this room. None have control subscripts, motion sensor is occupancy, and daylight zone is not the full width of the room.	will review	AJ	10/19/2022	
182	10/14/2022	LB	15-Elec	EL100c	Corr. 8H002	Is the entire hallway one control zone for occupancy sensors?	Yes, that is the intent. Will review SOO and expectations with client	AJ	10/19/2022	
183	10/14/2022	LB	15-Elec	EL100c	Sci Lab C021	What is the purpose of the dimmer switch located away from the door?	will be removed	AJ	10/19/2022	
184	10/14/2022	LB	15-Elec	EL101a	Locker rooms	What is meant by low voltage switch? Aren't the dimmer switches throughout the project low voltage?	To indicate low voltage, on/off non dimming switch. A swith	AJ	10/19/2022	
185	10/14/2022	LB	15-Elec	EL101a	Classroom A150	Relocate second switch to near the second door.	second switch is a teacher switch. It will stay. a third switch can be added by the other door.	AJ	10/19/2022	
186	10/14/2022	LB	15-Elec	EL101a	Stage A149, Auditorium A138	Review exit signage.	has been addressed.	AJ	10/19/2022	
187	10/14/2022	LB	15-Elec	EL101a	Storage A138.2	Add vacancy sensor switch.	has been addressed.	AJ	10/19/2022	
188	10/14/2022	LB	15-Elec	EL101a	Kitchen suite	Complete lighting controls in this area, e.g., add switches for A137.4, define daylight zone for A136.	Will be completed for next submission	AJ	10/19/2022	
189	10/14/2022	LB	15-Elec	EL101a	Water A146.6	Remove occ sensor symbol or revisit 'SM' SOO.	Controls of that room will be revisited	AJ	10/19/2022	

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Project Concord Middle School  
Subject BECx 60% CD Drawing and Spec Review Issues Log

Sheet No. \_\_\_\_\_  
Project No. 220772  
Date 10/15/2022  
By/Chk By \_\_\_\_\_

			masonry ties must be designed for masonry assemblies where the distance between the inside face of the veneer and the steel framing exceeds 6 5/8" in accordance with TMS 402 "Alternate Design of Anchored Masonry Veneer" provisions. Unless the products and installation instructions in this section meet the TMS 402 design provisions, we recommend adding delegated design language for design of long span masonry anchors.	Design Team	Delegated Design sections will be added to this spec section for 90% CD submission
100	042000	General	We recommend adding the following: complying with ASTM C150	Design Team	We will review and accommodate as necessary for 90% CD submission.
101	042000	2.05 D	We recommend adding the following: complying with ASTM C207	Design Team	We will review and accommodate as necessary for 90% CD submission.
102	042000	2.05 D	Verify the products listed here meet design requirements for long spans or add long span masonry anchors section.	Design Team	We will review and accommodate as necessary for 90% CD submission.
103	042000	2.08	We recommend referencing the Building Enclosure Commissioning Requirements spec for mockup testing to avoid contradictions in testing scope. The BECx spec includes air-leakage-location testing and adhesion testing, similar to that included here, but air-leakage-volume testing is included with fenestrations as ASTM E783 measures air leakage through fenestrations. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
104	072713	1.08 B	Consider specifying a non-aluminum faced modified-bituminous product for applications where counterflashing/transition strip could possibly be in contact with masonry, as aluminum facer can corrode when in contact with masonry. See SGH comment on drawing sheet A9/A-510 for example of this condition.	Design Team	We will review and accommodate as necessary for 90% CD submission.
105	072713	2.04	We recommend adding the following paragraphs: I. Pretreat penetrations, including masonry veneer anchors, with appropriate sealant and/or flashing.	Design Team	We will review and accommodate as necessary for 90% CD submission.
106	072713	3.02	J. Pretreat exposed gypsum core of sheathing board with appropriate primer and/or flashing. We recommend referencing the Building Enclosure Commissioning Requirements spec for field quality control testing to avoid contradictions in testing scope. The BECx spec includes air-leakage-location testing and adhesion testing, similar to that included here, but air-leakage-volume testing is included with fenestrations as ASTM E783 measures air leakage through fenestrations. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
107	072713	3.04 D	We recommend referencing the Building Enclosure Commissioning Requirements spec for mockup testing to avoid contradictions in testing scope. The BECx spec includes air-leakage-location testing and adhesion testing, similar to that included here, but air-leakage-volume testing is included with fenestrations as ASTM E783 measures air leakage through fenestrations. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
108	072715	1.08 B	We recommend adding the following paragraph: I. Pretreat exposed gypsum core of sheathing board with appropriate primer and/or flashing. We recommend referencing the Building Enclosure Commissioning Requirements spec for field quality control testing to avoid contradictions in testing scope. The BECx spec includes air-leakage-location testing and adhesion testing, similar to that included here, but air-leakage-volume testing is included with fenestrations as ASTM E783 measures air leakage through fenestrations. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
109	072715	3.02	We recommend adding the following paragraphs: 6. Details showing transitions to adjacent construction, including air barriers and fenestrations. 7. Requirements for meeting specified uplift requirements.	Design Team	We will review and accommodate as necessary for 90% CD submission.
110	072715	3.04 D	8. Details at the roof drain sumps, roofing penetrations, etc. We recommend specifying ASTM C1289 type, class, and grade. NRCA recommends ASTM C1289, Type II, Class 2 (coated glass facer) products for use with single-ply membrane roof systems. Grade 2 (compressive strength of 20 psi) or Grade 3 (compressive strength of 25 psi) would be appropriate.	Design Team	We will review and accommodate as necessary for 90% CD submission.
111	075419	1.05 D	Coordinate insulation thickness/layers with roof assemblies shown on drawing A-003. Materials listed in Part 2 only include self-adhering sheet vapor retarder products: include polyethylene film products if that material will be used. Also clarify which roof areas will receive the different vapor retarder materials and coordinate with the drawings. Polyethylene film is more appropriate for metal deck assemblies where substrate board is not provided. Self-adhering sheet vapor retarders are appropriate for assemblies with a continuous substrate.	Design Team	We will review and accommodate as necessary for 90% CD submission.
112	075419	2.05 B	Specify which insulation layers to be adhered/mechanically fastened. Based on responses to our 100% DD review comments, we understand the base layer of insulation will be fastened and subsequent layers of insulation and coverboard will be adhered.	Design Team	We will review and accommodate as necessary for 90% CD submission.
113	075419	2.05 B.1	We recommend referencing the Building Enclosure Commissioning Requirements spec for field quality control testing to avoid contradictions in testing scope. The BECx spec includes additional testing requirements, including roof uplift resistance testing, machine-weld testing, seam probing, flood testing around roof drains, and electric field vector mapping (EFCM) testing. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
114	075419	3.03 A and 3.04 A	We recommend referencing the Building Enclosure Commissioning Requirements spec for mockup testing to avoid contradictions in testing scope. The BECx spec includes qualitative air-leakage testing and quantitative air leakage testing, but adhesion testing is included with air barriers. The BECx also includes water penetration testing and water nozzle spray testing. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
115	075419	3.05 G	which is more descriptive:  Water Leakage: Water leakage shall be defined as water that accumulates at any location within or around the fenestration that is not designed to accommodate, control, and direct such water to the building exterior. This includes any water past the interior plane of the glazing of the fenestration. Fenestration shall not allow any water to enter the glazing pockets of the fenestration assembly (if applicable).	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
116	075419	3.09 C-E	Add solar heat-gain coefficient requirements, which is required to comply with energy code.	Design Team	We will edit this for 90% CD submission.
117	084413	1.09 B	specific design conditions.  J. Condensation Resistance: Engage a qualified independent testing agency to perform a computer thermal analysis of the curtain wall system to determine the probability of condensation in accordance with NFRC 500. Analysis must successfully show that condensation does not occur on interior surfaces under the most onerous combination of environment design conditions as listed below including considerations of interior construction and finishes. Internal condensation and drainage systems must prevent uncontrolled condensation inboard of the vapor barrier plane. Analysis shall utilize the latest version of THERM, computer software developed by Lawrence Berkley National Laboratory (LBNL), or approved equivalent: 1. Design Conditions: a. Outdoor Air Temperature: b. Wind Speed: c. Indoor Air Temperature: d. Indoor Relative Humidity:	Design Team	We will review and accommodate as necessary for 90% CD submission.
118	084413	2.01 G.1	We recommend referencing the Building Enclosure Commissioning Requirements spec for field quality control testing to avoid contradictions in testing scope. The BECx spec includes air infiltration testing, water penetration testing, and water spray testing, but does not include structural silicone sealant adhesion testing and inspection. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with Cx/BE/CxA to review.
119	084413	2.01 I	Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.	Design Team	We will review and accommodate as necessary for 90% CD submission.
120	084413	2.01 I.3			
121	084413	3.04 B			
122	085113	1.05 D			



Project Concord Middle School  
Subject BECx 60% CD Drawing and Spec Review Issues Log

Sheet No. \_\_\_\_\_  
Project No. 220772  
Date 10/15/2022  
By/Chk By \_\_\_\_\_

123	085113	2.02 D	See SGH comment in Glazed Aluminum Curtain Walls specification, Section 084413, Para. 2.01 G.1 regarding definition of leakage.	Design Team	We will review and accommodate as necessary for 90% CD submission.
124	085113	2.02 F	See SGH comment in Glazed Aluminum Curtain Walls specification, Section 084413, Para. 2.01 I.3, regarding recommended condensation requirements.	Design Team	We will review and accommodate as necessary for 90% CD submission.
125	085113	3.03 B	We recommend referencing the Building Enclosure Commissioning Requirements spec for field quality control testing to avoid contradictions in testing scope. The BECx spec includes air infiltration testing and water-resistance testing as listed above, as well as other tests. We can discuss discrepancies during a future coordination meeting.	Design Team	We will review and accommodate as necessary for 90% CD submission. SMMA will schedule a coordination meeting with CxA/BECxA to review.
126	086300	1.04 D	We recommend adding the following paragraph: 3. Include details showing skylight integration with adjacent roofing assemblies.	Design Team	This will be added for the 90% CD submission.
127	086300	2.02 J	See SGH comment in Glazed Aluminum Curtain Walls specification, Section 084413, Para. 2.01 I.3, regarding recommended condensation requirements.	Design Team	We will review and accommodate as necessary for 90% CD submission.
128	086300	3.03 A	We recommend referencing the Building Enclosure Commissioning Requirements spec for field q	Design Team	This reference will be added for the 90% CD submission.

## 6B.2 OPM Deliverables

### *6B.2.2 Project Schedule*

#### **A. Updated OPM Project Schedule**

Hill International continued to provide updates to the overall project schedule during the 60% CD phase. The most recent project update, attached herein, dated September 26, 2022, includes revisions to the permitting tasks and progress to this data date, as well as the addition of the town process to achieve a Special Town Meeting and vote in early 2023. This Special Town meeting is being planned for January 19, 2023, and the subsequent vote is being planned for February 9, 2023. The design, permitting, and prequalification tasks are being maintained through early 2023 in support of bidding in March/April 2023 as previously proposed. The school opening date of February 24, 2025 is being maintained as well. Phase 2 construction work (abatement/demolition of the existing Sanborn School and natural grass fields) will commence in spring 2023 and will be completed September 12, 2025. The fields will be ready for use after two growing seasons starting September 1, 2026.



Concord Middle School  
Project Schedule UPDATE  
September 26, 2022



ID	Task Name	Duration	Start	Finish	Total Slack	Predecessors	
1	Design & Pre-Construction Phases	940 days	Wed 8/14/19	Wed 5/10/23	830 days		<div><div></div></div> 34%
2	OPM Selection	15 days	Wed 8/14/19	Wed 9/4/19	0 days		<div><div></div></div> 100%
7	Designer Selection	62 days	Tue 8/20/19	Mon 11/18/19	0 days		<div><div></div></div> 100%
21	Feasibility Study	521 days	Tue 11/19/19	Thu 12/16/21	1183 days		<div><div></div></div> 99%
38	Schematic Design	155 days	Thu 5/6/21	Thu 12/16/21	355 days		<div><div></div></div> 0%
48	Town Actions	77 days	Mon 10/18/21	Fri 2/4/22	241 days		<div><div></div></div> 0%
60	Design Development	102 days	Mon 2/7/22	Fri 7/1/22	211 days		<div><div></div></div> 0%
69	Commissioning Agent Selection	126 days	Tue 2/22/22	Fri 8/19/22	1011 days		<div><div></div></div> 0%
84	Construction Documents	164 days	Tue 7/5/22	Mon 2/27/23	211 days		<div><div></div></div> 0%
85	60% Construction Documents	77 days	Tue 7/5/22	Fri 10/21/22	211 days		<div><div></div></div> 0%
86	60% Construction Documents - Pricing Set	62 days	Tue 7/5/22	Thu 9/29/22	211 days 68		<div><div></div></div> 0%
87	Finalize 60% CD Estimate Set	0 days	Thu 9/29/22	Thu 9/29/22	968 days 86		<div><div></div></div> 9/29
88	Building Inspector Review of 60% Estimate Set	15 days	Fri 9/30/22	Fri 10/21/22	968 days 87		<div><div></div></div> 0%
89	OPM & CxA Review 60% CD	10 days	Fri 9/30/22	Fri 10/14/22	973 days 87		<div><div></div></div> 0%
90	60% CD Cost Estimate	10 days	Fri 9/30/22	Fri 10/14/22	970 days 87		<div><div></div></div> 0%
91	60% CD Reconciliation & VM List	2 days	Mon 10/17/22	Tue 10/18/22	970 days 90		<div><div></div></div> 0%
92	60% CD submission to CMSBC	1 day	Wed 10/19/22	Wed 10/19/22	970 days 91		<div><div></div></div> 0%
93	CMSBC Meeting to Finalize Warrant Article Cost	0 days	Thu 10/20/22	Thu 10/20/22	158 days		<div><div></div></div> 10/20
94	90% Construction Documents	60 days	Thu 10/20/22	Fri 1/13/23	158 days		<div><div></div></div> 0%
95	90% Construction Documents- Pricing Set	40 days	Thu 10/20/22	Fri 12/16/22	158 days 93		<div><div></div></div> 0%
96	Finalize 90% CD Estimate Set	0 days	Fri 12/16/22	Fri 12/16/22	158 days 95		<div><div></div></div> 12/16
97	OPM & CxA review 90% CD	10 days	Mon 12/19/22	Fri 12/30/22	163 days 96		<div><div></div></div> 0%

Critical

Critical Split

Critical Progress

Task

Split

Task Progress

Manual Task

Start-only

Finish-only

Duration-only

Baseline

Baseline Split

Baseline Milestone

Milestone

Summary Progress

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External Milestone

Inactive Task

Inactive Milestone

Inactive Summary

Deadline

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Concord Middle School  
Project Schedule UPDATE  
September 26, 2022



ID	Task Name	Duration	Start	Finish	Total Slack	Predecessors	
98	90% CD Cost Estimate	17 days	Mon 12/19/22	Tue 1/10/23	158 days	96	
99	90% CD Cost Reconciliation	3 days	Wed 1/11/23	Fri 1/13/23	158 days	98	
100	Complete 90% CD Documents for submission	5 days	Mon 1/2/23	Fri 1/6/23	163 days	97	
101	90% CD submission to CMSBC	0 days	Fri 1/13/23	Fri 1/13/23	158 days	100,99	
102	100% Construction Documents	29 days	Tue 1/17/23	Mon 2/27/23	158 days	101	
103	100% Construction Documents	29 days	Tue 1/17/23	Mon 2/27/23	158 days		
104	100% CD Package to CMSBC / Bid Package Complete	0 days	Mon 2/27/23	Mon 2/27/23	158 days	103	
105	Permitting	196 days	Mon 8/1/22	Wed 5/10/23	344 days		
106	ZBA Plan Review & Approval	95 days	Mon 8/1/22	Thu 12/15/22	931 days		
107	Submit plans for review (i) Site Plan Review (ii) Special Permit for Ground Water Conservancy (iii) Building Height Waiver	0 days	Mon 8/1/22	Mon 8/1/22	995 days		
108	Plan Review by DPW / Engineering / Water / CMLP / ZBA / Planning Board	31 days	Mon 8/1/22	Tue 9/13/22	995 days	107	
109	Planning Board Meeting Date	0 days	Tue 9/13/22	Tue 9/13/22	995 days	108	
110	ZBA Meeting Date	0 days	Thu 11/10/22	Thu 11/10/22	955 days		
111	Special Permit Recommendations to ZBA from Planning Board	0 days	Thu 11/10/22	Thu 11/10/22	955 days	108	
112	ZBA - 20 Day Appeal (Filed by Town Clerk)	20 days	Thu 11/17/22	Thu 12/15/22	931 days		
113	ZBA Issues Approval & Order of Conditions	0 days	Thu 12/15/22	Thu 12/15/22	931 days	112	
114	Tree Protection and Removal Permit by Planning Board	35 days	Tue 2/28/23	Tue 4/18/23	846 days	104	
115	Septic System Approval by Health Division	84 days	Wed 9/7/22	Thu 1/5/23	916 days		
116	Building Permit	10 days	Thu 4/27/23	Wed 5/10/23	158 days		
117	GC Submit Application/Plan Review by Town	10 days	Thu 4/27/23	Wed 5/10/23	158 days	143	
118	GC pulls Building Permit (Upon Contract Award / Issuance of NTP)	0 days	Wed 5/10/23	Wed 5/10/23	158 days	117,143	

Critical

Critical Split

Critical Progress

Task

Split

Task Progress

Manual Task

Start-only

Finish-only

Duration-only

Baseline

Baseline Split

Baseline Milestone

Milestone

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Inactive Milestone

Inactive Summary

Deadline



**Concord Middle School  
Project Schedule UPDATE  
September 26, 2022**



ID	Task Name	Duration	Start	Finish	Total Slack	Predecessors																																																
119	Town Process	76 days	Mon 10/24/22	Thu 2/9/23	892 days																																																	
120	Open Warrant	0 days	Mon 10/24/22	Mon 10/24/22	892 days																																																	
121	Joint Finance Committee & CMSBC Meeting	0 days	Thu 11/3/22	Thu 11/3/22	892 days	120FS+9 days																																																
122	Close the Warrant	0 days	Fri 11/4/22	Fri 11/4/22	892 days	121FS+1 day																																																
123	Post Warrant	0 days	Mon 11/14/22	Mon 11/14/22	892 days	122FS+5 days																																																
124	Public Hearing	0 days	Thu 12/1/22	Thu 12/1/22	892 days	123FS+12 days																																																
125	Finance Comm Report	0 days	Thu 12/22/22	Thu 12/22/22	892 days	124FS+15 days																																																
126	Special Town Meeting	0 days	Thu 1/19/23	Thu 1/19/23	892 days	125FS+19 days																																																
127	Town Vote	0 days	Thu 2/9/23	Thu 2/9/23	892 days	126FS+15 days																																																
128	GC and Subs Contractor Prequalifications	70 days	Tue 11/1/22	Thu 2/9/23	169 days																																																	
129	Draft RFQ and Advertising	10 days	Tue 11/1/22	Tue 11/15/22	169 days	86FS-21 days																																																
130	Posted Advertisement	0 days	Tue 11/15/22	Tue 11/15/22	169 days	129																																																
131	Receive RFQ	10 days	Wed 11/16/22	Wed 11/30/22	169 days	130																																																
132	Review Submissions and Prequals Committee Meetings	35 days	Thu 12/1/22	Thu 1/19/23	169 days	131																																																
133	Final Report	10 days	Fri 1/20/23	Thu 2/2/23	169 days	132																																																
134	Issue Final Contractor List	5 days	Fri 2/3/23	Thu 2/9/23	169 days	133																																																
135	Bidding	41 days	Mon 2/27/23	Wed 4/26/23	158 days																																																	
136	Advertise on Central Register	0 days	Mon 2/27/23	Mon 2/27/23	158 days	104,134																																																
137	Posted on Central Register / Documents Available	0 days	Mon 3/6/23	Mon 3/6/23	158 days	136FS+5 days																																																
138	Pre-Bid Conference	1 day	Tue 3/14/23	Tue 3/14/23	158 days	137FS+5 days																																																
139	FSB Duration	15 days	Wed 3/15/23	Tue 4/4/23	158 days	138																																																
140	GC Duration	25 days	Tue 3/7/23	Mon 4/10/23	164 days	137																																																
		Critical	Task	Manual Task	Duration-only	Baseline Milestone	Summary	External Tasks	Inactive Milestone																																													
		Critical Split	Split	Start-only	Baseline	Milestone	Manual Summary	External Milestone	Inactive Summary																																													
		Critical Progress	Task Progress	Finish-only	Baseline Split	Summary Progress	Project Summary	Inactive Task	Deadline																																													
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Concord Middle School  
Project Schedule UPDATE  
September 26, 2022



ID	Task Name	Duration	Start	Finish	Total Slack	Predecessors	
141	Filed Sub-bid Due	0 days	Tue 4/4/23	Tue 4/4/23	158 days 138,139		
142	General Bid (DBB)	0 days	Wed 4/19/23	Wed 4/19/23	158 days 141FS+10 days,140		
143	Contract Award / NTP	5 days	Thu 4/20/23	Wed 4/26/23	158 days 142		
144	Construction Phase 1 - New School Building & Site	463 days	Thu 5/11/23	Mon 3/17/25	158 days		
145	Phase 1 Construction	20 mons	Thu 5/11/23	Thu 12/12/24	7.9 mons 143FS+9 days,118		
146	New Building Substantially Complete	0 days	Thu 12/12/24	Thu 12/12/24	430 days 145		
147	Construction Phase 1 - Punchlist	63 days	Fri 12/13/24	Mon 3/17/25	367 days 145		
148	Move into new Building	10 days	Fri 2/7/25	Fri 2/21/25	158 days 145FS+37 days		
149	New School Open for Classes	0 days	Mon 2/24/25	Mon 2/24/25	158 days 148FS+1 day		
150	Construction Phase 2 - Demo Existing School / Construct Fields	224 days	Tue 2/25/25	Thu 1/15/26	158 days		
151	Phase 2 Demo / Construction	7 mons	Tue 2/25/25	Fri 9/12/25	7.9 mons 149		
152	Fields Substantially Complete	0 days	Fri 9/12/25	Fri 9/12/25	158 days 151		
153	Construction Phase 2 Punchlist	42 days	Mon 9/15/25	Thu 11/13/25	158 days 152		
154	Project Final Completion	0 days	Thu 11/13/25	Thu 11/13/25	200 days 153		
155	Project Close-Out	42 days	Fri 11/14/25	Thu 1/15/26	158 days 153		
156	Grass Established for Field Usage	0 days	Tue 9/1/26	Tue 9/1/26	0 days		
157	Fields Ready for Use	0 days	Tue 9/1/26	Tue 9/1/26	0 days		

Critical

Critical Split

Critical Progress

Task

Split

Task Progress

Manual Task

Start-only

Finish-only

Duration-only

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## 6B.2 OPM Deliverables

### *6B.2.3 Project Scope and Budget*

#### **A. Project Scope and Budget, Cost Estimates, and Reconciliation**

As noted in section 6A.2.1, the Design Development package was reviewed and independent cost estimates were prepared by two estimators: AM Fogarty, retained by SMMA Architects, and PM&C, hired by Hill International. These cost estimates utilized Unifomat II and CSI.

The estimate detail was reconciled and finalized on October 18, 2022. The estimate summary and detail are attached for reference.

In summary, the reconciled estimated construction cost is \$86,455,680. The construction budget is \$80,772,447. The 60% CD estimate is currently \$5,683,233 over the construction budget.

There were no substantiative changes in quality or scope from Design Development to 60% CD's, apart from accepted value management.



Concord Middle School  
60% CD COST ESTIMATE - RECONCILED

10/19/22



		142,513. sf	
		RECONCILED VALUE (Average)	
	Program Area		Cost/SF
NEW BUILDING		142,513 SF	
A	Substructure		
A10	Foundations		
	A1010 Standard Foundations	\$2,844,603	\$19.96 /sf
	A1020 Special Foundations	\$0	\$0.00 /sf
	A1030 Lowest Floor Construction	\$1,403,898	\$9.85 /sf
A20	Basement Construction		
	A2010 Basement Excavation	\$0	\$0.00 /sf
	A2020 Basement Walls	\$0	\$0.00 /sf
B	Shell		
B10	Superstructure		
	B1010 Floor Construction	\$4,321,433	\$30.32 /sf
	B1020 Roof Construction	\$3,089,596	\$21.68 /sf
B20	Exterior Enclosure		
	B2010 Exterior Walls	\$5,304,967	\$37.22 /sf
	B2020 Windows	\$2,806,408	\$19.69 /sf
	B2030 Exterior Doors	\$147,646	\$1.04 /sf
B30	Roofing		
	B3010 Roof Coverings	\$3,073,401	\$21.57 /sf
	B3020 Roof Openings	\$94,538	\$0.66 /sf
C	Interiors		
C10	Interior Construction		
	C1010 Partitions	\$4,280,997	\$30.04 /sf
	C1020 Interior Doors	\$1,051,302	\$7.38 /sf
	C1030 Specialties/Millwork	\$1,537,734	\$10.79 /sf
C20	Stairs		
	C2010 Stair Construction	\$340,000	\$2.39 /sf
	C2020 Stair Finishes	\$43,273	\$0.30 /sf
C30	Interior Finishes		
	C3010 Wall Finishes	\$1,762,317	\$12.37 /sf
	C3020 Floor Finishes	\$1,274,737	\$8.94 /sf
	C3030 Ceiling Finishes	\$1,825,269	\$12.81 /sf
D	Services		
D10	Conveying		
	D1010 Elevators	\$232,900	\$1.63 /sf
D20	Plumbing		
	D20 Plumbing	\$3,114,983	\$21.86 /sf
D30	HVAC		
	D30 HVAC	\$8,493,402	\$59.60 /sf
D40	Fire Protection		
	D40 Fire Protection	\$1,054,858	\$7.40 /sf
D50	Electrical		
	D50 Electrical	\$7,776,392	\$54.57 /sf
E	Equipment & Furnishings		
E10	Equipment		
	E10 General	\$1,824,912	\$12.81 /sf
E20	Furnishings		
	E2010 Fixed Furnishings	\$1,538,789	\$10.80 /sf
F	Special Construction & Hazmat Removals		
F10	Special Construction		
	F1010 Special Construction	\$0	\$0.00 /sf
F20	Building Demolition		
	F2010 Building Elements Demolition	\$698,539	\$4.90 /sf
	F2020 Hazardous Components Abatement	\$1,010,444	\$7.09 /sf
	Sub-total for above trade work	\$60,947,331	\$427.66 /sf
G	Sitework		
G 10	Site Preparation	\$2,861,151	\$20.08 /sf
G 20	Site improvements	\$6,206,046	\$43.55 /sf
G 30	Utilities	\$2,404,146	\$16.87 /sf
G 40	Site Electric	\$799,269	\$5.61 /sf
	Sub-total incl. Sitework & Demo	\$73,217,942	\$513.76 /sf
	Markups		
	Escalation	0.00%	\$2,639,669 \$18.52 /sf
	Design and Estimating Contingency	0.00%	\$2,196,673 \$15.41 /sf

	Sub-total incl. Escalation & Design Cont		\$78,054,284	\$547.70 /sf
	General Conditions - Main Building	20mo	\$2,700,000	\$18.95 /sf
	General Conditions - Demo + Sitework	7mo	\$455,000	\$3.19 /sf
	General Requirements	2.00%	\$1,561,176	\$10.95 /sf
	Bonds	1.00%	\$741,273	\$5.20 /sf
	Insurance	1.00%	\$835,163	\$5.86 /sf
	Permit	N/A	\$0	\$0.00 /sf
	Overhead & Profit	2.50%	\$2,108,785	\$14.80 /sf
	Total Estimated Construction Cost		\$86,455,680	\$606.65 /sf

		142,513. sf	
		PM & C, dated 10/18/22	
			Cost/SF
		142,513 SF	
		\$2,729,630	\$19.15 /sf
		\$0	\$0.00 /sf
		\$1,381,229	\$9.69 /sf
		\$0	\$0.00 /sf
		\$0	\$0.00 /sf
		\$4,516,989	\$31.70 /sf
		\$2,938,889	\$20.62 /sf
		\$5,206,168	\$36.53 /sf
		\$2,896,665	\$20.33 /sf
		\$149,330	\$1.05 /sf
		\$3,107,885	\$21.81 /sf
		\$85,175	\$0.60 /sf
		\$4,228,827	\$29.67 /sf
		\$998,200	\$7.00 /sf
		\$1,552,875	\$10.90 /sf
		\$325,000	\$2.28 /sf
		\$42,500	\$0.30 /sf
		\$1,741,247	\$12.22 /sf
		\$1,265,307	\$8.88 /sf
		\$1,760,742	\$12.35 /sf
		\$242,500	\$1.70 /sf
		\$3,071,425	\$21.55 /sf
		\$8,445,287	\$59.26 /sf
		\$1,039,080	\$7.29 /sf
		\$7,786,263	\$54.64 /sf
		\$1,801,819	\$12.64 /sf
		\$1,519,100	\$10.66 /sf
		\$0	\$0.00 /sf
		\$644,897	\$6.78 /sf
		\$1,010,444	\$7.09 /sf
		\$60,487,473	\$424.43 /sf
		\$2,915,342	\$20.46 /sf
		\$6,161,316	\$43.23 /sf
		\$2,436,180	\$17.09 /sf
		\$685,730	\$4.81 /sf
		\$72,686,041	\$510.03 /sf
3.50%		\$2,620,332	\$18.39 /sf
3.00%		\$2,180,581	\$15.30 /sf

	\$77,486,954	\$543.72 /sf
20mo	\$2,700,000	\$18.95 /sf
7mo	\$455,000	\$3.19 /sf
2.00%	\$1,549,739	\$10.87 /sf
1.00%	\$774,870	\$5.44 /sf
1.00%	\$829,666	\$5.82 /sf
N/A	\$0	\$0.00 /sf
2.50%	\$2,094,906	\$14.70 /sf
	\$85,891,135	\$602.69 /sf

		142,513. sf	
		AM Fogarty, dated 10/18/22	
			Cost/SF
		142,513 SF	
		\$2,959,575	\$20.77 /sf
		\$0	\$0.00 /sf
		\$1,426,566	\$10.01 /sf
		\$0	\$0.00 /sf
		\$0	\$0.00 /sf
		\$4,125,876	\$28.95 /sf
		\$3,240,303	\$22.74 /sf
		\$5,403,766	\$37.92 /sf
		\$2,716,151	\$19.06 /sf
		\$145,961	\$1.02 /sf
		\$3,038,916	\$21.32 /sf
		\$103,900	\$0.73 /sf
		\$4,333,166	\$30.41 /sf
		\$1,104,404	\$7.75 /sf
		\$1,522,592	\$10.68 /sf
		\$355,000	\$2.49 /sf
		\$44,046	\$0.31 /sf
		\$1,783,387	\$12.51 /sf
		\$1,284,167	\$9.01 /sf
		\$1,889,795	\$13.26 /sf
		\$223,300	\$1.57 /sf
		\$3,158,540	\$22.16 /sf
		\$8,541,516	\$59.93 /sf
		\$1,070,635	\$7.51 /sf
		\$7,766,521	\$54.50 /sf
		\$1,848,004	\$12.97 /sf
		\$1,558,478	\$10.94 /sf
		\$0	\$0.00 /sf
		\$752,180	\$5.28 /sf
		\$1,010,444	\$7.09 /sf
		\$61,407,189	\$430.89 /sf
		\$2,806,959	\$19.70 /sf
		\$6,250,776	\$43.86 /sf
		\$2,372,112	\$16.64 /sf
		\$912,807	\$6.41 /sf
		\$73,749,843	\$517.50 /sf
3.50%		\$2,659,006	\$18.66 /sf
3.00%		\$2,212,765	\$15.53 /sf

	\$78,621,614	\$551.68 /sf
20mo	\$2,700,000	\$18.95 /sf
7mo	\$455,000	\$0.00 /sf
2.00%	\$1,572,612	\$11.03 /sf
0.90%	\$707,676	\$4.97 /sf
1.00%	\$840,659	\$5.90 /sf
N/A	\$0	\$0.00 /sf
2.50%	\$2,122,664	\$14.89 /sf
	\$87,020,225	\$610.61 /sf

DELTA
PM&C - AMF
(\$275,282)
(\$229,945)
\$0
(\$45,337)
\$0
\$0
\$126,228
\$391,113
(\$301,414)
(\$197,598)
\$180,514
\$3,369
\$68,969
(\$18,725)
(\$401,859)
(\$104,339)
(\$106,204)
\$30,283
(\$30,000)
(\$1,546)
(\$42,140)
(\$18,860)
(\$129,053)
(\$175,957)
\$19,200
(\$87,115)
(\$96,229)
(\$31,555)
\$19,742
(\$85,563)
(\$46,185)
(\$39,378)
(\$107,283)
\$0
\$0
\$0
(\$107,283)
\$0
(\$919,716)
(\$144,086)
\$108,383
(\$89,460)
\$64,068
(\$227,077)
(\$1,063,802)
(\$38,674)
(\$32,184)

- Notes:
- 1.) Variance of \$1,129,090 between the two estimates is under 2%, which is an acceptable standard.
  - 2.) Other FF&E has been included in the total project budget under soft costs for non-fixed equipment and furniture.
  - 3.) Construction hard costs include security scope. Technology scope has been included in the total project budget under soft costs.
  - 4.) Existing building demolition assumes 89,271 SF for main structure and 5,848 SF for the modular units.
  - 5.) Hazardous materials abatement is per the Nobis environmental survey and report.
  - 6.) Both AM Fogarty and PM&C carried 3.5% escalation.
  - 7.) Duration of Phase 1 work assumes (20) months for General Conditions.
  - 8.) Assumes permit fees waived.

Concord Middle School

60% CD AND DESIGN DEVELOPMENT COST ESTIMATE COMPARISON

10/19/22



		142,513. sf	60% CD RECONCILED VALUE		142,704. sf		DESIGN DEVELOPMENT RECONCILED VALUE		DELTA
Program Area				Cost/SF				Cost/SF	60% CD - DD
NEW BUILDING			142,513	SF		142,704	SF		
A	Substructure								(\$133,413)
A10	Foundations								
	A1010 Standard Foundations		\$2,844,603	\$19.96 /sf		\$2,855,444	\$20.01 /sf		(\$10,841)
	A1020 Special Foundations		\$0	\$0.00 /sf		\$0	\$0.00 /sf		\$0
	A1030 Lowest Floor Construction		\$1,403,898	\$9.85 /sf		\$1,526,469	\$10.70 /sf		(\$122,572)
A20	Basement Construction								
	A2010 Basement Excavation		\$0	\$0.00 /sf		\$0	\$0.00 /sf		\$0
	A2020 Basement Walls		\$0	\$0.00 /sf		\$0	\$0.00 /sf		\$0
B	Shell								\$508,672
B10	Superstructure								
	B1010 Floor Construction		\$4,321,433	\$30.32 /sf		\$4,111,061	\$28.81 /sf		\$210,372
	B1020 Roof Construction		\$3,089,596	\$21.68 /sf		\$2,906,841	\$20.37 /sf		\$182,755
B20	Exterior Enclosure								\$0
	B2010 Exterior Walls		\$5,304,967	\$37.22 /sf		\$5,302,253	\$37.16 /sf		\$2,715
	B2020 Windows		\$2,806,408	\$19.69 /sf		\$2,693,307	\$18.97 /sf		\$113,101
	B2030 Exterior Doors		\$147,646	\$1.04 /sf		\$131,421	\$0.92 /sf		\$16,225
B30	Roofing								\$0
	B3010 Roof Coverings		\$3,073,401	\$21.57 /sf		\$3,114,494	\$21.82 /sf		(\$41,093)
	B3020 Roof Openings		\$94,538	\$0.66 /sf		\$69,940	\$0.49 /sf		\$24,598
C	Interiors								\$480,369
C10	Interior Construction								
	C1010 Partitions		\$4,280,997	\$30.04 /sf		\$4,041,269	\$28.32 /sf		\$239,728
	C1020 Interior Doors		\$1,051,302	\$7.38 /sf		\$1,057,482	\$7.41 /sf		(\$6,180)
	C1030 Specialties/Millwork		\$1,537,734	\$10.79 /sf		\$1,443,417	\$9.85 /sf		\$94,317
C20	Stairs					\$0			\$0
	C2010 Stair Construction		\$340,000	\$2.39 /sf		\$347,000	\$2.43 /sf		(\$7,000)
	C2020 Stair Finishes		\$43,273	\$0.30 /sf		\$40,939	\$0.29 /sf		\$2,334
C30	Interior Finishes								\$0
	C3010 Wall Finishes		\$1,762,317	\$12.37 /sf		\$1,735,760	\$12.16 /sf		\$26,558
	C3020 Floor Finishes		\$1,274,737	\$8.94 /sf		\$1,283,572	\$8.99 /sf		(\$8,835)
	C3030 Ceiling Finishes		\$1,825,269	\$12.81 /sf		\$1,685,821	\$11.81 /sf		\$139,448
D	Services								\$453,575
D10	Conveying								
	D1010 Elevators		\$232,900	\$1.63 /sf		\$225,350	\$1.58 /sf		\$7,550
D20	Plumbing								
	D20 Plumbing		\$3,114,983	\$21.86 /sf		\$3,030,897	\$21.24 /sf		\$84,086
D30	HVAC								
	D30 HVAC		\$8,493,402	\$59.60 /sf		\$8,467,944	\$59.34 /sf		\$25,458
D40	Fire Protection								
	D40 Fire Protection		\$1,054,858	\$7.40 /sf		\$1,016,303	\$7.12 /sf		\$38,555
D50	Electrical								
	D50 Electrical		\$7,776,392	\$54.57 /sf		\$7,478,466	\$52.41 /sf		\$297,927
E	Equipment & Furnishings								\$280,724
E10	Equipment								
	E10 General		\$1,824,912	\$12.81 /sf		\$1,812,808	\$12.70 /sf		\$12,104
E20	Furnishings								
	E2010 Fixed Furnishings		\$1,538,789	\$10.80 /sf		\$1,270,170	\$8.90 /sf		\$268,620
F	Special Construction & Hazmat Removals								\$0
F10	Special Construction								
	F1010 Special Construction		\$0	\$0.00 /sf		\$0	\$0.00 /sf		\$0
F20	Building Demolition								
	F2010 Building Elements Demolition		\$698,539	\$4.90 /sf		\$698,539	\$4.90 /sf		\$0
	F2020 Hazardous Components Abatement		\$1,010,444	\$7.09 /sf		\$1,010,444	\$7.08 /sf		\$0
	Sub-total for above trade work		\$60,947,331	\$427.66 /sf		\$59,357,405	\$415.78 /sf		\$1,589,926
G	Sitework								\$1,017,714
G 10	Site Preparation		\$2,861,151	\$20.08 /sf		\$2,121,694	\$14.87 /sf		\$739,457
G 20	Site improvements		\$6,206,046	\$43.55 /sf		\$6,403,917	\$44.88 /sf		(\$197,871)
G 30	Utilities		\$2,404,146	\$16.87 /sf		\$2,023,605	\$14.18 /sf		\$380,542
G 40	Site Electric		\$799,269	\$5.61 /sf		\$703,683	\$4.93 /sf		\$95,586
	Sub-total incl. Sitework & Demo		\$73,217,942	\$513.76 /sf		\$70,610,303	\$494.63 /sf		\$2,607,640
	Markups								
	Escalation	3.5%	\$2,639,669	\$18.52 /sf	4.67% to 5%	\$3,585,092	\$25.11 /sf		(\$945,423)
	Design and Estimating Contingency	3.0%	\$2,196,673	\$15.41 /sf	5% @ DD	\$3,530,515	\$24.73 /sf		(\$1,333,842)
	Sub-total incl. Escalation & Design Cont		\$78,054,284	\$547.70 /sf		\$77,725,910	\$544.48 /sf		\$328,375
	General Conditions - Main Building	20mo	\$2,700,000	\$18.95 /sf	24mo	\$2,700,000	\$18.92 /sf		\$0
	General Conditions - Demo + Sitework	7mo	\$455,000	\$3.19 /sf	7mo	\$455,000	\$3.19 /sf		Incl. Above
	General Requirements	2.00%	\$1,561,176	\$10.95 /sf	2.00%	\$1,554,519	\$10.89 /sf		\$6,657
	Bonds	1.00%	\$741,273	\$5.20 /sf	1.00%	\$738,213	\$5.17 /sf		\$3,060
	Insurance	1.00%	\$835,163	\$5.86 /sf	1.00%	\$831,737	\$5.83 /sf		\$3,426
	Permit	N/A			N/A		\$0.00 /sf		\$0
	Overhead & Profit	2.50%	\$2,108,785	\$14.80 /sf	2.50%	\$2,100,135	\$14.71 /sf		\$8,651
	Total Estimated Construction Cost		\$86,455,680	\$606.65 /sf		\$86,105,512	\$603.19 /sf		\$350,168



January - February 2022 Estimated Cost for Warrant Article / Special Town Meeting	
Description	Warrant Article Cost
20 Construction	
Schematic Design Reconciled Estimate	\$82,512,622
VM Accepted in Schematic Design (Dec 2021)	-\$1,740,145
SD Construction Estimate with VM Accepted	\$80,772,477
30 Architectural & Engineering	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
Printing (Over the Minimum)	\$20,000
Testing & Inspections	\$250,000
Subtotal	\$8,095,500
40 Administrative Costs	
Owner's Project Manager Basic Services	\$3,643,580
Commissioning Agent	\$280,000
Advertising	\$30,000
Other Administrative Costs	\$50,000
Other Project Costs (Moving)	\$200,000
Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
50 Furniture, Fixtures and Equipment	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
70 Contingency	
Construction Contingency (5% Hard Costs)	\$4,038,624
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$4,799,828
Sub-Total	\$100,796,385
Owner's Bid Contingency (2.5% Hard Costs)	\$2,019,312
Total	\$102,815,697
Note: **Excludes \$1.5M initial funding for Feasibility and SD Phase	

June 2022 Design Development Estimate Projection	
Description	DD Estimate Projection
20 Construction	
Design Development Reconciled Estimate	\$86,105,312
DD Construction Estimate	\$86,105,312
30 Architectural & Engineering	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
Printing (Over the Minimum)	\$20,000
Testing & Inspections	\$250,000
Subtotal	\$8,095,500
40 Administrative Costs	
Owner's Project Manager Basic Services	\$3,643,580
Commissioning Agent	\$280,000
Advertising	\$30,000
Other Administrative Costs	\$50,000
Other Project Costs (Moving)	\$200,000
Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
50 Furniture, Fixtures and Equipment	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
70 Contingency	
Construction Contingency (5% Hard Costs)	\$4,305,266
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$5,066,470
Sub-Total	\$106,395,862
Owner's Bid Contingency	\$2,019,312
Total	\$108,415,174

September 2022 Design Development Estimate + VM	
Description	DD Estimate Projection
20 Construction	
Design Development Reconciled Estimate	\$86,105,312
VM Accepted 8/4 thru 9/22 SBC Meetings	-\$1,879,261
DD Construction Estimate w/ VM Accepted	\$84,226,051
30 Architectural & Engineering	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
Printing (Over the Minimum)	\$20,000
Testing & Inspections	\$250,000
Subtotal	\$8,095,500
40 Administrative Costs	
Owner's Project Manager Basic Services	\$3,643,580
Commissioning Agent	\$280,000
Advertising	\$30,000
Other Administrative Costs	\$50,000
Other Project Costs (Moving)	\$200,000
Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
50 Furniture, Fixtures and Equipment	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
70 Contingency	
Construction Contingency (5% Hard Costs)	\$4,211,303
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$4,972,507
Sub-Total	\$104,422,638
Owner's Bid Contingency	\$2,019,312
Total	\$106,441,949
Note: **	

November 2022 60% CD Estimate + VM CURRENT COST	
Description	60% CD Estimate Projection
20 Construction	
60% CD Reconciled Estimate	\$86,455,680
VM Accepted 10/27 SBC Meeting (Revised 11/17 SBC Mtg)	-\$110,931
60% CD Construction Estimate	\$86,344,749
30 Architectural & Engineering	
Designer - Basic Services	\$7,180,000
Geotechnical Engineering CA	\$205,000
Geoenvironmental Engineering-allowance	\$185,000
Site Survey	\$20,000
Survey of Existing Conditions / Wetlands	\$0
Hazardous Materials	\$145,000
A&E Sub Consultants	\$70,500
Other Reimbursable Costs	\$20,000
Printing (Over the Minimum)	\$20,000
Testing & Inspections	\$250,000
Subtotal	\$8,095,500
40 Administrative Costs	
Owner's Project Manager Basic Services	\$3,643,580
Commissioning Agent	\$280,000
Advertising	\$30,000
Other Administrative Costs	\$50,000
Other Project Costs (Moving)	\$200,000
Utility Fees	\$300,000
Legal	\$0
Subtotal	\$4,503,580
50 Furniture, Fixtures and Equipment	
Furniture, Fixtures and Equipment	\$1,365,000
Security	\$0
Technology	\$1,260,000
Subtotal	\$2,625,000
70 Contingency	
Construction Contingency (5% Hard Costs)	\$4,317,237
Owner's Contingency (5% Soft Costs)	\$761,204
Subtotal	\$5,078,441
Sub-Total	\$106,647,270
Owner's Bid Contingency	\$2,019,312
Total	\$108,666,582
Note: **	

## B. Updated Project Budget

The total project budget remains at \$104,316,000 as approved by the Town in February 2022. As noted in the OPM recommendation and schedule summary, a Special Town meeting is being planned for January 19, 2023, and the subsequent vote is being planned for February 24, 2023, to achieve budget alignment prior to the bidding phase in March/April 2023.

### **C. Early Bid Packages**

There are no early packages for this project.

## D. Value Management

A robust value management log was presented by Hill International and SMMA Architects at the July 28, 2022, School Building Committee meeting to allow for the committee to reduce scope back to the approved total project budget established in February 2022 if they so desired.

Hill International and SMMA Architects facilitated extensive value management with the School Building Committee over the span of (5) meetings from August 4, 2022, to September 22, 2022. These meetings resulted in the School Building Committee acceptance of \$1,879,261 worth of value management and rejection of \$9,781,029 worth of value management. The School Building Committee considered large scope cuts such as a reduction in size of the gymnasium and auditorium, as well as other changes that would impact the Education Plan, but ultimately decided to maintain major scope decisions made during the Feasibility and Schematic Design Phases of the project and maintain programming and function as established by the Education Plan.

Attached is the final Design Development value management log summary for review as well as a cost comparison chart reporting on the current overall project cost projection of \$106,441,949 including value management accepted during the Design Development phase.

Additional value management for the 60% CD phase was reviewed and voted on by the School Building Committee at the October 27, 2022, meeting. \$384,592 worth of savings was accepted as shown on the attached 60% CD value management log. However, some of this scope was further reviewed by the School Building Committee at the November 17, 2022, meeting and two items were moved to deduct alternate scope. This vote by the committee added wood look ceilings and gymnasium bleachers back into the scope for the 90% CD set, to be documented at deduct alternates. The estimated value of these two items is \$273,662. The final 60% CD value management total is \$110,931 as shown on the attached cost comparison summary. With this accepted value management, the estimated construction cost is \$86,344,749.



# Value Management Log

Updated 10/27/2022



## 60% CD Set

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Item #	Ext.	VE/VM Item	Discipline/ Trade	Risks/Impacts	Comments/Details	Ball In Court	DD Estimated Value (PM+C)	DD Estimated Value (AM Fogarty)	DD Reconciled Value (Avg of Estimates)	Status	Rejected Value	YES = CAN BE REMOVED WITH NO TIME IMPACT	Value CAN BE REMOVED WITH NO TIME IMPACT	10/27 CMSBC Re-Vote
32		Site: Athletic Fields: Remove Boys Baseball Field, Girls Softball Field, and overlay Soccer Field, including all fences, equipment, and revise athletic field cross sections to match typical lawn section. Leave retaining wall and limit of clearing in place.	Site			N/A	\$(1,228,773)	\$(1,775,769)	\$(1,502,271)	Reject	\$(1,502,271)	YES	\$(1,502,271)	Remains Rejected
14		Replace 4,500 SF wood-look metal ceiling panel (MCP-1) with 2x2 ACP-1. (1/3 of the total 7,500 was removed in SD)	Interiors		4,500 is the total remaining	N/A	\$(193,586)	\$(185,257)	\$(189,422)	Accept	\$(189,422)	YES	\$(189,422)	\$(189,422)
65		Replace linoleum with VCT	Interiors		*ASSUMES NO PATTERN IN FLOORS AS CURRENTLY DESIGNED	N/A	\$(169,180)	\$(170,257)	\$(169,719)	Reject	\$(169,719)	YES*	\$(169,719)	Remains Rejected
74		Rough in Only for Sound Field Systems in Classrooms- Systems and Speakers by FF&E	Electrical		* FF&E BUDGET IMPACT	N/A	\$(115,420)	\$(136,328)	\$(125,874)	Reject	\$(125,874)	YES*	\$(125,874)	Rejected by Vote
21		Remove sunshades from south facing windows at classrooms	Exteriors	Major glare impact	IF REMOVED IT WILL NOT MEET THE DAYLIGHTING CRITERIA - LOSS OF 1 POINT	N/A	\$(91,872)	\$(122,528)	\$(107,200)	Reject	\$(107,200)	YES*	\$(107,200)	Remains Rejected
71		Eliminate bleachers in the Gymnasium (possibly provided by donation?)	Interiors			N/A	\$(87,000)	\$(81,480)	\$(84,240)	Accept	\$(84,240)	YES	\$(84,240)	\$(84,240)
56		Remove 8' tall mesh front storage cabinets at Team Commons	Interiors		PM+C; 9 LOCATIONS @ \$5000 PER LOC	N/A	\$(52,200)	\$(87,300)	\$(69,750)	Reject	\$(69,750)	YES	\$(69,750)	Rejected by Vote
60		Eliminate lightning preventor system	Electrical			N/A	\$(69,600)	\$(69,840)	\$(69,720)	Reject	\$(69,720)	YES	\$(69,720)	Remains Rejected
67		Replace granite curbing at straight sections with precast concrete curbing	Site		PMC; 4700 LF	N/A	\$(49,068)	\$(85,808)	\$(67,438)	Reject	\$(67,438)	YES	\$(67,438)	Remains Rejected
79	D	Provide a SS sleeve to concrete filled galvanized steel bollards (57 EA) in lieu of granite bollards	Site			N/A				Accept	\$(52,831)	YES	\$(52,831)	\$(52,831)
70		Eliminate environmental graphics (\$50K allowance)	Interiors			N/A	\$(58,000)	\$(58,200)	\$(58,100)	Accept	\$(58,100)	YES	\$(58,100)	\$(58,100)
24		Remove sunshades from south facing curtainwall	Exteriors	Major glare impact	IF REMOVED IT WILL NOT MEET THE DAYLIGHTING CRITERIA - LOSS OF 1 POINT	N/A	\$(35,496)	\$(43,929)	\$(39,713)	Reject	\$(39,713)	YES*	\$(39,713)	Remains Rejected
75		Eliminate roof davit and associated structure	Architecture			N/A	\$(23,200)	\$(34,920)	\$(29,060)	Reject	\$(29,060)	YES	\$(29,060)	Remains Rejected
37		Electrical: Change distribution feeders to aluminum for 150Amp feeders, and higher.	Electrical		* FACILITIES DOES NOT AGREE WITH THIS CHANGE	N/A	\$(25,520)	\$(23,280)	\$(24,400)	Reject	\$(24,400)	YES*	\$(24,400)	Remains Rejected
59		Eliminate unit skylights in Admin area	Architecture		2 LOC	N/A	\$(20,045)	\$(27,936)	\$(23,990)	Reject	\$(23,990)	YES	\$(23,990)	Remains Rejected
42		Electrical: Install low energy Fire Alarm cable in lieu of MC.	Electrical		* FACILITIES DOES NOT AGREE WITH THIS CHANGE	N/A	\$(40,600)	\$(6,518)	\$(23,559)	Reject	\$(23,559)	YES*	\$(23,559)	Remains Rejected



Value Management Log

Updated 10/27/2022

60% CD Set



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Item #	Ext.	VE/VM Item	Discipline/ Trade	Risks/Impacts	Comments/Details	Ball In Court	DD Estimated Value (PM+C)	DD Estimated Value (AM Fogarty)	DD Reconciled Value (Avg of Estimates)	Status	Rejected Value	YES = CAN BE REMOVED WITH NO TIME IMPACT	Value CAN BE REMOVED WITH NO TIME IMPACT	10/27 CMSBC Re-Vote
68		Remove (2) maintenance sheds at loading dock- provide conduit and electrical stub up and concrete pads only	Site			N/A	\$(11,600)	\$(23,303)	\$(17,452)	Reject	(\$17,452)	YES	\$(17,452)	Remains Rejected
7		Remove electrical from outdoor classrooms	Electrical	Any devices used in the outdoor classrooms must be battery powered and are reliant on the battery life being adequate.		N/A	\$(9,760.00)	\$(9,760.00)	(\$9,760)	Reject	(\$9,760)	YES	(\$9,760)	Remains Rejected
TOTALS							DO NOT TOTAL	DO NOT TOTAL	DO NOT TOTAL		DO NOT TOTAL	DO NOT TOTAL	(\$2,664,497)	(\$384,592)





Value Management Log  
Updated 10/3/2022  
Design Development Set



A	B	C	D	E	F	G	H	I	J	K	L	M
Item #	Ext.	VE/VM Item	Discipline/ Trade	Risks/Impacts	Comments/Details	Ball In Court	DD Estimated Value (PM+C)	DD Estimated Value (AM Fogarty)	DD Reconciled Value (Avg of Estimates)	Status	Accepted Value	Rejected Value
3		Reduce number of outdoor classrooms on south of academic wing from 4 to 3.	Site	Impacts Education Plan	We have had limited discussion on utilization of / plan for outdoor classrooms at this time to inform how many should be provided.	N/A	(\$58,000)	(\$49,618)	(\$53,809)	Accept	(\$53,809)	
7		Remove electrical from outdoor classrooms	Electrical	Any devices used in the outdoor classrooms must be battery powered and are reliant on the battery life being adequate.		N/A	\$(9,760.00)	\$(9,760.00)	(\$9,760)	Reject		(\$9,760)
8		Remove bollard lighting from outdoor classrooms	Electrical			N/A	\$(18,056.00)	\$(25,620.00)	(\$21,838)	Accept	(\$21,838)	
9		Reduce advanced lighting controls from 100% addressable lights to 60%	Electrical	This is a MA Energy Code c406 requirement that would need to be		N/A	(\$41,384)	(\$41,761)	(\$41,573)	Accept	(\$41,573)	
11		Remove sink in all (9) Team Commons	Plumbing		Reduces the flexibility of the team commons by eliminating the potential for any projects that need to incorporate water usage.	N/A	(\$40,600)	(\$49,499)	(\$45,050)	Reject		(\$45,050)
13		Remove millwork "work station" from Grade Level 6 Team Commons; retain sink on perimeter of room	Interiors		Use of moveable furniture in lieu of work station. Will allow for different identity, more movement; retains "Maker Space" sink	N/A	(\$52,461)	(\$46,575)	(\$49,518)	Reject		(\$49,518)
14		Replace 4,500 SF wood-look metal ceiling panel (MCP-1) with 2x2 ACP-1. (1/3 of the total 7,500 was removed in SD)	Interiors		4,500 is the total remaining	N/A	(\$193,586)	(\$185,257)	(\$189,422)	Reject		(\$189,422)
15		Reduce quantity of wall tile in the cafeteria to 50%	Interiors			N/A	(\$10,962)	(\$11,081)	(\$11,022)	Reject		(\$11,022)
16		Remove wood paneling from Media Center walls and ceiling, replace with Painted wall and ceiling. (1/3 of the total SF was removed in SD)	Interiors		Wall paneling removed during DD as wall shelving and display cases were finalized. Misc wood trim only remains	N/A	\$0	(\$5,000)	(\$2,500)	Reject		(\$2,500)
17	A	Reduce interior lightshelf to 10"	Interiors		Cannot be chosen with 17B	N/A	(\$45,675)	(\$45,833)	(\$45,754)	Reject		(\$45,754)
17	B	Remove interior light shelf	Interiors	Minimal impact on daylighting and glare.	Cannot be chosen with 17A	N/A	(\$121,800)	(\$122,220)	(\$122,010)	Accept	(\$122,010)	
21		Remove sunshades from south facing windows at classrooms	Exteriors	Major glare impact		N/A	(\$91,872)	(\$122,528)	(\$107,200)	Reject		(\$107,200)
22		Reduce sunshades at south facing classrooms to 1'-0" deep	Exteriors	Major glare impact		N/A	(\$30,624)	(\$49,674)	(\$40,149)	Reject		(\$40,149)
23		Replace sunshades on south facing curtainwall with deep mullion caps (assume custom/semi-custom die to make 2.5"x8" cap)	Exteriors	Major glare impact	Difference in unit price cost assumptions. PMC ; 204LF SUNSHADE VS 300LF CW MULLION	N/A	(\$24,847)	(\$33,244)	(\$29,046)	Reject		(\$29,046)
24		Remove sunshades from south facing curtainwall	Exteriors	Major glare impact	Difference in unit price cost assumptions.	N/A	(\$35,496)	(\$43,929)	(\$39,713)	Reject		(\$39,713)
27		Reduce entrance canopy by 15 LF of the canopy length. Canopy is 16.5' wide.	Architecture		Canopy can be reduced 15 LF from what is shown on A-103 to keep the projection beyond the admin volume.	N/A	see #78	see #78	see #78	Reject		\$0
28	A	Replace curtain wall on north wall of art rooms with punched windows. Change 898 SF of CW to 414 SF of punched window and 484 SF of opaque wall assembly with phenolic cladding	Architecture		This may benefit comfort, glare reduction and slight impact in improving enclosure performance	N/A	(\$36,459)	(\$39,490)	(\$37,974)	Reject		(\$37,974)
28	B	Replace curtain wall on north wall of art rooms with punched windows up to the bridge deliniation (per CMSBC motion on 9/22). Replacing 614 SF of curtainwall at the second floor bridge with 430 SF of windows and 184SF of phenolic siding.				N/A	(\$29,000)	(\$22,432)	(\$25,716)	Accept	(\$25,716)	
29		Change curtainwall and window glazing from triple to double	Architecture	Significant impact to energy model and building EUI	Difference in unit price cost assumptions. PMC SAVINGS \$30/SF	N/A	(\$491,828)	(\$384,469)	(\$438,149)	Reject		(\$438,149)
30		Site: At south side of building at Dining Commons terrace: Remove 100 linear feet of retaining wall and guardrail, remove lawn terraces, remove CIP Stairs and concrete walkway. Add 800 SF of concrete pavement to patio and regrade. (BOD C-121)	Site			N/A	\$(319,824)	\$(385,109)	\$(352,467)	Reject		(\$352,467)
31	A	Form-Facing Panels for Smooth Finish: Exterior-grade plywood panels, nonabsorptive, that will provide continuous, true, and smooth architectural finished concrete surfaces, medium-density overlay, Class1, or better, mill-applied release agent and edge sealed, complying with DOCPS1. (BOD Sec. 03 30 00)	Site		Cannot be selected with 31B or C	N/A	\$(46,400)	\$(34,454)	\$(40,427)	Accept	(\$40,427)	
31	B	Board Forms: Lumber boards of face design, texture,	Site		Cannot be selected with 31A or C	N/A	\$(69,600)	\$(10,592)	\$(40,096)	Reject		(\$40,096)
31	C	Masonry Veneer: Concrete retaining wall per structural, damp proofing with a 1" air cavity, CMU Masonry veneer similar to EWA-1.	Site		Cannot be selected with 31A or B	N/A	\$144,072	\$184,814	\$164,443	Reject		\$164,443
32		Site: Athletic Fields: Remove Boys Baseball Field, Girls Softball Field, and overlay Soccer Field, including all fences, equipment, and revise athletic field cross sections to match typical lawn section. Leave retaining wall and limit of clearing in place.	Site			N/A	\$(1,228,773)	\$(1,775,769)	\$(1,502,271)	Reject		(\$1,502,271)
33		Site: Wood Bridge: Remove 6' wide wood bridge with wood guardrails (43 LF)	Site			N/A	\$(87,000)	\$(74,205)	\$(80,603)	Reject		(\$80,603)
34	A	Air Vapor Barrier Alt 1: Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane	Architecture		Cannot be selected with 34B	N/A	\$(69,601)	\$(12,102)	\$(40,852)	Reject		(\$40,852)
34	B	Air Vapor Barrier Alt 2: Modified Bituminous Sheet: 40-mil- thick, self-adheringsheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick, cross-laminated polyethylene film with release liner on adhesive side and formulated for application with primer that complies with VOC limits of authorities having jurisdiction	Architecture		Cannot be selected with 34A PMC - looks like similar product to what is carried in base estimate?	N/A	\$-	\$-	\$-	Reject		\$0
35		Sound Absorptive Treatment @ C-Wing Corridors - Tectum Panels ilo K-13 spray insulation to 75% Area	Architecture			N/A	\$(88,949)	\$(49,781)	\$(69,365)	Reject		(\$69,365)
36		Plumbing - Overflow drainage; install scuppers at roof edge ilo internally piped overflow drainage	Plumbing			N/A	\$(84,680)	\$(34,920)	\$(59,800)	Accept	(\$59,800)	
37		Electrical: Change distribution feeders to aluminum for 150Amp feeders, and higher.	Electrical			N/A	\$(25,520)	\$(23,280)	\$(24,400)	Reject		(\$24,400)
38		Electrical: Change PVC 40 to EB conduit for Utility primary duct bank. Note Utility primary will need confirmation from CMLP.	Electrical			N/A	\$(4,640)	\$(4,640)	\$(4,640)	Accept	(\$4,640)	
39		Electrical: Change PVC 40 to EB conduit for Communications exterior duct bank	Electrical			N/A	\$(17,400)	\$(17,400)	\$(17,400)	Accept	(\$17,400)	
40		Electrical: Change PVC 40 to EB conduit for Building secondary and underground feeders	Electrical			N/A	\$(13,920)	\$(13,920)	\$(13,920)	Accept	(\$13,920)	
41		Electrical: Change PVC 40 to DB conduit for branch circuit wiring (lighting and power)	Electrical			N/A	\$(11,600)	\$(11,600)	\$(11,600)	Accept	(\$11,600)	
42		Electrical: Install low energy Fire Alarm cable in lieu of MC.	Electrical			N/A	\$(40,600)	\$(6,518)	\$(23,559)	Reject		(\$23,559)
43		Electrical: If PV canopies are installed in the North Parking lot, South parking Lot, and Walkway: Remove 4 Type BB light poles, 3 type AA1 Light poles, 5 Type CC Light poles.	Electrical			N/A	\$(35,786)	\$(28,320)	\$(32,053)	Reject		(\$32,053)



Value Management Log  
Updated 10/3/2022  
Design Development Set



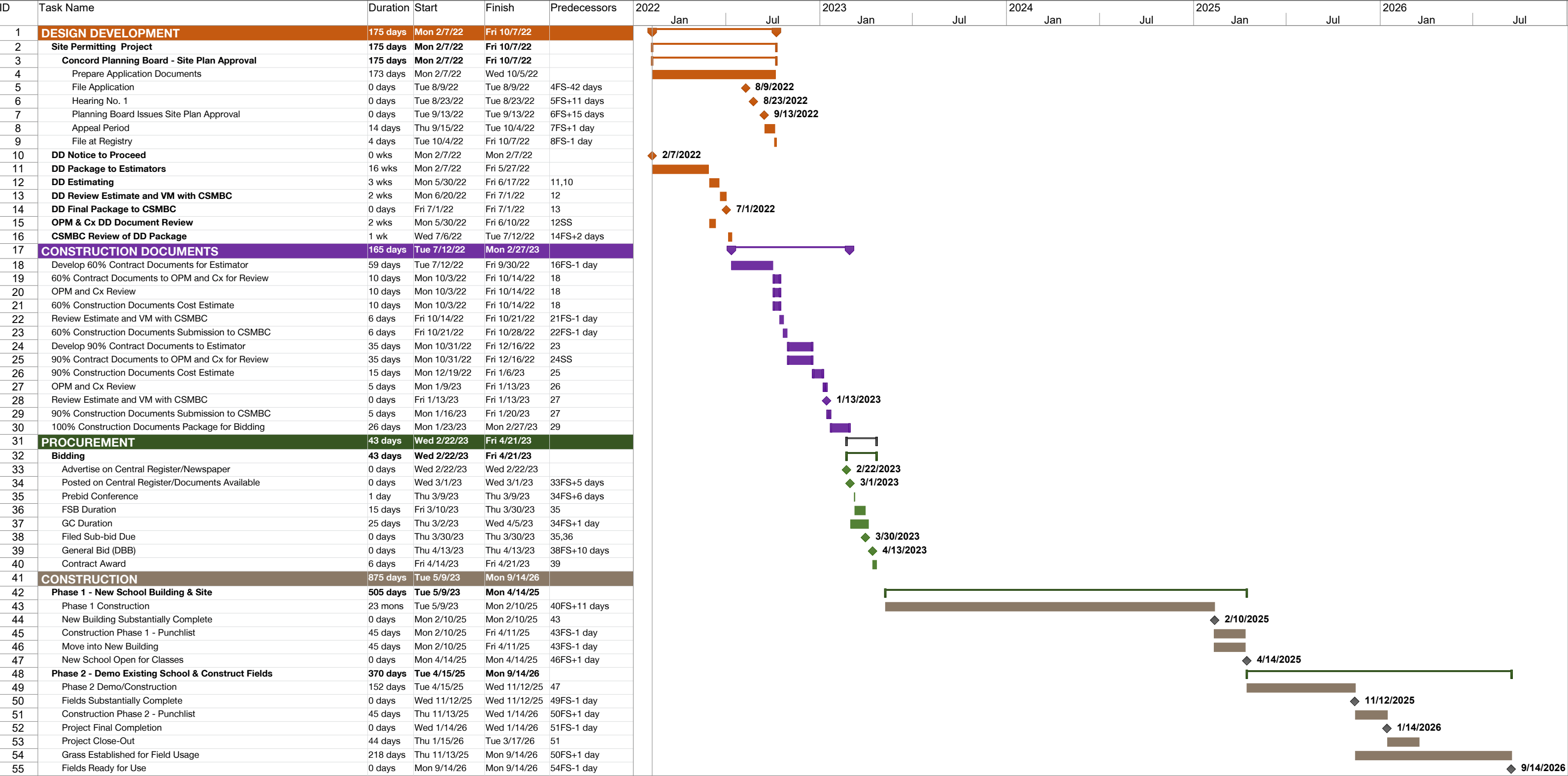
A	B	C	D	E	F	G	H	I	J	K	L	M
Item #	Ext.	VE/VM Item	Discipline/ Trade	Risks/Impacts	Comments/Details	Ball In Court	DD Estimated Value (PM+C)	DD Estimated Value (AM Fogarty)	DD Reconciled Value (Avg of Estimates)	Status	Accepted Value	Rejected Value
44		Electrical: If PV canopies are installed in the North Parking lot, South parking Lot, and Walkway: Install 40 surface mounted canopy light fixtures. Basis of design Hubbell Lighting STR1 Edge-Lit Size 1 (4500 lumen output, 3000k color temp.) or equal.	Electrical			N/A	\$25,520	\$38,907	\$32,214	Reject		\$32,214
45		Exterior Wall Assemblies: Install Metal Composite material wall panels in lieu of phenolic: available products that may be incorporated into the Work include, but are not limited to, the following: 3A Composites USA, Inc.; Alucobond Plus; Alcoa Inc.; Reynobond FR.; ALOCTEX Inc Alcotex, FR.; Or equal.	Architecture			N/A	\$(63,585)	\$(5,820)	\$(34,703)	Reject		\$(34,703)
46		FOR DISCUSSION: Reduce Construction Schedule by (2) months	General	Risk of GC not completing project per schedule.	Would allow for an earlier occupancy and (2) months less in GC's.	N/A	\$(270,000)	\$(270,000)	\$(270,000)	Reject		\$(270,000)
47		Reduce underslab insulation from 4" to 2", Maintain 4" at 6' around the perimeter	Architecture	Potential increase in EUI		N/A	\$(102,725)	\$(88,988)	\$(95,856)	Accept	\$(95,856)	
48		Reduce exterior wall mineral wool insulation from 8" to 6"	Architecture	Potential increase in EUI		N/A	\$(139,200)	\$(139,680)	\$(139,440)	Accept	\$(139,440)	
49		Reduce roof polyiso insulation from 10" to 8"	Architecture	Potential increase in EUI		N/A	\$(189,776)	\$(288,415)	\$(239,096)	Accept	\$(239,096)	
50		Replace folding glass walls at Classrooms into Commons with hollow metal frames and glazing (Maintain folding glass wall at Media Center)	Architecture		PMC; REPLACE WITH SINGLE LEAF DOOR AND 15'X8' HM GLAZING?	N/A	\$(125,280)	\$(101,582)	\$(113,431)	Reject		\$(113,431)
51		Replace operable panel walls in between classrooms with GWB wall (G3C.U)	Architecture		PMC; INCLUDES SOFFIT AND GWB ABOVE - REPLACE WITH ACT	N/A	\$(261,151)	\$(313,698)	\$(287,424)	Reject		\$(287,424)
52		Eliminate stair access to roof- reduce height of stair tower, add alternating tread stair and hatch for roof access	Architecture		PMC; LEFT IN CLOSURE FOR ELEVATOR OVER RUN	N/A	\$(122,682)	\$(164,124)	\$(143,403)	Reject		\$(143,403)
53		Combine Gym and Auditorium AHUs	Mechanical		PMC; SAVINGS IN CURB, CONTROLS & COST OF AHU, ADD FOR DUCTWORK	N/A	\$(87,000)	\$(58,200)	\$(72,600)	Accept	\$(72,600)	
54		Replace exposed corridor ceilings (K-13) with ACP-1 ceilings	Architecture			N/A	\$(22,237)	\$(43,299)	\$(32,768)	Accept	\$(32,768)	
55		Change quarry tile floor and base with epoxy at Kitchen	Interiors		PMC; INCLUDES BASE	N/A	\$(69,124)	\$(24,686)	\$(46,905)	Accept	\$(46,905)	
56		Remove 8' tall mesh front storage cabinets at Team Commons	Interiors		PM+C; 9 LOCATIONS @ \$5000 PER LOC	N/A	\$(52,200)	\$(87,300)	\$(69,750)	Reject		\$(69,750)
57	A	Reduce ceramic wall tile in toilet rooms to 8' on wet walls only. Epoxy paint on all other walls	Interiors			N/A	\$(254,643)	\$(294,444)	\$(274,543)	Reject		\$(274,543)
57	B	Reduce ceramic wall tile in toilet rooms to 6' on wet walls only. Epoxy paint on all other walls	Interiors			N/A	\$(183,944)	\$(183,944)	\$(183,944)	Accept	\$(183,944)	
58		Eliminate porcelain wall tile at corridors- maintain 6" porcelain tile base and include impact resistant GWB and SS corner guards	Interiors			N/A	\$(249,641)	\$(237,642)	\$(243,641)	Reject		\$(243,641)
59		Eliminate unit skylights in Admin area	Architecture		2 LOC	N/A	\$(20,045)	\$(27,936)	\$(23,990)	Reject		\$(23,990)
60		Eliminate lightning preventor system	Electrical			N/A	\$(69,600)	\$(69,840)	\$(69,720)	Reject		\$(69,720)
61		Reduce concrete slab thickness to 4" at classroom wing. Maintain 5" at Auditorium and Gym	Structure			N/A	\$(47,733)	\$(70,102)	\$(58,918)	Accept	\$(58,918)	
62		Eliminate Phase 2 existing building demo and abatement scope	Site			N/A	\$(1,920,196)	\$(2,051,694)	\$(1,985,945)	Reject		\$(1,985,945)
63		Reduce height of Gymnasium to minimum clearance allowed by MIAA for basketball - Approx 5'-0" ft	Architecture			N/A	\$(97,411)	\$(111,252)	\$(104,332)	Accept	\$(104,332)	
64		Eliminate Vape Detection System	Electrical			N/A	\$(48,720)	\$(48,888)	\$(48,804)	Accept	\$(48,804)	
65		Replace linoleum with VCT	Interiors		PMC; ASSUME MCT	N/A	\$(169,180)	\$(170,257)	\$(169,719)	Reject		\$(169,719)
66	A	Reduce Auditorium and Specialty space AV systems by 25%	Electrical			N/A	\$(269,572)	\$(260,969)	\$(265,271)	Reject		\$(265,271)
66	B	Reduce Auditorium and Specialty space AV systems by 15%				N/A	\$(159,162)	\$(159,162)	\$(159,162)	Accept	\$(159,162)	
67		Replace granite curbing at straight sections with precast concrete curbing	Site		PMC; 4700 LF	N/A	\$(49,068)	\$(85,808)	\$(67,438)	Reject		\$(67,438)
68		Remove (2) maintenance sheds at loading dock- provide conduit and electrical stub up and concrete pads only	Site			N/A	\$(11,600)	\$(23,303)	\$(17,452)	Reject		\$(17,452)
69		Eliminate full height built-in shelving at Media Center (all shelving to be FF&E)	Interiors			N/A	\$(77,952)	\$(72,314)	\$(75,133)	Accept	\$(75,133)	
70		Eliminate environmental graphics (\$50K allowance)	Interiors			N/A	\$(58,000)	\$(58,200)	\$(58,100)	Reject		\$(58,100)
71		Eliminate bleachers in the Gymnasium (possibly provided by donation?)	Interiors			N/A	\$(87,000)	\$(81,480)	\$(84,240)	Reject		\$(84,240)
72	A	Eliminate all millwork display cases	Interiors		Cannot be Accepted with 74B	N/A	\$(144,332)	\$(165,172)	\$(154,752)	Reject		\$(154,752)
72	B	Reduce millwork display cases by 50%	Interiors		Cannot be Accepted with 74A	N/A	\$(72,166)	\$(82,586)	\$(77,376)	Reject		\$(77,376)
73		Revise Ever Alert Master Clock system (proposed proprietary) to traditional wireless master clock system	Electrical			N/A	\$(78,848)	\$(104,760)	\$(91,804)	Accept	\$(91,804)	
74		Rough in Only for Sound Field Systems in Classrooms- Systems and Speakers by FF&E	Electrical		61 locations; PMC base estimate Accentech allowance @ \$130k	N/A	\$(115,420)	\$(136,328)	\$(125,874)	Reject		\$(125,874)
75		Eliminate roof davit and associated structure	Architecture			N/A	\$(23,200)	\$(34,920)	\$(29,060)	Reject		\$(29,060)
76		Eliminate green screen/cable trellis	Site			N/A	\$(58,000)	\$(58,200)	\$(58,100)	Accept	\$(58,100)	
77		Simplify main entry canopy design by 50%	Architecture		PMC; Target savings; dteel framing, decking, membrane roofing, DEFS soffit & framing	N/A	\$(60,320)	\$(58,087)	\$(59,203)	Reject		\$(59,203)
78		Eliminate entry concrete planter, add metal picket fence rail for fall protection, concrete retaining wall to remain	Architecture			N/A	\$(19,058)	\$(6,606)	\$(12,832)	Accept	\$(12,832)	
79	A	Replace granite bollards with concrete filled galvanized steel bollards	Site		PMC ASSUME 69 LOC	N/A	\$(120,060)	\$(132,521)	\$(126,291)	Reject		\$(126,291)
79	B	Provide a SS sleeve to concrete filled galvanized steel bollards	Site		Cannot be Accepted with 79A	N/A	\$(66,560)	\$(74,321)	\$(70,441)	Reject		\$(70,441)
79	C	Reduce the quantity of granite bollards from 76 to 57 by changing the spacing to 14.5' o.c. at the buses and 12' o.c. at the parents drop off.	Site			N/A	\$(62,814)	\$(62,815)	\$(62,815)	Accept	\$(62,815)	
80	A	Remove bevel at CMU exterior walls	Architecture			N/A	\$(108,089)	\$(14,412)	\$(61,251)	Reject		\$(61,251)
80	B	Remove bevel at CMU exterior walls as proposed on South façade. Reject area on North façade.				N/A	\$15,979	\$15,979	\$15,979	Accept	\$15,979	
81		Reduce size of Gymasium by 3,500 Square Feet to MSBA Standard	Architecture			N/A	\$(1,500,000)	\$(927,500)	\$(1,213,750)	Reject		\$(1,213,750)
82		Reduce size of Auditorium to accomodate 270 person occupancy; reduce by 1/3 from 5040 SF to 3240 SF	Architecture			N/A	\$(800,000)	\$(540,000)	\$(670,000)	Reject		\$(670,000)
TOTALS							DO NOT TOTAL	DO NOT TOTAL	DO NOT TOTAL		(\$1,879,261)	(\$9,781,029)

## 6B.3 Designer Deliverables

### *6B.3.1 General Requirements*

#### **1. Updated Work Plan**

The Updated Project workplan is attached to this section.





## 2. Basis of Design Narratives

### Architectural

The new Concord Middle School Design realizes the goal of Concord Public Schools to replace two existing facilities with one combined middle school housing grades six through eight. The facility is designed to serve students and the community for generations. The school will accommodate a 700-student population projected enrollment. The project incorporates a team-teaching model and appropriate space to support positive learning environments to meet the educational needs of Middle School students. The project will be designed to achieve net-zero energy operations.

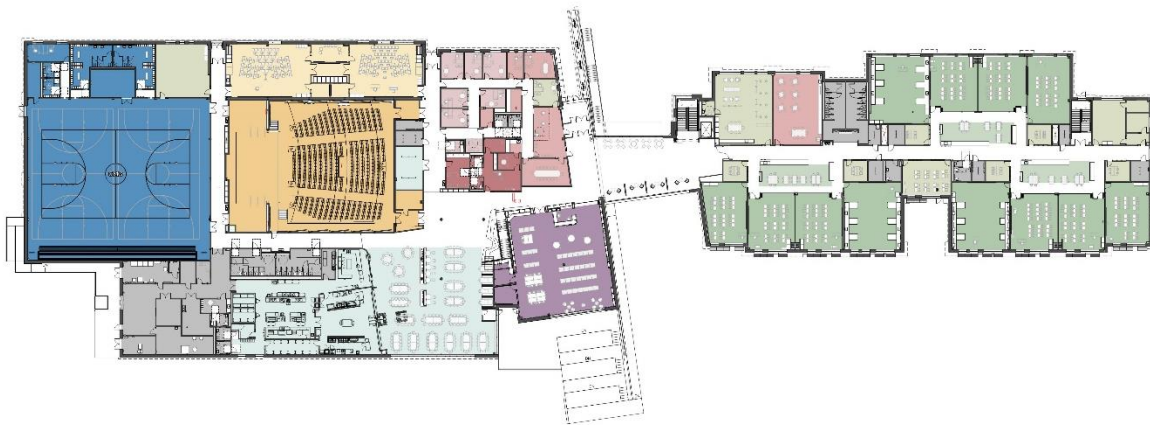


Site Plan

The new middle school facility will be of all-new construction and will be located on the property currently occupied by the existing Sanborn Middle School. The new building will occupy a portion of the property southwest of the existing structure, in the location of the current athletic fields and a sloping, tree-covered area immediately south of the athletic fields. Located to provide a strong connection to the existing topography and landscape while accommodating required on-site vehicular circulation, the building footprint is also optimized for solar orientation.

The main entrance drive, the bus drop, the parent drop-off, parking, and athletic fields will be positioned to the northern and western sides of the property, occupying much of the existing plateau and the footprint of the existing Sanborn building, which is to be demolished. Service is provided via a separate drive to the southwest. An entry plaza is located on the northern side of the building, lending prominence to the main entry and allowing easy pedestrian access for walkers and bikers from the neighborhood. The design approach engages the sloping topography and the existing tree cover in a manner that prevents the school from overwhelming the residential street.

The plan configuration for the new facility is made up of two wings organized around a central lobby, which connects over an existing site ravine. The western wing contains shared program spaces serving the whole school while learning communities are located within a 3-story portion of the building to the east, accessible from a central entry lobby/connector element.



Ground Level Program Plan

The new school's location on the existing Sanborn site naturally makes the building an integral and important community center and a resource for all citizens. By co-locating the Gymnasium, Auditorium, and Cafeteria at the very front of the school after-hours use is easily accommodated and prominently on display for the Town. The natural separation formed by the lobby space has been designed to allow for easy securing of the classroom spaces during after-hour activities.

The Media Center is centrally located on the ground floor opposite the administration suite and main entrance, central to the school and is large enough and flexible enough to allow for multiple zones of activities with access to the exterior dining and a tiered assembly landscaped space.

The 420-seat Auditorium is located north of the cafeteria offering immediate access from the main entry. Music classrooms are located directly north of the Auditorium to allow them to function in a green room capacity.

The Gymnasium and associated spaces are located northwest of the cafeteria with immediate access to the athletic fields to the north. The Media Center is positioned on the ground floor, just across from the

main entrance and administration area to anchor the school and establish presence the “heart of the school.”

Guidance, Nurse, and Administration share a suite of resources, but each has a dedicated entry to reduce any stigma associated with a student seeking their services. Guidance and administrative offices will also be scattered throughout the classroom wing. World language and art spaces are located on the upper floor as part of one shared western wing. An open stair to the cafeteria connects these classrooms with the whole school and a display area in the corridor allows the arts to be on display or provides space for critique.

The main entry/lobby flows to the west to an open Cafeteria, and is flanked by the main administration area, Media Center and Auditorium. This offers passive surveillance of students and visitors as they pass through the security vestibule upon entry.



Entry Lobby

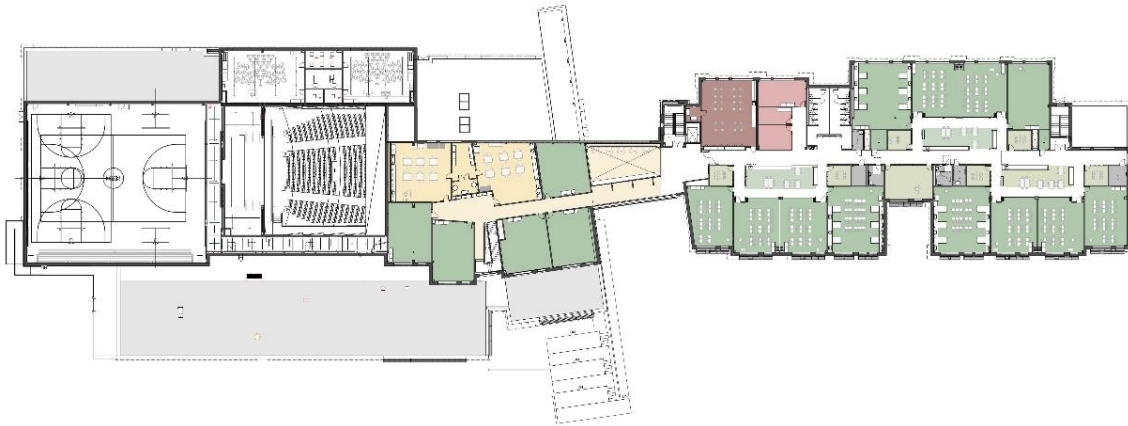
Due to the existing topography, vertical travel is limited to one floor above or below the entrance level, with each grade co-located on a separate floor and accessed by a communicating stair. Each floor houses (3) teams with integrated special education spaces and an allocation of off-team classrooms. Team Commons have access to daylighting from the full glass folding walls of the adjacent classrooms and are located proximate to one another to encourage and facilitate grade level interaction.

*Lower-Level Program Plan*

Each middle school grade is arranged to maintain fidelity of both classroom teams and grade levels while offering proximity of off-team classrooms. This arrangement allows for full integration of Special Education and Team learning environments, with teacher and student support spaces organized around centrally located Team commons. The organization of Team classrooms around the neighborhood commons serves to reinforce the social cohort of the Team by creating a localized sense of place and belonging. Each grouping of the classrooms also has two small SPED resource spaces or breakout rooms for small groups or one-on-one interaction – a critical part of today’s educational experience. To build upon the Middle School’s Home Base concept “cloak” areas have been established within classrooms except for the 6<sup>th</sup> grade wing which will incorporate lockers into the Commons spaces. Each grade shares a Workroom classroom located in the middle of the floor plan to be shared by all Teams.

Specialized learning spaces have been provided to serve all grades in an off-team model. Grouped Art rooms located on the upper floor with northern exposure allow them to share resources. Two Music rooms located north of the Auditorium also include individual practice rooms and a shared ensemble practice room and instrument storage area. World language is co-located along a shared corridor to limit teacher travel and facilitate resource sharing. Engineering and Family and Consumer Science have dedicated rooms which are easily accessed by all students. All students have easy access to outdoor learning spaces from the Lower-Level floor.



*Upper-Level Program Plan*

The building will be clad in combination of a brick veneer and concrete masonry units in a warm palette. The brick veneer will extend to the roof line at each wing. Secondary rain screen phenolic cladding will be used as an accent on the lobby/bridge connection volume to add natural “wood-look” tones to the palette. A canopy will highlight the entry area. The large volumes of the gym and auditorium have been located towards the center of the school for better flow into student life and to reduce large height walls against the parameter/entry.

*Aerial View from Northeast*

#### Description of Desired Features of the School

The new Concord Middle School is guided by a set of underlying principles, developed in response to the educational program, the site, and the broader architectural context of Concord. Of these principles, the desire to connect with nature and the surrounding site is a core value that informs many of the aesthetic features of the building, from its massing to the distribution of program, to the placement of windows and glazing, and the selection of materials. The building is positioned to provide a welcoming presence from Old Marlborough Road and provides opportunities for the students to connect back to the tree covered site from within whether through use of a terraced performance/ravine area, outdoor instructional spaces, or playing fields.



*View from the Front Entrance Looking West.*

The main entrance for the school is defined by an axis created by a natural site ravine. The main lobby connects across this ravine and is located between a stepped two-story wing and a three-story classroom wing. The main entry is located immediately adjacent to the Administration which provides for passive surveillance. The Music Classrooms and ancillary support of the Gymnasium flow to the west and, along with the Administration, forms a welcoming one-story volume as you enter the school. Behind that the larger volume of the Gymnasium and Auditorium are clad in a lighter color to break down the scale of the building.



*View from the Front Entrance Looking East.*

The selection of materials for the new Concord Middle School will build upon the traditional type found in the local Concord buildings yet will strive for subtly unique expression in its visual and tactile characteristics - i.e., those of color, texture and layering in masonry, reflectance, and vibrancy. The brick veneer will extend to the roof line across the project. A warm “striated” blend of brick will offer texture and relate to banding commonly found in Concord. This blend consists of 3 uniquely colored bricks stacked in rows of individual colors. This is accented with both darker and lighter concrete masonry units to offer relief along the longer expanses of the building.

The concrete masonry will have a polished finish and coursed with a uniquely shaped unit to give texture and shadow to the field. Secondary rain screen phenolic cladding will be used above the second-floor line along the lobby/connector to generate a sense of lightness to the building forms and introduce warmth in a wood look material. The classroom fenestration will consist of large window units which have been optimized for natural daylight. The entry lobby Media Center, and Cafeteria are accented with glass curtainwall at key locations to introduce natural light provide views to the surrounding landscape.



*View of Sloped Performance Area*

The curtain wall within the lobby on the front and rear of the building allows a glimpse of the colorful ceiling elements which create a whimsical playfulness through the front façade to the tree line behind the building. The diagonal columns of the entry canopy roof structure reaching past the face of the building further distinguish the entry. The sloped ravine area between the classroom stairs extending across to the Media Center and Entry provides an outdoor space for informal performance and education. This can be used for both school and community functions. The playful undulation of the façade encourages the imagination of the students within, reminding them of the movement of the trees in the surrounding wetlands and site.



*View of Gym corner on entry drive*



*View outdoor learning spaces facing west*

As the building meets the forest on the south edge, retaining walls have been introduced to address grade change and preserve the natural landscape. The height of these elements has been visually reduced by introducing an accessible ramp and sloping green space to the outdoor dining area. This element frames and reinforces the existing natural ravine and creates an accessible outdoor connection



between the upper and lower student spaces. Towards the east, outdoor learning spaces are built into the sloped landscape to allow students to appreciate their place in relationship to the historic environment of Concord and the adjacent wetlands.



*View of Lobby Looking West*



*View of Lobby Looking East*

Designed to accommodate the flow of students entering the school and changing classes, the space is designed as a mostly open circulation space. Flexible seating is provided for moments of social interaction and gathering. When not used for circulation, the space may also host informal presentations and group activity. The ceiling and wayfinding graphics are designed to encourage movement and provide moments of reflection. Fixed display elements offer a home for temporary exhibits or class use.



*View of Media Center from corridor*



*View of Cafeteria stair and built-in seating looking south*

Between the Media Center and the corridor, millwork shelving and an operable wall creates an open and inviting connection to the school. This allows the Media Center to become the heart of the school as everyone passes and engages in content on display. The media center millwork is framed by a ceiling soffit and wraps around a staircase sitting between the cafeteria and Media Center. The millwork element becomes informal seating in the corridor offering a place for social interaction and small group presentation. This space also serves as a pre-function room for the auditorium.





*View of Cafeteria Dining*

In addition to seating for dining, the cafeteria is imagined as a space for informal learning throughout the school day and pre-function for the Auditorium and Gymnasium. The design features mostly movable furniture which can be stored away giving the room more flexibility. Built-in seating is provided along with areas of lower ceiling acoustical baffles break down the scale of the large space to provide choice in seating areas accommodating social interaction for all. Glazing at the rear of the room gives students clear view of the tree line behind the building offering a connection back to nature.



*View of Team Commons and Classrooms*



*View of typical classroom*

Classrooms are arranged around a Team Commons. This space is conceived as an eddy off of the main corridor circulation. With a combination of solid and glazed operable partitions, the classrooms and

team commons can be opened and configured to meet the needs of instruction. Two Small Group Rooms are located at either end of the commons with interior glazing between. These offer flexibility of group learning or individualized one-on-one instruction. A long counter anchors the space with a divider screen which provides additional workspace. Storage and display millwork is built into the counter display making this an innovative hub for 21<sup>st</sup> century learning. At one end of the team commons a partial height partition provides a fixed element for instruction and collaboration and offers storage on the back side.



*View of auditorium*

Tuned for acoustic performance a combination of folded planar wall and ceiling elements visual interest and accent lighting. Fabric wrapped panels and seating introduce texture and color into the room. The proscenium is highlighted by a wood paneling surround offering a place for the eye to rest and enjoy the performance. A soft sloped floor allows easy access to seating and appropriate sightlines to the stage.





*View of Gymnasium*

The Gymnasium is designed to be flexible for a variety of sporting events in addition to all school assemblies. Tiered seating and adjustable audio/visual equipment give the space full flexibility. Color is introduced into acoustic paneling and accent paint. Northern clerestory windows allow dappled natural light to filter into the room.

## Structural

### Structural Systems at New Construction

#### Foundations

The exterior foundation walls for the school will be 18" thick, 4000 psi, reinforced cast-in-place concrete walls with an 8" brick shelf, resting on a to 36" wide continuous reinforced concrete strip footings, around the perimeter of the building. The foundations will extend at least 4'-0" below finished grade for footings resting on compacted structural fill or undisturbed soils, and 2'-0" for footings resting on ledge. Wall reinforcing will consist of approximately 3 to 4psf of reinforcing steel.

Individual spread footings at columns with allowable bearing pressures as recommended in the Site Geotechnical Evaluation Report. Based on preliminary visual observations at the site, the footings will most likely rest on natural undisturbed soils, compacted structural fill, having an allowable design bearing pressure of approximately 3000 pounds per square foot. The average interior footing size will be approximately 7 to 8 feet square x 20 inches deep with 6 to 7 psf of reinforcing steel

At locations of interior braced frames (for the lateral force resisting system), 24"x24" grade beams will be installed 1'-0" to 2'-0" below the ground floor slab-on-grade, connecting the cast in place concrete piers and footings below each of the two columns that are part of the braced frame.

#### Standard Slabs-on-Grade

All slab-on-grade floors shall be 4000psi concrete, 4" thick at the typical classroom wings, 5" thick at the cafeteria, multi-purpose, gymnasium, and other spaces subjected to heavy-duty use; and 6" thick at mechanical and electrical rooms. Slabs on grade will be reinforced with welded wire mesh, placed over a gas vapor mitigation barrier if required, on a layer of insulation over a base course of approximately 8" to 12" of compacted gravel. The exact details of the slab-on-grade subgrade preparation will be determined from the recommendations set forth in the Geotechnical Evaluation Report.

#### Pits and Bases

Elevator pits will be constructed with 10" reinforced concrete walls with 4 psf of reinforcing steel and a 12" thick reinforced concrete foundation mat with 8 psf of reinforcing steel. A sump pit will be provided as required. An appropriate water stop will be part of the design.

#### Structural Frame

The building will be framed with structural steel, consisting of wide flange or tube-shaped columns. The columns will be connected with wide flange structural steel girders, and in turn, will support wide flange structural steel beams, space 7' to 8' maximum, and compositely connected to the slab with field welded shear connectors. Steel framing which is not concealed by walls or ceilings will be considered Architecturally Exposed Structural Steel. All steel beams and girders will be spray fireproofed except in selected areas where they are called out as AESS which will be protected with an intumescent paint. The total structural steel for the structural floor frame, columns, and lateral bracing will be approximately 10 to 12psf.

The link/bridge between the academic wing and the public wings will be framed with clearspan wide flange beams, supporting both the roof and floor of the bridge. The floor deck of the bridge will 6" thick composite slab matching that of the building. The roof of the bridge will be framed with wide flange steel beams with a 1 ½" x 18gage, type B galvanized steel deck.

#### Lateral Load-Resisting System

Lateral loads due to wind and seismic forces will be resisted by diagonal braced frames and/or moment frames at selected locations, at each level and will be incorporated within the interior and/or exterior wall systems. The steel framing associated with braced frames is typically 1 to 1.5 PSF of building for new construction. The overall building will be subdivided into individual building sections with seismic and expansion joints between each section. Each section will have its own lateral force resisting system.

**Structural Steel Recycled Content:** All steel is to consist of a minimum of 95% recycled steel with over 80% post-consumer and 15% pre-consumer recycled material in compliance with LEED for Schools requirements.

**Misc. Metals Recycled Content:** Recycled Content of Metal Products; Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 60 percent.

**New Floor/Frame Construction:** Typical elevated floor construction will consist of a 3 1/4" lightweight concrete slab on 2", 20 gage composite metal deck, (5 ¼" total depth), reinforced with welded wire fabric. (This floor system provides a 1-hour fire rated floor slab without the need to spray fire-proof the deck). The slab will be supported on a system of composite, wide flange structural steel beams compositely connected to the slab with field welded shear connectors. Steel composite beams will be supported on composite steel wide flange girders. The steel girders will in turn be supported on steel wide-flange columns, round, or square tubular columns. Steel weights for these areas to be 10-12 PSF.

A vibration analysis is typically performed on all framing members, in order to create a structure that is comfortable, and free from excessive vibrations that would create discomfort for the building's occupants.

#### Roof Structural Frame

The structural steel building frame will extend up to the roof which will be primarily framed with structural steel beams and/or open web joists. The specific roof framing type for each area is described by room type below All roofs will be sloped to roof drains at 1/4 inch per foot.

All roof areas that are not designated for rooftop equipment, or other purposes, will be designed with a 20 PSF allowance for future roof mounted photovoltaics. Areas to receive photovoltaic panels will require an 18-gage deck.

Roof construction at the classroom area, will consist of a 1-1/2" deep, 20 gage, Type B, galvanized metal roof deck. Roof decks will be supported on a system of wide flange structural steel beams, spaced 5' to 6' apart, maximum, and in turn will be supported on steel wide flange girders. The steel

girders will in turn be supported on steel wide-flange columns and square tubular columns. Steel weights for these areas to be 9-10 psf.

Some portions of the roof will be designated as "Green Roofs". At these locations, these roofs will be framed similar to the floor framing at this level. Additional dead and live loads for these areas will be considered in the design.

The roof areas directly beneath the rooftop mechanical equipment, as well as a 5' perimeter around the unit, will be constructed with a 4" normal weight concrete topping slab supported on a 2" deep, 20 gage, galvanized composite metal deck, (6" total depth), supported on wide flange beams and girders.

The Gymnasium roof framing will be 1-1/2" deep, 18gage, Type BCA, galvanized, cellular acoustic deck which will be supported by "LH" or "DLH" series long-span steel joists spaced a maximum of 6'-6" apart. The Gymnasium structural framing shall include design factors for support of gym divider partition and other hung equipment.

The Cafeteria roof framing will be 1-1/2" deep, 18gage, Type BCA, galvanized, cellular metal deck supported on "LH" series long span steel joists spaced a maximum of 6'-6" apart. The joists will frame into perimeter steel girders, supported on wide flange or tubular shaped steel columns carried to the foundation. Typical steel weights for these areas to be 12 PSF.

Canopy Construction will consist of a steel framed roof with 1-1/2" galvanized metal deck supported on steel beams and columns. Lateral load resistance will be provided by moment frames around the perimeter of the canopy.

## Site

Because the existing Sanborn Middle School will remain in use during construction of the new building, the project will require a phased approach to the site work. The initial phase will generally include site preparation for construction of the new building, earth work operations, utility installations, pedestrian and vehicular circulation infrastructure, parking, and other site improvements necessary to allow the new building to function. The following phase will generally include the abatement, demolition and removal of existing building and site elements for the remainder of the site outside of the initial phase limit of work, including the existing building, parking and circulation systems, utilities, and surface and landscape elements. Upon demolition and removal of these elements, the new play fields will be completed.

The site development program includes the new building; new vehicular circulation drives and pedestrian routes allowing access to the site from Old Marlborough Road; parking lots totaling approximately 150 spaces; bus parking areas for 18 buses; a loading area with a dedicated access drive; outdoor learning areas adjacent to the classroom wing and the cafeteria, a sloped lawn amphitheater adjacent to the main building entrance; a pedestrian promenade bisecting the site that leads from the main bus drop off area to the main entrance; and a new boys baseball field, girls softball field, and co-ed soccer pitch, all constructed of natural turf. The parent drop-off / pick-up queue is located at the front of the building, and the bus drop-off / pick-up area is split between the main entrance promenade and the service drive located west of the building.

The circulation design and drop off locations are intended to minimize vehicle back up onto Old Marlborough Road, maximize on-site vehicle queuing by incorporating the south parking lot as parent pick-up queuing, maintain safe separation between buses and passenger cars, and create safe routes for students to access the building entrance and recreation areas without the need to cross active vehicle paths of travel. Accessible routes to the building and to the site amenities from the car and bus drop-off areas and Old Marlborough Road will be included. The entrance sign will be located at the main bus/passenger vehicle entrance. There will be appropriate traffic and parking signage throughout the site. Roadway and pedestrian scale lighting will be included.

New canopy, understory, and ground plane vegetation will be introduced around the perimeter of the building and throughout the developed site to complement the architecture of the building, develop and frame outdoor rooms, and add shade, scale, color, texture and four-season interest/educational opportunities to the site. Bioretention basins designed to treat stormwater runoff from the parking and vehicular access drives will be planted to create vertical separation to break down the scale of the pavement areas, while allowing for accommodation of the proposed PV canopies over the parking areas. Site lighting will consist of 3' pathway, 12' pedestrian scale and 20' vehicular scale full cutoff LED fixtures.

Outdoor student recreation will include both passive open lawn and active athletic field play areas. The active athletic field play areas will be constructed of a special athletic field turf seed mix and extended topsoil depth that will allow this area to withstand extensive use. The athletic field program will include MIAA regulation-sized boys' baseball and girls' softball fields, as well as an MIAA regulation-sized soccer pitch that will partially overlay the boys' baseball outfield. The soccer pitch will also be sufficiently sized to support youth soccer field overlays.



Outdoor classrooms will be located around the perimeter of the classroom wing, the design of which will support the educational curriculum while also allowing for environmental discovery and alternative learning environments.

## **Mechanical/Electrical/Plumbing & Fire Protection**

### **Plumbing**

The new plumbing system will be designed in accordance with the 10th Edition of the Commonwealth of Massachusetts Building Code and 248 CMR 10.00: Uniform State Plumbing Code.

The building will be serviced by a new 6" domestic water supply that will enter into the facility through the water service room. A Mass. Approved, 6" master double reduced pressure backflow preventer will be provided to the main domestic water supply to protect the service (per the DEP regulation 310 CMR 22). The service entrance will be equipped with a strainer, water meter that meets the requirements of the local water department, and a duplex pre-packaged skid domestic water booster pump system with variable frequency drives. Potable water will meet both the NSF 61 and NSF 372 standards for lead free safe drinking water act. Any other mechanical connections will include a reduced pressure-principle backflow preventer. Domestic cold water inside the building will be "L" type copper tube with wrought or cast copper fittings. All cold-water piping will be insulated to prevent condensation.

The new school will include a central hot water supply and recirculation system. Three electric water heaters will be installed in parallel and located in the water heater room. Domestic hot water heaters will consist of three commercial electric water heaters, each sized for 66% of the hot water demand. Storage tanks will be ASME rated. Storage tanks will meet the thermal efficiency and standby loss requirements of the U.S Dept. of energy and current edition of ASHRAE / IESNA 90.1.3. The acceptable manufacturers of hot water heaters are PVI, Lochinvar-AWN, A. O. Smith, or equal.

The domestic hot water distribution will have dual temperature hot water supply and recirculation systems in the building. One system will operate at 140°F and will serve the kitchen appliances requiring high temperature water. The other system will operate at 120°F and will serve the other kitchen appliances, custodian room sinks, locker room, lavatories, and classroom sinks. All lavatory faucets will have thermostatic mixing valves to temper water supply. Domestic hot water will be distributed in "L" type copper tube with wrought or cast copper fittings. The hot water (HW) and re-circulating (HWC) piping will be provided with 1" insulation.

Science classroom sinks will be supplied with isolated protected water systems to prevent contamination of the potable water systems. Protected cold, hot, and hot water recirculation systems will be provided and isolated from the domestic water systems by means of backflow preventers. An electric water heater will be provided at a janitor's closet to recirculate the non-potable hot water system

Insulation will be applied to protected cold water, protected hot water, protected hot water return piping. Insulation will be continuous through supports and include a vapor retarding jacket. Insulation for protected cold water will be 1/2" thick. For all protected hot water and protected hot water return piping, insulation will be 1" thick.

Storm drainage systems will include single drain bodies flashed into the waterproofing membrane. . Storm drainage systems will be sized to handle a rainfall rate of 4 inches per hour, with a total runoff

from the main roof and the roof deck of just under 1 cubic foot per second. The storm drainage system will be comprised of cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit at various locations of the building and connect to the site storm water collection system. All the lower-level roofs connected to a riser higher roof level will be provided with a Back Water Valve

A new sanitary waste system will drain by gravity and connect to the site sewer system. A dedicated kitchen waste line will be installed to collect grease-laden wastewater from the kitchen appliances and fixtures. The kitchen waste line will exit the building and will be connected to a new, exterior grease interceptor exterior to the building. Chamber vents from the interceptor will be routed to the roof independent from the sanitary waste and vent system. Localized, interior grease traps will be provided at the source for individual grease-laden drainage fixtures and drains in the kitchen. Art room sinks will be provided with solids interceptors. All above ground sanitary drainage and vent will be piped in cast iron with "no-hub" joints. Piping smaller than 3-inch may be piped in DWV copper. Piping below slab (buried) will be cast iron hub and spigot type. All floor drains will have wet trap primer connection with electronic trap primer.

A sewage ejector with slicer will be required waste from all fixtures at the lower level of building C. Sanitary waste discharge from all water closets, floor drains, sinks, lavatories and drinking fountain at the lower level will be collected and will be pump out of the building independently to 10'-0" outside the building and connected to the site sanitary drainage system.

Gas/Oil separator will be provided to receive pumped waste discharge from elevator sump pump. The vent piping from the separator will be routed back into the building, independent from the rest of the sanitary vent system. The vent shall be extended independently 18" above the roof, or as approved by the local Authorities and the Authorities of the M.W.R.A. Waste from the elevator sump must be separated from sewer effluent and directed to a tight tank and not the septic system.

Basis of Design: A lab waste and vent system will be required to collect waste from all science classrooms and laboratories. The system will include a rectangular neutralization/dilution (Limestone) tank with standard bolted and gasketed reinforced cover. The system also includes a sampling sump, pH probe assembly with support and stand, pH monitoring and alarm system, pH control panel, pH wiring cable for hook-up, adapters, and limestone chips.

After treatment, lab waste piping downstream of the neutralization/dilution (Limestone) tank will convey lab waste out of the building independently by gravity to 10'-0" outside the building and connected to the site sanitary drainage system.

A lab waste sewage ejector will be required to collect waste from all science classrooms and laboratories at the lower level. Lab waste discharge from all science classrooms and laboratories at the lower level will be collected and will be pump out of the building independently to 10'-0" outside the building and connected to the site sanitary drainage system.

There will be no pH adjustment system for the art rooms based on the assumption that oil-based paints will not be used in the art rooms.

The emergency generator was changed to natural gas from diesel as the site is within a Water Protection Overlay District where diesel generators are not allowed under the Concord Zoning By-laws.

Plumbing fixtures will be provided in the facility to accommodate the projected population of male students and female students and shall be in accordance with 248 CMR Paragraph 10.10

Table 1. Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction-LEED-V4, Credit 2).

Water Closet	Urinals	Lavatory
Electronic sensor operated, battery powered, 1.28 gpf flush valve (American Standard or equal)	Electronic sensor operated, battery powered, ultra-low flow flush valve type-0.125gpf (American Standard or equal)	Bradley Verge Wash Basin or equal, sensor activated, battery powered hand washing faucet, 0.5 gpm flow restricting aerator and field adjustable run time limit setting.

Water closets and urinals will be commercial vitreous china, wall hung (ADA compliant). Lavatories will be Bradley multi-station units or wall mounted china. Each floor will include a janitor's closet with a corner mop service basin. Toilet cores on each floor will include an alcove-recessed electric water cooler with bottle filling station and, in a high-low handicapped accessible configuration to meet MAAB requirement. All toilet and mechanical rooms will have floor drains complete with trap primers. All art rooms will include self-rimming stainless-steel sinks with gooseneck type faucets and eye/face wash units. Plumbing roughing connections and faucets will be provided to each kitchen appliances requiring plumbing work. Non-freeze wall hydrants will be provided at various points and at least every 100 feet along the building's perimeter walls.

## Mechanical

A new Heating, Ventilating and Air Conditioning system will be provided to serve the various program spaces of the middle school building to meet/exceed current codes will being all-electric, and strive for net zero-ready energy goals for the project.

### Ventilation

Ventilation will be provided to the majority of spaces by Dedicated Outdoor Air System (DOAS) units with high efficiency energy recovery wheels or superblock technology. The DOAS units will be configured as DX heat pumps with enthalpy wheels with remote condensers. The units will provide variable volume air distribution for conditioned outdoor air supply and return (exhaust). The DOAS units will be provided with acoustic attenuation. The DOAS units will provide general exhaust functions for the school, including utility spaces and restrooms. Separate exhaust systems will be provided for the kitchen and for the kiln exhaust.

Each program space (e.g., classroom) will be served by a VAV (Variable Air Volume) box system to modulate ventilation supply air based on measured space CO2 levels. The ventilation return will be similarly controlled through a central exhaust VAV box, whereby each floor of a wing is provided with zone exhaust VAVs as plenum return and dedicated exhaust VAV boxes will be provided for restrooms, where located in a certain zone.

The Gym, Cafeteria and Auditorium will be provided with ventilation through rooftop air handling units. The Gym and Auditorium will be served by one AHU and the Cafeteria will be served by another unit. The system will use VAV terminal boxes for space temperature control with electric reheat coils as needed for space temperature control.

Duct distribution will be provided using galvanized (G90) ductwork, providing 4" pressure class on ductwork up to the proposed supply and return/exhaust VAV boxes and 2" pressure class between the VAV boxes and the space grilles/diffusers. Supply ductwork within the building will be insulated with R-6 blanket type insulation. Exterior ductwork (supply or return/exhaust) will be insulated with 2" rigid insulation with tapered insulation for a sloped top and with weatherproof, UV-proof wrap.

Kitchen exhaust will include a grease exhaust fan with VFD (Variable Frequency Drive) distributed with NFPA 96-compliant exhaust ductwork with a 2-hour enclosure (as fire wrap) with cleanouts or similarly rated system. A dedicated dishwasher exhaust fan will be connected to the proposed commercial dishwasher with aluminum ductwork. Makeup air for the kitchen will be provided with a dedicated rooftop heat pump unit with backup electric coil and a VFD. A Kitchen Demand Controlled Ventilation system will modulate the airflow of the kitchen exhaust and makeup air unit based on cooking demand.

Dedicated exhaust will be provided for kilns with a canopy hood to provide temperature-controlled exhaust of the kiln when in use.

### Heating and Air Conditioning

Variable Refrigerant Flow (VRF) heat pump systems will provide heating and air conditioning to the classrooms and other program spaces. Rooftop air cooled condensing units (ACCUs) will be located to

minimize piping distances. Typical systems will be heat recovery heat pump configurations, capable of providing either heating or cooling to all the zones served by each subsystem.

Refrigerant piping will be provided as a hard-piped system using copper ACR piping with brazed joints. Condensate drain piping will use copper Type L piping with brazed or pro-press fittings, sloped to drain and sized to match the equipment drain connection. Interior piping insulation shall be NFPA 90A and 90B compliant. Exterior piping insulation shall include weatherproof aluminum cladding.

Larger spaces, including the Gymnasium, Cafeteria and Auditorium will be served by air handling units with packaged DX heating/cooling. The AHUs will be located on the roof with sound attenuators on all inlets and outlets, and energy recovery wheels on the return.

Vestibules, stairways, storage, loading dock, and other back-of-house spaces will be heated with either electric unit heaters or baseboard. Corridors will be on the VRF system for both heating and cooling.

Independent, split-type air conditioning systems will be provided for Data Closets and fans or split-type air conditioning for Electrical rooms, depending on the degree of transformer load (smaller electrical rooms will use transfer fans).

#### Building Automation Systems

The facility will be provided with a Johnson Controls Metasys, web-accessible, microprocessor-based, direct digital control (DDC) building management system (BMS) for control of HVAC systems and equipment and for monitoring of selected other systems.

The VRF system will include a proprietary DDC system for direct operation and control. This system will have a BACnet interface to the BMS to enable monitoring, alarm and setpoint adjustment of the VRF system through the BMS.

A demand-controlled ventilation system will be provided for modulation of the kitchen exhaust and makeup airflows based on cooking demand through a third-party system (e.g., Melink or specified equal).

CO2 sensors will be provided for demand-controlled ventilation for typical occupied spaces. The CO2 sensors will be individual sensors provided through the BMS manufacturer.

#### General Requirements

Acoustic attenuation and vibration control will be provided to minimize noise and vibration transmission to occupied spaces in the form of in-duct attenuators, duct lagging, vibration isolators and/or roof-level slabs beneath HVAC equipment.

Rooftop DOAS units will be supported by insulated 24" roof curbs with vibration isolation. Concrete slabs may be recommended by the acoustic consultant, Acentech.

Rooftop duct or piping supports will use manufactured support bases to rest on the roof membrane with Unistrut support framing. ACCUs for VRF or smaller split systems will be supported on 24"-high stands per manufacturers requirements.

The utility shed will have heating and ventilation as required for the plumbing equipment.

#### Freeze Protection

The heating system will be powered from the emergency generator for freeze protection during a loss of normal power. A strategy for staggering the operation of ACCU subsystems when on emergency power will be used for the opportunity to limit the size of the generator.

#### Fire Protection

The entire building will be protected throughout with a wet automatic fire suppression system. A fire department pumper connection will be provided at the exterior wall near the site hydrant. The fire department connection will either be wall-mount or free-standing, depending on the final architectural details and the preference of the Fire Department AHJ. Roof manifolds will be provided at each two story or greater roof area. Total number of fire department connections and roof manifolds shall be in accordance with local fire department requirements. Exterior fire service to be equipped with a post indicator valve, located approximately 40 feet from the building wall, equipped with a supervisory switch, and wired to the building fire alarm system. The system will be designed in accordance with NFPA Standard 13 (2013), IBC 2021 with Massachusetts State Building Code (9th edition) amendments, Massachusetts Fire Prevention Code 527 CMR, and local jurisdiction.

A new 8" fire service will be installed to a dedicated water service room/fire service room. The room will have a supervised double check valve assembly backflow preventer. The facility will also include an electric fire pump on emergency power with secondary electrical power and will be installed in a dedicated Fire Pump Room. The Fire Pump controller will include a factory assembled Wye Delta Controller with Automatic Transfer Switch. The system will also include wet alarm valve assemblies. Sprinkler mains will be equipped with control valves, inspector test stations, and flow switches.

The water service/fire service room will be located on the Ground level of building A and access to the room shall be directly from an exterior door at grade or through fire resistance rated enclosures.

From the fire service room, fire protection piping will run to each stairway, and up through the stairways as Class III standpipes. Floor control valve stations (consisting of a monitored shut-off valve, flow switch and an inspector's test valve with sight glass) will be provided at the stairs at each floor, fed from the standpipe system.

Sprinklers will be supplied from the standpipes in the stairs. The building shall be protected as light hazard, ordinary hazard group 1, and ordinary hazard group 2.

Light hazard design shall have sprinkler spacing no more than 225 square feet (15' x 15' pattern) per sprinkler. The system will be hydraulically calculated to provide 0.10 GPM per square foot over the most hydraulically remote 1500 square feet. Areas to be protected as light hazard: general classrooms, fitness rooms, common areas, gymnasiums, offices.

Ordinary hazard (group 1) design shall have sprinkler spacing no more than 130 square feet (10' x 13' pattern) per sprinkler. The system will be hydraulically calculated to provide 0.15 GPM per square foot over the most hydraulically remote 1500 square feet. Areas to be protected as ordinary hazard (group 1): kitchens, storage rooms, electrical closets.

Ordinary hazard (group 2) design shall have sprinkler spacing no more than 130 square feet (10' x 13' pattern) per sprinkler. The system will be hydraulically calculated to provide 0.20 GPM per square foot over the most hydraulically remote 1500 square feet. Areas to be protected as ordinary hazard (group 2): stages.

Areas not to be provided with wet-pipe sprinkler protection: areas below raised floors, non-combustible concealed spaces above suspended ceilings, elevator shaft and pit, elevator machine room, and electrical transformer vaults (if meeting the conditions outlined in 780 CMR).

Standpipes will be supplied in all required egress stairs. Standpipes will be designed in accordance with NFPA Standard 14, 2013, and local Fire Department requirements. Standpipes will be located in each required egress stairway and adjacent to the Stage. Additionally, standpipes will be located so that no part of the building is more than 200 feet from a standpipe valve. Each standpipe will be equipped with a 2-1/2" fire department hose valve with 1-1/2" reducer at the stair floor landing. Because the building is not a high rise, there is no minimum pressure requirement for the standpipes since the facility will be protected with automatic sprinklers throughout.

The sprinkler system shall be zoned for water flow as follows: separate into zones per floor with a maximum of 52,000 square feet per zone for the purposes of monitoring water flow. The test valves for each zone shall be located to be accessible, and their discharge lines are to be directed outside the building to a safe location.

Sprinkler heads in areas with finished ceilings will be concealed pendant type. In areas with no suspended ceilings, there will be upright sprinkler heads. All sprinklers will be quick response heads. Sprinkler heads in mechanical rooms will be provided with wire guards.

The fire protection piping will be schedule 40 piping with threaded fittings for any piping sized 1-1/2" and less. For sizes over 2", schedule 10 piping with roll grooved fittings and couplings will be used. All valves controlling the flow of water will be equipped with supervisory devices that report to the Fire Alarm system.

## Electrical

Based on preliminary loads, a single 2000 Ampere, 277/480 Volt, 3 phase, 4 wire service will be provided to the new Middle School with a new utility pad mounted transformer and underground primary wiring and secondary wiring. The utility electrical transformer will be furnished, installed, owned, and maintained by the electric company, Concord Municipal Light Plant.

A primary voltage of 13.8 kV will be extended overhead to the new utility pole on Old Marlboro Road and transition underground to the stepped down to the secondary voltage of 480Y/277 Volts. The transformer secondary feeders will run underground and be terminated in the main switchboard located



in the buildings main electrical room. All underground conduit raceways will be concrete encased per utility standards.

The new service will be metered at the transformer secondary voltage. The utility metering CTs will be installed 'cold-sequence', downstream of the main service disconnect, in the metering compartment of the main switchboard. Final meter requirements to be confirmed with utility.

The switchboard will be rated for 2500 Amps and be provided with tin-plated aluminum phase and neutral bus bars, and copper equipment ground bus. The main protective device will be an insulated-case circuit breaker (ICCB), individually fixed mounted, 2000 Amp, 100% rated, with a solid-state trip unit capable of adjusting long time, short time, and ground fault protection characteristics. Switchboard will include an arc energy reduction maintenance switch (ARMS) with a local indicator for a main circuit breaker.

Downstream from the 2,000 Ampere main protection device, a system of new distribution panelboards will be installed in all electrical rooms to energize branch circuit panelboards. The distribution system will separately sub-meter loads by use – lighting, mechanical, receptacle power, tele-data, and AV. All panelboards will be installed in dedicated electrical rooms. A multi-point sub-metering system shall be installed to separately monitor each use type, in accordance with ASHRAE 90.1 electrical monitoring device guidelines.

A 60% addressable and networked lighting control system will be installed to conform with the latest Energy Code. Daylight sensors and occupancy sensors will be installed throughout. Fixtures located adjacent to windows will be tied to daylight sensors that will automatically dim the fixture lumen output up or down depending on the amount of natural light entering the room or space. In addition, plug load controls will be provided and tied to the lighting control system. 75% of receptacles will be controlled by either occupancy sensors or timeclock to automatically turn off when an occupant leaves a space or by scheduled time basis. The lighting control system will also support load shedding programmability and utility demand response events.

All fixtures will utilize high efficiently integral LED lamps with integral dimmable addressable drivers, which will provide more acceptable light output with increased energy efficiency.

Light fixtures will be provided at all exterior egress doors per code, wall packs will be installed along the building perimeter for security purposes and pedestrian lights and/or bollards to illuminate walkways. Light poles with LED heads will be provided in the parking lots. All exterior fixtures will be controlled by astronomical time clock with photocell override via the lighting control panel.

A stand alone, dimming rack with a DMX controller will be used for theatrical lighting control.

A new 500KW/625kVA 277/480V, 3-phase, 4 wire pad-mounted, packaged natural-gas engine emergency generator will be provided to supply power to the building life safety and optional standby loads.

The generator will be pad mounted on the site with a sound attenuated weatherproof enclosure. Separate 2-hour rated emergency closets will be built to house life safety distribution equipment.



The building will be designed to be “Net Zero Ready” by installing conduit pathways, dedicated equipment space on-site/indoors/on the roof, electrical equipment sized per code requirements, and interconnection points for a preliminarily sized 1216 kWac system. The future system will include a combination of interconnection points at the main switchboard and directly to the utility transformer, as well as energy storage units. Final metering requirements to be coordinated with utility.

Electric vehicle charging stations will be provided at two (2) locations within the parking lot. Each car charger will support level 2 charging, be bollard type, 6.6 kW rated output, and capable of charging two (2) vehicles simultaneously via a power shared controller. Two charging stations (capable of charging 4 vehicles) will be located in the north parking lot. In addition, underground conduit pathways will be provided to support twelve (12) future EV charging stations.

The fire alarm system will be a new addressable voice evacuation system. Detection devices will be installed in egress paths for early warning and new speaker/strobe notification appliances installed throughout per NFPA 72. A Bi-Directional Antenna system throughout the building will be installed if required by local Fire Department.

## DATA/Comms/Security

### Information Technology

#### Electronic Safety and Security System

##### Introduction

- An integrated electronic security system consisting of 5 sub-systems, including video surveillance, electronic access control, electronic intrusion detection, duress alert/active shooter system, and security communication and visitor management will be installed. All systems will be integrated.

##### Site

- Perimeter video surveillance shall include high resolution, lowlight, and infrared fixed and multi-lens cameras in concert with video analytics, including motion detection, camera tampering, etc., to establish a virtual perimeter and monitor activity within the site. Video surveillance will be used to cover the driveways, parking areas, and outdoor classrooms. Cameras will be aesthetically mounted to poles and to the school, where permitted, to provide maximum coverage of the perimeter. All exterior building cameras will be power over Ethernet (PoE), specified for the environment in which they are located, and will include lightning and surge protection. All PoE power supplies will be on UPS and emergency power. Pole-mounted cameras will connect to the security network via fiber cabling and will be powered from independent 120VAC power with step-down transformers mounted in a NEMA enclosure at the base of the pole.

##### Building Perimeter

- Doors scheduled as entry doors should be controlled by a proximity card reader, electric lock, request to exit switch, door position switch and be monitored by video on both the interior and exterior of the school. This includes classroom wing stair doors that lead directly to the exterior that will be used for recess or outside learning, doors to the west courtyard adjacent to the gym, doors to the gym toilets and the door to the cafeteria. Vestibule doors at the main entrance shall include a video intercom system whereby a visitor would request access into the school.
- Only during parent and bus drop off shall certain exterior doors remain unsecure. At these times staff should be positioned at the doors providing supervision of the entry process. Outside of these times under no other circumstances shall doors be unsecure or propped open. Either of these events shall trigger an alarm on the access control system for staff review.
- All exterior doors not used for normal entry, but for emergency egress only, shall be equipped with hardware on the interior side of the door only unless specifically requested by the police or fire department, door position switches and alarms. Alarms will be generated for unauthorized access and can be silent alarms, generated only on the access control workstation, and/or audible alarms for local annunciation. All doors either access controlled or monitored shall include door closers.
- An intercom speaker phone shall be located outside of the loading dock delivery doors to allow the driver of the delivery vehicle to communicate with the custodian office or the main office to request access into the school.

- All doors with access into the school should be marked in numerical order based on the clock position method, starting with the main entry as number one. All doors should be clearly labeled with large, reflective numbers. These markings will serve as a reference point for first responders.
- Flashing Prizm lights will be installed on the exterior of the school, visible from all exterior areas, to indicate a lockdown in progress. This will warn staff members outside of the school to evacuate students to a predetermined location and alert first responders traveling on the adjacent streets of the emergency.

#### Building Interior

- All controlled and monitored doors shall communicate with access control panels and an intrusion detection system mounted in a climate-controlled secure closet inside the school. This location will also house the power over ethernet (PoE) switches that power the cameras. These panels will transmit the access control data to the access control workstations. The system will have the capability to receive and acknowledge various types of facility alarm conditions to include door-propped-open and door-forced-open. The system will be addressable, and all alarms will be displayed on a facility map indicating specific location and type of alarm.
- Through the access control system and associated equipment, the school will have the capability to lockdown, rendering all card access doors only to be operated by pre-authorized credentials, i.e., the administrative team, and kept in the separate Knox Boxes for police and fire on the exterior of the school. Lockdown buttons should be fully functional and monitored on a 24x7 basis by the school, local police department and a dedicated monitoring service or central station.
- These panels will also include a fire alarm module to support a connection with the fire alarm system. In addition, intrusion detection keypads should be located at common entry points for after-hours door and motion sensor status monitoring. These keypads will be disarmed by the first person entering and armed by the last person leaving the school.
- Similar to the ability to lockdown the school during an emergency, the school will have the ability to secure portions of the school for after school and weekend events in the gymnasium or cafeteria. The doors surrounding the perimeter of these spaces can be programmed to secure or include a manual system override. Users will have the ability to use the spaces allowed by the school without access to classroom or administrative areas of the school. In all cases, proper egress from the spaces will remain free and accessible. Authorized credentials for staff with permission will be able to enter through secure doors regardless of the door status.
- Wireless duress buttons shall be installed to ensure that assistance can be summoned covertly without escalating a bad situation and to notify school personnel of an emergency. Duress buttons should be located in high-risk areas as designated by School Administrators. Positioning of the buttons should be such that the staff member can activate the button without obvious movements that could escalate a confrontation. Duress buttons shall be fully functional and monitored by the school. A network-based application shall also be installed on designated staff computers to allow for the reporting and notification of active events in the building and to establish two-way communications with first responders.
- The access control system database will be linked to the district user database, which will allow new employee data to be passed to the system for pre-population of card holder data, which

will allow personnel to quickly create new access control credentials. Access control credentials will be produced offsite with badging software within, or integrated with, the access control system and allow for multi-colored badges with a photograph and permit full user design of style, logo, fonts, and data placement. The system will be part of, or integrated with, the access control system in order to permit tracking of individual badge usage, activation/deactivation of badges at any time or based on user-defined rule sets and provide both standard and custom reporting capability.

- Card access should be employed at the inner and outer doors of the entry vestibule, entry door into the administrative office, tel/data closets, and rooms containing security equipment. Basic classrooms and other spaces will be provided with a storeroom type lockset, or similar functionality, where the corridor handle is always secure, only unlocked by a key, and the interior handle remains free. All door hardware should be in compliance with local life safety code and not restrict the ability of parties to exit the room in the event of a fire emergency.
- PoE video cameras will be employed within vestibules, hallways, the gymnasium, the cafeteria, stairwells, and other group gathering areas. The video management system server and the network video recorder (NVR), will be capable of recording and storing all video, including the exterior cameras, for a minimum of 30 days. The video management system will transmit video to workstations located throughout the school, and/or at alternate locations, including the local Police Station, where live viewing will be permitted of any camera image. All cameras will be capable of transmitting in color and exterior cameras will have low light capability where needed (based on lighting design and configuration). Software for motion-based as well as object-based and/or forensic video detection will be used in order to provide discrimination of unwanted versus normal events. All cameras should have wiring installed inside walls and above ceilings. Any cable that requires surface mounting shall be run in electrical metallic tubing (EMT) with appropriate fasteners.
- A desk in the school office will house an access control system workstation, a video management workstation, a visitor management workstation, the master video intercom, a lockdown and duress button. It is from this desk that visitors requesting access into the building will communicate through the video intercom system. Once allowed into the school main office through the remote unlocking capability from the master intercom, visitors will utilize a visitor management kiosk where upon scanning their photo identification will check their background against custom databases set by the school, including custody alerts, banned visitors or sex offender registries. Once cleared by the software, the visitor will be provided a credential by office staff to wear while inside the school.
- The Principal's and Assistant Principal Office will be equipped the following equipment: video management workstation, master intercom station, duress button. The Custodian Office will be equipped with the following equipment: master intercom station. The SRO Office will be equipped with the following equipment: a video management workstation and a duress button. The Guidance Office, SPED (Special Education) Office, Therapist, Athletic Office, and Nurses Office will be equipped with a duress button.
- Ground floor windows with direct view from the exterior and all classrooms and offices with visibility from interior corridors will be fitted with easily controlled shades to allow teachers, staff, and students to properly shelter in place while decreasing visibility. During a lockdown students and staff should be trained to shut off lights and get into a location that is out of site of the window.

- All systems operating the security system should be tied into the uninterruptable power supply (UPS) system and generator. Incorporating this system will eliminate the downtime while maintaining visibility that they are exposed to without a backup system.

#### Infrastructure

- Below are the various power, network and conduit requirements for the access control and video assessment systems:

#### Network

- A network connection would be required for each access control panel location. This is typically in the form of a network jack located within the security equipment enclosure.
- Category 6e cabling will be required for each camera, routed back to a network switch inside a secure closet.
- Two network connections would be required for each video server recorder; the final configuration for recorders will vary depending on the number of cameras throughout the school. A complete network switch infrastructure is installed with the purpose to connect all security and building systems devices together with a 10GbE backbone. Switches are typically located in all IDF (Tel/Data) rooms.
- Coordination of IT elements such as data drops, IP addresses and VLAN configuration, if desired, will be conducted well in advance of system deployment and will be closely monitored throughout the system installation.
- A network connection would be required for each access control, video management, and visitor management workstation.
- Rack-mounted equipment will be installed in a 7-foot server cabinet with locking system.

#### Power and Fire Alarm

- Power for security devices, as outlined below, should not be shared with any circuit supplying non-security related equipment.
- Provide one 120VAC 20 Amp UPS circuit and Fire Alarm connection for each access control panel location.
- Provide one 120VAC 20 Amp UPS circuit for each door to receive an electrified panic hardware device. This circuit may be shared with other security devices.
- Provide one 120VAC 20 Amp UPS circuit and Fire Alarm connection for each door to receive any type of delayed egress device. This circuit may be shared with other security devices.
- Provide one 120VAC 20 Amp UPS circuit and Fire Alarm connection for each set of interlocked controlled doors. This circuit may be shared with other security devices.
- Provide 120VAC UPS power for each pole mounted exterior camera. This circuit may be shared with other security devices.
- Five 120VAC 20 Amp UPS circuits would be required for the security desk.
- Six 120VAC 20 Amp UPS circuits would be required to support the security desk monitors.

- A rack-mounted managed Uninterruptible Power Supply (UPS) will have adequate power to support at least 30 minutes of outage in the event of a power loss for all rack-mounted equipment.

#### Conduit

- One 1" conduit would be required for each card reader location. Conduit shall be run from the card reader location to the nearest IT closet or cable tray.
- One 1" conduit would be required for the following devices and would be run to the nearest IT closet or cable tray:

#### Video Assessment Camera

- Monitored doors without a card reader
- Intercom or Call for Assistance stations
- Wide Area Network (WAN) services will be provided over the district-wide, high-speed fiber optic network.
- A Main Distribution Frame (MDF) Head-End room will be constructed to serve as the primary hub of communications. A laser optimized, OM4, fiber optic backbone cable network will be provided to connect the MDF with Intermediate Distribution Frame rooms (IDF) throughout the building.
- The horizontal cable infrastructure will be comprised of Category 6E to provide high-speed voice and data communications throughout the building. The building will be cabled to provide robust WiFi coverage throughout the interior and exterior learning environments.
- A master clock system with secondary clocks will be installed in classrooms, offices, and other learning spaces. An analog Public-Address system will be installed with speakers located throughout the building designed with the ability to page an individual room, initiate two-way communications with classrooms or offices or make a facility-wide announcement and broadcast emergency notifications.
- Audio Visual systems will be provided to support large group activities in the Gymnasium and Cafetorium. These spaces will be equipped with local sound systems, projection screens, a high lumen projection system and touch panels to provide remote control AV the equipment.
- Sound Field systems will be installed in all classrooms and/or academic spaces. The Sound Field Systems will be made ready to interface with interactive flat panel monitors to provide even, full sound distribution within the classroom.
- The telephone system will be a VoIP solution that will be purchased separately from the base building construction budget as part of the Technology Equipment budget. Modern school designs include sustainable insulation and window systems that limit the transmission of cellular voice signals. The school will also be equipped with an internal antenna and repeater system to support the use of cellular phones.
- A Bi-Directional Amplification system will be installed to support first responder radio communications within the building and outside the building, if required by the Fire Department. System design will be developed in collaboration with Concord Emergency Service Personnel.

- Schools within the district currently use two-way radio systems to provide wireless voice communications among Administrators and selected staff. The new school will be equipped with an infrastructure of antennas and signal boosters that will be specified to integrate with the existing district-wide two-way radio system.
- Network electronic equipment (switches, firewalls, wireless access points), student, Teacher and Staff computers, classroom interactive projectors, document cameras and related electronic educational peripheral equipment will be purchased separately from the base building construction budget as part of the Technology Equipment budget.

### 3. Building Code Analysis

A code compliance report was completed on the 60% CD Cost Estimate documents by Building Fire & Access, inc. A report was issued on October 7, 2022. Recommendations contained within will be incorporated into the project and all costs associated with them will be included in the 60% CD estimate.





17 Brian Road ♦ Lancaster, MA 01523



IMAGE CREDIT – EWING COLE/SMMA

## **CONCORD MIDDLE SCHOOL**

835 OLD MARLBORO ROAD, CONCORD, MA 01742

### **Code Compliance Report**

60% Construction Documents

Prepared For:

Symmes Maini & McKee Associates

1000 Massachusetts Avenue

Cambridge, MA 02138

BFA # SMMA 21-002

October 7, 2022

## Executive Summary

The Project involves the construction of a new middle school facility. The building will consist of 3 floors and include classrooms, science laboratories, music & art spaces, a media center, a cafeteria with stage, and gymnasium. Unique aspects include a 2 story lobby space.

Massachusetts General Law Chapter 148 Section 26G	Since the building is greater than 7,500 gsf in aggregate area, sprinklers are required to be installed throughout under M.G.L. Ch148 §26G.		
Uses	Primary - Educational, Group E (Section 305.1) Accessory - Assembly, Group A-2/A-3/A-4 (Section 303.1.3)		
Mixed Use Approach	Non-separated Mixed-Use Approach (Sections 508.3 and 303.1.3).		
Construction Classification	Type IIA (1 Hour rated, noncombustible) will be provided.		
Height (Tables 504.3 & 504.4)	Allowed = 85 Feet & 4 Stories Proposed = 42 Feet & 3 Stories (Rooftop structures do not contribute to building height)		
Area (Table 506.2 & Sections 506.2.3 and 506.3)	<u>Area</u>	<u>Single Floor</u>	<u>Aggregate</u>
	Allowed	86,125 gsf	258,375 gsf
	Proposed	81,367 gsf	142,388 gsf
Conclusion	The building is within the limits for Type IIA.		
Type IIA Construction	The structure, floor and roof are required to be 1 hour rated (Table 601). The roof structure over the auditorium and gymnasium are more than 20 feet above the floor below and may be unprotected.		
Exterior Walls	Loadbearing walls are required to be 1 hour rated (Table 601).  Nonloadbearing walls may be non-rated because the fire separation distance is greater than 20 feet (Table 705.5 Footnote g).		
Exterior Openings	Unlimited unprotected openings are permitted because the fire separation distance is greater than 20 feet (Table 705.8).		
Sprinklers	Sprinklers are required throughout (M.G.L. Ch. 148 §26G & Table 903.1).		
Standpipes	Standpipes are not required because the floor level of the highest story is 28 feet above grade (Section 905.3). However, given the limitation on fire department access, standpipes are recommended as mitigation.		
Fire extinguishers	Fire extinguishers are required throughout. General coverage must be provided so the maximum travel distance is 75 feet from the most remote point to an extinguisher (Section 906.1 & NFPA 10). Additionally, specific coverage criterion is required in the kitchen and MEP spaces.		

## Executive Summary (Continued)

Fire Alarm	<p>A voice alarm system is required throughout (Section 907.2.3).</p> <p>Manual fire alarm boxes are not required (907.2.3 Exception 4) except for one manual device at a normally occupied location such as the Main Office.</p> <p>Area smoke detection is not required.</p> <p>Local smoke detection is required for specific fire safety functions including (Section 907.3):</p> <ul style="list-style-type: none"> <li>a) Door release for hold open devices,</li> <li>b) Ducts served by equipment over certain cfm,</li> <li>c) Elevator emergency operation, and</li> <li>d) Certain delayed egress devices, if utilized.</li> </ul>
Emergency Responder Radio Coverage	Emergency Responder Radio Coverage is required throughout (Section 916.1).
CO Detection	<p>CO Detection is required throughout classrooms where:</p> <ul style="list-style-type: none"> <li>1. A fuel burning appliance feature is located within the space (Section 915.1.2),</li> <li>2. The space is served by a fuel burning, forced air furnace (Section 915.1.3), or</li> <li>3. Fuel burning equipment is located outside of the classrooms (Section 915.1.4) and none of the exceptions to 915.1.4 is not satisfied.</li> </ul>
Elevator	<p>A medical emergency elevator is required. The cab must accommodate an ambulance gurney in its horizontal position (24-inches wide by 84-inches long with 5" radius corners) per 3002.4. The elevator must also comply with the criteria of 521 CMR 28.</p> <p>The elevator must be equipped with Phase I and II automatic recall and Fire Department control features (780 CMR 30.00 and 524 CMR). Automatic sprinklers are not required, nor permitted, in the elevator machine rooms, in the elevator pits (except hydraulic), or at the top of elevator hoistways (780 CMR 903.2 Exception 4 and 524 CMR).</p>
Two Way Communication Systems	A two-way communication system is required between each elevator lobby/landing and an approved location (Section 1009.8). Typically, the two way system communications with a station adjacent to the fire alarm control panel.
Occupant Load	<p>Per Section 1004.3, the calculated occupant load on a classroom of 800 to 980 nsf is 40-49 persons using 1/20 nsf. At 1,000 sf, the occupant load is 50 and 2 exits are required from each classroom.</p> <p>The following occupant loads are calculated per 780 CMR and actual are based on an assumed class maximum size of 24 students, 1 Instructor and 1 Aide.</p>
Upper Level	<div>Calculated – 915 persons</div> <div>Actual – 322</div>

## Executive Summary (Continued)

Ground - Classroom Side	Calculated – 800 persons	Actual – 247
Ground – Assembly Side	<p>Typical Everyday      Calculated – 1,000+/- persons      Actual - 50</p> <p>Special Event – Gymnasium – Game Day      300 persons</p> <p>Special Event – Gymnasium – Assembly      1,000 persons (limited by 3 Exits)</p> <p>Special Event – Auditorium – Assembly      420 persons (limited by seats)</p>	
Lower Level	Calculated – 741 persons	Actual – 208
<b>Building Official Approval Required</b>	<p>780 CMR 1004.1.2 Exception allows the use of the actual occupant loads to be used as the design occupant load <u>if approved by the building official</u>. The project team may request approval to use the actual occupant loads as the design occupant load for plumbing fixture count determination and the egress system.</p> <p>Based on experience, approval is frequently granted to use the actual occupant load for plumbing fixture determination. However, approval to use actual loads for egress is less likely. As a result, egress analyses typically use calculated occupant loads and plumbing fixture determinations use the actual. The remainder of this report will proceed on this basis.</p>	
Exit Capacity	<p>Because there are sprinklers and voice alarm, the factors for egress width are 0.2"/person for stairs and 0.15"/person for horizontal elements (doors, aisles, corridors, ramps etc. (Exceptions 1 to both 1005.3.1 &amp; 1005.3.2).</p> <p>Assuming 66" clear width stairs (maximum without a center handrail), each stair can accommodate 330 persons.</p>	
Number of Exits & Capacity - Floors	<p>Upper Level – 3 Exits with 900 person capacity (3 stairways with 60" clear width required).</p> <p>Ground Level – 7 Exits with capacity exceeding 2,500 persons.</p> <p>Lower Level – 3 Exits with capacity of 660 persons (limited by the number of exits). The exit doors are clustered in two locations with inadequate separation distance to be considered more than 2 exits.</p>	
Number of Exits & Capacity Gymnasium & Auditorium	Each have 3 Exits with capacity of 1,000 persons (limited by number of exits).	

## Executive Summary (Continued)

Spaces/Rooms Requiring 2 Exits	<p>The following rooms/spaces are likely to require two exits and doors which swing in the direction of egress travel:</p> <p>Upper Level – Art Classrooms and Engineering</p> <p>Ground Level – ASD, Media Center, Orchestra, Band, &amp; Cafeteria</p> <p>Lower Level – Family &amp; Consumer Science</p>
Corridors	<p>Corridors are required to be a minimum of 72 inches in width (Table 1020.3).</p> <p>Dead ends are limited to 20 feet on the First Floor because the corridors serve both the A and E uses. On the Second and Third Floors, the dead ends are permitted to be 50 feet (1020.5 Exception 2).</p>
Travel Distance	<p>The maximum allowable travel distance is 250 feet (Table 1017.2).</p> <p>Where open exit access stairs are used, the travel distance is measured down the stair to the exterior discharge door.</p>
Open Exit Access Stairways	<p>1019.3 Exception 1 allows two story open exit access stairways without any special protection except that the areas served by the two story stairs cannot be open to other floors via other unprotected floor openings.</p>
Risk Category	<p>For structural design purposes, the building is a Risk Category III (Table 1604.5).</p>
Wind Borne Debris	<p>Per the definition in Chapter 2, the project location is not in a windborne debris region. Wind Borne Debris glazing is not required.</p>
Accessibility	<p>The building must be fully accessible.</p>
Plumbing Fixture Counts	<p>Assuming the building official allows the design occupant load to be used based on actual occupant loads, the following summarizes the occupant loads served by the fixtures currently illustrated in plans.</p>
Grades 6 through 8th	<p>Student fixtures are required as follows:</p> <ol style="list-style-type: none"> <li>1. 1/30 female water closets</li> <li>2. 1/90 male water closets</li> <li>3. 1/90 male urinals (in addition to toilets: not substitutions)</li> <li>4. 1/90 lavatories for each sex</li> <li>5. 1/75 for drinking fountains</li> </ol> <p>25 fixtures for each sex. With female fixtures limiting, the maximum student population served is 1,500.</p>
Staff	<p>Staff fixtures are provided via six gender neutral, single user toilet rooms. This “all” gender neutral approach complies with 248 CMR 10.10.18(r) Item 1) and serves up to 120 staff.</p>
Cafeteria Staff	<p>Separate facilities are required for kitchen staff (248 CMR 10.10(18)(h)5).</p> <p>2 single user toilet rooms are provided.</p>

## Executive Summary (Continued)

Special Events	<p>For special events, fixtures are required as follows:</p> <ol style="list-style-type: none"><li>1. 1/200 female water closets</li><li>2. 1/600 male water closets</li><li>3. 1/200 male urinals (in addition to toilets: not substitutions)</li><li>4. 1/200 lavatories for each sex</li></ol> <p>Assuming the bathrooms by the gymnasium/auditorium are the only ones available, the population served is 1,400 persons.</p>
Gender Neutral	<p>248 CMR has specific criteria for gender neutral toilet facilities.</p> <p>(r) <u>Use of Gender-neutral Toilet Rooms.</u> For purposes of the minimum fixture requirements of 248 CMR, wherever 248 CMR 10.00 requires two or more toilet fixtures designated by gender, those facilities may be replaced with single use Gender-neutral toilet rooms pursuant to one of the following options:</p> <ol style="list-style-type: none"><li>1. Every gender designated toilet fixture is replaced with an equal number of single use gender-neutral toilet rooms (such that there are no gender designated fixtures); or</li><li>2. Where the code requires four or more toilet fixtures combined for males and females, gender designated fixtures may be replaced by single use Gender-neutral toilet rooms in increments of two such that for every male designated fixture replaced by a Gender-neutral toilet room, a female designated fixture must also be replaced by a Gender-neutral toilet room, and vice-versa (<i>e.g.</i> instead of three men's toilets, four female toilets, there may be installed two men's toilets, three female toilets, and two single use Gender-neutral toilet rooms).</li></ol>

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## INTRODUCTION

### BACKGROUND

Symmes Maini & McKee Associates has retained Building, Fire & Access, Inc. to provide building code and accessibility consulting services for the Concord Middle School Project (Project). The building will be located at 835 Old Marlboro Road, Concord, MA 01742. This report serves as the Code Compliance Report for the project and describes the code compliance considerations based on the unique aspects of the project.

### PROJECT DESCRIPTION

The Project involves the construction of a new middle school facility. The building will consist of 3 floors and include classrooms, science laboratories, music & art spaces, a media center, a cafeteria with stage, and gymnasium. Unique aspects include a 2 story lobby space.

### APPLICABLE CODES

The following codes are applicable to this project (this report focuses on 780 and 521 CMR). Massachusetts is currently in the process of updating the applicable codes including the building and energy codes. Depending on the permit application date, the team may need to update the design to reflect code changes.

- **Accessibility**
  - Massachusetts Architectural Access Board (521 CMR).
  - The Americans with Disabilities Act, 2010 ADA Standards for Accessible Design (ADA).
- **Building Code** - Massachusetts State Building Code Ninth Edition (780 CMR). 780 CMR is an amended version of the 2015 International Building Code.
  - **Energy Conservation Code** – 780 CMR Appendix AA. Appendix AA (also known as the Stretch Energy Code) is an amended version of the 2018 International Energy Code (IECC).
  - **Mechanical** - International Mechanical Code, 2015, as adopted by 780 CMR (IMC).
  - **NFPA 13** – 2013 - Standard for the Installation of Sprinklers
  - **NFPA 14** – 2013 - Standard for the Installation of Standpipes
  - **NFPA 72** – 2013 - National Fire Alarm Code
- **Fire Code** - Massachusetts Comprehensive Fire Safety Code (527 CMR). 527 CMR will be an amended version of the 2015 NFPA 1, National Fire Code.
- **Electrical Code** - Massachusetts Electrical Code, 527 CMR 12.00. The Massachusetts Electrical Code is an amended version of the 2020 National Electrical Code (NFPA 70).
- **Plumbing** - Massachusetts Fuel Gas and Plumbing Codes (248 CMR). 248 CMR is unique to Massachusetts.
  - **NFPA 54** – 2012 – National Fuel Gas Code with Amendments
- **Elevator** – Massachusetts Elevator Regulations (524 CMR). 524 CMR is an amended version of the 2013 Edition of ASME A17.1, Safety Code for Elevators and Escalators.

## ASSUMPTIONS AND CONSIDERATIONS

The code review and this report have been prepared based on the following specific assumptions and considerations.

- If any hazardous materials are to be located within the building now or in the future, the amount of such materials will be limited to the exempt amounts/Maximum Allowable Quantities (MAQ's) permitted by 780 CMR.
- The building will be equipped with an automatic sprinkler system, an approved voice fire alarm system and emergency responder radio coverage throughout. These are all required systems by 780 CMR in new construction E Use buildings with more than 100 students.
- The fire department access has been approved by the Concord Fire Department.

## MASSACHUSETTS GENERAL LAW CHAPTER 148 SECTION 26G

Massachusetts General Law Chapter 148 Section 26G (MGL Ch. 148 §26G) is Massachusetts enhanced sprinkler law. This law requires all buildings other than residential and state owned properties, to be equipped with a complete system of automatic fire sprinkler where the building has an aggregate area of 7,500 gsf or more. The Concord Middle School is required to comply with this law (sprinklers are also required per 780 CMR).

## 780 CMR REVIEW

## USE AND OCCUPANCY CLASSIFICATION

780 CMR 305 classifies school uses as Education, Group E. Accessory and incidental uses do not affect the use classification of the building.

The following summarizes the accessory Use Group classifications per 780 CMR 303.1 Exception 4 and 780 CMR 508.2:

- |                          |                                       |
|--------------------------|---------------------------------------|
| • Cafeteria              | Assembly, Group A-2 (780 CMR 303)     |
| • Gymnasium              | Assembly, Group A-3/A-4 (780 CMR 303) |
| • Music & Art Rooms      | Assembly, Group A-3 (780 CMR 303)     |
| • Administrative Offices | Business Group B (780 CMR 304)        |

All other uses within the building will be incidental uses per 780 CMR 508.2.5.

## **ACCESSORY ASSEMBLY TO GROUP E**

780 CMR 303.1.3 identifies that assembly areas which are accessory to Group E are not required to be treated as separate occupancies. Therefore, assembly spaces such as the gymnasium and cafeteria are part of an E Group for construction classification purposes. The respective A group sub-classification is still applied for the space relative to other provisions of the code including interior finish, fire protection, egress, etc.

### GYMNASIUM & CAFETERIA

780 CMR 302.1 requires that spaces, which can be utilized for different uses at different times, satisfy the code for each purpose. The gymnasium and cafeteria are such spaces, and the egress has been considered for daily physical education uses (A-3), athletic events (A-4) and special events (A-3/A-2).

### MIXED-USES

For buildings with multiple uses, a mixed occupancy approach must be followed per 780 CMR 508.3.1. A non-separated mixed use approach is proposed. Again, based on 780 CMR 303.1.3, the E use is used for construction classification purposes and no separations are required between the assembly spaces and the remainder of the building.

### SPECIAL USE – PLATFORM/STAGE

The “stage” located in the auditorium needs to be evaluated further to determine if it is a stage or a platform as defined by 780 CMR. The key consideration is whether there are no overhead hangings including curtains (other than horizontal sliding curtains), drops, scenery or other stage type effects other than sound and light.

**PLATFORM.** *A raised area within a building used for worship, the presentation of music, plays or other entertainment; the head table for special guests; the raised area for lecturers and speakers; boxing and wrestling rings; theater-in-the-round stages; and similar purposes wherein, other than horizontal sliding curtains, there are no overhead hanging curtains, drops, scenery or stage effects other than lighting and sound. A temporary platform is one installed for not more than 30 days.*

**STAGE.** *A space within a building utilized for entertainment or presentations, which includes overhead hanging curtains, drops, scenery or stage effects other than lighting and sound.*

#### Stage

If a stage, the following criteria applies:

1. The stage must be constructed as a 1 hour floor using noncombustible materials.
2. Because the stage is less than 50 feet in height, a proscenium wall & curtain are not required.
3. Because the stage exceeds 1,000 gsf, stage ventilation is required either through roof vents or mechanical smoke control.
4. Standpipes are required to be provided on each side of the stage.
5. Scenery using combustible materials is limited. The materials used must meet NFPA 701 Test Method 1 or Test Method 2 as appropriate.

#### Platform

If a platform, the following criteria applies:

1. The platform must be constructed as a 1 hour floor using noncombustible materials.
2. Standpipes and ventilation are required.

#### Egress from the Stage or Platform

The stage/platform area is 1,875 nsf. Per Table 1004.1 an occupant load factor of 1/15 nsf is used and the calculated occupant load is 125 persons. Two exits are required from the stage/platform and both must be accessible (Section 1009.1 & 521 CMR 20.11).



## HEIGHT, AREA, AND CONSTRUCTION CLASSIFICATION

The construction type of a building is determined by occupancy classification, building height & area, open exterior perimeter, and fire suppression systems (780 CMR 503, 504, 506). Since the Group A uses are accessory to the Group E (780 CMR 303.1.3), they are not considered for determining construction classification.

### **HEIGHT REVIEW**

Type IIA construction permits 85 feet & 4 stories above grade for Education, Group E occupancies. The actual proposed height is 42 feet & 3 stories above grade and within the limits for Type IIA construction.

### **AREA REVIEW**

#### Maximum Single Floor Area

The maximum allowable single floor area is determined by the equation:  $A_a = A_t + (NS \times I_f)$

Where:

$A_a$  = Allowable Area = 86,125 sf

$A_t$  = Tabular allowable area factor (SM) per Table 506.2 = 79,500 sf

NS = Non-sprinklered Tabular Area (NS) per Table 506.2 = 26,500 sf

$I_f$  = Increase for Frontage per 506.3 = 0.25<sup>1</sup>

The actual maximum footprint area is the Ground Level at 81,367 sf and within the limits for Type IIA construction.

#### Maximum Aggregate Building Area

For sprinklered Education Group E buildings with multiple stories, the permitted aggregate area allowed is based on the following equation:

$$A_a = [A_t + (NS \times I_f)] \times S_a$$

Where:

$A_a$  = Allowable Area = 258,375 sf

$A_t$  = Tabular allowable area factor (SM) per Table 506.2 = 79,500 sf

NS = Non-sprinklered Tabular Area (NS) per Table 506.2 = 26,500 sf

$I_f$  = Increase for Frontage per 506.3 = 0.25

$S_a$  = Actual number of building Stories, not to exceed 3.

The actual aggregate area is 142,388 sf and within the limits for Type IIA construction.

#### Type IIA Construction Review

The maximum footprint area proposed is 81,367 gsf and the aggregate area over three floors is 142,388 gsf. Using the maximum allowable area equation, the Type IIA limits are 86,125 gsf per floor and 258,375 gsf aggregate.

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1 Because 50% of the building perimeter fronts on side yards that are 30' or greater in width,  $I_f$  = 25% (0.50-0.25).

## FIRE SEPARATION DISTANCES

The required fire resistance rating of the exterior walls, and opening limitations therein, are determined by the fire separation distance (FSD) measured perpendicularly from the face of the building to the property line or center line of a public street, where the building fronts on a street.

### **EXTERIOR WALL FIRE RESISTANCE RATINGS**

Based on the site plan provided, the exterior walls front on open yards with FSD greater than 20 feet. Given this FSD and Type IIA construction, Table 602 identifies that the exterior nonloadbearing walls are not required to be rated. Loadbearing walls are required to be 1 hour rated for Type IIA construction, but such walls are only required to be rated from the interior (705.5).

### **EXTERIOR WALL UNPROTECTED OPENINGS**

Unprotected openings (e.g., doors, windows, louvers) in exterior walls are also limited based on the fire separation distance. However, because the exterior walls are not required to be rated at fire separation distances greater than 20 feet, unlimited unprotected openings are permitted (705.8.1).

## CONSTRUCTION CLASSIFICATION

The construction classification is permitted to be Type IIA, noncombustible non-rated construction. Fire resistance ratings are noted in Table 1 - Construction Type Criteria.

Construction Type	IIA
Building Element (780 CMR Table 601)	Fire Resistance Rating Required (Hours)
Primary Structural Frame <sup>2</sup>	1
Exterior Bearing Walls (Rated from interior only because FSD > 10 feet)	1
Exterior Nonbearing Walls	0
Interior Nonbearing Walls & Partitions	0
Floor Deck and Secondary Members Supporting Floor Deck Only	1
Roof Deck and Secondary Members Supporting Roof Deck Only	1
Gymnasium and Auditorium Roof Decks and Secondary Structure (Greater than 20 feet between finished floor and underside of structure)	0

*Table 1 - Construction Type Criteria*

- 
- 2 Primary structure includes:
- Columns.
  - Girders, trusses, and spandrels having direct connections to the columns.
  - Members of floor and roof construction having direct connections to the columns.
  - Bracing members essential to the vertical stability of the primary structure under gravity loads.

### ADDITIONAL STRUCTURAL RATING REQUIREMENTS

Regardless of Construction type, elements need to be rated equal to the rating of the fire rated separation being supported (shafts, specific incidental use rooms). In 1 hour rated Type IIA construction, it is pragmatic to put any rooms require not be rated greater than 1 hour on floor slabs on grade to minimize additional ratings on structural bays.

### INCIDENTAL ACCESSORY OCCUPANCIES / OCCUPANCIES SEPERATIONS

The following rooms, spaces, and occupancy separations in a fully sprinklered building containing the uses outlined are required to be enclosed in FRR fire barriers or full height, smoke tight partitions as indicated (780 CMR 509, 707).

Room / Space or Occupancy	Required Enclosure
Rooms containing Emergency Responder Radio Coverage Equipment and/or Riser	2 Hours
Electrical rooms with only dry equipment, where sprinkler protection is omitted in accordance with NFPA 13.	2 Hours
Emergency Power Panels/Equipment served by a generator	2 Hours
Elevator hoistways connecting 3 stories or less (and associated Control/Machine Rooms)	1 Hour
Fire Pump Room	1 Hour
Workshop (If Painting is to Occur)	1 Hour

Table 2 - Enclosure of Rooms and Spaces

### TWO STORY UNPROTECTED VERTICAL OPENINGS

Because the Building is sprinklered, 780 CMR 712.1.9 and 1019.3 Item 1 may be applied. Two story vertical openings do not require shaft enclosure, are not required to be classified as atria, and require no additional protection features. These unprotected vertical openings are separated from other vertical openings to the Lower Level by 1 hour construction.

#### Two Story vertical Opening

There is a vertical opening between the Ground and Upper Levels in the main lobby.

#### Two Story Exit Access Stairway (Stairway 3)

Stairway 3 is a two story open exit access stairway connecting the Ground and Upper Level.

### MEP SHAFTS

MEP shafts must be 1 hour rated for those connecting 3 stories or less.

### DUCTS WITHOUT SHAFTS

For ducts which penetrate a single rated floor assembly (connecting 2 stories), 717.6.1 allows the omission of a shaft enclosure provided a fire damper is installed in line with the rated floor and the annular space around the duct is protected with a through penetration protection system in accordance with Section 714.4.

Stairway 1 will utilize a listed, 1 hour rated, accordion assembly on the Ground Level. This accordion assembly must pass testing criteria as a wall assembly per ASTM E119. All other enclosure elements will be traditional walls and doors. The following figure shows the recommended enclosure approach to allow an unprotected opening. All identified walls a 1 hour rated and doors are 1 hour rated with smoke and draft control complying with UL 1784.



### STAIRWAY 2 ENCLOSURE & EXTERIOR WALLS

Stairway 2 is enclosed in traditional listed 1 hour rated walls and doors. The exterior wall with 10 feet and 180 of the unprotected opening is required to be rated for 1 hour. The following figure shows the recommended enclosure approach to allow an unprotected opening. All identified walls a 1 hour rated and doors are 1 hour rated with smoke and draft control complying with UL 1784.

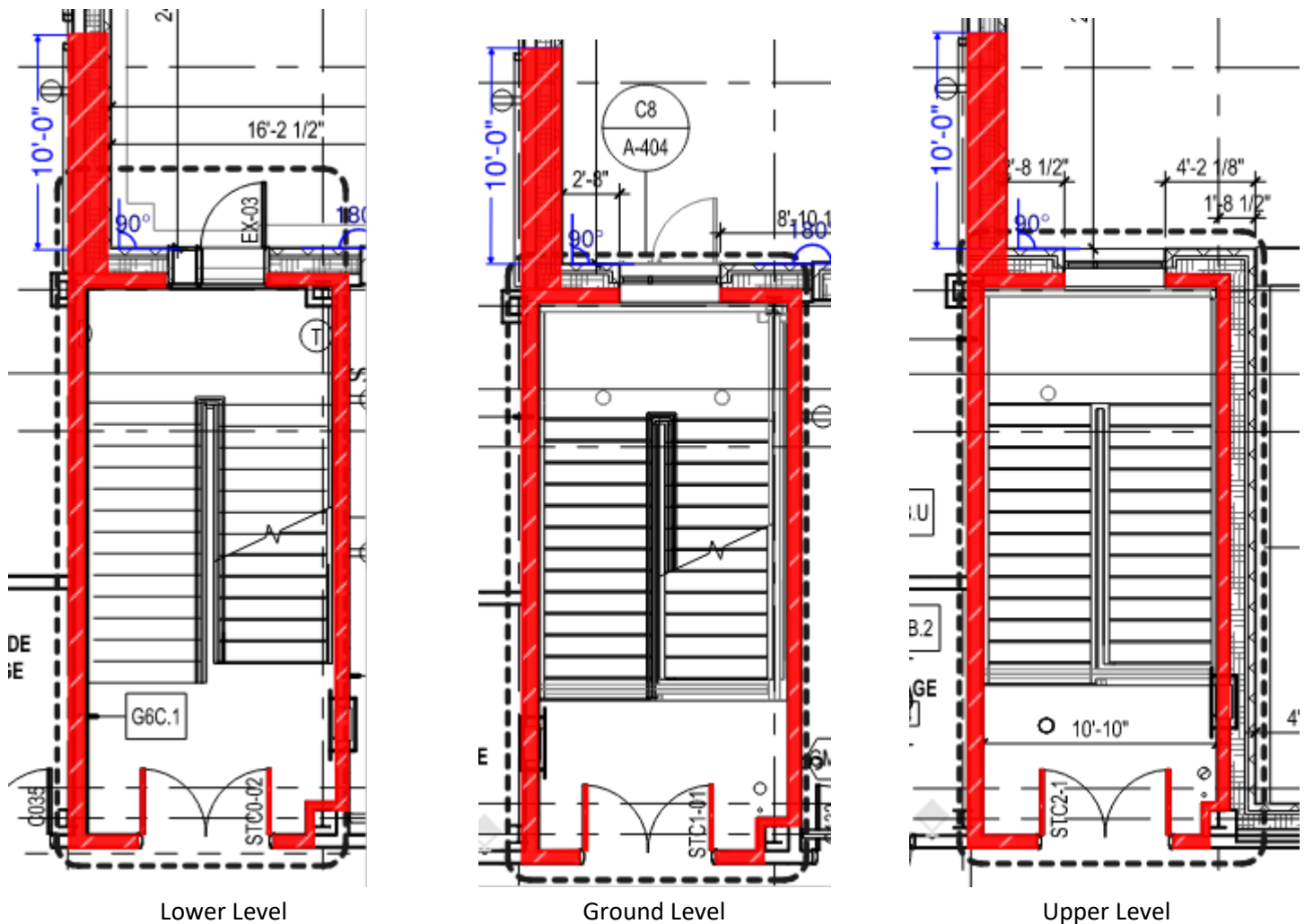


Figure 2 - Stairway 2 Enclosure

## INTERIOR FINISH

Chapter 8 of 780 CMR regulates interior finish and trim of buildings. Interior finish includes all wall, ceiling and floor finishes, wainscoting and paneling or other finish applied structurally or for acoustical treatment, insulation, decoration or similar purposes (780 CMR 801.1). All interior finish materials and trim must be classified in accordance with ASTM E84, by their flame-spread rating as follows:

Interior Finish Classifications		
Classification	Flame Spread	Smoke Development
Class A	0 – 25	0 – 450
Class B	26 – 75	0 – 450
Class C	76 – 200	0 – 450

*Table 3 - Interior Finish Classifications*

Interior finish materials that have a flame-spread rating in excess of 200 or a smoke-developed rating in excess of 450 are not permitted. The interior finishes provided within the project should have flame-spread classifications that do not exceed the following classifications in the locations identified (780 CMR Table 803.11):

Interior Finish Requirements (780 CMR Table 803.9)			
Use Group	Required Vertical Exits and Passageways	Exit Access Corridors and Other Exit ways	Rooms or Enclosed Spaces
E, B	B	C	C
A-2/A-3/A-4	B	B	C
S	C	C	C

*Table 4 - Interior Finish Requirements*

## FIRE PROTECTION SYSTEMS

### **FIRE SUPPRESSION AND STANDPIPES SYSTEMS**

#### Sprinkler Systems

The building is required to be equipped throughout with automatic sprinkler protection in accordance with 780 CMR 903. The sprinkler system must be designed in accordance with NFPA 13.

#### Standpipe Systems

Standpipes are not required because the highest occupied floor is less than 30 feet above the lowest level of fire department access. However, standpipes are required at stages and if identified as mitigation in fire department access approval.

### Water Supply

The sprinkler system must be provided with an automatic water supply of adequate pressure, capacity, and reliability.

### Fire Department Connections

Automatic sprinkler fire department connections must be provided in accordance with 780 CMR 912.0. In accordance with 780 CMR 912.2 and 912.3, the fire department connection locations must be approved by the Fire Department.

### Fire Extinguishers

Portable fire extinguishers are required per 780 CMR and 527 CMR requires extinguishers to be provided at the discretion of the head of the fire department. All fire extinguishers to be provided are to be in accordance with NFPA 10, *Standard for the Installation of Portable Fire Extinguishers* (906.0). The primary criteria affecting the number of extinguishers to be necessary is the 75 foot travel distance limitation from the most remote point to an extinguisher. It is also recommended that 10# extinguishers be used.

## **FIRE DETECTION AND ALARM SYSTEMS**

A fire alarm system must be provided with voice/emergency alarm capabilities per 780 CMR 907.2.3. In addition, devices to detect water flow in sprinkler systems and for elevator recall are required (NFPA 13, 524 CMR and 527 CMR). Carbon monoxide protection is required (915.2.3).

## **EMERGENCY RESPONDER RADIO COVERAGE**

An emergency responder radio coverage system is required in accordance with 780 CMR Section 916. In addition, the Fire Department has their own specific criteria for this type of system. The Fire Department must be contacted for the relative criteria. Two hour enclosures are required for equipment rooms and risers.

## **ELEVATORS**

Elevator service is provided for medical emergency access to each floor with at least one (1) elevator. The cab must be sized to accommodate an ambulance gurney in its horizontal position (24-inches wide by 84-inches long with 5" radius corners) per 3002.4. The elevator must also comply with the criteria of 521 CMR 28.

The elevator must be equipped with Phase I and II automatic recall and Fire Department control features (780 CMR 30.00 and 524 CMR). Automatic sprinklers are not required, nor permitted, in the elevator machine rooms, in the elevator pits (except hydraulic), or at the top of elevator hoistways (780 CMR 903.2 Exception 4 and 524 CMR).

### Two Way Communication System

A two-way communication system is required at the elevator landing on each accessible floor that is one or more stories above the story of exit discharge complying with Sections 1007.8.1 and 1007.8.2 (780 CMR 1007.8).

## **MEANS OF EGRESS**

### **OCCUPANT LOAD**

The occupant loads for the project were determined using 780 CMR 1004.1 and 1004.6. More detailed occupant loads will be calculated when interior plans are developed further. A primary consideration in E occupancies are that the occupant load factors use net area (1/20 net for classrooms and 1/50 net for shops and vocational).



**FLOOR AREA, NET.** *The actual occupied area not including unoccupied accessory areas such as corridors, stairways, ramps, toilet rooms, mechanical rooms and closets.*

780 CMR 1004.1.2 Exception allows the use of the actual occupant loads to be used as the design occupant load if approved by the building official. In my opinion, a request should be made of the building official to approve the use of actual occupant loads based on the following considerations:

- The occupant load factor for classrooms (1/20 nsf) was based on studies of schools done in the late 50's to 60's when classroom sizes were not limited and the square footage allocated to classrooms was much smaller than current standards. Class size restrictions alone frequently prevent more than 25-30 persons per class. Special Education and K/Pre-K class sizes are even lower.
- In schools, there are a number of spaces that are not simultaneously used. For example, music and art classes are made up of students who would otherwise be in the traditional classrooms. The typical daily activities in the cafeteria and gymnasiums are the largest area spaces where the occupant loads are from other classrooms.

The following Tables summarize calculated occupant and expected actual occupant loads.

Space	Area	O.L.F.	O.L.	Actual	Comment Actual Simultaneous
Classroom	12,040 nsf	1/20 nsf	602	308	Simultaneous
Accessory E	2,983 nsf	1/20 nsf	150	-	Non-simultaneous
Science Labs	3,765 nsf	1/50 gsf	76	-	Non-simultaneous
Engineering	1,260 gsf	1/50 gsf	26	-	Non-simultaneous
Art Rooms	2,356 gsf	1/50 gsf	48	-	Non-simultaneous
Teachers Offices	898 gsf	1/100 gsf	9	10	Simultaneous
MEP/Storage	969 gsf	1/300 gsf	4	-	Non-simultaneous
Totals			915	318	

*Table 5 - Calculated Occupant Loads – Upper Level*

Space	Area	O.L.F.	O.L.	Actual	Comment Actual Simultaneous
Classroom	7,740 nsf	1/20 nsf	387	198	Simultaneous
Accessory E	3,020 nsf	1/20 nsf	151	-	Non-simultaneous
Science Labs/Family	5,000 nsf	1/50 gsf	100	-	Non-simultaneous
Teachers Workroom	952 gsf	1/100 gsf	10	10	Simultaneous
MEP	600 gsf	1/300 gsf	2	-	Non-simultaneous
Totals			741	208	

*Table 6 - Calculated Occupant Loads – Lower Level*

Space	Area	O.L.F.	O.L.	Actual	Comment Actual Simultaneous
Classroom	7,740 nsf	1/20 nsf	387	198	Simultaneous
Accessory E	6,200 nsf	1/20 nsf	310	-	Non-simultaneous
Science Labs	3,750 nsf	1/50 gsf	75	-	Non-simultaneous
Teacher's Lounge	1,152 gsf	1/15 nsf	77	30	Non-simultaneous
Media Center	3,300 nsf	1/15 nsf	220	-	Non-simultaneous
Nurse	1,000 gsf	1/100 gsf	10	-	Simultaneous
Cafeteria	4,000 gsf	1/15 nsf	267	-	Non-simultaneous
Kitchen	3,800 gsf	1/200 gsf	19	20	Simultaneous
Band/Orchestra Rooms	3,360 nsf	1/15 nsf	224	-	Non-simultaneous
Offices	4,500 gsf	1/100 gsf	45	45	Simultaneous
P.E. Office	152 gsf	1/100 gsf	2	2	Simultaneous
Gymnasium	4,196 gsf	1/50 gsf	84	-	Non-simultaneous
Bleachers	5,400"	1/18"	300	-	Non-simultaneous
Auditorium	Fixed Seating		420	-	Non-simultaneous
MEP	3,300 gsf	1/300 gsf	11	2	Non-simultaneous
Totals			1,743	297	

Table 7 - Calculated Occupant Loads – Ground Level

Space	O.L.	Comment
Gym/Bleachers	1,000	Limited by Number of Exits

Table 8 - Calculated Occupant Loads – Special Event Scenario #1 – Seating Only in Gym

Space	O.L.	Comment
Auditorium	420	Fixed Seats

Table 9 - Calculated Occupant Loads – Special Event Scenario #2 – Auditorium

All Assembly spaces must be posted with maximum occupant loads (1004.3).

## NUMBER OF EXITS

### Floors

780 CMR 1006.3 - Where the floor occupant load is between 1 to 500 persons, two exits are required. Likewise, between 501-1,000 persons 3 exits are required and 1,001 or more persons requires a minimum of 4 exits.

### Upper Level

The calculated occupant load requires 3 exits. There are 3 exit stairways (2 enclosed and 1 open exit access) serving the Upper Level. The required number of exits is compliant.

### Ground Level

The calculated occupant load requires 4 exits. There are 3 exit doors and 1 enclosed exit stairway (not including Stairway B). The required number of exits is compliant.

### Lower Level

The calculated occupant load requires 4 exits. There are 3 exit doors serving the Lower Level. The number of exits is compliant.

### Special Event Scenario #1

The occupant load (1,000) requires 3 exits. There are 4 exit paths available with capacity of over 1,800+ persons.

### Rooms and Spaces

For each room with an occupant load of 49 or less and with a common path of travel less than 75 feet, a single exit doorway is permitted (780 CMR 1006.2). For rooms with occupant loads of more than 49 but not more than 500 persons, or in which the common path of travel exceeds 75 feet<sup>3</sup>, a minimum of two exits are required.

### Assembly Spaces over 300

Assembly spaces with occupant loads greater than 300 require a main exit capable of accommodating 50% of the required occupant load. The remaining exits are required to accommodate the remaining 50% (1029.3). Where there is more than 1 well defined exit, the main exit can be distributed with building official approval.

Taken individually, the gymnasium and cafetorium have a single set of double doors which satisfies the main exit requirements.

For the combined gymnasium/cafetorium special event, multiple doors are required to satisfy the main exit provision. The main exit directly from the cafeteria to the exterior is a set of double doors which provides capacity for 450 persons. The 2<sup>nd</sup> Main exit from the cafeteria (to the main lobby vestibule and outside is another set of double doors which provides capacity for 450 persons.

### Accessible Means of Egress

At least one (1) accessible means of egress is provided from an accessible room or space. Where more than one (1) means of egress or exit is required from a floor, room or space at least two (2) accessible means of egress must be provided (1009.1). Accessible means of egress must provide a continuous path of travel to a public way (1009.2). All exterior exit doors on the levels of discharge must be accessible or provided with exterior areas of rescue assistance (521 CMR).

### **EXIT WIDTH (CAPACITY)**

The egress width factor for the building is 0.2 inches/occupant for stairs, 0.15 inches/occupant for doors, ramps and corridors (780 CMR 1005.3). The exits provide capacity for both calculated and actual occupant loads.

#### Upper Level

The stairways provide a combined capacity of 900 persons.

#### Ground Level

The 4 exits from the corridor provide a combined capacity for 1,800+ persons.

#### Lower Level

The 3 exits from the corridor provide a combined capacity for 660 persons.

### **TRAVEL DISTANCE**

Exits are located such that the maximum length of exit access travel, measured from the most remote point to an approved exit along the natural and unobstructed line of travel does not exceed 250 feet (1017.2).

### **EXIT ACCESS ARRANGEMENT**

When 2 exits are required from a room or space, the exits must be separated by minimally one-third the maximum diagonal of the space served (1007.1.1 exception 2).

Egress doors serving an occupant load greater than 50 persons are required to swing in the direction of egress travel (1010.1.2).

The length of a dead-end passageway or corridor cannot exceed 20-feet in A occupancies and 50 feet in B & E occupancies (1020.4). Where corridors serve both A and B & E uses, the more restrictive 20 foot dead end is applicable. In all occupancies, a dead-end of up to 2½ x the width of the passageway or corridor is permitted.

### **CORRIDORS**

Corridors are not required to be rated but must be provided with a minimum clear width of 72 inches (1020.2).

### **EXIT STAIRWAYS**

All means of egress stairways must comply with the dimensional criteria established by 780 CMR 1009.0 as follows:

- Minimum 80-inch headroom (1011.3);
- Maximum 12-feet vertical rise between landings (1011.8);
- Riser heights 4" minimum and 7" maximum (1011.5.2);
- No variation more than 3/8-inch in depth between largest and smallest tread in any flight of stairs (1011.5.4).

### Roof Access

780 CMR 1011.12 does not require roof access since the building is less than 4 stories in height. However, if gas or elevator equipment is located on the roof, 248 CMR requires permanent access to the roof and 524 CMR requires a stairway to the roof.

## **EMERGENCY LIGHTING**

The means of egress is equipped with artificial lighting facilities to provide the required intensity of illumination continuously during the time that condition of occupancy of the building requires that the exits be available. Lighting is also provided to illuminate the exit discharge (1008.1). The means of egress lighting in the building, rooms, or spaces required to have more than 1 exit or exit access, is connected to an emergency electrical system that complies with 527 CMR 12.00, the Massachusetts Electrical Code (1008.1) to assure continued illumination for a duration of not less than 90 minutes in case of emergency or primary power loss (1008.3).

### RISK CATEGORY DETERMINATION

For structural design purposes, the building is a Risk Category III per Table 1604.5 because it is an educational Group E occupancy with an occupant load greater than 250 persons.

### WINDBORNE DEBRIS DETERMINATION

From 2015 Edition of the International Building Code, Chapter 2, Definitions (not amended by MA):

**WIND-BORNE DEBRIS REGION.** *Areas within hurricane-prone regions located:*

- 1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed,  $V_{ult}$ , is 130 mph (58 m/s) or greater; or*
- 2. In areas where the ultimate design wind speed is 140 mph (63.6 m/s) or greater; or Hawaii.*

*For Risk Category II buildings and structures and Risk Category III buildings and structures, except health care facilities, the wind-borne debris region shall be based on Figure 1609.3.(1). For Risk Category IV buildings and structures and Risk Category III health care facilities, the wind-borne debris region shall be based on Figure 1609.3(2).*

The International Code Council's commentary to this definition provides additional clarification on intent:

*This definition identifies those areas that require consideration of the impact of wind-borne debris on the building envelope (see the commentary to Sections 1609.1 and 1609.1.2 for information on the effects of openings in the building envelope). Note that Section 1609.3 makes Figure 1609.3.1(2) applicable to both Risk Category III and IV structures for obtaining the ultimate design wind speed. However, this definition of wind-borne debris regions provides somewhat of an exception by allowing Figure 1609.3.1(1) to be used for establishing the wind-borne debris regions that are applicable to Risk Category III structures, other than health care facilities. This results in wind-borne debris regions applicable to Risk Category III (other than health care facilities) that are consistent with the areas that were defined in the prior editions of the code. At the same time, it should be noted that the wind-borne debris region established by Figure 1609.3.1(2) for Risk Category IV, as well as health care facilities that are Risk Category III, is an expansion of the wind-borne debris region defined in prior editions of the code.*

Based on this criterion, the project site in Concord is more than a mile from the coast so Item 1 is not applicable. For Item 2 to be applicable, the  $V_{ult}$  per Figure 1609.3(1) would have to identify as 140 mph or more. Concord is north of the 140 mph delineation. Therefore, item 2 criterion is not satisfied.

Because the project site does not satisfy the criteria of Items 1 or 2 to the definition of WIND-BORNE DEBRIS, the school is not considered to be in a wind borne debris region under 780 CMR and does not require windborne debris glazing.

## 521 CMR REVIEW

Both State (521 CMR) and Federal (ADASAD) criteria apply to schools. Where both address the same element or feature, the more restrictive criteria apply. The following summarizes key accessibility considerations.

### ADASAD - SCOPING

All areas of newly designed and newly constructed buildings and facilities must comply with ADASAD requirements (ADASAD 201.1).

## 521 CMR CHAPTER 12 – EDUCATION FACILITIES

Educational facilities must comply with 521 CMR, except as specified or modified in 521 CMR 12.00. All administrative spaces, instructional spaces, and areas open to students or the public must comply with 521 CMR. Lecture halls and classrooms of educational facilities must also comply with Chapter 14.00, Places of Assembly.

### **LIBRARIES**

All areas of libraries including reading and study areas, stacks, reference rooms, reserve areas and special collections/facilities must comply with 521 CMR 12.

- 5% of tables, study carrels, computer workstations or fixed seating must be accessible (not less than one of each type provided).
- 36" clear aisles are required between tables and workstations. Seating areas cannot overlap with the aisle.
- 30"x48" Clear space is required at each seating space required. No more than 19" of knee space may be used.
- Tables and counters must be between 28 and 34 inches AFF.

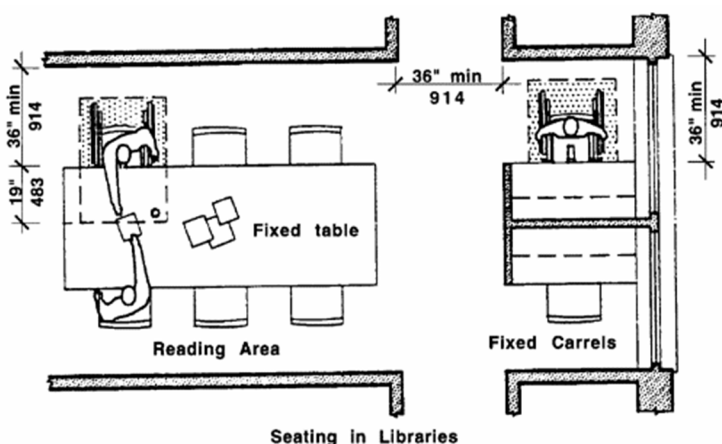


Figure 3 - 521 CMR Figure 12a

- At least one check out area must have a 36" long counter not more than 36" AFF
- Any security gates, turnstiles or similar devices must be accessible and allow the passage of persons in wheelchairs.
- Card catalogs (if provided) must have 36" clear aisles with maximum height reaches between 18" and 48" AFF.

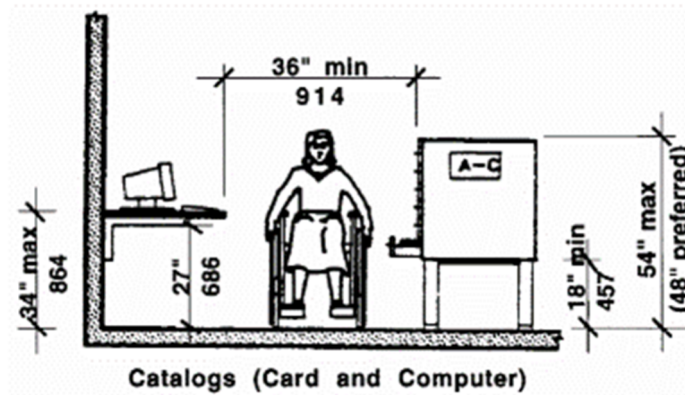


Figure 4 - 521 CMR Figure 12b

- Stacks must have minimum 36" clear aisles (42" clear preferred)

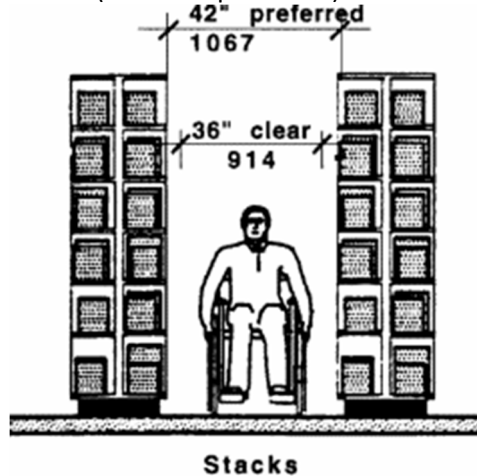


Figure 5 - 521 CMR 12c

### KITCHENS IN CLASSROOMS

If provided, kitchens in classrooms must comply with the requirements of 521 CMR 28.00: Kitchens.

- 30"x48" Clear space is required at each seating space required. No more than 19" of knee space may be used.
- Tables and counters must be between 28 and 34 inches AFF.
- At least 50% of storage must be within the accessible reach ranges (18" to 48" AFF).
- Controls must meet 39.0 and be within reach ranges.

### SINKS, COUNTERS, AND OTHER WORK AREAS IN CLASSROOMS OR LABORATORIES

At least 5%, with a minimum of one of each type of element, in each classroom or laboratory must comply with 12.4.

Countertops



## **RECREATIONAL FACILITIES**

All recreational facilities must comply with the requirements of 521 CMR 19.00. Facilities covered by 521 CMR 19 are not provided at the school except for play areas. ADASAD has more specific criteria for Play Areas.

### **ADASAD PLAY AREAS**

Play areas for children ages 2 and over shall comply with ADASAD 240. Where separate play areas are provided within a site for specific age groups, each play area shall comply with ADASAD 240.

#### **Ground Level Play Components**

Ground level play components shall be provided in the number and types required by 240.2.1. Ground level play components that are provided to comply with 240.2.1.1 shall be permitted to satisfy the additional number required by 240.2.1.2 if the minimum required types of play components are satisfied. Where two or more required ground level play components are provided, they shall be dispersed throughout the play area and integrated with other play components.

Where ground level play components are provided, at least one of each type shall be on an accessible route and shall comply with 1008.4.

Where elevated play components are provided, ground level play components shall be provided in accordance with Table 240.2.1.2 (see next page) and shall comply with 1008.4.

EXCEPTION: If at least 50 percent of the elevated play components are connected by a ramp and at least 3 of the elevated play components connected by the ramp are different types of play components, the play area shall not be required to comply with 240.2.1.2.

#### **Elevated Play Components**

Where elevated play components are provided, at least 50 percent shall be on an accessible route and shall comply with 1008.4.

#### **1008.4 Play Components**

Ground level play components on accessible routes and elevated play components connected by ramps shall comply with 1008.4.

**1008.4.1 Turning Space.** At least one turning space complying with 304 shall be provided on the same level as play components. Where swings are provided, the turning space shall be located immediately adjacent to the swing.

Number of Elevated Play Components Provided	Minimum Number of Ground Level Play Components Required to be on an Accessible Route	Minimum Number of Different Types of Ground Level Play Components Required to be on an Accessible Route
1	Not applicable	Not applicable
2 to 4	1	1
5 to 7	2	2
8 to 10	3	3
11 to 13	4	3
14 to 16	5	3
17 to 19	6	3
20 to 22	7	4
23 to 25	8	4
26 and over	8, plus 1 for each additional 3, or fraction thereof, over 25	5

Table 10 - Table 240.2.1.2 Number and Types of Ground Level Play

**1008.4.2 Clear Floor or Ground Space.** Clear floor or ground space complying with 305.2 and 305.3 shall be provided at play components.

*Clear floor or ground spaces, turning spaces, and accessible routes are permitted to overlap within play areas. A specific location has not been designated for the clear floor or ground spaces or turning spaces, except swings, because each play component may require that the spaces be placed in a unique location. Where play components include a seat or entry point, designs that provide for an unobstructed transfer from a wheelchair or other mobility device are recommended. This will enhance the ability of children with disabilities to independently use the play component.*

*When designing play components with manipulative or interactive features, consider appropriate reach ranges for children seated in wheelchairs. The following table provides guidance on reach ranges for children seated in wheelchairs. These dimensions apply to either forward or side reaches. The reach ranges are appropriate for use with those play components that children seated in wheelchairs may access and reach. Where transfer systems provide access to elevated play components, the reach ranges are not appropriate.*

Children's Reach Ranges			
Forward or Side Reach	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
High (maximum)	36 in (915 mm)	40 in (1015 mm)	44 in (1120 mm)
Low (minimum)	20 in (510 mm)	18 in (455 mm)	16 in (405 mm)

Table 11 - Children's Reach Ranges

**1008.4.3 Play Tables.** Where play tables are provided, knee clearance 24 inches (610 mm) high minimum, 17 inches deep (430 mm) minimum, and 30 inches (760 mm) wide minimum shall be provided. The tops of rims, curbs, or other obstructions shall be 31 inches (785 mm) high maximum.

**EXCEPTION:** Play tables designed and constructed primarily for children 5 years and younger shall not be required to provide knee clearance where the clear floor or ground space required by 1008.4.2 is arranged for a parallel approach.

**1008.4.4 Entry Points and Seats.** Where play components require transfer to entry points or seats, the entry points or seats shall be 11 inches (280 mm) minimum and 24 inches (610 mm) maximum from the clear floor or ground space.

**EXCEPTION:** Entry points of slides shall not be required to comply with 1008.4.4.

**1008.4.5 Transfer Supports.** Where play components require transfer to entry points or seats, at least one means of support for transferring shall be provided.

## SPACE ALLOWANCES

### **WHEELCHAIR CLEAR FLOOR SPACE**

All wheelchair clear floor spaces must be a minimum of 30 inches x 48 inches with a cross slope of not more than 1:48.

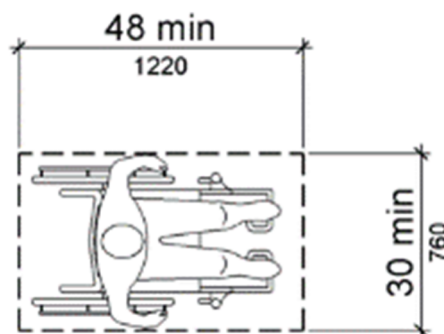


Figure 6 - Wheelchair Clear Floor Space

### WHEELCHAIR PASSAGE WIDTH

Width for a single wheelchair must be a minimum of 36" clear. A reduction to 32" clear is permitted provided the lineal distance of the reduction is not more than 24" (i.e. a 24" doorway).

### WHEELCHAIR PASSING WIDTH

Width for two wheelchairs to pass is 60".

### WHEELCHAIR TURNING SPACE

Circular - A 180 degree turning space with a 60" diameter is required for turning space (ADASAD 304.3.1, 521 CMR 6.3).

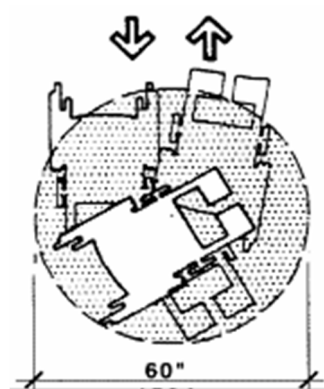


Figure 7 - Circular Turning Space

T Shaped - A "T" shaped turning space is also permitted (ADASAD 304.3.2, 521 CMR 6.3).

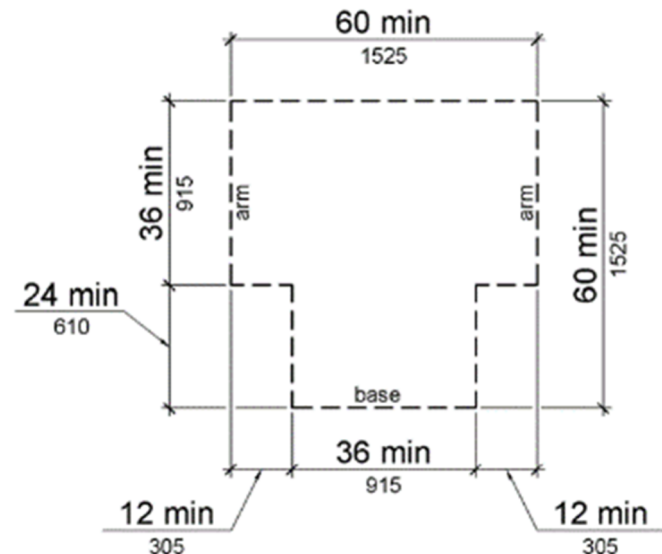
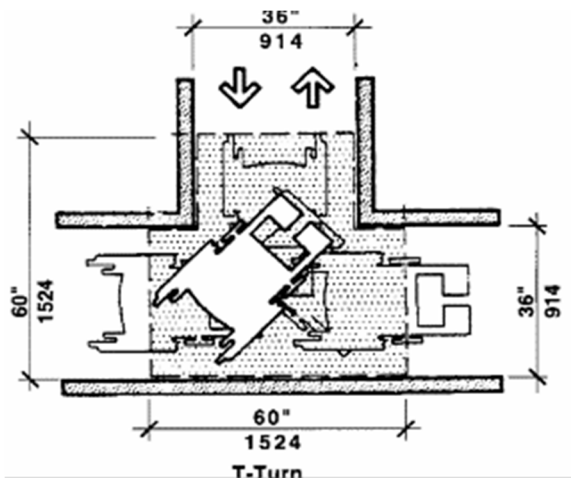


Figure 8 - T Shaped Turning Space

## **REACH RANGES**

The ADA Standards for Accessible Design (ADASAD) are more restrictive than the current 521 CMR. The next 521 CMR is expected to mirror the ADASAD.

### **FORWARD REACH**

If the clear floor space only allows forward approach to an object without an obstruction, the maximum high forward reach allowed shall be 48 inches and the low reach shall be a minimum of 15 inches above the floor.

- If the high forward reach is over an obstruction no more than 20 inches in depth but which has knee space clearance, the maximum high forward reach allowed shall be 48 inches.
- If the high forward reach is over an obstruction between 20 and 25 inches in depth but which has knee space clearance, the maximum high forward reach allowed shall be 44 inches.
- If the obstruction is more than 25" in depth or does not have kneespace controls and devices should not be installed in that location.

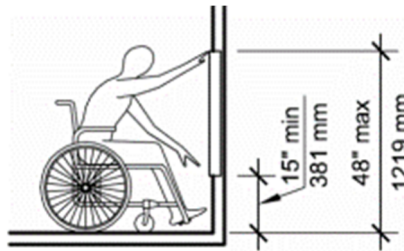


Figure 9 - Forward Reach Limits

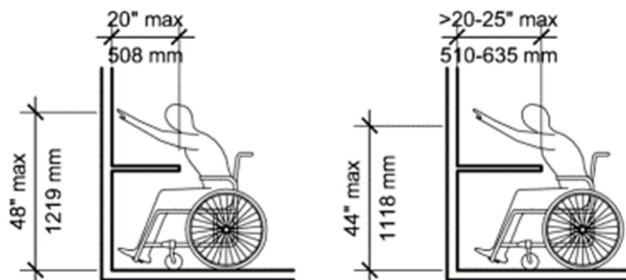


Figure 10 - Maximum Forward Reach Limit over an Obstruction

### **SIDE REACH**

If the clear floor space allows parallel approach to an object without obstruction, the maximum high side reach allowed shall be 48 inches and the low reach shall be a minimum of 15 inches above the floor.

- If the clear floor space allows parallel approach to an object with an obstruction no more than 10 inches in depth and no more than 34 inches above the floor, the maximum high side reach allowed shall be 48 inches and the low reach shall be a minimum of 15 inches above the floor.
- If the clear floor space allows parallel approach to an object with an obstruction between 10 and 24 inches in depth and no more than 34 inches above the floor, the maximum high side reach allowed shall be 46 inches.

- If the obstruction is more than 24" in depth, controls and devices should not be installed in that location.

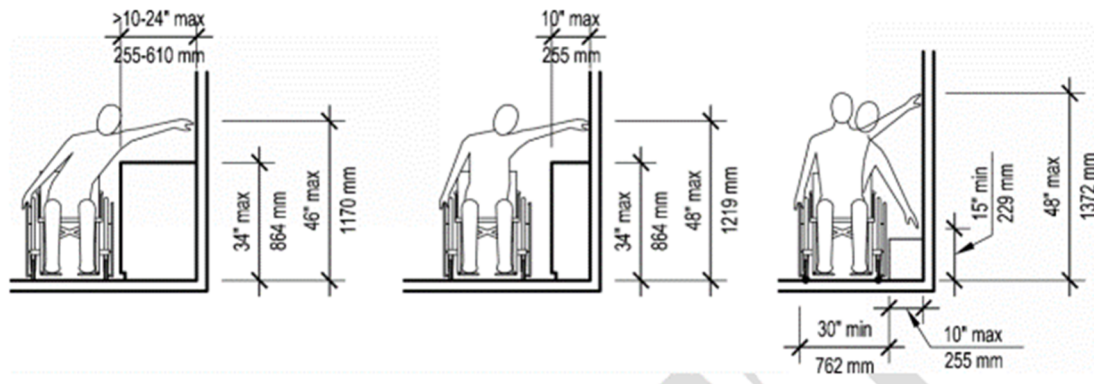


Figure 11 - High and Low Side Reach & Maximum Reach over an Obstruction

## **ACCESSIBLE ROUTES**

### **GENERAL**

It is required that at least one accessible route connect accessible buildings, accessible facilities, accessible elements, and accessible spaces that are on the same site.

### **PROTRUDING OBJECTS**

Objects with leading edges more than 27 inches and not more than 80 inches above the finish floor or ground can protrude 4 inches maximum horizontally into the circulation path. While ADASAD has an exception for handrails up to 4½ inches but 521 CMR does not.

### **HEADROOM**

Walks, halls, corridors, passageways, aisles, or other circulation spaces must have a minimum of 80 inches clear headroom. If vertical clearance of an area adjoining an accessible route is reduced to less than 80 inches, a barrier must be provided to warn blind or visually impaired persons of the reduced headroom.

### **SLOPE AND CROSS SLOPE**

The slope of accessible routes cannot exceed 1:20 (anything steeper must meet ramp criteria). The cross slope may not exceed 1:20 (50%).

### **AREAS OF RESCUE ASSISTANCE**

As previously noted in the accessible egress section of this report, areas of rescue assistance/areas of refuge are not required in the building (780 CMR 1009.3 Exceptions 2 & 5 and 521 CMR 8.12 Exception 1).

### **EXIT DISCHARGE**

The exit discharge shall provide a continuous path of travel from an exit to a public way by means of a walkway or a ramp.

- a. Where public ways are further than 100 feet from an exit, exterior areas of rescue assistance complying with

20.12.2 may be constructed along the exit discharge located no closer than 100 feet from the building.

- b. In buildings where the grade at the level of exit discharge prohibits construction of either a walkway or a ramp, a portion of an exterior exit balcony located immediately adjacent to an emergency exit complying with 521 CMR 20.12.2 may be constructed as an area of rescue assistance.

### **SITE ARRIVAL POINTS**

Accessible routes within the site must be provided from public transportation stops, accessible parking and accessible passenger loading zones, and public streets or sidewalks (site arrival points) to the accessible building entrance served.

### **CAFETERIA**

An accessible route must connect all dining areas (there are no raised or sunken areas and no outdoor seating areas (ADASAD 206.2.5).

### **PERFORMANCE AREAS**

Where a circulation path directly connects a performance area to an assembly seating area, an accessible route shall directly connect the assembly seating area with the performance area. An accessible route shall be provided from performance areas to ancillary areas or facilities used by performers. This applies to the platform and the

### **EMPLOYEE WORK AREAS**

Common use circulation paths within employee work areas must be accessible (ADASAD 206.2.8).

### **COURTS**

Courts for sports activities must be provided with an accessible route throughout the court area (ADASAD 206.2.12).

### **PLAY AREAS**

Play areas must be provided with accessible routes (see Play Areas ADASAD section of this report).

## **CURB CUTS**

### **GENERAL**

Whenever sidewalks, walkways, or curbs on streets and ways are constructed, reconstructed, or repaired, curb cuts are required.

### **LOCATION**

Curb cuts must occur wherever an accessible route crosses a curb and at the following locations:

- Curb cuts are required at each corner of each intersection, located within the crosswalk and/or the pedestrian path of travel. Curb cuts must be perpendicular to the curb at street crossings and each must have a level landing at the top. At marked crossings, the bottom of the ramp run, exclusive of flared sides, must be wholly contained within the marked crossing. The crosswalk/pedestrian path of travel must also be perpendicular to the curb.
- Curb cuts are required at driveways intersecting sidewalks when the driveway has side curbs.



- Any raised islands in crossings must be cut through level with the street or have curb cuts at both sides and a level area at least 48 inches long between the curb cuts in the part of the island intersected by the crossings.
- Curb cuts shall be located or protected to prevent their obstruction by parked vehicles.

Additional criteria for curb cuts are located in Section 21.2 through 21.9 of 521 CMR.

### STREET CROSSINGS

Where provided, pedestrian street crossings at, above, or below grade shall comply with the following:

- Crossing controls shall be raised from or flush with their housings and shall be a minimum of two inches in the smallest dimension. The force required to activate controls shall be no greater than 5 lbs.
- Controls shall be located as close as practicable to the curb cut serving the controlled crossing and shall permit operation from a clear ground space.

### DETECTABLE WARNINGS

Reserved in 521 CMR. ADSAD has several criteria but technically only requires them at public transportation platform edges. However, if detectable warnings are provided voluntarily or at the request of the district, they need to comply with the ADSAD criteria. Detectable warnings consist of a surface of truncated domes and comply with the following:

- Dome Size** - Truncated domes in a detectable warning surface must have a base diameter of 0.9 inch minimum and 1.4 inches maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inch.
- Dome Spacing** - Truncated domes in a detectable warning surface must have a center-to-center spacing of 1.6 inches minimum and 2.4 inches maximum, and a base-to-base spacing of 0.65 inch minimum, measured between the most adjacent domes on a square grid.
- Contrast** - Detectable warning surfaces must contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light.

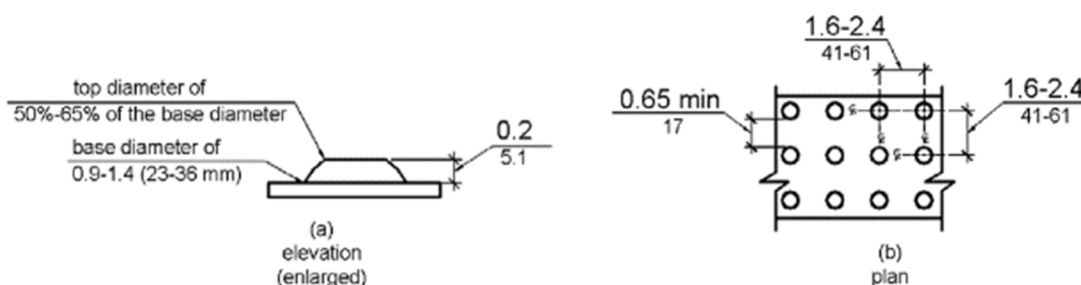


Figure 12 - Detectable Warnings

## WALKWAYS

Walkways include but not be limited to all walks, sidewalks, overpasses, bridges, tunnels, underpasses, plazas, courts and other pedestrian pathways, and shall comply with the following requirements:

- Width of walkways must be not less than 48 inches excluding curb stones. An unobstructed path of travel must be provided which is at least 36 inches clear excluding curb stones.
- Walkways with a running slope greater than 1:20 (5%) are ramps and must comply with ramp criteria.
- The cross slope of walkways cannot exceed 1:50 (2%). Sidewalks on public streets and public ways are considered walkways but if the slope of the natural topography exceeds 1:20 (5%) a ramp is not required.
- Nowhere shall the surface slope of any plaza area exceed 1:50 (2%).
- Walkway surfaces must be stable, and firm and shall lie generally in a continuous plane with a minimum of surface warping.
- Grading and drainage must be designed to minimize pooling of water or accumulation of ice or flow of water across walkways.
- Gratings must comply with the criteria identified in Floor Surfaces.
- Wherever a walkway crosses or joins streets, public ways, driveways or parking lots, the intersection must blend to a common level with a slope no greater than 1:20 (5%) or a curb cut must be installed.

## PARKING AND PASSENGER LOADING ZONES

### **GENERAL**

Any person who has lawful control of improved or enclosed private property used as off-street parking for general public use where the public has the right of access as invitees or licensees, must make the parking areas (including temporary parking areas) to be accessible.

### **NUMBER**

Accessible parking must be provided as follows (ADASAD is more restrictive for 0-15).

<u>Total Parking in Lot Required</u>	<u>Minimum Number of Accessible Spaces</u>
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6

201-300	7
301-400	8
401-500	9
501-1,000	2% of total
1,001 and over	20 plus 1 for each 100 over 1000

### **VAN ACCESSIBLE PARKING SPACES**

For every 6 or fraction thereof, at least one must be a van parking space (ADASAD 208.2.4) that meets the following:

- Provide minimum vertical clearance of 8'2" at the parking space and along at least one vehicle access route to such spaces from site entrance(s) and exit(s).
- Each space must be a minimum of 8' in width and have an access aisle of 8' in width (192" total).
- Each space shall have a sign designating it "Van Accessible" and having the universal symbol of accessibility.

### **OTHER ACCESSIBLE PARKING SPACES**

Accessible parking spaces must comply with the following:

- 8' in width with a 5' wide access aisle
- Be level with surface slopes not exceeding 1:50 (2%) in all directions
- Uniform and smooth surfaces are required.
- Spaces must be delineated with high contrasting painted lines or similar delineation.
- Each access aisle must connect with an accessible route to building entrances.
- Two accessible parking spaces may share an access aisle.
- Spaces must be identified with signs indicating they are reserved.
  - The universal symbol of accessibility must be included.
  - The height of the sign must be located between 5' and 8' above the surface (measured to the top of the sign).

### **LOCATION**

Accessible parking spaces shall be located as follows:

- Accessible parking spaces serving a building or facility must be located on the shortest accessible route of travel from adjacent parking to an accessible entrance.
- In buildings with multiple accessible entrances with adjacent parking, accessible parking spaces must be dispersed and located closest to the accessible entrances, but in no case, more than three spaces from the

accessible entrance.

- Where accessible spaces cannot be located within 200 feet of an accessible entrance, an accessible passenger drop-off area must be provided within 100 feet of an accessible entrance.

### **PASSENGER LOADING ZONES**

If provided, passenger loading zones must meet the following:

- Passenger loading zones must provide an access aisle at least 60" wide and 20' long, adjacent, and parallel to the vehicle pull-up space.
- If there are curbs between the access aisle and the vehicle pull-up space, then a curb must be provided.
- Vehicle standing spaces and access aisles must be level with surface slopes not exceeding 1:50 (2%) in all directions.
- A minimum of 9'6" of vertical clearance must be provided at accessible passenger loading zones and along at least one vehicle access route to such areas from site entrance(s) and exit(s).

### **RAMPS**

Any part of an accessible route with a slope greater than 1:20 (5%) is considered a ramp and must comply with the following:

- Ramps must have the least possible slope. The maximum slope of a ramp can be 1:12 (8.3%). There is no tolerance allowed on slope.
- The maximum rise for any run is 30".
- The minimum clear width of a ramp must be 48" measured between the railings.
- Cross slopes must not be more than 1:50 (2%).
- At a minimum, landings must be provided at the bottom and the top of each ramp and each ramp run, and whenever a ramp changes direction. The maximum length of a ramp run between landings cannot exceed 30'.
- Landings must be a minimum of 5' in any dimension where there are turns.
- Handrails must be provided in pairs on each side of the ramp. One handrail between 34" and 38" and a second between 18" and 20" above the surface of the ramp.
- Handrails must be provided with 12" extensions at the top and bottom of the ramp and continuous in between.

- When a handrail is mounted adjacent to a wall, the clear space between the handrail and the wall must be 1½ inches.
- A minimum of a 2" high edge protection is required along both sides of the ramp.
- Circular ramps are not permitted except with approval of the Board through the variance process.

## **ENTRANCES**

All public entrances are required to be accessible (521 CMR 25.1). The approach to the entrance must be a paced walk 3 with a slip resistant surface. Level surfaces are required on each side of the entrance doors.

## **DOORS AND DOORWAYS**

All doorways and openings required to be accessible have a clear opening of not less than 32 inches. A minimum clear floor area/maneuvering clearance must be provided on both sides of all non-automatic doors and gates. These dimensions vary depending on the approach to a given door.

### **DOORS IN SERIES/VESTIBULES**

The minimum space between two hinged or pivoted doors in series must be 48 inches, plus the width of any door swinging into the space. Doors in series must swing either in the same direction or away from the space between the doors.

## **STAIRS**

Stairways must have continuous handrails on both sides of all stairs. Where handrails terminate at the top and bottom of a stair run, they must have extensions. Ends of handrails are either rounded or returned smoothly to the floor, wall, or post. Extensions on handrails that are not attached to walls must be returned smoothly to the floor or a post. Extensions are not required where such extensions would cause a hazardous condition.

## **ELEVATORS**

At least one accessible route must connect each story and mezzanine. An elevator is provided for this purpose.

## **FLOOR SURFACES**

### **GENERAL**

Ground and floor surfaces including floors, walks, ramps, and curb cuts must be stable, firm, slip resistant, and maintained with materials that ensure continued slip resistance.

### **LEVEL CHANGES**

Ground and floor surfaces must be of a common level throughout, except for the following permitted changes in level.

- Changes in level up to and including  $\frac{1}{4}$  inch may be vertical and without edge treatment.
- Changes in level greater than  $\frac{1}{4}$  inch and less than  $\frac{1}{2}$  must be beveled with a slope no greater than one-in-two (1:2) (50%).
- Changes in level greater than  $\frac{1}{2}$  inch are not allowed unless a ramp, walkway, or an accessible means of vertical access is provided.

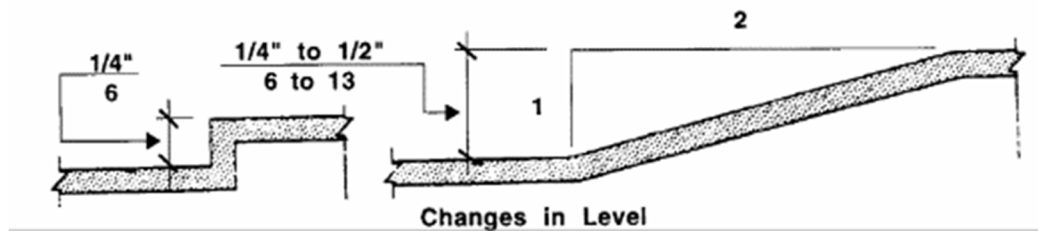


Figure 13 - 521 CMR Figure 29a

### CARPET

When carpet or carpet tile is used on a ground or floor surface, it must comply with the following:

- **Material:** Carpet material shall be high density, non-absorbent, and the maximum pile thickness must be  $\frac{1}{2}$  inch.

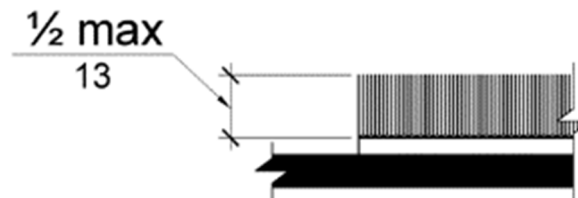


Figure 14 - Carpet Pile Height

- **Installation:** Carpet must be adhered directly to the floor or must be stretched tautly and securely fastened to floor surfaces at all edges.
- **Exposed edges:** Edges of carpet exposed to traffic must have trim along the entire length of the exposed edge. Edges perpendicular to the path of travel must have edging strips no higher than of an inch above the floor and must have a beveled edge with a slope no greater than one-in-two (1:2) (50%).
- **Padding:** If padding is installed, it must not exceed  $\frac{1}{4}$  of an inch in thickness and must be secured taut to the floor.

### MATS AND GRATES

Door mats  $\frac{1}{2}$  inch thick or less must be securely anchored at all edges to avoid tripping. Door mats between  $\frac{1}{4}$  inch and  $\frac{1}{2}$  inch thick must be secured with beveled edging that slopes no more than 1:2 (50%). Door mats thicker than  $\frac{1}{2}$  inch must be recessed. Grates must have openings not exceeding  $\frac{1}{2}$  inch in the path of travel.

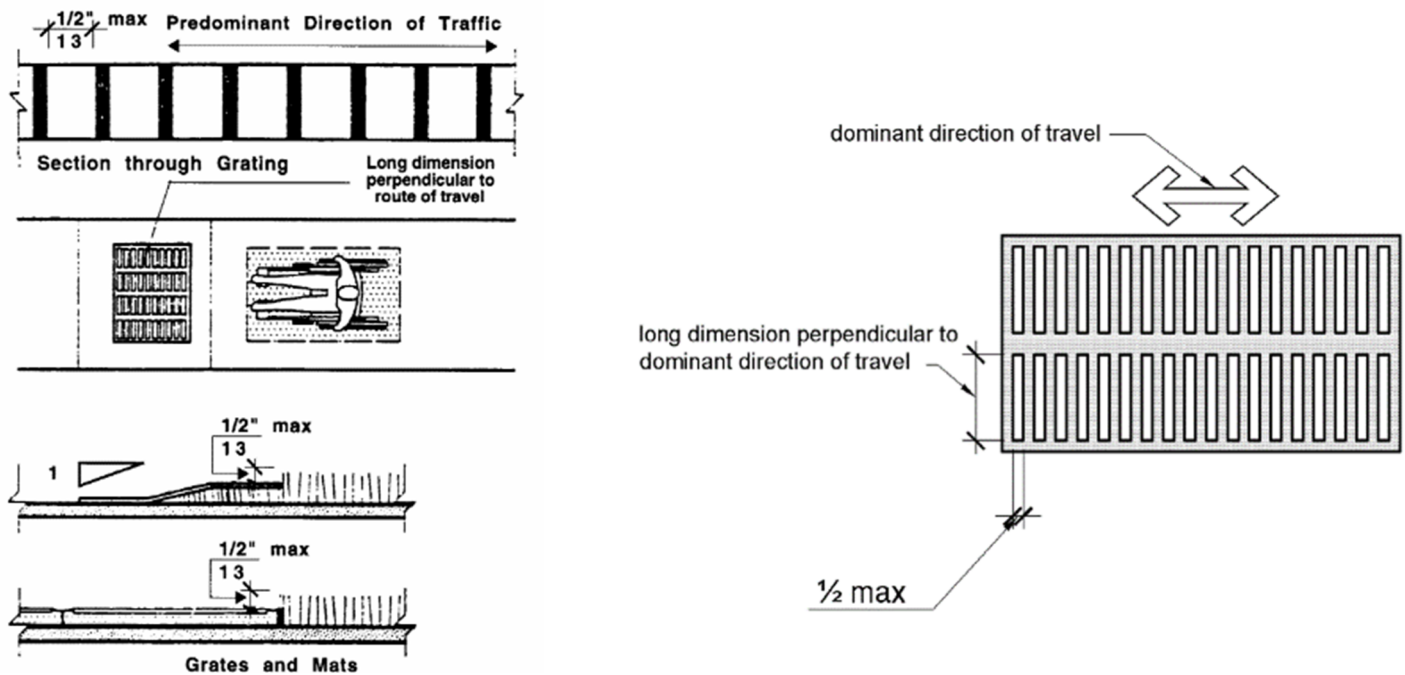


Figure 15 - 521 CMR Figures 25c & 29b

## PUBLIC TOILET ROOMS

All public toilet rooms must be accessible. Within the public restrooms, the clear spaces required for the accessible route, the turning space(s) and the fixture(s) is permitted to overlap. Where multiple single user toilet rooms are provided, all must be made accessible except where multiple single user toilet rooms are grouped together and accessed from a common door. Where multiple single user toilet rooms are accessed from a shared door, this arrangement functions as a public toilet room and only one single user toilet room is required to be accessible. This is consistent with the number of toilet stalls that would be required to be made accessible in a conventional public toilet room.

## DRINKING FOUNTAINS

Drinking fountains include water coolers. Drinking fountains, when provided, must comply with the following requirements.

1. All drinking fountains shall be accessible and on an accessible route.
2. Either two drinking fountains shall be provided (one hi and one low) or a single combined hi/lo fixture shall be provided.



## **OPERABLE PARTS**

Operable parts on accessible elements, accessible routes, and in accessible rooms and spaces shall comply with the following:

- All controls and operating mechanism must be within the reach ranges previously identified.
- Clear floor space either parallel or front approach must be provided.
- All controls must be located at least 18" from an inside corner.
- All controls must be operable with one hand and not require tight grasping, pinching or twisting of the wrist.
- Operating force cannot exceed 5 lbs.

## **TRANSACTION COUNTERS**

Where counters have cash registers and are provided for sales or distribution of goods or services to the public, at least one of each type shall comply with the following.

- a) Location: The counter shall be on an accessible route
- b) Length: A portion of the counter shall be at least 36 inches in length and be located closest or nearest the cash register.
- c) Height: That portion of the counter shall not exceed 36 inches above the finish floor.

## **ALARMS**

If emergency warning systems must include both audible alarms and visual alarms.

Audible emergency alarms must produce a sound that exceeds the prevailing equivalent sound level in the room or space by at least 15 dbA or exceeds any maximum sound level with a duration of 60 seconds by 5 dbA, whichever is louder. If an audible alarm in an adjacent space provides the proper decibel level within a room, then only the visual alarm is needed. Sound levels for alarm signals shall not exceed 120 dbA.

Visual signal appliances must be provided in each of the following areas: restrooms, meeting rooms, hallways, lobbies, classrooms, and any general usage areas open to the public. Visual alarm signal appliances shall be integrated into the building or facility alarm system. If single station audible alarms are provided, then single station visual alarm signals must be provided.

Visual alarm signals shall have photometric features and located in accordance with NFPA 72.

## SIGNAGE

Signs that designate permanent rooms and spaces (including toilet room signs, room numbers, stair signs, etc.) must be provided with the following features:

- Mounting location must be so a person can approach to within 3" without encountering a protruding object or be within the door swing area. Mounting height must be 60" AFF to the centerline of the sign.
- Be provide with raised and braille characters and pictorial symbols.
- The characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background: either light characters on a dark background or dark characters on a light background.

Other signs that provide direction to, or information about, functional spaces of the building must comply with the following:

- Characters proportions must be between 3:5 and 1:1 with a stroke width ratio of between 1:5 and 1:10.
- Characters and numbers on signs must be sized according to the viewing distance from which they are to be read. The minimum height of suspended or overhead characters is 3" and is measured using an uppercase X. Lower case characters are permitted.
- The characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background: either light characters on a dark background or dark characters on a light background.

Elements and spaces of accessible facilities that must be identified by the International Symbol of Accessibility are:

- a. Parking spaces designated as reserved for individuals with disabilities;
- b. Accessible passenger loading zones;
- c. Accessible entrances when not all are accessible (inaccessible entrances shall have directional signage to indicate the route to the nearest accessible entrance);
- d. Accessible toilet and bathing facilities when not all are accessible; and
- e. Emergency egress signs, which are required to be illuminated.

## PLUMBING FIXTURE REVIEW (248 CMR)

A plumbing fixture review was completed against Section 10:10 of 248 CMR 10, the Massachusetts Uniform State Plumbing Code. More specifically, the review focused on compliance with Section 10:10(18) and 10:10(18): Table 1.

## GENERAL

The plumbing code requires fixtures to be provided based on the uses in the building and the occupant loads established. The plumbing code contains several provisions specific to Educational uses. One of the most impactful provisions is the criterion to require separate facilities for students and staff:

*248 CMR 10.10 (18) (h) (3) - Separate toilet facilities shall be provided for teachers and other staff employees. These toilet facilities shall be in addition to the requirements of 248 CMR 10.10(18): Table 1, See Educational Use Group E (staff) for teacher occupancy toilet facility requirements.*

Also, separate staff facilities are required for cafeterias where cooking/preparation of food is performed.

## **PLUMBING FIXTURE FACTORS**

Student fixtures are required as follows:

1. 1/30 female water closets
2. 1/90 male water closets
3. 1/90 male urinals (in addition to toilets: not substitutions)
4. 1/90 lavatories for each sex
5. 1/75 for drinking fountains

Staff fixtures are required as follows:

1. 1/20 female water closets
2. 1/25 male water closets
3. 50% substitution
4. 1/40 lavatories for each sex

## **DRINKING FOUNTAINS**

Hi/lo drinking fountains are required per 521 CMR and ADAAG. Numerous hi/lo fountains utilize separate hi and lo bowls with individual spouts for each bowl. If a "hi/lo" fountain is provided but utilizes a single supply line and a single drain, it has been interpreted to be counted as a single fixture. More recently, the interpretation has shifted (like multiple station lavatories) that they can count as two provided both bowls can be used at the same time. The clearance for the low fountain (wheelchair users) will impact the spacing between bowls.

## **OCCUPANT LOADS**

The occupant loads used in determining fixtures must be established by the authority having jurisdiction. Frequently, the calculated occupant loads are used in the absence of the approval of the authority to use actual programmed occupancy. In the case of schools, it is not uncommon for the programmed occupant load to be used. In these cases, the authority must still provide approval. In recent discussions with the plumbing board staff, it has been noted that in no case should the fixtures provided serve less than 50% of the calculated occupant load. In any case, once the occupant load is established, if the application of the factors results in a fraction, the fraction is to be rounded up. Non-simultaneous use in the Cafeteria and Gymnasium are assumed. This approach must be approved by the building and plumbing officials.

## **GENDER NEUTRAL FIXTURES**

248 CMR has specific criteria for gender neutral toilet facilities.

(r) Use of Gender-neutral Toilet Rooms. For purposes of the minimum fixture requirements of 248 CMR, wherever 248 CMR 10.00 requires two or more toilet fixtures designated by gender, those facilities may be replaced with single use Gender-neutral toilet rooms pursuant to one of the following options:

1. Every gender designated toilet fixture is replaced with an equal number of single use gender-neutral toilet rooms (such that there are no gender designated fixtures); or
  2. Where the code requires four or more toilet fixtures combined for males and females, gender designated fixtures may be replaced by single use Gender-neutral toilet rooms in increments of two such that for every male designated fixture replaced by a Gender-neutral toilet room, a female designated fixture must also be replaced by a Gender-neutral toilet room, and vice-versa (*e.g.* instead of three men's toilets, four female toilets, there may be installed two men's toilets, three female toilets, and two single use Gender-neutral toilet rooms).
- 

The design proposes to use Option 1 and have all fixtures to be gender neutral. This requires that first the required number based on gender be identified and then all required fixtures to be replaced 1 for 1 with gender neutral fixtures.

The desire to have full height toilet stalls and common area lavatories (group arrangement as opposed to single user toilet rooms) has required a variance in numerous jurisdictions. A discussion with the local plumbing official should be arranged to review the approach and needs for approval.

## **FIXTURE COUNTS**

### **MIDDLE SCHOOL GRADES**

25 fixtures for each sex. With female fixtures limiting, the maximum student population served is 1,500.

### **STAFF**

Staff fixtures are provided via six gender neutral, single user toilet rooms. This "all" gender neutral approach complies with 248 CMR 10.10.18(r) Item 1) and serves up to 120 staff.

### **KITCHEN STAFF**

Separate facilities are required for kitchen staff (248 CMR 10.10(18)(h)5).

2 single user toilet rooms are provided and serve up to 40 employees.

### **SPECIAL EVENTS**

Assuming the bathrooms by the gymnasium/auditorium are the only ones available, the population served is 1,400 persons.

**\*\*End of Report\*\***

#### 4. List of Proprietary Items Under Consideration

The following items are being included as proprietary items in the project.

- Septic Denitrification System – Aquapoint, Bioclere 30/32
- Stormwater Treatment (Water Quality) - Rain Guardian, Rain Guardian Turret and Rain Guardian Bunker
- Door Keying Systems- Schlage
- Access Control System- Genetech
- Security CCTV System – LuxRiot
- Building Management System – JCI Meyasys
- Intrusion Detection System: Honeywell Vista Series
- Exterior Drinking Fountain: Elkay; ezH2O Upper Bottle Filling Station, Bi-Level Pedestal, Non Filtered, Non-Refrigerated - LK4420BF1U – grey, with Direct Bury Adaptor - 97890C, and Locking Hose Bib - LK4471LHB – grey

The School Building Committee reviewed and voted to Approve these proprietary items at their Building Committee meeting on September 29, 2022.

## 5. Interior Color Theory Statement

The interior design relates to the exterior design and palette to enhance the theme of interconnection to nature. Glazing along the exterior creates a visual and physical connection to the interior to further strengthen this design goal. The interior has been designed to encourage student engagement via both formal and informal learning environments.

The interior color palette concept is based on themes of nature in ways that may be applied to identify the academic clusters or building levels to enhance wayfinding and placemaking within the project. Accent colors have been selected to coordinate with a neutral base palette. Patterns, colors, and materials provide wayfinding and movement throughout the building. Select locations of environmental graphics will assist in this wayfinding and placemaking.

Interior materials have been selected conscious of the project's budget, as well as the sustainability, acoustic, and long-term building maintenance goals. For a complete list of materials, please refer to the finish schedule in the drawing set.

## 6. Project Registration with USGBC

The project is not registered with the USGBC. The project is being designed as LEED certifiable only.



## 6B.3 Designer Deliverables

### *6B.3.2 Space Summary*

#### **1. Updated Space Summary and Signed Certification**

The Space Summary for the 60% Construction Documents submission is an updated version of the new construction grade 6-8 summary previously submitted in the Design Development submission. This revised Space Summary was developed because of ongoing discussions between the CMSBC and School Department. The goal was to capture all the program space required to meet the educational vision and planning conducted over the course of the feasibility phase, adding the gym and auditorium scope raised by the community and confirmed by the CMSBC, incorporating other space reductions in working toward meeting the project budget goals.

The district is committed to delivering high quality educational spaces for all the programs listed in the Space Summary while also working within the 1.5 net to gross multiplier.

A current Space Summary has been included in the section attachments.

Proposed Space Summary - Middle Schools																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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## 2. Comparison of Current Design with Final Educational Program

Concord Middle School currently serves students in grades 6, 7, and 8 located in two schools with grade six located in one building and grades seven and eight another. Despite the vintage of the schools and their original purposes as an elementary school and junior high school, Concord Middle School provides deep, rich, and robust curriculum offerings focused on meeting the individual needs of students and integrating a range of opportunities both during and outside of the school day.

A new Concord Middle School where all three grades coexist in one building will allow for the vision of teams of core content teachers to share the instruction for a group of students, enhancing social relationships as well as interdisciplinary and cooperative learning. The modified teams that are assigned to mixed grades and spread throughout expansive buildings will, in a new school, have pods within the school where core classrooms and a shared common space invite team and grade-level experiences and connections.

A commitment to intervention and enrichment is also integral to the philosophy of Concord Middle School resulting in students receiving targeted both instruction and a range of choices for enrichment. This Response to Intervention and Response to Enrichment model provides benefits to academics, emotional well-being, and engagement. Similarly, all students participate in the fine and performing arts programs, world languages, physical education, health, and technology courses. The extensive athletic program promotes both skill and enjoyment for all students as do the expansive after school clubs. There is literally an option for everyone.

As the community embarks on the design of a new Concord Middle School it should meet these needs as well as be flexible to meet educational changes of the next 50 years.

## Introduction, Strategic Plan, and Core Values

The Concord Middle School Educational Plan was initiated in the winter of 2019 as part of a timeline to work through the 2019-2020 school year toward completion of Feasibility and Schematic Design of a new Concord Middle School. The process was moving forward in March of 2020 when, as with everything, the design process halted due to the Coronavirus pandemic. During the summer of 2020, some work was furthered on the Education Plan with completion of its first draft in December of 2020. The draft was made available to the project team, School Committee, and Concord School Building Committee for review and input in the first weeks of January 2021. As a result of the pandemic, Concord Middle School operated very differently during the 2020-2021 school year. References to schedules and programs are either anchored in the 2019-2020 school year or projected for future years beginning with the Fall of 2021 and beyond.

## Concord Public Schools Core Values

In 2018, the Concord Public Schools and Concord-Carlisle Regional School District embarked on a strategic planning process. The process resulted in an identified mission, vision and core values as well as four district-wide strategic objectives:

### Multiple Paths to Success

Employ teaching practices that are highly engaging, emphasize innovation, and offer multiple paths to student success.

### Well-Being

Establish and commit to ensuring student achievement through student well-being.

### Inclusive Culture

Create a collaborative and inclusive culture in the schools and community that values diversity and recognizes the contributions and uniqueness of each learner.

### Innovative Environment

Create a physical environment that catalyzes student learning through safe, healthy, and innovative indoor and outdoor spaces.

The objectives are each supported by strategic initiatives which are clearly outlined in the complete document, Strategic Plan 2018-2023. Concord Middle School aligns its plan with this mission, vision and core values to develop a plan appropriate for the vision in grades six through eight.

### Concord Middle School Core Values

All Concord Middle School staff are committed to cultivating a climate that nurtures the following values in our students:

#### Community

Compassion and loyalty towards the world outside of the self.

#### High Achievement

Confidence and willpower to learn from mistakes, appreciate success, and grow towards one's potential.

#### Lifelong Learning

Passion to discover new interests and to uncover the fascinating in the mundane.

## 2019-2020 School Improvement Plan

CMS 2019-2020 School Improvement Plan

Concord Middle School Core Values and Learning Beliefs

Concord Middle School staff are committed to cultivating a climate that nurtures the following values in our students:

- Community: Compassion and loyalty towards the world outside of the self.
- High Achievement: Confidence and willpower to learn from mistakes, appreciate success, and grow towards one’s potential.
- Lifelong Learning: Passion to discover new interests and to uncover the fascinating in the mundane.

Concord and Concord-Carlisle Regional School District Vision

Students of Concord and Concord-Carlisle Regional Schools actively seek varied pathways through which they achieve their potential and find joy. They will possess a strong sense of self and embrace their responsibilities as members of both local and global communities.

Concord and Concord-Carlisle Regional School District Vision of Student Learning

I am a student in Concord Public Schools and Concord Carlisle High School.

- My safe learning environment is created by respectful relationships with my teachers and my peers.
- My teachers are knowledgeable, highly skilled and passionate.
- My teachers care about me by affirming me, giving me useful feedback, and working with me individually when I need it.
- I am learning important content based on agreed upon standards, clear goals, and real world applications.
- My learning experiences are engaging, enjoyable, and challenging.
- My learning experiences vary from one another (individual vs. group work; creative vs. repetitive practice; novel vs. known; digital vs. traditional; personal choice vs. consistent topic).
- I am learning how to learn by staying organized, breaking down assignments, managing my time, using all available resources, and always giving my best effort.
- I take risks, learn from my mistakes, and know every day that I am growing.
- When I struggle, I continue to grow and learn.
- With hard work, I will be prepared for higher learning, the work world, and knowledgeable citizenship in my community and the wider world.

Concord and Concord-Carlisle Regional School District Core Values

The Concord and Concord-Carlisle Regional School District values:

Excellence	Engagement	Perseverance
Inclusion	Innovation	

Concord and Concord-Carlisle Regional School District Theory of Action

If we...

- Provide engaging, innovative learning experiences that support multiple paths to success,
- Ensure our students’ well-being

<p>- Create a collaborative and inclusive culture that values diversity and the uniqueness of each learner</p> <p>And - Create a physical environment that catalyzes student learning,</p> <p>Then... - Our students will achieve their potential and find joy.</p>			
CMS SIP Goals			
<p>Multiple Paths to Success Year Two</p> <p><b>1.</b> Employ teaching practices that are highly engaging, emphasize innovation, and offer multiple paths to student success.</p>	<p><b>Well-Being Year Two</b></p> <p><b>2. Establish and commit to ensuring student achievement through student well-being.</b></p>	<p><b>Inclusive Culture Year Two</b></p> <p><b>3. Create a collaborative and inclusive culture in the schools and community that values diversity and recognizes the contributions and uniqueness of each learner.</b></p>	<p>Innovative Environment Year Two</p> <p><b>4.</b> Create a physical environment that catalyzes student learning through safe, healthy, and innovative indoor and outdoor spaces.</p>
CMS SIP Initiatives			
<p><b>1.1</b> Support in year two, a middle school RtI/tiered levels of support and data team that would oversee all RtI/tiered levels of support at the middle school.</p>	<p><b>2.1</b> Support in year two, a middle school Challenge Success and Mindfulness Steering Committees to create opportunities for students and families at the middle school to learn a variety of coping strategies to develop mindfulness and help redefine success from a whole child perspective.</p>	<p><b>3.1</b> Support the work of the CMS Allies group with a focus on cultural proficiency and inclusive practices to meet the individual learning needs of each student.</p>	<p><b>4.1</b> Reestablish a middle school Building Reconfigure Steering Committee to reflect on the transition of two 6th / 7th / 8th grade buildings to Sanborn being an all 7th and 8th grade building and Peabody being an all 6th grade building.</p>
<p><b>1.2</b> Support in year two, middle school ACCESS (social and emotional program) at both Sanborn (7th /8th Grade) and Peabody (6th Grade) along with in year one, a 6th grade language based program.</p>	<p><b>2.2</b> Support in year two, the Rethinking the Middle School 1:1 Committee to examine the role of digital learning for students at a middle school age.</p>	<p><b>3.2</b> Support in year two, the Celtics Playbook Initiative, an anti-discrimination and bias-prevention student program.</p>	<p><b>4.2</b> Pursue a new middle school building.</p>
<p><b>1.3</b> Support in year two, a Student Council with a focus on increasing student voice in the culture and climate of CMS.</p>	<p><b>2.3</b> Improve practices to ease the 5th to 6th grade and 8th to 9th grade transitions. Working with CCHS and Carlisle Middle School in the support of the 8th to 9th grade transition.</p>	<p><b>3.3</b> Continue to partner with students and families from Boston to increase opportunities for them, as members of the community, to participate in the middle school.</p>	<p><b>4.3</b> Increase and leverage the use of the physical environment and outdoor space in instructional experiences at the middle school. This includes support of the new outdoor classroom at Sanborn.</p>



### 3. DESE Approved SPED Space Confirmation

The preferred solution solves many of the District's needs by constructing a new 6-8 700 student school which fulfills the educational vision of the District and consolidating the Peabody School (current 6th grade) and the Sanborn School (current grades 7 & 8).

All new construction adjacent to the location of the existing Sanborn Middle school. The configuration of the new construction will feature a single-story wing housing large spaces such as the gymnasium, 240-seat cafeteria, 420-seat auditorium, and media center and a three-story academic wing housing most of the general classrooms. The existing school can remain in full operation during the construction and no swing space will be required, although some temporary facilities for utility relocation will be constructed. Approximately 134 parking spaces will be provided, five outdoor learning areas of different typologies, and natural turf field areas for physical education and recess.

Several reasons lead to the preferred alternative. Most importantly, it provides the quality of academic space needed for the combined student population based on enrollment information gathered from the New England School Development Council (NSEDEC) and the spaces necessary to implement grade wide team-based learning initiatives available in a new building. In this option, building functions are located for educational efficiency, enhanced teacher collaboration, and student engagement in teaching and learning.

Additional considerations that led the Building Committee to selection of this preferred alternative is its compactness, optimal solar orientation, ability to be constructed while keeping the existing school fully operational, connection to nature and integration with its surrounding site.

The layout considers creating team commons within each grade to enhance the student cohort, maintaining that sense of a small school within a larger building. These team common areas are organized to provide full integration of Special Education and learning environments. Windows and internal borrowed lights will be placed to allow maximum penetration of natural light and visual connection between adjacent spaces and outdoors.

And the three-story wing of the building is steps down the slope of the site, which will give it the appearance of a two-story building from Old Marlboro Road and the school's neighbors.

#### 4. DESE Approved Public Day Education Spaces Confirmation

Our middle school STE program builds upon students' natural curiosity and love of exploration as they learn to think critically about the world around them. Working as individuals and in cooperative learning groups, students develop analytical, reasoning, and problem-solving skills. They learn to make hypotheses, conduct experiments, record observations, interpret data, and draw conclusions based on evidence. Our goal is to cultivate an active interest in science and technology and to develop students' ability and desire to pursue a future in the STE world.

Starting with the Class of 2024, the CMS science program has been using the DESE recommended model of integrated science instruction.



Example of New Learning Spaces

Using this model, students are exposed each year to a variety of concepts from the earth, space, life, and physical sciences, all taught within different thematic units. Much of the students' scientific knowledge is derived from or reinforced by experimental evidence and hands-on activities.

Fully aligned with the Massachusetts Science, Technology, and Engineering Frameworks (MA STE-16) and utilizing the FOSS Next Generation middle school science curriculum as a foundation, engineering and design challenges are woven in as problem-solving experiences at each grade level. Laboratory work and scientific practices are integral parts of each course.

In a new school, daily implementation of a hands-on, inquiry-based science and engineering curriculum requires flexible space which is currently limited. The spaces – indoor and outdoor – need to allow for and promote creativity and innovation. Classroom labs need to be well equipped and have ample space for students to work safely, for the safe storage of science materials and supplies, and for storage of on-going student projects.

In addition to the general design needs of modern classrooms – wall space for visuals, projection area(s), technological versatility, natural light, flexible furniture, etc. – science labs also require specialized chemical and flame-resistant benches with numerous accessible electrical outlets, multiple sinks with hot and cold running water, safety showers and eyewash stations, and enhanced ventilation systems.

## 6B.3 Designer Deliverables

### *6B.3.3 Project Approvals*

#### **1. Status of Approvals**

The project is currently going through the approval process with the Town of Concord. The project submitted a Special Permit to the Zoning Board of Appeals on August 1, 2022. Approval for the special permit is anticipated in November 2022. Plans for the septic system and flow variance were submitted to the State DEP Northeast Office for review and have been Approved. Local review and approval of the septic system was submitted to the Concord Board of Health in early July 2022. Approval is anticipated in November 2022.

#### **2. Confirmation of Receipt of All Necessary Approvals**

The project started the local permitting process in August 2022 with anticipated approvals in November 2022. The project anticipates a waiver of all local permitting fees but notes it is up to the interim Town Manager and other Department Directors, especially for water and sewer to waive fees.

Design Review Board – Architectural Review

Design Review Approval - Review is part of the Special Permit Process

Building Department – Review is part of the Special Permit Process but also requires various designer input after Special Permit Approval.

Building Permit - Review is part of the Special Permit Process

Board of Public Works - Review is part of the Special Permit Process

Street Occupancy and Trench Permit – Permit by the Contractor

Water Department – Review is part of the Special Permit Process

Application for Water Connection – Application by the Contractor

#### **3. State Review or Permit Status**

State of Massachusetts

Massachusetts Environmental Policy Act – The Title 5 Flow Variance for the septic flow reduction is a MEPA threshold that requires an Environmental Notification Form (ENF). What is not clear is whether the threshold is the only trigger as MEPA appears to also require State funding which this project is not pursuing. Nitsch attended a pre-filing hearing with MEPA in August 2022 to determine the scope of the

review. The MEPA review focused on the septic variance as the project did not meet any additional MEPA thresholds. The project received the MEPA Certificate from the ENF on September 23, 2022.

Massachusetts Historical Commission – The project was submitted to MHC for review and comment. No response was received with the response window.

Massachusetts Department of Transportation – The project site does not access a MassDOT roadway and is not subject to a MassDOT permit.

Access Permit – Confirm with Traffic Engineer. Local permit through DPW required which will be issued as part of the Special Permit process.

#### 4. Schedule for Local Zoning Approvals

The Concord MS project will be issued one permit by the Concord Zoning Board of Appeals (ZBA). This assumes that the project will need to go through the Site Plan Review process with the Planning Board. The Board will provide recommendations to the Zoning Board of Appeals for final approval and conditions.

All Town Staff meeting occurred on June 7, 2022 to review the proposed permitting process as outlined below.

Task Name	Duration	Start	Finish
<b>Permitting</b>	<b>215 days</b>	<b>Wed 6/15/22</b>	<b>Fri 4/21/23</b>
ZBA Plan Review & Approval	129 days	Mon 8/1/22	Thu 12/8/22
Submit plans for review (i) Site Plan Review (ii) Special Permit for Ground Water Conservancy (iii) Building Height Waiver)	0 days	Mon 8/1/22	Mon 8/1/22
Plan Review by DPW / Engineering / Water / CMLP / ZBA / Planning Board	31 days	Mon 8/1/22	Tue 9/13/22
Planning Board Meeting Date (Continued to October 25)	42 days	Tue 9/13/22	Tue 10/25/22
ZBA Meeting Date	0 days	Thu 11/10/22	Thu 11/10/22
Special Permit Recommendations to ZBA from Planning Board	0 days	Thu 11/10/22	Thu 11/10/22
ZBA - 20 Day Appeal (filed by Town Clerk)	20 days	Thu 11/17/22	Thu 12/8/22
ZBA Issues Approval & Order of Conditions	0 days	Thu 12/8/22	Thu 12/8/22
Tree Protection and Removal Permit by Planning Board	60 days	Fri 11/18/22	Mon 2/13/23
Septic System Approval by Health Division	128 days	Wed 6/15/22	Fri 10/21/22
Building Permit	37 days	Wed 3/1/23	Fri 4/21/23
Submit Application & Permit Set to Town Building Department	0 days	Wed 3/1/23	Wed 3/1/23
Application/Plan Review by Town	30 days	Wed 3/1/23	Tue 4/11/23
GC pulls Building Permit (Upon Contract Award / Issuance of NTP)	0 days	Fri 4/21/23	Fri 4/21/23

## 5. Certification of Utility Official Notification

### Utility Infrastructure

#### Water

There is an existing 6-inch Ductile Iron Cement Lined (DICL) water service that enters the site off Old Marlborough Road and connects to the existing school building and at least three fire hydrants around the existing building.

The new school project proposes to remove the existing water service and install a new 8-inch DICL off Old Marlborough Road to the new building. There will be a new 6-inch DICL water service to four (4) new fire hydrants. The water line will not loop around the proposed school but extend on three sides of the building. A 6-inch potable water and 8-inch fire protection line will extend off the new water line to service the new school building. Three (3) new fire hydrants will be placed near the new school building as requested by the Concord Fire Department. Additional coordination with the Concord Water Department is required as the project design progresses. The project should request a fee waiver from the Concord DPW/Water Department for any new water connections associated with the new Concord Middle School project.

The Jenny Duggan Town well is located just to the south of the project site. This well is monitored by the Town for nitrate levels throughout the year. Considering the new project's location to the well, and that the entire site is within a Groundwater Conservancy District, the design team worked to provide stormwater water quality treatment for the new building and parking lot run off. Currently, the site stormwater management does not meet current standards. The project will employ structures and Low Impact Development (LID) approaches to stormwater to improve water quality and infiltrate more stormwater than the existing site infiltrates.

A fire flow test will be performed by the Mechanical Engineer to determine whether there is adequate pressure in the existing water system for the new building's fire suppression system.

#### Sanitary Sewer

A municipal sewer service is not available for this project. The existing school is served by a septic system and components, which will be removed from the site as part of the new project. A new septic system with new tanks, pump chamber and septic field will be installed near the existing school's septic field. In addition, the project will install a Bioclere denitrification system to provide total nitrogen treatment at or below 25 mg/l. The new septic field will be on the opposite end of the site from the Jenny Dugan well. The new septic field is designed to handle the new school's septic flow based on a variance for schools under Title 5 which equates to a daily design flow of 6,000 gallons per day. The Jenny Dugan well will be better protected with the new septic field on the opposite side of the site from the well and the addition of the denitrification system which will improve the effluent quality. In addition, a groundwater study from 2001 indicated the groundwater in the location of the new septic field would flow away from the Jenny Dugan well pumping influence. The project will request a fee waiver from the Concord BOH which must be granted by the Town Manager.

## Storm Drain

The existing storm drain system involves sheet flows to leaching catch basins for the entire site. As currently configured the existing drainage system is not in compliance with current stormwater regulations.

The project proposes to use best practices management for stormwater by sheeting stormwater runoff by sheet flow toward structural pre-treatment systems and then into bio-retention systems with overflows to underground infiltration systems with isolator rows. This will provide a robust level of pre-treatment prior to infiltrating stormwater. The project will capture and infiltrate the entire new school roof run off, while swales convey and provide pre-treatment of runoff from new pedestrian impervious surfaces behind the school. The project anticipates capturing and infiltrating large storm events while providing rate and volume reductions when compared to the existing conditions. The project team will use the NOAA Atlas 14 storm events in recognition of storms that are more frequent with greater intensity. All stormwater will be managed on site. The Town of Concord does not allow new developments to discharge stormwater into the Town drainage system.

Storm runoff will be treated to meet the requirements of the Massachusetts Department of Environmental Protection (DEP) Stormwater Handbook, latest edition, and the Town of Concord requirements for stormwater.

## Gas

A new 2-inch gas service, for the new generator only, is proposed for this project. The existing 2-inch gas service to the site will be removed and disposed.

## Electric / Telecom

Electric service will be provided from an existing electric utility pole on Old Marlboro Road. The project electrical engineer will coordinate connections and site routing with the Concord Municipal Light Plant. It is anticipated that a new utility pole will be installed, and new conduits to the new building will be installed underground in conduits encased in concrete.

## 6B.3 Designer Deliverables

### *6B.3.7 Project Coordination*

- Verify the submittal is coordinated with any early-bid packages, if applicable.
- Room names and numbers are coordinated between all disciplines.
- Finish grade elevations coordinated between all disciplines.
- Civil earthwork grading and excavation plans are coordinated with architectural and landscape plans.
- Materials/soil terms used in the Earthwork specification is coordinated with architectural, structural, and civil specifications and plans.
- Seismic detailing coordinates with architectural drawings.
- Confirm that there are no beams and columns protruding horizontally and vertically into stairwells, and other interior spaces.
- Structural dimensions match architectural drawings.
- Column orientation matches architectural drawings.
- Column grid lines match architectural drawings.
- Column and bearing wall locations match architectural drawings.
- Column locations coordinated with all other disciplines.
- Slab depressions are indicated in the structural drawings and coordinated with the architectural finishes and plumbing drawings.
- Verify that the structural, mechanical, or other disciplines, do not conflict with architectural plans or specifications.
- Verify coursing dimensions at vertical masonry construction.
- Coordinate thermal insulation and thermal breaks between conditioned interior spaces and unconditioned exterior spaces.
- Room wall/floor/ceiling construction coordinated with the finish schedule.
- Coordinate access to mechanical and plumbing systems with architectural finishes. Confirm that requirements for access panel sizes and locations are coordinated between architectural and MEP/FP drawings and specifications.
- Mechanical equipment power requirements and physical locations, including special information as to who mounts, connects, tests, etc.
- Coordinate outside air intake opening locations and any hazard or noxious contaminants as described by 780 CMR: Massachusetts State Building Code.
- Verify potential spatial conflicts in mechanical equipment.
- Coordinate roof plans with MEP drawings; indicate roof top systems, access, walk pads & guardrails.
- Coordinate Solar Readiness areas on roof plans, structural plans, electrical/plumbing drawings, and site plans.
- Equipment plan coordinates with architectural plans.
- The Designer confirms that the project continues to comply with the MSBA High School Science Lab Guidelines and/or Recommendations of Best Practices for K-12 STEM learning Spaces.