WILMINGTON WILDWOOD ELEMENTARY SCHOOL PROJECT



MSBA – Module 6C

90% CONSTRUCTION DOCUMENTS REPORT

28 SEPTEMBER 2026

DORE + WHITTIER

Left Field PROJECT MANAGEMENT

FONTAINE BROS.

LeftField

September 28, 2026

Ms. Katie Cronin, Project Coordinator
Ms. Robin McElaney, Senior Project Coordinator/ DSP Administrator
Massachusetts School Building Authority
40 Broad Street; Suite 500
Boston, MA 02109

RE: Town of Wilmington; Wilmington Elementary School
MSBA 90% CD Submission

Dear Ms. Cronin & Ms. McElaney

I, David Saindon, have reviewed the enclosed Wilmington Elementary School ("the Project") 90% Construction Document submission and certify that the information is accurate and complete to the best of my knowledge and belief. In addition, I certify the following:

1. Leftfield has reviewed and coordinated the materials with Dore + Whittier Architects
2. The submittal is complete and conforms to MSBA requirements
3. The proposed project, as documented within this 90% CD submission, is in general alignment with the scope as depicted in the schematic design submission/Town approval
4. The proposed project, as documented within this 90% CD submission, is within the District's budget, and the District has approved the materials for submission to the MSBA.

Please note the following: The proposed Project remains on budget and on schedule, with Fontaine Bros. mobilized to commence early site work this summer as planned. On September 15, 2026, Dore + Whittier Architects and LeftField presented the 90% Construction Documentation to the Building Committee, which unanimously voted to approve and advance the 90% Construction Documentation submission to the MSBA. A certification of that vote is attached to this cover letter. The approved meeting minutes from the September 15, 2026, meeting will be forwarded as a supplement to this submission following their anticipated approval by the School Building Committee at its meeting currently scheduled for October 20, 2026. Additionally, the Project's overall gross square footage (GSF) has not changed. A minor adjustment of +2 square feet was made to the net square footage (NSF) to accommodate structural coordination requirements. These changes do not affect the DESE special education program or its overall functionality as submitted as part of the 60% CD submission, which DESE recently approved.

Please feel free to contact me with any questions regarding the enclosed information.

Sincerely,
Leftfield, LLC



David Saindon
Project Director

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September 28, 2026

Katie Cronin, Project Manager
Robin McElaney, Senior Project Coordinator/ DSP Administrator
Massachusetts School Building Authority
10 Post Office Square, Suite S400
Boston, MA 02109

RE: Certification of Vote Authorizing MSBA 90% Construction Documents Submission

Dear Ms. Cronin & Ms. McElaney:

The Wilmington Elementary School Building Committee, also known as the Wildwood School Building Committee ("SBC"), convened in an open meeting on September 15, 2026, at 6:30 PM. A quorum of the Committee was present. During this meeting, LeftField and Dore + Whittier Architects presented the 90% Construction Documents ("90% CD") submission for the Wilmington Elementary School Project. Upon completion of the presentation, the following action was taken by the SBC:

Motion by Mr. Kelley, seconded by Mr. Turner
"To authorize Dore + Whittier Architects and LeftField, on behalf of the Town, to submit the 90% Construction Document submission, as presented and reviewed, to the Massachusetts School Building Authority."

A roll call vote was taken as follows:

Diane M. Allan - Yes
Gregory B. Bendel (Absent)
Kate Bissell - Yes
Kevin A. Caira (Absent)
Michael Camoscio – Yes
Justin Cusce – Yes
Marianne Gallezzo – Yes
Nicholas Golden – Yes
Christine Holloran (Absent)
Dennis Kelley – Yes
Lilia Maselli – Yes
Paul J. Melaragni (Absent)
Craig P. Miner - Yes
Christine Murray - Yes
Judith L. O'Connell – Yes
Christine Prendergast (Absent)
David A. Ragsdale - Yes
Stacy Scott – Yes
R. Eric Slagle - Yes
Matthew Poska - Yes
Stephen Turner – Yes
Vivian Varbedian – Yes
Christine Bourne - Yes

The motion carried, with 18 votes in favor, 0 opposed, and 5 abstentions.

I hereby certify that the above is a true and accurate record of the action taken at the SBC meeting held on September 15, 2026, with respect to the submission of the 90% CD materials to the Massachusetts School Building Authority.

Judith O'Connell, Assistant Town Manager
Chair of the School Building Committee

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Acknowledgements

Dore & Whittier Architects, Inc. acknowledges the following individuals from the Town of Wilmington and the Wilmington Public School District and for their assistance to the Design Team.

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R. Eric Slagel, Town Manager
Judith L. O'Connell, Assistant Town Manager
Dennis Kelley, Public Buildings Superintendent
Jamie Magaldi, DPW
Paul Alunni, Town Engineer
Valerie Gingrich, Planning and Conservation
Al Spaulding, Building Inspector

School Building Committee (SBC)
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Vivian Varbedian, North Side Parent, Committee Vice Chair
Diane M. Allen, Permanent Building Committee
Gregory B. Bendel, Former Board of Selectmen, Parent
Kate Bissell, Principal, Wildwood Early Childhood Center
Christine Bourne, School Department Director of Finance
Kevin A. Caira, Board of Selectmen Alternate
Michael Camoscio, North Side Parent/Mechanical Engineer
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Nicholas Golden, School Committee
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Lilia Maselli, Select Board Member
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Christine Pendergast, North Side Parent
Matthew P. Poska, Superintendent of Schools
David A. Ragsdale, School Committee
Stacy Scott, Principal, Woburn Street Elementary School
R. Eric Slagel, Town Manager
Stephen Turner, School Committee

Wilmington Public Schools District
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SUMMARY 6C.1.0

INTRODUCTION 6C.1.1

INTRODUCTION

Summary

This design team is excited to submit this document for the 90% Construction Document Submission of the new Wilmington Wildwood Elementary School, located at 320 Salem Street, Wilmington, MA, 01887. The new Wilmington Elementary School has been designed with a grade configuration of PK through grade 5, (K-5) with 755 students plus PK with 100 students, and a gross square footage of 165,035 square feet, as approved in the original PFA. The 90% CD submission has maintained the original GSF as approved.

A Special Town Meeting Election to approve the project was held on October 13, 2025, resulting in overwhelming support for the plans for a new consolidated elementary school serving 755 students in grades K-5 and 100 preschool students. The project is proceeding with Construction Management at Risk (CMR) under the Ch 149A construction delivery method. Fontaine Brothers ("FBI") is currently under contract, finishing up its preconstruction phase, mobilized on-site in July, and has commenced early site enabling activities.

The building design measures an area of 165,035 GSF and aligns with the Schematic Design Submission and the execution of the Project Funding Agreement.

The project is designed to support the consolidated educational program with a lens on safety, durability, and sustainability. Integrated Special Education and Extended Learning spaces provide inclusive access for all students and support a wide range of teaching and learning opportunities.

Design Process Update

The Design Team completed the 60% Construction Documentation phase in July 2026 and has since advanced the Project through the 90% Construction Documents phase, while also continuing coordination with local permitting authorities and project stakeholders. During this phase, the Project Team continued to meet with key faculty, staff, District representatives, Town departments, and project consultants to further refine the design, confirm operational needs, and coordinate building and site requirements.

The team has continued to hold regular coordination meetings with the Owner, OPM, Construction Manager, School Building Committee ("SBC"), and SBC liaisons for Site, Interiors, and Security. These coordination efforts have included participation by the District administration, facilities personnel, the Department of Public Works, the Police and Fire Departments, Town regulatory staff, community representatives, abutters, and the design and construction teams.

Design coordination during the 90% CD phase included continued review of program spaces, specialty office layouts, casework and storage needs, site circulation, parent and bus operations, temporary play-area planning during construction, playground safety and vehicle-separation measures, utility coordination, and local permitting requirements. The Project Team also continued reviewing

construction logistics and site access considerations to support continued operation of the existing school during construction.

Public presentations and project discussions during this phase included updates on building and site design, landscape elements, traffic and circulation, playground and temporary play-area planning, engineering updates, interior design, and coordination with Town departments and regulatory boards. Comments and recommendations received through these meetings have been considered by the design team and incorporated into the 90% Construction Documents where appropriate, with additional refinements to continue as the documents advance into the 100% Construction Documents phase.

Interior & Exterior Design

The Design Team worked with the SBC Liaisons on interior design elements and presented said design elements, images, materials, and options to the School Building Committee throughout the development of the 90% construction document phase. Meetings were held both in person and online as the design progressed. The drawings and renderings included in this submission reflect the work and guidance of this work.

Summary of Building and Site Plan Updates

The overall site plan layout has remained generally consistent as the Project has advanced into the 90% Construction Documents phase. Revisions during this phase primarily consisted of refinements to landscape elements, site details, stormwater design, and permitting-related requirements based on continued coordination with Town staff, regulatory boards, the District, and other project stakeholders.

As of the issuance of this submission, the Project has received approval from the Wilmington Conservation Commission through issuance of an Order of Conditions and from the Wilmington Planning Board through approval of the Ground Water Protection District Special Permit. The Project also received approval from the Wilmington Select Board on July 13, 2026, for an Earth Removal Permit.

MassDEP Update:

The Wilmington Conservation Commission closed its public hearing on June 3, 2026, and issued an Order of Conditions for the Project on June 4, 2026, under MassDEP File No. 344-1588. Prior to issuance, the Project Team responded to environmental allegations raised by neighborhood and abutter parties regarding arsenic in site soils. Following review of the supporting environmental documentation, MassDEP counsel indicated that the identified arsenic levels were consistent with naturally occurring conditions and that no further MassDEP action was required regarding the private-party correspondence. The Town will continue to manage site conditions through the standard Licensed Site Professional process and comply with applicable soil-management and environmental-control requirements.

The Town subsequently received notice of an appeal of the Order of Conditions and, on August 14, 2026, received an informational request from MassDEP. The Town, through its Engineer of Record, is preparing a response. Fontaine Brothers has mobilized and commenced work

outside the Bordering Vegetated Wetland buffer zone; no work will proceed within the buffer zone pending MassDEP's determination on the appeal. The Town and Project Team will continue to track the appeal and maintain compliance with applicable regulatory requirements and the Project Funding Agreement.

As part of the coordinated effort between the OPM and Designer, working directly with key personnel such as police, fire, and building facilities, the team has established final room number designations. As part of the 90% construction documentation and further refinement in the 100% construction documentation, the team updated the initial construction documentation room number designations to reflect the final operational room number designations the District will use, aligned with final room numbering and signage.

Project Budget and Construction Cost

The project budget per the PFA is $173,265,626, with a schematic design construction budget of $137,743,666. The current 90% construction document phase construction budget, utilizing the Fontaine Bros. ("FBI") as the new 90% construction control estimate, is $136,174,844. This reflects an underrun of $1,568,822 as compared to the schematic design construction control budget. None of the revisions implemented during the 90% CD phase have affected the project budget or schedule. In fact, the team has worked diligently and creatively throughout the 90% CD phase to keep the Project within budget.

Early Bid Packages/ Schedule

An updated project schedule is included and has been approved by the Building Committee, reflecting ongoing planning and discussions among the District/Town, Leftfield, Fontaine Brothers, and Dore and Whittier. Under this schedule, Phase I of the project, the new elementary school, has commenced construction activities, as planned, in late June/early July 2026, and is anticipated to be substantially complete by July 2028. This will allow ample time to deploy technology and FF+E before Fall 2028 occupancy. Phase II of the project, the demolition of the existing HS and completion of site development, will be complete by August 2029. Early Bid Packages are as follows:

- EBP #1 (Site enabling) – released with the 60% CD set in June 2026. The Town executed a sitework scope Letter of Recommendation (LOR), or award, on June 26, 2026.
- EBP #2 (Foundations, Structural Steel, elevator, Switchgear) – scheduled to be released based on the 90% CD design. As of the issuance of this report, these scopes are in the process of scope debriefs with
- EBP #3 (Early underground limited electrical) – based on continued analysis of construction sequencing and schedule, FBI requested that the team consider an interim ERP scope of limited underground electrical scope related to primary underground ductbank work. This ERP scope is currently in the prequalification phase, with bidding to follow and an anticipated award in late October.
- ERP #4 (All remaining scope) – released based on the 100% CD documents anticipated to be issued to the MSBA and for trade bidding in early November of 2026. This set is considered the "bid" set.

An Early Release Package (ERP) Definition and Schedule Matrix outlining the above is available in Appendix 4 of this report.

Construction Delivery Method

On November 19, 2024, the Wilmington Elementary School Building Committee (the "Committee") approved the Construction Manager at Risk (CM-R) delivery method as the preferred construction approach for the Project.

Inspector General Status Update

In December 2024, SMMA, on behalf of the Town, the Project, and the project team, submitted the CM-R application to the Office of the Inspector General ("IG"). On January 13, 2025, the IG issued its approval authorizing the Project to proceed using the Construction Manager at Risk delivery method. Pursuant to the IG approval letter, the IG must be notified if the Owner's Project Manager (OPM) changes. In June 2025, LeftField was formally selected as the Town's new OPM, and a contract was executed on September 17, 2025. In July 2025, LeftField formally notified the IG of the change in OPM services. The IG subsequently acknowledged the notification and took no exception to the change.

Fontaine Status Update

The Committee received Statements of Qualifications (SOQs) from four CM firms in response to the CM-R procurement. After reviewing the SOQs, the Wilmington Elementary School Building Committee CM-R Subcommittee (the "Subcommittee") interviewed all four firms. The Subcommittee conducted interviews on February 11 and February 12, 2025. Following the interview process, the Subcommittee ranked Fontaine Bros., Inc. ("FBI") as the highest-qualified firm. The Subcommittee subsequently notified FBI of its selection for construction management services on March 11, 2025.

Since then, Fontaine has actively provided preconstruction services in accordance with the RFP and executed contract. These services have included site logistics planning; development of early trade-package procurement strategies; preparation of a schematic design, design development, 60% CD, and 90% CD cost estimates and reconciliations with the design team; continued support in addressing neighborhood concerns; coordination of preconstruction condition surveys of adjoining properties; and preparation of early bid and award of the sitework scope, which was awarded this past June.

Supplier Diversity Office ("SDO") Status Update

Following review of the executed Town–Fontaine construction manager agreement, LeftField prepared an amendment to align the contract language with standard LeftField construction manager agreement provisions. Fontaine has reviewed the proposed amendment and raised no exceptions. During this review, LeftField also identified that consultation with the Massachusetts Supplier Diversity

Office (SDO) had not occurred prior to the award of the CM-R agreement. LeftField has since engaged with the SDO and, on June 12, 2026, received formal participation goals from the SDO as follows: MBE: 6.2%, WBE: 7.8%, VBE/SDVOBE: 3.0%. LeftField will incorporate these goals with Fontaine through a CM-Agreement as part of a future contract amendment.

Project Budget Update and Compliance

The Project Funding Agreement (PFA) has a total project budget of $173,265,626. The current budget, as of the issuance of this 90% construction document ("90% CD") Submittal, results in no change to the PFA budget. No additional funding appropriations are being considered.

The PFA has an estimated schematic design construction cost/ budget of $137,743,666. The reconciled 90% CD estimates prepared by Fontaine ("FBI") and PM+C resulted in an underrun in the construction budget line. For purposes of establishing a 90% CD control estimate, the Project Team is using the FBI estimate. As you will see in other sections of the 90% CD submittal, the FBI 90% CD control estimate of $136,174,844 is $1,568,822 under the control PFA schematic construction budget of $137,743,666. The Designer's (PM+C) reconciled 90% CD construction cost estimate is $ 135,560,400, which is $2,183,266 under the control PFA construction budget of $137,743,666.

PFA Schematic Design Construction Budget	90% Reconciled Estimates		% Δ Between Estimates
	PM+C	Fontaine	
$137,743,666	$135,560,400	$136,174,844	0.45%
Underrun >>	$2,183,266	$1,568,822	

A copy of the Designer's cost estimate is provided in Section 6C.3.4 of this report. A copy of the CM-R's cost estimate is provided in Appendix 8 of this report.

OPM DELIVERABLES 6C.2.0

SUBMISSION REVIEW & COORDINATION 6C.2.1

OPM DELIVERABLES

OPM 90% Construction Document Review and Coordination

As part of the 90% Construction Documents ("90% CD") phase, LeftField completed a detailed review of the 90% CD drawings, specifications, and project manual documents. Review comments were documented in the OPM Review Comment Tracking Form and provided to the design team for review, coordination, and incorporation into the forthcoming 100% Construction Document submission. The review included an evaluation of the project manual and specifications, as well as civil, landscape, architectural, structural, food service, mechanical, electrical, plumbing, fire protection, and technology drawings.

The review comments generally focused on document coordination, constructability, bidding clarity, Owner operational preferences, and opportunities to further refine the drawings and specifications as the design advances from 90% Construction Documents into the 100% Construction Document phase. Several comments addressed coordination within the project manual and specifications, including updates to the electronic bidding platform information, inclusion of the sub-slab ventilation system within the appropriate trade contractor scope, confirmation of the Distributed Antenna System for three cellular carriers, correction of broken or inaccurate drawing bookmarks, clarification of exterior ductwork requirements, review of fire and smoke damper specifications, and confirmation of responsibility for security-system integration.

A number of comments focused on interdisciplinary coordination among the architectural, civil, landscape, structural, food service, mechanical, electrical, plumbing, fire protection, and technology documents. These comments included coordination of structural notes for glulam beams and DLT decking; solar-ready zones and potential conflicts with MEP elements; utility, fence-base, and light-pole locations; kitchen equipment closures and ventilation balance; floor drains and floor-sloping details; plumbing-fixture selections; grease-trap access; sprinkler protection below stair landings; and protection of devices within the gymnasium. Additional comments addressed rooftop fire-alarm notification, telecommunications equipment and UPS requirements, exterior wireless access, and integration of automatic temperature controls with the Town's existing operational environment.

Site and architectural-related comments focused on confirmation of the proposed monument sign, removal of a superseded drop-off layout, disposition and potential relocation of the existing soccer-field plaque, coordination of site utilities with fence and lighting elements, and completion of the courtyard layout. Additional comments addressed the extent of the exterior and interior signage packages, guardrail heights, accessibility of acoustical wall panels above the gymnasium bleachers, and coordination of protective enclosures for gymnasium-mounted devices.

Mechanical, electrical, and plumbing comments included recommendations to clarify backflow prevention at mop sinks, emergency eyewash and shower drainage and monitoring, radiant-panel piping connections, fire-damper access, exterior ductwork construction, kiln exhaust controls, thermostat locations, local UPS provisions for the ATC workstation and telecommunications racks, and integration of the security and mass-notification systems. The review also requested further

coordination regarding a potential GMP allowance for a post-startup power-quality study, hydronic-system leak or low-fluid notification, and access for cleaning the indoor grease traps. Collectively, these comments are intended to improve coordination, constructability, operational functionality, and bidding clarity prior to issuance of the 100% Construction Documents.

Overall, the review found that the 90% Construction Documents are appropriately developed for this stage of design and provide sufficient detail to support continued advancement into the 90% Construction Document phase. The identified comments are typical for a project at this phase and are intended to support continued coordination, improve bidding clarity, strengthen constructability, and further refine the documents before issuance of the 100% Construction Documents.

The design team will review and respond to the OPM comments, including any remaining open Design Development comments, as the design progresses. Responses and related drawing and specification revisions will be incorporated and documented as part of the forthcoming 100% Construction Document bid submission. A complete log of the OPM 90% CD review comments is included in Appendix 5 of this report.

Technical Accuracy, Coordination, & Clarity

LeftField has reviewed the 90% Construction Documents ("90% CD") submission with consideration for technical accuracy, interdisciplinary coordination, constructability, and the overall clarity of the drawings and specifications. In general, the 90% CD documents are consistent with the level of development expected for an MSBA 90% Construction Documents submission.

The 90% CD submission also supports the Project Team's planned early procurement strategy. Specifically, the documents have been advanced to support the early bidding of foundations, structural steel, heavy timber, elevator, and switchgear scopes of work associated with Early Bid Package No. 2 ("EBP #2"), which is anticipated to be procured and awarded in the coming weeks. The documents will continue to be developed through the 100% Construction Documents submission,

Fontaine Brothers, in coordination with Dore + Whittier and the Project Team, continued discussions with Reading Municipal Light Department regarding the permanent primary electrical service for the new school, including service routing, dedicated cable runs to the two proposed transformers, underground electrical infrastructure, and related utility requirements. The Project Team also continued coordination of the structural steel and glulam beam systems, particularly at the interfaces between these structural elements. This coordination supported the development and issuance of Early Release Package No. 2.

Throughout the 90% CD phase, Dore + Whittier continued to conduct coordination meetings with the Owner, LeftField, Fontaine Brothers, project consultants, and key stakeholders, including School District representatives, Town facilities personnel, the Department of Public Works, Police and Fire Department representatives, and other members of the Project Team. These efforts included continued review of building and site design, construction logistics and phasing, utility coordination, operational requirements, and measures necessary to maintain safe and uninterrupted operations at the existing school during construction. The Project Team also presented construction logistics and phasing information to school staff and the community, with the understanding that sequencing, durations, and logistics would continue to be refined as design, permitting, procurement, utility coordination, and field activities progressed.

Overall, the 90% CD submission demonstrates an appropriate level of accuracy, coordination, and clarity for an MSBA 90% Construction Documents submission. The documents also supported issuance of Early Release Package No. 2 and early procurement of the structural steel and glulam beam systems, while establishing the basis for completion of the 100% Construction Documents, final trade bidding, and development of the Guaranteed Maximum Price.

Efficiency & Cost Effectiveness

LeftField has reviewed the 90% CD submission in conjunction with the reconciled construction cost estimates prepared by Fontaine Brothers, Inc., and PM&C. Based on this review, a formal Value Engineering ("VE") process requiring Committee approval is not necessary at this time, as the Project remains within the approved construction budget. A copy of the MSBA VE tracking sheet can be found in Appendix 13 of this report.

LeftField has participated in numerous coordination meetings with the design team and Project stakeholders throughout the 90% CD phase. Based on these discussions and our review of the 90% CD documents, the design and project scope remain consistent with the overall program and scope established during the Schematic Design phase. Based on our experience with similar school construction projects in Massachusetts and the scope previously defined, the current design approach is considered efficient and cost-effective.

Operability

LeftField has reviewed the 90% Construction Documents (“90% CD”) submission with consideration for the facility’s long-term operability, maintainability, and day-to-day use as an elementary school. Based on this review, the 90% CD documents reflect a design that appropriately supports school operations and incorporates feedback received through the ongoing stakeholder engagement process.

Throughout the design process, Dore + Whittier has conducted user group meetings and coordination sessions with District facilities personnel, school staff, District leadership, and Town representatives to review operational needs, building functionality, and maintenance considerations. Input received during these meetings continues to be incorporated into the design as the documents advance.

The 90% CD review identified several operability and maintainability related coordination items for continued refinement. These included completing plumbing fixture schedules; providing appropriate floor slopes and details at floor drains; confirming drainage, monitoring, and notification requirements for emergency eyewash and shower equipment; and coordinating backflow protection at mop sinks with the cleaning-product dispensing equipment used by Wilmington Facilities. Additional comments addressed maintenance access to fire dampers, connection details for radiant panels, controls for the kiln exhaust system, thermostat locations, local UPS provisions for the ATC workstation and telecommunications racks, and notification of hydronic-system leaks or low-fluid conditions. The review also identified the need to confirm exterior wireless coverage, integration of the building automation system with the Town’s existing operational environment, access for cleaning indoor grease traps, and protection of building systems and devices within the gymnasium and other exposed locations. These comments are typical of this stage of document development and are intended to further improve long-term building operations, maintenance access, system reliability, and user functionality before issuance of the 100% Construction Documents

Overall, the 90% CD submission reflects a design approach that supports efficient building operations and long-term facility use. The design team will continue to review and incorporate operability-related comments as the documents advance into the 100% Construction Documents submission.

Constructability

LeftField has reviewed the 90% Construction Documents ("90% CD") submission with consideration for constructability and the ability to efficiently implement the proposed design in the field. Based on this review, the 90% CD documents reflect a design that is generally consistent with industry standards and applicable Massachusetts energy code requirements. The drawings and specifications are developed to a level appropriate for the 90% CD phase and provide a sufficient foundation for advancing the design into the 100% Construction Documents phase.

The 90% CD submission supports the Project Team's planned procurement of Early Release Package No. 2, which includes foundations, structural steel, glulam beam systems, elevator, and switchgear. The documents also establish the basis for completion of the 100% Construction Documents, final trade bidding, and development of the Guaranteed Maximum Price.

As part of the 90% CD review, LeftField identified several constructability-related items requiring further coordination as the documents advance toward the 100% Construction Documents. These included coordination of the primary utilities with site fencing and lighting; resolution of outdated site and drop-off layouts; structural notes for the glulam beam and DLT decking systems; conflicts between solar-ready zones and rooftop MEP elements; and accessibility of acoustical panels above the gymnasium bleachers. Additional comments addressed kitchen equipment closures and ventilation balance; floor slopes and drainage; emergency eyewash and shower provisions; mop-sink backflow protection; grease-trap access; fire-damper maintenance access; radiant-panel connections; exterior ductwork construction; kiln exhaust controls; and thermostat locations. The review also identified the need to coordinate rooftop fire-alarm coverage, protective enclosures for gymnasium devices, telecommunications and ATC equipment, security-system integration, and other interfaces among the architectural, structural, civil, landscape, food service, mechanical, electrical, plumbing, fire protection, and technology documents. These comments are intended to improve constructability, eliminate potential scope gaps, and strengthen interdisciplinary coordination before issuance of the 100% Construction Documents

These comments are typical for a project at the 90% CD phase and are intended to improve construction coordination, reduce potential scope gaps, and support efficient bidding and field execution. The Project Team will continue to incorporate OPM and Construction Manager constructability feedback as the documents advance into the 100% Construction Documents submissions.

Overall, the 90% CD submission reflects an appropriate level of constructability for this phase of design and provides a clear basis for continued coordination, early procurement, and advancement to the 100% Construction Documents bid set.

Phasing

LeftField has reviewed the 90% Construction Documents ("90% CD") submission with consideration for the project phasing approach established during Schematic Design and further developed through

the Design Development phase. The 90% CD documents continue to reflect the previously defined phasing strategy, which includes construction of the new school facility while the existing school remains operational, followed by demolition of the existing building and completion of final site improvements.

As part of the 90% CD review, LeftField identified several site-phasing and logistics items requiring further coordination as the documents advance toward the 100% Construction Documents. These included removing the superseded drop-off layout from the civil drawings, coordinating the proposed site utilities with adjacent fencing and lighting elements, confirming the disposition and potential relocation of the existing soccer-field monument, and completing the courtyard layout information. Continued coordination of these items will help maintain consistency among the phasing, civil, landscape, architectural, and electrical documents and provide greater clarity regarding site access, temporary and permanent site conditions, salvage requirements, and the sequencing of work around the occupied school.

Fontaine Brothers will continue to develop the detailed construction logistics and site utilization plans as the documents advance into the 100% Construction Documents submission bid set. The District remains familiar with the proposed phasing strategy and understands that adjustments to site circulation, including student drop-off, pick-up, parking, and service access, will be required during various stages of construction. The Project Team will continue to coordinate site phasing and circulation with the Town, District, police, and fire departments to confirm that emergency access and operational considerations are maintained throughout construction.

As the Project progresses, the Project Team will continue to refine Phase II logistics to address parking availability, site circulation, demolition sequencing, and final site development during the period when the new school is occupied and the existing building is being removed. Overall, the 90% CD submission reflects an appropriate phasing approach for this stage of design, with continued coordination to occur as the Construction Documents are further developed.

Bid Ability

LeftField has reviewed the 90% Construction Documents (“90% CD”) submission with consideration for the Project’s bid strategy and the ability to effectively procure the work through a phased bidding approach. Based on this review, the 90% CD documents support the Project Team’s planned strategy to implement early bid packages in advance of the full 100% Construction Documents bid submission.

The 90% CD documents have been advanced to support Early Bid Package No. 2 (“EBP #2”), which includes foundations, structural steel, glulam beam systems, elevator, and switchgear. The documents will continue to be developed through the 100% Construction Documents bid submission.

As part of the 90% CD review, LeftField identified several bid-ability and scope-coordination items requiring further refinement, including updates to the electronic bidding information, clarification of trade assignments and system responsibilities, correction of document links, and resolution of inconsistencies between the drawings and specifications. These comments are intended to clarify trade responsibilities, reduce potential scope gaps, and improve bidding clarity before final trade bidding.

These comments are typical for this phase of design and are intended to improve clarity, coordination, and completeness prior to issuance of subsequent Construction Documents submissions. Overall, the 90% CD submission provides an appropriate basis for early procurement and continued development of the remaining bid packages. Additional information regarding the anticipated early bid packages and their relationship to the Construction Documents submissions is provided in the Wilmington Early Release Package Definition and Schedule Matrix, included in Appendix 4 of this report.

Site Access During Construction

LeftField reviewed the 90% CD submission for site access, circulation, and continued operation of the occupied school. The documents and Fontaine Brothers' logistics planning maintain separation between construction activities and school operations to the extent practical, including parent and bus circulation, service access, and emergency routes.

The review identified several items for continued coordination, including removal of the superseded drop-off layout, coordination of utilities with fencing and lighting, completion of the courtyard layout, and clarification of site and pedestrian circulation. These efforts are intended to reduce conflicts and support safe, efficient operations throughout construction.

The Project Team will continue coordinating access, circulation, demolition activities, and final site improvements with the District, Town, public safety representatives, and Fontaine Brothers as the documents advance toward the 100% Construction Documents. Overall, the 90% CD submission provides an appropriate basis for continued refinement of the construction logistics and site-access plan.

Design Process Update

During the 90% Construction Documents ("90% CD") phase, Dore + Whittier continued coordinating with the Owner, LeftField, Fontaine Brothers, District representatives, Town staff, and project consultants to refine the design and confirm alignment with the District's educational, operational, and facilities objectives.

Coordination continued on building functionality, site design, construction logistics, temporary school operations, playground planning, and utility requirements. The temporary play-area planning addressed activity and open-play areas, protective fencing, gates, pedestrian safety, maintenance access, and measures to prevent balls from entering the roadway. Fontaine Brothers also presented updated phasing and logistics information to school staff and the community, including construction limits, access, temporary facilities, and continued parent and bus operations.

Site and playground coordination continued with school representatives and Town facilities personnel to address playground capacity, inclusive and accessible equipment, fencing heights, pedestrian and maintenance gates, vehicle access, and long-term maintainability. The Project Team also continued coordination of the temporary playground amenities and associated fencing needed to support safe student use during construction.

Utility coordination continued with Reading Municipal Light Department regarding the permanent primary electrical service, including the proposed dedicated cable runs serving the project's two transformers. The design team and Fontaine Brothers also continued coordinating bidding requirements and trade responsibilities as the documents advanced.

Overall, the 90% CD phase included continued stakeholder engagement and focused coordination of building systems, construction logistics, temporary school operations, playground safety, site circulation, utility service, and procurement requirements. Feedback received through these efforts has been incorporated where appropriate, with remaining items to be resolved as the documents advance toward the 100% Construction Documents, final trade bidding, and development of the Guaranteed Maximum Price.

Commissioning Consultants Review & Summary

ICO Energy and Engineering has been engaged by the MSBA as the Project's Commissioning Agent. As part of the 90% Construction Documents ("90% CD") phase, LeftField coordinated with ICO regarding its review of the mechanical, electrical, and plumbing drawings and specifications that fall within the Project's commissioning requirements. ICO also completed a backcheck of prior Design Development and 60% CD comments. Its review evaluated the documents for alignment with the Owner's Project Requirements ("OPR"), Basis of Design ("BOD"), applicable codes and standards, and industry best practices.

ICO noted that control drawings and sequences for several systems, including rooftop air-handling units, exhaust fans, and other equipment, had not been fully finalized, limiting its ability to complete a full controls review. Other open items included completion and coordination of mechanical and electrical schedules; emergency-generator loads; RTU sequences and freezestat locations; BMS monitoring points; plumbing and electrical submetering; BMS emergency power and UPS requirements; the Owner's informational kiosk; consistency between equipment schedules and control points; domestic hot-water equipment; and incorporation of OPR requirements for setpoints, occupancy schedules, lighting controls, lighting levels, CO2 levels, generator fuel monitoring, and high outdoor-air exchange operation.

The review also identified equipment-coordination items, including cooling requirements for network, telecommunications, and electrical rooms; consistency of dedicated cooling-unit locations and schedules; emergency lighting within occupied rooms; and continued coordination of controls diagrams with the equipment actually included in the Project. Several earlier comments were closed through the backcheck, while the remaining open items will continue to be tracked and addressed before construction.

In addition to the MEP commissioning review, Building Enclosure Science ("BES") completed a backcheck and review of the 90% CD Project Manual and architectural drawings. The review focused on constructability, system interfaces, material sequencing, and the performance of individual enclosure systems as they relate to the building envelope's overall performance. BES reported that most prior 60% CD comments were closed, although some items remained open and will be addressed as part of the 100% CD bid set.

The 90% BECx review identified items requiring further coordination, including the top-of-wall and coping assemblies; air-barrier continuity at parapets, window and door openings, louvers, duct sleeves, structural attachments, and roof curbs; through-wall flashing at stone lintels and masonry caps; window air and water seals; sill-pan configurations; roof membrane terminations; elevator-pit waterproofing transitions; stone-anchor penetrations; and construction-mockup access for inspection of air-barrier and flashing tie-ins. BES also updated the building-envelope field-testing matrix and

recommended that the OPM, Architect, and BES review it before bidding so applicable contractor responsibilities are included in the bid documents.

The updated BECx Plan establishes the commissioning framework for enclosure submittal and shop-drawing reviews, the preconstruction commissioning conference, mockup construction and testing, construction checklists, field observations, enclosure testing, and ongoing issue tracking. The systems identified for commissioning include concrete and masonry assemblies, waterproofing, insulation, air barriers, wall panels, roofing, flashing, sealants, doors, curtain walls, windows, and louvers.

The design team will review and respond to the remaining MEP commissioning and BECx comments as the documents advance toward the 100% Construction Documents and construction. The team will continue to track responses and related drawing and specification revisions through the commissioning review process. Detailed ICO and BES review materials are included in Appendix 6 of this report.

Construction Manager Review and Continued Coordination

During the 90% Construction Documents ("90% CD") phase, Fontaine Brothers has continued to provide constructability input and preconstruction coordination as part of its ongoing role as Construction Manager. This coordination has occurred through regular project meetings, cost-estimating coordination, logistics discussions, early bid package planning, and direct coordination with LeftField, Dore + Whittier, and the design consultants.

Fontaine's continued input during this phase has focused on matters such as construction sequencing, site logistics, early procurement strategy, coordination of site enabling work, constructability of building systems, and clarification of scope items that may affect bidding and field execution. This ongoing dialogue has helped inform the continued development of the 90% CD documents and will continue as the design advances into the 100% Construction Documents bid set.

A separate formal Construction Manager review comment log is not included as part of this 90% CD submission. The Project Team understands that a formal CM review log is not a specific MSBA requirement for the 90% CD submission. However, Fontaine Brothers remains actively engaged in the design review and preconstruction process, and its comments and recommendations will continue to be coordinated with the design team and incorporated into future submissions where appropriate.

Coordination of District's Response to the MSBA Schematic Design Submission

A copy of the MSBA 60% construction document submission review and the District's return comments can be found in Appendix 1 of this report. There are no outstanding items. However, please refer to the "Conservation Commission Approval/ MassDEP Update" section of this OPM summary.

DCAMM Designer Evaluation for Study Phase

LeftField confirms submission of the DCAMM Designer evaluation for the Study Phase. The evaluation was issued to DCAMM electronically on October 31, 2025. LeftField confirms review of MSBA Project Advisory #79 and will complete the designer evaluation submissions upon completion of the 100% construction documents phase and will complete the Construction evaluation upon the final CM payment.

Project Schedule

A Project schedule has been included in this 90% CD submission and can be found in Appendix 7 of this report. All schedule elements and updates have been included as listed in the MSBA 90% CD submission template.

Project Approvals

Pursuant to the MSBA 90% CD review template pertaining to various project-related approvals, please note the following:

DESE - Special Education approval by the Department of Elementary and Secondary Education

The total GSF of the facility has remained unchanged, and the NET SF dedicated to special education has remained unchanged. Following the MSBA's review of the DD submittal, Dore + Whittier has provided a new DESE submittal as part of this 60% CD submission, which was recently approved by DESE. A copy of the DESE approval can be found in Section 6C.3.3C.

MHC – Project Notification Form and approvals by MA Historical Commission

The project has received MHC review and confirmation that it is not within its jurisdiction. No further action is required. A copy of the MHC approval letter was provided in Appendix 15 of the Design Development submission.

OIG - Construction Manager at Risk approval by the Office of Inspector General

All OIG approvals for CM-R have been obtained. No further action is required. A copy of the IG approval to proceed can be found in Appendix 16 of the DD submission.

Executive Office of Energy and Environmental Affairs/EEA:

MSBA- State Site Permit Tracking Worksheet
Please see section 6C.3.3, A for the State Site Permitting Tracking Worksheet.

MEPA - MA Environmental Policy Act by Energy & Environmental Affairs
A MEPA process will not be required. No further action is required. Please see section 6C.3.3, B for the MEPA checklist.

ENF - Environmental Notification Form
N/A. No further action is required.

EIR - Environmental Impact Report
N/A. No further action is required.

Article 97 Land Disposition Policy approval by Energy & Environmental Affairs
N/A. No further action is required.

MA DEP - Massachusetts Department of Environmental Protection
The project will submit an NTWP (non-traditional work plan) for the removal of ACM associated with the existing North Intermediate School at a future date in the spring of 2028.

Conservation Commission Approval/ MassDEP Update

The Wilmington Conservation Commission issued an Order of Conditions for the Project under MassDEP File No. 344-1588 for the work proposed at 320 Salem Street. The public hearing was closed on June 3, 2026, and the Order of Conditions was issued on June 4, 2026.

Prior to the close of the Conservation Commission hearing and the issuance of the Order of Conditions, private neighborhood/abutter parties submitted correspondence to MassDEP raising environmental allegations regarding the Project site, including assertions of anthropogenic arsenic in the soil resulting from historical site use or disposal activities. In response, the Project's environmental consultant submitted a response package to MassDEP on April 6, 2026, which included environmental documentation, soil investigation information, regulatory context, and supporting analysis. The information provided to MassDEP indicated that the arsenic concentrations identified at the site are consistent with naturally occurring conditions in the region and that the condition does not require reporting under the Massachusetts Contingency Plan.

Following MassDEP's review of the documentation provided by the Project's environmental consultant, Town Counsel spoke with MassDEP counsel regarding the matter. Based on that discussion, MassDEP counsel indicated that MassDEP had reviewed the submitted documentation and determined that the arsenic levels found at the site are consistent with naturally occurring conditions, that no further action was required by MassDEP with respect to the private-party correspondence submitted to DEP, and that the Town should continue to address the site through the standard Licensed Site Professional process. The Town and Project Team will continue to comply with applicable requirements for soil management, soil disposition, and construction-phase environmental controls.

Subsequent to the issuance of the Order of Conditions, the Town received notice of a neighborhood/abutter appeal of the Conservation Commission's Order of Conditions on or about June 15, 2026. On August 14, 2026, the Town received an Informational Request letter from the MassDEP related to the appeal. As of the issuance of this report, the Town, through its Engineer of Record, is in the process of preparing a response. Fontaine Brothers, the Construction Manager, has mobilized and commenced work operations. However, has remained outside the Bordering Vegetated Wetland buffer zone associated with the issued Order of Conditions. No work will commence within the buffer zone until MassDEP has issued its determination, subject to the pending appeal.

The Town and Project Team will continue to track the pending appeal as part of the Project permitting schedule and will maintain compliance with the Project Funding Agreement and all applicable regulatory requirements.

Planning Board – Groundwater Protection District Special Permit.

On June 2, 2026, the Planning Board voted to close the public hearing and approve GWPD Special Permit #26-03 with conditions for the Wilmington Elementary School Project at 320 Salem Street.

Select Board - Earth Removal Permit

On July 13, 2026, the Select Board voted to Earth Removal Permit for the Wilmington Elementary School Project at 320 Salem Street.

MA DOT - Massachusetts Department of Transportation
N/A. No further action is required.

MA DPH - Massachusetts Department of Public Health (typically relating to CH74 Medical / Dental functions)
N/A. No further action is required.

EPA –NPDES National Pollutant Discharge Elimination System Notice of Intent approval by the US Environmental Protection Agency
Fontaine submitted its NPDES NOI on June 24, 2026, which was accepted by the DEP.

MAAB - Accessibility variances by MA Architectural Access Board
No MAAB variances are required for this project.

List all target dates for all local zoning approvals, testing, and permits.
N/A. No further action is required.

Provide a certification that all applicable utility officials have been contacted by the Designer regarding each basic utility connection.
Please see Appendix 17 as proof that the Project Team has been in continuous communication with Reading Municipal Light and Power in regard to the Project.

Please note that no State reviews are required for this Project. *Please see the commentary above listed under the Conservation Commission Approval Update.

Please see Appendix 14 in this report regarding the District letter confirming that the Project has undergone review and obtained all necessary state reviews and approvals as outlined in the MSBA 90% CD review template.

LeftField confirms that the updated project schedule identifies the 90% CD and proposed 100% CD submission dates, incorporates the required MSBA review and comment-response durations, and summarizes related Project Approval activities. The updated schedule is included in Appendix 7 of this report.

Project Scope and Budget

CM Construction Cost Estimate – Uniformat II and CSI MasterFormat (no VE required)
Fontaine construction cost estimate, dated 09/09/2026, can be found in Appendix 8 of this report.

PM&C Construction Cost Estimate – Uniformat II and CSI MasterFormat (no VE required)
PM&C construction cost estimate, dated 09/09/2026, can be found in Section 6C.3.4 of this report.

OPM Cost Estimate Reconciliation Form

LeftField OPM reconciliation of the CM-R and Designer construction cost estimates form can be found in Appendix 9 of this report.

Cost Estimate Comparison Form

The LeftField updated cost estimate comparison form can be found in Appendix 10 of this report.

Updated Project Budget

The Project Funding Agreement (PFA) established a total project budget of $173,265,626. As of the issuance of this 90% CD submission, the overall Project budget remains consistent with the approved PFA, and no adjustments to increase or decrease the total project budget are proposed. At this time, the District is not pursuing any additional funding appropriations.

The PFA includes a Schematic Design construction budget of $137,743,666. As part of the 90% CD phase, Fontaine Brothers, Inc., and PM&C prepared independent construction cost estimates, which were subsequently reconciled. The reconciliation resulted in estimates that are both below the PFA construction budget. To establish the Project's 90% CD control estimate moving forward, the Project Team has elected to use the Fontaine Brothers, Inc. estimate.

The Fontaine Brothers, Inc. 90% CD control estimate totals $136,174,844, which is $1,568,822 below the PFA Schematic Design construction budget of $137,743,666. The Designer's reconciled 90% CD construction estimate, prepared by PM&C, totals $135,560,400, which is $2,183,266 below the PFA construction budget.

PFA Schematic Design Construction Budget	90% Reconciled Estimates		% Δ Between Estimates
	PM+C	Fontaine	
$137,743,666	$135,560,400	$136,174,844	0.45%
Underrun >>	$2,183,266	$1,568,822	

As a result of Budget Revision Requests (BRR) #1 and #2, as well as anticipated cost savings reflected in the Fontaine Brothers, Inc. 90% CD reconciled estimate, LeftField has prepared a revised MSBA 3011 budget as part of the 90% CD submission requirements. Probable savings reflected in the reconciled estimate have been temporarily reallocated within the revised 3011 budget to the Owner's Construction Contingency. This reallocation has been made solely for purposes of the 90% CD submission requirements, and LeftField is not currently planning to submit a Budget Revision Request associated with this projected cost underrun.

An updated MSBA 3011 budget, dated September 28, 2026, is included in Appendix 11 of this report.

Early Bid Packages

As identified during the Schematic Design phase, the Project Team evaluated early release packages as part of the overall procurement strategy for the Wilmington Elementary School Project. Following the engagement of Fontaine Brothers, Inc., and through continued evaluation of market conditions

and supply chain considerations, the scope and sequencing of these early release packages have been further refined.

An updated project schedule has been developed and reflects continued coordination among the District/Town, LeftField, Fontaine Brothers, Inc., and Dore + Whittier. Under the current schedule, Phase I of the project, which includes construction of the new elementary school facility, is anticipated to commence construction activities in late June 2026, with Substantial Completion targeted for July 2028. This schedule provides sufficient time for installing technology systems and FF&E prior to the planned Fall 2028 occupancy. Phase II of the project, consisting of demolition of the existing school building and completion of final site improvements, is currently scheduled to conclude in August 2029.

To support schedule certainty and address potential procurement and supply chain risks, the Project Team continues to evaluate the use of Early Bid Packages (EBPs). Early Bid packages are as follows

- EBP #1 (Site enabling) – released with the 60% CD set in June 2026. The Town executed a sitework scope Letter of Recommendation (LOR), or award, on June 26, 2026.
- EBP #2 (Foundations, Structural Steel, elevator, Switchgear) – scheduled to be released based on the 90% CD design. As of the issuance of this report, these scopes are in the process of scope debriefs with
- EBP #3 (Early underground limited electrical) – based on continued analysis of construction sequencing and schedule, FBI requested that the team consider an interim ERP scope of limited underground electrical scope related to primary underground ductbank work. This ERP scope is currently in the prequalification phase, with bidding to follow and an anticipated award in late October.
- ERP #4 (All remaining scope) – released based on the 100% CD documents anticipated to be issued to the MSBA and for trade bidding in early November of 2026. This set is considered the "bid" set.

An Early Release Package (ERP) Definition and Schedule Matrix outlining the above is available in Appendix 4 of this report.

Value Engineering Recommendations

Based on the reconciliation of the 90% construction cost estimates prepared by Fontaine Brothers, Inc. and PM&C, the Project remains within the approved construction budget. As a result, a formal Value Engineering (VE) process requiring review and approval by the School Building Committee has not been necessary as part of the 90% CD submission. A copy of the MSBA VE tracking sheet can be found in Appendix 13 of this report.

Copy of Committee Vote for Accepted VE
Not Applicable; please see the comment above.

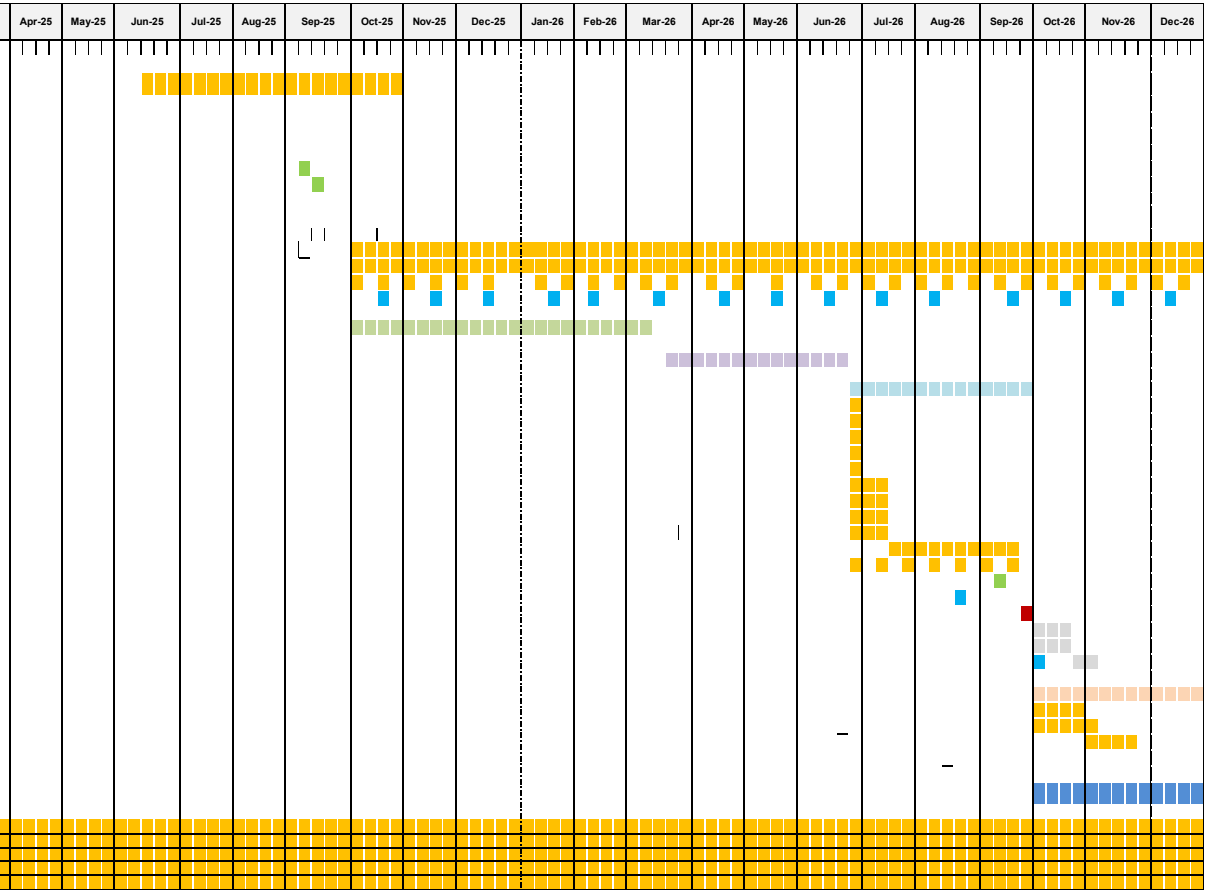
Independent Structural Design Review

On behalf of the District, LeftField solicited quotes from six qualified engineering firms for independent structural peer review services. Three firms submitted quotes, and the District awarded the contract to DM Berg Consultants on June 17, 2026. DM Berg completed its initial review of the 60% CD structural documents and issued comments on July 20, 2026. The structural engineer of record subsequently provided responses to those comments.

For the final backcheck, the Project Team elected to have DM Berg review the MSBA 90% CD submission rather than the earlier 90% CD pricing set, allowing additional time to finalize the structural documents. Following its review, DM Berg will confirm whether its prior comments have been appropriately addressed and incorporated and will issue the required structural peer-review certification letter. This review supports the structural work associated with Early Release Package No. 2, including the foundations and structural steel.

UPDATED WORK PLAN **A**

WILMINGTON WILDWOOD ELEMENTARY SCHOOL BUILDING PROJECT	Completion
Project Funding	
5.1 Project Scope and Budget Agreement	9/16/2025
5.2 Local Authorization and Financial Support (120 days)	
5.1.1 Special Town Meeting Election	9/13/2025
5.1.2 Debt Exclusion Election	9/16/2025
Detailed Design & Construction Documents	
Document Development	3/20/2026
Team Meetings (weekly)	on-going
Leadership Group Meetings (weekly +/-)	on-going
SBC Meetings (monthly +/-)	on-going
6.1 Design Development Documents	3/18/2026
6.2 60% Construction Documents	6/22/2026
6.3 90% Construction Documents	9/25/2026
Structural and energy calculations	
Project Schedule update	
Interior details, layouts, materials, sections and elevations	
Floor plan layouts, furniture, built-ins, details	
Cross coordination with all disciplines	
Updated code analysis	
Updated space summary	
Updated work plan	
Updated specifications	
90% Cost estimating and reconciliation	
Consultant Coordination	biweekly
Reconciliation	9/9/2026
ERP #2 (Foundations/Dampproofing/Structural/Elevator)	9/21/2026
90% CD MSBA Submission	9/28/2026
MSBA 90% CD Review	10/19/2026
ERP #3 (Limited underground electrical work)	10/2/2026
Comment Response	11/6/2026
6.4 100% Construction Documents	10/30/2026
Final Bid Specifications	10/29/2026
Final Bid Documents	10/30/2026
Opt-In Energy Code/ LEED compliance documentation (FINAL)	10/30/2026
100% CD MSBA Submission (with addenda)	1/30/2027
6.5 Bidding & Procurement	1/25/2027
7 Construction — Schedule beyond dates shown	
Demo and Sitework Phase 2 A	9/5/2028
Sitework Phase 2 B	12/19/2028
Final Completion	12/19/2028
Closeout	6/13/2029



BASIS OF DESIGN NARRATIVES B

BASIS OF DESIGN NARRATIVE - ARCHITECTURE

Summary

The program is to provide a new Pre-K-5 school on the North Intermediate School site, 320 Salem Street, that will be a consolidation of the Wildwood Early Childhood Center, Woburn Street and North Intermediate schools. The project will be a newly constructed elementary school with a design enrollment of 755 students in grades K-5 plus 100 PreK students (total design enrollment 855, with 140 staff for occupancy of 995). The building gross floor area is 165,035 GSF located at. The consolidated Wildwood Elementary School will consolidate students from existing facilities and provide a modern, energy-efficient learning environment supporting inclusive education, integrated special education spaces, and extended learning areas. The project is designed to support the district-wide CARES program (Children's Art, Recreation and Enrichment Services) for before and after-school operations.

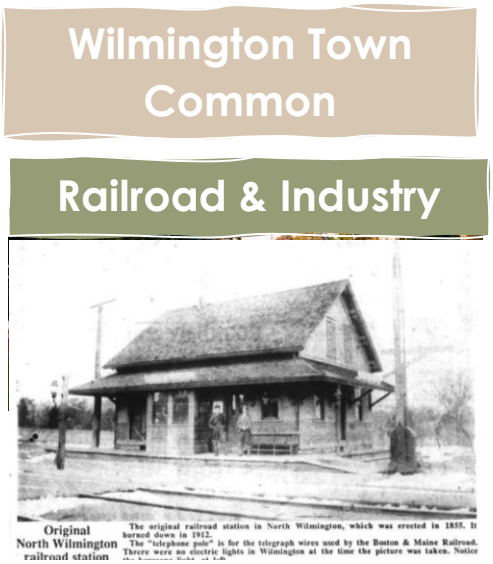
Architectural Characteristics Narrative

The architecture of the building draws inspiration from both the natural landscape and the historical character of Wilmington. The town's wetlands, wooded areas, waterways, and natural features such as Silver Lake inform a calm and cohesive environment that supports learning, orientation, and student development. At the same time, Wilmington's civic traditions and history—reflected in places such as the Town Common and the town's growth during the railroad era—provide additional influence on the building's character and relationship to the community.

During the study phase, several functional and educational goals were established to guide the development of the design.

Design Inspiration – Connection to Wilmington

Wilmington's history as a New England town shaped by its civic spaces, natural landscape, and transportation networks provides an important influence on the design. Established in 1730, the Wilmington Town Common has long served as the historic center of the community and a gathering place for social, civic, and educational activities. The Common reflects the traditional New England pattern of shared public space surrounded by civic buildings, reinforcing the importance of community connection and public life.



During the 19th century, Wilmington's railroads connected the town to regional markets, fostering economic growth and the exchange of new ideas. This period of industrial activity brought technological progress and innovation, shaping the town's development and contributing to a culture that values both tradition and forward thinking.



Silver Lake represents another defining feature of Wilmington's identity. As a natural landscape supporting both ecology and recreation, the lake has long been an important community resource. Historically, a school was located near the lake, reinforcing the connection between education and the surrounding landscape and embedding learning within the natural character of the town.

Together, these civic, historical, and environmental influences informed the design approach for the proposed school. The building draws inspiration from Wilmington's tradition of durable materials, simple forms, and thoughtful relationships to landscape and community spaces. Interpreted through contemporary design, these ideas create a learning environment that reflects the character of Wilmington while supporting the needs of today's students.

Desired Visual or Aesthetic Focal Point or Features of the School

The architecture of the elementary school building continues to draw inspiration from the character of the Town and the architectural language established through the School Building Committee process and community input. At Design Development, the design has been further refined to strengthen the balance between tradition and youthful energy that shaped the original concept.


Aerial view of the site

The building maintains a timeless palette of materials, including warm red brick and soft-toned masonry, which anchors the design within the town's historic context while prioritizing durable, cost-effective construction. During this phase, the exterior materials, detailing, and facade compositions have been further developed to reinforce a cohesive architectural expression. The energy-efficient design and compact, functional layout continue to support traditional building forms that integrate comfortably with the surrounding neighborhood.

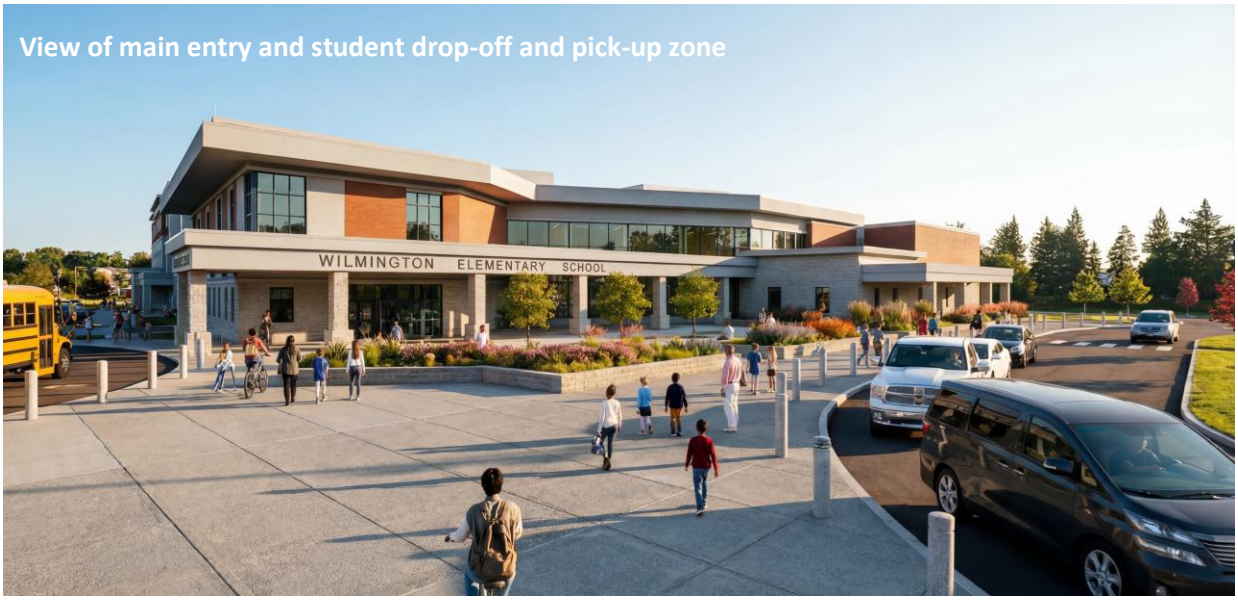
The building massing has also been further studied and refined. The three-story academic wing remains positioned behind the two-story public core, minimizing the visual impact of the taller volume and maintaining an approachable, human-scaled presence along Salem and Ballardvale Streets. This

layered massing strategy continues to support a civic identity while remaining sensitive to the surrounding neighborhood context and the scale of elementary-aged students.


View of building massing looking northwest

At the same time, the design continues to embrace the joyful spirit of an elementary school. Playful elements, including accent colors and wayfinding graphics, integrated throughout the building introduce moments of identity at entry points and key gathering spaces. Natural wood elements and increased access to daylight strengthen the connection between interior spaces and the natural environment, supporting vibrant learning environments that feel open, safe, and inspiring.

Through the Design Development process, the project team has continued to refine the building's architectural expression while maintaining the core vision established during Schematic Design, creating a school that reflects the character of Wilmington while fostering curiosity, imagination, and



View of main entry and student drop-off and pick-up zone

a love for learning. The building's compact massing and durable material palette also support key energy performance goals by reducing the overall building envelope area and improving thermal efficiency. High-performance envelope assemblies and carefully integrated glazing enhance daylighting within classrooms and shared spaces while maintaining strong thermal performance. The use of durable, long-lasting materials further supports sustainability goals by reducing long-term

maintenance and lifecycle impacts, contributing to a resilient and energy-efficient learning environment.

As visitors arrive at the school, the design aims to clearly highlight the entrance of the building as the destination, whether arriving by bus, vehicular or pedestrian. Featuring a prominent canopy, the entry plaza serves as a focal point, signaling to both students and visitors that they have reached the main entrance.



Flanking the entrance, the administration and library are positioned on one side, while the cafeteria is located on the opposite side. The thoughtful integration of masonry with brick accents, curtain wall and roof overhangs adds texture and visual balance to the front facade, creating an inviting and well-proportioned entrance that feels both open and grounded.

Upon entering the building, visitors are welcomed by the warmth of natural wood, with exposed glulam framing and a two-story open space bathed in natural light streaming through a large curtain wall. This cafeteria, a multi-functional space (assemblies, concerts, community events), serves as the heart of the building.


Library

Situated directly above the main entrance, the Library is designed to be a highly visible hub, both from the exterior and from the Cafeteria. Its strategic location offers a visual connection for students as they move between the dining area and educational wings. Serving as a central anchor to the building's core, it also boasts views of the field and playground. A divider curtain has been included for greater flexibility and acoustical benefits.

Within each grade community, extended learning areas are integrated adjacently within the classrooms. As an alternate learning space and extension of the classroom, the extended learning areas serve multiple purposes, from small group collaboration, indoor play, to large class gatherings. The space is an extension of the classroom and fosters connection and flexibility to meet the needs of a neurodiverse student population.



Extended Learning Area



Typical classroom



View of the Gymnasium

Owner's Project Requirements

From a technical standpoint, the Owner's Project Requirements document (OPR) stands as a definitive guide to the overall project goals in terms of its technical performance, longevity and durability, and usability. The OPR is one of the yardsticks used to measure the success of the project and helps communicate general goals that relate to the LEED certification process. The OPR will serve as the outline for the more detailed Basis of Design (BOD) document. Both documents inform, direct, and guide the design and construction process and are reviewed by the Commissioning Authority for clarity and completeness. It is included in Appendix-12.

BASIS OF DESIGN NARRATIVE: LANDSCAPE ARCHITECTURE

Summary

The proposed new Wilmington Elementary School will be located on the current site of the North Intermediate School, located at 320 Salem Street in Wilmington, Massachusetts. The project involves the construction of a new elementary school (grades pre-K to 5) to replace the current school building in a different location and configuration within the site. The final project will provide the Town with a new school building and an integrated site to become a community asset. Regarding the immediate school grounds, the students and administration will enjoy improved access to a variety of program elements, including: three playgrounds; separated by age groups (Pre-K, K-2nd grade, 3rd-5th grade), two full basketball courts, one U-8 soccer field, outdoor classroom opportunities, inner courtyard with seating for gatherings and community events, large open lawn areas for active recreation and informal youth sporting events.

Site Improvements

In reference to the 90% Construction Documents MSBA site plans (dated September 25, 2026) the proposed landscape will include a variety of student-focused program elements that will be integrated with the new building, the existing topography, and the existing vegetation to the greatest extent possible.

Given the location of the proposed building and its relationship to the existing topography, working closely with the Civil Engineer, we will coordinate the anticipated roadway, parking lot, and site grading throughout the property together with design spaces for arrival, gathering, outdoor learning, recreation, and play. In addition to designing for visibility and safety, the site design considers stormwater and drainage patterns as designed by the Civil Engineering Team.

In review of the site circulation, the location and orientation of the new school will allow for safe, defined bus and parent drop-off/pick-up zones and vehicular circulation loops with long access for queuing to pull passenger vehicles from Salem Street and Ballardvale Street to address increased traffic concerns. A drop-off loop to the northwest provides a turnaround for parents. When this loop is not in use for vehicular access, it can be utilized for ancillary play space. Toward the west of the property, there will be a drive lane for emergency vehicle access only. As shown in the plan, the following features are included within the Construction Document Plans:

1. Bituminous concrete vehicular drop-off and pick-up zone and associated parking lot with traffic calming and wayfinding elements throughout (to be coordinated with the Civil Engineer).
2. Vehicular gates to control traffic circulation.
3. Stone drip edge with aluminum edging will be used at the building foundation adjacent to the exterior façades where it abuts softscape (foundation planting and lawn panels).

4. The parking lot will contain planted medians with lawn and shade trees.
5. The perimeter of the site (at the west, south, and northeast) will receive dense screened planting, including deciduous shade trees, evergreen trees, understory shrubs, and herbaceous material to create a buffer at abutting properties. In addition, revegetation will occur adjacent to two isolated vegetated wetlands (to be further reviewed with the appropriate Town Agencies).
6. Lawn areas will receive a combination of Tall Fescue Blue Seed Mix (for general lawn areas), Fescue and Rye Grass (for shade and sloped areas), Athletic Field Sod Lawn (for athletic field areas), as well as Low-Growing Wildflower and Right-of-way Native Woods with Annual Ryegrass mixes (at wetland restoration areas).
7. The utility zones will maintain:
    a. Cast-in-place concrete pads for dumpsters, each utility, and one maintenance shed (10'-0" x 20'-0")
    b. Metal enclosure screen fences and gates at the dumpster and utilities
8. The entrance plazas at the building will maintain:
    a. Cast-in-place concrete paving (at the student loading and unloading zones)
    b. Concrete unit pavers; wet set; pedestrian (plazas, walkways)
    c. Granite monolith seatwalls
    d. Benches with backs and armrests
    e. Tables with Integral Seating; ADA Accessible
    f. Litter and recycling receptacles
    g. Bicycle racks (final quantity and type as defined per zoning requirements)
    h. Deciduous shade trees with grates (including soil cells to maximize health and longevity)
    i. Low shrub and perennial foundation beds

To enhance the interior/exterior relationship between the building and the landscape for the students, administration, and community uses, the landscape will provide outdoor spaces for both passive and active recreation, in addition to outdoor classrooms and gathering areas. Per plan, the proposed program elements will include:

1. Athletic field:
    a. Soccer goals
    b. Players' benches
    c. Athletic field sod lawn
    d. Chain link fences (8-foot height and 10-foot height) with fence strip
2. Full Basketball Court (2 locations):
    a. Bituminous concrete/asphalt paving (pedestrian; ADA accessible) with color sealcoat and line striping for basketball court
    b. Basketball hoop and goal systems
    c. Chain link fence (10-foot height) with fence strip and gates
    d. Litter and recycling receptacles
3. Pre-K Playground:
    a. Poured-in-place resilient rubber surfacing with underdrainage (ADA accessible)

b. Synthetic Lawn with underdrainage
c. Play equipment
d. Decorative Metal fence (4-foot height) with fence strip and gates
e. Buddy Bench
f. Litter Receptacles

4. Kindergarten through 2nd Grade Playground:
    a. Poured-in-place resilient rubber surfacing with underdrainage (ADA accessible)
    b. Play equipment
    c. Buddy Bench
    d. Decorative Metal fence (4-foot height) with fence strip and gates
    e. Litter Receptacles
5. 3rd grade through 5th Grade Playground:
    a. Poured-in-place resilient rubber surfacing (ADA accessible)
    b. Play equipment
    c. Buddy Bench
    d. Decorative Metal fence (4-foot height) with fence strip and gates
    e. Leaf Shape Shade Structure
    f. Litter Receptacles
6. Courtyard:
    a. Concrete Unit Pavers; wet set; pedestrian
    b. Synthetic Lawn with underdrainage
    c. Cast-in-place Concrete Paving
    d. Bituminous concrete/asphalt paving (pedestrian; ADA accessible) with color sealcoat and line striping for four-square
    e. Granite Monolith Seatwalls
    f. Masonry Panel System Seatwalls
    g. Movable Square Seats
    h. Sculptural Benches
    i. Backless Curved Benches
    j. Circular Benches
    k. Stump Seats
    l. Raised Planters; ADA Accessible
    m. Litter Receptacles
7. Outdoor Classroom:
    a. Synthetic Lawn with underdrainage
    b. Cast-in-place Concrete Paving
    c. Free-Form Benches
    d. Backless Benches with armrests
    e. Litter Receptacles

Throughout each gathering, play, and outdoor learning space, low-growing, low-maintenance plant material shall be provided for seasonal interest and aesthetics. Plant material, in most locations, shall be secured with plant beds edged with vertical granite curb. To extend the plant material's longevity, maintenance will be critical, and irrigation (even if temporary during establishment) is strongly encouraged. The primary athletic field shall be irrigated and shall have underdrainage.

The landscape features must be inclusive to all users; therefore, the site paving, topography, and site elements shall adhere to the MAAB (Massachusetts Architectural Access Board) and the ADA (Americans with Disabilities Act) requirements. Where possible, sloped walkways (maximum 5% slope) are encouraged over ramps, which require handrails (maximum 8% slope).

BASIS OF DESIGN NARRATIVE – STRUCTURAL (NEW CONSTRUCTION)

SUBSTRUCTURE

Foundations

Based on the recommendations on the geotechnical report, the columns of the proposed structure will bear on reinforced concrete spread footings and the perimeter foundation walls will bear on continuous reinforced concrete strip footings extending at least 4 ft.- 0 in. below grade. With the bearing capacity of the soil of 4,000 pounds per square foot, a typical interior footing will be 10 ft.- 0 in. x 10 ft.- 0 in. x 30 in. deep and the typical exterior footings will be 9 ft.- 0 in. x 9 ft.- 0 in. x 24 in. deep in the three-story areas. In the two-story areas a typical interior footing will be 9 ft.- 0 in. x 9 ft.- 0 in. x 24 in. deep and the typical exterior footings will be 8 ft.- 0 in. x 8 ft.- 0 in. x 24 in. deep. In single-story areas a typical interior footing would be 7 ft.- 0 in. x 7 ft.- 0 in. x 24 in. deep and the typical exterior footings will be 6 ft.- 0 in. x ft.- 0 in. x 24 in. deep. Typical interior and exterior footings at the cafeteria and gymnasium will be 8 ft.- 0 in. x 8 ft.- 0 in. x 24 in. deep. The exterior foundation walls will be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft.- 0 in. below finished grade.

Slabs-on-Grade

Based on the recommendations on the geotechnical report, the lowest level of the proposed structure will be a 5 in. thick concrete slab-on-grade reinforced with welded wire reinforcing over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

superstructure

Floor Construction

Typical Floor Construction

The floor construction will be 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire reinforcing spanning across wide flange steel beams, supported by steel girders and columns. The weight of the structural steel is estimated to be 15 psf for the typical framing. The weight of the structural steel is estimated to be 20 psf for the classrooms above the gymnasium, the floor will be framed with steel beams or trusses spanning across width of the gymnasium.

Roof Construction

Typical Roof Construction

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

Library Roof Framing

The roof construction will be ¾ in. APA-rated Sturd-I-Floor tongue-and-groove plywood sheathing, and spruce pine fir dowel laminated timber paneling, spanning across douglas fir glued laminated timber beams, spaced at 10 ft. on center, supported by glued laminated and steel girders and columns.

Cafeteria Roof Framing

The roof construction will be ¾ in. APA-rated Sturd-I-Floor tongue-and-groove plywood sheathing, and spruce pine fir dowel laminated timber paneling, spanning across douglas fir glued laminated timber beams, spaced at 10 ft. on center, supported by glued laminated and steel girders and columns.

Gymnasium Roof Framing

The roof construction will be a galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning across wide flange steel beams, supported by steel girders and columns and a full-story steel truss. The weight of the structural steel framing is estimated to be 20 psf. The weight of the steel truss is estimated to be 400 plf.

VERTICAL FRAMING ELEMENTS

Columns

Columns will be hollow structural steel columns. Typical columns will be HSS 8 x 8 columns. Typical columns in double-story areas will be HSS 12 x 12 steel columns. Typical mass timber columns will be 16 ½ in. x 16 ½ in. douglas fir glue-laminated wood columns.

Lateral Load-Resisting System

The typical lateral load resisting system will be concentric braced frames comprised of hollow structural steel (HSS) members. The lateral load resisting system of the Gymnasium and Kitchen areas will be reinforced masonry shear walls.

BASIS OF DESIGN NARRATIVE - CIVIL

PAVEMENT/CURB/SIDEWALKS

The proposed site includes curb cuts along Ballardvale Street and Salem Street to provide vehicular access to the campus. A loop driveway is provided around the Elementary School to accommodate parent drop-off and pick-up circulation and emergency vehicle access. A parent vehicle turnaround is proposed to the northwest of the new building, while a bus loop is proposed at the southeast corner.

The primary access driveways will consist of 25-foot-wide bituminous concrete pavement designed to accommodate passenger vehicles, buses, and emergency response vehicles. The proposed parking areas will provide a total of 196 parking spaces, including one van-accessible space, five accessible spaces, and 190 standard parking spaces.

Six to ten-foot-wide sidewalks are provided throughout the site to ensure pedestrian connectivity between parking areas, building entrances, playgrounds, and athletic facilities. 5-, 8-, and 10-foot-wide crosswalks are provided at designated pedestrian crossings to enhance safety and accessibility.

Curbing throughout the paved areas surrounding the school will consist of vertical granite curb, while the parking areas will be bordered by precast concrete curb. Flush curb sections at curb cut ramps, including detectable warning panels, will be provided to ensure compliance with ADA accessibility requirements. In addition, mountable granite curbs will be installed at the playground and athletic field gates to facilitate access for maintenance vehicles.

All paved surfaces, including driveways and parking areas, will be bituminous concrete. Sidewalks are proposed to be concrete.

SEWER

Under the proposed conditions, the existing gravity sewer line connecting the school to the main on Ballardvale Street will be demolished. New 8-inch PVC pipes and associated manholes will be installed, with one line exiting the new school from the front and rear sides and traveling along the paved areas to connect to an existing sewer manhole near the school entrance at the northeast corner of the site.

WATER

The project site is served by the public water supply system. Under the proposed conditions, a new 8-inch ductile iron water main will be installed and looped around the proposed Elementary School building to provide adequate circulation and fire protection coverage throughout the campus.

The looped water main will serve four new fire hydrants located around the building in accordance with fire protection requirements. A new domestic water service and a new fire service connection will be provided to the building, with both services entering near the designated loading area.

The proposed water main loop will connect to the existing 12-inch water main along Ballardvale Street in the eastern portion of the site, and to the existing 16-inch water main along Salem Street in the southern portion of the site.

SOILS

The site is predominantly underlain by Deerfield loamy fine sand with a Hydrological Soil Group (HSG) of A, which has moderately high to very high infiltration rates, and by Udorthents, which do not have an assigned Hydrologic Soil Group (HSG) due to the variable composition of this fill material.

Subsurface explorations performed by Lahlaf Geotechnical Consulting, Inc. in April and December 2025 included a series of soil borings and test pits across the site. Groundwater was encountered at depths ranging from approximately 8.0 to 10.8 feet below existing grade during these investigations. Additional groundwater measurements collected from existing monitoring wells on April 25, 2026, indicated groundwater depths ranging from approximately 4.0 to 5.4 feet below ground surface.

CDW Consultants performed additional confirmatory test pits on August 27 and September 4, 2026, within the areas of the proposed infiltration systems, as requested during the MassDEP appeal process for the Notice of Intent. Groundwater was encountered at depths ranging from approximately 10.0 to 12.5 feet below existing grade, while redoximorphic features were observed at depths ranging from approximately 3.5 to 8.2 feet below ground surface. Based on the field observations and their relationship to the underlying soil conditions, the shallower redoximorphic features appear to be associated with localized perched water conditions occurring above restrictive fine silty sand layers, while the deeper redoximorphic features are considered indicative of the seasonal high groundwater condition.

Infiltrometer testing was also conducted throughout the site, with measured infiltration rates ranging from 0.05 inches per hour to 126.5 inches per hour, reflecting the variability of subsurface conditions across the project area.

For stormwater management design, HSG rating A will be used to determine curve numbers and calculate required groundwater recharge and water-quality treatment volumes. The infiltration rate for each system reflects the results of infiltrometer tests conducted near the systems.

STORMWATER

Stormwater from the existing site drains in all directions—north, east, northeast, west, and northwest. In paved areas, the stormwater system consists of strategically located catch basins at low points. These catch basins connect to five separate underground infiltration systems comprised of concrete chambers. The stormwater areas are more generally described as follows:

Stormwater North

Watershed P-4 is located northwest of the project site and includes portions of grassed areas and wooded areas. Runoff flows northerly and discharges onto the abutters' properties (DP-4p).

Stormwater East

The following watersheds discharge to DP-1p, which is the existing drainage system along Ballardvale Street:

Watershed P-1aa is located on the southeastern side of the site and includes sidewalks, paved parking areas, and landscaped grass areas. Runoff flows easterly and discharges at DP-1p.

Watershed P-1ab is located at the school entrance off Ballardvale Street and includes grass, sidewalks, and a small portion of the driveway. Runoff flows easterly and discharges at DP-1p.

Watersheds P-1b, P-1c, P-1d, P-1e, and P-1f are generally located along the southern, eastern, and northern portions of the site and include combinations of sidewalks, paved parking, basketball courts, playground areas, roof drainage, wooded areas, and grassed surfaces. Runoff from these watersheds is collected by a series of catch basins and conveyed to the Underground Infiltration System UGI-1 (119 units of the 2-foot-high Retain-It) and Underground Infiltration System UGI-2 (105 units of the 2-foot-high Retain-It). Treated flows are then discharged easterly to DP-1p.

Stormwater Northeast

Watershed P-5 is located north of the project site and includes portions of grassy fields and wooded areas. Runoff flows to the northeast and discharges onto the abutters' properties (DP-5p).

Stormwater West

The following watersheds discharge to DP-2p, reflecting the existing drainage system along Arlene Avenue to the western portion of the site:

Watersheds P-2a, P-2b, P-2ca, P-2cd, P-2d, and P-2i are located along the site's southern and western portions and include wooded areas, grassed fields, paved parking, sidewalks, and portions of the playground. Runoff from these areas generally flows westward or is collected by a series of catch basins and then discharges at DP-2p.

Watersheds P-2e, P-2f, P-2g, and P-2k are located on the southern portion of the site and include sidewalks, paved parking areas, and roof drainage from the proposed elementary school. Runoff is collected by catch basins and routed to the Underground Infiltration System UGI-3 (105 units of the 2-foot-high Retain-It). Treated flows are then discharged westerly to DP-2p.

Watersheds P-2cb and P-2cc are located in the western portion of the site and include the courtyard, synthetic and natural grass areas, and portions of the playgrounds. Runoff is collected by catch basins and conveyed to the Underground Infiltration System UGI-4 (58 units of the 2-foot-high Retain-It). Discharge from UGI-4 flows westerly to DP-2p.

Watersheds P-2h and P-2j are located in the northwestern portion of the site and include roof drainage, paved parking, a portion of the playground, and grassed surfaces. Runoff is collected by catch basins and conveyed to the Underground Infiltration System UGI-5 (140 units of the 2-foot-high Retain-It). Discharge from UGI-5 flows westerly to DP-2p.

Stormwater Northwest

Watershed P-3 is located northwest of the proposed Elementary School and includes grassed areas and paved parking. Runoff flows toward the northwest and discharges at DP-3p.

Proposed Stormwater

Under the proposed conditions, new underground stormwater systems have been shown throughout the site and sized to mitigate increases in runoff flow rate resulting from additional impervious areas.

These underground systems connect back into the existing drainage systems along Ballardvale Street and Arlene Avenue.

PERMITTING REQUIREMENTS

A Notice of Intent (NOI) was filed with the Wilmington Conservation Commission for proposed work within the 100-foot Buffer Zone associated with wetlands located to the south and west of the project site. The Conservation Commission subsequently issued an Order of Conditions for the project, which was appealed to MassDEP by abutters. The appeal is currently under review by MassDEP. Based on available FEMA flood mapping, the project site is not located within a FEMA-designated Special Flood Hazard Area.

BASIS OF DESIGN NARRATIVE - HVAC

A lifecycle cost analysis (LCCA) has been performed to quantify anticipated upfront costs, operating costs, and avoided energy costs for several mechanical system options to serve the HVAC needs of the Wilmington Wildwood Elementary School. The Elementary School is a new three-story school with an approximate gross area of 167,000 s.f. The building has been simulated with the school's anticipated hours of operation provided by the owner as follows:

It is anticipated that the typical student hours will occur from 6:30 am – 6:00 pm (Mon-Fri) while the building will be occupied between 6 pm – 9 pm (Mon-Fri) for limited community use, sports, and recreation programs. Limited summer programming shall occur throughout the building from 7:00 am – 3:30 pm (Mon-Fri) for special needs, summer camps, recreation, and sports practices. The Gym will also have limited community use on the weekends from 9:00 am – 9:00 pm.
The goal of the mechanical system lifecycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the greatest combined savings over a 50 year cycle to determine the most advantageous system considering anticipated hours of operation, electrical costs, maintenance costs, initial construction costs, and replacement costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings has been recommended.

The results of the LCCA have been presented to the Town's building committee who subsequently voted to proceed with the option that is outlined in the following the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for *LEED for Schools v4* where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the Commonwealth of Massachusetts Adopted Building Codes (IBC, IMC, IECC latest Adopted Editions with MA amendments), and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

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

The HVAC narrative below provides a summary of new HVAC systems which shall be designated for the building.

3. BASIS OF DESIGN: (MASS CODE)

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

Outside: Winter 2.3 degrees F, Summer 91 degrees F DB 74 degrees F WB

Inside: 70 deg. F +/- 2 degrees F for Heating, 75 degrees F +/- 2 degrees F (55 percent RH)

for all Air-conditioned areas (Administration, Nurses Office, Guidance, Cafeteria, Classrooms,

Teacher Support, Gym).

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

cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the

International Mechanical Code (latest adopted editions) as a minimum. All occupied areas

will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION – Air Source Heat Pump Chiller/Heater with Classroom Displacement Ventilation

A. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that include the following quantities of chiller modules:

12 modular air source to water heat pump chillers with simultaneous heating and cooling and a capacity of 30 tons each. An additional heat pump chiller/heater or a supplemental 600 kw backup electric boiler shall be included to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

One of the modules will be redundant for heating/cooling backup purposes. The air-cooled heat pump chiller units will be grade mounted and shall be capable of providing 130 degrees F heating hot water supply at a 2.3 degrees F ambient temperature condition. A large roof mounted location for the air-cooled heat

pump chillers will be required. Insulated roof mounted piping from heating/cooling plant to an indoor mechanical room shall be provided.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water and chilled water to heating and cooling equipment and air handling equipment throughout the building via a four-pipe fiberglass insulated schedule 40 black steel and copper piping system.

Three primary hot water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided and will modulate speed to maintain flow to the heat pump chiller through a primary hot water loop. Secondary hot water pumps (Quantity of two in a primary/standby arrangement) with variable frequency drives will be provided for meeting the variable flow needs of the hot water system distribution throughout the building. Closely spaced tees in the primary hot water loop within the mechanical room shall be provided to hydraulically separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators, expansion tanks, and buffer tanks shall be provided.

Three primary chilled water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided and will modulate speed to maintain flow to the heat pump chiller through a primary chilled water loop. Three secondary chilled water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided for meeting the variable flow needs of the chilled water system distribution throughout the building. Closely spaced tees in the primary chilled water loop within the mechanical room shall be provided to hydraulically separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators, expansion tanks, and buffer tanks shall be provided.

1. The heat pump chiller plant will distribute between 44 degrees F and 54 degrees F chilled water to the roof mounted air handling units located throughout the building and will distribute between 58 degrees F and 62 degrees F chilled water to the terminal radiant cooling panels units in the fully-air conditioned building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be separate from the hot water distribution piping system. Compensated chilled water pumps with variable frequency drives will be provided for variable flow chilled water system distribution.

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

1. New 100% outdoor air (DOAS) rooftop air handling units with supply and return air fans, VFDs, dual core energy recovery sections, hot water heating

(and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. As VAV boxes modulate, the associated supply and return air fans at the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classrooms will typically be provided with two individual wall mounted displacement diffuser units between 180 and 250 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant panels will be provided along exterior walls. Space enthalpy sensors shall modulate the control valve of the terminal cooling coil closed when the space enthalpy is above dewpoint conditions for the design cooling water temp.

Planned RTU Quantities, zones and airflow capacities are as follows:

RTU-1: (Classroom Wing) – 13,500 CFM Total, 51 Tons cooling, 300 MBH heating
RTU-2: (Classroom Wing) – 14,835 CFM Total, 56 Tons cooling, 320 MBH heating
RTU-3: (Classroom Wing) – 11,130 CFM Total, 43 Tons cooling, 247 MBH heating
RTU-4: (Gym) – 12,000 CFM Total, 45 Tons cooling, 365 MBH heating
RTU-7: (Music) – 1,025 CFM Total, 5 Tons cooling, 41 MBH heating (enthalpy wheel)
RTU-8: (Admin) – 2,100 CFM Total, 12 tons cooling, 80 MBH heating (enthalpy wheel)

2. New, partially recirculating rooftop air handling units with supply and return air fans, VFDs, enthalpy wheel energy recovery sections, hot water heating (and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. The supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on zone temperature and CO2 requirements. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Return air will be drawn back to the units by ceiling return air registers located high within the room and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental pedestal mounted hot water terminal equipment will be provided along exterior walls. The control valve

actuators associated with this terminal equipment shall be interlocked with zone temperature sensors.

Planned RTU Quantities, zones and airflow capacities are as follows:

RTU-5: (Cafetorium) – 7,040 CFM Total, 30 Tons Cooling, 225 MBH heating

3. New (DOAS) or partially recirculating rooftop air handling units with supply and return air fans, VFDs, energy recovery sections, hot water heating (and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new overhead air distribution system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. As VAV boxes modulate, the associated supply and return air fans at the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Zones will typically be provided with ceiling mounted supply air diffusers. Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Terminal heating and cooling will be provided at spaces served by DOAS rooftop units.

   RTU-6: (Kitchen/Custodial) – 2,905 CFM Total, 12 Tons cooling, 72 MBH heating
   RTU-9: (Media Ctr) – 3,250 CFM Total, 12 Tons cooling, 88 MBH heating
   MAU: (Kitchen Hood Makeup) – 5,500 CFM Total, 30 Tons cooling, 431 MBH heating

C. Air Distribution Systems:

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-6). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or insulated stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

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

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

E. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all fully air conditioned areas (eg. Admin Offices, Guidance, Nurse's suite, classrooms) of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors, entryways. Hot water unit heaters shall be provided for all utility rooms.

F. Split system AC heat pump units:

New ductless split system high efficiency heat pump AC units will be installed to serve Elevator machine rooms, and IT and MDF Server rooms.

G. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

H. Utility Areas:

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

The Main Electric Rooms and IDF rooms will be air conditioned by high efficiency ductless air source heat pumps.

I. Testing, Adjusting, Balancing & Commissioning:

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

J. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (electric, water). The new DDC/ATC system shall be a BACNet open protocol system that is capable of being integrated into the Town Wide Central energy management system.

5. TESTING REQUIREMENTS:

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present where applicable to the selected HVAC option.
- Heat pump chiller plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- All pumps
- Terminal heating and cooling devices
- Ductless AC Systems
- Automatic temperature control and building energy management system

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

6. OPERATION MANUALS AND MAINTENANCE MANUALS

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

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

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

8. COMMISSIONING

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

9. LEED Energy Savings Summary

To estimate the LEED V4 EAc2 – Optimize Energy Performance savings, energy model simulations have been performed comparing the design building to a baseline ASHRAE Standard 90.1-2010 building.

The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
  - Wall: U-0.064
  - Roof: U-0.048
  - Windows: 0.55 U-Value, 0.40 SHGC
  - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
  - System 8 - Electric heating/chilled water cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)
  - System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)

    - (2) high-efficiency water-cooled chillers with associated cooling tower
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.99 w/s.f.

The design building is as follows:

- Envelope:
    - Roof: U-0.018
    - Brick Veneer Walls: U-0.028
    - MCM Panel Walls: U-0.025
    - Windows: U-0.25, 0.30 SHGC
    - Curtainwall: U-0.25, 0.30 SHGC
- Mechanical System:
    - (Refer to System description)
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.5 w/s.f.

10. LEED Energy Savings Summary

A comparison of the Design Building against the ASHRAE Standard 90.1-2010 Baseline Building results in an energy cost savings of 43.4% for 11 total points relating to LEED V4 EAc2 – Optimize Energy Performance.

Note:

The values indicated above are based on energy modelling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

BASIS OF DESIGN NARRATIVE - ELECTRICAL

A lifecycle cost analysis (LCCA) has been performed to quantify anticipated upfront costs, operating costs, and avoided energy costs for several mechanical system options to serve the HVAC needs of the Wilmington Wildwood Elementary School. The Elementary School is a new three-story school with an approximate gross area of 167,000 s.f. The building has been simulated with the school's anticipated hours of operation provided by the owner as follows:

It is anticipated that the typical student hours will occur from 6:30 am – 6:00 pm (Mon-Fri) while the building will be occupied between 6 pm – 9 pm (Mon-Fri) for limited community use, sports, and recreation programs. Limited summer programming shall occur throughout the building from 7:00 am – 3:30 pm (Mon-Fri) for special needs, summer camps, recreation, and sports practices. The Gym will also have limited community use on the weekends from 9:00 am – 9:00 pm.
The goal of the mechanical system lifecycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the greatest combined savings over a 50 year cycle to determine the most advantageous system considering anticipated hours of operation, electrical costs, maintenance costs, initial construction costs, and replacement costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings has been recommended.

The results of the LCCA have been presented to the Town's building committee who subsequently voted to proceed with the option that is outlined in the following the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for *LEED for Schools v4* where indicated on this narrative.

11. CODES

    All work installed under Division 230000 shall comply with the Commonwealth of Massachusetts Adopted Building Codes (IBC, IMC, IECC latest Adopted Editions with MA amendments), and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

12. DESIGN INTENT

    The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the

complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

The HVAC narrative below provides a summary of new HVAC systems which shall be designated for the building.

13. BASIS OF DESIGN: (MASS CODE)

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

Outside: Winter 2.3 degrees F, Summer 91 degrees F DB 74 degrees F WB

Inside: 70 deg. F +/- 2 degrees F for Heating, 75 degrees F +/- 2 degrees F (55 percent RH) for all Air-conditioned areas (Administration, Nurses Office, Guidance, Cafeteria, Classrooms, Teacher Support, Gym).

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

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

14. SYSTEM DESCRIPTION – Air Source Heat Pump Chiller/Heater with Classroom Displacement Ventilation

A. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that include the following quantities of chiller modules:

12 modular air source to water heat pump chillers with simultaneous heating and cooling and a capacity of 30 tons each. An additional heat pump chiller/heater or a supplemental 600 kw backup electric boiler shall be included to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

One of the modules will be redundant for heating/cooling backup purposes. The air-cooled heat pump chiller units will be grade mounted and shall be capable of providing 130 degrees F heating hot water supply at a 2.3 degrees F ambient temperature condition. A large roof mounted location for the air-cooled heat pump chillers will be required. Insulated roof mounted piping from heating/cooling plant to an indoor mechanical room shall be provided.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water and chilled water to heating and cooling equipment and air handling equipment throughout the building via a four-pipe fiberglass insulated schedule 40 black steel and copper piping system.

Three primary hot water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided and will modulate speed to maintain flow to the heat pump chiller through a primary hot water loop. Secondary hot water pumps (Quantity of two in a primary/standby arrangement) with variable frequency drives will be provided for meeting the variable flow needs of the hot water system distribution throughout the building. Closely spaced tees in the primary hot water loop within the mechanical room shall be provided to hydraulically separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators, expansion tanks, and buffer tanks shall be provided.

Three primary chilled water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided and will modulate speed to maintain flow to the heat pump chiller through a primary chilled water loop. Three secondary chilled water pumps (two pumping in a parallel arrangement with one standby pump) with variable frequency drives will be provided for meeting the variable flow needs of the chilled water system distribution throughout the building. Closely spaced tees in the primary chilled water loop within the mechanical room shall be provided to hydraulically separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators, expansion tanks, and buffer tanks shall be provided.

2. The heat pump chiller plant will distribute between 44 degrees F and 54 degrees F chilled water to the roof mounted air handling units located throughout the building and will distribute between 58 degrees F and 62 degrees F chilled water to the terminal radiant cooling panels units in the fully-air conditioned building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be separate from the hot water distribution piping system. Compensated chilled water pumps with

variable frequency drives will be provided for variable flow chilled water system distribution.

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

1. New 100% outdoor air (DOAS) rooftop air handling units with supply and return air fans, VFDs, dual core energy recovery sections, hot water heating (and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. As VAV boxes modulate, the associated supply and return air fans at the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classrooms will typically be provided with two individual wall mounted displacement diffuser units between 180 and 250 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant panels will be provided along exterior walls. Space enthalpy sensors shall modulate the control valve of the terminal cooling coil closed when the space enthalpy is above dewpoint conditions for the design cooling water temp.

Planned RTU Quantities, zones and airflow capacities are as follows:

RTU-1: (Classroom Wing) – 13,500 CFM Total, 51 Tons cooling, 300 MBH heating
RTU-2: (Classroom Wing) – 14,835 CFM Total, 56 Tons cooling, 320 MBH heating
RTU-3: (Classroom Wing) – 11,130 CFM Total, 43 Tons cooling, 247 MBH heating
RTU-4: (Gym) – 12,000 CFM Total, 45 Tons cooling, 365 MBH heating
RTU-7: (Music) – 1,025 CFM Total, 5 Tons cooling, 41 MBH heating (enthalpy wheel)
RTU-8: (Admin) – 2,100 CFM Total, 12 tons cooling, 80 MBH heating (enthalpy wheel)

2. New, partially recirculating rooftop air handling units with supply and return air fans, VFDs, enthalpy wheel energy recovery sections, hot water heating (and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. The supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on zone temperature and CO2 requirements. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Return air will be drawn back to the units by ceiling return air registers located high within the room and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental pedestal mounted hot water terminal equipment will be provided along exterior walls. The control valve actuators associated with this terminal equipment shall be interlocked with zone temperature sensors.

   Planned RTU Quantities, zones and airflow capacities are as follows:

RTU-5: (Cafetorium) – 7,040 CFM Total, 30 Tons Cooling, 225 MBH heating

3. New (DOAS) or partially recirculating rooftop air handling units with supply and return air fans, VFDs, energy recovery sections, hot water heating (and reheat) coils with modulating valve, chilled water cooling coil, economizer capability, and MERV 14 filtration will be provided to serve a new overhead air distribution system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the spaces served. As VAV boxes modulate, the associated supply and return air fans at the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Zones will typically be provided with ceiling mounted supply air diffusers. Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Terminal heating and cooling will be provided at spaces served by DOAS rooftop units.

RTU-6: (Kitchen/Custodial) – 2,905 CFM Total, 12 Tons cooling, 72 MBH heating
RTU-9: (Media Ctr) – 3,250 CFM Total, 12 Tons cooling, 88 MBH heating
MAU: (Kitchen Hood Makeup) – 5,500 CFM Total, 30 Tons cooling, 431 MBH heating

C. Air Distribution Systems:

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-6). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or insulated stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

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

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

E. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all fully air conditioned areas (eg. Admin Offices, Guidance, Nurse's suite, classrooms) of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors, entryways. Hot water unit heaters shall be provided for all utility rooms.

F. Split system AC heat pump units:

New ductless split system high efficiency heat pump AC units will be installed to serve Elevator machine rooms, and IT and MDF Server rooms.

G. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

H. Utility Areas:

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

The Main Electric Rooms and IDF rooms will be air conditioned by high efficiency ductless air source heat pumps.

I. Testing, Adjusting, Balancing & Commissioning:

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

J. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (electric, water). The new DDC/ATC system shall be a BACNet open protocol system that is capable of being integrated into the Town Wide Central energy management system.

15. TESTING REQUIREMENTS:

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present where applicable to the selected HVAC option.
- Heat pump chiller plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- All pumps
- Terminal heating and cooling devices
- Ductless AC Systems
- Automatic temperature control and building energy management system

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

16. OPERATION MANUALS AND MAINTENANCE MANUALS

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

17. RECORD DRAWINGS AND CONTROL DOCUMENTS

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

18. COMMISSIONING

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

19. LEED Energy Savings Summary

To estimate the LEED V4 EAc2 – Optimize Energy Performance savings, energy model simulations have been performed comparing the design building to a baseline ASHRAE Standard 90.1-2010 building.

The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
  - Wall: U-0.064
  - Roof: U-0.048
  - Windows: 0.55 U-Value, 0.40 SHGC
  - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
  - System 8 - Electric heating/chilled water cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)
  - System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)
  - (2) high-efficiency water-cooled chillers with associated cooling tower
- Domestic Hot Water System:
  - Instantaneous electric domestic hot water system
- Lighting System:
  - 0.99 w/s.f.

The design building is as follows:

- Envelope:
  - Roof: U-0.018
  - Brick Veneer Walls: U-0.028
  - MCM Panel Walls: U-0.025
  - Windows: U-0.25, 0.30 SHGC
  - Curtainwall: U-0.25, 0.30 SHGC
- Mechanical System:
  - (Refer to System description)
- Domestic Hot Water System:

    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.5 w/s.f.

20. LEED Energy Savings Summary

A comparison of the Design Building against the ASHRAE Standard 90.1-2010 Baseline Building results in an energy cost savings of 43.4% for 11 total points relating to LEED V4 EAc2 – Optimize Energy Performance.

Note:

The values indicated above are based on energy modelling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

PLUMBING

Plumbing Fixtures

The number of plumbing fixtures will be added in the facility to accommodate the population of approximately 438 male students and 438 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, such as manual flush valves and flow restricting aerators (for indoor water use reduction-LEED v4- WE Credit 2 & 4).

Water Closet	Urinals	Lavatory
1.28 gpf High Efficiency Toilet, 1.28 gpf manual flush valve.	0.125 gpf Ultra High Efficiency urinal with manual flush valve.	Delta metering faucet with temperature mixing valve, 0.35 gpm flow restricting aerator.

Water closets and urinals will be commercial vitreous china, wall hung (ADA compliant). Lavatories will be wall-mounted china. Each floor includes a janitor's closet with a mop service basin, if chemical dispenser will be attached to water supply, a code required BFP will be required, Toilet cores on each floor will include a drinking water fountain with a high-low handicapped accessible configuration and a bottle filling station. Toilet and mechanical rooms will have a floor drain with a trap primer. Hose bibs will be provided in each multi-stall bathroom and mechanical room. Roof Hydrants will be provided on the roof.

All classrooms will have two self-rimming stainless-steel sinks with 1 gpm gooseneck-type faucets with aerator.

Drinking fountain will be dual height with bottle filler. Elkay, Hasley Taylor or Oasis.

Plumbing connections will be provided to each kitchen appliance requiring plumbing.

Any art room and STE room sinks will be provided with in-line solids interceptor.

Exterior non-freeze wall hydrants will be provided on all sides of the school building.

Domestic Water Distribution

New 6" domestic water supply line will enter the water room. A 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 domestic water distribution will incorporate water meter at main line and few branch piping to monitor the water usage on various levels such as boiler room, water heater and irrigation system if one is being provided. Boiler water feed, make-up, and any other mechanical take-offs will branch off through a reduced pressure-principle backflow preventer.

The domestic cold-water piping inside the building will be distributed in "L" type copper tube with wrought or cast copper fittings. Potable water will meet both the NSF 61 and NSF 372 standards for the lead-free Safe Drinking Water Act. The piping will be insulated to prevent condensation.

Domestic hot water system will be three (3) electric hot water heater with a 54-kW heating element and a 120-gallon storage capacity. KW may be able to be reduced if HVAC can provide pre-heated water.

The acceptable manufacturers of hot water heaters are PVI, Lochinvar, A.O. Smith, Rheem or equal.

The water heater will supply hot water to classroom fixtures and kitchen appliances. The domestic hot water distribution system will have a recirculation system including but not limited to pump, aqua-stat and automatic thermostatic mixing valves. Piping will extend to each fixture with no dead leg more than 12 feet in length. There will be one temperature hot water supply / recirculation system in the building. Commercial kitchens no longer require 140-degree water to 3-bay sink and dishwasher. The system will operate at 120°F and will serve all plumbing fixtures including commercial kitchen, kitchen sinks and appliances, as well as the custodian room sinks, lavatories and classroom sinks. Faucets will reduce the temperature to 105°F at the public lavatories and classroom sinks via associated mixing valves.

Domestic hot water will be distributed in “L” type copper tube with wrought or cast copper fittings. The hot water (HW), and re-circulating (HWR) piping will be insulated as required by the Energy Code.

Sanitary Waste

Multiple 6” gravity mains will exit the building and connect to the sewer system. Refer to Civil narrative for details on sewer infrastructure.

A dedicated 4” grease waste line will be installed to collect grease laden waste water from the new Kitchen appliances and fixtures. An interior grease trap will service fixtures that require one, such as dishwashers and the 3-bay sink. The grease line will then exit the building and will be connected to an exterior grease trap outside the building provided under the site. A dedicated 4” chamber vent will be provided and will run back to building and terminate independently through the roof. For culinary sinks, 3-bay sink, grease troughs and dishwasher an interior grease trap will be provided at the source.

Above ground sanitary drainage will be piped in cast iron with “no-hub” joints (3” or larger). Piping smaller than 3 inches will be piped in copper. Piping below floor shall be weight cast iron hub and spigot type.

Each elevator pit will be provided with a 50 GPM sump pump with water minder system that will run to an oil separator before it connects to sanitary. A monitoring point would be added to Mechanical discipline BMS.

Rain Water Drainage

Roof Drain system will carry rainwater away from the flat roof of the new building with conventional primary roof drains. Overflow drains will be provided and run independently from the primary drains. Overflow piping will spill to daylight via wall scuppers. Rainwater piping and the system 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 system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit the building in multiple locations.

FIRE PROTECTION SYSTEMS

General

The fire protection systems design complies with the Massachusetts State Building Code (780 CMR), Massachusetts Comprehensive Fire Code (527 CMR), NFPA 13, NFPA 14 (2019 Edition), NFPA 24, NFPA 101, the MSBA School Construction Guidelines, and the requirements of the Wilmington Fire Department.

Water Supply and Service

A hydrant flow test conducted in coordination with the Town of Wilmington Water Department confirms that the available municipal water supply provides adequate static pressure, residual pressure, and flow to meet the calculated sprinkler and standpipe system demand. Based on hydraulic analysis completed at this stage, a fire pump is not required.

An 8-inch fire service is extended from the site hydrant loop into the building's Water Entry Room. Cross-connection control is provided by a supervised 8-inch double check valve assembly backflow preventer located at the service entrance. The Water Entry Room also houses the wet alarm check valve. Downstream of the backflow assembly, a 6-inch wet riser supplies the combined sprinkler and standpipe systems.

System Description

The building is protected by a fully automatic wet-pipe sprinkler system designed and hydraulically calculated in accordance with NFPA 13 except for the receiving area and exterior canopies with building above. Standpipes are provided in each required egress stair enclosure in accordance with NFPA 14. The layout has been arranged so that no portion of the building is more than 200 feet from a standpipe hose valve.

Each standpipe is equipped with a 2½-inch fire department hose valve with a 1½-inch reducer located at the stair floor landing. Hose valves are installed within recessed cabinets coordinated with architectural finishes.

Floor control valve stations are provided at several standpipe risers, in each floor to serve the sprinkler zones such that each zone coverage does not exceed 52,000 sq. ft. Each station includes a monitored shut-off valve, waterflow switch, and an inspector's test valve with sight glass. All valves controlling water flow are electrically supervised and report to the building fire alarm system.

A Storz-type fire department connection is provided at the exterior wall within 100 feet of a site hydrant. The final configuration, whether wall-mounted or free-standing, will be confirmed in coordination with the Fire Department Authority Having Jurisdiction.

Hazard Classifications and Design Criteria

Light Hazard areas include classrooms, corridors, cafeteria, restrooms, offices, media spaces, and gymnasium areas. These spaces are designed at a density of 0.10 gallons per minute per square foot over a 1,500 square foot remote area.

Ordinary Hazard Group 1 areas include the kitchen, mechanical rooms, electrical rooms, locker rooms, and science classrooms. These areas are designed at 0.15 gallons per minute per square foot over a 1,500

square foot remote area. Where applicable, Ordinary Hazard Group 2 areas are designed at 0.20 gallons per minute per square foot over a 1,500 square foot remote area.

Maximum sprinkler spacing complies with NFPA 13, with Light Hazard areas limited to 225 square feet per sprinkler and Ordinary Hazard areas limited to 130 square feet per sprinkler. Required hose stream allowances are included in the hydraulic calculations.

An exterior canopy condition, where occupied building space is located above, will be protected by a dry-pipe sprinkler system.

Sprinkler Types and Materials

Concealed quick-response pendant sprinklers are provided in areas with finished ceilings, with selected locations receiving custom color cover plates to coordinate with architectural finishes. Upright quick-response sprinklers are installed in areas without suspended ceilings. Sprinklers located in the gymnasium and mechanical rooms are provided with listed wire guards for protection.

Fire protection piping 1½ inches and smaller is Schedule 40 steel with threaded or grooved fittings. Piping 2 inches and larger is Schedule 10 steel with roll-grooved fittings and couplings. All fittings are grooved type. Dry system piping is galvanized to improve long-term durability.

The system will undergo hydrostatic testing, main drain testing, dry system trip testing, alarm verification, and final inspection with the Wilmington Fire Department prior to acceptance. Record drawings and hydraulic calculation documentation will be provided at project closeout.

BASIS OF DESIGN NARATIVE - TECHNOLOGY

Voice/Data Structured Cabling System

Voice/data outlets shall be installed in all academic and administrative spaces including but not limited to classrooms and instructional areas, large group assembly spaces, gym, cafeteria, and Library. Voice/data outlets shall be installed at every desk workstation in all offices.

Pathways between each Intermediate Distribution Frame (IDF) Room and the Main Distribution Frame (MDF) Room will be furnished and installed using conduit between rooms and above the finished ceiling of main corridors, as well as conduits between floors. Twelve-strand OM4 multimode and twelve-strand single-mode fiber optic cabling, as well as multi-pair voice riser cable, shall be installed between each IDF and the MDF. Fiber patch panels and voice cross-connect blocks shall be installed in rooms for terminating fiber and multi-pair riser cable.

Data drops shall be furnished and installed including a voice drop for a telephone in each classroom and instructional space.

In new construction areas with new CMU or gypsum walls, furnish and install in-wall two gang outlet boxes, plaster ring, 1 inch conduit to nearest accessible ceiling, insulating bushings, and pull line for all voice/data outlet locations. If nearby accessible ceilings are not feasible, conduits may be extended to the nearest accessible ceiling or directly to nearest IDF room.

A structured cabling system shall be provided consisting of Category 6A voice/data cable, modular jacks, patch panels, wiring blocks, racks, fiber optic cable, fiber patch panels, 2-post and 4-post open equipment racks, device plates, outlet boxes, conduit, etc. for a complete and fully functional voice/data/video system.

Provide structured cabling for wireless access points to be located on ceilings and wall enclosures at designated locations throughout the building to ensure 100% coverage. Provide two Category 6A data cables/jacks at the wireless access point outlet for connection of a future Wireless Access Point to the building Local Area Network.

Preparation for Instructional Video Presentation Equipment

Video presentation equipment and cabling shall be specified and procured as part of the equipment phase of the project for all instructional spaces including but not limited to classrooms, small group meeting spaces, SPED rooms, Library, and conference rooms, etc. Therefore, all academic and administrative areas designated to receive video presentation equipment shall be prepared during construction to accommodate primarily wall-mounted interactive flat panel display technology on height-adjustable mounts.

This will include providing conduit pathways, back boxes, and power to support video presentation equipment, and shall include but not be limited to providing empty double gang outlet boxes at the projector and flat panel device location and at a separate location for making connections to the

device, plaster rings, 1¼ inch conduit to nearest accessible ceiling, insulating bushings, and pull line for all future system video cabling.

Digital Signage System

Data outlets and power receptacles shall be installed in strategic areas to support the installation of Digital Signage displays. Data outlets shall consist of Category 6A cable, devices plates, outlet boxes, conduit, etc.

The Digital Signage System shall consist of 65", 75", and 86" LED flat panel display with easy to manage signage player and software.

Gymnasium Local Sound and Projection System

A dedicated local sound system for the Gymnasium shall be furnished and installed and shall include an amplifier, overhead program playback speakers, Bluetooth for mobile device connections, wireless microphone system, dedicated microphone outlets and an assistive listening system mounted in a sound system rack with a lockable door.

A portable high-lumen projector and a built-in tensioned electric projection screen will be provided in the Gymnasium with user connection plates and a system interface to control the selection of video sources and system volume.

Cafeteria Local Sound and Projection System

A dedicated local sound system for the Cafeteria shall be furnished and installed and shall include an amplifier, program playback as well as voice lift speakers, Bluetooth for mobile device connections, wireless microphone system, dedicated hardwired microphone outlets and an assistive listening system mounted in a sound system rack with a lockable door.

A permanently mounted high-lumen rear projector and a built-in tensioned electric projection screen will be provided in the Cafeteria with user connection plates and a system interface to control the selection of video sources and system volume.

Master Clock and Distributed Communication System

A master clock system with connections to the internet for synchronizing time shall be included in the building. Low voltage secondary clocks shall be installed in all academic and administrative spaces, and in all common spaces such as conference rooms, library, gymnasium, and cafeteria. The master clock shall be located in the MDF room. A fully IP-based distributed communication system shall be furnished and installed with public address speakers located in all classrooms and instructional spaces, offices, administrative areas, conference rooms, library, gymnasium, cafeteria and main corridors. IP PoE Talkback speakers with a call-in switch shall be furnished and installed in all academic classroom and instructional spaces. The distributed communication system central equipment shall be located in the MDF room. The system shall be integrated with the telephone system so that public address announcements can be initiated from any telephone handset using an access code. The

system shall be interfaced to the Master Clock system for generating scheduled bell tones over the distributed communication system speakers.

Video Intercom and Door Control System

A video intercom system shall be installed at the school's main entry doors to provide administrators with a means of communicating with visitors to the school before allowing entry. The system shall provide a way to interact with visitors while receiving visual verification. The system shall also provide administrators with the ability to unlock doors for visitors remotely. The system shall include door stations with speaker and camera, master stations with display and control buttons, and all low voltage cabling and power supplies. The door vendor shall provide electronic door latch hardware.

Integrated Security System

Intrusion Detection: A complete intrusion detection system shall be furnished and installed to include but not be limited to magnetic door contacts, motion detectors, sirens, alarm keypads for arming and disarming the system, conduit, and wire. Intrusion detectors shall be installed in corridors, lobbies and all exterior ground level rooms with windows.

Video Surveillance: A complete video surveillance system shall be furnished and installed to include but not be limited to a server and software, color IP cameras, dedicated network switches, and adequate network storage for archiving video. Interior IP cameras at all egress doors and corridors shall be furnished and installed. Exterior cameras shall be furnished and installed around the exterior of the building. Dedicated Ethernet switches with Power over Ethernet (PoE) ports shall provide power and connectivity to all IP security cameras to the server. A Network Video Recorder (NVR), Video Management System (VMS), and client software shall be included. The NVR shall be large enough to store thirty (30) days of image storage at 15 fps. A cabinet/rack shall be provided in the MDF to house the main equipment including the NVR, rack-mounted monitor, and a UPS system. Conduit and cabling for security camera surveillance system shall be provided under the voice/data structured cabling system. The NVR system including all VMS software and licensing shall be a proprietary system manufactured by Milestone, so that the system matches the existing surveillance VMS currently installed in other buildings. Cameras shall be manufactured by Axis Communications to match the standard in the Town.

Access Control: A complete access control system shall be furnished and installed at designated door locations. The system shall include Card/Proximity Readers, all low voltage cabling, power supplies, and a system server with management software. The door hardware vendor shall provide electronic door latch hardware and Request to Exit devices. The system shall be a proprietary system manufactured by Lenel/S2 to match the existing Netbox Extreme access control system equipment installed in other school buildings.

A complete conduit system including back boxes pull lines, plaster rings, etc. as required to support all security system devices shall be furnished and installed.

Classroom Speech Reinforcement System

A speech reinforcement system shall be provided in all classrooms size instructional spaces. The system shall consist of an amplifier/speaker assembly installed in the finished ceiling utilizing an integrated and dedicated wireless technology, wireless media connector, and two wireless microphones, one lapel microphone for the teacher and another handheld microphone for students.

The system shall amplify the teacher's voice to increase intelligibility, as well as provide a means for providing enhanced program audio playback for multimedia presentations in the classrooms.

The basis of design will be Lightspeed Topcat Cascadia.

School Network Switches and Wireless Access Points

All modern building systems, including but not limited to lighting, HVAC, security, etc., require network connectivity to the internet to function properly.

Therefore, building-wide Network Switches shall be provided, which will deliver network connectivity to voice and data outlets, wireless access points, VoIP telephone handsets, as well as for all building management systems. The Network switch design will also include multiple 10 GbE connections over fiber between IDF Rooms and the MDF room. The network switches and wireless access points shall be a proprietary system manufactured by Cisco Meraki to match the district wide networking standards, which is the basis for all schools in the district.

Telephone and Voicemail System

A telephone system shall be provided, including telephone handsets in all classrooms and instructional spaces; at all administrative/staff office workstations, and in all common areas such as conference rooms, library, etc. The telephone system shall be capable of Voice over IP (VoIP). All head end equipment, including a voice mail system, sized appropriately for the number of users, shall be installed in the MDF.

The system shall be integrated with the Distributed Communication System so that public address announcements can be made from any telephone system handset with the proper access codes pressed at the handset.

The Telephone and Voicemail System shall be a proprietary hosted Zoom VoIP system manufactured by Yealink to match the district wide telephone standards, which is the basis for all schools in the district.

Technology Systems procured and installed during the Equipment Phase (FF&E phase):

Instructional Video Presentation Equipment

Video presentation equipment at all teaching stations including classrooms, SPED rooms, Library, etc. Equipment shall include 65", 75", and 86" interactive flat panels and document cameras. Some ultrashort interactive projectors may also be deployed in specialized areas. Flat panels (and projectors) shall be mounted to the wall with specialized cabling extending between display device and an interface outlet on the teaching wall. Small group meeting spaces and conference rooms may be equipped with smaller 55" interactive flat panel displays.

Computer Network Equipment

Computer network equipment shall include but not be limited to servers, network storage, firewall appliances, teacher and staff computers, teacher tablets, teacher Chromebooks, student computers, student tablets, and Chromebooks.

Computer Carts and Lockers

Storage and Charging Carts and Lockers will be purchased for securing and charging student tablets, Chromebooks, and computer laptops. Lockers provide a means for securely storing and charging student devices in classrooms, while carts offer portability and flexibility in utilizing the technology within the school.

Network Copier/Printer Equipment

Large Copier/Printers shall be supplied and supplemented with smaller workgroup laser printers and personal laser printers in key administrative and teacher support areas.

Portable Video Presentation System

Mobile interactive flat panel and/or projectors on durable, stable wheeled carts or stands for use in areas not equipped with display technology.

Cafeteria Point of Sale Equipment

Electronic Cash Register(s) for processing the purchase of school meals shall be provided.

Visitor Management System

A visitor management system for providing the ability to scan visitor's picture identifications (driver's license) and printing visitor credentials while on school premises shall be provided.

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WILMINGTON ELEMENTARY SCHOOL
SUMMARY OF BUILDING REGULATIONS

90% CONSTRUCTION DOCUMENTS

DORE + WHITTIER

Project Number: **23-0847**
Prepared by: **Dave Mentzer**

Project Summary & Applicable Codes

The Wilmington Elementary School (the Project) includes construction of a new elementary school serving grades Pre-Kindergarten through grade 5. This summary is intended to convey compliance of the completed school building project with the 10th Edition of the Massachusetts State Building Code (CMR 780) which is anticipated to be effective when the project is eligible for construction permitting.

Applicable Codes:

1. Massachusetts State Building Code (780 CMR), 10th Edition (2021 IBC with amendments)
2. Uniform Sate Plumbing Code (248 CMR 10.00)
3. Massachusetts Architectural Access Board (MAAB) Regulations (521 CMR)
4. 2010 Americans with Disabilities Act Standards for Accessible Design (where more stringent than MAAB)
5. Massachusetts Base Energy Code (780 CMR, Chapter 13), 10th Edition (2021 IECC with amendments)*
6. Massachusetts Fire Code (537 CMR 1.00) 2021 NFPA 1 with MA Amendments
7. Massachusetts Electrical Code (527 CMR 12.00) 2023 NFPA 70 with MA Amendments
8. Massachusetts Board of Elevator Regulations (524 CMR)

*The Base Energy Code is listed here as the required minimum energy code applicable in Wilmington. The project has been designed to comply with the Massachusetts Specialized Opt-In Code, CMR 225 c.23 (2021 IECC including Appendix CC as amended for Opt-In Code.)

Occupancy Characteristics

The completed project will contain classrooms for grades Pre-K through 5, administrative offices, a cafeteria (including a performance platform) and associated kitchen, a gymnasium, and associated support spaces (mechanical, electrical, and storage spaces).

The occupancy of the complex will be generally classified as Use Group E (Educational) as defined in Section 305 with specific functions and occupancies defined as follows:

Level	Function	Use Group
1	Classrooms	E
	Offices	B (2)
	Gymnasium	E (1)
	Media Center (Library)	E (1)
	Cafeteria & Kitchen	E (1)
	Storage	S-2 (2)

	Utility & Miscellaneous	U (2)(3)
2	Classrooms	E
	Offices	B(2)
	Storage	S-2 (2)
	Utility & Miscellaneous	U (2)
3	Classrooms	E
	Offices	B(2)
	Storage	S-2 (2)
	Utility & Miscellaneous	U (2)

Note 1: Assembly areas that are accessory to Group E occupancies are not considered separate occupancies (§303.1.3).
Note 2: Accessory occupancies are not required to be separated from the main occupancy (§508.2.4).
Note 3: Incidental Accessory Occupancies shall be separated from the main occupancy as described in Table 509.

Physical Characteristics

The project is organized into a three-story classroom wing to the west and a one and two-story public spaces building to the east. The classroom wing contains primarily educational spaces while the public wing incorporates large volume assembly spaces, additional educational spaces, and administrative areas.

The total facility area of the project identified in the Code Plan Diagrams is described as follows:

Level	**Building Area (SF)**
1	76,227
2	64,165
3	42,206
Total:	**160,731**

The building heights from the average grade plane to highest portion of the flat roof can be characterized as follows:

Stories	**Building Height (Area)**
Three-Story	44 feet (Classrooms)
Two-Story	29 feet (Media Center, Gymnasium

Construction Type, Allowable Height, Allowable Area

Occupancy Separations & Mixed Use

The building is classified as **Type IIA** construction.

Allowable Height

The allowable tabular building height in feet as described in table 504.3 for Type II A, Group E in a building equipped with an automatic sprinkler system is **85 feet.** The maximum roof height, above the average grade is **44 feet,** at the three-story classroom wing. The building complies.

The allowable tabular building height in stories as described in table 504.4 for Type II A, Group E in a building equipped with an automatic sprinkler system is **4 stories.** The maximum number of stories at the classroom wings is **3 stories.** The building complies.

Allowable Area

The allowable tabular area in square feet as described in Table 506.2 for Type II A, Group E in a multistory building equipped with an automatic sprinkler system is **79,500 square feet**.

The project includes a fire access road providing 30-plus foot wide access to 100% of the perimeter of the building. The amount of Area Increase determined in accordance with Table 506.3.3 is **0.75.**

The Project is considered Mixed-Occupancy, Multistory building, and the allowable area for each story is determined in accordance with Section 506.2.2. Because the building is less than four stories, each story will comply individually with Section 508.1 for Mixed Use and Occupancy.

Allowable Area (Aa) = $[A_t + (NS \times I_f)]$
Aa = [79,500 + (26,500 x 0.75)] = **99,375 SF**

Each Story includes unseparated accessory occupancies that do not occupy more than 10 percent of the floor area of the story and complies with Section 508.2 for Accessory Occupancies.

The following Incidental Uses will be provided with the required separation and/or protection in accordance with Table 509:

Incidental Use per Table 509	**Separation and/or Protection**
Electrical rooms containing transformers over 112 1/2 Kva	1 hour separation [1]
Emergency Electrical rooms & closets	2 hour separation [1]

Note 1: Separation based on NEC requirement, included for convenience

Fire Resistance Rating of Building Elements:

Fire resistance rating of building elements for **Type IIA** construction are based on the requirements of Table 601 or by other code provisions as described below. Refer to Means of Egress section of this Summary for rating of egress components.

Primary Structural Elements

1 hour fire-resistance rating

The Project will utilize Heavy Timber framing in accordance with section 2304.11. Heavy Timber portions will support the roof construction over the Cafeteria and portions of the Media Center.

In accordance with Table 601-note c. Heavy Timber complying with section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less fire-resistance rating is required.

Bearing Walls

Exterior: **1-hour** fire-resistance rating
Interior: **1-hour** fire-resistance rating

Other Exterior Walls

The building is significantly separated from any other building and therefore exterior walls are not subject to the fire resistive rating requirements based on separation distance in Table 602.

Exterior walls may be required to be rated in close proximity to exit enclosures in accordance with Section 1023.7.

Portions of exterior walls within 4 feet of the intersection with the fire wall between Code Buildings AB and C will be rated for 1-hour in accordance with section 706.5.1.2.

Interior Walls & Partitions

No requirement based on construction type per Table 601. Interior walls and partitions shall be rated based on the specific conditions outlined in the Occupancy Separations and Mixed Use, Building Separations, or Special Use & Occupancy Considerations sections of this Code Summary. Additional interior wall & partition ratings may also be required by other sections of the code and are described elsewhere in this Summary.

Floor Construction and Secondary Members:

1-hour fire-resistance rating

No requirement based on construction type per Table 601. Horizontal assemblies in compliance with Section 711.2 will be required to separate occupancies as outlined in the Occupancy Separations and Mixed Use, Building Separations, or Special Use & Occupancy Considerations sections of this Code Summary.

Roof Construction and Secondary Members:

1 hour fire-resistance rating

The Project will utilize Heavy Timber framing in accordance with section 2304.11. Heavy Timber portions will support the roof construction over the Cafeteria and portions of the Media Center.

In accordance with Table 601-note c. Heavy Timber complying with section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less fire-resistance rating is required.

Means of Egress

Occupant Loads will be calculated based on Table 1004.1.2 for Assembly Spaces without fixed seating, by actual seat count for spaces with fixed seating (1004.4), or by the design occupant load where this value exceeds the tabular values in accordance with Section 1004.2.

Exception: The gymnasium will have a reduced maximum occupancy of **950 occupants** in lieu of the calculation for assembly spaces without fixed seating in accordance with the Section 1004.5 Exception. Such maximum occupancy will be posted at each door of the gymnasium.

For the sake of these calculations, General Classrooms and other instructional spaces intended to contain only loose furniture are calculated as “Classroom area” (20 net square feet per occupant). Art Studios, Music Classrooms, and other vocational or specialty instruction spaces intended to contain large amounts of fixed casework and/or equipment are calculated as “Shops and other vocational areas” (50 net square feet per occupant).

Exception: Kindergarten and Pre-K classrooms will have a reduced maximum occupancy of **49 occupants** in lieu of the calculation at 20 SF / occupant in accordance with the Section 1004.5 Exception. Such maximum occupancy will be posted at the door to the classrooms. As such, theses spaces are not required to have two means of egress, exit signs, or doors with exit devices.

Occupancy loads for individual spaces are indicated on the Code Plan Diagrams.

The number of required exits per story (per section 1006.3) and the total egress capacity required and provided are summarized on the Code Plan Diagrams.

At least two exits or exit access doorways shall be provided from all spaces with a maximum occupant load larger than 49 per Table 1006.2.1; this requirement is applicable to all general classrooms with a net square footage over 1000 SF except for the alternative occupant loads reviewed and accepted by the Authority Having Jurisdiction noted above.

At least three exits shall be provided from spaces with an occupant load of 501 to 1,000 occupants, and at least four exits shall be provided from spaces with an occupant load greater than 1,000 occupants (1006.2.1.1). Exits shall be arranged in accordance with section 1007.1.1.

The Common Path of Egress Travel shall be limited in accordance with Table 1006.2.1 as follows:

75 feet in Educational and Assembly Occupancies
100 feet in Business Occupancies

Unoccupied mechanical rooms and penthouses are not required to comply with Common Path of Egress Travel requirements in accordance with Section 1006.2.1 Exception 3.

The maximum length of exit access travel distance shall not exceed 250 feet in accordance with Table 1017.2.

Corridors are not required to be rated per Table 1020.1.

Corridors with a required Educational occupancy of 100 or more shall not be less than 72" wide in accordance with Table 1020.2, or not less than 44" for all other portions of the building.

Dead end corridors shall not be greater than 50' in length (1020.4 Ex. 2)

Interior exit stairways, which provide a protected path of egress travel to the exit discharge, shall be enclosed with fire barriers and / or horizontal assemblies with a rating of not less than 1 hour (1023.2).

Exit access stairways, which serve only two stories, are not required to be enclosed with a rated shaft enclosure (1019.3.1).

Special Occupancy & Use Considerations

Cafeteria with Performance Platform

Different occupant loads for the Cafeteria were calculated for Multiple Function Occupant Load in accordance with Section 1004.3. The means of egress assume the highest occupant load scenario. The total occupant load for the Cafeteria is greater than 50 and less than 500, requiring two means of egress per Section 1006.2.

The area identified on the plans as the Platform meets the code definition of a Platform defined in section 202. Portions of section 410 related to stages, proscenium ratings, roof vents, egress from stairs, and rated separations are not applicable to the platform. The construction of the platform will comply with section 410.4.

Gymnasium

A maximum occupant load for the Gymnasium of 950 has been mandated by the Town. As such, the maximum occupant load is reduced as noted above.

Media Center

The occupant load for the Media Center has assumed portions of the space containing shelving will be classified as Stacks and the other portions will be classified as Reading Areas in accordance with table 1004.1.2.

Special Egress Considerations:

Stairways:

Exit access stairways connecting only two stories and which are not open to other stories are not required to be enclosed (1019.3, Ex. 1). The exit access stairway from the upper level adjacent to the Media Center that descends to the Cafeteria will not be enclosed.

Where the exterior stair enclosure walls are not rated, the exterior walls that are less than 180 degrees from the unrated exterior wall of a stairway enclosure shall have a fire resistance rating of not less than 1 hour for a distance of 10 feet from the stair enclosure per section 1023.7. Openings within these walls will have a fire protection rating of ¾ hour.

Fire Protection Systems

Sprinkler systems will be provided in accordance with 903.3.2(1)(a). Such systems will be NFPA 13 systems as required by Section 903.3.1.1

Sprinklers will not be provided in the elevator machine room per Section 903.2 Exception 2. Specific areas exempted from fire protection under section 903.3.1.1.1 require the approval of the fire code official.

Alternative fire-extinguishing systems shall be provided for all Type I hoods in commercial kitchens per section 904.2.2.

Because no floor level is more than 30 feet above the lowest level of fire department vehicle access, no Class III standpipes are required due to building height per section 905.3.1. However, a standpipe will be provided in the enclosed stair as directed by the local Fire Department.

Per section 905.4, Class I standpipe hose connections will be provided to improve the firefighting operations in the following locations:

- At floor level landings of enclosed egress stairs.

The new school will be provided with portable fire extinguishers in accordance with Section 906.1. In addition to general portable fire distribution, additional portable fire extinguishers will be provided in the following locations:

- Within 30 feet of commercial cooking equipment.
- In the elevator machine room.
- On each floor of structure *while under construction* (to be provided by the General Contractor).
- Where required by the International Fire Code sections on Table 906.1. (No such areas have been identified in the project).
- Special hazard areas such as Science Classrooms, Tech classrooms, or other locations required by the fire code official. (No such areas have been identified in the project).

Fire alarm and detection systems will be installed in accordance with Section 907. Refer to Fire Alarm drawings for additional information and requirements.

Emergency Power & Lighting

Emergency Power shall be provided by an on-site generator and in accordance with Chapter 27 to provide the illumination levels set forth in Section 1008. Refer to Electrical drawings for additional information related to generator and egress lighting.

Plumbing Fixtures

The required plumbing fixture types and counts have been calculated based on 248 CMR 10.00: Uniform State Plumbing Code, Table 1.

Pre-Kindergarten **Classrooms with Unisex / Gender-neutral toilet rooms pet 10.10 (15)(c)12.d**								
	Students Only	Toilets	Lavs				Jan. Sink	DF
Required Student Fixtures[9]:	**90**	**5**	**9**				**1 per Flr**	
Provided:							YES	
Gen Neut Allocation[9]	1 Tlt Rm per Classroom	5	5					
Lavs Provide in Classrooms[10]	2 per Classroom		10					
Total Fixtures Provided:		**5**	**15**				**0**	**0**

Kindergarten **Classrooms with Unisex / Gender-neutral toilet rooms pet 10.10 (15)(c)12.d**								
	Students Only	Toilets	Lavs				Jan. Sink	DF
Required Student Fixtures[9]:	**144**	**6**	**6**				**1 per Flr**	
Provided:							YES	
Gen Neut Allocation[9]	1 Tlt Rm per Classroom	8	8					
Lavs Provide in Classrooms[10]	2 per Classroom		16					
Total Fixtures Provided:		**8**	**24**				**0**	**0**

Educational Occupancy Scenario - Whole Building (Excluding Pre-Kindergarten & Kindergarten)								
	Total Occupants	F Toilets	F Lavs	M Toilet	M Lav	M Urinal	Jan. Sink	DF
Required Student Fixtures[1]:	**890**	**11**	**18**	**11**	**18**	**up to 50%**	**1 per Flr**	**7**
Provided:							4	7
Group Toilet Rooms		28	22	27	23	7		
Gen Neut Allocation[4]	0 GN	3	5	6	6			
Total Fixtures Provided:		**31**	**27**	**33**	**29**	**7**	**4**	**7**

Required Faculty Fixtures:					
	Total Occupants	F Toilets	F Lavs	M Toilet	M Lav
Required Faculty Fixtures[2]:	**140**	**4**	**4**	**3**	**4**
Provided:					
Gen Neut Allocation[4]	13 GN = 7F / 6M	7	7	6	6
Total Fixtures Provided:		**7**	**7**	**6**	**6**

Assembly Occupancy Scenario - Code Building B						
	Total Occupants	F Toilets	F Lavs	M Toilet	M Lav	M Urinal
Required Fixtures[3]:	**1240**	**17**	**13**	**9**	**13**	**up to 67%**
Provided[5]:						
Group Toilet Rooms		20	14	15	14	6
Gen Neut Allocation[4]	5 GN = 2F / 3M	2	2	2	2	0
Total Fixtures Provided:		**22**	**16**	**17**	**16**	**6**

1. Student Fixture Counts based on 248 CMR 10.10(15) Table 1 for "Public & Private Schools, Kindergarten, Middle & High School"
2. Faculty Fixture Counts based on 248 CMR 10.10(15) Table 1 for "Public & Private Schools, Kindergarten, Middle & High School Staff"
3. Student Fixture Counts based on 248 CMR 10.10(15) Table 1 for "Assembly - Indoor Recreational Facilities, Rinks, Swimming Pools, Gymnasiums and Other with Spectator Seating (Patrons & Staff)"
4. Gender Neutral Allocation accounts for how designated single user gender neutral toilet rooms have been allocated to male or female fixture requirements to satisfy minimum fixture requiremetn of Table1.
5. Only "open to public" gang and single user toilet rooms on Level 1 have been included in the provided fixtures for Assembly use tabulation.
6. Gender Neutral toilet rooms are used to satisfy the minimum fixture requirements using one of the two options provided in 10.10(15)(g) for each occupancy group.
7. Where option (r) 2. is utilized, the balance of requried fixutres are provided in gender-designated gang toilet rooms
8. Where option (r) 1. is utilized, all required plumbing fixtures are provided in gender neutural single user toilet rooms
9. Fixture Counts based on 248 CMR 10.10(15) Table 1 for "Public & Private Pre-Schools and Daycare" one single user rest toom is allowed for up to 20 children and staff combined. The district has committed to a Pre-Kinderegarten target class size of 15 students per classroom.
10. Per 248 CMR 10.10(15)(c)(12)(d)(ii) for Students younger than six years old, lavatories may be installed in classroom areas.
11. Per 248 CMR 10.10(15)(c)(12)(d)(i) for Students younger than six years old, unisex/gender neutral toilet facilities may be installed.

The minimum fixture counts for students in Special Education classrooms and in Kindergarten through 2nd grade classrooms are provided as unisex/gender-neutral toilet rooms as permitted in section 10:10(15)(g)(2) of 248 CMR. Gang toilet rooms are provided to meet the required fixture counts for students in grades 3 through 5.

Energy Efficiency

The Town of Wilmington is not a Strech Code or Opt-In Code community. However, new school building will be designed in accordance with the Massachusetts Municipal Opt-In Specialized Code (225 CMR 23.00: 2021 International Energy Code with Massachusetts Amendments, including Appendix CC.)

The Project will seek compliance through the Targeted Performance Compliance requirements of Section C401.2.1(2).

The building envelope will demonstrate compliance with the Component Performance Alternative method for Low Glazed Wall System Buildings described in section C402.1.5.1.

A solar ready zone will be indicated on the drawings in accordance with the requirements of section C402.3 and Appendix CB. The required reserved electrical requirements stipulated in Appendix CB will be provided.

Section C402.5 - Air Leakage Thermal Envelope

A continuous air barrier complying with Section C402.5.1 will be provided for the building envelope.

The air leakage of all fenestrations will be specified in accordance with the limitations described in Table C402.5.3.

Building entrances shall be designed with Vestibules in accordance with Section C402.5.5. Exterior doors exempt from this requirement include:

- The Shipping / Receiving door and Mechanical Room door. (Section 402.5.8, Ex. 2).

Accessibility

The Project will comply with the Massachusetts Architectural Access Board (MAAB) 521 CMR, or the 2010 Americans with Disability Act Standards for Accessible Design where it is more stringent than MAAB. Spaces accessed only by ladder, crawlspaces, catwalks, or non-passenger elevators are exempt (Section 3.12).

In educational facilities, only administrative areas, instructional spaces, and areas open to students or the general population are required to comply with 521 CMR (Section 12.1.1). Areas with restricted access intended for use only by staff (such as instructor toilets, toilets for kitchen staff, mechanical and other support spaces) are not required to comply with 521 CMR. Such staff-only toilet rooms or spaces will comply with ADA Standards.

Accessible Routes, General Site and Building Elements

An Accessible Route shall be provided from accessible parking, passenger loading sizes, and public streets or sidewalks to the accessible building entrance they serve and shall coincide with the route for the general public (Section 20.2). At least one accessible route shall connect the building with all facilities, elements, and spaces on the site and within the building (Section 20.2.1). The accessible route will comply with the provisions of Section 20.

All spaces required to be accessible will be provided with at least one accessible means of egress in accordance with Section 20.11.1.

Curb cuts complying with Section 21 shall be provided wherever an accessible route crosses a curb (Section 21.2).

Accessible parking spaces shall be provided in accordance with Table 23.2.1. One in every six, but not less than 1 accessible space shall be van accessible in accordance with ADA 208.2.4 (note this requirement is more stringent than MAAB Section 23.2.2). Accessible spaces will be located on the shortest accessible route from the parking to an accessible entrance (Section 23.3.1). Where an accessible space cannot be located within 200 feet of an accessible entrance, an accessible passenger drop-off shall be provided within 100 feet of the accessible entrance (23.3.3). Accessible Parking Spaces, Accessible Van Spaces, and the associated access to the site Accessible Route will comply with Section 23.4

Plumbing Elements and Facilities

Single User Toilet Rooms intended for use by the students or general public or located in the Administrative Suite shall be accessible in accordance with 521 CMR. Toilet rooms with restricted access only by staff members shall be accessible in accordance with the 2010 ADA Standards.

Toilet rooms intended for use only by pre-kindergarten (Pre-K) and elementary school aged children (as defined Section 30.1-b) shall be designed in accordance with Sections 30.14 through 30.20. This includes single user toilet rooms in Special Education classrooms, single user toilet rooms in Pre-Kindergarten through 2nd grade classrooms, and gang toilet rooms serving assembly spaces and the grades 3 through 5 classroom wing.

Drinking fountains shall be located on each floor along the accessible route and installed in accordance with 521 CMR Section 36.

Special Occupancy Rooms and Features

The spaces or portions of the building described below require unique description and consideration with respect to accessibility.

Stairways and Elevators.

All stairs connecting public and educational or administrative staff areas will be designed as accessible stairways in accordance with Section 27. Stairways intended only for use by service staff, including the roof access stairs or ladders, are not required to be accessible (Section 12.1.1).

The elevator will be designed in accordance with Section 28 and to accommodate the required gurney size described in 524 CRM (Massachusetts Elevator Regulations) Section 17.40-(1). As such, it will accommodate the dimensional requirements described in 521 CMR Section 28.

Assembly Spaces in Educational Facilities - Generally

Amphitheaters, lecture halls, and classrooms will comply with Chapter 14 for Places of assembly in accordance with section 12.1.3. The gymnasium and cafeteria will also comply with the requirements of Chapter 14.

Assistive Listening Systems shall be provided for all assembly spaces in accordance with 14.5.

Gymnasium

Fixed operable bleacher seating will be provided in the Gymnasium, and the requirements for Number of Accessible Seats (Section 14.2) will be provided for each section of operable bleachers.

Cafeteria

No fixed seating will be provided in the Cafeteria, and the requirements for Number of Accessible Seats (Section 14.2) are not applicable to this space.

Cafeteria tables will be a combination of fixed (attached) and loose seating and will accommodate wheelchairs.

The raised platform (Stage) has an accessible route consisting of a ramp designed in accordance with Section 24 (per Section 14.6.1-a.).

Media Center

The Media Center will be designed to accommodate the requirements for Libraries described in Section 12.2.

At least 5% of all reading and study areas, stacks, reference rooms, computer work stations, shall be accessible and designed to accommodate the requirements of Section 12.2.2.

At least one lane of the check-out area will have a counter a maximum of 36" in height (Section 12.2.3).

Security devices and Card Catalogs will not be provided for the facility.

Aisles between stacks will have a minimum clear width of 42" as the preferred dimension described in Section 12.2.6.

Built In Furnishings and Equipment

Per Section 12.4, a minimum of 1 type of each element in each classroom will comply with the following:

- Countertops and sinks will comply with Section 12.2.2-b, c, and d and consist of a Clear Floor Space with Knee Clearance and a countertop height of 28" to 34".
- At least 50% of shelf space in cabinets with comply with Sections 6.5 Forward Reach and 6.6 Side Reach.
- Controls and operating mechanisms shall comply with Section 39 Controls.

GREEN COMMUNITES DESIGNATIONS / REQUIREMENTS D

GREEN COMMUNITIES DESIGNATION AND REQUIREMENTS

The Town of Wilmington has not adopted the **MA Stretch Energy Code.**

The Wilmington Elementary School project will meet the minimum energy efficiency requirements described in the MA DOER "Opt-in Specialized Code" standards. The results of the updated TEDI analysis indicate that the basis of design complies with the Stretch Code TEDI requirements. The detail of the report is included in Appendix 19.

SUSTAINABILITY NARRATIVE

The Town of Wilmington and the design team identified sustainability as an important goal for the Project early in the process and have developed the design with sustainability best practices in mind.

The Project is following the MSBA's Green Schools Program, Project Advisory 81, dated June 2023 and is targeting a minimum of LEED for Schools v4 'Silver' level of certification. The Project will achieve a minimum total of three of seven available points related to indoor air quality and will be designed to, at a minimum, meet the minimum energy efficiency requirements described in the MA DOER "Stretch Code Green Community" standards.

In addition to meeting the minimum requirements of the recently updated MSBA Green Schools Program, the Project will achieve the following to earn additional reimbursement of the Estimated Basis of Total Facilities Grant:

- For 3%: Meet the minimum energy efficiency requirements described in the MA DOER "Opt-in Specialized Code" standards.
- For 1%: Achieve a minimum total of five points (from seven available points) in the LEED indoor air quality points.

Making sustainable choices for the built environment requires the collaboration of all design disciplines in an integrated process, including the architect, owner, consultants addressing the needs of the students and teachers. To that end, the team conducted initial workshops to help expand on these goals and to outline tasks and responsibilities going forward.

The goals for a sustainable project include designing a low impact site and energy-efficient building that serves as an educational tool for staff, students, and visitors. Daylighting and acoustics will be key design elements to improve the interior environmental quality. To the extent possible, the design team

will seek to select building materials and furniture that are low-emitting and have a reduced environmental impact. Per MSBA requirements, the building systems, including the envelope and HVAC systems will be commissioned to ensure they operate efficiently and as designed. Additional sustainable design features will be further reviewed as the design develops.

The Project must achieve a minimum of 50-59 points to be LEED for Schools 'Silver'. Currently, the Project is tracking 65 points as 'Yes' and another 18 identified as 'Maybe'. See below for a summary of the credits being targeted as 'Yes'. In some instances, the beta v4.1 rating system, which is intended to serve as an update to (and improvement upon) LEEDv4, have been followed. The USGBC allows LEEDv4 projects to substitute any prerequisite or targeted credit for the LEEDv4.1 equivalent. An updated LEED scorecard has been provided in which credits this project intends to pursue using the v4.1 criterion have been denoted with (v4.1).

CREDIT-BY-CREDIT SUMMARY

Integrative Process

- IPc1 Integrative Process: The project team perform energy and water-use analyses in early design.

Location + Transportation

- LTc2 Sensitive Land Protection: The project is located on previously developed land.
- LTc3 High Priority Site: The project is located on a Difficult to Develop Area (DDA) as designated by HUD.
- LTc4 Surrounding Density and Diverse Uses: The project is located within 1/2-mile walking distance of at least 4-7 diverse uses.
- LTc8 Electric Vehicles **v4.1**: Electric vehicle charging spaces will be provided for at least 5% of the total parking capacity of the project.

Sustainable Sites

- SSc1 Site Assessment: Early analysis was completed to assess the impacts of the site topography, hydrology, climate, vegetation, soils, human use, and potential human health effects.
- SSc2 Site Development – Protect or Restore Habitat: The project will restore 30% (including the building footprint) of the previously developed site area with native & adaptive vegetation.
- SSc3 Open Space: The project will provide outdoor space greater than or equal to 30% of the total site area (including building footprint), where a minimum of 25% of that outdoor space must be vegetated. The outdoor space will be physically accessible.
- SSc4 Rainwater Management **v4.1**: The Project will be able to treat and manage the 80th percentile storm events on-site using low-impact development and green infrastructure.

- SSc6 Light Pollution Reduction: The Project team is exploring opportunities to meet uplight and light trespass requirements for the area's lighting zone.
- SSc8 Joint Use of Facilities: The project will include spaces that are designated for joint use.

Water Efficiency

- WEc1 Outdoor Water Use Reduction: The Project will require no permanent irrigation for landscaping (excluding athletic fields).
- WEc2 Indoor Water Use Reduction: Potable water use will be reduced by at least 30% compared to the baseline for indoor plumbing fixtures and all commercial kitchen fixtures and appliances will meet credit requirements.
- WEc3 Optimize Process Water Use **v4.1**: Following Option 2, the project will show a 100% reduction in annual water use as compared to a water-cooled chiller system by not including a cooling tower in the design.
- WEc4 Water Metering: The Project will include submeters for at least two of the following water subsystems to meet credit requirements: irrigation, indoor plumbing fixtures and fittings, domestic hot water, boiler, and/or other process water.

Energy + Atmosphere

- EAc1 Enhanced Commissioning: As required by the MSBA, a third-party commissioning agent will be brought on board to perform enhanced commissioning activities for the building systems and envelope. Monitoring-based commissioning will also be pursued.
- EAc2 Optimize Energy Performance: The project will follow the Electrification Alternative Compliance Pathway (ACP): EApc161 Energy Simulation Performance Path. The ACP uses "Demand Adjusted Energy" metric, that considers both electricity and fuel consumption to evaluate energy performance, as well as calculating and evaluating a reduction in greenhouse gas emission.
- EAc3 Advanced Energy Metering: The project will include advanced energy meters on all energy sources used by the base building, as well as any individual energy end uses that represent 10% or more of the total annual consumption of the building.

Materials + Resources

- MRc2 BPDO: EPDs **v4.1**: The project manual will be developed to include language for environmental product declarations for at least 20 different, permanently installed products.
- MRc4 BPDO: Material Ingredients **v4.1**: The project manual will be developed to include language for healthy materials with disclosure documentation in the form of health product declarations, Declare Labels, Cradle-to-Cradle Certification, or Product Lens certification for at least 20 different, permanently installed products.

- MRc5 Construction and Demolition Waste Management: The project will target the diversion of at least 4 distinct waste streams at a rate of at least 50% during construction and demolition phases.

Indoor Environmental Quality

- EQc1 Enhanced IAQ Strategies: MERV 13+ filtration media will be installed for all units delivering supply air. Cross-contamination measures (i.e., negative pressure, automatic door closers, etc.) will be provided for all hazardous chemical storage areas. Walk-off mats will be provided at all regularly used entrances. All densely occupied spaces will be provided with CO2 monitoring.
- EQc2 Low-Emitting Materials **v4.1**: The project manual will be developed to include language for low-emitting materials for project finishes such as adhesives & sealants, paints & coatings, flooring, ceilings, insulation, wall panels, and composite wood.
- EQc3 Construction IAQ Management Plan: The Project will require the contractor to develop and implement an IAQ management plan that requires compliance with all applicable control measures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.
- EQc4 IAQ Assessment: The Project will conduct a flush-out of the building prior to occupancy.
- EQc5 Thermal Comfort: The Project will meet the thermal comfort criteria established by ASHRAE 55-2010 for applicable spaces. At least 50% of individual occupant spaces and all multi-occupant spaces will be equipped with thermal controls.
- EQc6 Interior Lighting: At least 90% of individual occupant spaces and all multi-occupant spaces will be equipped with lighting controls.

Innovation

- INc1 Innovation – O+M Green Cleaning + IPM: The Project will implement a Green Cleaning Plan and an Integrated Pest Management Plan.
- INc2 Innovation – Local Food Production: The project will include adequate space for growing edible plantings, as well as programmatic areas nearby for students to congregate.
- INc3 Innovation – Purchasing - Lamps: The lighting design is 100% LED.
- INc4 Exemplary Performance – Optimize Process Water Use: Following Option 2, the project will show a 100% reduction in annual water use as compared to a water-cooled chiller system by not including a cooling tower in the design.
- INc5 Pilot – Integrative Analysis of Building Materials: The Project will use at least 3 different permanently installed products that have a documented qualitative analysis of the potential health, safety, and environmental impacts of the product in five stages of the product's life cycle.
- INc6 LEED AP: Multiple principal project participants are LEED Accredited Professionals.

UPDATED LEED SCORECARD E

LEEDv4 BD+C: Schools (LEEDv4 SC)
Project Scorecard

The Green Engineer
Sustainable Design Consulting

Project: Wilmington Elementary School
Address: 320 Salem Street Wilmington, MA
Date: 8/20/26

Yes	Maybe	No				
1	0	0	**INTEGRATIVE PROCESS**		**1**	**Responsible**
1			IPc1	Integrative Process	1	Team
Yes	**Maybe**	**No**				
4	0	11	**LOCATION & TRANSPORTATION**		**15**	**Responsible**
		N	LTc1	LEED for Neighborhood Development Location	15	Team
1			LTc2	Sensitive Land Protection	1	Civil
1		1	LTc3	High Priority Site	1-2	Env. Eng.
1		4	LTc4	Surrounding Density and Diverse Uses	1-5	TGE
		4	LTc5	Access to Quality Transit	1-4	TGE
		1	LTc6	Bicycle Facilities	1	Arch/LA
		1	LTc7	Reduced Parking Footprint	1	Arch/Civil
1			LTc8	Green Vehicles	1	Arch/Civil
Yes	**Maybe**	**No**				
7	4	1	**SUSTAINABLE SITES**		**12**	**Responsible**
Y			SSpr1	Construction Activity Pollution Prevention	Req'd	Civl/CM
Y			SSpr2	Environmental Site Assessment	Req'd	Env. Eng.
1			SSc1	Site Assessment	1	Arch/Civil/LA
2			SSc2	Site Development - Protect or Restore Habitat	1-2	LA
1			SSc3	Open Space	1	LA
1	2		SSc4	Rainwater Management	2-3	Civil
	2		SSc5	Heat Island Reduction	1-2	Arch/LA
1			SSc6	Light Pollution Reduction	1	MEP/LA
		1	SSc7	Site Master Plan	1	Owner
1			SSc8	Joint Use of Facilities	1	Arch/Owner
Yes	**Maybe**	**No**				
10	0	2	**WATER EFFICIENCY**		**12**	**Responsible**
Y			WEpr1	Outdoor Water Use Reduction	Req'd	LA
Y			WEpr2	Indoor Water Use Reduction	Req'd	MEP
Y			WEpr3	Building-level Water Metering	Req'd	Owner/MEP
2			WEc1	Outdoor Water Use Reduction	1-2	LA
5		2	WEc2	Indoor Water Use Reduction	1-7	MEP
2			WEc3	Cooling Tower Water Use	1-2	MEP
1			WEc4	Water Metering	1	MEP
Yes	**Maybe**	**No**				
23	1	7	**ENERGY & ATMOSPHERE**		**31**	**Responsible**
Y			EApr1	Fundamental Commissioning and Verification	Req'd	CxA
Y			EApr2	Minimum Energy Performance	Req'd	Team/Modeler
Y			EApr3	Building-level Energy Metering	Req'd	MEP
Y			EApr4	Fundamental Refrigerant Management	Req'd	MEP
6			EAc1	Enhanced Commissioning	2-6	CxA
16			EAc2	Optimize Energy Performance	1-16	Team/Modeler
1			EAc3	Advanced Energy Metering	1	MEP
		2	EAc4	Demand Response	1-2	Owner/MEP
		5	EAc5	Renewable Energy Production	1-3	Owner
	1		EAc6	Enhanced Refrigerant Management	1	MEP

Yes	Maybe	No	MATERIALS & RESOURCES		13	Responsible
Y			MRpr1	Storage & Collection of Recyclables	Req'd	Owner/Arch.
Y			MRpr2	Construction and Demolition Waste Management Plan	Req'd	CM
	1	4	MRc1	Building Life-Cycle Impact Reduction	2-5	Arch
1	1		MRc2	Building Product Disclosure & Optimization-EPD's	1-2	Arch/CM
	1	1	MRc3	Building Product Disclosure & Optimization-Raw Materials	1-2	Arch/CM
1	1		MRc4	Building Product Disclosure & Optimization-Material Ingredients	1-2	Arch/CM
1	1		MRc5	Construction and Demolition Waste Management	1-2	CM

Yes	Maybe	No	INDOOR ENVIRONMENTAL QUALITY		16	Responsible
Y			EQpr1	Minimum IAQ Performance	Req'd	MEP
Y			EQpr2	Environmental Tobacco Smoke (ETS) Control	Req'd	Owner
Y			EQpr3	Minimum Acoustical Performance	Req'd	Acoust. Eng.
2			EQc1	Enhanced IAQ Strategies	1-2	Arch/MEP
3			EQc2	Low-Emitting Materials	1-3	Arch/CM
1			EQc3	Construction IAQ Management Plan	1	CM
1	1		EQc4	IAQ Assessment	1-2	Owner/CM
1			EQc5	Thermal Comfort	1	MEP
1	1		EQc6	Interior Lighting	1-2	Arch/MEP
	3		EQc7	Daylight	1-3	Arch
	1		EQc8	Quality Views	1	Arch
	1		EQc9	Acoustic Performance	1	Acoust. Eng.

Yes	Maybe	No	INNOVATION		6	Responsible
1			INc1.1	Innovation: O+M - Green Cleaning + IPM	1	Team
1			INc1.2	Innovation: Local Food Production	1	Team
1			INc1.3	Innovation: Purchasing - Lamps	1	Team
1			INc1.4	Exemplary Performance Credit: Optimize Process Water Use (100% reduction)	1	Team
1			INc1.5	Pilot Credit: Integrative Analysis of Building Materials	1	Team
1			INc2	LEED Accredited Professional	1	Team

Yes	Maybe	No	REGIONAL PRIORITY 01887 (underlined)		4	Responsible
		X	RPc1	Regional: Surrounding Density (4 pts)	1	-
		X	RPc2	Regional: Access to Quality Transit (1 pt)	1	-
1			RPc3	Regional: Protect or Restore Habitat (2 pts)	1	-
1			RPc4	Regional: Optimize Energy Performance (8 pts)	1	-
			RPcX	Regional: Renewable Energy (2 pts)	1	-
			RPcX	Regional: Building Lifecycle Impact Reduction (2 pts)	1	-

Yes	Maybe	No	PROJECT TOTALS (Certification Estimates)	110
65	18	27		

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

SITE VULNERABILITY AND RISK ASSESSMENT NARRATIVE

Summary

Below is a statement from D+W describing the status of the project scope, as related to a site vulnerability and risk assessment evaluation for Wilmington Elementary School project. This is an update to the risk assessments of the selected site and project as described in previous modules of submissions to the MSBA.

Vulnerabilities Assessments

Flooding & Storm Surges

No changes to the project scope that would affect the risk assessment noted in previous submissions.

High Winds

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Extreme Temperatures

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Winter Weather

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Power Outages

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Community Resilience

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Developmental Considerations

General Site Suitability

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Building Massing & Orientation

No changes to the project scope that would affect the risk assessment in previous submissions.

Floor Elevations of Occupied Areas and Critical Equipment

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Stormwater Management

No changes to the project scope that would affect the risk assessment noted in in previous submissions.

Building Materials

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Building Systems Selection

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Emergency Back-Up Systems

No changes to the project scope that would affect the risk assessment noted in previous submissions.

Emergency Event Design Considerations

No changes to the project scope that would affect the risk assessment noted in previous submissions.

LIST OF PROPRIETARY ITEMS G

PROPRIETARY PRODUCTS NARRATIVE

Summary

A proprietary specification items list has been developed and preliminarily included in the Specifications. The Design Team will continually review these items throughout the development of the documents to identify additional products that meet the required specification and performance criteria to reduce the need for proprietary items.

The school building committee understands that Mass. General Laws, Chapter 30 Section 39M(b), require that materials specifications in construction contracts name a minimum of three manufacturers for each material or product specified in order to provide for competitive bidding. Specifications that restrict competition to less than three manufacturers may only be used for "sound reasons in the public interest" after a reasonable investigation.

For each product, D+W has undertaken an in-depth investigation and determined, in accordance with MGL Chapter 30 Section 39M(b), that for reasons of the product performance, reliability, maintenance issues, coordination with existing products in the district, and/or an anticipated life cycle cost savings, that designation of the products as "proprietary" for bidding purposes is in the public interest for the reasons stated.

Products that are under consideration are as outlined below. Any additional products under consideration by the owner will be further reviewed in the upcoming phase.

1. Thermal Insulation:
    a. Cellular Glass Insulation: Pittsburgh Corning FOAMglas Perinsul SIB.
2. Door Hardware:
    a. Locks, cylinders, and keying: Schlage Primus and Mortise Locks
3. Glazing:
    a. School Guard laminated security glazing - Where School Guard glazing is used, sealant and accessories shall be of types approved by School Guard manufacturer.
4. Fire Protection Specialties:
    a. Knox Rapid Entry System.
    b. Fire Panels: Silent Night or Firelight
5. HVAC:
    a. Building Management System: Johnson Controls
7. Electrical:
    a. Lighting Controls: Current NX Site Manager
8. Communications:
    a. Network Switches: Cisco C9300
    b. Wireless: Meraki – MR Series
    c. VOIP Phone: Yealink.
    d. Classroom Audio Systems: Lightspeed Topcat.
9. Electronic Building Security Systems:

a. Door access control systems, including door hardware, control electronic hardware, and operating system software: Genetec (Lenel/S2)
b. Video surveillance equipment, including closed circuit video cameras, control electronic hardware, and operating system software: exacqVision
c. Cameras/ Intrusion Detection: Axis
d. Door Video-Intercom and Control System: AiPhone

EXTERIOR AND INTERIOR COLOR THEORY NARRATIVE

Summary

The proposed exterior and interior materials, finishes, and color selections for Wilmington Elementary School are informed by the character of Wilmington's natural landscape and the architectural traditions of New England civic buildings. Drawing inspiration from the region's wetlands, waterways, and wooded terrain, the design establishes a cohesive framework that supports a welcoming learning environment while emphasizing durability, clarity, and long-term performance.

Material and color selections are intentionally restrained and organized to reinforce the building's architectural composition, support intuitive wayfinding, and create spaces that feel calm, grounded, and enduring. Throughout the design process, the project team has worked closely with the Town, District and School Building Committee to review and confirm the proposed materials, finishes, and color palette to ensure alignment with District priorities for durability, maintainability, and long-term stewardship.

Exterior

The exterior of Wilmington Elementary School is designed to reflect the architectural heritage of New England while complementing the established material palette found throughout Wilmington, Massachusetts. The exterior color and material strategy draws upon traditional masonry tones commonly used in civic and educational buildings, creating a building that feels both timeless and welcoming to the community.

At the base of the building, tan veneer concrete masonry units establish a strong visual foundation. This material wraps the building perimeter and defines key structural elements such as exterior columns, providing a durable and grounded presence at the pedestrian level. The warm tan tone references natural stone and masonry traditionally used in New England institutional buildings while offering a resilient surface suited to areas exposed to high traffic, snow accumulation, and maintenance demands.

Above the base, the first and second floors of the classroom wings are clad in gray masonry brick. This cool gray tone provides a calm, neutral field that balances the warmth of the base while maintaining a restrained civic character appropriate for an educational setting. The gray brick also visually unifies the classroom levels, allowing the building massing to read as cohesive while subtly expressing the rhythm of the internal learning environments.

At the third-floor classroom level, the masonry palette shifts to red brick, introducing a color traditionally associated with schools and civic buildings throughout Massachusetts. This red brick band reinforces the building's connection to regional architectural traditions while helping break

down the building's vertical massing. The layered masonry composition adds visual depth and scale to the façade while maintaining a consistent material language.

Accenting these primary masonry materials are tan cast stone panels and horizontal banding located at key program areas including the Library, Cafeteria, and vertical circulation elements such as stair shafts. These cast stone elements introduce refined detailing that highlights important shared spaces within the school. The warm tone complements the base masonry while providing subtle contrast with both the gray and red brick. The horizontal banding reinforces the building's proportions and provides continuity across façade transitions.

Curtain wall glazing is incorporated at selected program areas, including the Cafeteria and Extended Learning spaces, to introduce transparency and natural light within the primarily masonry façade. These glazed areas create moments of visual openness that emphasize key communal spaces while strengthening connections between the interior and the surrounding site.

At the Cafeteria, expansive curtain wall glazing opens views toward the entry courtyard, reinforcing the space as a central hub of student activity and community engagement. The transparency allows interior activity to be visible from the arrival areas while providing students with views of the landscape and entry sequence.

Similarly, Extended Learning areas include curtain wall glazing oriented toward the playground courtyards. This strategy strengthens the relationship between indoor and outdoor learning environments while allowing staff to maintain visual connection to play areas and bringing natural daylight deeper into the building.

To further enrich the material composition and strengthen the building's connection to the Wilmington community, blue masonry brick is introduced as a transitional accent within the façade. This color references Wilmington's town color and provides a subtle yet meaningful civic identity within the overall palette. The blue brick is strategically integrated with tan cast stone elements at the west end stair shafts and along portions of the playground courtyard façades, where it acts as a visual transition between the primary gray and red brick fields.

At the west end stair towers, the blue brick and cast stone combination highlights these vertical circulation elements as important landmarks within the building composition. The contrast between the cool blue brick and the warm tan cast stone creates a layered architectural expression that distinguishes these elements without disrupting the overall harmony of the masonry palette. Within the playground courtyard, the blue brick serves as an inviting accent that adds visual interest and reinforces a sense of place for students. The color provides a playful yet refined note that reflects the school's educational mission while subtly celebrating the identity of the town.

Together, the grounded masonry base, layered brick palette, cast stone accents, and strategically placed curtain wall glazing create a balanced and contextually responsive façade. The design reflects the enduring masonry traditions of New England civic architecture while integrating contemporary elements that support daylight, visibility, and connections to the landscape. The resulting exterior expression is durable, welcoming, and aligned with the character of the Wilmington community.



Figure 1: Exterior view from the southeast.

Figure 2: Exterior view of blue brick and cast stone accent and from the west



Interior

Interior Color and Material Narrative

The interior material and color strategy for Wilmington Elementary School draws inspiration from the natural landscape of Wilmington, including its wetlands, wooded areas, and waterways. These environmental qualities inform a calm, cohesive interior environment that supports learning, orientation, and student development.

Rather than relying on literal imagery or highly graphic applications, the design interprets these natural references through a restrained palette of colors, textures, and materials. The goal is to create interiors that feel warm, grounded, and timeless while maintaining clarity, durability, and long-term maintainability appropriate for an elementary school environment.

Movement through the building is supported through clear spatial organization and subtle material and color cues that help students and staff intuitively understand circulation and location within the building.

Interior Framework

The interior color framework reflects the developmental progression of students within the school. As students move through the building's levels, the palette shifts subtly in tone and contrast to reinforce identity and support age-appropriate environments while maintaining overall consistency throughout the building.

Variation in color is carefully controlled so that spaces remain visually calm and easy to navigate. The design intentionally avoids complex patterns or overly decorative applications that could become distracting or difficult to maintain over time.

Level 1 – Foundation: Roots and Water

The first level establishes a sense of stability and comfort for the youngest students. Accent tones draw from wetland and woodland conditions, incorporating softened greens, blue-inflected neutrals, and warm earth tones. These colors create a welcoming and grounded atmosphere while supporting orientation and visual clarity.

Primary finishes remain calm and consistent to reduce overstimulation and support focused learning environments.



Figure 3: Level 1 Interior design concept and framework

Level 2 – Growth: Structure and Branching

The second level introduces slightly richer tones inspired by woodland landscapes, including muted bark tones and mid-range foliage hues. These colors reflect a sense of growth and development while maintaining a balanced and cohesive palette.

At this level, students are developing greater independence, and the environment supports this transition through subtle increases in color variation while maintaining overall visual consistency.

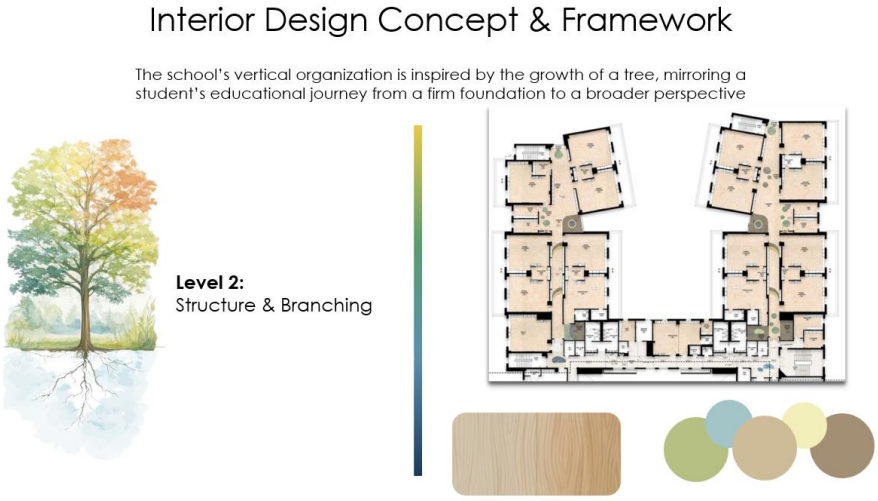


Figure 4: Level 2 Interior design concept and framework

Level 3 – Canopy

The upper level represents the canopy layer of the conceptual framework and reflects increased independence and perspective for older students. Accent tones incorporate slightly lighter, more expansive hues inspired by sky and filtered canopy light. The primary finishes remain consistent with the rest of the building to maintain a unified interior character.

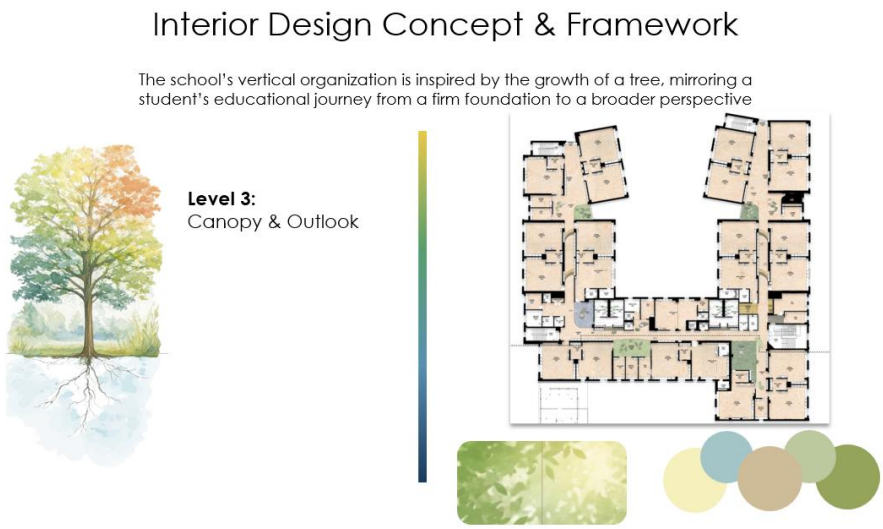


Figure 5: Level 3 Interior design concept and framework

Material Strategy

Material selections throughout the building prioritize durability, maintainability, and long-term performance while supporting a cohesive aesthetic.

Primary finishes remain consistent across the building to simplify maintenance and reinforce visual clarity. These include:

- Linoleum flooring as the primary flooring material in classrooms and learning areas
- Terrazzo flooring at primary gathering spaces and high-traffic circulation areas
- Durable wall tile at high-impact locations
- Consistent door and casework finishes throughout the building

The primary wall color is a warm neutral that reflects daylight effectively while reducing visual fatigue. Accent colors are introduced selectively to support level identity and assist with orientation.

Floor material transitions are used strategically to reinforce program zones and durability requirements rather than graphic expression. The design intentionally avoids highly patterned flooring applications that could create visual distraction or complicate long-term maintenance.

Wood elements at doors, casework, and select ceiling locations introduce warmth and texture while reinforcing the natural material palette.

Material selections were evaluated based on:

- Durability under heavy daily use

- Ease of cleaning and maintenance
- Long-term aging characteristics
- Availability of replacement materials
- Overall life-cycle value

Wayfinding and Identity

Wayfinding is integrated through architectural elements, controlled accent colors, and clear spatial hierarchy. Level-based accent tones help differentiate grade areas while maintaining a cohesive overall palette throughout the building.

Nature-inspired graphics to be used selectively at key locations to reinforce identity and orientation without overwhelming the environment.

This approach supports intuitive navigation for students and staff while maintaining visual consistency across the building.



Figure 6: Interior finishes

District Review and Alignment

Throughout the Construction Documents phase, the project team has worked closely with the Town and District, including the Site and Interiors Liaisons, and the School Building Committee, to review the proposed exterior and interior materials, finishes, and color selections.

The exterior materials, including masonry, cast stone, and curtain wall systems, were evaluated with the District to ensure alignment with the architectural character of Wilmington and the project's goals for durability and long-term performance. Interior materials and finishes, including flooring, wall finishes, casework, and accent colors, were similarly reviewed to support maintainability, operational needs, and a cohesive learning environment.

The District has reviewed and confirmed alignment with the proposed exterior and interior material, finish, and color selections as part of the 90% Construction Documents submission.



Figure 7: Cafeteria + Stair view

Project:

Wilmington Elementary School

MSBA Module 6 Requirements:

90% Construction Documents – Structural Loading Calculations

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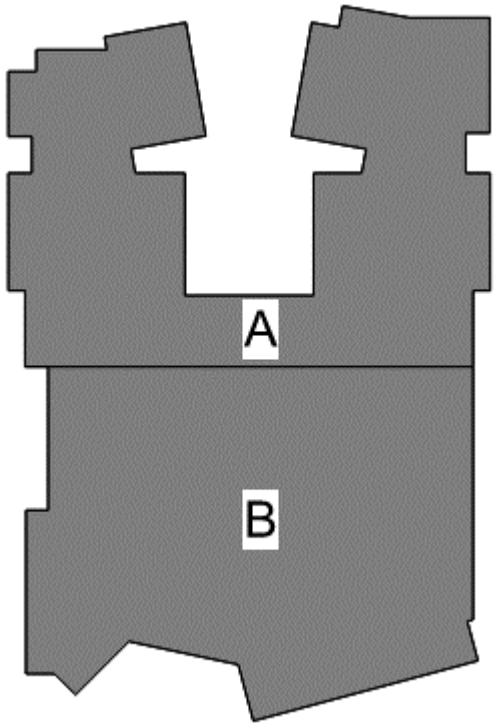
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Project Synopsis

The project is located in Wilmington, Massachusetts. The building to be constructed is a three-story elementary school. The building is comprised of two zones, named Area A and B on the project documents. Area A will be a three-story academic wing for classrooms. Area B will be a three-story area for the kitchen, cafeteria, gymnasium, and mechanical rooms.

The majority of the structure will be steel-framed, supported by reinforced concrete foundations. The first floor shall be constructed as a normal-weight concrete slab-on-grade. All floor systems above the first floor will be constructed with light-weight concrete slab-on-steel deck, spanning across steel beams, supported by steel girders and columns. The majority of the roof system throughout the building will constructed with steel deck, spanning across steel beams, supported by steel girders and columns. The roof systems at high-profile areas such as the cafeteria and library will be constructed with dowel-laminated timber paneling, spanning across glue-laminated timber beams, supported by timber and steel girders and columns.

The typical lateral load resisting system for the structure will be ordinary concentric braced frames, comprised of hollow structural steel (HSS) members. Some areas of the structure, such as the gymnasium and kitchen, will utilize special reinforced masonry shear walls for the lateral load resisting system.

Design Codes

1. Massachusetts State Building Code, 10th Edition
2. International Building Code, 2021 Edition
3. ASCE 7-16: Minimum Design Loads for Buildings and Other Structures
4. ACI 318-14: Building Code Requirements for Structural Concrete
5. ACI 530-13: Building Code Requirements for Masonry Structures
6. AISC 360-10: Specification for Structural Steel Buildings
7. *Other codes as required by the design codes listed above*

Geotechnical Recommendations for Foundation Analysis and Design

The foundation design for this project shall be done using the recommendations from the geotechnical report, prepared by Lahlaf Geotechnical Consulting, Inc. from January 14, 2026. Their report includes the recommended maximum net allowable bearing pressure of 4,000 pounds per square-foot to be used for the design of the structure's foundations.

Project Materials and Strengths

Concrete:

a.	Foundations	f_c' = 4500 psi, Normal-Weight Concrete
b.	Slab On Grade	f_c' = 4500 psi, Normal-Weight Concrete
c.	Composite Slab On Steel Deck	f_c' = 4500 psi, Light-Weight Concrete
d.	Exterior Concrete	f_c' = 5000 psi, Normal-Weight Concrete

Reinforcing Steel:	ASTM A615, Grade 60
Welded Wire Reinforcement:	ASTM A1064

Structural Steel:

a.	Wide-Flange	ASTM A992, F_y = 50 ksi
b.	Channels	ASTM A36, F_y = 36 ksi
c.	Plates, Bars, Angles, etc.	ASTM A36, F_y = 36 ksi
d.	Hollow Structural Steel Sections (Square and Rectangular)	ASTM A500, Grade C, F_y = 50 ksi
e.	Hollow Structural Steel Sections (Round)	ASTM A500, Grade C, F_y = 46 ksi
f.	Structural Pipes	ASTM A53, Grade B, F_y = 46 ksi
g.	High-Strength Bolts	ASTM A325-N

Steel Deck	ASTM A653 (Galvanized)
Concrete-Masonry Units	ASTM C90, Grade N – Type I, 2000 psi
Grout:	ASTM C476, 2500 psi
Mortar:	ASTM C270 – Type S, 1800 psi

Glue-Laminated Timber:

a.	Beams	Douglas Fir-Larch, Grade 24F-V4 DF/DF
b.	Girts	Douglas Fir-Larch, Grade 24F-V8 DF/DF
c.	Columns	Douglas Fir-Larch, Grade 26F-V2 DF/DF

Dowel-Laminated Timber:	Spruce Pine Fir, (Minimum) Grade No. 2
Plywood Sheathing:	APA-Rated Sturd-I-Floor Tongue-and-Groove

Dead and Live Loading Parameters

Typical Floor Dead Load:

2 in. x 18-Gauge Composite Steel Deck	3 psf
5 ¼ in. Light-Weight Concrete	42 psf
Mechanical/Electrical/Plumbing/Fire Protection	8 psf
Ceiling	2 psf
Miscellaneous	5 psf
	∑60 psf

Typical Roof Dead Load:

3 in. x 18-Gauge Type NS or NSA Steel Deck	3 psf
Roofing and Insulation	7 psf
Mechanical/Electrical/Plumbing/Fire Protection	8 psf
Ceiling	2 psf
Photovoltaic Panels	15 psf
Miscellaneous	5 psf
	∑40 psf

Typical Mechanical Roof Pad Dead Load:

3 in. x 16-Gauge Composite Steel Deck	4 psf
7 in. Normal-Weight Concrete	66 psf
Roofing and Insulation	7 psf
Mechanical/Electrical/Plumbing/Fire Protection	8 psf
Ceiling	2 psf
Miscellaneous	5 psf
	∑92 psf

Dowel-Laminated Timber Roof Dead Load:

¾ in. APA-Rated Surd-I-Floor Tongue and Groove Sheathing – Exposure 1 Plywood	3 psf
2x8 Acoustic Dowel-Laminated Timber Paneling	20 psf
Roofing and Insulation	7 psf
Mechanical/Electrical/Plumbing/Fire Protection	8 psf
Photovoltaic Panels	15 psf
Miscellaneous	5 psf
	∑58 psf

Typical Live Loads:

Classrooms with Partitions……..	40 psf + 15 psf *(Reducible)*
Reading Rooms……	60 psf *(Reducible)*
Corridors (First Floor)……..	100 psf *(Reducible)*
Corridors (Above First Floor)……..	80 psf *(Reducible)*
Lobbies…….	100 psf *(Non-Reducible)*
Assembly/ Public Gathering Areas……..	100 psf *(Non-Reducible)*
Stairs…….	100 psf *(Non-Reducible)*
Storage (Light)…….	125 psf *(Non-Reducible)*
Storage (Mechanical Equipment Rooms)…….	150 psf *(Non-Reducible)*
Roof (Live)……...	20 psf *(Non-Reducible)*

Snow Loading Paramters

Ground Snow Load, P_g	50 psf
(Minimum) Flat Roof Snow Load, P_f (min)	30 psf
Terrain Category	B
Exposure Factor, C_e	1.00 (Partially Exposed)
Thermal Factor, C_t	1.00 (All)
Importance Factor, I_S	1.10 (Importance Category III)
Flat Roof Snow Load, P_f	39 psf

Allowance for drifting per the tenth edition of the Massachusetts State Building Code

Wind Loading Parameters

Wind loading parameters as per the tenth edition of the Massachusetts State Building Code

Basic Wind Speed, V	126 mph (Risk Category III)
Exposure Category	B

Wind loads in accordance with ASCE 7-16

Seismic Loading Parameters

Seismic loading parameters as per the tenth edition of the Massachusetts State Building Code

Seismic Design Category	B (Risk Category III)
Site Class	D
Mapped Spectral Response Accelerations	$S_S = 0.327$; $S_1 = 0.072$
Basic Seismic Force Resisting Systems	Structural Steel Systems Not Specifically Detailed for Seismic Resistance
Response Modification Factor, R	3.0
Deflection Amplification Factor, C_d	3.0
Analysis Procedure	Equivalent Lateral Force
Seismic Importance Factor, I_E	1.25 (Risk Category III)
Spectral Resopnse Coefficients	$SD_S = 0.329$; $SD_1 = 0.115$
Seismic Response Coefficient, C_s	0.137

Sample Gravity Analysis and Design Calculations

1. Non-Composite Steel Beam

In accordance with AISC 360-10 using the LRFD method

Support conditions

Support A	Vertically restrained
	Rotationally free
Support B	Vertically restrained
	Rotationally free

Applied loading

Beam loads	Dead self weight of beam × 1
	Dead full UDL 0.34 kips/ft
	Roof live full UDL 0.17 kips/ft
	Snow full UDL 0.3 kips/ft

Load combinations

Load combination 1	Support A	Dead × 1.20
		Live × 1.60
		Roof live × 1.60
		Snow × 1.60
		Dead × 1.20
		Live × 1.60
		Roof live × 1.60
		Snow × 1.60
	Support B	Dead × 1.20
		Live × 1.60
		Roof live × 1.60
		Snow × 1.60

Analysis results

Maximum moment	M_{max} = **135.9** kips_ft	M_{min} = **0** kips_ft
Maximum shear	V_{max} = **18.1** kips	V_{min} = **-18.1** kips
Deflection	δ_{max} = **0.9** in	δ_{min} = **0** in
Maximum reaction at support A	R_{A_max} = **18.1** kips	R_{A_min} = **18.1** kips
Unfactored dead load reaction at support A	R_{A_Dead} = **5.7** kips	
Unfactored roof live load reaction at support A	$R_{A\_Roof\ live}$ = **2.5** kips	
Unfactored snow load reaction at support A	R_{A_Snow} = **4.5** kips	
Maximum reaction at support B	R_{B_max} = **18.1** kips	R_{B_min} = **18.1** kips
Unfactored dead load reaction at support B	R_{B_Dead} = **5.7** kips	
Unfactored roof live load reaction at support B	$R_{B\_Roof\ live}$ = **2.6** kips	
Unfactored snow load reaction at support B	R_{B_Snow} = **4.5** kips	

Section details

Section type	**W 18x40 (AISC 15th Edn (v15.0))**
ASTM steel designation	**A992**
Steel yield stress	F_y = **50** ksi
Steel tensile stress	F_u = **65** ksi
Modulus of elasticity	E = **29000** ksi

Resistance factors

Resistance factor for tensile yielding	ϕ_{ty} = **0.90**
Resistance factor for tensile rupture	ϕ_{tr} = **0.75**
Resistance factor for compression	ϕ_c = **0.90**
Resistance factor for flexure	ϕ_b = **0.90**

Lateral bracing

Span 1 has continuous lateral bracing

Classification of sections for local buckling - Section B4.1

Classification of flanges in flexure - Table B4.1b (case 10)

Width to thickness ratio	$b_f / (2 \times t_f)$ = **5.73**	
Limiting ratio for compact section	$\lambda_{pff} = 0.38 \times \sqrt{[E / F_y]}$ = **9.15**	
Limiting ratio for non-compact section	$\lambda_{rff} = 1.0 \times \sqrt{[E / F_y]}$ = **24.08**	Compact

Classification of web in flexure - Table B4.1b (case 15)

Width to thickness ratio	$(d - 2 \times k) / t_w$ = **50.94**	
Limiting ratio for compact section	$\lambda_{pwf} = 3.76 \times \sqrt{[E / F_y]}$ = **90.55**	
Limiting ratio for non-compact section	$\lambda_{rwf} = 5.70 \times \sqrt{[E / F_y]}$ = **137.27**	Compact

Section is compact in flexure

Design of members for shear - Chapter G

Required shear strength	$V_r = \max(\text{abs}(V_{max}), \text{abs}(V_{min})) =$ **18.123** kips
Web area	$A_w = d \times t_w =$ **5.638** in^2
Web plate buckling coefficient	$k_v =$ **5**
Web shear coefficient - eq G2-3	$C_v =$ **1**
Nominal shear strength – eq G2-1	$V_n = 0.6 \times F_y \times A_w \times C_v =$ **169.155** kips
Resistance factor for shear	$\phi_v =$ **1.00**
Design shear strength	$V_c = \phi_v \times V_n =$ **169.155** kips

PASS - Design shear strength exceeds required shear strength

Design of members for flexure in the major axis - Chapter F

Required flexural strength	$M_r = \max(\text{abs}(M_{s1\_max}), \text{abs}(M_{s1\_min})) =$ **135.921** kips_ft

Yielding - Section F2.1

Nominal flexural strength for yielding - eq F2-1	$M_{nyld} = M_p = F_y \times Z_x =$ **326.667** kips_ft
Nominal flexural strength	$M_n = M_{nyld} =$ **326.667** kips_ft
Design flexural strength	$M_c = \phi_b \times M_n =$ **294.000** kips_ft

PASS - Design flexural strength exceeds required flexural strength

Design of members for vertical deflection

Consider deflection due to dead, live, roof live and snow loads

Limiting deflection	$\delta_{lim} = \min(1.5 \text{ in}, L_{s1} / 360) =$ **1** in
Maximum deflection span 1	$\delta = \max(\text{abs}(\delta_{max}), \text{abs}(\delta_{min})) =$ **0.873** in

PASS - Maximum deflection does not exceed deflection limit

2. Composite Steel Beam

In accordance with AISC 360-16 using the LRFD method

Design summary

Overall design status: Pass

Overall design utilization: 0.674

Description	Unit	Provided	Required	Utilization	Result
Moment, constr	(kip_ft)	294	90.12	0.307	PASS
Shear, constr	(kips)	169.16	12.02	0.071	PASS
Moment, comp	(kip_ft)	476.22	210.21	0.441	PASS
Shear, comp	(kips)	169.16	28.03	0.166	PASS
Deflection, constr	(in)	1.5	0.63	0.418	PASS
Deflection, comp	(in)	1.5	1.01	0.674	PASS

Basic dimensions

Beam span: L = **30.000** ft

Beam spacing on one side: b_1 = **8.500** ft

Beam spacing on other side: b_2 = **8.500** ft

Deck orientation: **Deck ribs perpendicular to beam**

Profiles are assumed to meet all dimensional criteria in AISC 360-16

Overall depth of slab: t = **5.250** in

Height of ribs: h_r = **2.000** in

Centers of ribs: rib_{ccs} = **12.000** in

Average width of rib: w_r = **7.000** in

Material properties

Concrete

Specified compressive strength of concrete: f'_c = **4.50** ksi

Wet density of concrete: w_{cw} = **120** lb/ft^3

Dry density of concrete: w_{cd} = **110** lb/ft^3

Modulus of elasticity of concrete: $E_c = w_{cd}^{1.5} \times \sqrt{(f'_c \times 1\ ksi)} / (1\ lb/ft^3)^{1.5}$ = **2447** ksi

Steel

Specified minimum yield stress of steel: F_y = **50** ksi

Modulus of elasticity of steel: E_S = **29000** ksi

Loading – secondary beam

Weight of slab construction stage	$w_{slab\_constr} = [t - h_r \times (1 - w_r / rib_{ccs})] \times w_{cw}$ = **44.167** psf
Weight of slab composite stage	$w_{slab\_comp} = [t - h_r \times (1 - w_r / rib_{ccs})] \times w_{cd}$ = **40.486** psf
Weight of steel deck	w_{deck} = **3.000** psf
Additional dead load	w_{d_add} = **0.000** psf
Weight of steel beam	w_{beam_s} = **40.000** lb/ft
Weight of construction live load	w_{constr} = **20.000** psf
Superimposed dead load	w_{serv} = **15.000** psf
Weight of wall parallel to span	w_{w_par} = **0.000** lb/ft
Weight of wall perpendicular to span	w_{w_perp} = **0.000** lb/ft assumed to be at mid-span.
Floor live load	w_{imp} = **80.000** psf
Lightweight partition load	w_{part} = **10.000** psf
Total construction stage dead load	$w_{constr\_D} = [(w_{slab\_constr}+w_{deck}+w_{d\_add})\times((b_1+b_2)/2)] + w_{beam\_s}$ = **440.917** lb/ft
Total construction stage live load	$w_{constr\_L} = w_{constr} \times (b_1 + b_2) / 2$ = **170.000** lb/ft
Total composite stage dead load(excluding walls)	$w_{comp\_D} = [(w_{slab\_comp}+w_{deck}+w_{d\_add}+w_{serv}) \times (b_1+b_2)/2]+w_{beam\_s}$ = **537.132** lb/ft
Total composite stage live load	$w_{comp\_L} = (w_{imp} + w_{part}) \times (b_1 + b_2)/2$ = **765.000** lb/ft

Design forces – secondary beam

Max ultimate moment at construction stage	$M_{constr\_u} = (1.2 \times w_{constr\_D} + 1.6 \times w_{constr\_L}) \times L^2/ 8$ = **90.124** kips_ft
Max ultimate shear at construction stage	$V_{constr\_u} = (1.2 \times w_{constr\_D} + 1.6 \times w_{constr\_L}) \times L / 2$ = **12.017** kips

Maximum ultimate moment at composite stage

$M_{comp\_u} = (1.2 \times w_{comp\_D} + 1.6 \times w_{comp\_L}) \times L^2/ 8 + 1.2 \times w_{w\_par} \times L^2/8 + 1.2 \times w_{w\_perp} \times (b_1 + b_2)/2 \times L/4$= **210.213** kips_ft

Maximum ultimate shear at composite stage

$V_{comp\_u} = (1.2 \times w_{comp\_D} + 1.6 \times w_{comp\_L}) \times L / 2 + 1.2 \times w_{w\_par} \times L / 2 + 1.2 \times w_{w\_perp} \times (b_1 + b_2)/2 \times 1/2$= **28.028** kips

Point of max. B.M. from nearest support	L_{BM_near} = L/2 =**15.00** ft

Steel section check

Trial steel section	**W18X40**
Plastic modulus of steel section	Z_x = **78.40** in^3
Elastic modulus of steel section	S_x = **68.40** in^3
Width to thickness ratio	$\lambda_f = b_f / (2 \times t_f)$ = **5.733**
Limiting width to thickness ratio (compact)	$\lambda_{pf} = 0.38 \times \sqrt{(E_S / F_y)}$ = **9.152**
Limiting width to thickness ratio (noncompact)	$\lambda_{rf} = \sqrt{(E_S / F_y)}$ = **24.083**

Flange is compact

Depth to thickness ratio (h/t_w)	λ_w = **50.900**
Limiting depth to thickness ratio (compact)	$\lambda_{pw} = 3.76 \times \sqrt{(E_S / F_y)}$ = **90.553**
Limiting depth to thickness ratio (noncompact)	$\lambda_{rw} = 5.70 \times \sqrt{(E_S / F_y)}$ = **137.274**

Web is compact

Strength check at construction stage for flexure

Check for flexure

Plastic moment for steel section	$M_p = F_y \times Z_x =$ **326.667** kip_ft
Resistance factor for flexure	$\phi_b =$ **0.90**
Design flexural strength of steel section alone	$M_{constr\_n} = \phi_b \times M_p =$ **294.000** kip_ft
Required flexural strength	$M_{constr\_u} =$ **90.124** kip_ft

PASS - Beam bending at construction stage loading

Strength check at construction stage for shear

Web area	$A_w = d \times t_w =$ **5.638** in^2
Web plate buckling coefficient	$k_v =$ **5.34**
Depth to thickness ratio (h/t_w)	$\lambda_w =$ **50.900**
Web shear coefficient	$C_{v1} =$ **1.00**
Resistant factor for shear	$\phi_v =$ **1.0**
Design shear strength	$V_{constr\_n} = \phi_v \times (0.6 \times F_y \times A_w \times C_{v1}) =$ **169.155** kips
Required shear strength	$V_{constr\_u} =$ **12.017** kips

PASS - Beam shear at construction stage loading

Design of steel anchors

Note - for non-uniform stud layouts a higher concentration of studs should be located towards the ends of the beam

Effective slab width of composite section	$b = \min(L/8, b_1/2) + \min(L/8, b_2/2) =$ **90.000** in
Effective area of concrete flange	$A_c = b \times (t - h_r) =$ **292.50** in^2
Diameter of stud anchor	dia = **0.750** in
Length of stud anchor after weld	$H_s =$ **3.50** in
Specified tensile strength of stud anchor	$F_u =$ **65** ksi
Cross section area of one stud anchor	$A_{sa} = \pi \times dia^2 / 4 =$ **0.442** in^2
Maximum diameter permitted	$dia_{max} = 2.5 \times t_f =$ **1.313** in

PASS - Diameter of stud anchor provided is OK

Point of max. B.M. from nearest support	$L_{BM\_near} =$ **15.00** ft
No. of ribs from points of zero to max moment	$rib_{numbers} = int(L_{BM\_near} / rib_{ccs} - 1) =$ **14**
No. of ribs with 1 stud per rib	$N_{r1} =$ **14**
No. of ribs with 2 studs per rib	$N_{r2} =$ **0**
No. of ribs with 3 studs per rib	$N_{r3} =$ **0**
Total number of studs	$N_{prov} = N_{r1} + 2 \times N_{r2} + 3 \times N_{r3} =$ **14**
Group effect factor for 1 stud per rib	$R_{g1} =$ **1.00**
Group effect factor for 2 studs per rib	$R_{g2} =$ **0.85**
Group effect factor for 3 studs per rib	$R_{g3} =$ **0.70**
Value of $e_{mid\text{-}ht}$ is less than 2 in (51 mm)	
Position effect factor for deck perpendicular	$R_p =$ **0.60**
Nom. strength of one stud with 1 stud per rib	$Q_{n1} = \min(0.5 \times A_{sa} \times \sqrt{(f'_c \times E_c)}, R_{g1} \times R_p \times A_{sa} \times F_u) =$ **17.230** kips

Nom. strength of one stud with 2 studs per rib	$Q_{n2} = \min(0.5 \times A_{sa} \times \sqrt{(f'_c \times E_c)}, R_{g2} \times R_p \times A_{sa} \times F_u) =$ **14.645** kips
Nom. strength of one stud with 3 studs per rib	$Q_{n3} = \min(0.5 \times A_{sa} \times \sqrt{(f'_c \times E_c)}, R_{g3} \times R_p \times A_{sa} \times F_u) =$ **12.061** kips
Total strength of provided steel anchors	$S_{sc} = N_{r1} \times Q_{n1} + 2 \times N_{r2} \times Q_{n2} + 3 \times N_{r3} \times Q_{n3} =$ **241.22** kips
Resistance of concrete flange	$C_{cf} = 0.85 \times f'_c \times A_c =$ **1118.813** kips
Resistance of steel beam	$T_{sb} = A \times F_y =$ **590.000** kips
Beam/slab interface shear force	$C = \min(C_{cf}, T_{sb}) =$ **590.000** kips

Strength of studs is less than maximum interface shear force therefore partial composite action takes place

Strength check at partial composite action

Actual net tensile force	$V_h = C =$ **590.000** kips
Assuming plastic neutral axis at the bottom of the steel beam flange.	
Resultant compressive force at flange bottom	$P_{yf} = b_f \times t_f \times F_y =$ **158.025** kips
Net force at steel and concrete interface	$C_{net} = T_{sb} - 2 \times P_{yf} =$ **273.950** kips

PNA is in the web of the I Section

Shear connection force	$F_{shear} = S_{sc} =$ **241.22** kips
Total depth of concrete at full stress	$d_c = F_{shear} / (0.85 \times f'_c \times b) =$ **0.701** in
Depth of compression from top of the steel flange	$t' = A / (2 \times t_w) - b_f \times t_f / t_w - 0.85 \times f'_c / F_y \times b \times d_c / (2 \times t_w) + t_f =$ **1.564** in
Tension	
Bottom flange component	$F_{bf} = F_y \times b_f \times t_f =$ **158.025** kips
Moment capacity of bottom flange	$M_{bf} = F_{bf} \times (d - (t_f/2) - t') =$ **211.665** kip_ft
Web component	$F_{web\_t} = F_y \times (A - (2 \times b_f \times t_f) - (t' - t_f) \times t_w) =$ **257.583** kips
Moment capacity of web	$M_{web\_t} = F_{web\_t} \times (d - t' - t_f)/2 =$ **169.691** kip_ft
Compression	
Web component	$F_{web\_c} = F_y \times (t' - t_f) \times t_w =$ **16.367** kips
Moment capacity of web	$M_{web\_c} = F_{web\_c} \times (t' - t_f)/2 =$ **0.709** kip_ft
Top flange component	$F_{tf} = F_y \times b_f \times t_f =$ **158.025** kips
Moment capacity of top flange	$M_{tf} = F_{tf} \times (t' - t_f/2) =$ **17.142** kip_ft
Concrete flange component	$F_{cf} = 0.85 \times f'_c \times b \times d_c =$ **241.215** kips
Moment capacity of concrete flange	$M_{cf} = F_{cf} \times (t - d_c/2 + t') =$ **129.932** kip_ft
Design flexural strength of beam	$M_{comp\_n} = \phi_b \times (M_{bf} + M_{web\_t} + M_{web\_c} + M_{tf} + M_{cf}) =$ **476.225** kip_ft
Required flexural strength	$M_{comp\_u} =$ **210.213** kip_ft

PASS - Beam bending at partial composite stage

Check for shear	
Design shear strength	$V_{comp\_n} = V_{constr\_n} =$ **169.155** kips
Required shear strength	$V_{comp\_u} =$ **28.028** kips

PASS - Beam shear at partial composite stage loading

Check for deflection (Commentary section I3.1)

Calculation of immediate construction stage deflection

Deflection due to dead load $\Delta_{short\_D} = 5 \times w_{constr\_D} \times L^4 / (384 \times E_S \times I_x) =$ **0.4528** in

Amount of beam camber $\Delta_{camber} =$ **0.000** in

PASS - The camber is less than the construction stage dead load deflection

Deflection due to construction live load $\Delta_2 = 5 \times w_{constr\_L} \times L^4 / (384 \times E_S \times I_x) =$ **0.1746** in

Net total construction stage deflection $\Delta_{short} = \Delta_{short\_D} + \Delta_2 - \Delta_{camber} =$ **0.627** in

For short term loading:-

Short term modular ratio $n_s = E_S / E_c =$ **11.8**

Depth of neutral axis from top of concrete

$y_s = [b \times (t-h_r)/n_s \times (t-h_r)/2 + A \times (t+d/2)] / [b \times (t-h_r)/n_s + A]$

$y_s =$ **5.692** in

Moment of inertia of fully composite section

$I_s = I_x + A \times (d/2+t-y_s)^2 + b \times (t - h_r)^3/(12 \times n_s) + b \times (t - h_r)/n_s \times (y_s - (t-h_r)/2)^2$

$I_s =$ **1896** in^4

Effective mt of inertia for partially composite $I_{s\_eff} = 0.75 \times [I_x + \sqrt{(F_{shear} / C)} \times (I_s - I_x)] =$ **1074.8** in^4

Proportion of live load which is short term $r_{L\_s} =$ **67** %

Deflection due to short term live load $\Delta_{L\_s} = 5 \times r_{L\_s} \times w_{comp\_L} \times L^4 / (384 \times E_S \times I_{s\_eff}) =$ **0.2997** in

For long term loading:-

Long term concrete modulus as % of short term $r_{E\_l} =$ **50** %

Long term modular ratio $n_l = E_S / (E_c \times r_{E\_l}) =$ **23.7**

Depth of neutral axis from top of concrete

$y_l = [b \times (t-h_r)/n_l \times (t-h_r)/2 + A \times (t+d/2)] / [b \times (t-h_r)/n_l + A]$

$y_l =$ **7.771** in

Moment of inertia of fully composite section

$I_l = I_x + A \times (d/2+t-y_l)^2 + b \times (t - h_r)^3/(12 \times n_l) + b \times (t - h_r)/n_l \times (y_l - (t-h_r)/2)^2$

$I_l =$ **1577** in^4

Effective mt of inertia for partially composite $I_{l\_eff} = 0.75 \times [I_x + \sqrt{(F_{shear} / C)} \times (I_l - I_x)] =$ **921.7** in^4

Proportion of live load which is long term $r_{L\_l} = 1 - r_{L\_s} =$ **33** %

Deflection due to long term live load $\Delta_{L\_l} = 5 \times r_{L\_l} \times w_{comp\_L} \times L^4 / (384 \times E_S \times I_{l\_eff}) =$ **0.1721** in

Dead load due to parallel wall & superimp. dead $w_{D\_part} = w_{w\_par} + (w_{serv} \times (b_1 + b_2) / 2) =$ **127.5000** lb/ft

Long term deflection due to superimposed dead load (after concrete has cured):-

Wall parallel to span and superimposed dead $\Delta_4 = 5 \times (w_{D\_part}) \times L^4 / (384 \times E_S \times I_{l\_eff}) =$ **0.0869** in

Wall perpendicular to span $\Delta_5 = (w_{w\_perp} \times (b_1 + b_2) / 2) \times L^3 / (48 \times E_S \times I_{l\_eff}) =$ **0.0000** in

Combined deflections

Net total construction stage deflection	$\Delta_{short} = \Delta_{short\_D} + \Delta_2 - \Delta_{camber} =$ **0.627** in
Net total long term deflection	$\Delta_{long} = \Delta_{short\_D} + \Delta_{L\_s} + \Delta_{L\_l} + \Delta_4 + \Delta_5 - \Delta_{camber} =$ **1.012** in
Combined short and long term live load deflectn	$\Delta_{live} = \Delta_{L\_s} + \Delta_{L\_l} =$ **0.472** in
Net long term dead and super imposed dead defln	$\Delta_{dead} = \Delta_{short\_D} + \Delta_4 + \Delta_5 - \Delta_{camber} =$ **0.540** in
Post composite deflection	$\Delta_{comp} = \Delta_{L\_s} + \Delta_{L\_l} + \Delta_4 + \Delta_5 =$ **0.559** in
Allowable max deflection	$\Delta_{Allow} =$ **1.500** in

PASS - Deflection less than allowable

3. Steel Column

In accordance with AISC 360-16 using the LRFD method

Column and loading details

Column details

Column section	**HSS 8x8x5/16**

Design loading

Required axial strength	P_r = **200** kips (Compression)
Moment about x axis at end 1	M_{x1} = **0.0** kips_ft
Moment about x axis at end 2	M_{x2} = **0.0** kips_ft
Maximum moment about x axis	M_x = max(abs(M_{x1}), abs(M_{x2})) = **0.0** kips_ft
Moment about y axis at end 1	M_{y1} = **0.0** kips_ft
Moment about y axis at end 2	M_{y2} = **0.0** kips_ft
Maximum moment about y axis	M_y = max(abs(M_{y1}), abs(M_{y2})) = **0.0** kips_ft
Maximum shear force parallel to y axis	V_{ry} = **0.0** kips
Maximum shear force parallel to x axis	V_{rx} = **0.0** kips

Material details

Steel grade	**A500 Gr. C**
Yield strength	F_y = **50** ksi
Ultimate strength	F_u = **62** ksi
Modulus of elasticity	E = **29000** ksi
Shear modulus of elasticity	G = **11200** ksi

Unbraced lengths

For buckling about x axis	L_x = **168** in
For buckling about y axis	L_y = **168** in
For torsional buckling	L_z = **168** in

Effective length factors

For buckling about x axis	K_x = **1.00**
For buckling about y axis	K_y = **1.00**
For torsional buckling	K_z = **1.00**

Effective unbraced lengths

For buckling about x axis $L_{cx} = L_x \times K_x =$ **168** in

For buckling about y axis $L_{cy} = L_y \times K_y =$ **168** in

For torsional buckling $L_{cz} = L_z \times K_z =$ **168** in

Section classification

Section classification for local buckling (cl. B4)

Critical flange width $b = b_f - 3 \times t =$ **7.127** in

Critical web width $h = d - 3 \times t =$ **7.127** in

Width to thickness ratio of flange (compression) $\lambda_{f\_c} = b / t =$ **24.491**

Width to thickness ratio of web (compression) $\lambda_{w\_c} = h / t =$ **24.491**

Width to thickness ratio of flange (major flexure) $\lambda_{f\_fx} = b / t =$ **24.491**

Width to thickness ratio of web (major flexure) $\lambda_{w\_fx} = h / t =$ **24.491**

Width to thickness ratio of flange (minor flexure) $\lambda_{f\_fy} = h / t =$ **24.491**

Width to thickness ratio of web (minor flexure) $\lambda_{w\_fy} = b / t =$ **24.491**

Compression

Limit for nonslender section $\lambda_{r\_c} = 1.40 \times \sqrt{(E / F_y)} =$ **33.716**

The section is nonslender in compression

Slenderness

Member slenderness

Slenderness ratio about x axis $SR_x = L_{cx} / r_x =$ **53.7**

Slenderness ratio about y axis $SR_y = L_{cy} / r_y =$ **53.7**

Compressive strength

Flexural buckling about x axis (cl. E3)

Elastic critical buckling stress $F_{ex} = \pi^2 \times E / (SR_x)^2 =$ **99.3** ksi

Flexural buckling stress $F_{crx} = (0.658^{F_y / F_{ex}}) \times F_y =$ **40.5** ksi

Nominal compressive strength for flexural buckling $P_{nx} = F_{crx} \times A =$ **354.8** kips

Flexural buckling about y axis (cl. E3)

Elastic critical buckling stress $F_{ey} = \pi^2 \times E / (SR_y)^2 =$ **99.3** ksi

Flexural buckling stress $F_{cry} = (0.658^{F_y / F_{ey}}) \times F_y =$ **40.5** ksi

Nominal compressive strength for flexural buckling $P_{ny} = F_{cry} \times A =$ **354.8** kips

Design compressive strength (cl.E1)

Resistance factor for compression $\phi_c =$ **0.90**

Design compressive strength $P_c = \phi_c \times \min(P_{nx}, P_{ny}) =$ **319.3** kips

PASS - The design compressive strength exceeds the required compressive strength

4. Isolated Reinforced Concrete Footing

In accordance with ACI 318-19 (22)

Summary results

Overall design status PASS

Overall design utilization 0.745

Description	Unit	Applied	Resisting	FoS	Result
Uplift verification	kips	238.3			Pass
Description	**Unit**	**Applied**	**Resisting**	**Utilization**	**Result**
Soil bearing	ksf	3.723	5	0.745	Pass
Description	**Unit**	**Required**	**Provided**	**Utilization**	**Result**
Moment, positive, x-direction	kip_ft	190.2	401.3	0.474	Pass
Moment, positive, y-direction	kip_ft	190.2	386.4	0.492	Pass
Shear, one-way, x-direction	kips	57.3	104.0	0.551	Pass
Shear, one-way, y-direction	kips	57.3	101.5	0.565	Pass
Shear, two-way, Col 1	psi	76.417	201.246	0.380	Pass
Min.area of reinf, bot., x-direction	in^2	4.147	4.400		Pass
Max.reinf.spacing, bot, x-direction	in	18.0	10.1		Pass
Min.area of reinf, bot., y-direction	in^2	4.147	4.400		Pass
Max.reinf.spacing, bot, y-direction	in	18.0	10.1		Pass

Pad footing details

Length of footing L_x = **8** ft

Width of footing L_y = **8** ft

Footing area $A = L_x \times L_y$ = **64** ft^2

Depth of footing h = **24** in

Depth of soil over footing h_{soil} = **18** in

Density of concrete γ_{conc} = **150.0** lb/ft^3

Column no.1 details

Length of column l_{x1} = **12.00** in

Width of column l_{y1} = **12.00** in

position in x-axis x_1 = **48.00** in

position in y-axis y_1 = **48.00** in

Height of pedestal h_{ped1} = **1.00** in

Length of pedestal $l_{x,ped1}$ = **20.00** in

Width of pedestal $l_{y,ped1}$ = **20.00** in

Soil properties

Gross allowable bearing pressure	q_{allow_Gross} = **5** ksf
Density of soil	γ_{soil} = **120.0** lb/ft^3
Angle of internal friction	ϕ_b = **30.0** deg
Design base friction angle	δ_{bb} = **30.0** deg
Coefficient of base friction	$\tan(\delta_{bb})$ = **0.577**
Design wall friction angle	δ_b = **15.0** deg
Horizontal acceleration factor	K_h = **0.4**
Vertical acceleration factor	K_v = **0**
Acceleration coefficient	$\theta = \text{atan}(K_h / (1 - K_v))$ = **21.801**
Passive pressure coefficient (Coulomb)	$K_P = \sin(90 - \phi_b)^2 / (\sin(90 + \delta_b) \times [1 - \sqrt{[\sin(\phi_b + \delta_b) \times \sin(\phi_b) / (\sin(90 + \delta_b))]}]^2)$ = **4.977**
Passive dynamic pressure coefficient (M-O)	K_{PE} = 0 = **0**
Dead surcharge load	F_{Dsur} = **25** psf
Live surcharge load	F_{Lsur} = **100** psf
Self weight	$F_{swt} = h \times \gamma_{conc}$ = **300** psf
Soil weight	$F_{soil} = h_{soil} \times \gamma_{soil}$ = **180** psf

Column no.1 loads

Pedestal self weight	F_{SWz1} = **0.0** kips
Dead load in z	F_{Dz1} = **120.0** kips
Live load in z	F_{Lz1} = **80.0** kips
Live roof load in z	F_{Lrz1} = **20.0** kips
Snow load in z	F_{Sz1} = **50.0** kips
Seismic load in x	F_{Ex1} = **3.0** kips

Footing analysis for soil and stability

Load combinations per ASCE 7-16

1.0D (0.475)

1.0D + 1.0L (0.745)

Combination 2 results: 1.0D + 1.0L

Forces on footing

Force in z-axis

$F_{dz} = \gamma_D \times A \times (F_{swt} + F_{soil} + F_{Dsur}) + \gamma_L \times A \times F_{Lsur} + \gamma_D \times (F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil}) + \gamma_L \times F_{Lz1}$ = **238.3** kips

Moments on footing

Moment in x-axis, about x is 0

$M_{dx} = \gamma_D \times (A \times (F_{swt} + F_{soil} + F_{Dsur}) \times L_x / 2) + \gamma_L \times A \times F_{Lsur} \times L_x / 2 + \gamma_D \times (((F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil})) \times x_1) + \gamma_L \times (F_{Lz1} \times x_1)$ = **953.0** kip_ft

Moment in y-axis, about y is 0

$M_{dy} = \gamma_D \times (A \times (F_{swt} + F_{soil} + F_{Dsur}) \times L_y / 2) + \gamma_L \times A \times F_{Lsur} \times L_y / 2 + \gamma_D \times (((F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil})) \times y_1) + \gamma_L \times (F_{Lz1} \times y_1)$ = **953.0** kip_ft

Uplift verification

Vertical force — F_{dz} = **238.255** kips

PASS - Footing is not subject to uplift

Bearing resistance

Eccentricity of base reaction

Eccentricity of base reaction in x-axis — $e_{dx} = M_{dx} / F_{dz} - L_x / 2$ = **0** in

Eccentricity of base reaction in y-axis — $e_{dy} = M_{dy} / F_{dz} - L_y / 2$ = **0** in

Pad base pressures

$q_1 = F_{dz} \times (1 - 6 \times e_{dx} / L_x - 6 \times e_{dy} / L_y) / (L_x \times L_y)$ = **3.723** ksf

$q_2 = F_{dz} \times (1 - 6 \times e_{dx} / L_x + 6 \times e_{dy} / L_y) / (L_x \times L_y)$ = **3.723** ksf

$q_3 = F_{dz} \times (1 + 6 \times e_{dx} / L_x - 6 \times e_{dy} / L_y) / (L_x \times L_y)$ = **3.723** ksf

$q_4 = F_{dz} \times (1 + 6 \times e_{dx} / L_x + 6 \times e_{dy} / L_y) / (L_x \times L_y)$ = **3.723** ksf

Minimum base pressure — $q_{min} = \min(q_1,q_2,q_3,q_4)$ = **3.723** ksf

Maximum base pressure — $q_{max} = \max(q_1,q_2,q_3,q_4)$ = **3.723** ksf

Allowable bearing capacity

Allowable bearing capacity — $q_{allow} = q_{allow\_Gross}$ = **5** ksf

q_{max} / q_{allow} = **0.745**

PASS - Allowable bearing capacity exceeds design base pressure

Material details

Compressive strength of concrete	f'_c = **4500** psi
Yield strength of reinforcement	f_y = **60000** psi
Compression-controlled strain limit (21.2.2)	ε_{ty} = **0.00200**
Cover to top of footing	c_{nom_t} = **2** in
Cover to side of footing	c_{nom_s} = **2** in
Cover to bottom of footing	c_{nom_b} = **3** in
Concrete type	Normal weight
Concrete modification factor	λ = **1.00**
Column type	Concrete

Analysis and design of concrete footing

Load combinations per ASCE 7-16

1.4D (0.311)

1.2D + 1.6L + 0.5Lr (0.524)

1.2D + 1.6L + 0.5S (0.552)

1.2D + 1.0L + 1.6Lr (0.475)

1.2D + 1.0L + 1.6S (0.565)

Combination 6 results: 1.2D + 1.0L + 1.6S

Forces on footing

Ultimate force in z-axis

$F_{uz} = \gamma_D \times A \times (F_{swt} + F_{soil} + F_{Dsur}) + \gamma_L \times A \times F_{Lsur} + \gamma_D \times (F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil}) + \gamma_L \times F_{Lz1} + \gamma_S \times F_{Sz1} =$ **348.6** kips

Moments on footing

Ultimate moment in x-axis, about x is 0

$M_{ux} = \gamma_D \times (A \times (F_{swt} + F_{soil} + F_{Dsur}) \times L_x / 2) + \gamma_L \times A \times F_{Lsur} \times L_x / 2 + \gamma_D \times (((F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil})) \times x_1) + \gamma_L \times (F_{Lz1} \times x_1) + \gamma_S \times (F_{Sz1} \times x_1) =$ **1394.5** kip_ft

Ultimate moment in y-axis, about y is 0

$M_{uy} = \gamma_D \times (A \times (F_{swt} + F_{soil} + F_{Dsur}) \times L_y / 2) + \gamma_L \times A \times F_{Lsur} \times L_y / 2 + \gamma_D \times (((F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil})) \times y_1) + \gamma_L \times (F_{Lz1} \times y_1) + \gamma_S \times (F_{Sz1} \times y_1) =$ **1394.5** kip_ft

Eccentricity of base reaction

Eccentricity of base reaction in x-axis

$e_{ux} = M_{ux} / F_{uz} - L_x / 2 =$ **0** in

Eccentricity of base reaction in y-axis

$e_{uy} = M_{uy} / F_{uz} - L_y / 2 =$ **0** in

Pad base pressures

$q_{u1} = F_{uz} \times (1 - 6 \times e_{ux} / L_x - 6 \times e_{uy} / L_y) / (L_x \times L_y) =$ **5.447** ksf

$q_{u2} = F_{uz} \times (1 - 6 \times e_{ux} / L_x + 6 \times e_{uy} / L_y) / (L_x \times L_y) =$ **5.447** ksf

$q_{u3} = F_{uz} \times (1 + 6 \times e_{ux} / L_x - 6 \times e_{uy} / L_y) / (L_x \times L_y) =$ **5.447** ksf

$q_{u4} = F_{uz} \times (1 + 6 \times e_{ux} / L_x + 6 \times e_{uy} / L_y) / (L_x \times L_y) =$ **5.447** ksf

Minimum ultimate base pressure

$q_{umin} = \min(q_{u1},q_{u2},q_{u3},q_{u4}) =$ **5.447** ksf

Maximum ultimate base pressure

$q_{umax} = \max(q_{u1},q_{u2},q_{u3},q_{u4}) =$ **5.447** ksf

Moment design, x direction, positive moment

Ultimate bending moment

$M_{u.x.max} =$ **190.178** kip_ft

Tension reinforcement provided

10 No.6 bottom bars (10.1 in c/c)

Area of tension reinforcement provided

$A_{sx.bot.prov} =$ **4.4** in^2

Minimum area of reinforcement (8.6.1.1)

$A_{s.min} = 0.0018 \times L_y \times h =$ **4.147** in^2

PASS - Area of reinforcement provided exceeds minimum

Maximum spacing of reinforcement (8.7.2.2)

$s_{max} = \min(2 \times h, 18 \text{ in}) =$ **18** in

PASS - Maximum permissible reinforcement spacing exceeds actual spacing

Depth to tension reinforcement

$d = h - c_{nom\_b} - \phi_{x.bot} / 2 =$ **20.625** in

Depth of compression block

$a = A_{sx.bot.prov} \times f_y / (0.85 \times f'_c \times L_y) =$ **0.719** in

Neutral axis factor

$\beta_1 =$ **0.83**

Depth to neutral axis

$c = a / b_1 =$ **0.871** in

Strain in tensile reinforcement

$\varepsilon_t = 0.003 \times d / c - 0.003 =$ **0.06800**

Minimum tensile strain(8.3.3.1)

$\varepsilon_{min} = \varepsilon_{ty} + 0.003 =$ **0.00500**

PASS - Tensile strain exceeds minimum required

Nominal moment capacity

$M_n = A_{sx.bot.prov} \times f_y \times (d - a / 2) =$ **445.842** kip_ft

Flexural strength reduction factor

$\phi_f = \min(\max(0.65 + 0.25 \times (\varepsilon_t - \varepsilon_{ty}) / (0.003), 0.65), 0.9) =$ **0.900**

Design moment capacity	$\phi M_n = \phi_f \times M_n =$ **401.257** kip_ft
	$M_{u.x.max} / \phi M_n =$ **0.474**
	PASS - Design moment capacity exceeds ultimate moment load

One-way shear design, x direction

Ultimate shear force	$V_{u.x} =$ **57.29** kips
Depth to reinforcement	$d_v = h - c_{nom\_b} - \phi_{x.bot} / 2 =$ **20.625** in
Size effect factor (22.5.5.1.3)	$\lambda_s =$ **1**
Ratio of longitudinal reinforcement	$\rho_w = A_{sx.bot.prov} / (L_y \times d_v) =$ **0.00222**
Shear strength reduction factor	$\phi_v =$ **0.75**
Nominal shear capacity (Eq. 22.5.5.1)	$V_n = \min(8 \times \lambda_s \times 1 \times (\rho_w)^{1/3} \times \sqrt{(f'_c \times 1\ psi)} \times L_y \times d_v, 5 \times \lambda \times \sqrt{(f'_c \times 1\ psi)} \times L_y \times d_v) =$ **138.662** kips
Design shear capacity	$\phi V_n = \phi_v \times V_n =$ **103.996** kips
	$V_{u.x} / \phi V_n =$ **0.551**
	PASS - Design shear capacity exceeds ultimate shear load

Moment design, y direction, positive moment

Ultimate bending moment	$M_{u.y.max} =$ **190.178** kip_ft
Tension reinforcement provided	10 No.6 bottom bars (10.1 in c/c)
Area of tension reinforcement provided	$A_{sy.bot.prov} =$ **4.4** in^2
Minimum area of reinforcement (8.6.1.1)	$A_{s.min} = 0.0018 \times L_x \times h =$ **4.147** in^2
	PASS - Area of reinforcement provided exceeds minimum
Maximum spacing of reinforcement (8.7.2.2)	$s_{max} = \min(2 \times h, 18\ in) =$ **18** in
	PASS - Maximum permissible reinforcement spacing exceeds actual spacing
Depth to tension reinforcement	$d = h - c_{nom\_b} - \phi_{x.bot} - \phi_{y.bot} / 2 =$ **19.875** in
Depth of compression block	$a = A_{sy.bot.prov} \times f_y / (0.85 \times f'_c \times L_x) =$ **0.719** in
Neutral axis factor	$b_1 =$ **0.83**
Depth to neutral axis	$c = a / \beta_1 =$ **0.871** in
Strain in tensile reinforcement	$\varepsilon_t = 0.003 \times d / c - 0.003 =$ **0.06542**
Minimum tensile strain(8.3.3.1)	$\varepsilon_{min} = e\varepsilon_{ty} + 0.003 =$ **0.00500**
	PASS - Tensile strain exceeds minimum required
Nominal moment capacity	$M_n = A_{sy.bot.prov} \times f_y \times (d - a / 2) =$ **429.342** kip_ft
Flexural strength reduction factor	$\phi_f = \min(\max(0.65 + 0.25 \times (\varepsilon_t - \varepsilon_{ty}) / (0.003), 0.65), 0.9) =$ **0.900**
Design moment capacity	$\phi M_n = f_f \times M_n =$ **386.407** kip_ft
	$M_{u.y.max} / \phi M_n =$ **0.492**
	PASS - Design moment capacity exceeds ultimate moment load

One-way shear design, y direction

Ultimate shear force	$V_{u.y}$ = **57.29** kips
Depth to reinforcement	$d_v = h - c_{nom\_b} - \phi_{x.bot} - \phi_{y.bot} / 2$ = **19.875** in
Size effect factor (22.5.5.1.3)	λ_s = **1**
Ratio of longitudinal reinforcement	$\rho_w = A_{sy.bot.prov} / (L_x \times d_v)$ = **0.00231**
Shear strength reduction factor	ϕ_v = **0.75**
Nominal shear capacity (Eq. 22.5.5.1)	$V_n = \min(8 \times \lambda_s \times \lambda \times (\rho_w)^{1/3} \times \sqrt{(f'_c \times 1\ psi)} \times L_x \times d_v, 5 \times \lambda \times \sqrt{(f'_c \times 1\ psi)} \times L_x \times d_v)$ = **135.28** kips
Design shear capacity	$\phi V_n = \phi_v \times V_n$ = **101.46** kips
	$V_{u.y} / \phi V_n$ = **0.565**
	PASS - Design shear capacity exceeds ultimate shear load

Two-way shear design at column 1

Depth to reinforcement	d_{v2} = **20.25** in
Shear perimeter length (22.6.4)	l_{xp} = **40.250** in
Shear perimeter width (22.6.4)	l_{yp} = **40.250** in
Shear perimeter (22.6.4)	$b_o = 2 \times (l_{x,ped1} + d_{v2}) + 2 \times (l_{y,ped1} + d_{v2})$ = **161.000** in
Shear area	$A_p = l_{x,perim} \times l_{y,perim}$ = **1620.062** in^2
Surcharge loaded area	$A_{sur} = A_p - l_{x,ped1} \times l_{y,ped1}$ = **1220.062** in^2
Ultimate bearing pressure at center of shear area	$q_{up.avg}$ = **5.447** ksf
Ultimate shear load	$F_{up} = \gamma_D \times (F_{Dz1} + F_{SWz1} - l_{x,ped1} \times l_{y,ped1} \times h_{soil} \times \gamma_{soil}) + \gamma_L \times F_{Lz1} + \gamma_S \times F_{Sz1} + \gamma_D \times A_p \times F_{swt} + \gamma_D \times A_{sur} \times F_{soil} + \gamma_D \times A_{sur} \times F_{Dsur} + \gamma_L \times A_{sur}$ ´ $F_{Lsur} - q_{up.avg} \times A_p$ = **249.139** kips
Ultimate shear stress from vertical load	$v_{ug} = \max(F_{up} / (b_o \times d_{v2}), 0\ psi)$ = **76.417** psi
Column geometry factor (Table 22.6.5.2)	$\beta = l_{y,ped1} / l_{x,ped1}$ = **1.00**
Column location factor (22.6.5.3)	α_s =**40**
Size effect factor (22.5.5.1.3)	λ_s = **1**
Concrete shear strength (22.6.5.2)	$v_{cpa} = (2 + 4 / \beta) \times \lambda_s \times 1 \times \sqrt{(f'_c \times 1\ psi)}$ = **402.492** psi
	$v_{cpb} = (\alpha_s \times d_{v2} / b_o + 2) \times \lambda_s \times \lambda \times \sqrt{(f'_c \times 1\ psi)}$ = **471.658** psi
	$v_{cpc} = 4 \times \lambda_s \times \lambda \times \sqrt{(f'_c \times 1\ psi)}$ = **268.328** psi
	$v_{cp} = \min(v_{cpa}, v_{cpb}, v_{cpc})$ = **268.328** psi
Shear strength reduction factor	ϕ_v = **0.75**
Nominal shear stress capacity (Eq. 22.6.1.2)	$v_n = v_{cp}$ = **268.328** psi
Design shear stress capacity (8.5.1.1(d))	$\phi v_n = \phi_v \times v_n$ = **201.246** psi
	$v_{ug} / \phi v_n$ = **0.380**

PASS - Design shear stress capacity exceeds ultimate shear stress load

5. Continuous Reinforced Concrete Strip Footing

In accordance with ACI 318-19 (22)

Summary results

Overall design status: PASS

Overall design utilization: 0.177

Description	Unit	Applied	Resisting	FoS	Result
Uplift verification	kips	2.4			Pass
Description	**Unit**	**Applied**	**Resisting**	**Utilization**	**Result**
Soil bearing	ksf	0.885	5	0.177	Pass
Description	**Unit**	**Required**	**Provided**	**Utilization**	**Result**
Min.area of reinf, bot., y-direction	in^2	0.259	0.310		Pass
Max.reinf.spacing, bot, y-direction	in	18.0	12.0		Pass

Strip footing details - considering a one meter strip

Length of footing: L_x = **1** ft

Width of footing: L_y = **2.667** ft

Footing area: $A = L_x \times L_y$ = **2.667** ft^2

Depth of footing: h = **12** in

Depth of soil over footing: h_{soil} = **42** in

Density of concrete: γ_{conc} = **150.0** lb/ft^3

Wall no.1 details

Width of wall: l_{y1} = **20** in

position in y-axis: y_1 = **16** in

Soil properties

Gross allowable bearing pressure: q_{allow_Gross} = **5** ksf

Density of soil: γ_{soil} = **120.0** lb/ft^3

Angle of internal friction: ϕ_b = **30.0** deg

Design base friction angle: δ_{bb} = **30.0** deg

Coefficient of base friction: $\tan(\delta_{bb})$ = **0.577**

Footing loads

Self weight: $F_{swt} = h \times \gamma_{conc}$ = **150** psf

Soil weight: $F_{soil} = h_{soil} \times \gamma_{soil}$ = **420** psf

Wall no.1 loads per linear foot

Dead load in z — F_{Dz1} = **1.5** kips

Footing analysis for soil and stability

Load combinations per ASCE 7-16

1.0D (0.177)
1.0D + 1.0L (0.177)
1.0D + 1.0Lr (0.177)
1.0D + 1.0S (0.177)
1.0D + 1.0R (0.177)
1.0D + 0.75L + 0.75Lr (0.177)
1.0D + 0.75L + 0.75S (0.177)
1.0D + 0.75L + 0.75R (0.177)

Combination 1 results: 1.0D

Forces on footing per linear foot

Force in z-axis — $F_{dz} = \gamma_D \times A \times (F_{swt} + F_{soil}) + \gamma_D \times (F_{Dz1} - l_{x1} \times l_{y1} \times h_{soil} \times \gamma_{soil})$ = **2.4** kips

Moments on footing per linear foot

Moment in y-axis, about y is 0 — $M_{dy} = \gamma_D \times (A \times (F_{swt} + F_{soil}) \times L_y / 2) + \gamma_D \times (((F_{Dz1} - l_{x1} \times l_{y1} \times h_{soil} \times \gamma_{soil})) \times y_1)$ = **3.1** kip_ft

Uplift verification

Vertical force — F_{dz} = **2.36** kips

PASS - Footing is not subject to uplift

Stability against sliding

Resistance due to base friction — $F_{RFriction} = \max(F_{dz}, 0\ kN) \times \tan(\delta_{bb})$ = **1.363** kips

Bearing resistance

Eccentricity of base reaction

Eccentricity of base reaction in y-axis — $e_{dy} = M_{dy} / F_{dz} - L_y / 2$ = **-0.001** in

Strip base pressures

$q_1 = F_{dz} \times (1 - 6 \times e_{dy} / L_y) / (L_y \times 1\ ft)$ = **0.885** ksf

$q_2 = F_{dz} \times (1 + 6 \times e_{dy} / L_y) / (L_y \times 1\ ft)$ = **0.885** ksf

Minimum base pressure — $q_{min} = \min(q_1, q_2)$ = **0.885** ksf

Maximum base pressure — $q_{max} = \max(q_1, q_2)$ = **0.885** ksf

Allowable bearing capacity

Allowable bearing capacity

$q_{allow} = q_{allow\_Gross} = \mathbf{5}$ ksf

$q_{max} / q_{allow} = \mathbf{0.177}$

PASS - Allowable bearing capacity exceeds design base pressure

Material details

Compressive strength of concrete	$f'_c = \mathbf{45000}$ psi
Yield strength of reinforcement	$f_y = \mathbf{60000}$ psi
Compression-controlled strain limit (21.2.2)	$\varepsilon_{ty} = \mathbf{0.00200}$
Cover to top of footing	$c_{nom\_t} = \mathbf{2}$ in
Cover to side of footing	$c_{nom\_s} = \mathbf{2}$ in
Cover to bottom of footing	$c_{nom\_b} = \mathbf{3}$ in
Concrete type	Normal weight
Concrete modification factor	$\lambda = \mathbf{1.00}$
Wall type	Concrete

Analysis and design of concrete footing

Load combinations per ASCE 7-16

1.4D (0.005)
1.2D + 1.6L + 0.5Lr (0.004)
1.2D + 1.6L + 0.5S (0.004)
1.2D + 1.6L + 0.5R (0.004)
1.2D + 1.0L + 1.6Lr (0.004)
1.2D + 1.0L + 1.6S (0.004)
1.2D + 1.0L + 1.6R (0.004)

Combination 1 results: 1.4D

Forces on footing per linear foot

Ultimate force in z-axis

$F_{uz} = \gamma_D \times A \times (F_{swt} + F_{soil}) + \gamma_D \times (F_{Dz1} - l_{x1} \times l_{y1} \times h_{soil} \times \gamma_{soil}) = \mathbf{3.3}$ kips

Moments on footing per linear foot

Ultimate moment in y-axis, about y is 0

$M_{uy} = \gamma_D \times (A \times (F_{swt} + F_{soil}) \times L_y / 2) + \gamma_D \times (((F_{Dz1} - l_{x1} \times l_{y1} \times h_{soil} \times \gamma_{soil})) \times y_1) =$ **4.4** kip_ft

Eccentricity of base reaction

Eccentricity of base reaction in y-axis

$e_{uy} = M_{uy} / F_{uz} - L_y / 2 = \mathbf{-0.001}$ in

Strip base pressures

$q_{u1} = F_{uz} \times (1 - 6 \times e_{uy} / L_y) / (L_y \times 1\ ft) =$ **1.239** ksf

$q_{u2} = F_{uz} \times (1 + 6 \times e_{uy} / L_y) / (L_y \times 1\ ft) =$ **1.239** ksf

Minimum ultimate base pressure $q_{umin} = \min(q_{u1}, q_{u2}) =$ **1.239** ksf

Maximum ultimate base pressure $q_{umax} = \max(q_{u1}, q_{u2}) =$ **1.239** ksf

Moment design, y direction, positive moment

Ultimate bending moment $M_{u.y.max} =$ **0.055** kip_ft

Tension reinforcement provided No.5 bars at 12.0 in c/c bottom

Area of tension reinforcement provided $A_{sy.bot.prov} =$ **0.31** in^2

Minimum area of reinforcement (7.6.1.1) $A_{s.min} = 0.0018 \times L_x \times h =$ **0.259** in^2

PASS - Area of reinforcement provided exceeds minimum

Maximum spacing of reinforcement (7.7.2.3) $s_{max} = \min(3 \times h, 18\ in) =$ **18** in

PASS - Maximum permissible reinforcement spacing exceeds actual spacing

Depth to tension reinforcement $d = h - c_{nom\_b} - \phi_{y.bot} / 2 =$ **8.688** in

Depth of compression block $a = A_{sy.bot.prov} \times f_y / (0.85 \times f'_c \times L_x) =$ **0.041** in

Neutral axis factor $\beta_1 =$ **0.65**

Depth to neutral axis $c = a / \beta_1 =$ **0.062** in

Strain in tensile reinforcement $\varepsilon_t = 0.003 \times d / c - 0.003 =$ **0.41505**

Minimum tensile strain(7.3.3.1) $\varepsilon_{min} = \varepsilon_{ty} + 0.003 =$ **0.00500**

PASS - Tensile strain exceeds minimum required

Nominal moment capacity $M_n = A_{sy.bot.prov} \times f_y \times (d - a / 2) =$ **13.434** kip_ft

Flexural strength reduction factor $\phi_f = \min(\max(0.65 + 0.25 \times (\varepsilon_t - \varepsilon_{ty}) / (0.003), 0.65), 0.9) =$ **0.900**

Design moment capacity $\phi M_n = \phi_f \times M_n =$ **12.091** kip_ft

$M_{u.y.max} / \phi M_n =$ **0.005**

PASS - Design moment capacity exceeds ultimate moment load

One-way shear design, y direction

One-way shear design does not apply. Shear failure plane fall outside extents of foundation.

STRUCTURAL PEER REVIEW STATUS J

STRUCTURAL PEER REVIEW STATUS

Summary

The town has retained DM Berg Consultants, P.C. for structural peer review on this project.

DM Berg completed its initial review of the 60% CD structural documents and issued comments on July 20, 2026. The structural engineer of record subsequently provided responses to those comments, refer to Appendix 18.

For the final backcheck, the Project Team elected to have DM Berg review the MSBA 90% CD submission rather than the earlier 90% CD pricing set, allowing additional time to finalize the structural documents. Following its review, DM Berg will confirm whether its prior comments have been appropriately addressed and incorporated and will issue the required structural peer-review certification letter. This review supports the structural work associated with Early Release Package No. 2, including the foundations and structural steel.

ENERGY MODEL CALCULATIONS K

MSBA 90% CD
Energy Model Calculations
for
Wilmington Elementary School

Wilmington, MA

September 18, 2026

Prepared for:

WILMINGTON PUBLIC SCHOOLS

Prepared by:

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School
90% CD Energy Model Calculations Report

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Wilmington Elementary School – 90% Construction Documents
Energy Model Calculations

Section 1.0: Executive Summary

The Wilmington Elementary School is a new three-story school with an approximate gross area of 165,035 s.f. The building has been simulated with the school's anticipated hours of operation provided by the owner as follows:

It is anticipated that the typical student hours will occur from 6:30 am – 6:00 pm (Mon-Fri) while the building will be occupied between 6 pm – 9 pm (Mon-Fri) for limited community use, sports, and recreation programs. Limited summer programming shall occur throughout the building from 7:00 am – 3:30 pm (Mon-Fri) for special needs, summer camps, recreation, and sports practices. The Gym will also have limited community use on the weekends from 9:00 am – 9:00 pm.

A mechanical lifecycle engineering economic analysis was performed to assess the performance of various mechanical systems in comparison to a baseline mechanical system to determine the most cost effective system for the project. The results of the report concluded that Option 3, Displacement Ventilation with an Air-Source Heat Pump Plant, represented the lowest life cycle cost of the system options studied by yielding an approximate $5,680,330 savings over the 50 year study period with an instant payback by having a lower capital investment than the baseline system. The design system is as follows:

- 100% outside air hot water heating/chilled water cooling air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing displacement ventilation to the following areas:
    - RTU-1: 13,500 CFM Classrooms, Support, & Circulation Areas
    - RTU-2: 14,715 CFM Classrooms, Support, & Circulation Areas
    - RTU-3: 10,705 CFM Classrooms, Support, & Circulation Areas
    - RTU-7: 1,025 CFM Music, Support, & Circulation Areas
    - RTU-8: 2,110 CFM Administration, Support, & Circulation Areas
    - RTU-9: 3,250 CFM Media Center, Support, & Circulation Areas
- Passive chilled beam cooling/heating panels located along exterior walls of the above areas
- Hot water heating/chilled water cooling VAV air handling units with energy recovery wheels and demand control ventilation providing displacement ventilation to the following areas:
    - RTU-4: 12,000 CFM Gym
    - RTU-5: 7,060 CFM Cafetorium, Stage, & Support Areas
    - RTU-6: 2,410 CFM Kitchen, Custodial, & Support Areas
- Hot water radiant heating panels located along exterior walls of the above areas
- 100% outside air chilled/hot water VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:
    - MAU-1: 4,400 CFM Kitchen Hood Make-Up
- Overhead fiberglass insulated supply and return air ductwork distribution system

- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- (16) 30 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (480 ton total capacity, 365 ton cooling, 320 ton HHW/DHW heating, 4 modules redundant)

- (1) 2,000 MBH electric hot water boiler (Back Up Only)

- Chilled and hot water primary pumping with variable frequency drives

- Direct digital controls throughout

To estimate the LEED V4 EAc2 – Optimize Energy Performance savings, energy model simulations have been performed comparing the design building to a baseline ASHRAE Standard 90.1-2010 building.

1. The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
    - Wall: U-0.064
    - Roof: U-0.048
    - Windows: 0.55 U-Value, 0.40 SHGC
    - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
    - System 8 - Electric heating/chilled water-cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)
    - System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)
    - (2) high-efficiency water-cooled chillers with associated cooling tower
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.99 w/s.f.

2. The design building is as follows:

- Envelope:
    - Roof: U-0.018
    - Brick Veneer Walls: U-0.028
    - MCM Panel Walls: U-0.025
    - Windows: U-0.25, 0.30 SHGC
    - Curtainwall: U-0.25, 0.30 SHGC
- Mechanical System:
    - (Refer to system descriptions)
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.50 w/s.f.

LEED Energy Savings Analysis Conclusion

A comparison of the Design Building with against the ASHRAE Standard 90.1-2010 Baseline Building results in an energy cost savings of 45.3% for 16 total points for LEED V4 EAc2 – Optimize Energy Performance.

Note:

The values indicated in this report are based on energy modeling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

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Wilmington Elementary School - LEED v4.0 Energy Savings Summary

Baseline	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings*	Energy Cost Savings Percentage**	LEED EAc2 Points
LEED Baseline	**1. ASHRAE 90.1-2010 Envelope 2. ASHRAE 90.1-2010 Mechanical Systems (System 8 - CHW VAV AHU's w/ Fan-Powered VAV Boxes w/ Electric Reheat) 3. ASHRAE 90.1-2010 Lighting System (0.99 w/s.f.) 4. ASHRAE 90.1-2010 Electric Domestic Hot Water Systems**	1,798,933	$376,629	$2.28	37.2	459,978.6	-	-	-

Option	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings*	Energy Cost Savings Percentage**	LEED EAc2 Points
Design Building	**1. Design Envelope 2. Design Mechanical Systems (Displacement Ventilation System with Air-Source Heat Recovery Heat Pump Chiller/Heater Plant) 3. Design High-Efficiency Lighting System (0.50 w/s.f.) 4. Electric Domestic Hot Water Systems**	987,953	$206,043	$1.25	20.4	252,614.8	$170,586	**45.3%**	**16**

*Combined expense savings is the difference between the combined annual expense of the baseline and building in comparison.
**Energy cost savings percentage is the difference between the annual energy costs of the baseline and building in comparison.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

ENERGY MODEL
OUTPUT REPORTS

LEED v4 EA Credit Optimize Energy Performance Summary

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:19 AM

1. REPORT AND PROJECT INFORMATION

General

Simulation Program Name and Version ..... **Hourly Analysis Program 6.4**
Simulation Weather File Name .. **Boston Logan Intl AP, TMYx_2004_2018**

Alternative Designations

Proposed ..... **Design Building**
Baseline ..... **[B] LEED Building**

Space Summary

	Proposed Design	Baseline (0° rotation)
Conditioned Floor Area (sqft)	163,920	163,920
Unconditioned Floor Area (sqft)	2,840	2,840
Total Floor Area (sqft)	166,760	166,760

2. MINIMUM ENERGY PERFORMANCE CALCULATOR

SHADING AND FENESTRATION

Building Massing and Zoning

Above-Grade Wall & Vertical Glazing Areas

Orientation	Baseline Design (0° rotation)			Proposed Design		
	Gross Above-Grade Wall Area	Vertical Glazing Area		Gross Above-Grade Wall Area	Vertical Glazing Area	
	(sqft)	(sqft)	(% WWR)	(sqft)	(sqft)	(% WWR)
North	0	0	0.0	0	0	0.0
North-Northeast	992	80	8.1	992	80	8.1
Northeast	4,939	572	11.6	4,939	572	11.6
East-Northeast	10,682	1,792	16.8	10,682	1,792	16.8
East	0	0	0.0	0	0	0.0
East-Southeast	240	158	66.1	240	158	66.1
Southeast	974	48	4.9	974	48	4.9
South-Southeast	22,035	3,962	18.0	22,035	3,962	18.0
South	0	0	0.0	0	0	0.0
South-Southwest	0	0	0.0	0	0	0.0
Southwest	1,725	24	1.4	1,725	24	1.4
West-Southwest	13,470	1,242	9.2	13,470	1,242	9.2
West	0	0	0.0	0	0	0.0
West-Northwest	0	0	0.0	0	0	0.0
Northwest	3,784	984	26.0	3,784	984	26.0
North-Northwest	18,142	2,156	11.9	18,142	2,156	11.9
Total	**76,982**	**11,017**	**14.3**	**76,982**	**11,017**	**14.3**

Roof & Skylight Areas

Baseline Design (0° rotation)			Proposed Design		
Gross Roof Area	Skylight Area		Gross Roof Area	Skylight Area	
(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)
78,412	0	0.0	78,412	0	0.0

Note: In these tables, roof and skylight surfaces with slope of 60° or more (from horizontal) are treated as walls and vertical glazing, as according to ASHRAE 90.1 Section 3.

LEED v4 EA Credit Optimize Energy Performance Summary

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:19 AM

PERFORMANCE OUTPUTS

Energy Sources

Energy Type	Energy Consumption Units	Demand Units	Utility Rate Name	Utility Rate Structure
Electric	kWh	kW	RMLD: Commercial Schedule C Rate	

Performance Rating Method Compliance

Proposed Energy Summary by End Use

End Use	Unregulated ?	Energy Type	Units of Annual Energy and Peak Demand	Baseline	Proposed	Energy / Demand Savings per End Use	End Use Percent Contribution to Total Energy Savings	End Use Percent Contribution to Total Cost Savings	Percent of Total Proposed Site Energy Consumption
Interior Lighting		Electric	Consumption [kWh]	368,590	150,107	59.3 %	26.9 %	26.9 %	15.2 %
			Demand [kW]	116.3	56.3	51.6 %			
Space Heating		Electric	Consumption [kWh]	513,572	93,031	81.9 %	51.9 %	51.7 %	9.4 %
			Demand [kW]	894.7	508.6	43.2 %			
Space Cooling		Electric	Consumption [kWh]	155,365	112,734	27.4 %	5.3 %	5.3 %	11.4 %
			Demand [kW]	235.5	207.4	11.9 %			
Pumps		Electric	Consumption [kWh]	43,438	16,156	62.8 %	3.4 %	3.4 %	1.6 %
			Demand [kW]	33.9	8.4	75.3 %			
Heat Rejection		Electric	Consumption [kWh]	16,695	0	100.0 %	2.1 %	2.0 %	0.0 %
			Demand [kW]	19.9	0.0	100.0 %			
Fans - Interior		Electric	Consumption [kWh]	348,995	263,648	24.5 %	10.5 %	10.6 %	26.7 %
			Demand [kW]	124.5	95.2	23.5 %			
Receptacle Equipment	X	Electric	Consumption [kWh]	261,052	261,052	0.0 %	0.0 %	0.1 %	26.4 %
			Demand [kW]	202.3	202.3	0.0 %			
Service Water Heating		Electric	Consumption [kWh]	62,028	62,028	0.0 %	0.0 %	0.0 %	6.3 %
			Demand [kW]	54.0	54.0	0.0 %			
Exterior Lighting		Electric	Consumption [kWh]	16,134	16,134	0.0 %	0.0 %	0.0 %	1.6 %
			Demand [kW]	6.1	6.1	0.0 %			
Elevators	X	Electric	Consumption [kWh]	13,064	13,064	0.0 %	0.0 %	0.0 %	1.3 %
			Demand [kW]	6.7	6.7	0.0 %			

Performance Rating Energy Consumption and Cost by Fuel Type - Performance Rating Method Compliance

Energy Type	Site Energy Units	Baseline		Proposed		Percent Savings	
		Site Energy Use (Units shown per energy type)	Cost ($)	Site Energy Use (Units shown per energy type)	Cost ($)	Site Energy Use	Cost
Electric	kWh	1,798,932.8	376,629	987,952.6	206,043	45.1%	45.3%
Energy Model Subtotal	**kWh**	**1,798,932.7**	**376,629**	**987,952.6**	**206,043**	**45.1%**	**45.3%**

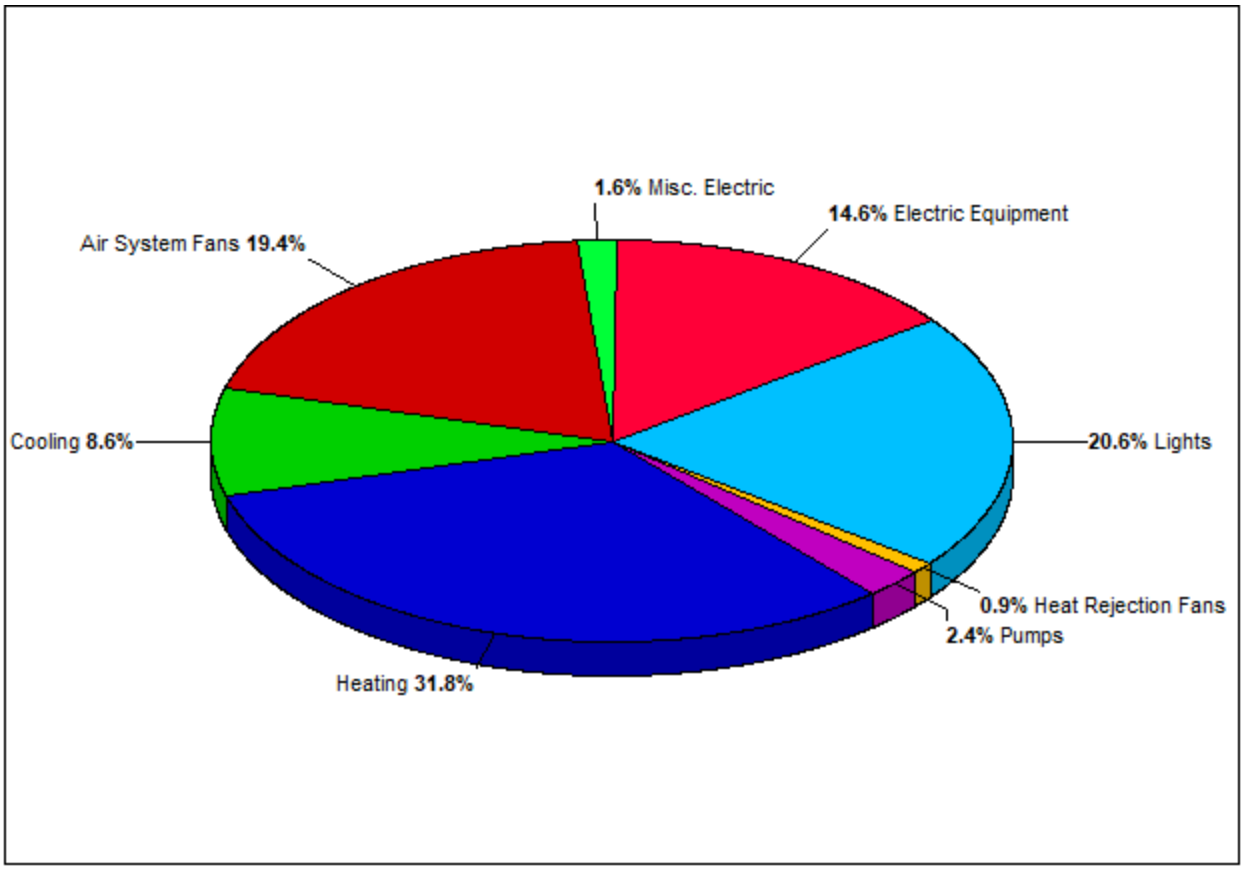
3. EA CREDIT POINTS REFERENCE TABLE

ASHRAE Standard 90.1-2010 Appendix G Percentage Improvement

Minimum Energy Cost Savings Percentage for Each Point Threshold

Project Cost Savings: 45.3%

Cost Savings			Points		
New Construction	Major Renovations	Core and Shell	Healthcare	Schools	All Others
6%	4%	3%	3	1	1
8%	6%	5%	4	2	2
10%	8%	7%	5	3	3
12%	10%	9%	6	4	4
14%	12%	11%	7	5	5
16%	14%	13%	8	6	6
18%	16%	15%	9	7	7
20%	18%	17%	10	8	8
22%	20%	19%	11	9	9
24%	22%	21%	12	10	10
26%	24%	23%	13	11	11
29%	27%	26%	14	12	12
32%	30%	29%	15	13	13
35%	33%	32%	16	14	14
38%	36%	35%	17	15	15
42%	40%	39%	18	16	16
46%	**44%**	**43%**	19	-	17
50%	48%	47%	20	-	18



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	73,208	0.439	19.4
Cooling	32,350	0.194	8.6
Heating	119,852	0.719	31.8
Pumps	9,100	0.055	2.4
Heat Rejection Fans	3,462	0.021	0.9
HVAC Sub-Total	**237,971**	**1.427**	**63.2**
Lights	77,551	0.465	20.6
Electric Equipment	54,960	0.330	14.6
Misc. Electric	6,144	0.037	1.6
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**138,656**	**0.831**	**36.8**
Grand Total	**376,628**	**2.259**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **166,760.2** sqft
Modeled Floor Area ..... **166,760.2** sqft

Energy Budget by System Component - [B] LEED Building

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:23 AM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	3,164,181	18.974
Heating Coil Loads	1,953,679	11.716
Grand Total	**5,117,859**	**30.690**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,190,812	7.141	4,252,901	25.503
Cooling	530,124	3.179	1,893,300	11.353
Heating	1,964,016	11.778	7,014,343	42.063
Pumps	148,215	0.889	529,339	3.174
Heat Rejection Fans	56,967	0.342	203,454	1.220
HVAC Sub-Total	**3,890,134**	**23.328**	**13,893,337**	**83.313**
Lights	1,257,678	7.542	4,491,706	26.935
Electric Equipment	890,716	5.341	3,181,128	19.076
Misc. Electric	99,628	0.597	355,813	2.134
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**2,248,021**	**13.481**	**8,028,647**	**48.145**
Grand Total	**6,138,155**	**36.808**	**21,921,984**	**131.458**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **166760.2** sqft
   Modeled Floor Area ..... **166760.2** sqft

Billing Details - Electric - [B] LEED Building

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:23 AM

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	29,339	15,674	13	0	45,026
Feb	24,473	12,722	13	0	37,207
Mar	23,019	12,215	13	0	35,246
Apr	15,960	10,963	13	0	26,936
May	18,163	10,773	13	0	28,949
Jun	20,647	11,362	13	0	32,022
Jul	14,242	7,499	13	0	21,755
Aug	15,448	8,757	13	0	24,218
Sep	22,412	11,507	13	0	33,932
Oct	16,762	11,281	13	0	28,056
Nov	18,489	11,140	13	0	29,642
Dec	22,031	11,596	13	0	33,641
Totals	240,985	135,488	156	0	376,629

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	45,026	219,011	0.2056
Feb	37,207	182,686	0.2037
Mar	35,246	171,834	0.2051
Apr	26,936	119,143	0.2261
May	28,949	135,586	0.2135
Jun	32,022	154,126	0.2078
Jul	21,755	106,316	0.2046
Aug	24,218	115,316	0.2100
Sep	33,932	167,304	0.2028
Oct	28,056	125,128	0.2242
Nov	29,642	138,020	0.2148
Dec	33,641	164,463	0.2045
Totals	376,629	1,798,933	0.2094

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	219,011
Feb	0	0	0	0	182,686
Mar	0	0	0	0	171,834
Apr	0	0	0	0	119,143
May	0	0	0	0	135,586
Jun	0	0	0	0	154,126
Jul	0	0	0	0	106,316
Aug	0	0	0	0	115,316
Sep	0	0	0	0	167,304
Oct	0	0	0	0	125,128
Nov	0	0	0	0	138,020
Dec	0	0	0	0	164,463
Totals	0	0	0	0	1,798,933

4. Billing Demands

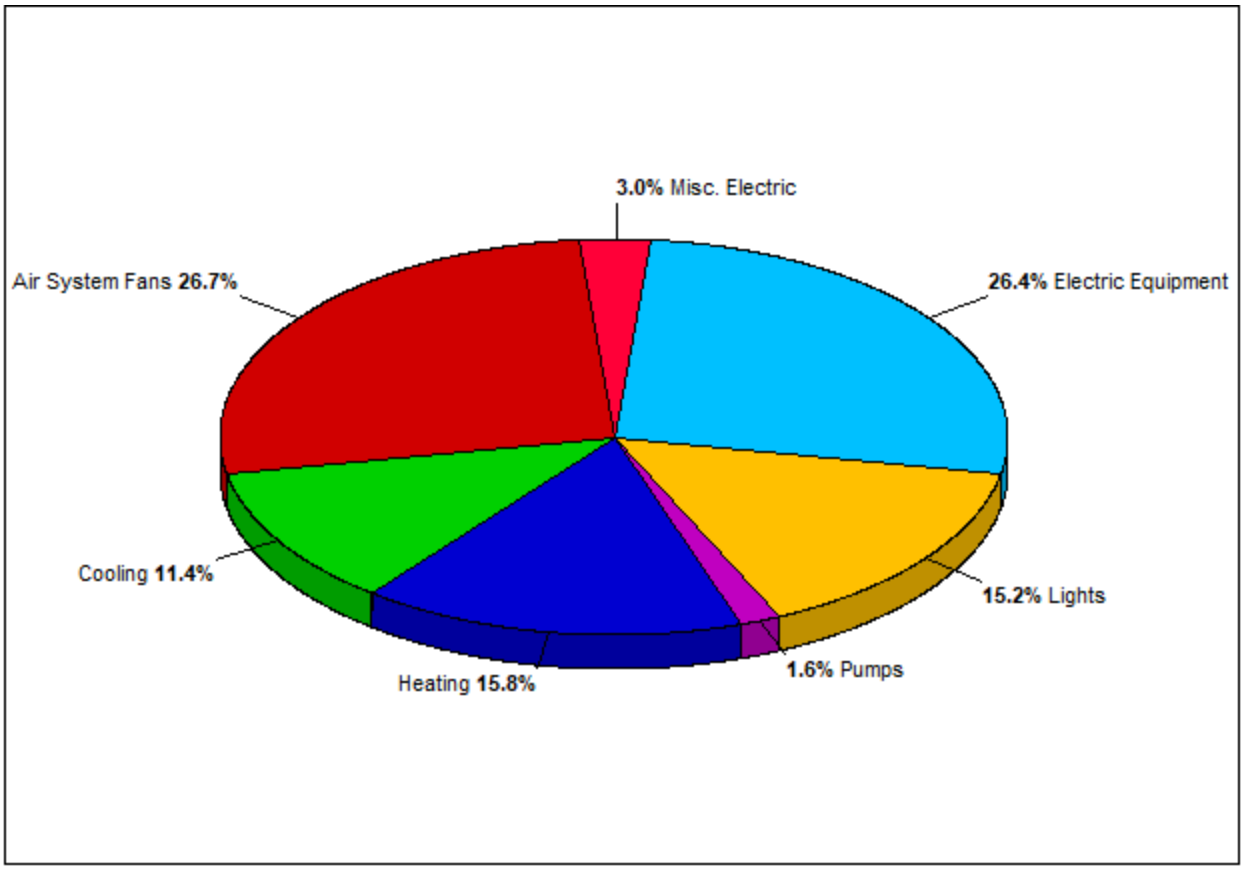
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1195.4
Feb	0.0	0.0	0.0	0.0	970.2
Mar	0.0	0.0	0.0	0.0	931.6
Apr	0.0	0.0	0.0	0.0	836.1
May	0.0	0.0	0.0	0.0	821.6
Jun	0.0	0.0	0.0	0.0	866.5
Jul	0.0	0.0	0.0	0.0	572.0
Aug	0.0	0.0	0.0	0.0	667.9
Sep	0.0	0.0	0.0	0.0	877.6
Oct	0.0	0.0	0.0	0.0	860.4
Nov	0.0	0.0	0.0	0.0	849.6
Dec	0.0	0.0	0.0	0.0	884.4

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1195.4
Feb	0.0	0.0	0.0	0.0	970.2
Mar	0.0	0.0	0.0	0.0	931.6
Apr	0.0	0.0	0.0	0.0	836.1
May	0.0	0.0	0.0	0.0	821.6
Jun	0.0	0.0	0.0	0.0	866.5
Jul	0.0	0.0	0.0	0.0	572.0
Aug	0.0	0.0	0.0	0.0	667.9
Sep	0.0	0.0	0.0	0.0	877.6
Oct	0.0	0.0	0.0	0.0	860.4
Nov	0.0	0.0	0.0	0.0	849.6
Dec	0.0	0.0	0.0	0.0	884.4

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/6 07:00
Mar	n/a	n/a	n/a	n/a	3/1 07:00
Apr	n/a	n/a	n/a	n/a	4/10 05:00
May	n/a	n/a	n/a	n/a	5/10 10:00
Jun	n/a	n/a	n/a	n/a	6/28 10:00
Jul	n/a	n/a	n/a	n/a	7/10 09:00
Aug	n/a	n/a	n/a	n/a	8/21 08:00
Sep	n/a	n/a	n/a	n/a	9/5 10:00
Oct	n/a	n/a	n/a	n/a	10/27 10:00
Nov	n/a	n/a	n/a	n/a	11/27 06:00
Dec	n/a	n/a	n/a	n/a	12/25 07:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	54,914	0.329	26.7
Cooling	23,537	0.141	11.4
Heating	32,462	0.195	15.8
Pumps	3,371	0.020	1.6
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**114,285**	**0.685**	**55.5**
Lights	31,263	0.188	15.2
Electric Equipment	54,412	0.326	26.4
Misc. Electric	6,081	0.037	3.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**91,757**	**0.550**	**44.5**
Grand Total	**206,042**	**1.236**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **166,760.2** sqft
Modeled Floor Area ..... **166,760.2** sqft

Energy Budget by System Component - Design Building

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:23 AM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	1,385,941	8.311
Heating Coil Loads	596,054	3.574
Grand Total	**1,981,995**	**11.885**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	899,602	5.395	3,212,863	19.266
Cooling	384,661	2.307	1,373,790	8.238
Heating	529,078	3.173	1,889,566	11.331
Pumps	55,125	0.331	196,875	1.181
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**1,868,466**	**11.205**	**6,673,093**	**40.016**
Lights	512,180	3.071	1,829,216	10.969
Electric Equipment	890,722	5.341	3,181,149	19.076
Misc. Electric	99,628	0.597	355,813	2.134
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,502,530**	**9.010**	**5,366,177**	**32.179**
Grand Total	**3,370,996**	**20.215**	**12,039,270**	**72.195**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **166760.2** sqft
   Modeled Floor Area ..... **166760.2** sqft

Billing Details - Electric - Design Building

Project: Wilmington ES - 90% CD Model 09/17/2026
Prepared by: GGD Consulting Engineers 10:23 AM

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	13,069	8,929	13	0	22,011
Feb	10,736	5,516	13	0	16,264
Mar	11,718	5,560	13	0	17,291
Apr	9,482	5,695	13	0	15,189
May	11,500	6,207	13	0	17,720
Jun	13,389	7,774	13	0	21,176
Jul	8,442	4,716	13	0	13,171
Aug	9,287	4,642	13	0	13,941
Sep	13,034	7,784	13	0	20,831
Oct	10,633	6,295	13	0	16,941
Nov	10,626	5,292	13	0	15,931
Dec	10,431	5,132	13	0	15,576
Totals	132,346	73,541	156	0	206,043

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	22,011	97,560	0.2256
Feb	16,264	80,141	0.2029
Mar	17,291	87,475	0.1977
Apr	15,189	70,779	0.2146
May	17,720	85,844	0.2064
Jun	21,176	99,951	0.2119
Jul	13,171	63,018	0.2090
Aug	13,941	69,323	0.2011
Sep	20,831	97,297	0.2141
Oct	16,941	79,374	0.2134
Nov	15,931	79,322	0.2008
Dec	15,576	77,868	0.2000
Totals	206,043	987,953	0.2086

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	97,560
Feb	0	0	0	0	80,141
Mar	0	0	0	0	87,475
Apr	0	0	0	0	70,779
May	0	0	0	0	85,844
Jun	0	0	0	0	99,951
Jul	0	0	0	0	63,018
Aug	0	0	0	0	69,323
Sep	0	0	0	0	97,297
Oct	0	0	0	0	79,374
Nov	0	0	0	0	79,322
Dec	0	0	0	0	77,868
Totals	0	0	0	0	987,953

4. Billing Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	681.0
Feb	0.0	0.0	0.0	0.0	420.7
Mar	0.0	0.0	0.0	0.0	424.0
Apr	0.0	0.0	0.0	0.0	434.3
May	0.0	0.0	0.0	0.0	473.4
Jun	0.0	0.0	0.0	0.0	592.9
Jul	0.0	0.0	0.0	0.0	359.7
Aug	0.0	0.0	0.0	0.0	354.0
Sep	0.0	0.0	0.0	0.0	593.6
Oct	0.0	0.0	0.0	0.0	480.1
Nov	0.0	0.0	0.0	0.0	403.6
Dec	0.0	0.0	0.0	0.0	391.4

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	681.0
Feb	0.0	0.0	0.0	0.0	420.7
Mar	0.0	0.0	0.0	0.0	424.0
Apr	0.0	0.0	0.0	0.0	434.3
May	0.0	0.0	0.0	0.0	473.4
Jun	0.0	0.0	0.0	0.0	592.9
Jul	0.0	0.0	0.0	0.0	359.7
Aug	0.0	0.0	0.0	0.0	354.0
Sep	0.0	0.0	0.0	0.0	593.6
Oct	0.0	0.0	0.0	0.0	480.1
Nov	0.0	0.0	0.0	0.0	403.6
Dec	0.0	0.0	0.0	0.0	391.4

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/9 10:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/13 10:00
May	n/a	n/a	n/a	n/a	5/16 10:00
Jun	n/a	n/a	n/a	n/a	6/26 10:00
Jul	n/a	n/a	n/a	n/a	7/19 13:00
Aug	n/a	n/a	n/a	n/a	8/3 08:00
Sep	n/a	n/a	n/a	n/a	9/4 10:00
Oct	n/a	n/a	n/a	n/a	10/26 10:00
Nov	n/a	n/a	n/a	n/a	11/1 10:00
Dec	n/a	n/a	n/a	n/a	12/18 10:00

Engineering Economic Analysis
for
Wilmington Elementary School

Wilmington, MA

September 18, 2026

Prepared for:

WILMINGTON PUBLIC SCHOOLS

Prepared by:

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School
Engineering Economic Analysis

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EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The Wilmington Elementary School is a new three-story school with an approximate gross area of 167,000 s.f. The building has been simulated with the school's anticipated hours of operation provided by the owner as follows:

It is anticipated that the typical student hours will occur from 6:30 am – 6:00 pm (Mon-Fri) while the building will be occupied between 6 pm – 9 pm (Mon-Fri) for limited community use, sports, and recreation programs. Limited summer programming shall occur throughout the building from 7:00 am – 3:30 pm (Mon-Fri) for special needs, summer camps, recreation, and sports practices. The Gym will also have limited community use on the weekends from 9:00 am – 9:00 pm.

The goal of the mechanical system lifecycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the greatest combined savings over a 50 year cycle to determine the most advantageous system considering anticipated hours of operation, electrical costs, maintenance costs, initial construction costs, and replacement costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year round temperature control and comfort at a possible marginal increase in capital cost.

Upon completion of the mechanical system lifecycle engineering economic analysis, the design building is simulated with the recommended mechanical system in comparison to an ASHRAE Standard 90.1-2010 baseline building to project the anticipated energy cost percentage savings for LEED V4 EAc2 – Optimize Energy Performance.

Section 1.1: Mechanical System Analysis

1.1.A: Baseline System Option – Mixed-Air Overhead Chilled/Hot Water Variable Air Volume (VAV) Air Handling Unit Systems with Air-Source Heat Pump (ASHP) Heat Recovery Chiller/Heater Plant

- Chilled/hot water VAV air handling units with energy recovery wheels and terminal VAV boxes with hot water reheat coils and energy recovery providing mixed-air over-head distribution the following areas:
    - RTU-A: 30,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 35,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 30,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-D: 10,000 CFM Gym
    - RTU-E: 5,000 CFM Media Center, Support, & Circulation Areas
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas
    - RTU-H: 6,000 CFM Administration, Support, & Circulation Areas
- 100% outside air chilled/hot water VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:
    - MAU-A: 4,500 CFM Kitchen Hood Make-Up
- Overhead fiberglass insulated supply and return air ductwork distribution system

- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- (15) 30 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 4 modules redundant)

  (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)

- Insulated chilled water, hot water, and condensate piping systems

- Chilled and hot water primary pumping with variable frequency drives

- Direct digital controls throughout

1.1.B: System Option One – VRF ASHP System with Supplemental Electric Heating Units

- 100% outside air ASHP heating/cooling VAV air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing ventilation to the terminal VRF units serving the following areas:

  - RTU-A: 14,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-B: 16,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-C: 13,000 CFM Classrooms, Support, & Circulation Areas
  - RTU-E: 2,500 CFM Media Center, Support, & Circulation Areas
  - RTU-H: 3,000 CFM Administration, Support, & Circulation Areas

- Terminal VRF heat pump evaporator units serving the spaces indicated above

- Insulated refrigerant and condensate piping systems

- Air-source heat recovery VRF heat pump condensing units (240 ton total capacity)

- ASHP cooling/heating VAV air handling units with energy recovery wheels and demand control ventilation providing mixed-air over-head distribution the following areas:

  - RTU-D: 10,000 CFM Gym
  - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
  - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas

- 100% outside air ASHP cooling/heating VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:

  - MAU-A: 4,500 CFM Kitchen Hood Make-Up

- Overhead fiberglass insulated supply and return air ductwork distribution system

- Electric radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- Direct digital controls throughout

1.1.C: System Option Two – Geothermal Variable Refrigerant Flow (VRF) Ground-Source Heat Pump (GSHP) System with GSHP VAV Air Handling Units

- 100% outside air WSHP heating/cooling VAV air handling units with energy recovery heat exchangers and terminal variable air volume boxes with demand control ventilation providing ventilation to the terminal VRF units serving the following areas:
    - RTU-A: 14,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 16,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 13,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-E: 2,500 CFM Media Center, Support, & Circulation Areas
    - RTU-H: 3,000 CFM Administration, Support, & Circulation Areas
- Terminal VRF heat pump evaporator units serving the spaces indicated above
- Insulated refrigerant and condensate piping systems
- Water-source heat recovery VRF heat pump condensing units (240 ton total capacity)
- WSHP heating/cooling VAV air handling unit with energy recovery wheel and demand control ventilation providing mixed-air over-head distribution the following areas:
    - RTU-D: 10,000 CFM Gym
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas
- 100% outside air WSHP cooling/heating VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:
    - MAU-A: 4,500 CFM Kitchen Hood Make-Up
- Overhead fiberglass insulated supply and return air ductwork distribution system
- Electric radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.
- (80) 600’ closed-loop type ground source geothermal wells (4.25 tons each for 335 tons total capacity)
- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)
- Insulated condenser water, geothermal water, and condensate piping systems
- Condenser and geothermal well primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.D: System Option Three - Chilled/Hot Water VAV Air Handling Unit Displacement Ventilation Systems with ASHP Heat Recovery Chiller/Heater Plant

- 100% outside air hot water heating/chilled water cooling air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing displacement ventilation to the following areas:

    - RTU-A: 17,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-B: 20,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-C: 17,000 CFM Classrooms, Support, & Circulation Areas
    - RTU-E: 3,000 CFM Media Center, Support, & Circulation Areas
    - RTU-H: 4,000 CFM Administration, Support, & Circulation Areas

- Passive chilled beam cooling/heating panels located along exterior walls of the above areas

- Hot water heating/chilled water cooling VAV air handling units with energy recovery wheels and demand control ventilation providing displacement ventilation to the following areas:

    - RTU-D: 10,000 CFM Gym
    - RTU-F: 10,000 CFM Cafeteria, Stage, & Support Areas
    - RTU-G: 3,000 CFM Kitchen, Custodial, & Support Areas

- Hot water radiant heating panels located along exterior walls of the above areas

- 100% outside air chilled/hot water VAV make-up air handling unit and kitchen exhaust fans with kitchen hood controls serving the following areas:

    - MAU-A: 4,500 CFM Kitchen Hood Make-Up

- Overhead fiberglass insulated supply and return air ductwork distribution system

- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.

- (15) 30 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 4 modules redundant)

- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)

- Chilled and hot water primary pumping with variable frequency drives

- Direct digital controls throughout

1.1.E: System Option Four – Chilled/Hot Water Cooling/Heating VAV Air Handling Unit Displacement Ventilation Systems with GSHP Heat Recovery Chiller/Heater Geothermal Plant

- This option is identical to Option 3 as outlined above but will utilize the following ground-source chilled/hot water plant equipment rather than the air-source heat pump chilled/hot water plant and wellfield outlined above:

    - (8) 50 ton high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (400 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating, 2 modules redundant)

    - (80) 600’ closed-loop type ground source geothermal wells (4.25 tons each for 335 tons total capacity)

- (1) 1,194 MBH (350 kW) electric hot water boiler (Back Up Only)
- Chilled, condenser, geothermal well, and hot water primary pumping with variable frequency drives

Section 1.2: Mechanical System Analysis Conclusion

The variable air volume air handling unit system is selected as the baseline system since it is similar to an ASHRAE 90.1/IECC baseline system but complies with the high-efficiency requirements of the MA Opt-In Stretch Energy Code. Unfortunately, the selection may result in overall ownership costs that in some cases are higher when compared to the alterative systems primarily relating to increased annual operating costs with potentially reduced thermal comfort conditions of the building. The option comparison of each alternative system to the baseline assesses the benefits of improved systems with potentially reduced combined operating costs and improved thermal comfort with the goal of selecting the system with the highest ownership savings over the 50 year study period.

Annual electrical consumption is calculated through the results of a thermal dynamic heat transfer analysis utilizing Department of Energy's (DOE) Energy Plus/Carrier Hourly Analysis Program (HAP) software with all architectural data provided by Dore & Whittier Architects.

The building envelope reflects Dore & Whittier Architects' high-efficiency design with effective insulation U-values in accordance with ASHRAE 90.1 Appendix A as follows:

- Roof: U-0.018
- Brick Veneer Walls: U-0.028
- MCM Panel Walls: U-0.025
- Windows: U-0.25, 0.30 SHGC
- Curtainwall: U-0.25, 0.30 SHGC

Utility cost data for electricity was obtained from utility bills provided by the owner as follows:

Reading Municipal Light Department (RMLD): Commercial Schedule C Rate

- Customer Charge: $13.00/month
- Distribution Demand: $13.11177/kW
- Distribution Energy: $0.02554/kWh
- Electrification Energy: $0.00500/kWh
- Fuel Charge: $0.05120/kWh
- Distributed Solar: $0.00402/kWh
- Purchase Power & Trans.: $0.04820/kWh

The "Building Life-Cycle" analysis was performed in BLCC v5.3-22 and includes future worth of each system option considered using the DOE rates for nominal discount (1.4%), escalation (for each utility type based on region), inflation (2.0%), and interest (2.0%). The analysis includes equipment replacement costs for major system components after 20, 30, and 40 years (varying per system option as indicated in the replacement cost estimate sheet).

Our observations of the Mechanical System Payback Summary suggest that Option 3, Displacement Ventilation with an Air-Source Heat Pump Plant, represents the lowest life cycle cost of the system options studied by yielding an approximate $5,680,330 savings over the 50 year study period with an instant payback by having a lower capital investment than the baseline system.

Section 1.3: Geothermal Federal Tax Credit

There are potentially significant federal tax credits available to the school for installing a geothermal heating system. Per the 2022 Inflation Reduction Act, the Federal Investment Tax Credit (§ 48) can range from 6% to 30% if Prevailing Wage and Apprenticeship (PWA) requirements are met. Additional tax credits may also be available for using Domestic Content (up to 10% of related domestic steel and iron material and manufactured product costs). For the purpose of this study, a 25.5% federal tax credit was factored at this time assuming PWA requirements would be met (accounting for a 15% deduction required by projects funded by tax exempt bonds to the 30% incentive). Please note that it is recommended that the Town consult with a financial tax advisor or attorney to complete the required IRS documentation if a Geothermal heating system is selected.

When accounting for the Federal Tax Credit, the Mechanical System Payback Summary suggests that System Option 4 represents the greatest total life cycle savings by yielding an approximate $8,710,034 savings over the 50 year study period with an instant payback.

The geothermal system additionally provides further benefits that should be considered such as providing the second lowest EUI of all options at 22.3 kBTU/s.f./yr. The system further provides system longevity, reduced maintenance, reduced downtime, and improved controllability of equipment. The geothermal design also does not require exterior mounted condensing equipment which will provide the best acoustics of all options studied.

For additional information please refer to the following references:

- ClimateMaster's IRA 2023 Commercial Geothermal Tax Guide, weblink @ lc028-climatemaster-commercial-federal-tax-incentives-brochure.pdf , and included in Appendix B
- IRS Clean Energy Tax Credit Information: Publication 5817-G (6-2023) (irs.gov), weblink @ https://www.irs.gov/pub/irs-pdf/p5817g.pdf, and included in Appendix B
- IRS & US Treasury Dept Notice 2023-44: Additional Guidance for the Qualifying Advanced Energy Project Credit Allocation Program under Section 48C(e) (irs.gov), weblink @ https://www.irs.gov/pub/irs-drop/n-23-44.pdf

Section 2.0: LEED Energy Savings Summary

To estimate the LEED V4 EAc2 – Optimize Energy Performance savings, energy model simulations have been performed comparing the design building to a baseline ASHRAE Standard 90.1-2010 building.

1. The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
  - Wall: U-0.064
  - Roof: U-0.048
  - Windows: 0.55 U-Value, 0.40 SHGC
  - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
  - System 8 - Electric heating/chilled water cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)
  - System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)
  - (2) high-efficiency water-cooled chillers with associated cooling tower

- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.99 w/s.f.

2. The design building is as follows:

- Envelope:
    - Roof: U-0.018
    - Brick Veneer Walls: U-0.028
    - MCM Panel Walls: U-0.025
    - Windows: U-0.25, 0.30 SHGC
    - Curtainwall: U-0.25, 0.30 SHGC
- Mechanical System:
    - (Refer to System Option descriptions)
- Domestic Hot Water System:
    - Instantaneous electric domestic hot water system
- Lighting System:
    - 0.5 w/s.f.

Section 2.1: LEED Energy Savings Analysis Conclusion

A comparison of the Design Building against the ASHRAE Standard 90.1-2010 Baseline Building results in the following energy cost savings for LEED V4 EAc2 – Optimize Energy Performance for each System Option as follows:

- System Option 1 – 27.1% cost for 11 total points
- System Option 2 – 44.1% cost for 16 total points
- System Option 3 – 42.8% cost for 16 total points
- System Option 4 – 48.6% cost for 16 total points

Note:

The values indicated above are based on energy modelling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

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Wilmington Elementary School - Mechanical System Payback Summary

Baseline	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	1. Mixed-Air Overhead CHW/HHW VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils 2. High-Efficiency ASHP Chiller/Heater Plant	$15,838,440	1,738,354	$327,852	$1.96	**35.5**	$77,410	$1,620,000	$3,198,500	$1,620,000	$405,262	-	-	-

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Cafe/Stage and Gym areas 4. Supplemental Electric Resistance Heating Units	$14,007,900	1,443,027	$291,930	$1.75	**29.5**	$58,460	$1,943,500	$1,185,000	$3,167,000	$350,390	**$54,872**	**$4,025,486**	**Instant*****
2	1. VRF System w/ Water-Source Heat Pump (WSHP) Heat Recovery Condensing Units 2. WSHP VAV Dedicated Outdoor Air Systems (DOAS) w/ ERV & DCV with Terminal VAV Boxes 3. Supplemental Electric Heating 4. Geothermal Well Field and Distribution Plant	$19,358,100	1,183,958	$223,944	$1.34	**24.2**	$62,235	$0	$3,945,000	$0	$286,179	**$119,083**	**$2,446,273**	**23**
3	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant	$14,442,360	1,160,735	$229,174	$1.37	**23.7**	$74,000	$1,620,000	$2,289,500	$1,620,000	$303,174	**$102,088**	**$5,680,330**	**Instant*****
4	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant	$18,306,360	1,093,195	$205,748	$1.23	**22.3**	$75,675	$0	$3,379,500	$0	$281,423	**$123,839**	**$4,041,912**	**21**

* Capital Investment Costs based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. specialty exhaust, overhead and profit).
** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.
*** Total life-cycle savings is based on a 50 year study period.
**** Discounted payback years is based upon BLCC5 Life Cycle Analysis.
***** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

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Wilmington Elementary School - Mechanical System Payback Summary
Including Federal Tax Credit

Baseline	System	Gross Capital Investment*	25.5% IRA Geothermal Federal Tax Credit***	Net Investment	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	**1. Mixed-Air Overhead CHW/HHW VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils 2. High-Efficiency ASHP Chiller/Heater Plant**	$15,838,440	$0	**$15,838,440**	1,738,354	$327,852	$1.96	**35.5**	$77,410	$1,620,000	$3,198,500	$1,620,000	$405,262	-	-	-

Option	System	Gross Capital Investment*	25.5% IRA Geothermal Federal Tax Credit***	Net Investment	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	**1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Cafe/Stage and Gym areas 4. Supplemental Electric Resistance Heating Units**	$14,007,900	$0	**$14,007,900**	1,443,027	$291,930	$1.75	**29.5**	$58,460	$1,943,500	$1,185,000	$3,167,000	$350,390	**$54,872**	**$4,025,486**	**Instant*****
2	**1. VRF System w/ Water-Source Heat Pump (WSHP) Heat Recovery Condensing Units 2. WSHP VAV Dedicated Outdoor Air Systems (DOAS) w/ ERV & DCV with Terminal VAV Boxes 3. Supplemental Electric Heating 4. Geothermal Well Field and Distribution Plant**	$19,358,100	$4,936,316	**$14,421,785**	1,183,958	$223,944	$1.34	**24.2**	$62,235	$0	$3,945,000	$0	$286,179	**$119,083**	**$7,382,588**	**Instant*****
3	**1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant**	$14,442,360	$0	**$14,442,360**	1,160,735	$229,174	$1.37	**23.7**	$74,000	$1,620,000	$2,289,500	$1,620,000	$303,174	**$102,088**	**$5,680,330**	**Instant*****
4	**1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant**	$18,306,360	$4,668,122	**$13,638,238**	1,093,195	$205,748	$1.23	**22.3**	$75,675	$0	$3,379,500	$0	$281,423	**$123,839**	**$8,710,034**	**Instant*****

* Capital Investment Costs based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. specialty exhaust, overhead and profit).

** Total payment costs indicated for these incentives need to be confirmed by the appropriate parties.

*** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

**** Total life-cycle savings is based on a 50 year study period.

***** Discounted payback years is based upon BLCC5 Life Cycle Analysis.

****** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

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Wilmington Elementary School - LEED v4.0 Energy Savings Summary

Baseline	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings**	Energy Cost Savings Percentage**	Total LEED EAc2 Points
LEED Baseline	**1. ASHRAE 90.1-2010 Envelope 2. ASHRAE 90.1-2010 Mechanical Systems (System 8 - CHW VAV AHU's w/ Fan-Powered VAV Boxes w/ Electric Reheat) 3. ASHRAE 90.1-2010 Lighting System (0.99 w/s.f.) 4. ASHRAE 90.1-2010 Electric Domestic Hot Water Systems**	2,001,943	$400,661	$2.40	40.9	511,887.4	-	-	-

Option	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility $/s.f.	Annual kBTU/s.f. (EUI)	Annual GHG Emissions (kg CO2)	Combined Expense Savings**	Energy Cost Savings Percentage**	Total LEED EAc2 Points
1	**1. Design Envelope 2. Design Mechanical Systems (Air-Source VRF System) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,443,027	$291,930	$1.75	29.5	368,975.2	$108,731	**27.1%**	**11**
2	**1. Design Envelope 2. Design Mechanical Systems (Ground-Source VRF System) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,183,958	$223,944	$1.34	24.2	302,732.5	$176,717	**44.1%**	**16**
3	**1. Design Envelope 2. Design Mechanical Systems (Displacement Ventilation System with Air-Source Heat Recovery Heat Pump Chiller/Heater Plant) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,160,735	$229,174	$1.37	23.7	296,794.5	$171,487	**42.8%**	**16**
4	**1. Design Envelope 2. Design Mechanical Systems (Geothermal Displacement Ventilation System with Ground-Source Heat Recovery Heat Pump Chiller/Heater Plant) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems**	1,093,195	$205,748	$1.23	22.3	279,524.8	$194,913	**48.6%**	**16**

*Combined expense savings is the difference between the combined annual expense of the baseline and building in comparison.
**Energy cost/Greenhouse Gas (GHG) emissions savings percentage is the difference between the annual energy costs of the baseline and building in comparison.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

LIFE CYCLE ANALYSES

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 1 - ASHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:51:49 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$14,007,900	$1,830,540
Future Costs:			
Energy Consumption Costs	$8,347,407	$6,929,275	$1,418,131
Energy Demand Charges	$3,404,705	$3,535,184	-$130,479
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$6,160,732	$907,293
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$16,625,191	$2,194,946
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$30,633,091	$4,025,486

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$2,194,946
- Increased Total Investment	-$1,830,540

Net Savings	$4,025,486

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,443,027.0 kWh	295,327.0 kWh	14,765,945.7 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	4,923.8 MBtu	1,007.7 MBtu	50,383.5 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	476,250.04 kg	97,468.38 kg	4,873,285.33 kg
SO2	162.71 kg	135.07 kg	27.64 kg	1,382.13 kg
NOx	438.08 kg	363.65 kg	74.42 kg	3,721.12 kg
Total:				
CO2	573,718.42 kg	476,250.04 kg	97,468.38 kg	4,873,285.33 kg
SO2	162.71 kg	135.07 kg	27.64 kg	1,382.13 kg
NOx	438.08 kg	363.65 kg	74.42 kg	3,721.12 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 2 - GSHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:15 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$19,358,100	-$3,519,660
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,685,251	$2,662,156
Energy Demand Charges	$3,404,705	$2,342,200	$1,062,505
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,826,752	$2,241,273
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,854,203	$5,965,933
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$32,212,303	$2,446,273

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,965,933
- Increased Total Investment	$3,519,660

Net Savings	$2,446,273

Savings-to-Investment Ratio (SIR)

SIR = 1.70

Adjusted Internal Rate of Return

AIRR = 2.48%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	21
Discounted Payback occurs in year	23

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	1,738,354.0 kWh	1,183,958.0 kWh	554,396.0 kWh	27,719,041.1 kWh

Energy Savings Summary (in MBtu)

Energy Type	-----Average Base Case	Annual Alternative	Consumption----- Savings	Life-Cycle Savings
Electricity	5,931.5 MBtu	4,039.8 MBtu	1,891.7 MBtu	94,581.3 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg
Total:				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 3 - ASHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:29 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$15,379,680	$458,760
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,573,736	$2,773,670
Energy Demand Charges	$3,404,705	$2,641,190	$763,515
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$5,383,640	$1,684,385
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$13,598,566	$5,221,570
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$28,978,246	$5,680,330

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,221,570
- Increased Total Investment	-$458,760

Net Savings	$5,680,330

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	**Base Case**	**Alternative**	**Savings**	**Savings**
Electricity	1,738,354.0 kWh	1,160,735.0 kWh	577,619.0 kWh	28,880,159.3 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	**Base Case**	**Alternative**	**Savings**	**Savings**
Electricity	5,931.5 MBtu	3,960.6 MBtu	1,970.9 MBtu	98,543.2 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	383,083.68 kg	190,634.74 kg	9,531,475.96 kg
SO2	162.71 kg	108.65 kg	54.07 kg	2,703.26 kg
NOx	438.08 kg	292.51 kg	145.56 kg	7,278.00 kg
Total:				
CO2	573,718.42 kg	383,083.68 kg	190,634.74 kg	9,531,475.96 kg
SO2	162.71 kg	108.65 kg	54.07 kg	2,703.26 kg
NOx	438.08 kg	292.51 kg	145.56 kg	7,278.00 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: Option 4 - GSHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:52:50 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$18,306,360	-$2,467,920
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,249,416	$3,097,991
Energy Demand Charges	$3,404,705	$2,125,799	$1,278,906
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,935,090	$2,132,935
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,310,305	$6,509,832
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$30,616,665	$4,041,912

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$6,509,832
- Increased Total Investment	$2,467,920

Net Savings	$4,041,912

Savings-to-Investment Ratio (SIR)

SIR = 2.64

Adjusted Internal Rate of Return

AIRR = 3.39%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	20
Discounted Payback occurs in year	21

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,093,195.0 kWh	645,159.0 kWh	32,257,066.8 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	3,730.1 MBtu	2,201.4 MBtu	110,065.7 MBtu

Emissions Reduction Summary

Energy	-----Average	Annual	Emissions-----	Life-Cycle
Type	Base Case	Alternative	Reduction	Reduction
Electricity				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg
Total:				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: IRA Rebate Option 2 - GSHP VRF System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:53:19 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$14,421,785	$1,416,655
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,685,251	$2,662,156
Energy Demand Charges	$3,404,705	$2,342,200	$1,062,505
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,826,752	$2,241,273
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,854,203	$5,965,933
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$27,275,988	$7,382,588

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$5,965,933
- Increased Total Investment	-$1,416,655

Net Savings	$7,382,588

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,183,958.0 kWh	554,396.0 kWh	27,719,041.1 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	4,039.8 MBtu	1,891.7 MBtu	94,581.3 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg
Total:				
CO2	573,718.42 kg	390,748.09 kg	182,970.33 kg	9,148,265.80 kg
SO2	162.71 kg	110.82 kg	51.89 kg	2,594.57 kg
NOx	438.08 kg	298.37 kg	139.71 kg	6,985.39 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - Mixed-Air VAV w/ ASHP Plant

Alternative: IRA Rebate Option 4 - GSHP Displacement System

General Information

File Name:	C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Wilmington Elementary School.xml
Date of Study:	Wed Jan 15 13:54:21 EST 2025
Project Name:	Wilmington Elementary School
Project Location:	Massachusetts
Analysis Type:	OMB Analysis, Non-Energy Project
Analysis Purpose:	Public Investment or Regulatory Analysis
Analyst:	
Base Date:	September 1, 2026
Service Date:	September 1, 2026
Study Period:	50 years 0 months(September 1, 2026 through August 31, 2076)
Discount Rate:	1.4%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$15,838,440	$13,638,238	$2,200,202
Future Costs:			
Energy Consumption Costs	$8,347,407	$5,249,416	$3,097,991
Energy Demand Charges	$3,404,705	$2,125,799	$1,278,906
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$7,068,025	$4,935,090	$2,132,935
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
	---	---	---
Subtotal (for Future Cost Items)	$18,820,137	$12,310,305	$6,509,832
	---	---	---
Total PV Life-Cycle Cost	$34,658,577	$25,948,543	$8,710,034

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$6,509,832
- Increased Total Investment	-$2,200,202

Net Savings	$8,710,034

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average Annual Consumption-----		Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	1,738,354.0 kWh	1,093,195.0 kWh	645,159.0 kWh	32,257,066.8 kWh

Energy Savings Summary (in MBtu)

Energy	-----Average Annual Consumption-----		Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Electricity	5,931.5 MBtu	3,730.1 MBtu	2,201.4 MBtu	110,065.7 MBtu

Emissions Reduction Summary

Energy Type	-----Average Base Case	Annual Alternative	Emissions----- Reduction	Life-Cycle Reduction
Electricity				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg
Total:				
CO2	573,718.42 kg	360,793.09 kg	212,925.33 kg	10,645,975.11 kg
SO2	162.71 kg	102.33 kg	60.39 kg	3,019.34 kg
NOx	438.08 kg	275.49 kg	162.58 kg	8,129.00 kg

COST ESTIMATES

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School
JOB NO: 894 135 00
CLIENT: Dore & Whittier Architects
DATE: 1/13/2025 **BY:** KL

Baseline - Air-Source Heat Pump Plant VAV Systems (MA Opt-In Stretch Energy Code Compliant)

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
VAV Box with Hot Water Reheat Coils	150	$1,500			$ 225,000
RTU-A: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	30,000 CFM	$21/CFM			$ 630,000
RTU-B: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	35,000 CFM	$21/CFM			$ 735,000
RTU-C: Classroom Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	30,000 CFM	$21/CFM			$ 630,000
RTU-D: Gym Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	5,000 CFM	$25/CFM			$ 125,000
RTU-F: Cafe/Stage Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	6,000 CFM	$23/CFM			$ 138,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood Controls	4,500 CFM	$23/CFM			$ 103,500
(15) 30 Ton High-Efficiency Air-Source Heat Recovery Heat Pump Chiller/Heater Plant (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	450 tons	$3,600/ton			$ 1,620,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Terminal Heating Units			167,000	$2.00	$ 334,000
Hot Water Piping & Ins. and Accessories			167,000	$6.50	$ 1,085,500
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$7.00	$ 1,169,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$25.00	$ 4,175,000
ATC/DDC Controls			167,000	$7.50	$ 1,252,500
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$13,198,700			$ 2,639,740
				TOTAL	$ 15,838,440
				TOTAL ($/FT²)	$ 94.84

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Air-Source Heat Pump replacement cost of $1,620,000 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** Rooftop Unit and Pump replacement cost of $3,198,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Air-Source Heat Pump replacement cost of $1,620,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Option 1 - Air-Source Heat Pump (ASHP) Variable Refrigerant Flow (VRF) Systems with ASHP Cooling/Heating Air Handling Units

PROJECT:	**Wilmington Elementary School**	
JOB NO:	**894 135 00**	
CLIENT:	**Dore & Whittier Architects**	
DATE:	**1/13/2025**	**BY: KL**

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Indoor VRF Evaporator Units	216	$4,500			$ 972,000
VRF Branch Controllers	14	$12,000			$ 168,000
Outdoor Air Cooled VRF Condensing Units (240 Ton Total Capacity)	240 tons	$3,000/ton			$ 720,000
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	14,000 CFM	$30/CFM			$ 420,000
RTU-B: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	16,000 CFM	$30/CFM			$ 480,000
RTU-C: Classroom 100% O.A. ASHP DOAS w/ ERV & DCV	13,000 CFM	$30/CFM			$ 390,000
RTU-D: Gym Overhead VAV ASHP w/ ERV & DCV	12,000 CFM	$30/CFM			$ 360,000
RTU-E: Media Center 100% O.A. ASHP DOAS w/ ERV & DCV	2,500 CFM	$35/CFM			$ 87,500
RTU-F: Cafe/Stage Overhead VAV ASHP w/ ERV & DCV	12,000 CFM	$30/CFM			$ 360,000
RTU-G: Kitchen/Custodial Overhead VAV ASHP w/ ERV & DCV	3,000 CFM	$35/CFM			$ 96,000
RTU-H: Admin. 100% O.A. ASHP DOAS w/ ERV & DCV	3,000 CFM	$35/CFM			$ 105,000
MAU-A: Kitchen 100% O.A. ASHP VAV MAU w/ Kitchen Hood Controls	4,500 CFM	$33/CFM			$ 148,500
Electric Terminal Heating Units			167,000	$3.50	$ 584,500
Electric Circuitry for VRF & Electric Terminal Heating Units			167,000	$3.00	$ 501,000
Refrigeration Piping & Insulation and Condensate Piping & Pumps			167,000	$10.00	$ 1,670,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls w/ Refrigerant Monitoring			167,000	$7.75	$ 1,294,250
Indoor VRF Evaporator Units (IDF, EMR, etc.)	10	$4,500			$ 45,000
Cabinet Electric Unit Heaters	16	$2,000			$ 32,000
Electric Unit Heaters	6	$1,000			$ 6,000
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$11,673,250			$ 2,334,650
				TOTAL	$ 14,007,900
				TOTAL ($/FT²)	$ 83.88

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Rooftop Unit Condenser & Air-Source VRF Condenser replacement cost of $1,943,450 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** VRF Evaporator Unit & Branch Controller replacement cost of $1,185,000 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Rooftop Unit & Air-Source VRF Condenser replacement cost of $3,167,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School

JOB NO: 894 135 00

CLIENT: Dore & Whittier Architects

DATE: 1/13/2025 **BY:** KL

Option 2 - Geothermal Ground-Source Heat Pump (GSHP) Variable Refrigerant Flow (VRF) Systems with GSHP Cooling/Heating Air Handling Units

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Indoor VRF Evaporator Units	216	$4,500			$ 972,000
VRF Branch Controllers	14	$12,000			$ 168,000
Indoor Water-Source VRF Condensing Units (240 Ton Total Capacity including Redundancy)	240 tons	$2,500/ton			$ 600,000
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	14,000 CFM	$24/CFM			$ 336,000
RTU-B: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	16,000 CFM	$24/CFM			$ 384,000
RTU-C: Classroom 100% O.A. GSHP DOAS w/ ERV & DCV	13,000 CFM	$24/CFM			$ 312,000
RTU-D: Gym Overhead VAV GSHP w/ ERV & DCV	12,000 CFM	$24/CFM			$ 288,000
RTU-E: Media Center 100% O.A. GSHP DOAS w/ ERV & DCV	2,500 CFM	$29/CFM			$ 72,500
RTU-F: Cafe/Stage Overhead VAV GSHP w/ ERV & DCV	12,000 CFM	$26/CFM			$ 312,000
RTU-G: Kitchen/Custodial Overhead VAV GSHP w/ ERV & DCV	3,000 CFM	$29/CFM			$ 87,000
RTU-H: Admin. 100% O.A. GSHP DOAS w/ ERV & DCV	3,000 CFM	$29/CFM			$ 87,000
MAU-A: Kitchen 100% O.A. GSHP VAV MAU w/ Kitchen Hood Controls	4,500 CFM	$27/CFM			$ 121,500
(80) 600' Deep Closed Loop Type Wells (4.25 tons/well; 335 Tons total capacity) including Underground Piping, Coring, Sleeves, Excavation, Dewatering, Oversight, etc.	80	$45,000			$ 3,600,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Ground/Condenser Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Geothermal Pumps and VFDs, Accessories	2	$45,000			$ 90,000
Geothermal CW Piping Mains + Added Glycol Fill					$ 120,000
Electric Terminal Heating Units			167,000	$3.50	$ 584,500
Electric Circuitry for VRF & Electric Terminal Heating Units			167,000	$3.00	$ 501,000
Refrigeration Piping & Insulation and Condensate Piping & Pumps			167,000	$10.00	$ 1,670,000
Condenser Water Piping & Insulation and Condensate Piping & Pumps			167,000	$6.00	$ 1,002,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls w/ Refrigerant Monitoring			167,000	$8.25	$ 1,377,750
Indoor VRF Evaporator Units (IDF, EMR, etc.)	10	$3,500			$ 35,000
Cabinet Electric Unit Heaters	16	$2,000			$ 32,000
Electric Unit Heaters	6	$1,000			$ 6,000
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$16,131,750			$ 3,226,350
				TOTAL	$ 19,358,100
				TOTAL ($/FT²)	$ 115.92

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* VRF Evaporator Unit & Branch Controller, Rooftop Unit, Water-Source Heat Pump, and Pump replacement cost of $3,945,000 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School

JOB NO: 894 135 00

CLIENT: Dore & Whittier Architects

DATE: 1/13/2025 **BY:** KL

Option 3 - Air-Source Heat Pump Plant Displacement Ventilation CHW/HHW Cooling/Heating VAV Systems w/ Terminal Chilled/Hot Water Radiation

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Displacement Diffuser Assemblies	170	$950			$ 161,500
Small Displacement Diffuser Assemblies (Admin.)	46	$850			$ 39,100
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-B: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	20,000 CFM	$21/CFM			$ 420,000
RTU-C: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-D: Gym Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-F: Cafe/Stage Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	4,000 CFM	$25/CFM			$ 100,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood	4,500 CFM	$23/CFM			$ 103,500
(15) 30 Ton High-Efficiency Air-Source Heat Recovery Heat Pump Chiller/Heater Plant (450 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	450 tons	$3,600/ton			$ 1,620,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Compensated Loop Pumps w/ VFD's, Accessories	2	$20,000			$ 40,000
Hot Water Terminal Heating/Cooling Units			167,000	$4.00	$ 668,000
Hot Water Piping & Ins. and Accessories			167,000	$6.50	$ 1,085,500
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$9.00	$ 1,503,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls			167,000	$8.00	$ 1,336,000
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$12,035,300			$ 2,407,060
				TOTAL	$ 14,442,360
				TOTAL ($/FT²)	$ 86.48

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Air-Source Heat Pump replacement cost of $1,620,000 after 20 year equipment life expectancy carried in Life-Cycle Analysis calculations.

** Rooftop Unit and Pump replacement cost of $2,289,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

*** Air-Source Heat Pump replacement cost of $1,620,000 after 40 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

PROJECT: Wilmington Elementary School
JOB NO: 894 135 00
CLIENT: Dore & Whittier Architects
DATE: 1/13/2025 **BY:** KL

Option 4 - Geothermal Heat Pump Plant Displacement Ventilation CHW/HHW Cooling/Heating VAV Systems w/ Terminal Chilled/Hot Water Radiation

ITEM OF WORK	NO.	UNIT PRICE	AREA	PRICE/S.F.	TOTAL
Displacement Diffuser Assemblies	170	$950			$ 161,500
Small Displacement Diffuser Assemblies (Admin.)	46	$850			$ 39,100
VAV Box with Demand Ventilation Controls	150	$1,250			$ 187,500
RTU-A: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-B: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	20,000 CFM	$21/CFM			$ 420,000
RTU-C: Classroom Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	17,000 CFM	$21/CFM			$ 357,000
RTU-D: Gym Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-E: Media Center Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-F: Cafe/Stage Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	12,000 CFM	$23/CFM			$ 276,000
RTU-G: Kitchen/Custodial Overhead VAV CHW/HHW Cooling/Heating w/ ERV & DCV	3,000 CFM	$25/CFM			$ 75,000
RTU-H: Admin. Displacement VAV CHW/HHW Cooling/Heating w/ ERV & DCV	4,000 CFM	$25/CFM			$ 100,000
MAU-A: Kitchen 100% O.A. VAV MAU CHW/HHW Cooling/Heating w/ Kitchen Hood	4,500 CFM	$23/CFM			$ 103,500
(8) 50 Ton High-Efficiency Water-Source Heat Recovery Geothermal Heat Pump Chiller/Heater Plant (400 ton total capacity, 335 ton cooling, 320 ton HHW/DHW heating)	400 tons	$2,500/ton			$ 1,000,000
(80) 600' Deep Closed Loop Type Wells (4.25 tons/well; 335 Tons total capacity) including Underground Piping, Coring, Sleeves, Excavation, Dewatering, Oversight, etc.	80	$45,000			$ 3,600,000
(1) 350 kW Electric Boiler including Accessories (For Back-Up Only)	1	$60,000			$ 60,000
Chilled Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Hot Water Pumps w/ VFD's, Accessories	2	$40,000			$ 80,000
Compensated Loop Pumps w/ VFD's, Accessories	2	$20,000			$ 40,000
Geothermal Pumps and VFDs, Accessories	2	$45,000			$ 90,000
Geothermal CW Piping Mains + Added Glycol Fill					$ 150,000
Hot Water Terminal Heating/Cooling Units			167,000	$4.00	$ 668,000
Hot Water Piping & Ins. and Accessories			167,000	$6.00	$ 1,002,000
Chilled Water Piping & Insulation and Condensate Piping & Pumps			167,000	$9.00	$ 1,503,000
Ductwork including GRD's, Dampers, & General Exhaust Systems			167,000	$18.00	$ 3,006,000
ATC/DDC Controls			167,000	$8.50	$ 1,419,500
Chilled/Hot Water Fan Coil Units (IDF, EMR, etc.)	10	$5,000			$ 50,000
Cabinet Hot Water Unit Heaters	16	$2,000			$ 32,000
Hot Water Unit Heaters	6	$1,200			$ 7,200
Exhaust Fans (Misc. Areas)					$ 40,000
HVAC General Conditions (as-builts, coordination, shop drawings, testing and balancing, Cx support, Project Management)	20.00%	$15,255,300			$ 3,051,060
				TOTAL	$ 18,306,360
				TOTAL ($/FT²)	$ 109.62

Cost estimates have been derived for system comparison purposes only and are based upon recent project costs. Estimates do not necessarily include HVAC systems and equipment that would be required for all system options studied (i.e. specialty cooling & exhaust systems, etc.).

* Rooftop Unit, Water-Source Heat Pump, and Pump replacement cost of $3,79,500 after 30 year equipment life expectancy carried in Life-Cycle Analysis calculations.

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

Wilmington Elementary School - Annual Maintenance Costs

Baseline - Air-Source Heat Pump Plant Overhead VAV

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box w/ Reheat Coil	150	$75	$11,250
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
Water Treatment	167,000	$0.10	$16,700
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	6	$2,000	$12,000
Small CHW AHU's (<6,000 CFM)	3	$1,500	$4,500
Fan Coil Units	10	$125	$1,250
Air-Source Heat Pump Plant	1	$10,000	$10,000
		TOTAL	**$77,410**

Option 1 - Air-Source VRF System

Unit Type	Quantity	Cost/Unit	Annual Cost
Indoor VRF Evaporators		$150	$0
Air-Cooled VRF Outdoor Units	1	$5,000	$5,000
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
ATC Controls	167,000	$0.10	$16,700
Large ASHP AHU's (>6,000 CFM)	5	$2,750	$13,750
Small ASHP AHU's (<6,000 CFM)	4	$2,250	$9,000
Indoor VRF Fan Coil Units	10	$150	$1,500
		TOTAL	**$58,460**

Option 2 - Geothermal VRF System

Unit Type	Quantity	Cost/Unit	Annual Cost
Indoor VRF Evaporators		$150	$0
VRF Ground Source Plant	1	$3,000	$3,000
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, etc.)	167,000	$0.03	$5,010
Water Treatment	167,000	$0.075	$12,525
ATC Controls	167,000	$0.10	$16,700
Large WSHP AHU's (>6,000 CFM)	5	$2,000	$10,000
Small WSHP AHU's (<6,000 CFM)	4	$1,500	$6,000
Indoor VRF Fan Coil Units	10	$150	$1,500
		TOTAL	**$62,235**

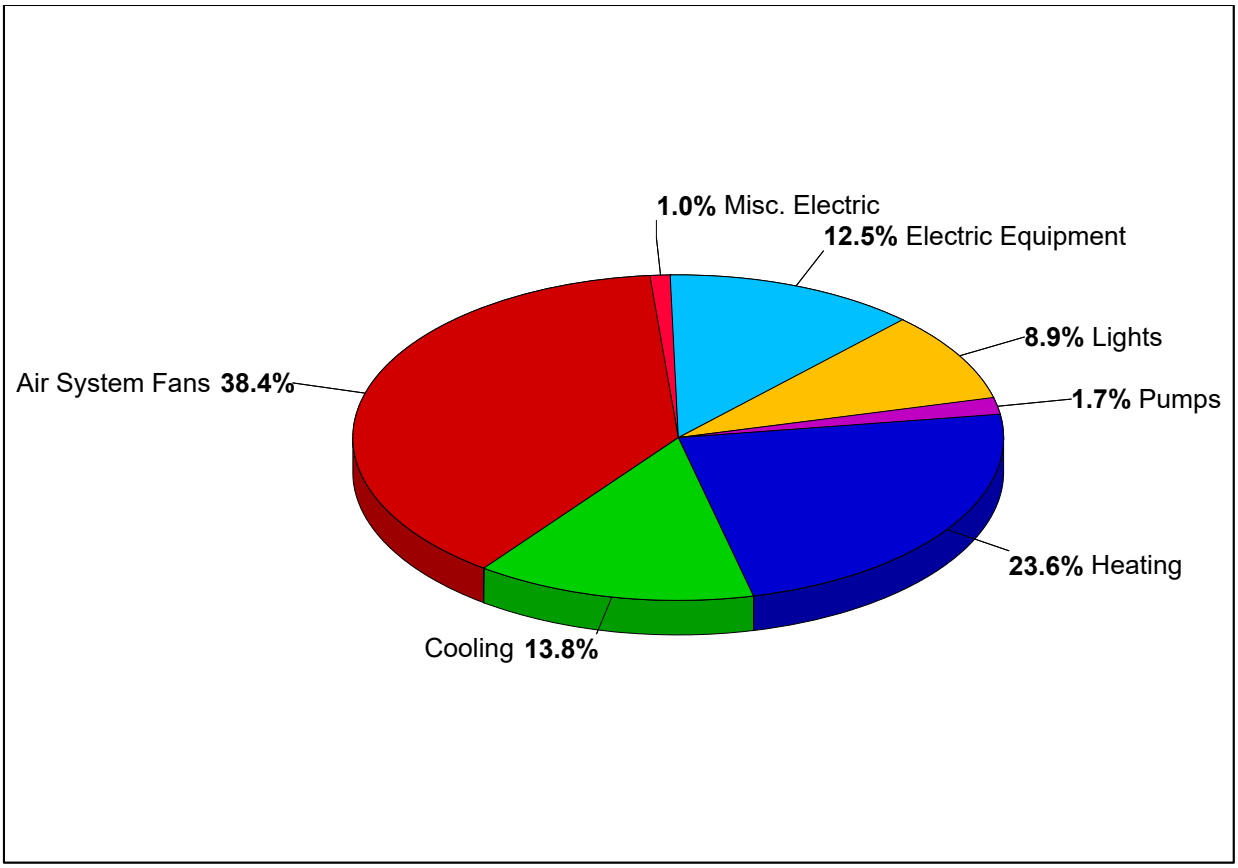
Option 3 - Air-Source Heat Pump Plant Displacement

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, RP's, etc.)	167,000	$0.05	$8,350
Water Treatment	167,000	$0.10	$16,700
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	5	$2,000	$10,000
Small CHW AHU's (<6,000 CFM)	4	$1,500	$6,000
Fan Coil Units	10	$125	$1,250
Air-Source Heat Pump Plant	1	$7,500	$7,500
		TOTAL	**$74,000**

Option 4 - Geothermal Heat Pump Plant Displacement

Unit Type	Quantity	Cost/Unit	Annual Cost
VAV Box	150	$50	$7,500
Terminal Equipment (CUH's, UH's, RP's, etc.)	167,000	$0.05	$8,350
Water Treatment	167,000	$0.125	$20,875
ATC Controls	167,000	$0.10	$16,700
Large CHW AHU's (>6,000 CFM)	5	$2,000	$10,000
Small CHW AHU's (<6,000 CFM)	4	$1,500	$6,000
Fan Coil Units	10	$125	$1,250
Geothermal Plant	1	$5,000	$5,000
		TOTAL	**$75,675**

ENERGY MODEL OUTPUTS



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	125,958	0.753	38.4
Cooling	45,404	0.272	13.8
Heating	77,337	0.463	23.6
Pumps	5,483	0.033	1.7
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**254,182**	**1.520**	**77.5**
Lights	29,306	0.175	8.9
Electric Equipment	40,926	0.245	12.5
Misc. Electric	3,439	0.021	1.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,671**	**0.441**	**22.5**
Grand Total	**327,852**	**1.961**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	2,986,634	17.865
Heating Coil Loads	2,728,537	16.321
Grand Total	**5,715,171**	**34.186**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	2,286,775	13.679	8,167,054	48.852
Cooling	798,997	4.779	2,853,559	17.069
Heating	1,412,824	8.451	5,045,799	30.182
Pumps	99,188	0.593	354,241	2.119
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**4,597,783**	**27.502**	**16,420,653**	**98.221**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**5,931,486**	**35.480**	**21,183,880**	**126.713**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	27,842	12,481	13	0	40,337
Feb	23,777	6,981	13	0	30,771
Mar	23,212	10,510	13	0	33,735
Apr	16,197	6,267	13	0	22,477
May	18,174	7,428	13	0	25,614
Jun	19,785	8,533	13	0	28,331
Jul	13,620	7,005	13	0	20,638
Aug	14,993	7,441	13	0	22,447
Sep	20,035	7,872	13	0	27,920
Oct	16,362	7,576	13	0	23,952
Nov	17,314	6,224	13	0	23,551
Dec	21,558	6,506	13	0	28,077
Totals	232,870	94,826	156	0	327,852

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	40,337	207,842	0.1941
Feb	30,771	177,492	0.1734
Mar	33,735	173,277	0.1947
Apr	22,477	120,910	0.1859
May	25,614	135,665	0.1888
Jun	28,331	147,696	0.1918
Jul	20,638	101,669	0.2030
Aug	22,447	111,920	0.2006
Sep	27,920	149,559	0.1867
Oct	23,952	122,142	0.1961
Nov	23,551	129,250	0.1822
Dec	28,077	160,932	0.1745
Totals	327,852	1,738,354	0.1886

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	207,842
Feb	0	0	0	0	177,492
Mar	0	0	0	0	173,277
Apr	0	0	0	0	120,910
May	0	0	0	0	135,665
Jun	0	0	0	0	147,696
Jul	0	0	0	0	101,669
Aug	0	0	0	0	111,920
Sep	0	0	0	0	149,559
Oct	0	0	0	0	122,142
Nov	0	0	0	0	129,250
Dec	0	0	0	0	160,932
Totals	0	0	0	0	1,738,354

4. Billing Demands

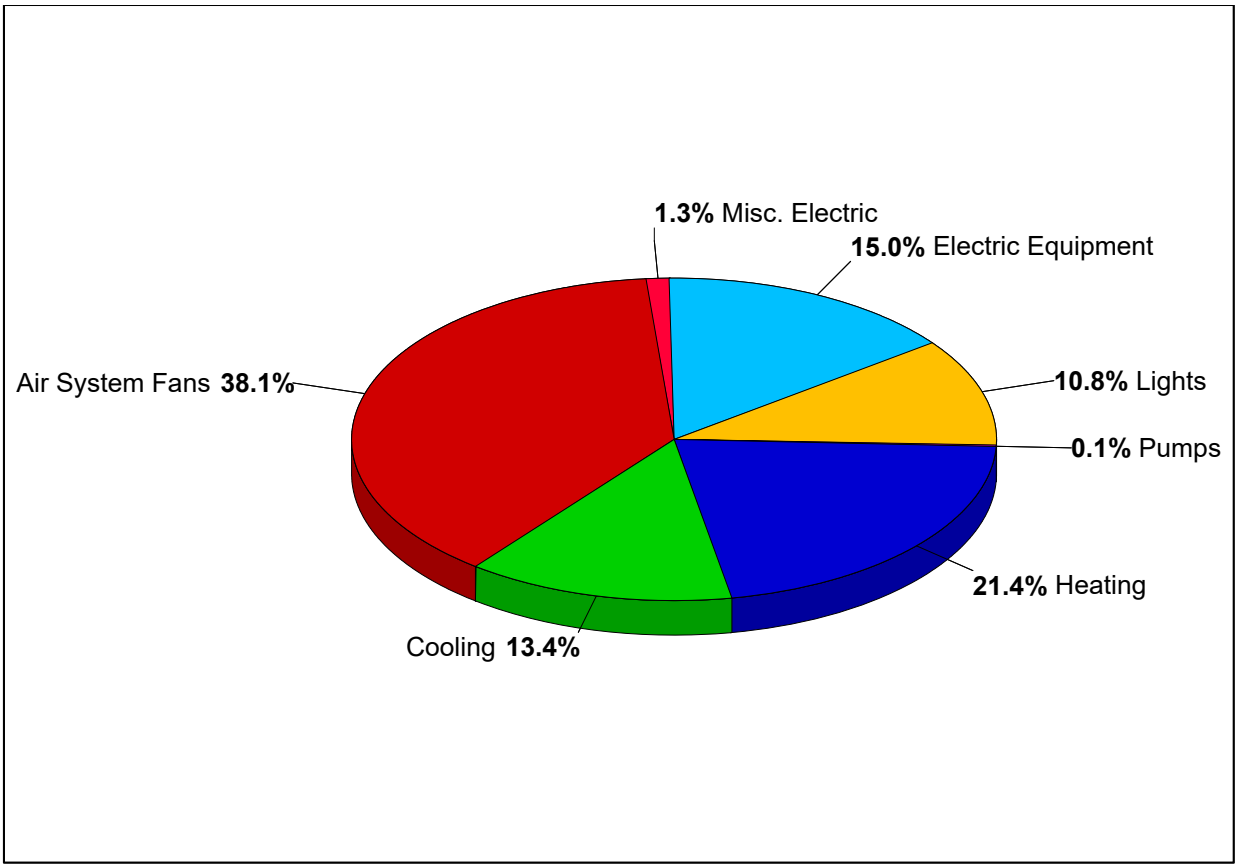
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	951.9
Feb	0.0	0.0	0.0	0.0	532.5
Mar	0.0	0.0	0.0	0.0	801.6
Apr	0.0	0.0	0.0	0.0	478.0
May	0.0	0.0	0.0	0.0	566.5
Jun	0.0	0.0	0.0	0.0	650.8
Jul	0.0	0.0	0.0	0.0	534.3
Aug	0.0	0.0	0.0	0.0	567.5
Sep	0.0	0.0	0.0	0.0	600.4
Oct	0.0	0.0	0.0	0.0	577.8
Nov	0.0	0.0	0.0	0.0	474.7
Dec	0.0	0.0	0.0	0.0	496.2

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	951.9
Feb	0.0	0.0	0.0	0.0	532.5
Mar	0.0	0.0	0.0	0.0	801.6
Apr	0.0	0.0	0.0	0.0	478.0
May	0.0	0.0	0.0	0.0	566.5
Jun	0.0	0.0	0.0	0.0	650.8
Jul	0.0	0.0	0.0	0.0	534.3
Aug	0.0	0.0	0.0	0.0	567.5
Sep	0.0	0.0	0.0	0.0	600.4
Oct	0.0	0.0	0.0	0.0	577.8
Nov	0.0	0.0	0.0	0.0	474.7
Dec	0.0	0.0	0.0	0.0	496.2

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/9 08:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/21 09:00
May	n/a	n/a	n/a	n/a	5/10 09:00
Jun	n/a	n/a	n/a	n/a	6/28 09:00
Jul	n/a	n/a	n/a	n/a	7/20 14:00
Aug	n/a	n/a	n/a	n/a	8/24 10:00
Sep	n/a	n/a	n/a	n/a	9/4 08:00
Oct	n/a	n/a	n/a	n/a	10/27 09:00
Nov	n/a	n/a	n/a	n/a	11/27 08:00
Dec	n/a	n/a	n/a	n/a	12/25 07:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	111,092	0.665	38.1
Cooling	39,034	0.234	13.4
Heating	62,582	0.374	21.4
Pumps	234	0.001	0.1
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**212,942**	**1.274**	**72.9**
Lights	31,424	0.188	10.8
Electric Equipment	43,874	0.262	15.0
Misc. Electric	3,687	0.022	1.3
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**78,985**	**0.473**	**27.1**
Grand Total	**291,927**	**1.746**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O1] ASHP VRF Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	3,964,639	23.715
Heating Coil Loads	1,748,837	10.461
Grand Total	**5,713,476**	**34.176**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,874,878	11.215	6,695,993	40.052
Cooling	649,569	3.885	2,319,889	13.877
Heating	1,061,620	6.350	3,791,500	22.679
Pumps	3,962	0.024	14,151	0.085
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**3,590,029**	**21.474**	**12,821,533**	**76.693**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,560	4.430	2,644,858	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,712**	**7.978**	**4,763,256**	**28.492**
Grand Total	**4,923,741**	**29.452**	**17,584,789**	**105.184**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	19,297	9,213	13	0	28,524
Feb	16,445	8,053	13	0	24,511
Mar	17,685	7,349	13	0	25,047
Apr	14,024	8,345	13	0	22,382
May	16,235	7,850	13	0	24,098
Jun	18,550	9,076	13	0	27,639
Jul	12,023	7,538	13	0	19,574
Aug	13,188	7,823	13	0	21,024
Sep	18,874	8,830	13	0	27,717
Oct	14,744	7,504	13	0	22,261
Nov	15,713	8,213	13	0	23,939
Dec	16,530	8,670	13	0	25,213
Totals	193,308	98,466	156	0	291,930

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	28,524	144,054	0.1980
Feb	24,511	122,761	0.1997
Mar	25,047	132,016	0.1897
Apr	22,382	104,688	0.2138
May	24,098	121,190	0.1988
Jun	27,639	138,477	0.1996
Jul	19,574	89,751	0.2181
Aug	21,024	98,448	0.2136
Sep	27,717	140,893	0.1967
Oct	22,261	110,062	0.2023
Nov	23,939	117,295	0.2041
Dec	25,213	123,392	0.2043
Totals	291,930	1,443,027	0.2023

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	144,054
Feb	0	0	0	0	122,761
Mar	0	0	0	0	132,016
Apr	0	0	0	0	104,688
May	0	0	0	0	121,190
Jun	0	0	0	0	138,477
Jul	0	0	0	0	89,751
Aug	0	0	0	0	98,448
Sep	0	0	0	0	140,893
Oct	0	0	0	0	110,062
Nov	0	0	0	0	117,295
Dec	0	0	0	0	123,392
Totals	0	0	0	0	1,443,027

4. Billing Demands

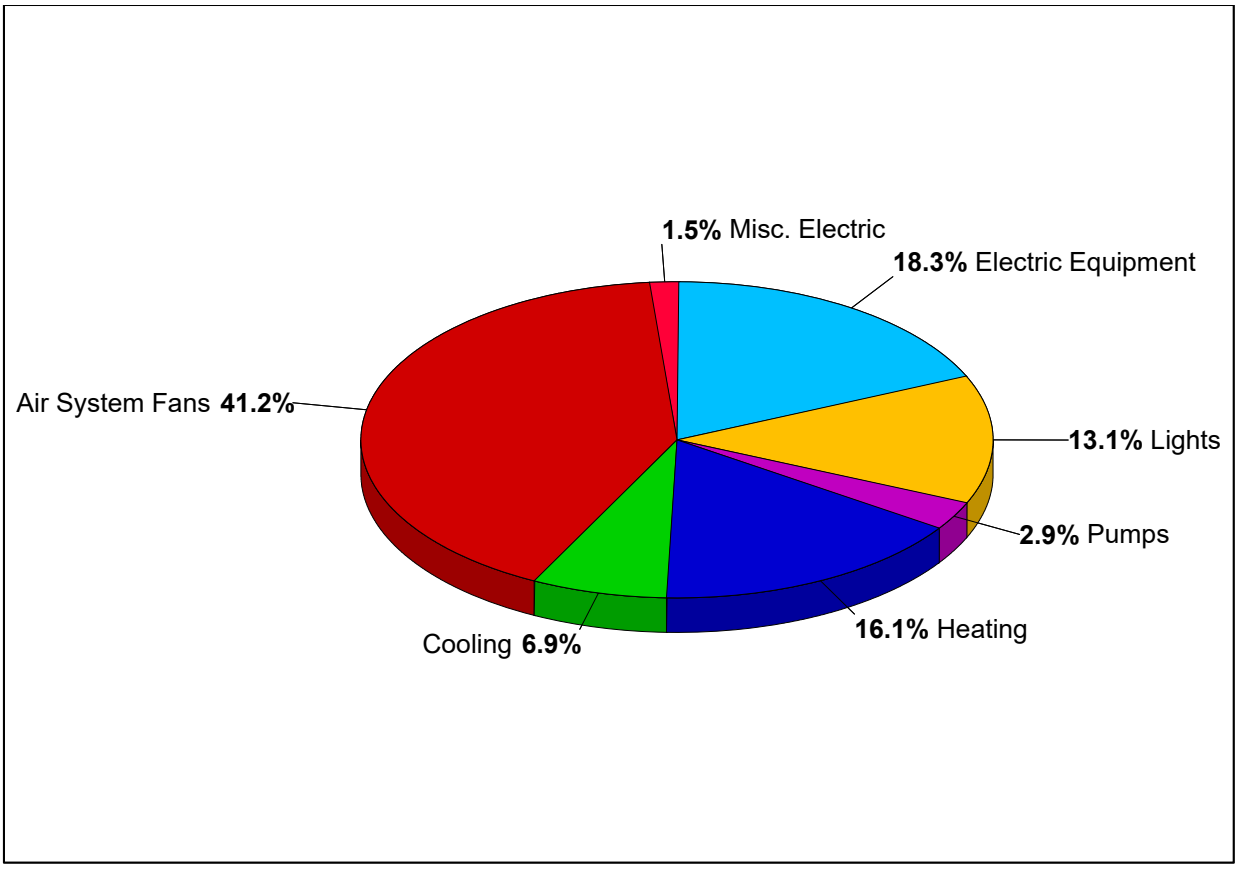
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	702.7
Feb	0.0	0.0	0.0	0.0	614.2
Mar	0.0	0.0	0.0	0.0	560.5
Apr	0.0	0.0	0.0	0.0	636.4
May	0.0	0.0	0.0	0.0	598.7
Jun	0.0	0.0	0.0	0.0	692.2
Jul	0.0	0.0	0.0	0.0	574.9
Aug	0.0	0.0	0.0	0.0	596.6
Sep	0.0	0.0	0.0	0.0	673.5
Oct	0.0	0.0	0.0	0.0	572.3
Nov	0.0	0.0	0.0	0.0	626.4
Dec	0.0	0.0	0.0	0.0	661.3

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	702.7
Feb	0.0	0.0	0.0	0.0	614.2
Mar	0.0	0.0	0.0	0.0	560.5
Apr	0.0	0.0	0.0	0.0	636.4
May	0.0	0.0	0.0	0.0	598.7
Jun	0.0	0.0	0.0	0.0	692.2
Jul	0.0	0.0	0.0	0.0	574.9
Aug	0.0	0.0	0.0	0.0	596.6
Sep	0.0	0.0	0.0	0.0	673.5
Oct	0.0	0.0	0.0	0.0	572.3
Nov	0.0	0.0	0.0	0.0	626.4
Dec	0.0	0.0	0.0	0.0	661.3

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/27 11:00
Mar	n/a	n/a	n/a	n/a	3/6 10:00
Apr	n/a	n/a	n/a	n/a	4/10 10:00
May	n/a	n/a	n/a	n/a	5/15 14:00
Jun	n/a	n/a	n/a	n/a	6/29 10:00
Jul	n/a	n/a	n/a	n/a	7/7 09:00
Aug	n/a	n/a	n/a	n/a	8/21 09:00
Sep	n/a	n/a	n/a	n/a	9/5 10:00
Oct	n/a	n/a	n/a	n/a	10/26 10:00
Nov	n/a	n/a	n/a	n/a	11/30 11:00
Dec	n/a	n/a	n/a	n/a	12/18 11:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	92,153	0.551	41.2
Cooling	15,519	0.093	6.9
Heating	35,945	0.215	16.1
Pumps	6,511	0.039	2.9
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**150,128**	**0.898**	**67.0**
Lights	29,371	0.176	13.1
Electric Equipment	41,000	0.245	18.3
Misc. Electric	3,443	0.021	1.5
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,815**	**0.442**	**33.0**
Grand Total	**223,943**	**1.339**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O2] Geo VRF Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	2,191,877	13.111
Heating Coil Loads	767,193	4.589
Grand Total	**2,959,070**	**17.700**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,664,212	9.955	5,943,614	35.552
Cooling	274,701	1.643	981,075	5.868
Heating	650,323	3.890	2,322,582	13.893
Pumps	116,843	0.699	417,296	2.496
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,706,078**	**16.187**	**9,664,566**	**57.809**
Lights	530,513	3.173	1,894,688	11.333
Electric Equipment	740,556	4.430	2,644,844	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,712**	**7.978**	**4,763,256**	**28.492**
Grand Total	**4,039,790**	**24.164**	**14,427,822**	**86.301**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	16,051	6,981	13	0	23,045
Feb	13,735	5,778	13	0	19,526
Mar	14,976	5,666	13	0	20,655
Apr	12,260	5,134	13	0	17,407
May	14,305	5,151	13	0	19,469
Jun	14,309	5,832	13	0	20,154
Jul	8,692	4,561	13	0	13,266
Aug	9,396	4,740	13	0	14,149
Sep	14,180	5,731	13	0	19,924
Oct	13,424	5,220	13	0	18,658
Nov	13,743	5,061	13	0	18,817
Dec	13,531	5,330	13	0	18,874
Totals	158,603	65,185	156	0	223,944

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	23,045	119,821	0.1923
Feb	19,526	102,529	0.1904
Mar	20,655	111,794	0.1848
Apr	17,407	91,518	0.1902
May	19,469	106,787	0.1823
Jun	20,154	106,813	0.1887
Jul	13,266	64,884	0.2045
Aug	14,149	70,143	0.2017
Sep	19,924	105,855	0.1882
Oct	18,658	100,212	0.1862
Nov	18,817	102,591	0.1834
Dec	18,874	101,011	0.1869
Totals	223,944	1,183,958	0.1891

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	119,821
Feb	0	0	0	0	102,529
Mar	0	0	0	0	111,794
Apr	0	0	0	0	91,518
May	0	0	0	0	106,787
Jun	0	0	0	0	106,813
Jul	0	0	0	0	64,884
Aug	0	0	0	0	70,143
Sep	0	0	0	0	105,855
Oct	0	0	0	0	100,212
Nov	0	0	0	0	102,591
Dec	0	0	0	0	101,011
Totals	0	0	0	0	1,183,958

4. Billing Demands

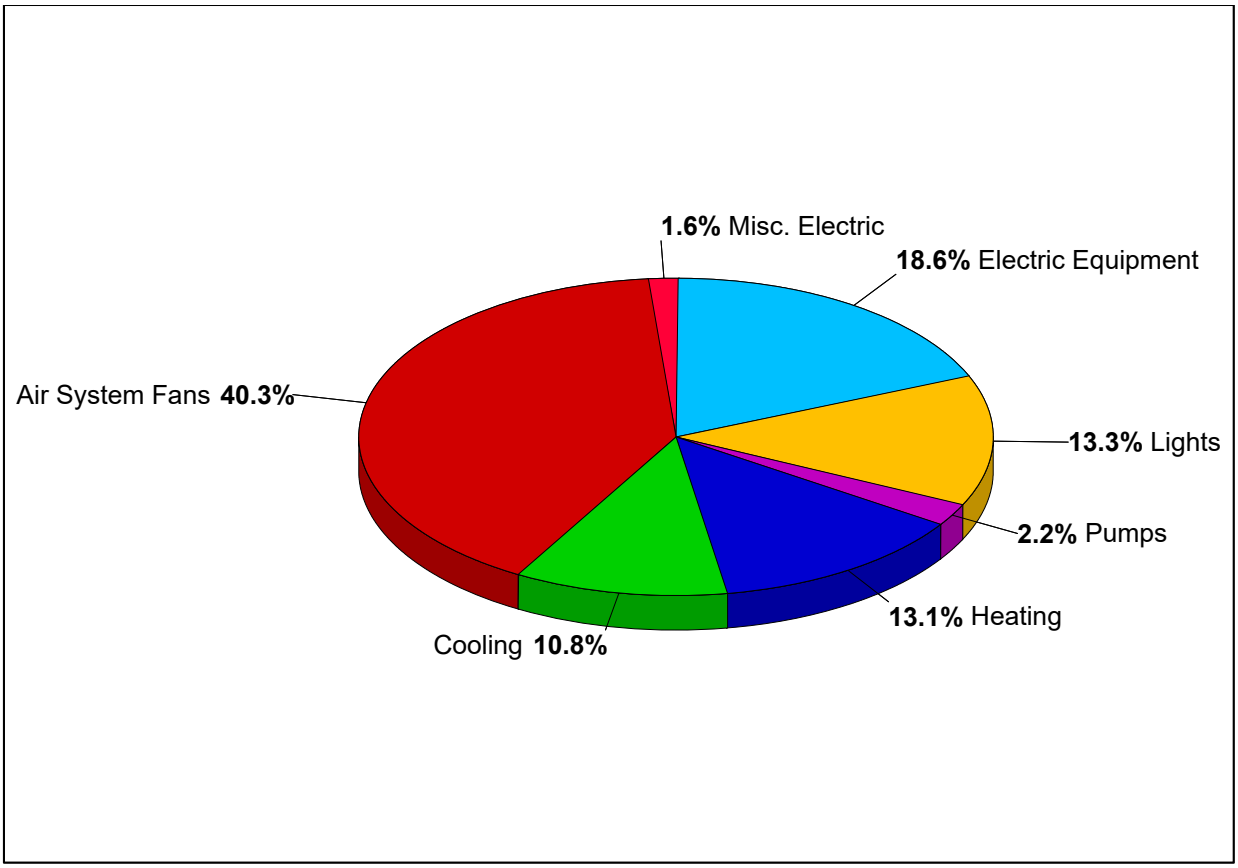
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	532.4
Feb	0.0	0.0	0.0	0.0	440.7
Mar	0.0	0.0	0.0	0.0	432.2
Apr	0.0	0.0	0.0	0.0	391.6
May	0.0	0.0	0.0	0.0	392.8
Jun	0.0	0.0	0.0	0.0	444.8
Jul	0.0	0.0	0.0	0.0	347.9
Aug	0.0	0.0	0.0	0.0	361.5
Sep	0.0	0.0	0.0	0.0	437.1
Oct	0.0	0.0	0.0	0.0	398.1
Nov	0.0	0.0	0.0	0.0	386.0
Dec	0.0	0.0	0.0	0.0	406.5

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	532.4
Feb	0.0	0.0	0.0	0.0	440.7
Mar	0.0	0.0	0.0	0.0	432.2
Apr	0.0	0.0	0.0	0.0	391.6
May	0.0	0.0	0.0	0.0	392.8
Jun	0.0	0.0	0.0	0.0	444.8
Jul	0.0	0.0	0.0	0.0	347.9
Aug	0.0	0.0	0.0	0.0	361.5
Sep	0.0	0.0	0.0	0.0	437.1
Oct	0.0	0.0	0.0	0.0	398.1
Nov	0.0	0.0	0.0	0.0	386.0
Dec	0.0	0.0	0.0	0.0	406.5

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/2 09:00
Feb	n/a	n/a	n/a	n/a	2/9 10:00
Mar	n/a	n/a	n/a	n/a	3/1 10:00
Apr	n/a	n/a	n/a	n/a	4/10 09:00
May	n/a	n/a	n/a	n/a	5/16 10:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/4 09:00
Oct	n/a	n/a	n/a	n/a	10/26 10:00
Nov	n/a	n/a	n/a	n/a	11/30 10:00
Dec	n/a	n/a	n/a	n/a	12/26 10:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	92,404	0.553	40.3
Cooling	24,818	0.148	10.8
Heating	30,125	0.180	13.1
Pumps	5,123	0.031	2.2
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**152,470**	**0.912**	**66.5**
Lights	30,523	0.183	13.3
Electric Equipment	42,602	0.255	18.6
Misc. Electric	3,577	0.021	1.6
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**76,702**	**0.459**	**33.5**
Grand Total	**229,172**	**1.371**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O3] ASHP Displacement Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	1,485,544	8.886
Heating Coil Loads	465,280	2.783
Grand Total	**1,950,824**	**11.669**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,602,666	9.586	5,723,809	34.237
Cooling	415,080	2.483	1,482,427	8.867
Heating	520,272	3.112	1,858,114	11.114
Pumps	88,818	0.531	317,206	1.897
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,626,835**	**15.713**	**9,381,555**	**56.116**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**3,960,539**	**23.690**	**14,144,782**	**84.608**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	15,620	9,551	13	0	25,185
Feb	13,023	5,332	13	0	18,368
Mar	13,937	6,542	13	0	20,492
Apr	11,164	4,743	13	0	15,920
May	13,070	5,397	13	0	18,479
Jun	15,117	7,374	13	0	22,504
Jul	10,515	6,185	13	0	16,713
Aug	11,477	6,532	13	0	18,023
Sep	14,394	6,942	13	0	21,349
Oct	12,153	5,258	13	0	17,424
Nov	12,525	4,655	13	0	17,193
Dec	12,497	5,014	13	0	17,523
Totals	155,492	73,526	156	0	229,174

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	25,185	116,604	0.2160
Feb	18,368	97,214	0.1889
Mar	20,492	104,039	0.1970
Apr	15,920	83,339	0.1910
May	18,479	97,564	0.1894
Jun	22,504	112,845	0.1994
Jul	16,713	78,496	0.2129
Aug	18,023	85,677	0.2104
Sep	21,349	107,452	0.1987
Oct	17,424	90,722	0.1921
Nov	17,193	93,497	0.1839
Dec	17,523	93,286	0.1878
Totals	229,174	1,160,735	0.1974

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	116,604
Feb	0	0	0	0	97,214
Mar	0	0	0	0	104,039
Apr	0	0	0	0	83,339
May	0	0	0	0	97,564
Jun	0	0	0	0	112,845
Jul	0	0	0	0	78,496
Aug	0	0	0	0	85,677
Sep	0	0	0	0	107,452
Oct	0	0	0	0	90,722
Nov	0	0	0	0	93,497
Dec	0	0	0	0	93,286
Totals	0	0	0	0	1,160,735

4. Billing Demands

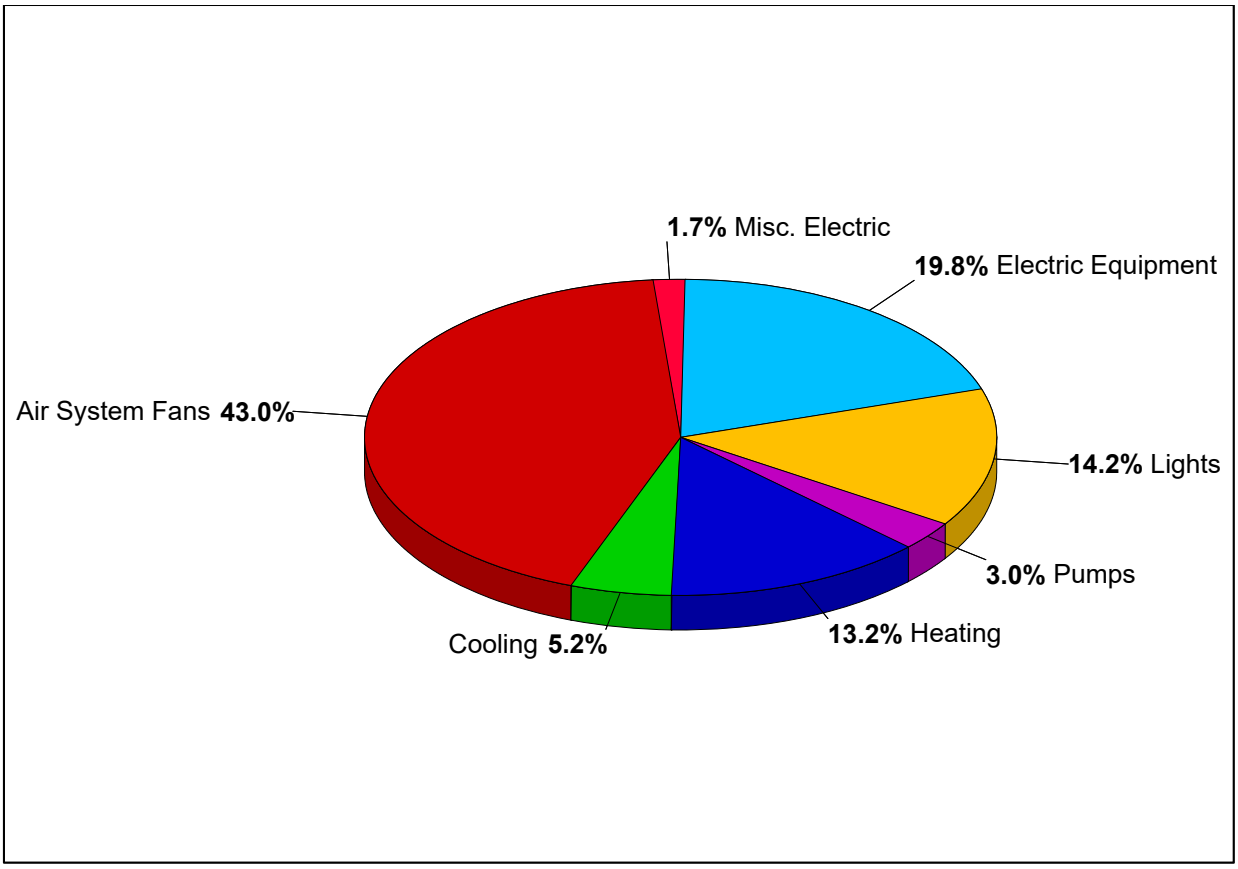
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	728.5
Feb	0.0	0.0	0.0	0.0	406.6
Mar	0.0	0.0	0.0	0.0	499.0
Apr	0.0	0.0	0.0	0.0	361.8
May	0.0	0.0	0.0	0.0	411.6
Jun	0.0	0.0	0.0	0.0	562.4
Jul	0.0	0.0	0.0	0.0	471.7
Aug	0.0	0.0	0.0	0.0	498.2
Sep	0.0	0.0	0.0	0.0	529.5
Oct	0.0	0.0	0.0	0.0	401.0
Nov	0.0	0.0	0.0	0.0	355.0
Dec	0.0	0.0	0.0	0.0	382.4

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	728.5
Feb	0.0	0.0	0.0	0.0	406.6
Mar	0.0	0.0	0.0	0.0	499.0
Apr	0.0	0.0	0.0	0.0	361.8
May	0.0	0.0	0.0	0.0	411.6
Jun	0.0	0.0	0.0	0.0	562.4
Jul	0.0	0.0	0.0	0.0	471.7
Aug	0.0	0.0	0.0	0.0	498.2
Sep	0.0	0.0	0.0	0.0	529.5
Oct	0.0	0.0	0.0	0.0	401.0
Nov	0.0	0.0	0.0	0.0	355.0
Dec	0.0	0.0	0.0	0.0	382.4

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/9 08:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/10 08:00
May	n/a	n/a	n/a	n/a	5/10 14:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/5 09:00
Oct	n/a	n/a	n/a	n/a	10/27 09:00
Nov	n/a	n/a	n/a	n/a	11/22 10:00
Dec	n/a	n/a	n/a	n/a	12/26 09:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	88,407	0.529	43.0
Cooling	10,639	0.064	5.2
Heating	27,214	0.163	13.2
Pumps	6,131	0.037	3.0
Heat Rejection Fans	0	0.000	0.0
HVAC Sub-Total	**132,390**	**0.792**	**64.3**
Lights	29,184	0.175	14.2
Electric Equipment	40,755	0.244	19.8
Misc. Electric	3,417	0.020	1.7
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**73,357**	**0.439**	**35.7**
Grand Total	**205,747**	**1.231**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.7** sqft
Modeled Floor Area ..... **167,180.7** sqft

Energy Budget by System Component - [O4] Geo Displacement Design

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:25 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	1,485,544	8.886
Heating Coil Loads	465,280	2.783
Grand Total	**1,950,824**	**11.669**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,602,666	9.586	5,723,809	34.237
Cooling	185,027	1.107	660,811	3.953
Heating	498,224	2.980	1,779,370	10.643
Pumps	110,465	0.661	394,519	2.360
Heat Rejection Fans	0	0.000	0	0.000
HVAC Sub-Total	**2,396,382**	**14.334**	**8,558,509**	**51.193**
Lights	530,509	3.173	1,894,674	11.333
Electric Equipment	740,552	4.430	2,644,829	15.820
Misc. Electric	62,643	0.375	223,724	1.338
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,333,703**	**7.978**	**4,763,227**	**28.492**
Grand Total	**3,730,086**	**22.312**	**13,321,736**	**79.685**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.7** sqft
   Modeled Floor Area ..... **167180.7** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	14,347	5,473	13	0	19,833
Feb	12,388	4,930	13	0	17,331
Mar	13,460	4,722	13	0	18,195
Apr	11,295	4,529	13	0	15,836
May	13,001	4,724	13	0	17,738
Jun	13,439	5,769	13	0	19,221
Jul	8,732	4,639	13	0	13,384
Aug	9,441	4,966	13	0	14,420
Sep	13,006	5,490	13	0	18,510
Oct	12,354	4,718	13	0	17,085
Nov	12,612	4,618	13	0	17,243
Dec	12,369	4,570	13	0	16,952
Totals	146,444	59,148	156	0	205,748

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	19,833	107,100	0.1852
Feb	17,331	92,478	0.1874
Mar	18,195	100,475	0.1811
Apr	15,836	84,313	0.1878
May	17,738	97,051	0.1828
Jun	19,221	100,319	0.1916
Jul	13,384	65,187	0.2053
Aug	14,420	70,477	0.2046
Sep	18,510	97,091	0.1906
Oct	17,085	92,222	0.1853
Nov	17,243	94,149	0.1832
Dec	16,952	92,332	0.1836
Totals	205,748	1,093,195	0.1882

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	107,100
Feb	0	0	0	0	92,478
Mar	0	0	0	0	100,475
Apr	0	0	0	0	84,313
May	0	0	0	0	97,051
Jun	0	0	0	0	100,319
Jul	0	0	0	0	65,187
Aug	0	0	0	0	70,477
Sep	0	0	0	0	97,091
Oct	0	0	0	0	92,222
Nov	0	0	0	0	94,149
Dec	0	0	0	0	92,332
Totals	0	0	0	0	1,093,195

4. Billing Demands

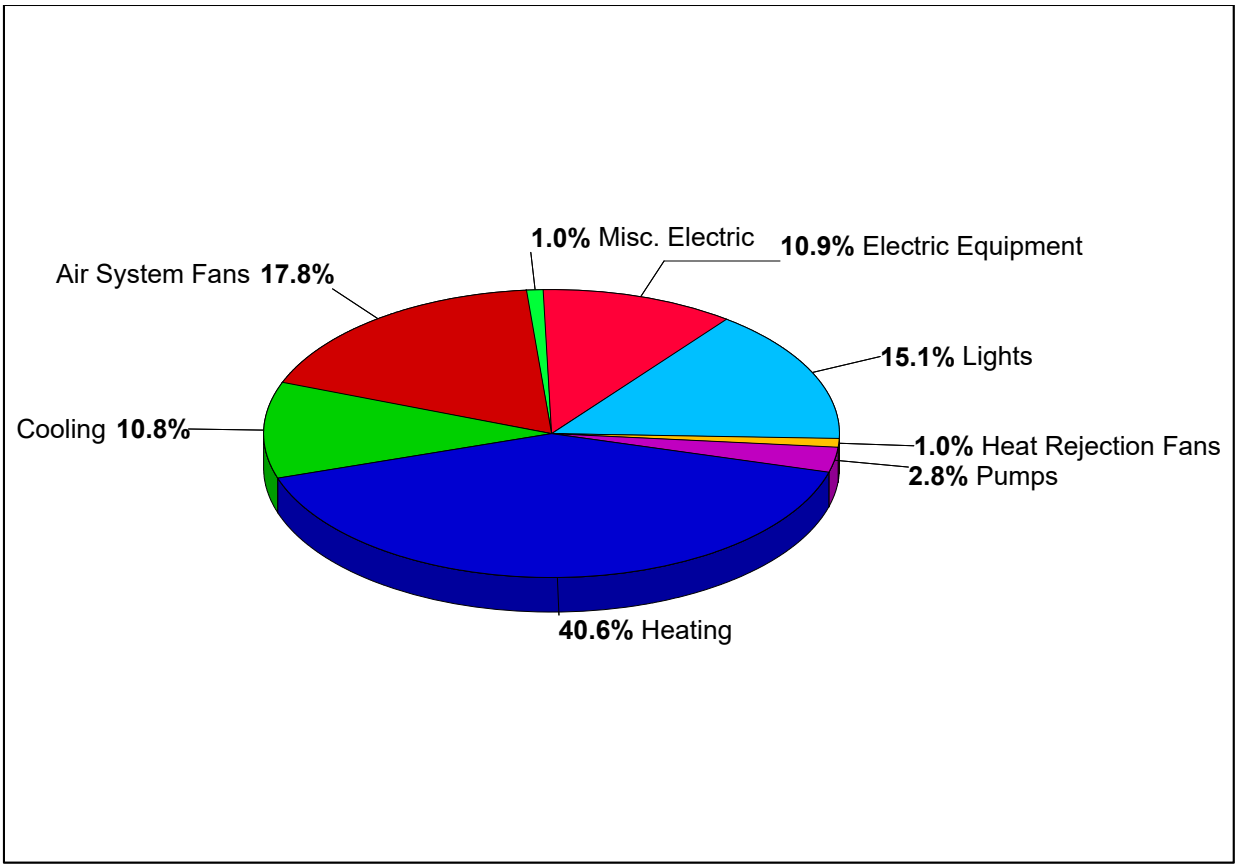
Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	417.4
Feb	0.0	0.0	0.0	0.0	376.0
Mar	0.0	0.0	0.0	0.0	360.2
Apr	0.0	0.0	0.0	0.0	345.4
May	0.0	0.0	0.0	0.0	360.3
Jun	0.0	0.0	0.0	0.0	440.0
Jul	0.0	0.0	0.0	0.0	353.8
Aug	0.0	0.0	0.0	0.0	378.7
Sep	0.0	0.0	0.0	0.0	418.7
Oct	0.0	0.0	0.0	0.0	359.8
Nov	0.0	0.0	0.0	0.0	352.2
Dec	0.0	0.0	0.0	0.0	348.5

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	417.4
Feb	0.0	0.0	0.0	0.0	376.0
Mar	0.0	0.0	0.0	0.0	360.2
Apr	0.0	0.0	0.0	0.0	345.4
May	0.0	0.0	0.0	0.0	360.3
Jun	0.0	0.0	0.0	0.0	440.0
Jul	0.0	0.0	0.0	0.0	353.8
Aug	0.0	0.0	0.0	0.0	378.7
Sep	0.0	0.0	0.0	0.0	418.7
Oct	0.0	0.0	0.0	0.0	359.8
Nov	0.0	0.0	0.0	0.0	352.2
Dec	0.0	0.0	0.0	0.0	348.5

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 08:00
Feb	n/a	n/a	n/a	n/a	2/6 08:00
Mar	n/a	n/a	n/a	n/a	3/1 09:00
Apr	n/a	n/a	n/a	n/a	4/13 10:00
May	n/a	n/a	n/a	n/a	5/11 09:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/21 10:00
Sep	n/a	n/a	n/a	n/a	9/4 09:00
Oct	n/a	n/a	n/a	n/a	10/9 09:00
Nov	n/a	n/a	n/a	n/a	11/30 10:00
Dec	n/a	n/a	n/a	n/a	12/18 10:00



1. Annual Costs

Component	Annual Cost ($)	($/sqft)	Percent of Total (%)
Air System Fans	71,423	0.427	17.8
Cooling	43,219	0.259	10.8
Heating	162,854	0.974	40.6
Pumps	11,182	0.067	2.8
Heat Rejection Fans	3,908	0.023	1.0
HVAC Sub-Total	**292,585**	**1.750**	**73.0**
Lights	60,611	0.363	15.1
Electric Equipment	43,596	0.261	10.9
Misc. Electric	3,866	0.023	1.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**108,074**	**0.646**	**27.0**
Grand Total	**400,659**	**2.397**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **167,180.6** sqft
Modeled Floor Area ..... **167,180.6** sqft

Energy Budget by System Component - [L-B] LEED Baseline

Project: Wilmington ES - LCCA Energy Model 01/15/2025
Prepared by: GGD Consulting Engineers, Inc. 2:26 PM

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/sqft)
Cooling Coil Loads	4,050,710	24.230
Heating Coil Loads	3,052,593	18.259
Grand Total	**7,103,303**	**42.489**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/sqft)	Source Energy (kBTU)	Source Energy (kBTU/sqft)
Air System Fans	1,216,465	7.276	4,344,519	25.987
Cooling	732,592	4.382	2,616,399	15.650
Heating	2,790,328	16.691	9,965,459	59.609
Pumps	188,975	1.130	674,909	4.037
Heat Rejection Fans	65,945	0.395	235,516	1.409
HVAC Sub-Total	**4,994,304**	**29.874**	**17,836,802**	**106.692**
Lights	1,030,064	6.161	3,678,800	22.005
Electric Equipment	740,569	4.430	2,644,889	15.821
Misc. Electric	65,901	0.394	235,361	1.408
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,836,534**	**10.985**	**6,559,050**	**39.233**
Grand Total	**6,830,838**	**40.859**	**24,395,852**	**145.925**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **167180.6** sqft
   Modeled Floor Area ..... **167180.6** sqft

1. Component Charges

Billing Period	Energy Charges ($)	Demand Charges ($)	Customer Charges ($)	Taxes ($)	Total Charge ($)
Jan	33,464	15,354	13	0	48,831
Feb	28,257	12,664	13	0	40,934
Mar	26,890	12,869	13	0	39,772
Apr	17,452	11,158	13	0	28,622
May	17,687	8,553	13	0	26,253
Jun	21,973	10,185	13	0	32,171
Jul	16,813	9,588	13	0	26,413
Aug	18,031	9,623	13	0	27,667
Sep	23,993	10,743	13	0	34,749
Oct	16,442	8,968	13	0	25,424
Nov	20,842	10,777	13	0	31,632
Dec	26,337	11,843	13	0	38,193
Totals	268,180	132,324	156	0	400,661

2. Totals

Billing Period	Total Charges ($)	Total Consumption (kWh)	Avg Price ($/kWh)
Jan	48,831	249,808	0.1955
Feb	40,934	210,936	0.1941
Mar	39,772	200,732	0.1981
Apr	28,622	130,276	0.2197
May	26,253	132,028	0.1988
Jun	32,171	164,026	0.1961
Jul	26,413	125,505	0.2105
Aug	27,667	134,598	0.2056
Sep	34,749	179,103	0.1940
Oct	25,424	122,741	0.2071
Nov	31,632	155,586	0.2033
Dec	38,193	196,604	0.1943
Totals	400,661	2,001,943	0.2001

3. Consumption Totals

Billing Period	Peak (kWh)	Mid-Peak (kWh)	Normal Peak (kWh)	Off-Peak (kWh)	Overall (kWh)
Jan	0	0	0	0	249,808
Feb	0	0	0	0	210,936
Mar	0	0	0	0	200,732
Apr	0	0	0	0	130,276
May	0	0	0	0	132,028
Jun	0	0	0	0	164,026
Jul	0	0	0	0	125,505
Aug	0	0	0	0	134,598
Sep	0	0	0	0	179,103
Oct	0	0	0	0	122,741
Nov	0	0	0	0	155,586
Dec	0	0	0	0	196,604
Totals	0	0	0	0	2,001,943

4. Billing Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1171.0
Feb	0.0	0.0	0.0	0.0	965.9
Mar	0.0	0.0	0.0	0.0	981.5
Apr	0.0	0.0	0.0	0.0	851.0
May	0.0	0.0	0.0	0.0	652.4
Jun	0.0	0.0	0.0	0.0	776.8
Jul	0.0	0.0	0.0	0.0	731.2
Aug	0.0	0.0	0.0	0.0	733.9
Sep	0.0	0.0	0.0	0.0	819.4
Oct	0.0	0.0	0.0	0.0	684.0
Nov	0.0	0.0	0.0	0.0	821.9
Dec	0.0	0.0	0.0	0.0	903.2

5. Maximum Demands

Billing Period	Peak (kW)	Mid-Peak (kW)	Normal Peak (kW)	Off-Peak (kW)	Overall (kW)
Jan	0.0	0.0	0.0	0.0	1171.0
Feb	0.0	0.0	0.0	0.0	965.9
Mar	0.0	0.0	0.0	0.0	981.5
Apr	0.0	0.0	0.0	0.0	851.0
May	0.0	0.0	0.0	0.0	652.4
Jun	0.0	0.0	0.0	0.0	776.8
Jul	0.0	0.0	0.0	0.0	731.2
Aug	0.0	0.0	0.0	0.0	733.9
Sep	0.0	0.0	0.0	0.0	819.4
Oct	0.0	0.0	0.0	0.0	684.0
Nov	0.0	0.0	0.0	0.0	821.9
Dec	0.0	0.0	0.0	0.0	903.2

6. Time Of Maximum Demands (Date/Hour)

Billing Period	Peak	Mid-Peak	Normal Peak	Off-Peak	Overall
Jan	n/a	n/a	n/a	n/a	1/30 07:00
Feb	n/a	n/a	n/a	n/a	2/10 06:00
Mar	n/a	n/a	n/a	n/a	3/1 06:00
Apr	n/a	n/a	n/a	n/a	4/10 05:00
May	n/a	n/a	n/a	n/a	5/16 10:00
Jun	n/a	n/a	n/a	n/a	6/26 09:00
Jul	n/a	n/a	n/a	n/a	7/10 10:00
Aug	n/a	n/a	n/a	n/a	8/18 09:00
Sep	n/a	n/a	n/a	n/a	9/5 10:00
Oct	n/a	n/a	n/a	n/a	10/27 10:00
Nov	n/a	n/a	n/a	n/a	11/27 06:00
Dec	n/a	n/a	n/a	n/a	12/27 06:00

APPENDIX:
2022 GEOTHERMAL FEDERAL TAX CREDIT REFERENCES

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IRA 2023

COMMERCIAL GEOTHERMAL

Tax Guide 2023





INFLATION REDUCTION ACT OF 2022 (IRA)

The Inflation Reduction Act of 2022 (IRA) substantially extends and enhances the federal income tax credits and incentives available for the installation of geothermal heat pump (GHP) energy property in commercial buildings, including the introduction of a new direct payment option for non-taxable entities. For taxable businesses, there are also new carryback and transfer provisions along with a continuation of the accelerated depreciation benefits. These new incentives are unfortunately more complex in structure. This guide is designed to provide a detailed review of the new tax and depreciation incentives available for commercial GHP energy property under the IRA.



Federal Income Tax Credits:

- Investment tax credit (ITC) up to 30% of system cost basis
- Domestic content bonus tax credit up to 10% of system cost basis
- Energy community bonus tax credit up to 10% of system cost basis
- Direct-pay option for non-taxable entities
- No cap on total credit amount
- Can be used to offset AMT tax
- Can be used in more than one year
- Can be carried back up to 3 years or transferred/sold to an unrelated party
- Can be combined with solar and other clean energy tax credits

Accelerated Depreciation:

- 5-year MACRS depreciation of system cost basis (less ½ of tax credit)
- Eligible for first-year bonus depreciation

Eligibility:

- Building located in U.S.
- Original use begins with taxpayer
- Construction commenced before 1/1/2035

Business Energy Investment Tax Credit

The business ITC for geothermal heat pump property was originally enacted in the Energy Improvement and Extension Act of 2008. This legislation added geothermal heat pumps to the definition of energy property under section 48(a) of the Internal Revenue Code with a 10% tax credit. This credit was extended by Bipartisan Budget Act of 2018 and most recently enhanced and further extended by the IRA of 2022. Effective 1/1/2023, there is now a 2-tier structure in place with a base credit rate of 6% and an increased rate of 30% if any one of the following criteria are met:

1. The maximum net output capacity of the GHP project is less than 1 megawatt (3.4 million Btu/h) of thermal energy. The Geothermal Exchange Organization (GEO) has submitted analysis that equates this to a total installed system capacity of 445 tons for distributed zone-level GHPs or 285 tons for central plant GHPs. The Department of Treasury is currently developing guidance.
2. The project is installed under specific prevailing wage and apprenticeship requirements. The IRS issued guidance for these requirements in Notice 2022-61 on 11-30-2022.
3. Construction of the project was commenced prior to 1-29-2023.



The ITC for GHP energy property is effective for projects that commence construction prior to 1/1/2035. In 2033 the base rate drops to 5.2% and the increased rate to 26%, while in 2034 they decline to 4.4% and 22% respectively.

Domestic Bonus Tax Credit

The domestic content bonus requires that any steel, iron, or manufactured product that is part of the GHP project at time of completion be produced in the United States. There is a 2-tier structure in place with a base credit rate of 2% and an increased rate of 10% that is based on the same criteria as for the ITC outlined above.

For purposes of this bonus, steel and iron used in the GHP project must be produced in the United States. This requirement applies to construction materials made primarily of steel or iron, but not to steel or iron used as components or sub-components of other manufactured products. Manufactured products are deemed to have been manufactured in the United States if at least 40% of the total cost of the incorporated components and subcomponents are mined, produced, or manufactured in the United States. The percentage of domestic content required for manufactured products increases to 45% for projects that begin construction in 2025, 50% for projects that begin construction in 2026, and 55% for projects that begin construction after 2026. GHP projects certainly appear to be able meet these requirements, however the Department of Treasury is developing necessary guidance.

The Domestic Content Bonus is not available for GHP projects completed before 1/1/2023

Direct Pay

Non-taxable entities have historically been unable to use the ITC. To address this, the IRA creates a new direct pay mechanism that, in effect, provides a refundable credit equal to the GHP project ITC with any domestic content bonus. Entities eligible include tax exempt organizations, a State or political subdivision thereof, the Tennessee Valley Authority, Indian tribal governments, Alaska Native Corporations, and rural electric cooperatives. Examples of these entities include charities, churches, foundations, state and local government buildings, schools, universities, and other nonprofits.

Direct pay is available for GHP projects that are placed in service after 12/31/2022.



Transfer or Sale of Tax Credit

Taxpayers may transfer the ITC including any domestic content bonus to an unrelated taxpayer. Consideration must be paid in cash, is not included in the income of the transferor, and is not deductible to the transferee. The transferee shall be treated as the taxpayer for all purposes with respect to the credit. For GHP energy projects held by a partnership, only the partnership can elect to transfer the eligible credits, not the individual partners. Direct pay is available for GHP projects that are placed in service after 12/31/2022.

Credit Carryback

The IRA extends the ITC carryback period to 3 years. The credit must originate in a tax year that begins after 12/31/2022. Any unused portion of the credit can also be carried forward.



Depreciation of Energy Property

Energy property is classified as a 5-year property in section 168(e) (3)(B)(vi) of the Internal Revenue Code, meaning the cost of the property can be deducted on an accelerated MACRS basis. For depreciation purposes, the system cost basis must be reduced by one half of the energy tax credit. In the example of a C-corporation in a 26% overall (federal plus state) tax bracket receiving a 40% ITC (includes the domestic content bonus), MACRS depreciation provides an additional tax savings equal to 20.8% of the energy property basis over the first 5 years, or optionally most within the first year. By comparison, conventional heating and cooling systems are generally depreciated on a 39-year straight line basis and would provide only 3.33% of the basis in tax savings over the first 5 years. The tax benefits for pass-through entities such as S-corporations could be much higher due to the higher marginal tax rates for individuals.

Energy property is eligible for first year bonus depreciation. The bonus allowance is 100% in 2022, 80% in 2023, 60% in 2024, 40% in 2025, 20% in 2026 and phases out in 2027. Refer to IRS Publication 946 for more information regarding how to depreciate property.

Eligible Geothermal Heat Pump Energy Property

The tax credit may be claimed for spending on equipment which uses the ground or ground water as a thermal energy source to heat a structure or as a thermal energy sink to cool a structure. The structure must be located in the United States. Spending includes costs of installation.

The credit cannot be claimed for spending on equipment used solely for a purpose other than heating or cooling a structure or on previously used equipment.

Construction Commenced Requirement

The credit can be claimed on spending for projects on which construction has commenced prior to January 1st, 2035. There is no time limit on when the construction must be completed for GHP energy projects. See IRS Notice 2018-59 for methods of establishing the commencement of construction.

System Cost Basis

The cost basis includes the direct costs associated with the purchase and installation of the energy property as well as any indirect costs that may be partly or fully allocable to its construction (including taxes). This includes equipment such as ground heat exchangers or wells, distribution piping and ductwork, pumps, GHPs and controls along with the associated installation labor and materials. The basis also generally includes those portions of the electrical, plumbing, design and GC fees that are specifically associated with the geothermal property. Utility rebates usually reduce the basis. See the uniform capitalization rules of IRS section 263A.

Dual Use Property Hybrid GHP Systems

If a GHP energy property contains a source of energy other than from the ground or ground water, portions of the system that carry both forms of energy may be considered dual use equipment. This would typically be equipment such as ductwork downstream of the GHP. The presence of an auxiliary energy source solely for emergency back-up purposes is not considered in this determination. Otherwise, if more than 25% of the annual energy (not peak energy) comes from the auxiliary source, any dual use equipment in the system may no longer be eligible for inclusion in the ITC cost basis. These comments are based on an interpretation of a 1979 code definition of energy property for direct use geothermal energy such as hot water for heating. There have been no further guidelines published by the IRS since that time. The IRS may not apply this language in this same way to GHP energy property and, as such, this interpretation is offered on a precautionary basis for those developing hybrid GHP energy projects. See 26 CFR 1.48-9 - Definition of energy property.

Energy Credit and AMT

The ITC can be used to offset both regular income taxes and alternative minimum taxes (AMT).





Ownership Considerations

Geothermal energy property ITC credits and depreciation deductions can only be claimed by the owner of the eligible property, including utilities that own energy property. At present, business models as used by the solar industry where a third-party owner (TPO) leases or sells energy from an energy property to a consumer are prohibited for GHP property due to IRS rules related to "limited use." The issue is the non-removable geothermal loop being dedicated to a single customer, in effect making the TPO a lender rather than a true owner. GEO is working with Treasury to develop a work around.



Energy Communities

The law includes an additional bonus credit of 10% (or 2% for projects over 1MW that don't meet prevailing wage/apprenticeship requirements) for Section 48 technologies that are installed in "energy communities." Energy communities are defined as:

- Census tract or adjoining tract with coal mine closed since 2000, or
- Census tract or adjoining tract with coal plant closed since 2010, or
- Defined as "a brownfield site" by the EPA, or
- a metropolitan or non-metropolitan statistical area where 0.17% or more direct employment, or at least 25% of local tax revenues, are related to extraction, processing, transport, or storage of coal, oil, or natural gas, and unemployment is at or above the national average in the previous year

Claiming the Credit

IRS Form 3468 is used to claim the Energy Credit. Visit www.irs.gov to download the latest tax form and instructions.

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Clean Energy Tax Incentives: Elective Pay Eligible Tax Credits

The Inflation Reduction Act of 2022 ("IRA") makes several clean energy tax credits available to businesses; tax-exempt organizations; state, local, and tribal governments; other entities; and individuals. The IRA also enables entities to take advantage of certain clean energy tax credits through its elective pay provision (also colloquially known as direct pay). Elective pay allows several types of entities, such as tax-exempts and governments, to treat the amount of certain credits as a payment against tax on their tax returns and as a result receive direct payments for certain clean energy tax credits.

	Tax Provision	Description
Energy Generation & Carbon Capture	**Production Tax Credit for Electricity from Renewables** (§ 45, pre-2025)	**For production of electricity from eligible renewable sources**, including wind, biomass, geothermal, solar, small irrigation, landfill and trash, hydropower, marine and hydrokinetic energy. **Credit Amount (for 2022):** 0.55 cents/kilowatt (kW); (1/2 rate for electricity produced from open loop biomass, landfill gas, and trash); 2.75 cents/kW if Prevailing Wage and Apprenticeship (PWA) rules are met [1,2,3,7]
	Clean Electricity Production Tax Credit (§ 45Y, 2025 onwards)	**Technology-neutral tax credit for production of clean electricity**. Replaces § 45 for facilities that begin construction and are placed in service after 2024. **Credit Amount:** Starts in 2025, consistent with credit amounts under section 45 [1,2,3,6,7]
	Investment Tax Credit for Energy Property (§ 48, pre-2025)	**For investment in renewable energy projects** including fuel cell, solar, geothermal, small wind, energy storage, biogas, microgrid controllers, and combined heat and power properties **Credit Amount:** 6% of qualified investment (basis); 30% if PWA requirements met [1,4,5,6,8]
	Clean Electricity Investment Tax Credit (§ 48E, 2025 onwards)	**Technology-neutral tax credit for investment in facilities that generate clean electricity** and qualified energy storage technologies. Replaces § 48 for facilities that begin construction and are placed in service after 2024 **Credit Amount:** 6% of qualified investment (basis); 30% if PWA requirements met [1,4,5,6]
	Low-Income Communities Bonus Credit (§ 48(e), 48E(h)) Application required	**Additional investment tax credit for small-scale solar and wind (§ 48(e)) or clean electricity (§48E(h)) facilities** (<5MW net output) on Indian land, federally subsidized housing, in low-income communities, and benefit low-income households. Allocated through an application process. **Credit Amount:** 10 or 20 percentage point increase on base investment tax credit [7]
	Credit for Carbon Oxide Sequestration (§ 45Q)	**Credit for carbon dioxide sequestration** coupled with permitted end uses in the United States. **Credit Amount:** $12-36 per metric ton of qualified carbon oxide captured and sequestered, used as a tertiary injectant, or used, depending on the specified end use; $60-$180 per metric ton if PWA requirements met.[1,7]
	Zero-Emission Nuclear Power Production Credit (§ 45U)	**For electricity from nuclear power facilities.** Facilities in operation prior to August 16, 2022. **Credit Amount (for 2023):** 0.3 cents/kWh (reduced rate for larger facilities); 1.5 cent/kWh if PW req's met [1,7]
Manufacturing	**Advanced Energy Project Credit** (§ 48C) Application required	**For investments in advanced energy projects.** A total of $10 billion will be allocated, not less than $4 billion of which will be allocated to projects in certain energy communities. **Credit Amount:** 6% of taxpayer's qualified investment; 30% if PWA requirements are met [1]
	Advanced Manufacturing Production Credit (§ 45X)	**Production tax credit for domestic clean energy manufacturing** of components including solar and wind energy, inverters, battery components, and critical materials. **Credit Amount:** Varies by component
Vehicles	**Credit for Qualified Commercial Clean Vehicles** (§ 45W)	**For purchasers of commercial clean vehicles**. Qualifying vehicles include passenger vehicles, buses, ambulances, and certain other vehicles for use on public streets, roads, and highways. **Credit Amount:** Up to $40,000 (max $7,500 for vehicles <14,000 lbs) [9]
	Alternative Fuel Vehicle Refueling Property Credit (§ 30C)	**For alternative fuel vehicle refueling and charging property**, located in low-income and non-urban areas. Qualified fuels include electricity, ethanol, natural gas, hydrogen, and biodiesel. **Credit Amount:** 6% of basis for businesses and can increase to 30% if PWA is met.
Fuels	**Clean Hydrogen Production Tax Credit** (§ 45V)	**For producing clean hydrogen** at a qualified, U.S.-based clean hydrogen production facility. **Credit Amount:** $0.60/kg multiplied by the applicable percentage (20% to 100%, depending on lifecycle greenhouse gas emissions), amount increases if PWA is met [1,7]
	Clean Fuel Production Credit (§ 45Z, 2025 onwards)	**Technology neutral tax credit for domestic production of clean transportation fuels**, including sustainable aviation fuels, beginning in 2025* **Credit Amount:** $0.20/gallon ($0.35/gal for aviation fuel) multiplied by CO2 "emissions factor"; $1.00/gallon ($1.75/gal for aviation fuel) multiplied by CO2 "emissions factor" if PWA is met [1,7]

Please see the notes on the next page or see IRS.gov/cleanenergy for more information.

Notes:

The information in this document may be subject to change as guidance is issued or finalized. For all IRA clean energy tax credits, please see **irs.gov/cleanenergy** for further details and eligibility requirements.

[1] Credit is increased by 5 times for projects that pay prevailing wages and use registered apprentices. Apprenticeship requirements do not apply for §§ 45L and 45U. Prevailing wage and apprenticeship requirements do not apply to certain projects, including certain projects of less than 1 megawatt or those that began construction prior to January 29, 2023.

[2] Credit is increased by 10% if the project meets certain domestic content requirements for steel or iron, and manufactured products.

[3] Credit is increased by 10% if located in an energy community.

[4] Credit is increased by up to 10 percentage points for projects meeting certain domestic content requirements for steel, iron, and manufactured products.

[5] Credit is increased by up to 10 percentage points if located in an energy community.

[6] Section 168(e) provides favorable depreciation treatment for facilities or property qualifying for this tax credit. These facilities or property will be treated as a 5-year property for purposes of cost recovery, leaving them with lower taxable income in the earlier years of a clean energy investment.

[7] Credit rate is adjusted annually for inflation.

[8] See section 48 for more detail and applicable exceptions to the credit rate.

[9] The entities eligible for elective pay of the commercial clean vehicle credit is a subset of the entities eligible for elective pay of other credits. In addition, starting January 1, 2024, the amount of a new clean vehicle or previously owned clean vehicle tax credit (but not a commercial clean vehicle credit) can be transferred to a dealer for an equivalent reduction in the eligible vehicle's sales price.



HEAT GAIN/ LOSS CALCULATIONS/ ELECTRICAL LOADS M

Zone Heat Balance Summary for RTU-01 (S Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 2. Heat Balance Loads for Zone DCUe-03A,3B,3C: 150 NETWORK/TELECOM

Table 2. Heat Balance Loads for Zone CUH-02,11,14: S4-1 STAIR 4

Table 2. Heat Balance Loads for Zone VAV-09-02: 204A LIBR WORK

Table 2. Heat Balance Loads for Zone VAV-08-02: 101B PRINC. SEC

Table 2. Heat Balance Loads for Zone 152 CARES STO

Table 2. Heat Balance Loads for Zone VAV-03-02: 108 PT CR

Table 1. Heat Balance Loads for Zone VAV-01-01: 118 PRE-K

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1116 sqft	1835	-	1116 sqft	1621	-
Roof Convection	265 sqft	483	-	265 sqft	360	-
Window Convection	88 sqft	619	-	88 sqft	909	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1272 sqft	2259	-	1272 sqft	1880	-
Interior Wall Convection	1545 sqft	1893	-	1545 sqft	332	-
Ceiling Convection	1007 sqft	2684	-	1007 sqft	542	-
Overhead Lighting Convection	636 W	918	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	604 W	1546	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14149	**5330**	**-**	**5645**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 2. Heat Balance Loads for Zone VAV-01-02,9,12: E116-E119 EXT/C103 CORR

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	107 sqft	160	-	107 sqft	148	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	273 sqft	1550	-	273 sqft	2613	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	2070 sqft	2996	-	2070 sqft	1196	-
Interior Wall Convection	4379 sqft	5647	-	4379 sqft	816	-
Ceiling Convection	2070 sqft	4134	-	2070 sqft	851	-
Overhead Lighting Convection	1035 W	1494	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	799 W	2045	-	0 W	0	-
People Convection	32	2352	6560	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		20377	**6560**	**-**	**5625**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-01-03: 117 SM GROUP

	DESIGN COOLING - SEPTEMBER 18:00			DESIGN HEATING		
	OA DB / WB 82.1 F / 70.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	177 sqft	288	-	177 sqft	7	-
Interior Wall Convection	791 sqft	1288	-	791 sqft	48	-
Ceiling Convection	177 sqft	435	-	177 sqft	12	-
Overhead Lighting Convection	88 W	127	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	88 W	226	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2806	**1230**	**-**	**67**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone VAV-01-04: 116 PRE-K

	DESIGN COOLING - SEPTEMBER 12:00			DESIGN HEATING		
	OA DB / WB 80.2 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	696 sqft	1125	-	696 sqft	930	-
Roof Convection	270 sqft	448	-	270 sqft	354	-
Window Convection	64 sqft	598	-	64 sqft	591	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1315 sqft	2379	-	1315 sqft	1248	-
Interior Wall Convection	2054 sqft	2783	-	2054 sqft	594	-
Ceiling Convection	1045 sqft	2827	-	1045 sqft	415	-
Overhead Lighting Convection	657 W	949	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	626 W	1603	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14624	**5330**	**-**	**4132**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone VAV-01-05: 115 SPEECH/LANG

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	157 sqft	270	-	157 sqft	222	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	265	-	24 sqft	243	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	222 sqft	552	-	222 sqft	300	-
Interior Wall Convection	708 sqft	1121	-	708 sqft	131	-
Ceiling Convection	222 sqft	700	-	222 sqft	85	-
Overhead Lighting Convection	111 W	160	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	333 W	852	-	0 W	0	-
People Convection	7	515	1435	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4434	**1435**	**-**	**981**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone VAV-01-06:114 SCHOOL PSYCH

	DESIGN COOLING - NOVEMBER 11:00			DESIGN HEATING		
	OA DB / WB 60.0 F / 58.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	111 sqft	165	-	111 sqft	160	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	233	-	24 sqft	252	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	165 sqft	354	-	165 sqft	224	-
Interior Wall Convection	661 sqft	1101	-	661 sqft	152	-
Ceiling Convection	165 sqft	494	-	165 sqft	64	-
Overhead Lighting Convection	83 W	119	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	248 W	634	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3394	**820**	**-**	**853**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone VAV-01-07: 113 STRIDES PK

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	597 sqft	882	-	597 sqft	807	-
Roof Convection	304 sqft	455	-	304 sqft	391	-
Window Convection	64 sqft	637	-	64 sqft	593	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1439 sqft	2283	-	1439 sqft	1439	-
Interior Wall Convection	2948 sqft	3092	-	2948 sqft	411	-
Ceiling Convection	1134 sqft	2724	-	1134 sqft	366	-
Overhead Lighting Convection	720 W	1039	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	671 W	1717	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14814	**5535**	**-**	**4006**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone VAV-01-08: 112 MUSIC/CHORUS

	DESIGN COOLING - SEPTEMBER 12:00			DESIGN HEATING		
	OA DB / WB 80.2 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	332 sqft	764	-	332 sqft	475	-
Roof Convection	269 sqft	779	-	269 sqft	377	-
Window Convection	88 sqft	912	-	88 sqft	871	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1237 sqft	3091	-	1237 sqft	1144	-
Interior Wall Convection	2382 sqft	3127	-	2382 sqft	617	-
Ceiling Convection	967 sqft	2992	-	967 sqft	365	-
Overhead Lighting Convection	618 W	893	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	544 W	1392	-	0 W	0	-
People Convection	37	2700	7532	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		16649	**7532**	**-**	**3849**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone VAV-01-10: 121 ART CR

	DESIGN COOLING - JUNE 17:00			DESIGN HEATING		
	OA DB / WB 86.8 F / 71.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	433 sqft	563	-	433 sqft	529	-
Roof Convection	299 sqft	514	-	299 sqft	388	-
Window Convection	80 sqft	577	-	80 sqft	739	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1211 sqft	1839	-	1211 sqft	1261	-
Interior Wall Convection	2290 sqft	2325	-	2290 sqft	347	-
Ceiling Convection	911 sqft	1933	-	911 sqft	340	-
Overhead Lighting Convection	605 W	874	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	536 W	1373	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		11908	**5330**	**-**	**3604**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone VAV-01-11: 120 STRIDES PK

	DESIGN COOLING - JUNE 17:00			DESIGN HEATING		
	OA DB / WB 86.8 F / 71.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	786 sqft	1102	-	786 sqft	1043	-
Roof Convection	281 sqft	431	-	281 sqft	369	-
Window Convection	88 sqft	661	-	88 sqft	848	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1410 sqft	2112	-	1410 sqft	1658	-
Interior Wall Convection	2648 sqft	2482	-	2648 sqft	374	-
Ceiling Convection	1129 sqft	2481	-	1129 sqft	440	-
Overhead Lighting Convection	705 W	1018	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	656 W	1678	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13950	**5535**	**-**	**4732**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 11. Heat Balance Loads for Zone VAV-01-13: 119 PRE-K

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	973 sqft	1497	-	973 sqft	1327	-
Roof Convection	266 sqft	443	-	266 sqft	358	-
Window Convection	88 sqft	512	-	88 sqft	859	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1266 sqft	2077	-	1266 sqft	1249	-
Interior Wall Convection	1665 sqft	1773	-	1665 sqft	348	-
Ceiling Convection	1000 sqft	2385	-	1000 sqft	486	-
Overhead Lighting Convection	633 W	914	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	601 W	1538	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13050	**5330**	**-**	**4627**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 12. Heat Balance Loads for Zone VAV-01-14: 118A SMALL GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	170 sqft	172	-	170 sqft	0	-
Interior Wall Convection	779 sqft	632	-	779 sqft	6	-
Ceiling Convection	170 sqft	245	-	170 sqft	1	-
Overhead Lighting Convection	85 W	123	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	85 W	218	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1684	**820**	**-**	**7**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 13. Heat Balance Loads for Zone VAV-01-15: 216 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	868 sqft	1838	-	868 sqft	1276	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	637	-	80 sqft	787	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	963 sqft	2113	-	963 sqft	265	-
Interior Wall Convection	991 sqft	1779	-	991 sqft	329	-
Ceiling Convection	963 sqft	3153	-	963 sqft	549	-
Overhead Lighting Convection	481 W	695	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	481 W	1232	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13726	**6355**	**-**	**3205**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 14. Heat Balance Loads for Zone VAV-01-16,29: E214-217 EXT

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	61 sqft	82	-	61 sqft	85	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	319 sqft	1587	-	319 sqft	3021	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1480 sqft	2168	-	1480 sqft	336	-
Interior Wall Convection	2447 sqft	3105	-	2447 sqft	582	-
Ceiling Convection	1480 sqft	2850	-	1480 sqft	660	-
Overhead Lighting Convection	740 W	1068	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	740 W	1893	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14664	**5330**	**-**	**4683**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 15. Heat Balance Loads for Zone VAV-01-17: 215 SM GROUP

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	180 sqft	215	-	180 sqft	6	-
Interior Wall Convection	793 sqft	1056	-	793 sqft	49	-
Ceiling Convection	179 sqft	344	-	179 sqft	11	-
Overhead Lighting Convection	90 W	130	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	90 W	230	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2268	**820**	**-**	**67**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 16. Heat Balance Loads for Zone VAV-01-18: 214 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	515 sqft	1133	-	515 sqft	685	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	862	-	80 sqft	724	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1020 sqft	2477	-	1020 sqft	240	-
Interior Wall Convection	1458 sqft	2920	-	1458 sqft	386	-
Ceiling Convection	1019 sqft	3712	-	1019 sqft	481	-
Overhead Lighting Convection	510 W	736	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	510 W	1305	-	0 W	0	-
People Convection	29	2132	5945	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15277	**5945**	**-**	**2516**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 17. Heat Balance Loads for Zone VAV-01-19: 213 LEARNING CENTER

	DESIGN COOLING - OCTOBER 10:00			DESIGN HEATING		
	OA DB / WB 63.6 F / 62.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	136 sqft	238	-	136 sqft	186	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	264	-	24 sqft	233	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	218 sqft	662	-	218 sqft	43	-
Interior Wall Convection	747 sqft	1216	-	747 sqft	191	-
Ceiling Convection	218 sqft	662	-	218 sqft	87	-
Overhead Lighting Convection	109 W	158	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	109 W	279	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4068	**1640**	**-**	**740**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 18. Heat Balance Loads for Zone VAV-01-20: 212 READ

	DESIGN COOLING - OCTOBER 10:00			DESIGN HEATING		
	OA DB / WB 63.6 F / 62.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	133 sqft	257	-	133 sqft	181	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	277	-	24 sqft	230	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	214 sqft	667	-	214 sqft	42	-
Interior Wall Convection	744 sqft	1304	-	744 sqft	181	-
Ceiling Convection	214 sqft	717	-	214 sqft	84	-
Overhead Lighting Convection	107 W	154	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	321 W	820	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4785	**1640**	**-**	**719**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 19. Heat Balance Loads for Zone VAV-01-21: 210 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	368 sqft	822	-	368 sqft	471	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	862	-	80 sqft	703	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	981 sqft	2417	-	981 sqft	215	-
Interior Wall Convection	1501 sqft	2909	-	1501 sqft	351	-
Ceiling Convection	980 sqft	3593	-	980 sqft	437	-
Overhead Lighting Convection	491 W	708	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	491 W	1256	-	0 W	0	-
People Convection	29	2132	5945	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14699	**5945**	**-**	**2178**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 20. Heat Balance Loads for Zone VAV-01-22: 209A SM GROUP

	DESIGN COOLING - SEPTEMBER 13:00			DESIGN HEATING		
	OA DB / WB 82.3 F / 70.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	162 sqft	164	-	162 sqft	1	-
Interior Wall Convection	758 sqft	648	-	758 sqft	8	-
Ceiling Convection	162 sqft	244	-	162 sqft	1	-
Overhead Lighting Convection	81 W	117	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	81 W	207	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1675	**820**	**-**	**11**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 21. Heat Balance Loads for Zone VAV-01-23: 209 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	364 sqft	743	-	364 sqft	467	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	864	-	80 sqft	707	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	902 sqft	2712	-	902 sqft	207	-
Interior Wall Convection	1496 sqft	2686	-	1496 sqft	333	-
Ceiling Convection	961 sqft	3369	-	961 sqft	443	-
Overhead Lighting Convection	451 W	651	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	451 W	1154	-	0 W	0	-
People Convection	29	2132	5945	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14310	**5945**	**-**	**2157**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 22. Heat Balance Loads for Zone VAV-01-24: 208 HEALTH

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	356 sqft	740	-	356 sqft	612	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	866	-	80 sqft	868	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	977 sqft	3011	-	977 sqft	1737	-
Interior Wall Convection	1445 sqft	2962	-	1445 sqft	670	-
Ceiling Convection	977 sqft	3356	-	977 sqft	758	-
Overhead Lighting Convection	488 W	705	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	488 W	1250	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14728	**5125**	**-**	**4645**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 23. Heat Balance Loads for Zone VAV-01-25: C201 CORR/E219 EXT

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1074 sqft	1466	-	1074 sqft	177	-
Interior Wall Convection	3581 sqft	3816	-	3581 sqft	417	-
Ceiling Convection	1073 sqft	1830	-	1073 sqft	319	-
Overhead Lighting Convection	537 W	775	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	203 W	519	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		8994	**1640**	**-**	**914**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 24. Heat Balance Loads for Zone VAV-01-26: 219 STAGE 1ST/2ND

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	445 sqft	581	-	445 sqft	533	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	533	-	80 sqft	684	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1186 sqft	1794	-	1186 sqft	209	-
Interior Wall Convection	2916 sqft	2956	-	2916 sqft	380	-
Ceiling Convection	1185 sqft	2575	-	1185 sqft	421	-
Overhead Lighting Convection	593 W	856	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	552 W	1412	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		12617	**5330**	**-**	**2227**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 25. Heat Balance Loads for Zone VAV-01-27: 218A SM GROUP

	DESIGN COOLING - JUNE 19:00			DESIGN HEATING		
	OA DB / WB 83.0 F / 70.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	166 sqft	172	-	166 sqft	1	-
Interior Wall Convection	769 sqft	630	-	769 sqft	8	-
Ceiling Convection	166 sqft	245	-	166 sqft	1	-
Overhead Lighting Convection	83 W	120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	83 W	212	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1673	**820**	**-**	**11**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 26. Heat Balance Loads for Zone VAV-01-28: 218 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	667 sqft	1262	-	667 sqft	889	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	563	-	80 sqft	733	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1013 sqft	2027	-	1013 sqft	245	-
Interior Wall Convection	1232 sqft	1983	-	1232 sqft	257	-
Ceiling Convection	1012 sqft	3010	-	1012 sqft	503	-
Overhead Lighting Convection	506 W	731	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	506 W	1296	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13151	**6355**	**-**	**2626**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 27. Heat Balance Loads for Zone VAV-01-30: 217 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	865 sqft	1898	-	865 sqft	1227	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	635	-	80 sqft	774	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	971 sqft	2076	-	971 sqft	262	-
Interior Wall Convection	1004 sqft	1646	-	1004 sqft	236	-
Ceiling Convection	972 sqft	3076	-	972 sqft	536	-
Overhead Lighting Convection	486 W	701	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	486 W	1243	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13553	**6355**	**-**	**3034**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 28. Heat Balance Loads for Zone VAV-01-31: 216A SMALL GROUP

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	165 sqft	218	-	165 sqft	1	-
Interior Wall Convection	766 sqft	823	-	766 sqft	7	-
Ceiling Convection	164 sqft	345	-	164 sqft	1	-
Overhead Lighting Convection	82 W	119	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	82 W	211	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2157	**1230**	**-**	**9**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 29. Heat Balance Loads for Zone VAV-01-32: 312 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	875 sqft	2047	-	875 sqft	1414	-
Roof Convection	973 sqft	3241	-	973 sqft	1470	-
Window Convection	80 sqft	662	-	80 sqft	866	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	972 sqft	2289	-	972 sqft	323	-
Interior Wall Convection	988 sqft	1985	-	988 sqft	404	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	486 W	702	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	486 W	1244	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14449	**6355**	**-**	**4478**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 30. Heat Balance Loads for Zone VAV-01-33,44: C300 CORR/E310-E313 EXT

	DESIGN COOLING - AUGUST 15:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	148 sqft	213	-	148 sqft	216	-
Roof Convection	1488 sqft	2920	-	1488 sqft	2075	-
Window Convection	232 sqft	1298	-	232 sqft	2320	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1487 sqft	2217	-	1487 sqft	355	-
Interior Wall Convection	2446 sqft	3139	-	2446 sqft	631	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	743 W	1073	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	743 W	1903	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14675	**5330**	**-**	**5597**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 31. Heat Balance Loads for Zone VAV-01-34: 311 SM GROUP

	DESIGN COOLING - AUGUST 18:00			DESIGN HEATING		
	OA DB / WB 88.1 F / 73.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	180 sqft	337	-	180 sqft	204	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	180 sqft	225	-	180 sqft	13	-
Interior Wall Convection	793 sqft	1089	-	793 sqft	90	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	90 W	130	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	90 W	230	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2305	**820**	**-**	**307**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 32. Heat Balance Loads for Zone VAV-01-35: 310 CLASSROOM

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	515 sqft	1303	-	515 sqft	768	-
Roof Convection	1006 sqft	3108	-	1006 sqft	1449	-
Window Convection	80 sqft	882	-	80 sqft	808	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1005 sqft	2631	-	1005 sqft	282	-
Interior Wall Convection	1446 sqft	3176	-	1446 sqft	466	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	502 W	725	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	502 W	1285	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15389	**6355**	**-**	**3773**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 33. Heat Balance Loads for Zone VAV-01-36: 309 LEARNING CENTER

	DESIGN COOLING - SEPTEMBER 10:00			DESIGN HEATING		
	OA DB / WB 73.6 F / 67.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	135 sqft	247	-	135 sqft	200	-
Roof Convection	221 sqft	485	-	221 sqft	309	-
Window Convection	24 sqft	258	-	24 sqft	252	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	221 sqft	609	-	221 sqft	50	-
Interior Wall Convection	758 sqft	1215	-	758 sqft	224	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	111 W	160	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	111 W	283	-	0 W	0	-
People Convection	7	515	1435	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3772	**1435**	**-**	**1035**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 34. Heat Balance Loads for Zone VAV-01-37: 308 READ

	DESIGN COOLING - OCTOBER 10:00			DESIGN HEATING		
	OA DB / WB 63.6 F / 62.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	134 sqft	287	-	134 sqft	197	-
Roof Convection	219 sqft	536	-	219 sqft	305	-
Window Convection	24 sqft	280	-	24 sqft	249	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	219 sqft	719	-	219 sqft	49	-
Interior Wall Convection	756 sqft	1443	-	756 sqft	217	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	110 W	158	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	329 W	842	-	0 W	0	-
People Convection	9	662	1845	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4927	**1845**	**-**	**1016**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 35. Heat Balance Loads for Zone VAV-01-38: 307 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	367 sqft	886	-	367 sqft	532	-
Roof Convection	973 sqft	2886	-	973 sqft	1385	-
Window Convection	80 sqft	883	-	80 sqft	795	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	973 sqft	2768	-	973 sqft	262	-
Interior Wall Convection	1499 sqft	3137	-	1499 sqft	450	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	486 W	702	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	486 W	1245	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14785	**6355**	**-**	**3424**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 36. Heat Balance Loads for Zone VAV-01-39: 306A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	167 sqft	267	-	167 sqft	185	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	167 sqft	170	-	167 sqft	10	-
Interior Wall Convection	772 sqft	668	-	772 sqft	49	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	84 W	121	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	84 W	214	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1734	**820**	**-**	**243**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 37. Heat Balance Loads for Zone VAV-01-40: 306 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	358 sqft	913	-	358 sqft	519	-
Roof Convection	951 sqft	2984	-	951 sqft	1352	-
Window Convection	80 sqft	888	-	80 sqft	793	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	950 sqft	2593	-	950 sqft	255	-
Interior Wall Convection	1490 sqft	3254	-	1490 sqft	418	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	475 W	686	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	475 W	1216	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14813	**6355**	**-**	**3337**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 38. Heat Balance Loads for Zone VAV-01-41: 315 STAGES 3RD/5TH

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	452 sqft	671	-	452 sqft	624	-
Roof Convection	1187 sqft	2869	-	1187 sqft	1614	-
Window Convection	80 sqft	567	-	80 sqft	790	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1186 sqft	1998	-	1186 sqft	260	-
Interior Wall Convection	2891 sqft	3330	-	2891 sqft	541	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	593 W	856	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	554 W	1418	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13693	**5535**	**-**	**3829**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 39. Heat Balance Loads for Zone VAV-01-42: 314A SM GROUP

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	167 sqft	268	-	167 sqft	184	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	166 sqft	169	-	166 sqft	9	-
Interior Wall Convection	772 sqft	679	-	772 sqft	43	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	83 W	120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	83 W	212	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1741	**820**	**-**	**236**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 40. Heat Balance Loads for Zone VAV-01-43: 314 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	660 sqft	1445	-	660 sqft	999	-
Roof Convection	1003 sqft	3157	-	1003 sqft	1464	-
Window Convection	80 sqft	596	-	80 sqft	829	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1002 sqft	2230	-	1002 sqft	295	-
Interior Wall Convection	1225 sqft	2170	-	1225 sqft	314	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	501 W	723	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	501 W	1283	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13881	**6355**	**-**	**3901**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 41. Heat Balance Loads for Zone VAV-01-45: 313 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	863 sqft	2157	-	863 sqft	1359	-
Roof Convection	974 sqft	3237	-	974 sqft	1456	-
Window Convection	80 sqft	664	-	80 sqft	856	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	974 sqft	2277	-	974 sqft	311	-
Interior Wall Convection	1002 sqft	1861	-	1002 sqft	281	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	487 W	703	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	487 W	1246	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14424	**6355**	**-**	**4263**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 42. Heat Balance Loads for Zone VAV-01-46: 312A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	171 sqft	274	-	171 sqft	189	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	171 sqft	167	-	171 sqft	9	-
Interior Wall Convection	782 sqft	691	-	782 sqft	43	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	85 W	123	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	85 W	218	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1768	**820**	**-**	**241**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 43. Heat Balance Loads for Zone VAV-01-47: C300 CORR

	DESIGN COOLING - AUGUST 15:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	654 sqft	1171	-	654 sqft	884	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	653 sqft	954	-	653 sqft	155	-
Interior Wall Convection	2187 sqft	2506	-	2187 sqft	444	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	326 W	471	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	65 W	167	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		5269	**0**	**-**	**1483**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 44. Heat Balance Loads for Zone VAV-01-48: 303 LEARNING CENTER

	DESIGN COOLING - OCTOBER 10:00			DESIGN HEATING		
	OA DB / WB 63.6 F / 62.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	173 sqft	419	-	173 sqft	279	-
Roof Convection	218 sqft	641	-	218 sqft	328	-
Window Convection	40 sqft	482	-	40 sqft	453	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	218 sqft	933	-	218 sqft	71	-
Interior Wall Convection	654 sqft	1507	-	654 sqft	218	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	109 W	157	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	109 W	279	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		5006	**1640**	**-**	**1349**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 45. Heat Balance Loads for Zone VAV-01-49: 302 ASSIST OFFICE

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	183 sqft	421	-	183 sqft	298	-
Roof Convection	225 sqft	617	-	225 sqft	339	-
Window Convection	40 sqft	483	-	40 sqft	456	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	945	-	225 sqft	73	-
Interior Wall Convection	657 sqft	1590	-	657 sqft	239	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	113 W	162	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	338 W	864	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		5450	**1025**	**-**	**1405**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-02 (N Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 1. Heat Balance Loads for Zone VAV-02-01: 140 KG

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1037 sqft	1581	-	1037 sqft	1519	-
Roof Convection	264 sqft	440	-	264 sqft	354	-
Window Convection	64 sqft	428	-	64 sqft	649	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1287 sqft	2114	-	1287 sqft	1802	-
Interior Wall Convection	1642 sqft	1911	-	1642 sqft	326	-
Ceiling Convection	1023 sqft	2488	-	1023 sqft	469	-
Overhead Lighting Convection	644 W	929	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	612 W	1567	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13516	**5740**	**-**	**5119**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 2. Heat Balance Loads for Zone VAV-02-02,6: E138-E141 EXT

	DESIGN COOLING - AUGUST 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	137 sqft	199	-	137 sqft	181	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	232 sqft	1051	-	232 sqft	2129	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1740 sqft	2577	-	1740 sqft	1370	-
Interior Wall Convection	2991 sqft	3860	-	2991 sqft	631	-
Ceiling Convection	1740 sqft	3485	-	1740 sqft	626	-
Overhead Lighting Convection	870 W	1256	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	870 W	2227	-	0 W	0	-
People Convection	38	2793	7790	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		17448	**7790**	**-**	**4938**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-02-03: 139 KG

	DESIGN COOLING - SEPTEMBER 13:00			DESIGN HEATING		
	OA DB / WB 82.3 F / 70.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	586 sqft	999	-	586 sqft	784	-
Roof Convection	254 sqft	470	-	254 sqft	333	-
Window Convection	88 sqft	777	-	88 sqft	842	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1277 sqft	2549	-	1277 sqft	1462	-
Interior Wall Convection	2050 sqft	3212	-	2050 sqft	445	-
Ceiling Convection	1023 sqft	3187	-	1023 sqft	426	-
Overhead Lighting Convection	639 W	922	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	608 W	1555	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15728	**5740**	**-**	**4292**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone VAV-02-04: 138B SM GROUP

	DESIGN COOLING - SEPTEMBER 14:00			DESIGN HEATING		
	OA DB / WB 84.0 F / 70.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	177 sqft	206	-	177 sqft	1	-
Interior Wall Convection	796 sqft	742	-	796 sqft	6	-
Ceiling Convection	177 sqft	305	-	177 sqft	1	-
Overhead Lighting Convection	89 W	128	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	89 W	227	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1976	**1025**	**-**	**7**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone VAV-02-05: 138 KG

	DESIGN COOLING - SEPTEMBER 12:00			DESIGN HEATING		
	OA DB / WB 80.2 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	965 sqft	1586	-	965 sqft	1346	-
Roof Convection	247 sqft	405	-	247 sqft	333	-
Window Convection	88 sqft	678	-	88 sqft	895	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1233 sqft	2223	-	1233 sqft	1744	-
Interior Wall Convection	1649 sqft	2017	-	1649 sqft	339	-
Ceiling Convection	962 sqft	2651	-	962 sqft	464	-
Overhead Lighting Convection	616 W	890	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	585 W	1497	-	0 W	0	-
People Convection	26	1911	5330	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13858	**5330**	**-**	**5121**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone VAV-02-07: 137 KG

	DESIGN COOLING - SEPTEMBER 12:00			DESIGN HEATING		
	OA DB / WB 80.2 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	507 sqft	798	-	507 sqft	680	-
Roof Convection	265 sqft	451	-	265 sqft	348	-
Window Convection	88 sqft	744	-	88 sqft	816	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1237 sqft	2246	-	1237 sqft	1360	-
Interior Wall Convection	2135 sqft	2817	-	2135 sqft	611	-
Ceiling Convection	973 sqft	2712	-	973 sqft	409	-
Overhead Lighting Convection	619 W	893	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	588 W	1504	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14223	**5740**	**-**	**4224**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone VAV-02-08: 136A SM GROUP

	DESIGN COOLING - OCTOBER 14:00			DESIGN HEATING		
	OA DB / WB 74.0 F / 65.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	176 sqft	205	-	176 sqft	0	-
Interior Wall Convection	794 sqft	744	-	794 sqft	6	-
Ceiling Convection	176 sqft	305	-	176 sqft	1	-
Overhead Lighting Convection	88 W	127	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	88 W	225	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1973	**1025**	**-**	**7**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone VAV-02-09: 136 STRIDES PRE-K

	DESIGN COOLING - OCTOBER 12:00			DESIGN HEATING		
	OA DB / WB 70.2 F / 64.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	433 sqft	601	-	433 sqft	530	-
Roof Convection	299 sqft	472	-	299 sqft	378	-
Window Convection	80 sqft	723	-	80 sqft	702	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1416 sqft	2232	-	1416 sqft	1267	-
Interior Wall Convection	3022 sqft	3229	-	3022 sqft	383	-
Ceiling Convection	1116 sqft	2573	-	1116 sqft	349	-
Overhead Lighting Convection	708 W	1022	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	657 W	1681	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14516	**5535**	**-**	**3610**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone VAV-02-10: C105 CORR/E136/E145 EXT

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1062 sqft	1163	-	1062 sqft	114	-
Interior Wall Convection	3412 sqft	3230	-	3412 sqft	279	-
Ceiling Convection	1062 sqft	1479	-	1062 sqft	171	-
Overhead Lighting Convection	531 W	766	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	310 W	794	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		7874	**1230**	**-**	**564**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone VAV-02-11: 146 ELL

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	184 sqft	319	-	184 sqft	226	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	48 sqft	232	-	48 sqft	429	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	486 sqft	935	-	486 sqft	116	-
Interior Wall Convection	1125 sqft	1658	-	1125 sqft	207	-
Ceiling Convection	486 sqft	1359	-	486 sqft	194	-
Overhead Lighting Convection	243 W	351	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	243 W	622	-	0 W	0	-
People Convection	18	1323	3690	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		6799	**3690**	**-**	**1172**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-02 (N Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 11. Heat Balance Loads for Zone VAV-02-12: 147 MATH

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	135 sqft	200	-	135 sqft	185	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	172	-	24 sqft	249	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	232 sqft	370	-	232 sqft	294	-
Interior Wall Convection	786 sqft	1319	-	786 sqft	196	-
Ceiling Convection	232 sqft	582	-	232 sqft	86	-
Overhead Lighting Convection	116 W	168	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	348 W	892	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3997	**820**	**-**	**1010**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 12. Heat Balance Loads for Zone VAV-02-13: 145 KG

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	538 sqft	814	-	538 sqft	724	-
Roof Convection	268 sqft	449	-	268 sqft	349	-
Window Convection	64 sqft	431	-	64 sqft	596	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1259 sqft	2023	-	1259 sqft	1328	-
Interior Wall Convection	2171 sqft	2475	-	2171 sqft	345	-
Ceiling Convection	989 sqft	2373	-	989 sqft	354	-
Overhead Lighting Convection	630 W	909	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	596 W	1526	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13057	**5740**	**-**	**3697**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 13. Heat Balance Loads for Zone VAV-02-14: 144A SM GROUP

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	172 sqft	203	-	172 sqft	0	-
Interior Wall Convection	784 sqft	727	-	784 sqft	5	-
Ceiling Convection	171 sqft	298	-	171 sqft	1	-
Overhead Lighting Convection	86 W	124	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	86 W	220	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1939	**1025**	**-**	**6**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 14. Heat Balance Loads for Zone VAV-02-15: 144 KG

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	541 sqft	749	-	541 sqft	732	-
Roof Convection	266 sqft	445	-	266 sqft	342	-
Window Convection	64 sqft	430	-	64 sqft	600	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1254 sqft	2037	-	1254 sqft	1339	-
Interior Wall Convection	2153 sqft	2599	-	2153 sqft	408	-
Ceiling Convection	988 sqft	2382	-	988 sqft	362	-
Overhead Lighting Convection	627 W	905	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	595 W	1522	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13127	**5740**	**-**	**3784**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 15. Heat Balance Loads for Zone VAV-02-16: 143 LEARNING CENTER

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	149 sqft	193	-	149 sqft	212	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	158	-	24 sqft	249	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	222 sqft	308	-	222 sqft	296	-
Interior Wall Convection	724 sqft	874	-	724 sqft	168	-
Ceiling Convection	222 sqft	476	-	222 sqft	86	-
Overhead Lighting Convection	111 W	160	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	111 W	284	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2822	**1025**	**-**	**1011**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 16. Heat Balance Loads for Zone VAV-02-17: 142 READ

	DESIGN COOLING - JULY 15:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	152 sqft	153	-	152 sqft	216	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	69	-	24 sqft	250	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	254	-	225 sqft	301	-
Interior Wall Convection	726 sqft	640	-	726 sqft	188	-
Ceiling Convection	224 sqft	350	-	224 sqft	88	-
Overhead Lighting Convection	112 W	162	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	112 W	288	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2284	**1025**	**-**	**1042**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-02 (N Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 17. Heat Balance Loads for Zone VAV-02-18: 141 KG

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	510 sqft	781	-	510 sqft	689	-
Roof Convection	258 sqft	428	-	258 sqft	332	-
Window Convection	64 sqft	430	-	64 sqft	599	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1241 sqft	1991	-	1241 sqft	1297	-
Interior Wall Convection	2192 sqft	2485	-	2192 sqft	427	-
Ceiling Convection	983 sqft	2303	-	983 sqft	362	-
Overhead Lighting Convection	620 W	895	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	590 W	1509	-	0 W	0	-
People Convection	28	2058	5740	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		12880	**5740**	**-**	**3706**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 18. Heat Balance Loads for Zone VAV-02-19: 140A SM GROUP

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	172 sqft	173	-	172 sqft	0	-
Interior Wall Convection	784 sqft	632	-	784 sqft	5	-
Ceiling Convection	172 sqft	245	-	172 sqft	1	-
Overhead Lighting Convection	86 W	124	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	86 W	221	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1689	**820**	**-**	**7**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 19. Heat Balance Loads for Zone VAV-02-20,24: C203 CORR/E237-E240 EXT

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	63 sqft	78	-	63 sqft	80	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	308 sqft	1694	-	308 sqft	2726	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	2517 sqft	3544	-	2517 sqft	459	-
Interior Wall Convection	5286 sqft	6134	-	5286 sqft	858	-
Ceiling Convection	2535 sqft	4283	-	2535 sqft	796	-
Overhead Lighting Convection	1258 W	1816	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	973 W	2490	-	0 W	0	-
People Convection	22	1617	4510	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		21657	**4510**	**-**	**4918**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 20. Heat Balance Loads for Zone VAV-02-21: 238 CLASSROOM

	DESIGN COOLING - OCTOBER 12:00			DESIGN HEATING		
	OA DB / WB 70.2 F / 64.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	487 sqft	1113	-	487 sqft	638	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	852	-	80 sqft	721	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1004 sqft	2576	-	1004 sqft	231	-
Interior Wall Convection	1403 sqft	3164	-	1403 sqft	351	-
Ceiling Convection	1004 sqft	3956	-	1004 sqft	473	-
Overhead Lighting Convection	502 W	724	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	502 W	1284	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15950	**6355**	**-**	**2415**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 21. Heat Balance Loads for Zone VAV-02-22: 237A SM GROUP

	DESIGN COOLING - OCTOBER 13:00			DESIGN HEATING		
	OA DB / WB 72.3 F / 65.1 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	159 sqft	184	-	159 sqft	1	-
Interior Wall Convection	749 sqft	747	-	749 sqft	7	-
Ceiling Convection	159 sqft	292	-	159 sqft	1	-
Overhead Lighting Convection	79 W	115	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	79 W	203	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1907	**1025**	**-**	**8**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 22. Heat Balance Loads for Zone VAV-02-23: 237 CLASSROOM

	DESIGN COOLING - OCTOBER 12:00			DESIGN HEATING		
	OA DB / WB 70.2 F / 64.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	860 sqft	1840	-	860 sqft	1219	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	836	-	80 sqft	767	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	966 sqft	2504	-	966 sqft	257	-
Interior Wall Convection	992 sqft	1869	-	992 sqft	232	-
Ceiling Convection	966 sqft	3501	-	966 sqft	533	-
Overhead Lighting Convection	483 W	697	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	483 W	1236	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14760	**6355**	**-**	**3009**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 23. Heat Balance Loads for Zone VAV-02-25: 236 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	651 sqft	1433	-	651 sqft	876	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	847	-	80 sqft	725	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	992 sqft	2401	-	992 sqft	279	-
Interior Wall Convection	1232 sqft	2341	-	1232 sqft	261	-
Ceiling Convection	994 sqft	3533	-	994 sqft	502	-
Overhead Lighting Convection	496 W	716	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	496 W	1270	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14819	**6355**	**-**	**2644**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 24. Heat Balance Loads for Zone VAV-02-26: 235A SMALL GROUP

	DESIGN COOLING - OCTOBER 13:00			DESIGN HEATING		
	OA DB / WB 72.3 F / 65.1 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	167 sqft	189	-	167 sqft	1	-
Interior Wall Convection	772 sqft	745	-	772 sqft	7	-
Ceiling Convection	167 sqft	298	-	167 sqft	1	-
Overhead Lighting Convection	84 W	121	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	84 W	214	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1935	**1025**	**-**	**9**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 25. Heat Balance Loads for Zone VAV-02-27: 235 STRIDES 1ST/2ND

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	451 sqft	678	-	451 sqft	543	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	819	-	80 sqft	669	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1208 sqft	2212	-	1208 sqft	208	-
Interior Wall Convection	3030 sqft	3532	-	3030 sqft	422	-
Ceiling Convection	1209 sqft	3099	-	1209 sqft	421	-
Overhead Lighting Convection	604 W	872	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	551 W	1409	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14605	**5535**	**-**	**2263**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 26. Heat Balance Loads for Zone VAV-02-28: E235/E245 EXT

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	451 sqft	648	-	451 sqft	76	-
Interior Wall Convection	1433 sqft	1608	-	1433 sqft	189	-
Ceiling Convection	451 sqft	781	-	451 sqft	123	-
Overhead Lighting Convection	225 W	325	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	225 W	577	-	0 W	0	-
People Convection	10	735	2050	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4673	**2050**	**-**	**388**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 27. Heat Balance Loads for Zone VAV-02-29: 247 ADJ

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	190 sqft	274	-	190 sqft	254	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	171	-	24 sqft	238	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	240 sqft	367	-	240 sqft	52	-
Interior Wall Convection	696 sqft	1118	-	696 sqft	182	-
Ceiling Convection	240 sqft	618	-	240 sqft	103	-
Overhead Lighting Convection	120 W	173	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	360 W	921	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3936	**820**	**-**	**828**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 28. Heat Balance Loads for Zone VAV-02-30: 246 BCBA OFFICE

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	159 sqft	245	-	159 sqft	197	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	183	-	24 sqft	214	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	348 sqft	570	-	348 sqft	60	-
Interior Wall Convection	1074 sqft	1443	-	1074 sqft	178	-
Ceiling Convection	348 sqft	930	-	348 sqft	119	-
Overhead Lighting Convection	174 W	251	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1218 W	3118	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		7180	**1230**	**-**	**768**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-02 (N Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 29. Heat Balance Loads for Zone VAV-02-31: 245 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	362 sqft	701	-	362 sqft	457	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	586	-	80 sqft	712	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	960 sqft	2057	-	960 sqft	208	-
Interior Wall Convection	1489 sqft	2484	-	1489 sqft	302	-
Ceiling Convection	960 sqft	3026	-	960 sqft	427	-
Overhead Lighting Convection	480 W	693	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	480 W	1228	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13052	**6355**	**-**	**2106**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 30. Heat Balance Loads for Zone VAV-02-32: 244A SM GROUP

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	173 sqft	160	-	173 sqft	1	-
Interior Wall Convection	790 sqft	640	-	790 sqft	8	-
Ceiling Convection	174 sqft	245	-	174 sqft	1	-
Overhead Lighting Convection	87 W	125	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	87 W	222	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1686	**820**	**-**	**10**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 31. Heat Balance Loads for Zone VAV-02-33: 244 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	364 sqft	710	-	364 sqft	464	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	589	-	80 sqft	718	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	967 sqft	2032	-	967 sqft	212	-
Interior Wall Convection	1492 sqft	2525	-	1492 sqft	345	-
Ceiling Convection	968 sqft	3044	-	968 sqft	437	-
Overhead Lighting Convection	484 W	698	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	484 W	1238	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13114	**6355**	**-**	**2177**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 32. Heat Balance Loads for Zone VAV-02-34: 242 LEARNING CENTER

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	150 sqft	210	-	150 sqft	204	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	164	-	24 sqft	236	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	337	-	225 sqft	45	-
Interior Wall Convection	732 sqft	947	-	732 sqft	177	-
Ceiling Convection	225 sqft	522	-	225 sqft	91	-
Overhead Lighting Convection	112 W	162	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	112 W	288	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3071	**1230**	**-**	**753**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 33. Heat Balance Loads for Zone VAV-02-35: 241 READ

	DESIGN COOLING - JUNE 19:00			DESIGN HEATING		
	OA DB / WB 83.0 F / 70.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	151 sqft	183	-	151 sqft	206	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	108	-	24 sqft	236	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	227 sqft	297	-	227 sqft	46	-
Interior Wall Convection	733 sqft	817	-	733 sqft	182	-
Ceiling Convection	227 sqft	474	-	227 sqft	93	-
Overhead Lighting Convection	113 W	164	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	340 W	871	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3207	**820**	**-**	**763**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 34. Heat Balance Loads for Zone VAV-02-36: 240 LANG 1ST/2ND

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	357 sqft	557	-	357 sqft	457	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	541	-	80 sqft	722	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	951 sqft	1678	-	951 sqft	210	-
Interior Wall Convection	1484 sqft	2064	-	1484 sqft	353	-
Ceiling Convection	951 sqft	2445	-	951 sqft	431	-
Overhead Lighting Convection	475 W	686	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	475 W	1216	-	0 W	0	-
People Convection	19	1397	3895	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		10583	**3895**	**-**	**2173**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 35. Heat Balance Loads for Zone VAV-02-37: 239A SM GROUP

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	164 sqft	188	-	164 sqft	1	-
Interior Wall Convection	763 sqft	721	-	763 sqft	7	-
Ceiling Convection	164 sqft	299	-	164 sqft	1	-
Overhead Lighting Convection	82 W	118	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	82 W	210	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1903	**1025**	**-**	**9**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 36. Heat Balance Loads for Zone VAV-02-38: 239 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	880 sqft	1741	-	880 sqft	1280	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	583	-	80 sqft	786	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	989 sqft	2085	-	989 sqft	266	-
Interior Wall Convection	1001 sqft	1673	-	1001 sqft	249	-
Ceiling Convection	990 sqft	3041	-	990 sqft	553	-
Overhead Lighting Convection	494 W	714	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	494 W	1265	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13379	**6355**	**-**	**3135**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 37. Heat Balance Loads for Zone VAV-02-39: 332 CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	485 sqft	1184	-	485 sqft	715	-
Roof Convection	1002 sqft	3015	-	1002 sqft	1443	-
Window Convection	80 sqft	895	-	80 sqft	811	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1002 sqft	2867	-	1002 sqft	280	-
Interior Wall Convection	1400 sqft	3269	-	1400 sqft	417	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	501 W	723	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	501 W	1282	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15516	**6355**	**-**	**3667**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 38. Heat Balance Loads for Zone VAV-02-40,43: C303 CORR/E331-E334 EXT

	DESIGN COOLING - JULY 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	142 sqft	154	-	142 sqft	182	-
Roof Convection	2460 sqft	3286	-	2460 sqft	3025	-
Window Convection	224 sqft	948	-	224 sqft	2097	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	2458 sqft	2562	-	2458 sqft	322	-
Interior Wall Convection	5154 sqft	4512	-	5154 sqft	682	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	1229 W	1774	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	964 W	2467	-	0 W	0	-
People Convection	23	1691	4715	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		17392	**4715**	**-**	**6307**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 39. Heat Balance Loads for Zone VAV-02-41: 331A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	176 sqft	275	-	176 sqft	193	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	176 sqft	172	-	176 sqft	9	-
Interior Wall Convection	793 sqft	671	-	793 sqft	43	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	88 W	127	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	88 W	225	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1764	**820**	**-**	**245**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 40. Heat Balance Loads for Zone VAV-02-42: 331 CLASSROOM

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	863 sqft	2039	-	863 sqft	1357	-
Roof Convection	976 sqft	2859	-	976 sqft	1459	-
Window Convection	80 sqft	871	-	80 sqft	850	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	970 sqft	2644	-	970 sqft	309	-
Interior Wall Convection	995 sqft	1942	-	995 sqft	276	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	485 W	700	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	485 W	1241	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14575	**6355**	**-**	**4251**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 41. Heat Balance Loads for Zone VAV-02-44: 329A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	167 sqft	307	-	167 sqft	183	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	167 sqft	194	-	167 sqft	9	-
Interior Wall Convection	771 sqft	752	-	771 sqft	41	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	83 W	120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	83 W	213	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1955	**1025**	**-**	**232**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 42. Heat Balance Loads for Zone VAV-02-45: 330 CLASSROOM

	DESIGN COOLING - SEPTEMBER 10:00			DESIGN HEATING		
	OA DB / WB 73.6 F / 67.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	651 sqft	1525	-	651 sqft	985	-
Roof Convection	999 sqft	2762	-	999 sqft	1455	-
Window Convection	80 sqft	867	-	80 sqft	812	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	999 sqft	2943	-	999 sqft	292	-
Interior Wall Convection	1232 sqft	2277	-	1232 sqft	309	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	499 W	721	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	499 W	1278	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14652	**6355**	**-**	**3853**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 43. Heat Balance Loads for Zone VAV-02-46: 329 STRIDES 3RD-5TH

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	451 sqft	776	-	451 sqft	627	-
Roof Convection	1206 sqft	2685	-	1206 sqft	1634	-
Window Convection	80 sqft	840	-	80 sqft	775	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1205 sqft	2307	-	1205 sqft	261	-
Interior Wall Convection	2983 sqft	3722	-	2983 sqft	555	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	603 W	870	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	553 W	1416	-	0 W	0	-
People Convection	27	1985	5535	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14600	**5535**	**-**	**3852**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 44. Heat Balance Loads for Zone VAV-02-47: 339 ELL

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	190 sqft	299	-	190 sqft	274	-
Roof Convection	502 sqft	1219	-	502 sqft	701	-
Window Convection	48 sqft	326	-	48 sqft	489	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	501 sqft	803	-	501 sqft	119	-
Interior Wall Convection	1231 sqft	1684	-	1231 sqft	316	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	250 W	361	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	250 W	641	-	0 W	0	-
People Convection	11	809	2255	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		6142	**2255**	**-**	**1898**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 45. Heat Balance Loads for Zone VAV-02-48: E329/E338 EXT LEARNING

	DESIGN COOLING - JULY 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	352 sqft	593	-	352 sqft	420	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	351 sqft	411	-	351 sqft	46	-
Interior Wall Convection	1034 sqft	929	-	1034 sqft	111	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	175 W	253	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	175 W	449	-	0 W	0	-
People Convection	9	662	1845	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3296	**1845**	**-**	**577**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 46. Heat Balance Loads for Zone VAV-02-49 340 MATH

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	135 sqft	229	-	135 sqft	201	-
Roof Convection	225 sqft	588	-	225 sqft	315	-
Window Convection	24 sqft	175	-	24 sqft	255	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	398	-	225 sqft	51	-
Interior Wall Convection	768 sqft	1430	-	768 sqft	219	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	113 W	163	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	113 W	289	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3713	**1230**	**-**	**1041**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 47. Heat Balance Loads for Zone VAV-02-50: 338 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	362 sqft	774	-	362 sqft	520	-
Roof Convection	964 sqft	3042	-	964 sqft	1371	-
Window Convection	80 sqft	603	-	80 sqft	807	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	964 sqft	2180	-	964 sqft	258	-
Interior Wall Convection	1490 sqft	2733	-	1490 sqft	402	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	482 W	695	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	482 W	1233	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13538	**6355**	**-**	**3358**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 48. Heat Balance Loads for Zone VAV-02-51: 337A SM GROUP

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	164 sqft	266	-	164 sqft	180	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	164 sqft	169	-	164 sqft	9	-
Interior Wall Convection	763 sqft	681	-	763 sqft	46	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	82 W	118	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	82 W	209	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1737	**820**	**-**	**235**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 49. Heat Balance Loads for Zone VAV-02-52: 337 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	464 sqft	982	-	464 sqft	675	-
Roof Convection	1023 sqft	3158	-	1023 sqft	1461	-
Window Convection	80 sqft	593	-	80 sqft	807	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1022 sqft	2231	-	1022 sqft	290	-
Interior Wall Convection	1435 sqft	2557	-	1435 sqft	340	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	511 W	738	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	511 W	1308	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13844	**6355**	**-**	**3572**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 50. Heat Balance Loads for Zone VAV-02-53: 336 LEARNING CENTER

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	149 sqft	227	-	149 sqft	217	-
Roof Convection	224 sqft	536	-	224 sqft	312	-
Window Convection	24 sqft	167	-	24 sqft	252	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	224 sqft	359	-	224 sqft	50	-
Interior Wall Convection	728 sqft	1024	-	728 sqft	157	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	112 W	161	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	112 W	286	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3202	**1230**	**-**	**988**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 51. Heat Balance Loads for Zone VAV-02-54: 335 READ

	DESIGN COOLING - JUNE 19:00			DESIGN HEATING		
	OA DB / WB 83.0 F / 70.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	152 sqft	217	-	152 sqft	224	-
Roof Convection	227 sqft	511	-	227 sqft	318	-
Window Convection	24 sqft	114	-	24 sqft	256	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	226 sqft	333	-	226 sqft	52	-
Interior Wall Convection	730 sqft	939	-	730 sqft	214	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	113 W	163	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	338 W	866	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3510	**1025**	**-**	**1065**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 52. Heat Balance Loads for Zone VAV-02-55: 334 LANG 3RD-5TH

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	350 sqft	753	-	350 sqft	506	-
Roof Convection	940 sqft	2991	-	940 sqft	1343	-
Window Convection	80 sqft	607	-	80 sqft	812	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	940 sqft	2244	-	940 sqft	256	-
Interior Wall Convection	1476 sqft	2755	-	1476 sqft	448	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	470 W	678	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	470 W	1202	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13509	**6355**	**-**	**3364**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 53. Heat Balance Loads for Zone VAV-02-56: 333A SM GROUP

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	161 sqft	262	-	161 sqft	177	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	161 sqft	165	-	161 sqft	9	-
Interior Wall Convection	752 sqft	671	-	752 sqft	45	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	80 W	116	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	80 W	205	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1714	**820**	**-**	**231**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 54. Heat Balance Loads for Zone VAV-02-57: 333 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	888 sqft	1929	-	888 sqft	1413	-
Roof Convection	1014 sqft	3138	-	1014 sqft	1516	-
Window Convection	80 sqft	595	-	80 sqft	854	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1012 sqft	2220	-	1012 sqft	324	-
Interior Wall Convection	1004 sqft	1831	-	1004 sqft	292	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	506 W	731	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	506 W	1295	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14017	**6355**	**-**	**4400**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-03 (W Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 1. Heat Balance Loads for Zone VAV-03-01: 108A OT CR

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	164 sqft	297	-	164 sqft	235	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	40 sqft	411	-	40 sqft	392	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	284 sqft	747	-	284 sqft	83	-
Interior Wall Convection	790 sqft	1548	-	790 sqft	258	-
Ceiling Convection	284 sqft	944	-	284 sqft	135	-
Overhead Lighting Convection	142 W	205	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	142 W	364	-	0 W	0	-
People Convection	6	441	1230	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4957	**1230**	**-**	**1103**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - OCTOBER 12:00			DESIGN HEATING		
	OA DB / WB 70.2 F / 64.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	403 sqft	579	-	403 sqft	503	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	88 sqft	801	-	88 sqft	806	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1342 sqft	2452	-	1342 sqft	1214	-
Interior Wall Convection	1956 sqft	2300	-	1956 sqft	269	-
Ceiling Convection	1342 sqft	3095	-	1342 sqft	482	-
Overhead Lighting Convection	671 W	968	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1666 W	4263	-	0 W	0	-
People Convection	11	974	5005	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15432	**5005**	**-**	**3274**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-03-03: 110 SPECH/LANG

	DESIGN COOLING - NOVEMBER 8:00			DESIGN HEATING		
	OA DB / WB 49.5 F / 49.5 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	131 sqft	122	-	131 sqft	176	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	105	-	24 sqft	232	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	269	-	225 sqft	282	-
Interior Wall Convection	781 sqft	861	-	781 sqft	160	-
Ceiling Convection	225 sqft	437	-	225 sqft	89	-
Overhead Lighting Convection	113 W	163	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	113 W	288	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2613	**1025**	**-**	**939**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone VAV-03-04: 111 ADJUSTMENT

	DESIGN COOLING - NOVEMBER 8:00			DESIGN HEATING		
	OA DB / WB 49.5 F / 49.5 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	126 sqft	133	-	126 sqft	179	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	113	-	24 sqft	243	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	218 sqft	300	-	218 sqft	280	-
Interior Wall Convection	776 sqft	913	-	776 sqft	312	-
Ceiling Convection	218 sqft	508	-	218 sqft	102	-
Overhead Lighting Convection	109 W	158	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	327 W	838	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3330	**1025**	**-**	**1116**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone VAV-03-05,9: C104 CORRIDOR

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	499 sqft	268	-	499 sqft	552	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	4982 sqft	2602	-	4982 sqft	1454	-
Interior Wall Convection	14651 sqft	7050	-	14651 sqft	1143	-
Ceiling Convection	4921 sqft	2019	-	4921 sqft	641	-
Overhead Lighting Convection	2491 W	3596	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	498 W	1275	-	0 W	0	-
People Convection	18	1323	3690	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		18133	**3690**	**-**	**3789**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone VAV-03-06,7: 129 TEACH COLLAB

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	729 sqft	1320	-	729 sqft	943	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	48 sqft	534	-	48 sqft	454	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1018 sqft	2028	-	1018 sqft	1147	-
Interior Wall Convection	1606 sqft	1873	-	1606 sqft	233	-
Ceiling Convection	1018 sqft	2813	-	1018 sqft	377	-
Overhead Lighting Convection	509 W	735	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1916 W	4903	-	0 W	0	-
People Convection	21	1454	2605	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15659	**2605**	**-**	**3154**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone VAV-03-08: 130A TEACH WELLNESS

	DESIGN COOLING - OCTOBER 15:00			DESIGN HEATING		
	OA DB / WB 75.0 F / 66.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	111 sqft	190	-	111 sqft	162	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	273	-	24 sqft	267	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	112 sqft	208	-	112 sqft	176	-
Interior Wall Convection	490 sqft	921	-	490 sqft	111	-
Ceiling Convection	112 sqft	304	-	112 sqft	50	-
Overhead Lighting Convection	56 W	81	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	224 W	574	-	0 W	0	-
People Convection	2	138	240	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2687	**240**	**-**	**767**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone VAV-03-10: 148 IT OFFICE

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	137 sqft	87	-	137 sqft	0	-
Interior Wall Convection	687 sqft	346	-	687 sqft	7	-
Ceiling Convection	137 sqft	128	-	137 sqft	1	-
Overhead Lighting Convection	69 W	99	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	206 W	527	-	0 W	0	-
People Convection	1	74	205	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1259	**205**	**-**	**9**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone VAV-03-11: 206 STE CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	427 sqft	950	-	427 sqft	641	-
Roof Convection	1257 sqft	3200	-	1257 sqft	1805	-
Window Convection	128 sqft	1358	-	128 sqft	1291	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1280 sqft	3553	-	1280 sqft	350	-
Interior Wall Convection	2387 sqft	3243	-	2387 sqft	503	-
Ceiling Convection	24 sqft	36	-	24 sqft	7	-
Overhead Lighting Convection	640 W	924	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	583 W	1492	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		16594	**5125**	**-**	**4596**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone VAV-03-12: 207 FLEX CLASSROOM

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	376 sqft	648	-	376 sqft	446	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	80 sqft	832	-	80 sqft	672	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1106 sqft	2587	-	1106 sqft	222	-
Interior Wall Convection	2057 sqft	2998	-	2057 sqft	401	-
Ceiling Convection	1106 sqft	3337	-	1106 sqft	454	-
Overhead Lighting Convection	553 W	798	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	522 W	1337	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14376	**5125**	**-**	**2195**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 11. Heat Balance Loads for Zone VAV-03-13,14: C202 CORR

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	4324 sqft	2399	-	4324 sqft	113	-
Interior Wall Convection	14598 sqft	7179	-	14598 sqft	655	-
Ceiling Convection	4322 sqft	2057	-	4322 sqft	208	-
Overhead Lighting Convection	2162 W	3120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	432 W	1106	-	0 W	0	-
People Convection	17	1250	3485	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		17111	**3485**	**-**	**976**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 12. Heat Balance Loads for Zone VAV-03-15: 227 ASSIST PRINC

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	174 sqft	317	-	174 sqft	348	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	280	-	24 sqft	301	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	223 sqft	774	-	223 sqft	947	-
Interior Wall Convection	681 sqft	1025	-	681 sqft	327	-
Ceiling Convection	223 sqft	677	-	223 sqft	193	-
Overhead Lighting Convection	111 W	161	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	334 W	855	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4456	**1025**	**-**	**2116**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-03 (W Class Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:26 AM

Table 13. Heat Balance Loads for Zone VAV-03-16: 226 MATH

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	171 sqft	249	-	171 sqft	336	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	257	-	24 sqft	297	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	219 sqft	639	-	219 sqft	891	-
Interior Wall Convection	678 sqft	826	-	678 sqft	324	-
Ceiling Convection	219 sqft	552	-	219 sqft	183	-
Overhead Lighting Convection	109 W	158	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	109 W	280	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3182	**615**	**-**	**2031**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 14. Heat Balance Loads for Zone VAV-03-17,18: 224 TEACH COLLAB

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	498 sqft	763	-	498 sqft	590	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	48 sqft	509	-	48 sqft	399	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1017 sqft	1915	-	1017 sqft	160	-
Interior Wall Convection	2656 sqft	3005	-	2656 sqft	332	-
Ceiling Convection	1017 sqft	2618	-	1017 sqft	326	-
Overhead Lighting Convection	508 W	734	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1914 W	4897	-	0 W	0	-
People Convection	19	1316	2365	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15758	**2365**	**-**	**1808**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 15. Heat Balance Loads for Zone VAV-03-19: 229A TEACH WELLNESS

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	117 sqft	183	-	117 sqft	175	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	24 sqft	294	-	24 sqft	259	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	113 sqft	320	-	113 sqft	27	-
Interior Wall Convection	488 sqft	748	-	488 sqft	120	-
Ceiling Convection	114 sqft	307	-	114 sqft	55	-
Overhead Lighting Convection	57 W	82	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	227 W	580	-	0 W	0	-
People Convection	1	69	120	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2583	**120**	**-**	**637**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 16. Heat Balance Loads for Zone VAV-03-20: 352 CLASSROOM

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	852 sqft	2158	-	852 sqft	1357	-
Roof Convection	970 sqft	3038	-	970 sqft	1456	-
Window Convection	80 sqft	885	-	80 sqft	837	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	970 sqft	2647	-	970 sqft	310	-
Interior Wall Convection	978 sqft	2306	-	978 sqft	349	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	485 W	700	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	485 W	1242	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15253	**6355**	**-**	**4310**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 17. Heat Balance Loads for Zone VAV-03-21: 351A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	166 sqft	272	-	166 sqft	183	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	166 sqft	187	-	166 sqft	15	-
Interior Wall Convection	769 sqft	684	-	769 sqft	42	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	83 W	120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	83 W	212	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1769	**820**	**-**	**240**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 18. Heat Balance Loads for Zone VAV-03-22: 351 CLASSROOM

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	403 sqft	932	-	403 sqft	575	-
Roof Convection	986 sqft	2805	-	986 sqft	1395	-
Window Convection	64 sqft	577	-	64 sqft	643	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	986 sqft	2932	-	986 sqft	358	-
Interior Wall Convection	1446 sqft	2714	-	1446 sqft	327	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	493 W	712	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	493 W	1262	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14212	**6355**	**-**	**3299**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 19. Heat Balance Loads for Zone VAV-03-23: 350 ADJUSTMENT

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	141 sqft	222	-	141 sqft	209	-
Roof Convection	226 sqft	431	-	226 sqft	317	-
Window Convection	24 sqft	206	-	24 sqft	257	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	226 sqft	658	-	226 sqft	82	-
Interior Wall Convection	754 sqft	1082	-	754 sqft	169	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	113 W	163	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	339 W	868	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3850	**615**	**-**	**1035**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 20. Heat Balance Loads for Zone VAV-03-24: C301 CORR/E315/E347 EXT

	DESIGN COOLING - JULY 18:00			DESIGN HEATING		
	OA DB / WB 88.1 F / 73.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	3866 sqft	4230	-	3866 sqft	4526	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	3796 sqft	3553	-	3796 sqft	476	-
Interior Wall Convection	10970 sqft	7372	-	10970 sqft	1047	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	1898 W	2740	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	894 W	2287	-	0 W	0	-
People Convection	29	2132	5945	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		22313	**5945**	**-**	**6049**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 21. Heat Balance Loads for Zone VAV-03-25: 320 SCHOOL PSYCH

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	183 sqft	353	-	183 sqft	285	-
Roof Convection	167 sqft	453	-	167 sqft	243	-
Window Convection	24 sqft	272	-	24 sqft	267	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	167 sqft	385	-	167 sqft	46	-
Interior Wall Convection	554 sqft	1037	-	554 sqft	141	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	83 W	120	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	250 W	641	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3556	**820**	**-**	**983**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 22. Heat Balance Loads for Zone VAV-03-26: 321 READ

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	163 sqft	259	-	163 sqft	241	-
Roof Convection	223 sqft	527	-	223 sqft	313	-
Window Convection	24 sqft	268	-	24 sqft	252	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	223 sqft	551	-	223 sqft	53	-
Interior Wall Convection	720 sqft	975	-	720 sqft	168	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	112 W	161	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	335 W	857	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3818	**615**	**-**	**1027**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 23. Heat Balance Loads for Zone VAV-03-27: 327 TEACH COLLAB

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 91.0 F / 74.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	498 sqft	984	-	498 sqft	691	-
Roof Convection	1021 sqft	2747	-	1021 sqft	1388	-
Window Convection	48 sqft	542	-	48 sqft	459	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1021 sqft	2100	-	1021 sqft	225	-
Interior Wall Convection	1850 sqft	2481	-	1850 sqft	324	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	510 W	737	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1914 W	4898	-	0 W	0	-
People Convection	19	1316	2365	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15803	**2365**	**-**	**3087**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 24. Heat Balance Loads for Zone VAV-03-28: 327A TEACH WELLNESS

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	117 sqft	218	-	117 sqft	189	-
Roof Convection	109 sqft	289	-	109 sqft	160	-
Window Convection	24 sqft	280	-	24 sqft	278	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	109 sqft	238	-	109 sqft	30	-
Interior Wall Convection	472 sqft	987	-	472 sqft	132	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	54 W	78	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	163 W	417	-	0 W	0	-
People Convection	1	74	205	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2581	**205**	**-**	**789**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 25. Heat Balance Loads for Zone VAV-03-29: 348 MATH

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	140 sqft	223	-	140 sqft	207	-
Roof Convection	224 sqft	433	-	224 sqft	314	-
Window Convection	24 sqft	207	-	24 sqft	257	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	224 sqft	623	-	224 sqft	81	-
Interior Wall Convection	753 sqft	1126	-	753 sqft	170	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	112 W	162	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	337 W	861	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3855	**615**	**-**	**1028**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 26. Heat Balance Loads for Zone VAV-03-30: 349 SPEECH/LANG

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	140 sqft	219	-	140 sqft	208	-
Roof Convection	225 sqft	426	-	225 sqft	316	-
Window Convection	24 sqft	205	-	24 sqft	257	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	225 sqft	648	-	225 sqft	81	-
Interior Wall Convection	754 sqft	1053	-	754 sqft	168	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	113 W	163	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	338 W	865	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3799	**615**	**-**	**1030**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 27. Heat Balance Loads for Zone VAV-03-31: 347 CLASSROOM

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	429 sqft	1070	-	429 sqft	633	-
Roof Convection	966 sqft	3015	-	966 sqft	1406	-
Window Convection	80 sqft	743	-	80 sqft	828	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	966 sqft	3419	-	966 sqft	396	-
Interior Wall Convection	1459 sqft	2999	-	1459 sqft	369	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	483 W	697	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	483 W	1236	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15458	**6355**	**-**	**3632**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 28. Heat Balance Loads for Zone VAV-03-32: 346 STRIDES 3RD-5TH

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	386 sqft	610	-	386 sqft	531	-
Roof Convection	1276 sqft	2666	-	1276 sqft	1730	-
Window Convection	64 sqft	541	-	64 sqft	621	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1276 sqft	3219	-	1276 sqft	494	-
Interior Wall Convection	2894 sqft	3426	-	2894 sqft	476	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	638 W	921	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	582 W	1490	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14711	**5125**	**-**	**3853**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 29. Heat Balance Loads for Zone VAV-03-33: 347A SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	158 sqft	294	-	158 sqft	179	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	158 sqft	306	-	158 sqft	29	-
Interior Wall Convection	756 sqft	759	-	756 sqft	52	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	79 W	114	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	79 W	203	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1970	**820**	**-**	**260**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 30. Heat Balance Loads for Zone VAV-03-34: C302 CORR/E341 EXT

	DESIGN COOLING - JULY 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	2762 sqft	3085	-	2762 sqft	3282	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	2762 sqft	2785	-	2762 sqft	390	-
Interior Wall Convection	6228 sqft	4579	-	6228 sqft	790	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	1381 W	1993	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	460 W	1178	-	0 W	0	-
People Convection	21	1544	4305	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15164	**4305**	**-**	**4461**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 31. Heat Balance Loads for Zone VAV-03-35: 341 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	368 sqft	829	-	368 sqft	549	-
Roof Convection	967 sqft	3228	-	967 sqft	1411	-
Window Convection	80 sqft	619	-	80 sqft	826	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	967 sqft	2434	-	967 sqft	415	-
Interior Wall Convection	1465 sqft	3202	-	1465 sqft	460	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	483 W	698	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	483 W	1237	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14525	**6355**	**-**	**3660**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 32. Heat Balance Loads for Zone VAV-03-36: 345 SM GROUP

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	173 sqft	309	-	173 sqft	193	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	173 sqft	329	-	173 sqft	25	-
Interior Wall Convection	787 sqft	743	-	787 sqft	45	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	86 W	125	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	86 W	221	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2022	**820**	**-**	**263**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 33. Heat Balance Loads for Zone VAV-03-37: 344 CLASSROOM

	DESIGN COOLING - SEPTEMBER 10:00			DESIGN HEATING		
	OA DB / WB 73.6 F / 67.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	500 sqft	1285	-	500 sqft	783	-
Roof Convection	976 sqft	3083	-	976 sqft	1446	-
Window Convection	80 sqft	896	-	80 sqft	828	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	976 sqft	3639	-	976 sqft	397	-
Interior Wall Convection	1430 sqft	3090	-	1430 sqft	680	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	488 W	704	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	488 W	1248	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		16223	**6355**	**-**	**4135**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 34. Heat Balance Loads for Zone VAV-03-38: 341A SM GROUP

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	163 sqft	282	-	163 sqft	188	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	163 sqft	226	-	163 sqft	44	-
Interior Wall Convection	762 sqft	726	-	762 sqft	64	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	82 W	118	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	82 W	209	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1855	**820**	**-**	**297**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 35. Heat Balance Loads for Zone VAV-03-39: 342 CLASSROOM

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	884 sqft	2148	-	884 sqft	1465	-
Roof Convection	983 sqft	3121	-	983 sqft	1520	-
Window Convection	80 sqft	608	-	80 sqft	880	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	983 sqft	2453	-	983 sqft	574	-
Interior Wall Convection	964 sqft	1683	-	964 sqft	306	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	491 W	709	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	491 W	1258	-	0 W	0	-
People Convection	31	2279	6355	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14258	**6355**	**-**	**4745**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 36. Heat Balance Loads for Zone VAV-03-40: 343 SPEECH

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	156 sqft	187	-	156 sqft	231	-
Roof Convection	232 sqft	339	-	232 sqft	327	-
Window Convection	24 sqft	186	-	24 sqft	259	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	232 sqft	572	-	232 sqft	76	-
Interior Wall Convection	736 sqft	820	-	736 sqft	169	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	116 W	168	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	116 W	297	-	0 W	0	-
People Convection	1	74	205	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2642	**205**	**-**	**1062**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-04 (Gym Overhead)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:27 AM

Table 1. Heat Balance Loads for Zone G100 GYM

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1460 sqft	5212	-	1460 sqft	1253	-
Roof Convection	7772 sqft	44751	-	7772 sqft	5458	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	12462 sqft	63329	-	12462 sqft	2277	-
Interior Wall Convection	12494 sqft	43134	-	12494 sqft	1871	-
Ceiling Convection	4622 sqft	27602	-	4622 sqft	726	-
Overhead Lighting Convection	6231 W	8994	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	3086 W	7898	-	0 W	0	-
People Convection	1100	75900	132000	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		276820	**132000**	**-**	**11584**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-05 (Cafe/Stage Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:27 AM

Table 1. Heat Balance Loads for Zone VAV-05-01,3: 163 CAFETERIA

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	3882 sqft	15502	-	3882 sqft	6602	-
Roof Convection	6851 sqft	41719	-	6851 sqft	11968	-
Window Convection	1613 sqft	17759	-	1613 sqft	17132	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	7573 sqft	31454	-	7573 sqft	9642	-
Interior Wall Convection	6514 sqft	23362	-	6514 sqft	2833	-
Ceiling Convection	722 sqft	350	-	722 sqft	435	-
Overhead Lighting Convection	3787 W	5465	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1893 W	4845	-	0 W	0	-
People Convection	350	29400	94500	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		169855	**94500**	**-**	**48611**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 2. Heat Balance Loads for Zone VAV-05-02: 164 STAGE

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	395 sqft	1825	-	395 sqft	646	-
Roof Convection	1145 sqft	5863	-	1145 sqft	1894	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1145 sqft	5337	-	1145 sqft	1292	-
Interior Wall Convection	1621 sqft	6471	-	1621 sqft	775	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	572 W	826	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	286 W	733	-	0 W	0	-
People Convection	50	3450	6000	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		24506	**6000**	**-**	**4607**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-06 (Kitch/Cust)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:27 AM

Table 1. Heat Balance Loads for Zone 151 CHAIR STO

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	481 sqft	274	-	481 sqft	9	-
Interior Wall Convection	1343 sqft	605	-	1343 sqft	53	-
Ceiling Convection	481 sqft	354	-	481 sqft	28	-
Overhead Lighting Convection	240 W	347	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	48 W	123	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1704	**0**	**-**	**89**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - JULY 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	526 sqft	307	-	526 sqft	14	-
Interior Wall Convection	1388 sqft	629	-	1388 sqft	80	-
Ceiling Convection	526 sqft	383	-	526 sqft	37	-
Overhead Lighting Convection	263 W	380	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	53 W	135	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1833	**0**	**-**	**131**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone 153/155 RECEIVING

	DESIGN COOLING - JULY 18:00			DESIGN HEATING		
	OA DB / WB 88.1 F / 73.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1617 sqft	1161	-	1617 sqft	1608	-
Roof Convection	680 sqft	536	-	680 sqft	634	-
Window Convection	7 sqft	37	-	7 sqft	53	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	124 sqft	451	-	124 sqft	616	-
Floor Convection	3073 sqft	1367	-	3073 sqft	1877	-
Interior Wall Convection	3910 sqft	2512	-	3910 sqft	1093	-
Ceiling Convection	2392 sqft	602	-	2392 sqft	401	-
Overhead Lighting Convection	968 W	1397	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1162 W	2973	-	0 W	0	-
People Convection	3	298	1453	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		11334	**1453**	**-**	**6282**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone 155C CUST OFF

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	228 sqft	469	-	228 sqft	285	-
Roof Convection	202 sqft	633	-	202 sqft	335	-
Window Convection	48 sqft	385	-	48 sqft	344	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	202 sqft	448	-	202 sqft	416	-
Interior Wall Convection	591 sqft	1292	-	591 sqft	319	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	101 W	146	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	303 W	775	-	0 W	0	-
People Convection	5	368	1025	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4515	**1025**	**-**	**1699**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-06 (Kitch/Cust)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:27 AM

Table 5. Heat Balance Loads for Zone 156C OFF

	DESIGN COOLING - JULY 18:00			DESIGN HEATING		
	OA DB / WB 88.1 F / 73.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	88 sqft	151	-	88 sqft	57	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	88 sqft	105	-	88 sqft	8	-
Interior Wall Convection	552 sqft	599	-	552 sqft	79	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	44 W	64	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	133 W	340	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1405	**410**	**-**	**144**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone 156D OFFICE

	DESIGN COOLING - JUNE 19:00			DESIGN HEATING		
	OA DB / WB 83.0 F / 70.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	83 sqft	164	-	83 sqft	53	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	83 sqft	114	-	83 sqft	7	-
Interior Wall Convection	535 sqft	768	-	535 sqft	73	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	42 W	60	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	125 W	319	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1572	**410**	**-**	**133**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone C106 CORRIDOR

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	796 sqft	616	-	796 sqft	403	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1393 sqft	811	-	1393 sqft	23	-
Interior Wall Convection	4537 sqft	2868	-	4537 sqft	179	-
Ceiling Convection	597 sqft	461	-	597 sqft	28	-
Overhead Lighting Convection	696 W	1005	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	139 W	356	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		6706	**1640**	**-**	**634**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-07 (Flex/Quiet Cafe/Music Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:27 AM

Table 1. Heat Balance Loads for Zone VAV-07-01: 162 FLEX CR

	DESIGN COOLING - AUGUST 10:00			DESIGN HEATING		
	OA DB / WB 79.6 F / 70.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	885 sqft	1587	-	885 sqft	1408	-
Roof Convection	1083 sqft	2304	-	1083 sqft	1587	-
Window Convection	96 sqft	624	-	96 sqft	1061	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1083 sqft	2101	-	1083 sqft	1634	-
Interior Wall Convection	1678 sqft	2078	-	1678 sqft	378	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	541 W	782	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	488 W	1249	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		12562	**5125**	**-**	**6067**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 2. Heat Balance Loads for Zone VAV-07-02: 161 QUIET CAFE

	DESIGN COOLING - JUNE 6:00			DESIGN HEATING		
	OA DB / WB 67.3 F / 65.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	215 sqft	449	-	215 sqft	333	-
Roof Convection	175 sqft	414	-	175 sqft	253	-
Window Convection	24 sqft	162	-	24 sqft	277	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	175 sqft	353	-	175 sqft	259	-
Interior Wall Convection	549 sqft	1070	-	549 sqft	160	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	88 W	126	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	44 W	112	-	0 W	0	-
People Convection	8	672	2160	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3359	**2160**	**-**	**1283**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-07-03: 159 QUIET CAFE

	DESIGN COOLING - JULY 7:00			DESIGN HEATING		
	OA DB / WB 70.7 F / 68.1 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	210 sqft	468	-	210 sqft	327	-
Roof Convection	169 sqft	414	-	169 sqft	245	-
Window Convection	24 sqft	121	-	24 sqft	281	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	169 sqft	355	-	169 sqft	280	-
Interior Wall Convection	543 sqft	1130	-	543 sqft	160	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	85 W	122	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	42 W	108	-	0 W	0	-
People Convection	8	672	2160	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3390	**2160**	**-**	**1292**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone VAV-07-04: 158 QUIET CAFE

	DESIGN COOLING - JUNE 6:00			DESIGN HEATING		
	OA DB / WB 67.3 F / 65.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	133 sqft	281	-	133 sqft	198	-
Roof Convection	169 sqft	402	-	169 sqft	240	-
Window Convection	24 sqft	161	-	24 sqft	274	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	169 sqft	338	-	169 sqft	246	-
Interior Wall Convection	621 sqft	1116	-	621 sqft	142	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	85 W	122	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	42 W	108	-	0 W	0	-
People Convection	8	672	2160	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3201	**2160**	**-**	**1100**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone VAV-07-05: 157 INSTR MUSIC

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	960 sqft	1900	-	960 sqft	1550	-
Roof Convection	1054 sqft	2735	-	1054 sqft	1567	-
Window Convection	96 sqft	563	-	96 sqft	1123	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1054 sqft	2210	-	1054 sqft	1649	-
Interior Wall Convection	1565 sqft	2122	-	1565 sqft	419	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	527 W	761	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	422 W	1081	-	0 W	0	-
People Convection	25	1838	5125	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		13209	**5125**	**-**	**6308**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-08 (Admin Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Table 1. Heat Balance Loads for Zone VAV-08-01: 101A OFFICE/WAIT

	DESIGN COOLING - JULY 12:00			DESIGN HEATING		
	OA DB / WB 86.2 F / 72.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	329 sqft	290	-	329 sqft	19	-
Interior Wall Convection	1371 sqft	1102	-	1371 sqft	83	-
Ceiling Convection	329 sqft	542	-	329 sqft	224	-
Overhead Lighting Convection	164 W	237	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	493 W	1263	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3654	**615**	**-**	**326**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - OCTOBER 11:00			DESIGN HEATING		
	OA DB / WB 67.1 F / 63.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	369 sqft	705	-	369 sqft	595	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	72 sqft	777	-	72 sqft	817	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	465 sqft	877	-	465 sqft	706	-
Interior Wall Convection	1173 sqft	2272	-	1173 sqft	324	-
Ceiling Convection	465 sqft	1653	-	465 sqft	573	-
Overhead Lighting Convection	233 W	336	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	698 W	1785	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		8699	**820**	**-**	**3016**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-08-03: 101 SUP OFF

	DESIGN COOLING - SEPTEMBER 9:00			DESIGN HEATING		
	OA DB / WB 69.7 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	297 sqft	639	-	297 sqft	573	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	48 sqft	385	-	48 sqft	647	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	128 sqft	241	-	128 sqft	266	-
Interior Wall Convection	307 sqft	752	-	307 sqft	110	-
Ceiling Convection	128 sqft	465	-	128 sqft	183	-
Overhead Lighting Convection	64 W	92	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	192 W	491	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3286	**615**	**-**	**1779**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone VAV-08-04: 102 CARES OFFICE

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	157 sqft	188	-	157 sqft	7	-
Interior Wall Convection	735 sqft	640	-	735 sqft	25	-
Ceiling Convection	157 sqft	341	-	157 sqft	101	-
Overhead Lighting Convection	78 W	113	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	235 W	602	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2178	**820**	**-**	**133**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone VAV-08-05: 101C CONF

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	321 sqft	525	-	321 sqft	17	-
Interior Wall Convection	1073 sqft	1235	-	1073 sqft	39	-
Ceiling Convection	321 sqft	881	-	321 sqft	184	-
Overhead Lighting Convection	161 W	232	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	161 W	411	-	0 W	0	-
People Convection	12	882	2460	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4166	**2460**	**-**	**240**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone VAV-08-06: 101D-K OFFICES

	DESIGN COOLING - NOVEMBER 10:00			DESIGN HEATING		
	OA DB / WB 56.9 F / 56.9 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	802 sqft	1463	-	802 sqft	1313	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	120 sqft	1327	-	120 sqft	1392	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	660 sqft	1416	-	660 sqft	1088	-
Interior Wall Convection	2092 sqft	4557	-	2092 sqft	523	-
Ceiling Convection	660 sqft	2275	-	660 sqft	654	-
Overhead Lighting Convection	330 W	476	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	989 W	2532	-	0 W	0	-
People Convection	18	1323	3690	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		15370	**3690**	**-**	**4971**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone VAV-08-07: 103 CARES OFFICE

	DESIGN COOLING - SEPTEMBER 16:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	173 sqft	197	-	173 sqft	7	-
Interior Wall Convection	775 sqft	644	-	775 sqft	23	-
Ceiling Convection	173 sqft	329	-	173 sqft	75	-
Overhead Lighting Convection	87 W	125	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	260 W	665	-	0 W	0	-
People Convection	4	294	820	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2254	**820**	**-**	**105**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone VAV-08-08: 101H/F TEACHER WORK

	DESIGN COOLING - OCTOBER 15:00			DESIGN HEATING		
	OA DB / WB 75.0 F / 66.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	505 sqft	712	-	505 sqft	27	-
Interior Wall Convection	1381 sqft	1414	-	1381 sqft	52	-
Ceiling Convection	505 sqft	1180	-	505 sqft	225	-
Overhead Lighting Convection	253 W	365	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1427 W	3651	-	0 W	0	-
People Convection	9	603	1102	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		7926	**1102**	**-**	**303**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone VAV-08-09: C101 CORR

	DESIGN COOLING - NOVEMBER 11:00			DESIGN HEATING		
	OA DB / WB 60.0 F / 58.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	120 sqft	23	-	120 sqft	146	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	639 sqft	194	-	639 sqft	184	-
Interior Wall Convection	3617 sqft	1050	-	3617 sqft	140	-
Ceiling Convection	639 sqft	160	-	639 sqft	253	-
Overhead Lighting Convection	320 W	461	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	64 W	164	-	0 W	0	-
People Convection	1	74	205	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2125	**205**	**-**	**723**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone VAV-08-10: 106 CONF

	DESIGN COOLING - AUGUST 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	218 sqft	312	-	218 sqft	4	-
Interior Wall Convection	878 sqft	876	-	878 sqft	16	-
Ceiling Convection	218 sqft	468	-	218 sqft	21	-
Overhead Lighting Convection	109 W	157	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	109 W	279	-	0 W	0	-
People Convection	8	588	1640	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2680	**1640**	**-**	**41**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 11. Heat Balance Loads for Zone VAV-08-11: 107A EXAM

	DESIGN COOLING - SEPTEMBER 20:00			DESIGN HEATING		
	OA DB / WB 76.9 F / 68.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	141 sqft	159	-	141 sqft	189	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	115 sqft	108	-	115 sqft	167	-
Interior Wall Convection	493 sqft	340	-	493 sqft	57	-
Ceiling Convection	115 sqft	218	-	115 sqft	42	-
Overhead Lighting Convection	58 W	83	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	173 W	442	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1497	**410**	**-**	**455**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 12. Heat Balance Loads for Zone VAV-08-12: 107B EXAM

	DESIGN COOLING - NOVEMBER 14:00			DESIGN HEATING		
	OA DB / WB 64.8 F / 60.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	111 sqft	99	-	111 sqft	1	-
Interior Wall Convection	621 sqft	415	-	621 sqft	7	-
Ceiling Convection	111 sqft	197	-	111 sqft	3	-
Overhead Lighting Convection	56 W	80	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	167 W	426	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		1365	**410**	**-**	**11**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 13. Heat Balance Loads for Zone VAV-08-13: 107 MEDICAL

	DESIGN COOLING - SEPTEMBER 12:00			DESIGN HEATING		
	OA DB / WB 80.2 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	176 sqft	203	-	176 sqft	225	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	7 sqft	65	-	7 sqft	66	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	24 sqft	140	-	24 sqft	174	-
Floor Convection	549 sqft	644	-	549 sqft	481	-
Interior Wall Convection	1703 sqft	1314	-	1703 sqft	163	-
Ceiling Convection	549 sqft	1073	-	549 sqft	163	-
Overhead Lighting Convection	275 W	396	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	714 W	1828	-	0 W	0	-
People Convection	7	515	1435	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		6178	**1435**	**-**	**1272**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 14. Heat Balance Loads for Zone VAV-08-14: C102 CORR

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1250 sqft	662	-	1250 sqft	86	-
Interior Wall Convection	4577 sqft	2406	-	4577 sqft	268	-
Ceiling Convection	1249 sqft	456	-	1249 sqft	253	-
Overhead Lighting Convection	625 W	902	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	125 W	320	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4893	**410**	**-**	**607**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 15. Heat Balance Loads for Zone VAV-08-15: G100A OFFICE

	DESIGN COOLING - JUNE 8:00			DESIGN HEATING		
	OA DB / WB 69.2 F / 66.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	146 sqft	166	-	146 sqft	5	-
Interior Wall Convection	712 sqft	729	-	712 sqft	38	-
Ceiling Convection	146 sqft	267	-	146 sqft	12	-
Overhead Lighting Convection	73 W	105	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	218 W	559	-	0 W	0	-
People Convection	3	221	615	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2047	**615**	**-**	**55**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 16. Heat Balance Loads for Zone VAV-08-16: 201 STAFF LUNCH

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	198 sqft	294	-	198 sqft	257	-
Roof Convection	326 sqft	729	-	326 sqft	417	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	326 sqft	479	-	326 sqft	83	-
Interior Wall Convection	907 sqft	1231	-	907 sqft	166	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	163 W	235	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	652 W	1668	-	0 W	0	-
People Convection	8	552	960	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		5189	**960**	**-**	**923**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for RTU-08 (Admin Disp)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Zone Heat Balance Summary for RTU-09 (Media Overhead)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Table 1. Heat Balance Loads for Zone VAV-09-01,3: 252 LIBRARY

	DESIGN COOLING - SEPTEMBER 11:00			DESIGN HEATING		
	OA DB / WB 77.1 F / 68.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	2138 sqft	4999	-	2138 sqft	2672	-
Roof Convection	4081 sqft	11294	-	4081 sqft	5224	-
Window Convection	478 sqft	4079	-	478 sqft	3560	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	4080 sqft	10965	-	4080 sqft	1729	-
Interior Wall Convection	3334 sqft	5659	-	3334 sqft	1446	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	2040 W	2944	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	2040 W	5220	-	0 W	0	-
People Convection	85	5865	10200	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		51026	**10200**	**-**	**14632**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	232 sqft	418	-	232 sqft	146	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	232 sqft	259	-	232 sqft	13	-
Interior Wall Convection	911 sqft	828	-	911 sqft	115	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	116 W	167	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	464 W	1187	-	0 W	0	-
People Convection	4	276	480	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3136	**480**	**-**	**274**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone VAV-09-04: C200 CORR

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	100 sqft	52	-	100 sqft	69	-
Roof Convection	1328 sqft	990	-	1328 sqft	825	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	1602 sqft	875	-	1602 sqft	77	-
Interior Wall Convection	6121 sqft	3217	-	6121 sqft	694	-
Ceiling Convection	274 sqft	186	-	274 sqft	25	-
Overhead Lighting Convection	801 W	1156	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	160 W	410	-	0 W	0	-
People Convection	2	147	410	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		7033	**410**	**-**	**1690**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for MAU-01 (Kitch Hood)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Table 1. Heat Balance Loads for Zone 156 KITCHEN

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 80.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	640 sqft	8431	-	640 sqft	579	-
Roof Convection	3044 sqft	53373	-	3044 sqft	2514	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	3044 sqft	49160	-	3044 sqft	2168	-
Interior Wall Convection	4685 sqft	53216	-	4685 sqft	1040	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	1522 W	2196	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	188835 W	483248	-	0 W	0	-
People Convection	11	914	2905	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		650539	**2905**	**-**	**6301**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for Unit Heaters (Stairs, Vestibules)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Table 1. Heat Balance Loads for Zone CUH-01,10: S3-1 STAIR 3

	DESIGN COOLING - OCTOBER 9:00			DESIGN HEATING		
	OA DB / WB 59.7 F / 59.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1425 sqft	221	-	1425 sqft	2154	-
Roof Convection	320 sqft	-130	-	320 sqft	545	-
Window Convection	113 sqft	420	-	113 sqft	863	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	46 sqft	-104	-	46 sqft	422	-
Floor Convection	957 sqft	92	-	957 sqft	728	-
Interior Wall Convection	1877 sqft	-763	-	1877 sqft	1275	-
Ceiling Convection	637 sqft	-1	-	637 sqft	1	-
Overhead Lighting Convection	479 W	691	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	96 W	245	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-671		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**5987**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - JUNE 20:00			DESIGN HEATING		
	OA DB / WB 79.9 F / 69.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	722 sqft	-106	-	722 sqft	820	-
Roof Convection	741 sqft	-12	-	741 sqft	820	-
Window Convection	237 sqft	-222	-	237 sqft	1732	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	2239 sqft	-110	-	2239 sqft	923	-
Interior Wall Convection	3921 sqft	-2165	-	3921 sqft	1661	-
Ceiling Convection	1498 sqft	-15	-	1498 sqft	8	-
Overhead Lighting Convection	1119 W	1616	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	224 W	573	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	442		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**5964**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone CUH-03: 128 VEST

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	86 sqft	8	-	86 sqft	129	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	152 sqft	-360	-	152 sqft	1077	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	196 sqft	4	-	196 sqft	493	-
Interior Wall Convection	592 sqft	115	-	592 sqft	478	-
Ceiling Convection	196 sqft	177	-	196 sqft	309	-
Overhead Lighting Convection	98 W	141	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	20 W	50	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-136		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**2486**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone CUH-04,12: S1-1 STAIR 1

	DESIGN COOLING - NOVEMBER 10:00			DESIGN HEATING		
	OA DB / WB 56.9 F / 56.9 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	587 sqft	3723	-	587 sqft	759	-
Roof Convection	377 sqft	-207	-	377 sqft	495	-
Window Convection	114 sqft	-36595	-	114 sqft	829	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	46 sqft	1524	-	46 sqft	395	-
Floor Convection	1131 sqft	-602	-	1131 sqft	549	-
Interior Wall Convection	3053 sqft	31874	-	3053 sqft	1907	-
Ceiling Convection	754 sqft	0	-	754 sqft	0	-
Overhead Lighting Convection	565 W	816	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	113 W	289	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-822		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**4934**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone CUH-05: 109 VEST

	DESIGN COOLING - OCTOBER 9:00			DESIGN HEATING		
	OA DB / WB 59.7 F / 59.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	55 sqft	-11	-	55 sqft	73	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	72 sqft	44	-	72 sqft	497	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	109 sqft	0	-	109 sqft	235	-
Interior Wall Convection	495 sqft	-13	-	495 sqft	321	-
Ceiling Convection	109 sqft	-62	-	109 sqft	124	-
Overhead Lighting Convection	54 W	78	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	11 W	28	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-64		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**1251**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone CUH-06,13: S2-1 STAIR 2

	DESIGN COOLING - DECEMBER 9:00			DESIGN HEATING		
	OA DB / WB 41.4 F / 41.4 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	1420 sqft	-23426	-	1420 sqft	2179	-
Roof Convection	324 sqft	-229	-	324 sqft	561	-
Window Convection	130 sqft	42088	-	130 sqft	978	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	46 sqft	-204	-	46 sqft	413	-
Floor Convection	971 sqft	1	-	971 sqft	736	-
Interior Wall Convection	1894 sqft	-18572	-	1894 sqft	1335	-
Ceiling Convection	647 sqft	0	-	647 sqft	0	-
Overhead Lighting Convection	486 W	701	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	97 W	248	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-607		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**6202**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone CUH-07: 160 VEST

	DESIGN COOLING - APRIL 6:00			DESIGN HEATING		
	OA DB / WB 51.3 F / 51.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	110 sqft	-3	-	110 sqft	147	-
Roof Convection	113 sqft	-25	-	113 sqft	209	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	46 sqft	-33	-	46 sqft	395	-
Floor Convection	113 sqft	30	-	113 sqft	251	-
Interior Wall Convection	466 sqft	-23	-	466 sqft	278	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	56 W	81	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	11 W	29	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-56		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**1280**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone CUH-08,9: 172 VEST

	DESIGN COOLING - MAY 6:00			DESIGN HEATING		
	OA DB / WB 60.3 F / 60.3 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	301 sqft	1	-	301 sqft	576	-
Roof Convection	68 sqft	-1	-	68 sqft	166	-
Window Convection	238 sqft	30	-	238 sqft	1883	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	352 sqft	7	-	352 sqft	1023	-
Interior Wall Convection	565 sqft	-4	-	565 sqft	541	-
Ceiling Convection	284 sqft	-17	-	284 sqft	673	-
Overhead Lighting Convection	176 W	254	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	35 W	90	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-360		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**4862**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone UH-01: 149C WATER ENTRY

	DESIGN COOLING - JANUARY 0:00			DESIGN HEATING		
	OA DB / WB 29.8 F / 29.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	157 sqft	-111	-	157 sqft	116	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	252 sqft	-67	-	252 sqft	281	-
Interior Wall Convection	847 sqft	-326	-	847 sqft	132	-
Ceiling Convection	252 sqft	0	-	252 sqft	0	-
Overhead Lighting Convection	126 W	182	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	126 W	322	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**529**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone UH-04,5: 250 MECHANICAL ROOM

	DESIGN COOLING - MARCH 9:00			DESIGN HEATING		
	OA DB / WB 46.7 F / 46.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 85.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	534 sqft	-291	-	534 sqft	360	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	24 sqft	-3	-	24 sqft	110	-
Floor Convection	1823 sqft	-850	-	1823 sqft	119	-
Interior Wall Convection	2365 sqft	-1071	-	2365 sqft	264	-
Ceiling Convection	1823 sqft	-1424	-	1823 sqft	208	-
Overhead Lighting Convection	911 W	1315	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	911 W	2332	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	-8		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		0	**0**	**-**	**1061**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance Summary for Ductless Coolig Units (Elec, Data, EMR)

(In Alternative: Design Building)

Project: Wilmington ES(6.4) 09/18/2026

Prepared by: GGD Consulting Engineers 8:28 AM

Table 1. Heat Balance Loads for Zone DCUe-01,2: 149 MAIN ELEC

	DESIGN COOLING - JUNE 19:00			DESIGN HEATING		
	OA DB / WB 83.0 F / 70.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	493 sqft	588	-	493 sqft	362	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	7 sqft	52	-	7 sqft	50	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	24 sqft	128	-	24 sqft	110	-
Floor Convection	1710 sqft	2346	-	1710 sqft	644	-
Interior Wall Convection	3382 sqft	5585	-	3382 sqft	505	-
Ceiling Convection	1710 sqft	3881	-	1710 sqft	267	-
Overhead Lighting Convection	450 W	649	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	8992 W	23012	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		36241	**0**	**-**	**1937**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	208 sqft	620	-	208 sqft	1	-
Interior Wall Convection	868 sqft	2173	-	868 sqft	16	-
Ceiling Convection	208 sqft	1084	-	208 sqft	5	-
Overhead Lighting Convection	104 W	150	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	4167 W	10664	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		14692	**0**	**-**	**22**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 3. Heat Balance Loads for Zone DCUe-04: 248 ELEC

	DESIGN COOLING - JULY 21:00			DESIGN HEATING		
	OA DB / WB 80.7 F / 71.1 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	241 sqft	405	-	241 sqft	4	-
Interior Wall Convection	976 sqft	1586	-	976 sqft	46	-
Ceiling Convection	240 sqft	702	-	240 sqft	7	-
Overhead Lighting Convection	120 W	174	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	2406 W	6158	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		9023	**0**	**-**	**56**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 4. Heat Balance Loads for Zone DCUe-05: 225 ELEC

	DESIGN COOLING - SEPTEMBER 18:00			DESIGN HEATING		
	OA DB / WB 82.1 F / 70.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	78 sqft	95	-	78 sqft	0	-
Interior Wall Convection	547 sqft	569	-	547 sqft	4	-
Ceiling Convection	78 sqft	164	-	78 sqft	1	-
Overhead Lighting Convection	39 W	57	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	785 W	2008	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2893	**0**	**-**	**5**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 5. Heat Balance Loads for Zone DCUe-06: 205 ELEC

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	113 sqft	251	-	113 sqft	69	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	113 sqft	161	-	113 sqft	5	-
Interior Wall Convection	633 sqft	782	-	633 sqft	62	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	57 W	82	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1133 W	2901	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4177	**0**	**-**	**136**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 6. Heat Balance Loads for Zone DCUe-07: 328 ELEC

	DESIGN COOLING - JULY 19:00			DESIGN HEATING		
	OA DB / WB 86.0 F / 72.6 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	114 sqft	247	-	114 sqft	65	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	114 sqft	148	-	114 sqft	3	-
Interior Wall Convection	645 sqft	780	-	645 sqft	35	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	57 W	82	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1137 W	2911	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4168	**0**	**-**	**103**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 7. Heat Balance Loads for Zone DCUe-08: 131 ELEV MACH

	DESIGN COOLING - JULY 23:00			DESIGN HEATING		
	OA DB / WB 76.9 F / 70.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	79 sqft	96	-	79 sqft	0	-
Interior Wall Convection	540 sqft	556	-	540 sqft	2	-
Ceiling Convection	79 sqft	163	-	79 sqft	0	-
Overhead Lighting Convection	39 W	57	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	786 W	2011	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		2883	**0**	**-**	**2**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 8. Heat Balance Loads for Zone DCUe-09: 301 ELEC

	DESIGN COOLING - SEPTEMBER 15:00			DESIGN HEATING		
	OA DB / WB 85.0 F / 71.0 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	98 sqft	191	-	98 sqft	58	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	98 sqft	166	-	98 sqft	4	-
Interior Wall Convection	580 sqft	1004	-	580 sqft	53	-
Ceiling Convection	0 sqft	0	-	0 sqft	0	-
Overhead Lighting Convection	49 W	70	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	976 W	2498	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3929	**0**	**-**	**115**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 9. Heat Balance Loads for Zone DCUe-10: 122 ELEC

	DESIGN COOLING - JUNE 18:00			DESIGN HEATING		
	OA DB / WB 85.1 F / 71.2 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	110 sqft	148	-	110 sqft	0	-
Interior Wall Convection	644 sqft	741	-	644 sqft	2	-
Ceiling Convection	110 sqft	245	-	110 sqft	0	-
Overhead Lighting Convection	55 W	79	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1097 W	2807	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		4021	**0**	**-**	**2**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Table 10. Heat Balance Loads for Zone DCUe-11: 220 IDF

	DESIGN COOLING - AUGUST 20:00			DESIGN HEATING		
	OA DB / WB 82.9 F / 71.8 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	101 sqft	141	-	101 sqft	0	-
Interior Wall Convection	596 sqft	657	-	596 sqft	3	-
Ceiling Convection	101 sqft	246	-	101 sqft	1	-
Overhead Lighting Convection	51 W	73	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	1011 W	2587	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3704	**0**	**-**	**5**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Table 11. Heat Balance Loads for Zone DCUe-12: 234 IDF

	DESIGN COOLING - AUGUST 17:00			DESIGN HEATING		
	OA DB / WB 89.8 F / 73.7 F			OA DB / WB 0.0 F / 0.0 F		
	OCCUPIED T-STAT 75.0 F			OCCUPIED T-STAT 70.0 F		
Zone Heat Balance Component	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**	**Details**	**Sensible [BTU/hr]**	**Latent [BTU/hr]**
Exterior Wall Convection	0 sqft	0	-	0 sqft	0	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	0 sqft	0	-	0 sqft	0	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	95 sqft	118	-	95 sqft	0	-
Interior Wall Convection	581 sqft	624	-	581 sqft	4	-
Ceiling Convection	95 sqft	211	-	95 sqft	2	-
Overhead Lighting Convection	48 W	69	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	953 W	2440	-	0 W	0	-
People Convection	0	0	0	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0		-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
		3461	**0**	**-**	**6**	**0**
Key:	**Positive values are cooling loads Negative values are heating loads**			**Positive values are heating loads Negative values are cooling loads**		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

SECURITY AND VISUAL ACCESS REQUIREMENTS N

SECURITY AND VISUAL ACCESS REQUIREMENTS

The safety and security strategy for the Wilmington Elementary School continues to build upon the multi-layered approach established during the previous phase. The design team has met with and will continue to be advised by several members of the District's emergency response network, including the Superintendent of Schools, the Town Public Buildings Superintendent, the District's security advisor (CISA), and Wilmington public safety officials. These meetings have reviewed topics such as access to the site, entry points to the building, safety glazing strategies, and electronic access control systems to inform the building design. The design team will continue to coordinate with the District, security consultants, and public safety officials to refine the specific technology systems and operational protocols associated with the building's safety and security infrastructure.

The District has established emergency procedures for each school within Wilmington Public Schools, which will be further refined and customized for the opening of the new facility. The building design supports these operational protocols through building layout, site organization, and the integration of appropriate technology infrastructure.

Site Security Strategy

Security and visual access for the proposed facility are addressed through a layered strategy that integrates passive architectural design principles with active security technologies. The site and building design incorporate principles of Crime Prevention Through Environmental Design (CPTED), including territorial reinforcement, natural access control, and natural surveillance.

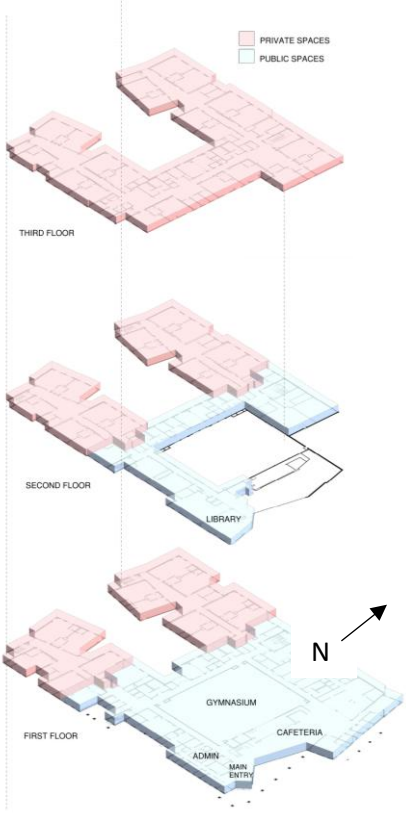


Figure: Site plan showing territorial reinforcement and natural surveillance

Territorial reinforcement is achieved through the use of fencing, sidewalks, landscaping, and site signage that clearly define the school property and reinforce the distinction between public and secured areas of the campus. Strategically located vehicular gates, crash-rated fences and site circulation strategies help control access to portions of the site at certain times. Landscaping elements

and site features such as bollards, benches, and planters are integrated into the design to prevent vehicular access to pedestrian areas while maintaining a welcoming and cohesive site environment.

Natural access control strategies guide visitors toward the primary entrance while minimizing access to other entry points. Pedestrian paths, entry drives, drop-off areas, and the entry plaza are organized to lead visitors to the clearly identifiable main entrance, which serves as a focal point of the site. Vehicular access to the perimeter of the building is maintained to provide multiple locations for emergency responders to access the facility.



Main Entry Design and Exterior Doors and Windows

The building incorporates a secure main entry sequence consisting of an exterior video intercom and controlled entry doors that lead to a secure vestibule with a check-in window for visitor verification prior to entry into the building. Intrusion-resistant glazing is incorporated at the entrance to enhance protection while maintaining transparency. The fire alarm control panel will be located within the main entrance vestibule to support visibility and access for emergency responders.

Exterior doors are equipped with automatic locking hardware and programmable card reader access, allowing faculty and staff to enter the building while enabling the District to monitor and control entry points. All exterior doors and windows will be clearly numbered and coordinated with building plans and fire alarm documentation provided to local police and fire departments to assist first responders in locating specific areas of the building quickly during an emergency. Knox boxes are located in coordination with the fire department.

Figure: Graphic showing separation of public and private spaces

Instructional Spaces and Visibility

Natural surveillance is reinforced through building orientation and space planning. The administration offices are prominently located at the front of the school, providing visual oversight of the main entry drive, playground and sports field, parking areas, and building entrance. Classroom windows provide views to exterior courtyards and play areas, while low shrubs and carefully maintained landscaping maintain clear sightlines to building entries and parking areas. Selective interior glazing between classrooms and adjacent learning spaces supports visibility and supervision while fostering an open

and inclusive educational environment. Shading devices at interior glazing and exterior windows allow visual connectivity to be reduced when necessary during shelter-in-place situations.

Mechanical access control and surveillance systems support and enhance these passive design strategies. Security cameras are planned throughout the interior of the school and around the perimeter of the building, providing coverage of entrances, circulation areas, playgrounds, and shared spaces such as the library, gymnasium, and cafeteria. Infrastructure will also be provided to support additional future cameras in if needed. Additional security systems planned are intrusion alarms and a mass notification system with both audible and visual messaging capabilities. Emergency panic buttons located in the main office and key administrative areas will provide silent communication directly with emergency responders. Access to restricted areas within the building will be managed through the card-based access control system.

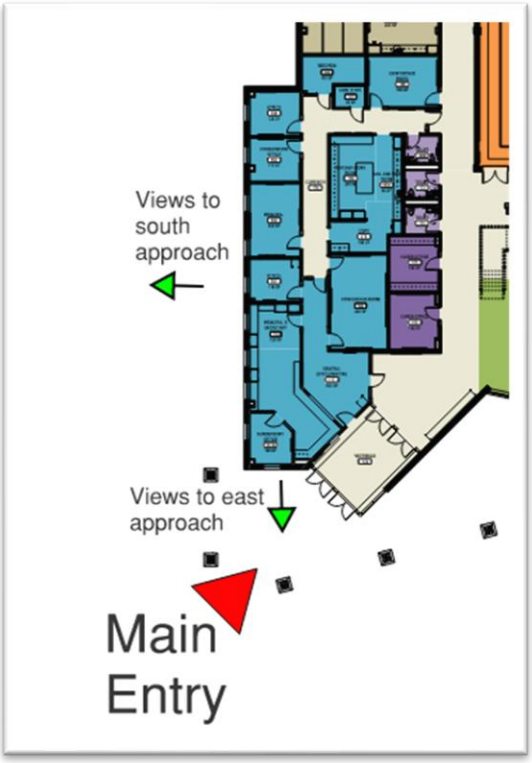


Figure: Cropped area of floor plan at Main Entry – showing views and secure vestibule

Doors and Hardware

Additional design strategies support emergency preparedness and response, including limiting the number of exterior doors while maintaining code-required egress, classroom lockset hardware that allows doors to be locked quickly from the inside, and egress planning that supports efficient evacuation protocols. Classroom locket hardware functions are compatible with the district's protocols related to lockdown.

Through the integration of these passive and active security strategies, the proposed Wilmington Elementary School will provide a safe, secure, and welcoming facility that supports the educational mission of the district while serving as an important community resource. Specific security systems and operational protocols will continue to be refined in coordination with the District and public safety partners as the project progresses through the Construction Documents phase.

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FACILITY MAINTENANCE REQUIREMENTS

Dore + Whittier has held ongoing meetings with maintenance staff at both the elementary school and district level throughout all design phases. In addition, the Town's Public Buildings Superintendent participates actively in the Leadership Group and School Building Committee meetings. Additional meetings to review specific details of custodial and maintenance spaces have included custodial and grounds staff to ensure practical and operational needs are addressed.

High durability, longevity, and resistance to abuse have been prioritized in selecting finishing materials. Terrazzo, linoleum flooring, and wainscoting have been incorporated in high-traffic areas to support long-term performance and minimize maintenance needs.

Training

Given the complexity of the proposed building systems, comprehensive training is essential for effective operation and long-term performance. Training methods and minimum hours are outlined in the project specifications and include both in-person and video-recorded sessions in accordance with Dore + Whittier standards. In-person training will be coordinated with the Owner as part of the project closeout and building turnover process.

- End users (teachers, administrators, and staff) will receive training on the day-to-day operation of systems such as lighting controls, communication systems, and classroom technology.
- Administrators and facilities personnel will receive advanced training on programmed systems, including building security, emergency operations, lighting management, and motorized window shades.
- Facilities staff will also be trained in proper cleaning methods using approved green products, ongoing maintenance procedures, and the use of the Building Management System (BMS) to monitor and report on plumbing, HVAC, and electrical systems for proactive facility management.

HVAC and Building Management Systems

HVAC systems are complex, and the District recognizes the need for properly trained personnel and professional service providers for routine maintenance. The building automation system ensures compliance with energy codes while allowing efficient operation.

An automation consultant is part of the project team, acting as a liaison between the Owner, controls contractor, mechanical engineer, commissioning agent, and facilities staff. During Construction Documents, they will meet with facilities staff to review the sequence of operations, zones, and intended functionality.

Lighting Fixtures and Controls

The maintenance staff are familiar with contemporary electrical systems and have requested lighting controls be intuitive and user-friendly. The design team will continue to review proposed lighting and controls with facilities personnel to ensure ease of use while meeting code requirements, daylighting, occupancy sensing, and scheduled lighting for common and exterior areas.

Cleaning and General Maintenance

Flooring materials are selected for durability and ease of maintenance. Weekly cleaning will utilize ride-on floor scrubbers, with dry mopping as needed. No flooring requires stripping or waxing.

Small custodial rooms are located throughout the building, each equipped with mop basins, storage for cleaning products and equipment, and water access. A “back-of-house” hub adjacent to the kitchen includes receiving, central storage, recycling/trash, and custodial office. This hub is strategically located near the main mechanical and electrical rooms for efficient monitoring and maintenance of the facility.

Plumbing Systems

Facility staff identified preferred plumbing fixtures during design review. Auto-flush toilets and sensor faucets are provided in all bathrooms, with manually operated faucets elsewhere. Irrigation systems are provided for the natural turf athletic areas. Fixture selection and operation will be revisited during the Construction Documents phase.

Roof Access

The low-slope membrane roof supports rooftop HVAC units, plumbing vents, exhaust fans, and drains. The design provides:

- Stair access to the roof level per District request
- Ship’s ladder access at the maintenance/receiving area
- Vertical ladders connecting roof levels for continuous access
- Walk mats leading from ladders to equipment and roof areas for safety

This arrangement ensures safe and efficient access for maintenance, inspection, and operational needs.

QUALITY CONTROL NARRATIVE

SUMMARY

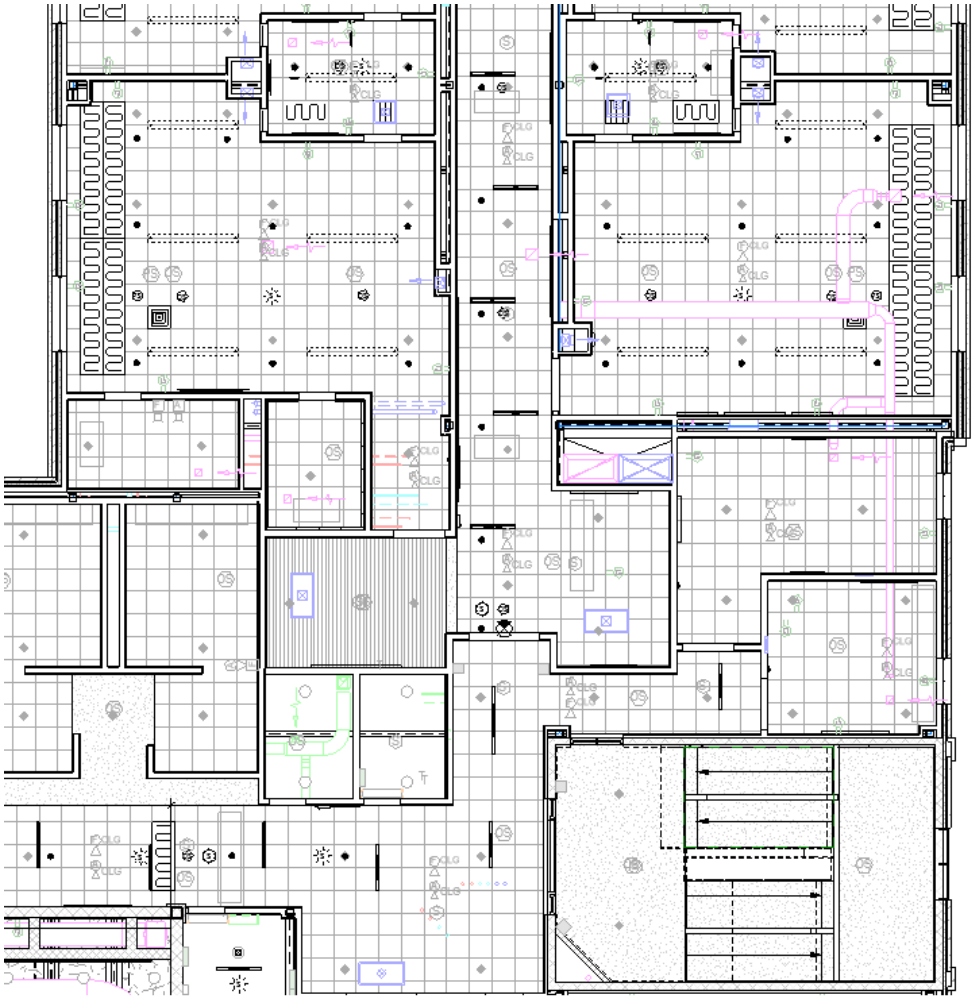
Dore + Whittier Architects and our consultants utilize various coordination and quality control measures throughout the design process. Most prevalent is use of BIM (Building Information Modeling) to coordinate the building, systems, infrastructure and equipment in one cohesive digital environment. The use of digital media augments more conventional teleconferencing as well as face to face meetings as the project progresses to provide complete and coordinated documents. Additionally, every project at D+W has an Operations Director assigned to specifically serve in a Quality Assurance / Quality Control oversight capacity. These individuals are senior staff tasked with reviewing documents for coordination, code and accessibility compliance, and compliance with bidding and regulatory requirements.

PROJECT SPECIFIC QA / QC INITIATIVES

1. **Ceiling Clearances and Coordination:** In order to allow for adequate space for all the above-ceiling systems and equipment, a floor-to-floor / floor-to-roof deck height of 14'-8" at all levels is provided. Ceilings in some public spaces – such as the Cafeteria and Media Center – will be higher. The Gym and some back-of-house spaces will incorporate exposed mechanical and structural components.

   Dore + Whittier develops BIM models using "live linking" with all major consulting engineers. Meaning that Architectural, Structural, Mechanical, Electrical, Fire Protection, and Plumbing team members are, effectively, working in the same model and seeing changes in real time. Architectural ceiling plans are developed and populated with equipment while continued development with MEPFP consultants is ongoing. This allows the team to see which components have been added to consultant models and where they may conflict with the architectural design intent. The view below is an example of conditions where modeled elements (consultant items in pink, blue, or green vs. architectural items in black) are not yet coordinated; these issues would be noted and discussed during coordination meetings through the duration of the project.

   Model conflict reports are developed at later phases of the project to pick up smaller, less obvious conflicts between ducts, piping, and beams that would be obscured from a strictly visual review.



2. **UTILITY ROOM AND MECHANICAL SHAFT SIZES:** Utility room sizes and locations were coordinated during Schematic Design with the MEPFP and Technology consultants. Proposed equipment layouts have been developed by consultants, service clearances and access needs have been confirmed, and piping strategies have been planned and discussed. Shafts and chases for ductwork, piping, and principal electrical routing have been located and sized based on the current coordination with the appropriate consultants.

3. **COORDINATION OF SPECIFICATIONS AND DRAWINGS:** Refer to narrative below.

4. **TRADE CONTRACTOR SUB-BID WORK:** The specifications include Trade Contractor Sub-bid Summary sections enumerating the Trade Contractor Sub-bid scopes of work, such that they can be clearly identified and accounted for and all parties understand who is responsible for the respective scopes of work. These summaries will continue to be developed as specific scoping requirements are incorporated.

5. **Scheduling:** Scheduled items in the drawings are typically generated through BIM software (Revit). Project components such as doors have parameters which are edited when the elements are added to the model; when these components are scheduled, the specified parameters reflect the assigned characteristics of each scheduled item. If the parameters of a component are edited as the project develops, its scheduled characteristics are updated automatically as they change.

6. **Equipment and Power:** At this stage in the project, all major pieces of mechanical equipment have been located on the plans. Ongoing coordination with ducts, terminations and coordination between disciplines is in progress. Power connections serving these major pieces of equipment are shown on Electrical drawings.

7. **Existing and New Construction:** The new school building will be constructed on the same site as the existing building. Coordination of existing and new construction entails ensuring that all existing school operations and utilities will be maintained while the new school is constructed, and the site is developed. Existing utilities have been identified and project phasing is being developed to ensure that these services are maintained.

8. **Phasing:** The project will require phasing of construction operations to allow the new school to be constructed while the existing school continues to operate on the same site. To this end, three major project phases are being developed, with sub-phases to coordinate sequencing within phases. The first phase consists of mobilization, temporary utility work required to maintain operation of the existing school building during construction, and site clearing and preparation for building and utility construction. The second phase consists of the new building and associated utility construction, while maintaining operation of the existing school building. Following relocation of the students and staff to the new school, the third phase consists of the demolition of the existing school building and the construction of the remainder of the site.

DRAWINGS & SPECIFICATIONS COORDINATION AND QC OVERSIGHT

Drawing documentation through BIM provides several distinct advantages over traditional drafting methods:

- In contrast to AutoCAD or hand drafting, project creation in BIM involves building a three-dimensional digital model of the building using actual sizes of architectural materials and elements, equipment, ductwork, piping, and structural elements.
- All consultants build their respective systems withing the same model environment, which is shared and referenced across the project team.

- Major consulting engineers are “live linking” in the same model. Backgrounds are shared with all other consultants on a regular basis.
- AutoCAD backgrounds by non-Revit using consultants are also exported weekly.
- Monitoring features within the software allow each consultant to be alerted when specific model content related to their work changes. These alerts provide specific locations to project team members, so that they can evaluate what response is appropriate to each situation.

Collaboration within the model and virtual ownership of various building elements (walls, columns, floor slabs, plumbing fixtures, etc.) is complex and requires close coordination, particularly with MEPFP equipment and devices that are exposed to view, such as light fixtures, speakers, and other terminal electrical devices. To clarify roles and responsibilities by each team member, Dore + Whittier creates a BIM Implementation Plan for each project. This plan defines the following:

- Identification of milestone deadlines throughout the design process, and specific deliverables at each milestone.
- Identification of project team leaders within each design consultant firm, and their respective project responsibilities.
- Identification of specific physical building content and features required to be fully modeled (as opposed to represented with drafting elements or linework).
- Identification of specific models planned for use throughout the project, including the central “working” models for each design discipline, coordination, energy usage, construction, and record models. Each model type has specific requirements for linking consultant information to prepare the required data output, so procedures may vary for each planned use of the model data.
- Identification of authorship and ownership for each type of model content, and how they are to be linked or monitored across models. Some content is driven by the architecture, such as initial floor slabs, suggested column locations, and plumbing fixture layouts. Once developed to a degree of reliability, those features are handed off to the consultant who becomes the owner of that item. These hand-offs happen at various points of the project.
- Identification of procedures for the exchange of and collaboration on models, and expectations of each consultant. Each consultant is required to continuously coordinate their work with all other design disciplines and eliminate conflicts as they are encountered during design.
- Identification of the preferred project team workflow for each phase of the design process.
- Identification of the procedures and practices to document the building as construction progresses to maintain up to date 3D model data for any revisions.

Project details are also created in Revit and, although typically drafted using 2D components, they are drafted over live views of actual modeled content; this live view serves as an underlay to the detail, and if any model content changes or shifts, the change in condition is immediately apparent to the drafter or reviewer.

In addition to these procedures, Dore + Whittier also conducts our own in-house third-party review of the documents to assure proper architectural technology is being exercised that BIM software will not evaluate. This evaluation is conducted by the most experienced Dore + Whittier staff members and includes categories such as proper use of flashings, roofing systems, exterior wall technology as well as building code and accessibility and procurement regulations. This review occurs throughout the design process as new drawing content is created, with comments being returned to the project team on a daily or weekly basis. The project reviewers attend regular project meetings to keep up to date with design and programming information and guide the process.

Specifications are created using RIB SpecLink (RIB) software. This software maintains a single database of all project-related specifications. BSD provides regular updates to the master specifications to maintain a current database that reflects current trends in product technologies and changes in the manufacturer sources. These updates are provided quarterly and are automatically incorporated into all project specifications.

RIB allows smart linking of information within a specification section or between related sections so that when changes are made to one section, required changes in related work in other sections are either automatically made, or alerted to the specification writer. RIB also allows the modeled content in the BIM to link to the specifications and reference specific products that are included in the model.

The RIB software is customizable, allowing the introduction of notes for specific sections to provide coordination reminders to the writer, including content or annotation that should appear on drawings, why specific features are included, etc. These notes are used to help build a project checklist for specification coordination.

In addition to leveraging the technical features of RIB, all project specifications are prepared by our in-house dedicated spec writer in coordination with the Project Manager, Project Architect, Job Captain, and Interior Designer. The same in-house third-party reviewers that review the drawing content also review the specifications for quality and coordination with the drawings. Like drawing review, specification sections are reviewed as they are prepared, and regular meetings occur with the project staff to confirm scope and discuss coordination between specifications and drawing content.

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SPACE SUMMARY

Signed Copies of the Educational Space Summary

Overview

The space summary on the following pages contains an itemization of the proposed spaces needed to deliver the District's educational program for grades PreK-5 using the MSBA's elementary space summary template.

The District and the Design Team worked together to align proposed spaces with MSBA square footage guidelines for individual program areas and the total gross square footage to the greatest extent possible. Some deviations were necessary either to accommodate building geometry and/or MEP/Structural coordination, or to improve functionality as it relates the District's educational program. These revisions are explained in more detail on the pages following the space summary.

Dore + Whittier's 90% Construction Document drawings and the updated space summary demonstrate the successful implementation and integration of the educational program. The total gross square footage remains the same as was developed at schematic design. Deviations from the schematic design submission are due to on-going input from end users and adjustments resulting from design efforts and refinement of mechanical chases, structural framing, plumbing chases, and other design development refinements. The essence of the overall building planning and individual spatial relationships have remained intact.

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Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
CORE ACADEMIC	**45,245**			**0**			**47,531**			**47,531**			**13,481**			**34,050**	STE Guidelines Policy
(List rooms of different sizes separately)																	
Kindergarten Classroom with Toilet				0	varies	7	8,088	varies	7	8,088	varies	0	-312	1,200	7	8,400	1,100 NSF (minimum size) - 1,300 NSF (maximum size); Minimum of (2) sinks required per Kindergarten Classroom
Rm. 137 + 137A					1,153												
Rm. 138 + 138A					1,156												
Rm. 139 + 139A					1,158												
Rm. 140 + 140B					1,159												
Rm. 141 + 141A					1,152												
Rm. 144 + 143A					1,156												
Rm. 145 + 145A					1,154												
General Classroom (Grades 1-6)				0		30	27,025	varies	30	27,025	varies	3	1,375	950	27	25,650	900 NSF (minimum size) - 1,000 NSF (maximum size); Minimum of (2) sinks required per General Classroom
Rm. 209					900												
Rm. 210					900												
Rm. 214					900												
Rm. 216					900												
Rm. 217					900												
Rm. 218					902												
Rm. 236					900												
Rm. 237					900												
Rm. 238					900												
Rm. 239					900												
Rm. 244					900												
Rm. 245					900												
Rm. 306					900												
Rm. 307					900												
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Rm. 332					900												
Rm. 333					900												
Rm. 337					900												
Rm. 338					900												
Rm. 341					900												
Rm. 342					900												
Rm. 344					905												
Rm. 347					905												
Rm. 351					910												
Rm. 352					900												
Science, Technology, Engineering (STE) Room (Grades 3-6) Rm. 206				0	1,080	1	1,080	1,080	1	1,080	0	1	1,080	1,080	0	-	1,080 NSF (minimum size); Refer to the 2018 STE Guidelines for additional information.
STE Storage Room - Rm. 206A				0	120	1	120	120	1	120	0	1	120	120	0	-	Minimum of (1) 120 NSF STE Storage Room required per STE Room; Refer to the 2018 STE Guidelines for additional information.
ELL Classroom				0			885	varies	0	885	varies	0	885				
RM 146					446	1				0							
RM 339					439	1				0							
Teacher Collaboration				0			2,674	varies	0	2,674	varies	0	2,674				
Rm 129					886	1		varies	1	0			0				
Rm 228					894	1		varies	1	0			0				
Rm 322					894	1		varies	1	0			0				
Extended Learning K																	
Rm. E139				0	40	1	40	40	1	40	40	1	40				
Rm. E140				0	159	1	159	159	1	159	159	1	159				
Rm. E141				0	123	1	123	123	1	123	123	1	123				
Rm. E138				0	170	1	170	170	1	170	170	1	170				
Rm. E136				0	152	1	152	152	1	152	152	1	152				

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
Rm. E145				0	77	1	77	77	1	77	77	1	77				
Extended Learning 1st-5th																	
Rm. E216				0	56	1	56	56	1	56	56	1	56				
Rm. E215				0	249	1	249	249	1	249	249	1	249				
Rm. E214				0	164	1	164	164	1	164	164	1	164				
Rm. E217				0	298	1	298	298	1	298	298	1	298				
Rm. E219				0	208	1	208	208	1	208	208	1	208				
Rm. E238				0	39	1	39	39	1	39	39	1	39				
Rm. E239				0	275	1	275	275	1	275	275	1	275				
Rm. E240				0	162	1	162	162	1	162	162	1	162				
Rm. E237				0	256	1	256	256	1	256	256	1	256				
Rm. E245				0	152	1	152	152	1	152	152	1	152				
Rm. E235				0	171	1	171	171	1	171	171	1	171				
Rm. E315				0	360	1	360	360	1	360	360	1	360				
Rm. E347				0	359	1	359	359	1	359	359	1	359				
Rm. E312				0	43	1	43	43	1	43	43	1	43				
Rm. E311				0	255	1	255	255	1	255	255	1	255				
Rm. E310				0	164	1	164	164	1	164	164	1	164				
Rm. E313				0	229	1	229	229	1	229	229	1	229				
Rm. E332				0	42	1	42	42	1	42	42	1	42				
Rm. E333				0	306	1	306	306	1	306	306	1	306				
Rm. E334				0	180	1	180	180	1	180	180	1	180				
Rm. E331				0	309	1	309	309	1	309	309	1	309				
Rm. E329				0	137	1	137	137	1	137	137	1	137				
Rm. E338				0	50	1	50	50	1	50	50	1	50				
Rm. E341				0	483	1	483	483	1	483	483	1	483				
Reading Specialists				0			0			0	0	0	0				
RM 142				0	200	1	200	200	1	200			200				
RM 212				0	199	1	199	199	1	199			199				
RM 241				0	207	1	207	207	1	207			207				
RM 308				0	200	1	200	200	1	200			200				
RM 321				0	195	1	195	195	1	195			195				
RM 335				0	200	1	200	200	1	200			200				
Math Tutors				0			0	0	0	0	0	0	0				
RM 147				0	198	1	198	198	1	198			198				
RM 226				0	196	1	196	196	1	196			196				
RM 340				0	196	1	196	196	1	196			196				
RM 348				0	200	1	200	200	1	200			200				

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
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ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
SPECIAL EDUCATION	**9,553**			**0**			**19,033**			**19,033**			**9,973**			**9,060**	Special Education spaces require DESE review and approval.
(List rooms of different sizes separately)																	
Self-Contained Special Education Classroom				0	varies	10	9,626	Varies	10	9,626	Varies	-2	3,926	950	6	5,700	900 NSF (minimum size) - 1,300 NSF; equal to the size of the proposed General Classrooms that serve the same student population.
Strides Program PK-K				0				0	0								
Rm 113					1,100	1											
Rm 120					1,100	1											
Rm 136					1,100	1											
Strides Program 1st-2nd				0				0	0								
Rm 235					900	1											
Strides Program 3rd-5th				0				0	0								
Rm 329					900	1											
Rm 346					926	1											
Stages Program 1st-2nd - Rm 219				0	900	1		900	1								
Stages Program 3rd-5th - Rm 315				0	900	1		900	1								
Language-Based Program 1st-2nd - Rm 240				0	900	1		900	1								
Language-Based Program 3rd-5th - Rm 334				0	900	1		900	1								
Self-Contained Special Education Toilet Room				0		8	835	varies	8	835	varies	26	475	60	6	360	
Strides Program PK-K Toilet				0													
Rm 113A					104	1											
Rm 120B					104	1											
Rm 136C					111	1											
Strides Program 1st-2nd Toilet - Rm 235B				0	116	1											
Strides Program 3rd-5th Toilet - Rm 329B				0	113	1											
Rm 346A					114	1											
Stages Program 1st-2nd Toilet - Rm 219A				0	87	1											
Stages Program 3rd-5th Toilet - Rm 315A				0	86	1											
Learning Center				0		6	1,202	varies	6	1,202	varies	2	-798	500	4	2,000	1/2 size of a General Classroom
Rm 143					200	1											
Rm 213					198	1											
Rm 242					208	1											
Rm 303					198	1											
Rm 309					198	1											
Rm 336					200	1											
Small Group Room				0		26	3,902	varies	26	3,902	varies	24	2,902	500	2	1,000	1/2 size of a General Classroom
Rm 117				0	152	1											
Rm 118A				0	151	1											
Rm 136A				0	151	1											
Rm 138B				0	151	1											
Rm 140A				0	151	1											
Rm 144A				0	151	1											
Rm 209A				0	150	1											
Rm 215				0	150	1											
Rm 216A				0	150	1											
Rm 218A				0	150	1											
Rm 235A				0	150	1											
Rm 237A				0	150	1											
Rm 239A				0	150	1											
Rm 244A				0	150	1											
Rm 306A				0	150	1											
Rm 311				0	150	1											
Rm 312A				0	150	1											
Rm 314A				0	150	1											
Rm 329A				0	150	1											
Rm 331A				0	150	1											
Rm 333A				0	147	1											
Rm 337A				0	150	1											
Rm 341A				0	147	1											

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools **Wildwood Early Childhood Center**	Existing Totals	PROPOSED PROGRAM								VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL								
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
Rm 345				0	151	1											
Rm 347A				0	150	1											
Rm 351A				0	150	1											
Calming				0		8	796	0	8	796	varies	8	796				
Rm 113B					99	1											
Rm 120A					98	1											
Rm 136B					96	1											
Rm 219B					102	1											
Rm 235C					99	1											
Rm 315B					104	1											
Rm 329C					99	1											
Rm 346B					99	1											
OT Classroom/Office - Rm 108A				0	251	1	251	251	1	251	251	1	251				
PT Classroom Rm 108				0	994	1	994	994	1	994	994	1	994				
School Psychologists				0		2	297	varies	2	297	varies	2	297				
Rm 114					149	1											
Rm 320					148	1											
BCBA Office/Team Chairs - Rm 246				0	318	1	318	318	1	318	318	1	318				
Speech & Language				0		4	812	varies	4	812	varies	4	812				
Rm 110					204	1											
Rm 115					205	1											
Rm 343					203	1											
Rm 349					200	1											
Public Day Education Spaces (List rooms separately below)																	
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
Collaborative Program Spaces (List rooms separately below)																	
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
ART & MUSIC	5,655			**0**			**5,058**			**5,058**			**-17**			**5,075**	
Art Classroom (25 seats) - Rm 121				0	973	1	973	973	1	973	-27	-1	-1,027	1,000	2	2,000	Assumed schedule: 2 times per week per student
Art Workroom with Storage and Kiln - Rm 121A				0	154	1	154	154	1	154	4	-1	-146	150	2	300	
General Music / Chorus (25-50 seats) - Rm 112				0	988	1	988	988	1	988	-212	-1	-1,412	1,200	2	2,400	Assumed schedule: 2 times per week per student
General Music Storage - Rm 112A				0	146	1	146	146	1	146	71	-4	-229	75	5	375	
Music Practice / Ensemble				0	0	0	0	0	0	0	0	0	0				
Instrumental Music - Rm 157				0	699	1	699	699	1	699	699	1	699				
Instrumental Storage - Rm 157A				0	242	1	242	242	1	242	242	1	242				
Flex Classrom - Music - Rm 162				0	886	1	886	886	1	886	886	1	886				
Flex Classrom - Art - Rm 207				0	970	1	970	970	1	970	970	1	970				
HEALTH & PHYSICAL EDUCATION	8,913			**0**			**12,206**			**12,206**			**5,906**			**6,300**	Excess Physical Education Spaces Policy
Gymnasium - Rm G100				0	11920	1	11,920	11,920	1	11,920	5,920	0	5,920	6,000	1	6,000	
Gym Storeroom - Rm G100B				0	169	1	169	169	1	169	19	0	19	150	1	150	
PE Office ~~with Shower and Toilet~~ - Rm G100A				0	117	1	117	117	1	117	-33	0	-33	150	1	150	
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
MEDICAL	**603**			**0**			**701**			**701**			**-9**			**710**	
Medical Suite Toilet - Rm 107C				0	68	1	68	68	1	68	8	0	8	60	1	60	
Nurses' Office / ~~Waiting Room~~ Exam - Rm 107A				0	99	1	99	99	1	99	-151	0	-151	250	1	250	
Examination Room / ~~Resting~~ Office - Rm 107B				0	98	1	98	98	1	98	-2	-3	-302	100	4	400	
Medical / Waiting Area / Resting Area - Rm 107				0	436	1	436	436	1	436	436	1	436				
~~Resting Area~~				0	0	0	0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				
[Enter room type here]				0			0	0	0	0	0	0	0				

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
ADMINISTRATION & GUIDANCE	**4,127**			**0**			**3,587**			**3,587**			**697**			**2,890**	
General Office / Waiting Room with Toilet - Rm 101A				0	604	1	604	604	1	604	77	0	77	528	1	528	
Teachers' Mail and Time Room - Rm 101G				0	96	1	96	96	1	96	-4	0	-4	100	1	100	
Copy Room - Rm 101F				0	149	1	149	149	1	149	-1	0	-1	150	1	150	
Records Room - Rm 101L				0	111	1	111	111	1	111	1	0	1	110	1	110	
Principal's Office with Conference Area - Rm 101E				0	203	1	203	203	1	203	-172	0	-172	375	1	375	
Principal's Secretary / Waiting - Rm 101B				0	126	1	126	126	1	126	1	0	1	125	1	125	
Assistant Principal's Office - Rm 227, Rm 302				0		2	397	varies	2	397	varies	1	277	120	1	120	
Rm 227					196												
Rm 302					201												
Supervisory / Spare Office				0		2	223	0	2	223	-120	1	103	120	1	120	
Rm 101D					116												
Rm 101					107	1											
Conference Room				0	varies	2	492	varies	2	492	242	1	242	250	1	250	
Conference Room - Rm 101C					296	1											
Conference Room - Rm 106					196	1											
School / Adjustment Counselors -Rm 111, Rm 247, Rm 350				0		3	591	0	3	591	-150	0	141	150	3	450	
Rm 111					201												
Rm 247					199												
Rm 350					191												
Guidance Storeroom - Rm 101M				0	36	1	36	36	1	36	1	0	1	35	1	35	
Teachers' Work Room - Rm 101H				0	202	1	202	202	1	202	-326	0	-326	528	1	528	
IT Technician Office - Rm 148				0	120	1	120	120	1	120	120	1	120				
Literacy Coordinator - Rm 101J				0	117	1	117	117	1	117	117	1	117				
STEM Coordinator - Rm 101K				0	120	1	120	120	1	120	120	1	120				
[Enter room type here]				0			0	0	0	0	0	0	0				
CUSTODIAL & MAINTENANCE	**486**			**0**			**2,344**			**2,344**			**-11**			**2,355**	
Custodian's Office - Rm 155C				0	167	1	167	167	1	167	17	0	17	150	1	150	
Custodian's Workshop				0	0	0	0	0	0	0	-375	-1	-375	375	1	375	
Custodian's Storage - Rm 155B				0	203	1	203	203	1	203	-172	0	-172	375	1	375	
Recycling Room / Trash - Rm 155A				0	414	1	414	414	1	414	14	0	14	400	1	400	
Receiving and General Supply Rm 153				0	1,156	1	1,156	1,156	1	1,156	804	0	804	352	1	352	
Storeroom				0	0	0	0	0	0	0	-503	-1	-503	503	1	503	
Network / Telecom Room -Rm 150				0	201	1	201	201	1	201	1	0	1	200	1	200	
Custodial Storage - Rm 249				0	203	1	203	203	1	203	203	1	203				
[insert room type here]				0			0	0	0	0	0	0	0				
OTHER	**2,650**			**0**			**5,452**			**5,452**			**5,452**			**0**	
(List rooms separately below)																	
Pre-Kindergarten Classroom with Toilet (if applicable)				0	varies	3	3,478	varies	3	3,478	varies	3	3,478	1,200	0	-	1,100 NSF (minimum size) - 1,300 NSF (maximum size)
Rm 116 + 116A					1154												
Rm 118 +118B					1163												
Rm 119 +119A					1161												
Extended Learning PK				0	varies	5	788	varies	5	788	varies	5	788				
Rm E118					42												
Rm E117					233												
Rm E116					140												
Rm E119					217												
Rm 105E					156												
CARES program Coorinator Office - Rm 103				0	142	1	142	142	1	142	142	1	142				
CARES Site Coorinator Office - Rm 102				0	143	1	143	143	1	143	143	1	143				
Health Classroom - Rm 208				0	901	1	901	901	1	901	901	1	901				
[Enter room type here]				0			0	0	0	0	0	0	0				
Total Building Net Floor Area (NFA)	**93,117**			**0**			**110,060**			**110,060**			**36,095**			**73,965**	**Total Building Net Floor Area (NFA)**

Proposed Space Summary - PK-5 Elementary School

PreK-5th Configuration - Revised 9/25/2026

Date: 9/25/2026 90% Construction Documents

Wilmington Public Schools Wildwood Early Childhood Center	Existing Totals	PROPOSED PROGRAM									VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL									
ROOM TYPE		ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	ROOM NFA[1]	# OF ROOMS	AREA TOTALS	COMMENTS
Proposed Student Capacity / Enrollment														# of Grades	6	755	**Total Enrollment (Enter Design Enrollment)**
														K	1	126	Kindergarten Enrollment
														Grade 1	1	252	Lower Elementary School Enrollment (Grades 1-2)
														Grade 2	1	378	Upper Elementary School Enrollment (Grades 3-6)
														Grade 3	1		
														Grade 4	1		
														Grade 5	1		
														Grade 6	0		
NON-PROGRAMMED SPACES			% of GFA	**0**		% of GFA	**54,975**		% of GFA	**54,975**							Complete this category with Schematic Design Submittal
Other Occupied Rooms (List rooms separately below)																	
PT Storage Rm 108B		-	#DIV/0!		-	0.2%	253	-	0.2%	253							
CARES Storage - Rm 152		-	#DIV/0!		-	0.3%	500	-	0.3%	500							
Flex Storage - Rm 162A		-	#DIV/0!		-	0.1%	104	-	0.1%	104							
Flex Storage - Rm 207A		-	#DIV/0!		-	0.0%	59	-	0.0%	59							
Teacher Wellness Room			#DIV/0!		-	0.2%	284		0.2%	284							
Rm 130A					**94**												
Rm 229A					**95**												
Rm 323A					**95**												
[Enter room type here]		-	#DIV/0!		-	0.0%		-	0.0%	0							
Unoccupied MEP / FP Spaces		-	#DIV/0!		-	2.2%	3,706	-	2.2%	3,706							
Unoccupied Closets, Supply Rooms, and Storage Rooms		-	#DIV/0!		-	0.3%	570	-	0.3%	570							
Toilet Rooms		-	#DIV/0!		-	2.9%	4,713	-	2.9%	4,713							
Circulation (corridors, stairs, ramps and elevators)		-	#DIV/0!		-	17.4%	28,664	-	17.4%	28,664							
Remaining[3]		-	#DIV/0!	**0**	-	9.8%	**16,122**	-	9.8%	**16,122**							
Total Building Gross Floor Area (GFA)[2]	**138,614**			**0**			**165,035**			**165,035**			**55,560**			**109,475**	**Total Building Gross Floor Area (GFA)[2]**
Grossing Factor (GFA / NFA)				**#DIV/0!**			**1.50**			**1.50**			**0.02**			**1.48**	**Grossing Factor (GFA / NFA)**

		PDP	PSR	SD	DD	60%CD	90%CD	Difference
1	**Individual Room Net Floor Area (NFA)**	167,900	163,573	165,035	165,035	165,035	165,035	0

2 **Total Building Gross Floor Area (GFA)**

3 **Remaining**

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architecture Firm: Dore & Whittier Architects, Inc.

Name of Principal Architect: Lee P. Dore

Signature of Principal Architect:

Date: 9/25/26

Deviations From MSBA Guidelines – 775 K-5 Students + 100 PreK

The table below communicates the evolution of the Wilmington Wildwood Elementary School space summary since its inception for the Preliminary Design Program. The space summary template contains the total NSF for each of the building's program areas and the proposed total GSF for the project. Individual spaces within various categories have been adjusted as the design has progressed and those are described in detail in the following narrative.

The proposed space summary identifies a need of 165,035 GSF at a net to gross multiplier of 1.5 to serve the educational program, a deviation of 55,560* GSF from the MSBA guidelines for K-5th grade population of 755 students + approximately 100 PreK students.

* It is important to note that the MSBA Space Summary Template for this enrollment is based on a net to gross multiplier of only 1.48.

	Existing Schools Combined	PDP	PSR	SD Report	DD Report**	60% CD	90% CD
Program Area	TOTAL NSF	TOTAL NSF	TOTAL NSF	TOTAL NSF	TOTAL NSF	TOTAL NSF	TOTAL NSF
Core Academic	36,096	45,700	45,700	47,700	47,526	47,494	47,531
Special Education	11,300	19,010	19,010	19,010	19,010	19,033	19,033
Art & Music	6,315	4,040	4,040	5,075	5,064	5,042	5,058
Health & Physical Education	9,772	12,300	12,300	12,300	12,237	12,237	12,206
Media Center	2,265	4,068	4,068	4,068	4,096	4,104	4,090
Dining & Food Service	13,620	9,458	9,458	10,058	10,058	10,058	10,058
Medical	603	710	710	710	698	701	701
Administration & Guidance	5,582	5,308	5,308	3,548	3,587	3,587	3,587
Custodial & Maintenance	2,654	2,355	2,355	2,355	2,344	2,344	2,344
Other	2,764	6,100	6,100	5,500	5,459	5,458	5,452
TOTAL NSF	90,972	110,240	110,240	110,324	110,079	110,058	110,060
TOTAL GSF	138,614	163,573	163,573	165,035	165,035	165,035	165,035

CORE ACADEMIC

The Core Academic program category totals 47,531 NSF, which represents an overall increase of 37 NSF since the 60% Construction Documents phase. There have not been any notable design changes within the Core Academic category. Spatial geometries have been adjusted to accommodate structural braced frames, column enclosures, mechanical chases, and other building components through coordination with other disciplines.

SPECIAL EDUCATION

The special education program category totals 19,033 NSF, which is unchanged since the 60% Construction Document submission. The changes in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

ART & MUSIC

The art and music program category totals 5,058 NSF, which represents an increase of 16 NSF since the 60% Construction Documents phase. In some areas, spatial geometry was refined through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

HEALTH & PHYSICAL EDUCATION

The Health and Physical Education program category totals 12,206 NSF, representing a decrease of 31 NSF since the 60% Construction Documents phase. The change in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

MEDIA CENTER

The Media Center program category totals 4,090 NSF, representing an decrease of 14 NSF since the 60% Construction Documents phase. The change in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

DINING & FOOD SERVICE

The Dining and Food Services program category totals 10,058 NSF, representing no change since the 60% Construction Documents phase. The changes in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

MEDICAL

The medical program category totals 701 NSF, reflecting no change since the 60% Construction Documents phase.

ADMINISTRATION & GUIDANCE

The administration & guidance program category is unchanged at 3,587 NSF, since 60% Construction Documents phase. The changes in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

CUSTODIAL AND MAINTENANCE

The custodial and maintenance program category totals 2,344 NSF, representing no change since the 60% Construction Documents phase. The changes in square footage reflects spatial geometry refinement through coordination with structural, mechanical, and other building systems to accommodate column enclosures, mechanical chases, and related building components.

OTHER

The other program category totals 5,452 NSF, representing a decrease of 6 SF from the 60% Construction Documents Phase. In certain areas, spatial geometry has been adjusted to accommodate structural requirements, column enclosures, mechanical chases, and other building components, coordinated across all trades.

SUMMARY

In summary, the Town, District and Design Team are proposing 110,060 NSF and 165,035 GSF to meet the educational program requirements of the Wilmington Wildwood Elementary School project, which serves 755 K–5 students and 100 PreK students. These square footages deviate from the MSBA guidelines by +36,095 NSF and +55,560 GSF, respectively.

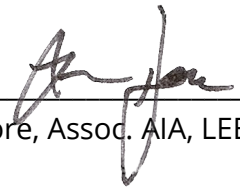
Space Measurement Analysis

Dore & Whittier uses Building Information Modelling (BIM) technology beginning with the feasibility study phase. This technology measures net square feet to the inside face of interior walls, to the exterior face of exterior walls for gross square feet and rounded to the nearest square foot. This data is then exported and translated into the space summary template.

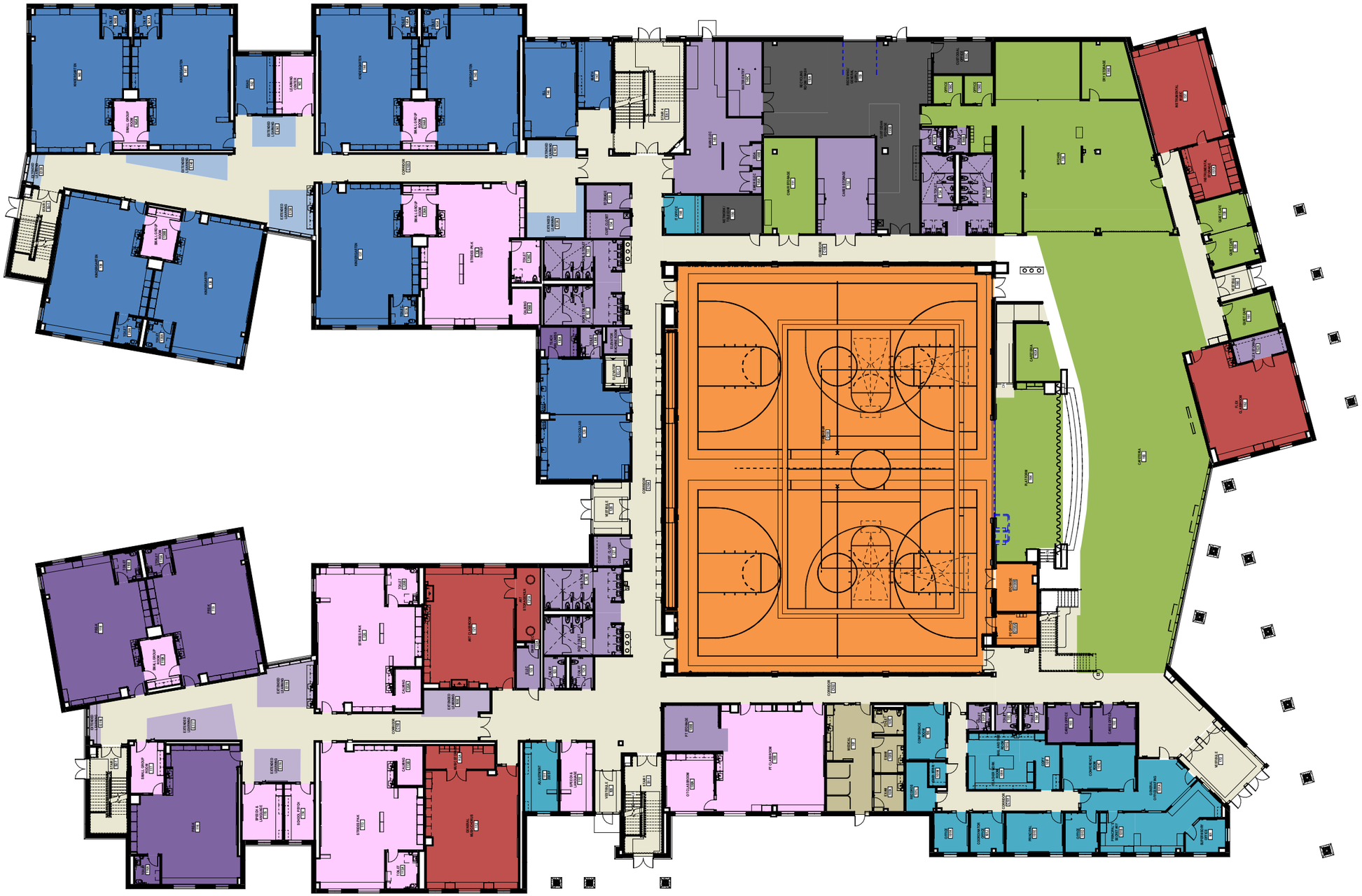
Our in-house methodology measures exterior square feet according to instructions provided by the MSBA. Everything from the exterior face of exterior walls is included in the calculation for gross square feet including all wall thicknesses, mechanical and plumbing enclosures, the elevator shaft on the lowest level, heating/cooling plant rooms, and all MEP closets. Our methodology also includes the entire stair on the first floor. Areas open-to-below of occupied spaces are excluded from the GSF calculation.

What follows are colored confirmation drawings similar to those provided in the DESE submission. These drawings communicate room usage and current square foot area. These square foot measurements align with the MSBA space summary provided above.

Dore & Whittier certifies that all programmed areas plus all other areas as described in the preceding methodology equals the total gross square foot area of the project.



Lee P. Dore, Assoc. AIA, LEED AP, Principal



PROGRAM FLOOR PLAN

LEVEL 1

Programming Legend

- Core Academic
- Special Education
- Art & Music
- Health & Physical Education
- Dining & Food Service
- Medical
- Administration & Guidance
- Media Center
- Custodial & Maintenance
- Dining & Food Service
- Other | Pre-Kindergarten
- Storage
- MEP
- Toilets
- Circulation

DORE + WHITTIER

PROGRAM FLOOR PLAN

LEVEL 2

N

0 16' 32' 64'

SCALE: 1/32"=1'-0"

Programming Legend

- Core Academic
- Special Education
- Art & Music
- Health & Physical Education
- Dining & Food Service
- Medical
- Administration & Guidance
- Media Center
- Custodial & Maintenance
- Dining & Food Service
- Other | Pre-Kindergarten
- Storage
- MEP
- Toilets
- Circulation

DORE + WHITTIER



N

0 16' 32' 64'

SCALE: 1/32"=1'-0"

PROGRAM FLOOR PLAN

LEVEL 3

Programming Legend

- Core Academic
- Special Education
- Art & Music
- Health & Physical Education
- Dining & Food Service
- Medical
- Administration & Guidance
- Media Center
- Custodial & Maintenance
- Dining & Food Service
- Other | Pre-Kindergarten
- Storage
- MEP
- Toilets
- Circulation

DORE + WHITTIER

PROJECT APPROVALS

The project has received MHC approval (see Appendix 15). The project has received approval of DESE (refer to letter enclosed) for the resubmission package with this 60% Constructions Documents Submission. Also attached is the permit tracking matrix and approval from the Select Board Permit To Remove Earth.

The design team has coordinated with DPW and town officials on local utilities to review the project relative to basic utility connections (water, sewer, electricity, cable/tel). Permitting approvals have been coordinated with the OPM's project schedule.

Site Planning Approvals Update

As of the issuance of this submission, the Project has received approval from the Wilmington Conservation Commission through issuance of an Order of Conditions and from the Wilmington Planning Board through approval of the Ground Water Protection District Special Permit. The Project also received approval from the Wilmington Select Board on July 13, 2026, for an Earth Removal Permit.

The Wilmington Conservation Commission closed its public hearing on June 3, 2026, and issued an Order of Conditions for the Project on June 4, 2026, under MassDEP File No. 344-1588. Prior to issuance, the Project Team responded to environmental allegations raised by neighborhood and abutter parties regarding arsenic in site soils. Following review of the supporting environmental documentation, MassDEP counsel indicated that the identified arsenic levels were consistent with naturally occurring conditions and that no further MassDEP action was required regarding the private-party correspondence. The Town will continue to manage site conditions through the standard Licensed Site Professional process and comply with applicable soil-management and environmental-control requirements.

The Town subsequently received notice of an appeal of the Order of Conditions and, on August 14, 2026, received an informational request from MassDEP. The Town, through its Engineer of Record, has prepared and submitted a response. Fontaine Brothers has mobilized and commenced work outside the Bordering Vegetated Wetland buffer zone; no work will proceed within the buffer zone pending MassDEP's determination on the appeal. The Town and Project Team will continue to track the appeal and maintain compliance with applicable regulatory requirements and the Project Funding Agreement.

Permitting table timeline

Permit	Permitting Preparer	Permitting Authority	(Anticipated) Filing Date	Hearing Date	Anticipated Review (Approval Date)
Site Design Development and Traffic Study review	CDW, Nitsch	Town of Wilmington (Engineering, DPW)	NA	No hearing required	Comments received in meetings or via emails.
Special Permit – Groundwater	CDW	Town of Wilmington Planning Board	March 11, 2026	April 7, 2026 and June 2, 2026	June 2, 2026
Notice of Intent	CDW	Town of Wilmington Conservation Commission	March 11, 2026	April 1, 2026 and June 3, 2026	June 3, 2026
Wilmington DPW (Roadway, driveway, and general utility layout)	CDW	Wilmington DPW	DPW reviewed project as part of Planning Board Submission	No hearing required	
National Pollutant Discharge Elimination System (NPDES) with EPA Notice of Intent (NOI)	Contractor	Environmental Protection Agency (EPA)	June 24, 2026	No hearing required	Once Submitted to EPA; Close NOI at end of Construction.
Building Permit	Town of Wilmington Building Commissioner (AHJ)	100% CD: October 2026	Anticipate October - November 2026		

STATE SITE PERMITTING TRACKING WORKSHEET A

Date:	9/25/2026
District:	Wilmington School District
Project Name:	Wildwood Early Childhood Center - PK-5 Elementary School Project
MSBA Project ID:	

SITE PERMIT	REQUIREMENTS	FILING DATE	EXPECTED RESPONSE DATE	TRIGGER - YES/NO	AGENCY COMMENTS/SUGGESTED ACTIONS	DESIGNER RESPONSES
CONCOM	NOI	3/12/2026	6/4/2026	Yes	Project to comply with Order of Conditions	Completed
MHC	PNF	6/16/2025	7/9/2025	No	It has been determined that this project is unlikely to affect significant historic or archaeological resources.	Completed
MA-DOT	PNF with MHC	6/16/2025	7/9/2025	No	See MHC comment	See MHC comment
MA-DEP	NOI	3/12/2026	6/4/2026	Yes		Appeal issued by neighborhood group
NHESP	NOI	12/12/2025	3/13/2026	NA		This project does not require a NHESP permit.
MEPA	PNF with MHC	6/16/2025	7/9/2025	No	See MHC comment	See MHC comment

Instructions to complete the permit tracking table:

1. Enter the date the PNF/NOI was filed.
2. Enter the date when the response is expected.
3. If a response is received from CONCOM/MHC/MA-DOT/MA-DEP/NHESP/MEPA, mention 'YES' in the 'trigger' column. Summarize the proposed/requested/mandated action by the agencies in a few words and corresponding Designer responses in the appropriate column. Please include the full response as an attachment with this submittal for MSBA's reference.
4. If there is no response by the expected response date, mention 'NO' in the 'trigger' column.
5. Indicate "Not Applicable" (where appropriate) in the "trigger" column and describe why each item is not applicable.
6. Describe the status of the following approvals. Any status updates/concerns/notes can be mentioned in the 'Designer Responses' column.
7. Make sure to attach the sheet with every submittal for the project to track any changes.
8. Provide the status of any other state or federal approval not listed above (the following list is not a comprehensive itemization of required state approvals; other requirements may apply, and some items listed below may not be applicable to this project).
9. Provide a copy of the PNF, NOI, appropriate application forms and/or approval letters where applicable.

Architect and Engineer Certification

By signing this certification, I hereby certify that all of the information provided in this "Permit Tracking Table" is true, complete and accurate to the best of my knowledge and belief.

Name of Architecture Firm: Dore & Whittier Architects, Inc.

Name of Architect: Lee Dore

Signature of Architect:

Date: 9/25/2026

By signing this certification, I hereby certify that all of the information provided in this "Permit Tracking Table" is true, complete and accurate to the best of my knowledge and belief.

Name of Engineering Firm: CDW Consultants, Inc.

Name of Engineer: Eric Wilhelmsen

Signature of Engineer:

Date: 9/25/2026

Use this MEPA guideline checklist to check any aspects that apply to the project, to understand if an ENF/EIR, or any additional review from MEPA may be required.

MEPA Trigger	(a) ENF and Mandatory EIR. (Triggered by any of the items in this column)		(b) ENF and Other MEPA Review if the Secretary So Requires. (Triggered by any of the items in this column)	
DGA/ ENVIRONMENTAL JUSTICE PROTOCOLS	1. If your site has an Environmental Justice population within a 1-mile DGA (Designated Geographical Area) while the project DOES NOT (a) exceed any Air threshold at 301 CMR 11.03(8) OR; (b) generate 150 or more New ADT(Average Daily Traffic) of diesel vehicle traffic over a duration of 1 year (excluding public transit trips) 2. If your site has an Environmental Justice population within a 5-mile DGA (Designated Geographical Area) while the project (a) exceeds any Air threshold at 301 CMR 11.03(8) OR; (b) generates 150 or more New ADT(Average Daily Traffic) of diesel vehicle traffic over a duration of 1 year (excluding public transit trips)	☐ ☐ ☐ ☐	None	
LAND	1. Direct alteration of 50 or more acres of land, unless the Project is consistent with an approved conservation farm plan or forest cutting plan or other similar generally accepted agricultural or forestry practices. 2. Creation of ten or more acres of impervious area.	☐ ☐	1. Direct alteration of 25 or more acres of land, unless the Project is consistent with an approved conservation farm plan or forest cutting plan or other similar generally accepted agricultural or forestry practices. 2. Creation of five or more acres of impervious area. 3. Disposition or change in use of land or an interest in land subject to Article 97 of the Amendments to the Constitution of the Commonwealth, unless the Secretary waives or 4. Conversion of land in active agricultural use to nonagricultural use, provided the land includes soils classified as prime, state-important or unique by the United States 5. Release of an interest in land held for conservation, preservation or agricultural or watershed preservation purposes, unless the Secretary waives or modifies the replacement 6. Approval in accordance with M.G.L. c. 121A of a New urban redevelopment project or a fundamental change in an approved urban redevelopment project, provided that the 7. Approval in accordance with M.G.L. c. 121B of a New urban renewal plan or a major modification of an existing urban renewal plan.	☐ ☐ ☐ ☐ ☐ ☐ ☐
STATE-LISTED SPECIES UNDER M.G.L. c. 131A (Massachusetts Endangered Species Act).	None		1. Alteration of designated significant habitat. 2. Greater than two acres of disturbance of designated priority habitat, as defined in 321 CMR 10.02, that results in a take of a state-listed endangered or threatened species or species of special concern.	☐ ☐
WETLANDS, WATERWAYS AND TIDELANDS.	1. Provided that a Permit is required: (a) alteration of one or more acres of salt marsh or bordering vegetating wetlands; or (b) alteration of ten or more acres of any other wetlands. 2. Alteration requiring a variance in accordance with the Wetlands Protection Act. 3. Construction of a New dam. 4. Structural alteration of an existing dam that causes an Expansion of 20% or any decrease in impoundment Capacity. 5. Provided that a Chapter 91 License is required, New non-water dependent use or Expansion of an existing non-water dependent structure, provided the use or structure occupies one or more acres of waterways or tidelands.	☐ ☐ ☐ ☐ ☐ ☐	1. Provided that a Permit is required: (a) alteration of coastal dune, barrier beach or coastal bank; (b) alteration of 500 or more linear feet of bank along a fish run or inland bank; (c) alteration of 1,000 or more sf of salt marsh or outstanding resource waters; (d) alteration of 5,000 or more sf of bordering or isolated vegetated wetlands; (e) New fill or structure or Expansion of existing fill or structure, except a pile- supported structure, in a velocity zone or regulatory floodway; or (f) alteration of ½ or more acres of any other wetlands.	☐ ☐ ☐ ☐ ☐ ☐

			2. Construction of a New roadway or bridge providing access to a barrier beach or a New utility line providing service to a structure on a barrier beach. 3. Dredging of 10,000 or more cy of material. 4. Disposal of 10,000 or more cy of dredged material, unless at a designated in-water disposal site. 5. Provided that a Chapter 91 License is required, New or existing unlicensed non-water dependent use of waterways or tidelands, unless the Project is an overhead utility line, a 6. Construction, reconstruction or Expansion of an existing solid fill structure of 1,000 or more sf base area or of a pile-supported or bottom-anchored structure of 2,000 or more sf base area, except a seasonal, pile-held or bottom-anchored float, provided the structure occupies flowed tidelands or other waterways.	☐ ☐ ☐ ☐ ☐
WATER	1. New withdrawal or Expansion in withdrawal of: (a) 2,500,000 or more gpd from a surface water source; or (b) 1,500,000 or more gpd from a groundwater source. 2. New interbasin transfer of water of 1,000,000 or more gpd or any amount determined significant by the Water Resources Commission. 3. Construction of one or more New water mains ten or more miles in length. 4. Provided that the Project is undertaken by an Agency, New water service to a municipality or water district across a municipal boundary through New or existing	☐ ☐ ☐ ☐ ☐	1. New withdrawal or Expansion in withdrawal of 100,000 or more gpd from a water source that requires New construction for the withdrawal. 2. New withdrawal or Expansion in withdrawal of 500,000 or more gpd from a water supply system above the lesser of current system-wide authorized withdrawal volume or three- 3. Construction of one or more New water mains five or more miles in length. 4. Construction of a New drinking water treatment plant with a Capacity of 1,000,000 or more gpd. 5. Expansion of an existing drinking water treatment plant by the greater of 1,000,000 gpd or 10% of existing Capacity. 6. Alteration requiring a variance in accordance with the Watershed Protection Act, unless the Project consists solely of one single family dwelling. 7. Non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities.	☐ ☐ ☐ ☐ ☐ ☐ ☐
WASTEWATER	1. Construction of a New wastewater treatment and/or disposal facility with a Capacity of 2,500,000 or more gpd. 2. New interbasin transfer of wastewater of 1,000,000 or more gpd or any amount determined significant by the Water Resource Commission. 3. Construction of one or more New sewer mains ten or more miles in length. 4. Provided that the Project is undertaken by an Agency, New sewer service to a municipality or sewer district across a municipal boundary through New or existing 5. New discharge or Expansion in discharge of any amount of sewage, industrial waste water or untreated stormwater directly to an outstanding resource water. 6. New Capacity or Expansion in Capacity for storage, treatment, processing, combustion or disposal of 150 or more wet tpd of sewage sludge, sludge ash, grit, screenings, or other	☐ ☐ ☐ ☐ ☐ ☐	1. Construction of a New wastewater treatment and/or disposal facility with a Capacity of 100,000 or more gpd. 2. Expansion of an existing wastewater treatment and/or disposal facility by the greater of 100,000 gpd or 10% of existing Capacity. 3. Construction of one or more New sewer mains: (a) that will result in an Expansion in the flow to a wastewater treatment and/or disposal facility by 10% of existing Capacity; or (b) five or more miles in length. 4. New discharge or Expansion in discharge: (a) to a sewer system of 100,000 or more gpd of sewage, industrial waste water or untreated stormwater; (b) to a surface water of: i. 100,000 or more gpd of sewage; ii. 20,000 or more gpd of industrial waste water; or iii. any amount of sewage, industrial waste water or untreated stormwater requiring a variance from applicable water quality regulations; or (c) to groundwater of: i. 10,000 or more gpd of sewage within an area, zone or district established, delineated or identified as necessary or appropriate to protect a public drinking water ii. 50,000 or more gpd of sewage within any other area; iii. 20,000 or more gpd of industrial waste water; or iv. any amount of sewage, industrial waste water or untreated stormwater requiring approval by the Department of Environmental Protection of a variance from Title 5 of 5. New Capacity or Expansion in Capacity for:	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

			(a) combustion or disposal of any amount of sewage sludge, sludge ash, grit, screenings, or other sewage sludge residual materials; or (b) storage, treatment, or processing of 50 or more wet tpd of sewage sludge or sewage	☐ ☐
TRANSPORTATION.	1. Unless the Project consists solely of an internal or on-site roadway or is located entirely on the site of a non-roadway Project: (a) construction of a New roadway two or more miles in length; or (b) widening of an existing roadway by one or more travel lanes for two or more miles. 2. New interchange on a completed limited access highway. 3. Construction of a New airport. 4. Construction of a New runway or terminal at an existing airport. 5. Construction of a New rail or rapid transit line along a New, unused or abandoned right-of-way for transportation of passengers or freight (not including sidings, spurs or other 6. Generation of 3,000 or more New adt on roadways providing access to a single location. 7. Construction of 1,000 or more New parking spaces at a single location.	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	1. Unless the Project consists solely of an internal or on-site roadway or is located entirely on the site of a non-roadway Project: (a) construction of a New roadway one-quarter or more miles in length; or (b) widening of an existing roadway by four or more feet for one-half or more miles, excluding widening to add bicycle or pedestrian accomodations. 2. Construction, widening or maintenance of a roadway or its right-of-way that will: (a) alter the bank or terrain located ten more feet from the existing roadway for one- half or more miles, unless necessary to install a structure or equipment; (b) cut five or more living public shade trees of 14 or more inches in diameter at breast height; or (c) eliminate 300 or more feet of stone wall. 3. Expansion of an existing runway at an airport. 4. Construction of a New taxiway at an airport. 5. Expansion of an existing taxiway at Logan Airport. 6. Expansion of an existing terminal at Logan Airport by 100,000 or more sf. 7. Expansion of an existing terminal at any other airport by 25,000 or more sf. 8. Construction of New or Expansion of existing air cargo buildings at an airport by 100,000 or more sf. 9. Conversion of a military airport to a non-military airport. 10. Construction of a New rail or rapid transit line for transportation of passengers or freight. 11. Discontinuation of passenger or freight service along a rail or rapid transit line. 12. Abandonment of a substantially intact rail or rapid transit right-of-way. 13. Generation of 2,000 or more New adt on roadways providing access to a single location. 14. Generation of 1,000 or more New adt on roadways providing access to a single location and construction of 150 or more New parking spaces at a single location. 15. Construction of 300 or more New parking spaces at a single location.	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
ENERGY.	1. Construction of a New electric generating facility with a Capacity of 100 or more MW. 2. Expansion of an existing electric generating facility by 100 or more MW. 3. Construction of a New fuel pipeline ten or more miles in length. 4. Construction of electric transmission lines with a Capacity of 230 or more kv, provided the transmission lines are five or more miles in length along New, unused or abandoned	☐ ☐ ☐ ☐	1. Construction of a New electric generating facility with a Capacity of 25 or more MW. 2. Expansion of an existing electric generating facility by 25 or more MW. 3. Construction of a New fuel pipeline five or more miles in length. 4. Construction of electric transmission lines with a Capacity of 69 or more kv, provided the transmission lines are one or more miles in length along New, unused or abandoned right	☐ ☐ ☐ ☐
AIR.	1. Construction of a New Stationary Source with federal potential emissions, after construction and the imposition of required controls, of: 250 tpy of any criteria air pollutant; 40 tpy of any HAP; 100 tpy of any combination of HAPs; or 100,000 tpy of GHGs based on CO2 Equivalent.	☐	1. Construction of a New Stationary Source with federal potential emissions, after construction and the imposition of required controls, of: 100 tpy of PM10, PM 2.5, CO, lead or SO2; 50 tpy of VOC or NOx; 10 tpy of any HAP; or 25 tpy of any combination of HAPs.	☐

	2. Modification of an existing Stationary Source with federal potential emissions that collectively will result, after construction and the imposition of required controls, of 75,000 tpy of GHGs based on CO2 Equivalent.	☐	2. Modification of an existing Stationary Source resulting in a "significant net increase" in actual emissions, provided that the stationary source or facility is major for the pollutant. For purposes of this threshold, a "significant net increase" in actual emissions shall mean an increase in emissions of: 15 tpy of PM10; 10 tpy of PM 2.5; 100 tpy of CO; 40 tpy of SO2; 25 tpy of VOC or NOx; 0.6 tpy of lead.	☐
SOLID AND HAZARDOUS WASTE.	1. New Capacity or Expansion in Capacity of 150 or more tpd for storage, treatment, processing, combustion or disposal of solid waste, unless the Project is a transfer station, is an Expansion of an existing facility within a validly site assigned area for the proposed use, or is exempt from site assignment requirements.	☐	1. New Capacity or Expansion in Capacity for combustion or disposal of any quantity of solid waste, or storage, treatment or processing of 50 or more tpd of solid waste, unless the Project is exempt from site assignment requirements. 2. Provided that a Permit is required in accordance with M.G.L. c. 21D, New Capacity or Expansion in Capacity for the storage, recycling, treatment or disposal of hazardous waste.	☐ ☐
HISTORICAL AND ARCHAEOLOGICAL RESOURCES.	None		1. demolition of all or any exterior part of any Historic Structure listed in or located in any Historic District listed in the State Register of Historic Places or the Inventory of Historic 2. destruction of all or any part of any Archaeological Site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the	☐ ☐
AREAS OF CRITICAL ENVIRONMENTAL CONCERN.	None		1. Any Project of ½ or more acres within a designated ACEC, unless the Project consists solely of one single family dwelling.	☐
REGULATIONS.	None		Promulgation of New or revised regulations, of which a primary purpose is protecting against Damage to the Environment, that significantly reduce: 1. standards for environmental protection; . 2.opportunities for public participation in permitting or other review processes; or 3. public access to information generated or provided in accordance with the regulations.	 ☐ ☐ ☐

Architect and Engineer Certification

By signing this certification, I hereby certify that all of the information provided in this "MEPA Trigger Checklist" is true, complete and accurate to the best of my knowledge and belief.

Dore and Whittier Architects, Inc.

Name of Architecture Firm

Lee P. Dore

Name of Architect



Signature of Architect

6-24-26

Date

By signing this certification, I hereby certify that all of the information provided in this "MEPA Trigger Checklist" is true, complete and accurate to the best of my knowledge and belief.

CDW Consultants

Name of Engineering Firm

Eric Wilhelmsen

Name of Engineer



Signature of Engineer

6-24-26

Date

MASSACHUSETTS
Department of Elementary
and Secondary Education
Pedro Martinez | Commissioner

September 22, 2026

Mike McGurl
Director of Capital Planning
Massachusetts School Building Authority
10 Post Office Square, Suite S400
Boston, MA 02109

Dear Director McGurl:

We have reviewed the revised documentation that was submitted by the Town of Wilmington on July 17, 2026 for the construction project at Wildwood Elementary School. We have done so in accordance with M.G.L. chapter 70B, section 6(6), which instructs us to certify "…that adequate provisions have been made in the school project for children with disabilities, as defined in section 1 of chapter 71B…".

Based on our review, we approve the district's proposed modifications and continue to believe their special education plan will support the community in effectively serving students with disabilities. The Massachusetts Department of Elementary and Secondary Education certifies that this school project has been planned to adequately provide appropriate space to serve the programs and school populations referenced in M.G.L. chapter 70B, section 6(6) noted above.

Sincerely,

Matthew J. Deninger
DESE designee on the MSBA Board of Directors

Cc: Vani Rastogi-Kelly, Director, Public School Monitoring, DESE
Amy Paulin, Assistant Director, Public School Monitoring, DESE
Andrew MacKenzie, Supervisor, Public School Monitoring, DESE
Kate Cronin, Project Manager, MSBA
Elena Seiti, Senior Capital Program Manager, MSBA
Claire Lerner, Project Coordinator, MSBA
Robin McElaney, Senior Project Coordinator, MSBA
Richard Hudson, MSBA
Stephen Garvey, MSBA

TOWN OF WILMINGTON

PERMIT TO REMOVE EARTH

Commences: July 14, 2026 Expires: July 13, 2027

TOWN OF WILMINGTON, 146 Middlesex Avenue, Wilmington, MA 01887-2733, is hereby permitted to remove earth from a parcel of land as shown on a plan of land entitled "Existing Condition Plan" (Sheets EX-1.0 and EX-1.1) with the latest revision date February 13, 2026 and "Grading and Drainage Plan" (Sheets C3.00, C3.01 and C3.02); with latest revision date May 27, 2026, prepared by CDW Consultants, Inc., 4 California Avenue, Suite 301, Framingham, MA 01701, which plans are on file with the Select Board, and which plan is incorporated by reference into this permit. (Assessor's Map 97, Parcel 61)

The conditions of this permit are as follows:

1. This permit is not assignable.
2. At the expiration of the permit, the grades shall substantially conform to the proposed grades as shown on the plan set approved by the Conservation Commission and Planning Board.
3. At the expiration of the permit, the entire area shall be covered with loam and seeded with a recognized grass seed of good quality; except where the area consists of proposed hardscape, proposed pavement surfaces, or other specific surface treatments as indicated on the approved plan set.
4. The Applicant, its agents and employees, shall use due caution when entering and leaving the site and shall use extreme caution when passing school buses and at times when the existing school is active.
5. The hauling routes for construction vehicles and equipment is anticipated to be Ballardvale Street, north, to Route 93.
6. The hours of hauling on ways used by the public shall be limited to Monday through Friday, inclusive, between 7:00 a.m. and 4:30 p.m., and shall occur outside of normal school drop-off and pick-up times.
7. The Applicant shall agree to keep loam within the Town of Wilmington whenever possible.
8. If rock crushing operations are to be used on-site, they will be limited to the hours of operation between 9:00 a.m. to 3:00 p.m. and on normal weekdays only. Rock crushing operations are not allowed on weekends or holidays.
9. Blasting operations shall be in accordance with all Town, State, and Federal laws, regulations and policies as may be applicable.
10. Disposal of any unsuitable material shall be in accordance with all Town, State, and Federal laws, regulations and polies as may be applicable.

11. The Applicant or their designated contractor shall follow the Construction Period Pollution Plan, Stormwater Pollution Prevention Plan, and Sediment and Erosion Control Plan as approved by the Conservation Commission.

12. The Applicant or their designated contractor is responsible for daily cleanup of all soil material, stones, etc. tracked along the hauling route.

13. The Applicant or their designated contractor shall limit excessive dust and noise associated with the Earth Removal process, to the extent practicable.

14. The Applicant shall notify the Town of their intentions to obtain a renewal of this permit at least thirty (30) days before the expiration date of the permit.

15. The performance bond requirement for earth removal permits is waived for this project. This bond requirement is for private development projects only. For municipal projects, the Town requires a performance bond in place for the entire project (inclusive of earth removal).

All of the above conditions are accepted.

DATED: July 13, 2026

SELECT BOARD

R. Eric Slagle, Town Manager

Kevin A. Caira, Chair

Lilia Maselli, Vice Chair

Gary B. DePalma

Jacob M. Gearwar

Frank J. West

NPDES – EPA NOTIFICATION E

John Vukic

From: no-reply@epacdx.net
Sent: Tuesday, July 7, 2026 5:00 PM
Subject: [External] EPA NeT CGP Coverage Status: Active: Wilmington Elementary School, NPDES ID: MAR1006EY

2026-07-07

Dear NeT User,

Coverage status has changed for a project / site under the CGP.

NPDES ID	Form Type	Coverage Status	Operator	Project/Site Name	EPA Comment
MAR1006EY	NOI	Active	Fontaine Bros., Inc.	Wilmington Elementary School	

Your Notice of Intent (NOI) requesting coverage under EPA's Construction General Permit (CGP) has been accepted and authorization to discharge under the CGP became effective on 07/07/2026 and will expire on 02/16/2027 .

Please note that this email does not represent a determination by EPA regarding the validity of the information you provided in your NOI or LEW. Your eligibility for coverage under this permit is based on the validity of the certification you provided. Your electronic signature on the NOI or LEW form certifies that you have read, understood, and are implementing all of the applicable requirements. An important aspect of this certification requires that you have correctly determined whether you are eligible for coverage under this permit.

The CGP requires you to have developed a Stormwater Pollution Prevention Plan (SWPPP) prior to submitting your NOI. The CGP also includes specific requirements for erosion and sediment controls, pollution prevention controls, conducting self-inspections, taking corrective actions, and conducting staff training. You must comply with any state, tribal, or territory-specific requirements in Part 9 (see https://www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp).

A copy of the submission can be found here.

If you have questions about this email or about NeT CGP, please refer to NeT Support or e-mail NPDESereporting@epa.gov for assistance.

This is an automated notification; please do not reply to this email.

NPDES FORM 3510-9		UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460 NOTICE OF INTENT (NOI) FOR THE 2022 NPDES CONSTRUCTION PERMIT	FORM Approved OMB No. 2040-0305 Expires on 02/28/2025

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory in accordance with this permit and EPA NPDES regulations (40 CFR 122.28(b)(2)). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information are estimated to average 1.1 to 19.6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Permit Information

NPDES ID: MAR1006EY

State/Territory to which your project/site is discharging: MA

Is your project/site located on federally recognized Indian Country lands? No

Is your project/site located on Lands of Exclusive Federal Jurisdiction? No

Are you requesting coverage under this NOI as a *"Federal Operator"* or a *"Federal Facility"* as defined in Appendix A (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-a-definitions.pdf)? No

Have stormwater discharges from your current construction site been covered previously under an NPDES permit? No

Will you use polymers, flocculants, or other treatment chemicals at your construction site? No

Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared in advance of filling this NOI, as required? Yes

Are you able to demonstrate that you meet one of the criteria listed in Appendix D (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-d-endangered-species-protection.pdf) with respect to protection of threatened or endangered species listed under the Endangered Species Act (ESA) and federally designated critical habitat?

Yes

Have you completed the screening process in Appendix E (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf) relating to the protection of historic properties? Yes

Indicating "Yes" below, I confirm that I understand that CGP only authorized the allowable stormwater discharges in Part 1.2.1 and the allowable non-stormwater discharges listed in Part 1.2.2. Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state or local authorities after issuance of this permit via any means, Including the Notice of Intent (NOI) to be covered by the permit, the Stormwater Pollution Prevention Plan (SWPPP), during an Inspection, etc. If any discharges requiring NPDES permit coverage other than the allowable stormwater and non-stormwater discharges listed in Parts 1.2.1 and 1.2.2 will be discharged, they must be covered under another NPDES permit.

Yes

Operator Information

Operator Information

Operator Name: Fontaine Bros., Inc.

Operator Mailing Address:

Address Line 1: 510 Cottage Street

Address Line 2:

City: Springfield

ZIP/Postal Code: 01104

State/Province: MA

County or Similar Division: Hampden

Country: US

Operator Point of Contact Information

First Name Middle Initial Last Name: John Vukic

Title: Sr. Project Manager

Phone: 413-781-2020

Ext.:

Email: jvukic@fontainebros.com

NOI Preparer Information

☑ **This NOI is being prepared by someone other than the certifier.**

First Name Middle Initial Last Name: Marian Rambelle

Organization: CDW Consultants Inc

Phone: 508-875-2657

Ext.:

Email: mrambelle@cdwconsultants.com

Project/Site Information

Project/Site Name: Wilmington Elementary School

Project/Site Address

Address Line 1: 320 Salem Street

Address Line 2:

City: Wilmington

ZIP/Postal Code: 01887

State: MA

County or Similar Division: Middlesex

Latitude/Longitude: 42.578225°N, 71.156789°W

Latitude/Longitude Data Source: Map **Horizontal Reference Datum:** WGS 84

Project Start Date: 07/13/2026 **Project End Date:** 12/31/2028 **Estimated Area to be Disturbed:** 4.5

Types of Construction Sites:

- Institutional

Will there be demolition of any structure built or renovated before January 1, 1980? Yes

➔ **Do any of the structures being demolished have at least 10,000 square feet of floor space?** Yes

Will you be discharging dewatering water from your site? Yes

Was the pre-development land use used for agriculture? No

Are there other operators that are covered under this permit for the same project site? No

Have earth-disturbing activities commenced on your project/site? No

Is your project/site located on federally recognized Indian Country lands? No

Is your project/site located on a property of religious or cultural significance to an Indian tribe? No

Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? Yes

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? No

Are any of the waters of the U.S. to which you discharge designated by the state or tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding National Resource Water)? See Resources, Tools and Templates (https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates)

No

ID: 001 Name: Lubbers Brook Description: Salem St

Latitude/Longitude: 42.57845°N, 71.156068°W

Tier Designation: N/A

Is this receiving water impaired (on the CWA 303(d) list)? Yes

Impaired Pollutants:

- Dissolved oxygen
- E. coli
- Dewater

Has a TMDL been completed for this receiving waterbody? No

ID: 002 Name: Lubbers Brook Description: Arlene Ave

Latitude/Longitude: 42.578248°N, 71.160312°W

Tier Designation: N/A

Is this receiving water impaired (on the CWA 303(d) list)? Yes

Impaired Pollutants:

- Dissolved oxygen
- E. coli
- Dewater

Has a TMDL been completed for this receiving waterbody? No

Stormwater Pollution Prevention Plan (SWPPP)

Will all required personnel, including those conducting inspections at your site, meet the training requirements in Part 6 of this permit? Yes

First Name Middle Initial Last Name: John Vukic

Title: Senior Project Manager

Phone: 617-828-6426 **Ext.:**

Email: jvukic@fontainebros.com

Endangered Species Protection Worksheet: Criterion C

Determine ESA Eligibility Criterion

Are your discharges and discharge-related activities already addressed in another operator's valid certification of eligibility for your "action area" under the current 2022 CGP? No

Has consultation between you, a Federal Agency, and the USFWS and/or the NMFS under section 7 of the Endangered Species Act (ESA) concluded? No

Are your construction activities the subject of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat?

No

You must determine whether species listed as either threatened or endangered, or their critical habitat(s) are located in your site's action area (i.e., all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action, including areas beyond the footprint of the site that are likely to be affected by stormwater discharges, discharge-related activities, and authorized non-stormwater discharges).

Determine your Action Area

You must consider the following in determining the action area for your site, and **confirm that all the following are true**:

- **In determining my "action area", I have considered that discharges of pollutants into downstream areas can expand the action area well beyond the footprint of my site and the discharge point(s). I have taken into account the controls I will be implementing to minimize pollutants and the receiving waterbody characteristics (e.g., perennial, intermittent, ephemeral) in determining the extent of physical, chemical, and/or biotic effects of the discharges. I confirm that all receiving waterbodies that could receive pollutants from my site are included in my action area.**

  True

- **In determining my "action area", I have considered that discharge-related activities must also be accounted for in determining my action area. I understand that discharge-related activities are any activities that cause, contribute to, or result in stormwater and authorized non-stormwater point source discharges, and measures such as the siting, construction timing, and operation of stormwater controls to control, reduce, or prevent pollutants from being discharged. I understand that any new or modified stormwater controls that will have noise or other similar effects, and any disturbances associated with construction of controls, are part of my action area.**

  True

Determine is ESA-listed species and/or critical habitat are in your site action area.

ESA-listed species and designated critical habitat are under the purview of the NMFS and the USFWS, and in many cases, you will need to acquire species and critical habitat lists from both federal agencies.

National Marine Fisheries Service (NMFS)

For NMFS species and designated critical habitat information, use the following webpage:

- https://www.epa.gov/npdes/construction-general-permit-cgp-threatened-and-endangered-species-eligibility (https://www.epa.gov/npdes/construction-general-permit-cgp-threatened-and-endangered-species-eligibility)

I have checked the webpage listed above and confirmed that:

- (●) There are no NMFS-protected species and/or designated critical habitat in my action area.
- ( ) There are NMFS-protected species and/or designated critical habitat in my action area.

U.S. Fish and Wildlife Service (USFWS)

For USFWS species and critical habitat information, use the following webpage:

- https://www.epa.gov/npdes/construction-general-permit-cgp-threatened-and-endangered-species-eligibility (https://www.epa.gov/npdes/construction-general-permit-cgp-threatened-and-endangered-species-eligibility)

I have checked the webpage listed above and confirmed that:

- ( ) There are no FWS-protected species and/or designated critical habitat in my action area.
- (●) There are FWS-protected species and/or designated critical habitat in my action area.

For FWS species, include the full printout from your IPaC query/Official Species List.

Name	Uploaded Date	Size
Ap L2_Species List_ New England Ecological Services Field Office (1) (1).pdf (attachment/2245743)	06/23/2026	255.85 KB

You may be eligible under **Criterion C**. You must assess whether your discharges or discharge-related activities are likely to result in short- or long-term adverse effects to ESA-listed threatened or endangered species or designated critical habitat. In order to make a determination of your site's likelihood of short- or long-term adverse effects, you must complete the Criterion C Eligibility fields below.

Discharges not likely to result in any short- or long-term adverse effects to ESA-listed species and/or designated critical habitat. True

You are eligible under **Criterion C**.

I confirm that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in my evaluation. Yes

Identify the USFWS information sources used (Note: state resources are not acceptable):

The USFWS Information for Planning and Consultation (IPaC) online tool and determination keys applicable to the project were used to determine a finding of "no-effect" on the listed species in the project area.

Identify the NMFS information sources used (Note: state resources are not acceptable):

According to the NMFS ESA Section 7 Mapper there are no listed species in the project area.

You must provide a list of all ESA-listed species and/or designated critical habitat that are located in your "action area". Select one of the options below and provide the required information:

- ( ) Option 1: Enter ESA-listed species
- (●) Option 2: Attach the species list(s)

Attach a printout of the species list(s) showing all ESA-listed species and/or designated critical habitat located in your "action area" using the space below:

Name	Uploaded Date	Size
Ap L2_Species List_ New England Ecological Services Field Office (1) (1).pdf (attachment/2245751)	06/23/2026	255.85 KB

What is the distance between your site and the ESA-listed species and/or designated critical habitat within the action area (in miles, state "on site" if the ESA-listed species and/or designated critical habitat is within the area to be disturbed)?

0

Provide the rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharge and discharge-related activities.

Appropriate perimeter sediment controls, such as silt fence and straw wattles, and inlet controls, such as catch basin silt sacks, will be installed prior to the commencement of any earth disturbing work. These controls, and other erosion and sediment controls, will prevent sediment, trash/debris, and other pollutants from entering the discharge.

Attach a copy of your site map showing the upland and in-water extent of your "action area".

Note: A copy of this site map must also be included with your SWPPP

Name	Uploaded Date	Size
Wilmington Elementary School Civil Site Plans_Sheet C1.00.pdf (attachment/2245759)	06/23/2026	1.58 MB

Have you provided documentation in your SWPPP supporting your eligibility under Criterion C? Yes

Historic Preservation

Are you installing any stormwater controls as described in Appendix E (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf) that require subsurface earth disturbances? (Appendix E (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf), Step 1)

Yes

- **Have prior surveys or evaluations conducted on the site already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf), Step 2):**

  No

- **Have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? (Appendix E (https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf), Step 3)**

  Yes

Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Signing an electronic document on behalf of another person is subject to criminal, civil, administrative, or other lawful action.

Certified By: John M. Vukic

Certifier Title: Sr Project Manager

Certifier Email: jvukic@fontainebros.com

Certified On: 06/23/2026 4:40 PM ET

MAAB ACCESSIBILITY VARIANCES

Accessibility Regulation Summary

The Project will comply with the Massachusetts Architectural Access Board (MAAB) 521 CMR, or the 2010 Americans with Disability Act Standards for Accessible Design where it is more stringent than MAAB.

Because the School project is new construction, it shall fully comply with CMR 521 (Section 3.2). Spaces accessed only by ladder, crawlspaces, catwalks, or non-passenger elevators are exempt (Section 3.12).

The project is not currently planning for any variances from the requirements of the Massachusetts Architectural Access Board.

DESIGNER'S CONSTRUCTION COST ESTIMATE **6C.3.4**

90% Construction Document Cost Estimate

Wildwood Elementary School

Wilmington, MA

MSBA Project ID Number: 202003420015

PM&C LLC
20 Downer Ave, Suite 5
Hingham, MA 02043
(T) 781-740-8007

Prepared for:

Dore + Whittier

September 28, 2026

PM&C

Wildwood Elementary School
Wilmington, MA

28-Sep-26

90% Construction Document Cost Estimate

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Gross Floor Area	$/sf	Estimated Construction Cost
TRADE COSTS	Dec-26			
NEW BUILDING		165,035	$529.47	$87,380,683
DEMOLITION				$816,492
HAZARDOUS MATERIAL ABATEMENT[1]				$1,476,600
SITEWORK				$9,129,626
LOR No. 1 SITEWORK				$13,552,110
SUB-TOTAL		165,035	$680.80	$112,355,511
DESIGN AND PRICING CONTINGENCY	1.0%			$988,034
ESCALATION	1.5%			$1,482,051
SUB-TOTAL				$114,825,596
NON TRADES SUB BONDS	1.25%			$706,122
GENERAL CONDITIONS				$5,733,391
GENERAL REQUIREMENTS				$5,737,083
PHASING				NR
BONDS	0.695%			$882,665
GENERAL LIABILITY INSURANCE	1.095%			$1,400,339
BUILDERS RISK	0.193%			$249,520
POLLUTION INSURANCE				$65,674
PERMIT				WAIVED
SUB-TOTAL				$129,600,390
CM FEE				$2,720,000
GMP Contingency	2.5%			$3,240,010
TOTAL OF ALL CONSTRUCTION		165,035	$821.40	**$135,560,400**

[1] Inspection, Testing and Monitoring Costs are not included

Wildwood Elementary School 28-Sep-26
Wilmington, MA

90% Construction Document Cost Estimate

Anticipated Bid Date:	October 30 2026
Item 1 - Filed Sub Bids	$43,905,643
Item 2 - CM amount	$91,654,757
Total Estimated Cost of Construction	**$135,560,400**

ALTERNATES (Including markups)

1. SG5 ILO SG4 at L1 Exterior Glazing	ADD	$	**48,623**
2. Ballistic L3 Glass ILO SG4 at L1 Windows, SG5 at Curtain Wall	ADD	$	**311,038**
3. SG4 at interior sidelights	ADD	$	**130,655**
4. SG5 at interior sidelights	ADD	$	**150,254**
5. SG4 at classroom borrowed lights	ADD	$	**108,456**
6. SG5 at borrowed lights	ADD	$	**124,724**
7. Ballistic Assembly at interior vestibule doors	ADD	$	**77,532**
8. Ballistic Assembly at Cafeteria	ADD	$	**127,231**
9. Ballistic door assemblies at exterior vestibule locations	ADD	$	**138,497**
10. Ballistic door assemblies at exterior stair locations	ADD	$	**95,645**

Wildwood Elementary School 28-Sep-26
Wilmington, MA

90% Construction Document Cost Estimate

BASIS OF ESTIMATE

This 90% Construction Document cost estimate was produced from drawings and specifications prepared by Dore + Whittier and their design team dated August 14, 2026. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, construction managers overhead and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under 149a of the Massachusetts General Laws to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- All professional fees and insurance
- Building Permit costs
- Land acquisition, feasibility, and financing costs
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items (e.g. draperies, furniture and equipment)
- Rock excavation; special foundations (unless indicated by design engineers)
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction or occupancy phasing or off hours' work, (except as noted in this estimate)

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Wildwood Elementary School
Wilmington, MA

28-Sep-26

90% Construction Document Cost Estimate

GFA 165,035

CONSTRUCTION COST SUMMARY IN CSI FORMAT

		BUILDING		*SITEWORK*		*TOTAL*	
		Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
TOTAL PROJECT CSI SUMMARY							
DIV. 2	**EXISTING CONDITIONS**				**$2,293,092**		**$2,293,092**
024116	Structure Demolition			$816,492		$816,492	
028213	Abatement			$1,476,600		$1,476,600	
DIV. 3	**CONCRETE**		**$5,518,221**		**$1,469,953**		**$6,988,174**
033000	Cast-in-Place Concrete	$5,270,668		$1,469,953		$6,740,621	
035400	Concrete Toppings	$247,553				$247,553	
DIV. 4	**MASONRY**		**$7,845,890**		**$29,105**		**$7,874,995**
040001	**Unit Masonry - FSB**	$7,745,890		$29,105		$7,774,995	
040005	Unit Masonry	$100,000				$100,000	
DIV. 5	**METALS**		**$10,005,385**		**$69,600**		**$10,074,985**
050001	**Metal Fabrications - FSB**	$1,952,971		$69,600		$2,022,571	
050005	Miscellaneous Metals	$125,000				$125,000	
051200	Structural Steel Framing	$7,927,414				$7,927,414	
DIV. 6	**WOODS & PLASTICS**		**$2,186,673**				**$2,186,673**
061000	Rough Carpentry	$473,338				$473,338	
061800	Heavy Timber Construction	$893,000				$893,000	
064100	Architectural Woodwork	$820,335				$820,335	
DIV. 7	**THERMAL & MOISTURE PROTECTION**		**$7,219,189**				**$7,219,189**
070001	**Waterproofing, Dampproofing and Caulking - FSB**	$1,171,919				$1,171,919	
070002	**Roofing and Flashing - FSB**	$2,729,303				$2,729,303	
072100	Thermal Insulation	$423,336				$423,336	
076400	Cladding	$1,956,160				$1,956,160	
078100	Fireproofing	$773,436				$773,436	
078400	Firestopping	$165,035				$165,035	
DIV. 8	**DOORS & WINDOWS**		**$3,845,625**				**$3,845,625**
080001	**Windows**	$2,550,440				$2,550,440	
080002	**Glass and Glazing - FSB**	$140,275				$140,275	
081113	Doors, Frames and Hardware	$642,860				$642,860	
083100	Access Doors and Frames	$10,000				$10,000	
083323	Overhead Coiling Doors	$10,000				$10,000	
083326	Coiling Grilles	$49,550				$49,550	
087100	Door Hardware	$442,500				$442,500	
089000	Louvers						
DIV. 9	**FINISHES**		**$14,336,575**				**$14,336,575**
090002	**Tiling - FSB**	$1,432,260				$1,432,260	
090003	**Acoustical Ceilings - FSB**	$1,464,090				$1,464,090	
090005	**Resilient Flooring - FSB**	$985,634				$985,634	
090007	**Painting - FSB**	$652,119				$652,119	
090008	Painting	$20,000				$20,000	
092900	Gypsum Board Assemblies	$7,336,236				$7,336,236	
096400	Wood Flooring	$438,590				$438,590	
096620	**Terrazzo - FSB**	$1,049,663				$1,049,663	
096700	Fluid-Applied Flooring	$247,590				$247,590	
096810	Carpet	$59,325				$59,325	
097200	Wall Coverings	$68,750				$68,750	
098400	Acoustic Room Components	$582,318				$582,318	
DIV 10	**SPECIALTIES**		**$1,955,359**				**$1,955,359**
101100	Visual Display Surfaces	$254,500				$254,500	
101200	Display Cases						
101400	Signage	$242,811				$242,811	
102100	Toilet Compartments and Cubicles	$103,500				$103,500	
102200	Operable Partitions	$211,398				$211,398	
102226	Operable Glass Partitions						
102600	Wall Protection	$5,000				$5,000	
102800	Toilet Accessories	$135,600				$135,600	
104300	Fire Protection Specialties	$20,500				$20,500	
105000	Lockers	$13,050				$13,050	
108213	Equipment Enclosure	$969,000				$969,000	
DIV. 11	**EQUIPMENT**		**$1,301,720**				**$1,301,720**
113100	Appliances	$35,000				$35,000	
114000	Food Service Equipment	$876,120				$876,120	
115213	Projection Screens	$20,000				$20,000	
116200	Theatre Equipment	$75,000				$75,000	
116600	Athletic Equipment	$285,600				$285,600	

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Wildwood Elementary School
Wilmington, MA

28-Sep-26

90% Construction Document Cost Estimate

GFA 165,035

CONSTRUCTION COST SUMMARY IN CSI FORMAT

		BUILDING		*SITEWORK*		*TOTAL*	
		Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
TOTAL PROJECT CSI SUMMARY							
117900	Miscellaneous Equipment	$10,000				$10,000	
DIV. 12	**FURNISHINGS**		**$4,130,932**				**$4,130,932**
122113	Window Treatments	$106,779				$106,779	
123200	Fixed Casework and Equipment	$3,654,253				$3,654,253	
124813	Entrance Mats and Frames	$144,900				$144,900	
126100	Fixed Audience Seating	$225,000				$225,000	
DIV. 13	**SPECIAL CONSTRUCTION**						
DIV. 14	**CONVEYING SYSTEMS**		**$336,000**				**$336,000**
142000	Passenger Elevators - FSB	$336,000				$336,000	
DIV. 21	**FIRE SUPPRESSION**		**$1,326,749**				**$1,326,749**
210000	**Fire Protection - FSB**	$1,326,749				$1,326,749	
DIV. 22	**PLUMBING**		**$3,570,995**				**$3,570,995**
220000	**Plumbing - FSB**	$3,535,995				$3,535,995	
220005	Plumbing	$35,000				$35,000	
DIV. 23	**HVAC**		**$13,749,185**				**$13,749,185**
230000	**HVAC - FSB**	$13,714,185				$13,714,185	
230005	HVAC	$35,000				$35,000	
DIV. 26	**ELECTRICAL**		**$10,052,185**		**$1,028,255**		**$11,080,440**
260000	**Electrical**	$10,002,185		$1,028,255		$11,030,440	
260005	Electrical	$50,000				$50,000	
DIV. 31	**EARTHWORK**				**$300,000**		**$300,000**
311000	Site Preparation			$300,000		$300,000	
312000	Earthwork						
312500	Erosion and Sedimentation Control						
DIV. 32	**EXTERIOR IMPROVEMENTS**				**$6,211,769**		**$6,211,769**
321000	Pavings			$310,086		$310,086	
323000	Site Improvements			$4,462,343		$4,462,343	
329900	Landscaping			$1,439,340		$1,439,340	
DIV. 33	**UTILITIES**				**$20,944**		**$20,944**
331000	Water Utilities						
333000	Sanitary Utilities						
334000	Storm Utilities			$20,944		$20,944	
SUBTOTAL DIRECT (TRADE) COST			**$87,380,683**		**$11,422,718**		**$98,803,401**

Wildwood Elementary School 28-Sep-26
Wilmington, MA

90% Construction Document Cost Estimate GFA 165,035

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*
BUILDING + SITE SUMMARY				
A10	**FOUNDATIONS**		**$3,528,440**	$21.38
A1010	Standard Foundations	$2,030,457		
A1020	Special Foundations	$0		
A1030	Lowest Floor Construction	$1,497,983		
B10	**SUPERSTRUCTURE**		**$11,336,848**	$68.69
B1010	Upper Floor Construction	$6,649,086		
B1020	Roof Construction	$4,687,762		
B20	**EXTERIOR CLOSURE**		**$15,801,498**	$95.75
B2010	Exterior Walls	$13,421,766		
B2020	Windows	$2,171,387		
B2030	Exterior Doors	$208,345		
B30	**ROOFING**		**$3,160,213**	$19.15
B3010	Roof Coverings	$3,147,713		
B3020	Roof Openings	$12,500		
C10	**INTERIOR CONSTRUCTION**		**$11,034,226**	$66.86
C1010	Partitions	$7,241,075		
C1020	Interior Doors	$1,374,823		
C1030	Specialties/Millwork	$2,418,328		
C20	**STAIRCASES**		**$1,043,325**	$6.32
C2010	Stair Construction	$700,000		
C2020	Stair Finishes	$343,325		
C30	**INTERIOR FINISHES**		**$7,148,647**	$43.32
C3010	Wall Finishes	$2,193,747		
C3020	Floor Finishes	$2,906,810		
C3030	Ceiling Finishes	$2,048,090		
D10	**CONVEYING SYSTEMS**		**$340,620**	$2.06
D1010	Elevator	$340,620		

Wildwood Elementary School 28-Sep-26
Wilmington, MA

90% Construction Document Cost Estimate GFA 165,035

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*
BUILDING + SITE SUMMARY				
D20	**PLUMBING**		**$3,570,995**	$21.64
D2000	Plumbing	$3,570,995		
D30	**HVAC**		**$13,749,185**	$83.31
D3000	HVAC	$13,749,185		
D40	**FIRE PROTECTION**		**$1,326,749**	$8.04
D4000	Fire Protection	$1,326,749		
D50	**ELECTRICAL**		**$10,052,185**	$60.91
D5010	Service & Distribution	$3,138,861		
D5020	Lighting & Power	$2,658,113		
D5030	Communication & Security Systems	$3,760,176		
D5040	Other Electrical Systems	$495,035		
E10	**EQUIPMENT**		**$1,301,720**	$7.89
E1010	Equipment	$1,301,720		
E20	**FURNISHINGS**		**$3,986,032**	$24.15
E2010	Fixed Furnishings	$3,986,032		
E2020	Movable Furnishings			
F10	**SPECIAL CONSTRUCTION**		**$0**	$0.00
F1000	Special Construction	$0		
F20	**DEMOLITION & HAZMAT REMOVALS**		**$0**	$0.00
F2010	Building Elements Demolition	$0		
F2020	Hazardous Components Abatement	$0		
TOTAL DIRECT BUILDING COST (Trade Costs)			**$87,380,683**	$529.47

PM&C

Wildwood Elementary School
Wilmington, MA

28-Sep-26

90% Construction Document Cost Estimate

GFA 165,035

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM	*SUB-TOTAL*	*TOTAL*	*$/SF*
BUILDING + SITE SUMMARY			
G10 SITE PREPARATION		**$300,000**	
G20 SITE IMPROVEMENTS		**$7,704,021**	
G30 SITE MECHANICAL UTILITIES		**$0**	
G40 SITE ELECTRICAL UTILITIES		**$1,125,605**	
TOTAL DIRECT SITE COST (Trade Costs)		**$9,129,626**	$55.32
TOTAL DIRECT PROJECT COST (Trade Costs)		**$96,510,309**	$584.79

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	GROSS FLOOR AREA CALCULATION						
	1st Floor	**78,595**	sf				
	2nd Floor	**45,065**	sf				
	3rd Floor	**43,820**	sf				
	TOTAL GROSS FLOOR AREA (GFA)				**167,480**	***sf***	
	A10 FOUNDATIONS						
	A1010 STANDARD FOUNDATIONS						
033000	*CONCRETE*						
	Strip Footings	*200*	*CY*				
	Foundation Walls	*473*	*CY*				
	Spread Footings	*1,086*	*CY*				
	Piers	*102*	*CY*				
	Elevator Pit	*30*	*CY*				
	Total Foundation Concrete	*1,891*	*CY*				
	Strip footings/Grade Beams						
	Formwork	**4,270**	sf	18.00	76,860		
	Re-bar	**21,350**	lbs.	2.25	48,038		
	Concrete material; 4,500 psi	**200**	cy	190.00	38,000		
	Placing concrete	**200**	cy	120.00	24,000		
	Foundation walls						
	Formwork	**18,840**	sf	22.00	414,480		
	Re-bar	**48,600**	lbs.	2.25	109,350		
	Concrete material; 4,500 psi	**473**	cy	190.00	89,870		
	Placing concrete	**473**	cy	120.00	56,760		
	Form shelf	**1,965**	lf	12.00	23,580		
	Column Footings						
	Formwork	**12,063**	sf	18.00	217,134		
	Re-bar	**101,160**	lbs.	2.25	227,610		
	Concrete material	**1,086**	cy	190.00	206,340		
	Placing concrete	**1,086**	cy	120.00	130,320		
	Set anchor bolts grout plates	**164**	ea	165.00	27,060		
	Piers						
	Formwork	**5,248**	sf	24.00	125,952		
	Re-bar, 300 lbs/cy	**30,600**	lbs	2.25	68,850		
	Concrete material	**102**	cy	190.00	19,380		
	Placing concrete	**102**	cy	120.00	12,240		
	Formed openings for utilities	**1**	ls	25,000.00	25,000		
	Elevator Pits; 12" walls/footing/slab	**1**	ea				
	Formwork	**480**	sf	26.00	12,480		
	Re-bar	**288**	lbs	2.25	648		
	Concrete material	**10**	cy	190.00	1,900		
	Placing concrete	**10**	cy	120.00	1,200		
	Slab, complete	**20**	cy	310.00	6,200		
	Sump pit premium	**1**	ea	1,500.00	1,500		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Bituminous dampproofing at brick shelf	**3,930**	sf	5.00	19,650		
	Waterproofing at elevator pits	**340**	sf	18.00	6,120		
072100	*THERMAL INSULATION*						
	Insulation, 2"	**11,410**	sf	3.50	39,935		
312000	*EARTHWORK*						
	Strip footings						
	Excavation	**2,155**	cy	14.00	w/ ERP 1		
	Store onsite, screen to make up levels	**2,155**	cy	22.00	w/ ERP 1		
	Backfill with imported material	**1,911**	cy	55.00	w/ ERP 1		
	Spread footings						
	Excavation	**4,444**	cy	14.00	w/ ERP 1		
	Store onsite, screen to make up levels	**4,444**	cy	22.00	w/ ERP 1		
	Backfill with imported material	**3,358**	cy	55.00	w/ ERP 1		
	Miscellaneous						

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Gravel fill beneath footings, 12"	**499**	cy	55.00	w/ ERP 1		
	Perimeter drain	**1,965**	lf	22.00	NR		
	Allowance for dewatering	**1**	ls	30,000.00	w/ ERP 1		
	SUBTOTAL					**2,030,457**	
A1020	**SPECIAL FOUNDATIONS**						
	Ground improvements	**78,595**	sf	10.00	w/ ERP 1		
	SUBTOTAL					-	
A1030	**LOWEST FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	New Slab on grade, 5" thick	*78,595*	*sf*				
	Vapor barrier	**78,595**	sf	1.50	117,893		
	Mesh reinforcing 15% lap	**90,384**	sf	1.85	167,210		
	Concrete - 5" thick	**1,284**	cy	190.00	243,960		
	Placing concrete	**1,284**	cy	120.00	154,080		
	MVR admixture	**1,284**	cy	75.00	96,300		
	Finishing and curing concrete	**78,595**	sf	4.00	314,380		
	Control joints - saw cut	**78,595**	sf	0.10	7,860		
	Misc.						
	Equipment pads, allowance	**1**	ls	5,000.00	5,000		
	Ramp @ Platform	**180**	sf	35.00	6,300		
	Coordination, bridging, premium time	**1**	ls	150,000.00	150,000		
	Weather conditions	**1**	ls	200,000.00	200,000		
072100	*THERMAL INSULATION*						
	Insulation, 2" - 4' at perimeter	**10,000**	sf	3.50	35,000		
312000	*EARTHWORK*						
	Slab on grade						
	Cut - over excavated 5' of fill beneath building				NR		
	Stockpile - process (for reuse on site fills outside of building) - removed from landfill disposal below				NR		
	Fill - import structural - 25% swell	**2,797**	cy	55.00	w/ ERP 1		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal - soil above impacted soils per PEER's report				w/ ERP 1		
	Clean non-regulated				w/ ERP 1		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal - impacted soils				w/ ERP 1		
	Landfill				w/ ERP 1		
	Compact existing sub-grade	**78,595**	sf	0.50	w/ ERP 1		
	Compacted granular fill, 12"	**3,056**	cy	48.00	w/ ERP 1		
	Underslab drainage	**78,595**	sf	2.00	w/ ERP 1		
	Radon system	**78,595**	sf	3.00	w/ plumbing		
	Plumbing + Radon E&B				w/ ERP 1		
	SUBTOTAL					**1,497,983**	
	TOTAL - FOUNDATIONS						**$3,528,440**
B10	***SUPERSTRUCTURE***						
		$6,810	per ton				
		1,164	TNS TOTAL FLOORS AND ROOF				
		13.9	/SF				
B1010	**FLOOR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete on Metal Deck	*88,885*	*sf*				
	WWF reinforcement	**102,218**	sf	1.85	189,103		
	Concrete topping to metal decking, 5-1/4" thick; light weight	**1,512**	cy	232.00	350,784		
	MVR admixture	**1,512**	cy	75.00	113,400		
	Place and finish concrete	**88,885**	sf	5.00	444,425		
	Rebar to decks	**26,666**	lbs	2.25	59,999		
	Acoustic isolation system	**14,445**	sf	30.00	433,350		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
051200	*STRUCTURAL STEEL FRAMING*						
	Structural steel, beams; w-sections/HSS	**404**	tns	5,200.00	2,100,800		
	Structural steel, bracing; HSS	**50**	tns	5,200.00	260,000		
	Structural steel, columns; w-sections/HSS	**172**	tns	5,200.00	894,400		
	Truss	**36**	tns	5,200.00	187,200		
	Structural steel, bridging	**2**	tns	5,200.00	10,400		
	Relieving angle	**19**	tns	5,200.00	98,800		
	Metal deck 3"	**88,885**	sf	7.00	622,195		
	Shear studs	**19,752**	ea	3.50	69,132		
	Moment connections	**10**	ea	800.00	8,000		
	Full weld	**45**	ea	800.00	36,000		
	Beam penetrations, allow	**1**	ls	50,000.00	50,000		
	CW support	**1**	ls	50,000.00	50,000		
	Co-ordination, bridging	**1**	ls	330,000.00	330,000		
078400	*FIREPROOFING/FIRESTOPPING*						
	Fireproofing at steel, 1 hour (2 hour rating at specific locations)	**88,885**	sf	3.50	311,098		
	Premium time	**1**	ls	30,000.00	30,000		
	SUBTOTAL					**6,649,086**	
B1020	**ROOF CONSTRUCTION**						
033000	*CONCRETE*						
	WWF reinforcement	**17,745**	sf	1.85	32,828		
	Concrete topping to metal decking, 5-1/4" thick; light weight at low roof	77	cy	232.00	17,864		
	Concrete topping to metal decking, 7" thick; normal weight at RTUs	**72**	cy	190.00	13,680		
	Place and finish concrete	**15,430**	sf	5.00	77,150		
	Rebar to decks	**4,629**	lbs	2.25	10,415		
051200	*STRUCTURAL STEEL FRAMING*						
	Structural steel, beams; w-sections/HSS	**402**	tns	5,200.00	2,090,400		
	Structural steel, bridging	**5**	tns	5,200.00	26,000		
	DLT roof at cafeteria and library, 10 psf total				NR		
	Canopies, 20 psf				incl		
	Roof edge, bent plate, etc.	**9**	tns	5,200.00	46,800		
	Shear studs	**3,429**	ea	3.50	12,002		
	Expansion joints	**1**	ls	15,000.00	15,000		
	Roof deck 'N' 3"	**73,525**	sf	7.00	514,675		
	Premium for cellular acoustic deck at gym				NR		
	Moment connections	**28**	ea	800.00	22,400		
	Roof deck @ canopies	**4,030**	sf	7.00	28,210		
	Roof screen support	**65**	tn	7,000.00	455,000		
061800	*HEAVY TIMBER CONSTRUCTION*						
	DLT - acoustic 2x8 dowel laminated timber paneling with 3/4" t&g exposure, 1" plywood and GLB	**6,650**	sf	120.00	798,000		
	Connections, temp protection, premium time	**1**	ls	95,000.00	95,000		
078400	*FIREPROOFING/FIRESTOPPING*						
	Fireproofing at steel and deck, 1 hour	**73,525**	sf	3.50	257,338		
	Patching at fireproofing	**1**	ls	50,000.00	50,000		
	Intumescent fireproofing, at gymnasium	**1**	ls	125,000.00	125,000		
	SUBTOTAL					**4,687,762**	
	TOTAL - SUPERSTRUCTURE						**$11,336,848**
B20	***EXTERIOR CLOSURE***	*76,484*	*sf*				
B2010	**EXTERIOR WALLS**	65,820	sf				
042000	*MASONRY*						
	Brick veneer; including detailing; Type 1 & 2	**45,415**	sf	52.00	2,361,580		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
186		Premium for glazed brick	**3,050**	sf	10.00	30,500		
187		CUVM	**7,645**	sf	70.00	535,150		
188		Cast stone panels	**11,837**	sf	160.00	1,893,920		
189		Cast stone banding/sill; 1'-3 5/8"	**923**	lf	200.00	184,600		
190		Cast stone sill, 7-5/8"	**1,786**	lf	140.00	250,040		
191		Cast stone window head	**1,059**	lf	120.00	127,080		
192		CMU back up, 8"	**5,540**	sf	38.00	210,520		
193		CMU back up, 12"	**492**	sf	42.00	20,664		
194		4" rigid insulation polyiso	**67,606**	sf	5.00	338,030		
195		Miscellaneous flashings	**65,820**	sf	1.00	65,820		
196		Staging to exterior wall	**76,484**	sf		incl		
197		Brick Roof Screen						
198		Brick veneer; including detailing	**1,815**	sf	52.00	94,380		
199		Cast stone cap w/ drip, 1' - 7 5/8"	**165**	lf	250.00	41,250		
200		Canopies						
201		Brick at column	**1,080**	sf	55.00	59,400		
202		CUVM at column	**900**	sf	80.00	72,000		
203		Cast stone trim	**180**	lf	120.00	21,600		
204		4" rigid insulation polyiso	**1,980**	sf	5.00	9,900		
205		Cast stone trim at canopy	**390**	lf	200.00	78,000		
206		Mockup	**1**	ls	50,000.00	50,000		
207		Weather conditions	**1**	ls	100,000.00	100,000		
208								
209	*055000*	*MISC. METALS*						
210		Brick relieving angle				w/ B10		
211		Misc. metals at masonry including loose lintels	**76,677**	sf	1.50	115,016		
212								
213	*070001*	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
214		Air barrier	**65,820**	sf	9.00	592,380		
215		Air barrier at roof edge/overhang	**15,299**	sf	9.00	137,691		
216		Air barrier at canopy columns and soffits	**6,700**	sf	9.00	60,300		
217		Damp proofing at brick screen	**2,091**	sf	9.00	18,819		
218		Miscellaneous sealants to closure	**65,820**	sf	0.75	49,365		
219		Air barrier/flashing at windows	**5,613**	lf	7.00	39,291		
220								
221	*072100*	*THERMAL INSULATION*						
222		6" Batt insulation in stud backup	**60,280**	sf	5.00	301,400		
223		Insulation at window openings	**5,613**	lf	7.00	39,291		
224								
225	*076400*	*CLADDING*						
226		MCM roof edge and soffit	**15,299**	sf	110.00	1,682,890		
227		4" rigid insulation	**11,474**	sf	5.00	57,370		
228		Prefinished metal siding at duct enclosure	**500**	sf	90.00	45,000		
229		Corrugated panel at backside of brick roofscreen	**2,091**	sf	70.00	146,370		
230		Canopies						
231		MCM roof edge and soffit	**1,170**	sf	70.00	81,900		
232		4" rigid insulation	**1,170**	sf	5.00	5,850		
233								
234	*090003*	*ACOUSTICAL TILE*						
235		Linear metal ceiling	**3,885**	sf	50.00	194,250		
236		4" rigid insulation	**3,885**	sf	5.00	19,425		
237								
238	*092900*	*GYPSUM BOARD ASSEMBLIES*						
239		Framing and sheathing at roof edge and soffits	**15,299**	sf	24.00	367,176		
240		Framing to canopy columns and soffits	**6,700**	sf	24.00	160,800		
241		CMFS - 6"	**60,280**	sf	18.00	1,085,040		
242		CMFS - 4" at duct enclosure	**500**	sf	18.00	9,000		
243		Gypsum Sheathing	**60,280**	sf	4.50	271,260		
244		Drywall lining to interior face of stud backup	**60,280**	sf	5.00	301,400		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Brick Roof Screen						
	CMFS - 6"	**2,091**	sf	18.00	37,638		
	1/2" sheathing	**2,091**	sf	4.50	9,410		
	Framing for mockup	**1**	ls	25,000.00	25,000		
	Premium time	**1**	ls	30,000.00	30,000		
101400	*SIGNAGE*						
	Exterior signage, allow	**1**	ls	25,000.00	25,000		
108213	*EQUIPMENT ENCLOSURE*						
	Metal panel roof screen, acoustic; 12'	**11,400**	sf	85.00	969,000		
	SUBTOTAL					**13,421,766**	
B2020	**WINDOWS**	*10,664*	*sf*				
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**5,613**	lf	12.00	67,356		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**5,613**	lf	12.00	67,356		
080001	*METAL WINDOWS*						
	Aluminum framed windows, triple glazed	**6,043**	sf	155.00	936,665		
	Aluminum Curtainwall, triple glazed	**4,621**	sf	185.00	854,885		
	Premium for Schoolguard glazing at L1	**2,935**	sf	75.00	220,125		
	Premium for ballistic glass				NR		
	Sunshades at South elevation windows				NR		
	Mockup	**1**	ls	25,000.00	25,000		
	SUBTOTAL					**2,171,387**	
B2030	**EXTERIOR DOORS**						
081110	*HOLLOW METAL*						
	Frame						
	Single	**5**	ea	600.00	3,000		
	Double	**4**	ea	800.00	3,200		
	Sidelight	**11**	sf	70.00	770		
	Door						
	F, flush	**5**	ea	1,000.00	5,000		
	FG, 2 glass panels	**8**	ea	1,500.00	12,000		
083323	*OVERHEAD DOOR*						
	Coiled doors, motorized						
	10' x 10'	**1**	ea	10,000.00	10,000		
084410	*CURTAINWALL*						
	Glazed aluminum entrance door and hardware in CW frame; pair	**4**	pr	16,000.00	64,000		
	Glazed aluminum entrance door and hardware in CW frame; single	**1**	ea	16,000.00	16,000		
	Premium for IG-4A, security glazing to doors	**9**	lvs	500.00	4,500		
	Premium for ballistic glazing to doors				NR		
087100	*DOOR HARDWARE*						
	Exterior door hardware	**13**	ea	1,400.00	18,200		
	Auto openers	**9**	lvs	5,000.00	45,000		
080002	*GLASS AND GLAZING*						
	Glass in doors and sidelights - IG4	**107**	sf	225.00	24,075		
090007	*PAINTING*						
	Paint doors and frames	**13**	ea	200.00	2,600		
	SUBTOTAL					**208,345**	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	TOTAL - EXTERIOR CLOSURE						**$15,801,498**
B30	***ROOFING***						
B3010	**ROOF COVERINGS**	*84,205*	*sf*				
050001	*MISCELLANEOUS METALS*						
	Roof ladders	**1**	ea	5,000.00	5,000		
	Stair grate and landing	**1**	ea	7,500.00	7,500		
	Safety railing	**1**	ls	250,000.00	250,000		
061000	*ROUGH CARPENTRY*						
	Roof blocking	**84,205**	sf	2.00	168,410		
070002	*ROOFING AND FLASHING*	84,205	*total area*				
	TPO - coverboard, minimum 9" rigid insulation, AVB	**80,175**	sf	30.00	2,405,250		
	Premium for FR deck sheathing	**69,700**	sf	2.00	139,400		
	Canopies	**4,030**	sf	25.00	100,750		
	Miscellaneous Roofing						
	Miscellaneous flashings and sealants	**84,205**	sf	0.50	42,103		
	Walkway pads	**2,930**	sf	10.00	29,300		
	Roof Edge Cladding/Fascia						
	MCM roof edge detail				w/ B2010		
	SUBTOTAL					**3,147,713**	
B3020	**ROOF OPENINGS**						
070002	*ROOFING AND FLASHING*						
	Roof hatch	**2**	ea	5,000.00	10,000		
	Elevator vent	**1**	ea	2,500.00	2,500		
	SUBTOTAL					**12,500**	
	TOTAL - ROOFING						**$3,160,213**
C10	***INTERIOR CONSTRUCTION***						
C1010	**PARTITIONS**						
040001	*MASONRY*						
	E/E1; 8" CMU	**13,276**	sf	40.00	531,040		
	G: 12" CMU	**14,230**	sf	45.00	640,350		
	H; 6" CMU	**1,907**	sf	38.00	72,466		
	4" CMU	**1,800**	sf	32.00	57,600		
050001	*MISCELLANEOUS METALS*						
	Seismic clips to CMU	**557**	ea	300.00	167,100		
	Misc. metals & lintels at CMU partitions	**29,306**	sf	2.00	58,612		
061000	*ROUGH CARPENTRY*						
	Wood blocking and misc. rough carpentry as req'd in partitions	**165,035**	gsf	1.00	165,035		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Miscellaneous sealants at partitions	**218,363**	sf	0.75	163,772		
078400	*FIRESTOPPING*						
	Firestopping at partitions	**165,035**	gsf	1.00	165,035		
080001	*METAL WINDOWS*						
	Interior Curtainwall	**79**	sf	165.00	13,035		
	Interior Storefront	**798**	sf	135.00	107,730		
	Premium for ballistic glazing	**30**	sf	100.00	3,000		
	Premium for 60 min FR	**323**	sf	350.00	113,050		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
080002	*GLASS AND GLAZING*						
	Borrowed lights	**982**	sf	50.00	49,100		
	Transaction window	**1**	ls	7,500.00	7,500		
081113	*HOLLOW METAL DOORS & FRAMES*						
	Borrowed lights	**982**	sf	35.00	34,370		
092900	*GYPSUM BOARD ASSEMBLIES*	*218,363*	*sf*				
	A - 6" MS, 1 layer GWB b/s, insulation	**14,875**	sf	20.50	304,938		
	A2/A2A - 6" MS, 2 layers GWB b/s, insulation	**105,697**	sf	25.50	2,695,274		
	BR - 6" MS, 1 layer GWB b/s, BR fiberglass o/s, insulation	**734**	sf	70.50	51,747		
	F4- 3-5/8" MS, 1 layer GWB o/s, insulation	**38,509**	sf	13.50	519,872		
	F5- 3-5/8" MS, 2 layers GWB o/s, insulation	**11,149**	sf	16.00	178,384		
	F6- 6" MS, 1 layer GWB o/s, insulation	**11,076**	sf	15.50	171,678		
	F7- 6" MS, 2 layers GWB o/s, insulation	**23,839**	sf	18.00	429,102		
	F8- 7/8" hat channel, 1 layer GWB o/s	**9,697**	sf	8.50	82,425		
	S7 - shaft wall	**2,787**	sf	26.00	72,462		
	Engineering, Touchup & patching, coordination	**1**	ls	125,000.00	125,000		
	Premium time	**1**	ls	50,000.00	50,000		
102200	*OPERABLE PARTITIONS*						
	12' x 8'	**1**	ea	11,520.00	11,520		
	23' x 8', Teacher Collaboration	**3**	ea	25,760.00	77,280		
	29'-4" x 13'-4"	**1**	ea	53,998.00	53,998		
	34' x 10'	**1**	ea	68,600.00	68,600		
	SUBTOTAL					**7,241,075**	
C1020	**INTERIOR DOORS**						
061000	*ROUGH CARPENTRY*						
	Wood blocking at openings	**4,907**	lf	4.00	19,628		
070001	*WATERPROOFING, DAMPPROOFING AND CAULKING*						
	Backer rod & double sealant	**4,907**	lf	3.50	17,175		
080002	*GLASS AND GLAZING*						
	Sidelight	**1,192**	sf	50.00	59,600		
	Premium for Schoolguard glazing	**9**	sf	50.00	450		
081113	*HOLLOW METAL DOORS & FRAMES*						
	Single	**251**	ea	450.00	112,950		
	Double	**32**	ea	600.00	19,200		
	Sidelight	**1,192**	sf	35.00	41,720		
081400	*WOOD DOORS*						
	Type F	**243**	ea	650.00	157,950		
	Type FG, 2 glazed panels	**4**	ea	850.00	3,400		
	Type G, glazed panel	**66**	ea	800.00	52,800		
	premium for STC 53 acoustic door systems	**3**	lvs	10,000.00	30,000		
	premium for ballistic doors	**4**	lvs	2,500.00	10,000		
	Door install	**313**	ea	500.00	156,500		
083110	*ACCESS DOORS AND FRAMES*						
	Access doors	**1**	ls	10,000.00	10,000		
083323	*OVERHEAD GRILLES*						
	OHD 4' x 4'	**1**	ea	2,400.00	2,400		
	OHG 20'-4" x 11'-5"	**2**	ea	23,575.00	47,150		
084110	*ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS*						
	Aluminum door, dbl leaf full lite w/ hardware	**5**	pr	14,000.00	70,000		
	Aluminum door, dbl leaf full lite w/ hardware, 60 min FR	**3**	pr	25,000.00	75,000		
	Aluminum door, sgl leaf full lite w/ hardware	**1**	ea	7,000.00	7,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	premium for ballistic doors	**4**	lvs	10,000.00	40,000		
087100	*DOOR HARDWARE*						
	Hardware; includes install	**313**	set	1,100.00	344,300		
	Auto openers	**7**	lvs	5,000.00	35,000		
090007	*PAINTING*						
	Paint door & frame	**313**	ea	200.00	62,600		
	SUBTOTAL					**1,374,823**	
C1030	**SPECIALTIES / MILLWORK**						
055000	*MISCELLANEOUS METALS*						
	Misc. metals as req'd throughout, allowance	**165,035**	gsf	3.50	577,623		
	Handrail at ramp	**70**	lf	150.00	10,500		
	Railing at cafeteria CW	**87**	lf	500.00	43,500		
	Railing at open to below areas, glass panels	**55**	lf	700.00	38,500		
	Misc metals coordination	**1**	ls	125,000.00	125,000		
061000	*ROUGH CARPENTRY*						
	Backer panels in electrical closets	**1**	ls	10,000.00	10,000		
	Rough carpentry & blocking as req'd throughout, allowance	**165,035**	gsf	0.26	42,909		
064020	*INTERIOR ARCHITECTURAL WOODWORK*						
	Window sills; solid surface	**1,300**	lf	96.00	124,800		
	Solid surface at restroom entrances	**1**	ls	30,000.00	30,000		
	Media						
	Circulation desk	**1**	ls	16,920.00	16,920		
	Custom window seats	**1**	ea	27,300.00	27,300		
	Wood veneer panels at bookcase - top and side; 14"	**272**	lf	144.00	39,168		
	Wood veneer panels at mobile bookcase - top; 28"	**84**	lf	288.00	24,192		
	Admin						
	Extended Learning						
	Bench w/ storage	**57**	lf	600.00	34,200		
	Stair 5						
	Millwork stair bench	**1**	ea	30,000.00	30,000		
	Tree feature at Stair 5	**1**	ls	84,000.00	84,000		
	Lego wall	**5**	ea	4,968.00	24,840		
	Display cases, 4' x 8'	**12**	ea	4,800.00	57,600		
	Bench , corridor 102	**50**	lf	540.00	27,000		
	Trash/recycling	**42**	lf	840.00	35,280		
	Miscellaneous wood trim and millwork throughout	**165,035**	gsf	1.00	165,035		
	VBE opportunities, allow	**1**	ls	100,000.00	100,000		
101100	*VISUAL DISPLAY SURFACES*						
	Markerboards	**4,400**	sf	30.00	132,000		
	Tackboards	**4,900**	sf	25.00	122,500		
101400	*SIGNAGE*						
	Room signage	**293**	loc	175.00	51,275		
	Code and wayfinding signage	**165,035**	gsf	0.50	82,518		
	Dedication plaque	**1**	ea	1,500.00	1,500		
	Custom graphics	**165,035**	gsf	0.50	82,518		
102110	*TOILET COMPARTMENTS*						
	Toilet partition - standard	**34**	ea	1,900.00	64,600		
	Toilet partition - ADA	**14**	ea	2,500.00	35,000		
	Toilet partition - urinal screen	**1**	ea	900.00	900		
	Curtain at nurse	**3**	loc	1,000.00	3,000		
102800	*TOILET ACCESSORIES*						

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Gang bathrooms	**14**	rms	4,000.00	56,000		
	Individual bathrooms	**35**	rms	1,500.00	52,500		
	Soap dispensers at classrooms	**1**	ls	25,000.00	25,000		
	Custodial closet accessories	**7**	rms	300.00	2,100		
102600	*CORNER GUARDS*						
	Corner guards	**1**	ls	5,000.00	5,000		
104400	*FIRE PROTECTION SPECIALTIES*						
	Fire extinguisher cabinets	**56**	ea	350.00	19,600		
	AED cabinets - allowance	**2**	ea	450.00	900		
105000	*LOCKERS*						
	LK-T1, single	**11**	ope	450.00	4,950		
	LK-T2, 2-tier	**6**	ope	350.00	2,100		
	LK-T5, 5 tier	**40**	ope	150.00	6,000		
	SUBTOTAL					**2,418,328**	
	TOTAL - INTERIOR CONSTRUCTION						**$11,034,226**
C20	***STAIRCASES***						
C2010	**STAIR CONSTRUCTION**						
033000	*CONCRETE*						
	Concrete to stairs	**5**	flt	4,000.00	20,000		
	Concrete to stair landings	**5**	flt	1,000.00	5,000		
055000	*MISCELLANEOUS METALS*						
	Stairs 1 & 3	**4**	flt	65,000.00	260,000		
	Stair 2	**2**	flt	65,000.00	130,000		
	Stair 4	**2**	flt	75,000.00	150,000		
	Stair 4 - roof	**1**	flt	65,000.00	65,000		
	Stair 5, Cafeteria w/ resin guardrail	**1**	flt	65,000.00	65,000		
	Stair 6, 3 treads	**1**	ls	5,000.00	5,000		
	SUBTOTAL					**700,000**	
C2020	**STAIR FINISHES**						
090005	*RESILIENT FLOORS*						
	Rubber tread/riser	**600**	lf	45.00	27,000		
	Raised rubber flooring	**1,245**	sf	25.00	31,125		
	Steps at stage; wood riser and tread	**90**	lf	120.00	10,800		
090007	*PAINTING*						
	Paint to stairs	**10**	flt	6,000.00	60,000		
966620	*TERRAZZO FLOORING*						
	Precast terrazzo tread/risers, Stairs 2, 4 & 5	**828**	lf	225.00	186,300		
	Terrazzo at intermediate landings	**562**	sf	50.00	28,100		
	SUBTOTAL					**343,325**	
	TOTAL - STAIRCASES						**$1,043,325**
C30	***INTERIOR FINISHES***						
C3010	**WALL FINISHES**						
064020	*INTERIOR ARCHITECTURAL WOODWORK*						
	Wood wainscot	**1,000**	sf	130.00	130,000		
	Wood trim at tile	**3,990**	lf	35.00	139,650		
	Custodian wainscot; FRP	**1,036**	sf	20.00	20,720		
090002	*TILE*						
	Corridors, cafeteria, etc.; 52"	**13,095**	sf	34.00	445,230		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Kitchen; full height	**2,670**	sf	34.00	90,780		
	Bathroom tile	**17,820**	sf	34.00	605,880		
090003	*ACOUSTICAL TILE*						
090007	*PAINTING*						
	Paint to GWB	**359,954**	sf	0.90	323,959		
	Paint to CMU	**62,352**	sf	1.25	77,940		
	Premium time	**1**	ls	20,000.00	20,000		
	Digital wall covering	**2,750**	sf	25.00	68,750		
098400	*ACOUSTIC ROOM COMPONENTS*						
	AWP-1; Wood fiber acoustic wall panel	**2,936**	sf	28.00	82,208		
	Premium for digital image	**650**	sf	40.00	26,000		
	Acoustic Wood Slat						
	Cafeteria	**1,580**	sf	90.00	142,200		
	AWP-2 - Fabric wrapped panel	**454**	sf	45.00	20,430		
	SUBTOTAL					**2,193,747**	
C3020	**FLOOR FINISHES**						
003300	*CONCRETE FINISHES*						
	Sealed concrete	**5,840**	sf	2.50	14,600		
	Painted concrete	**760**	sf	3.00	2,280		
	Floor prep	**165,035**	sf	1.50	247,553		
090005	*RESILIENT FLOORS*						
	LIN - Linoleum sheet; Forbo up to 10 colors	**91,476**	sf	7.00	640,332		
	RAF- Rubber Athletic Flooring	**2,305**	sf	18.00	41,490		
	RSF - Rubber sheet	**6,500**	sf	14.00	91,000		
	QTZ - Quartz tile	**1,045**	sf	6.00	6,270		
	SDT-1, Static dissipative tile	**190**	sf	12.00	2,280		
	Rubber base	**1**	ls	70,000.00	70,000		
	Floor protection	**101,516**	sf	0.75	76,137		
096400	*WOOD FLOORING*						
	Wood athletic flooring at Gym	**11,670**	sf	32.00	373,440		
	Ventilating cove base	**435**	lf	10.00	4,350		
	ST-1 , stage	**2,000**	sf	25.00	50,000		
966620	*TERRAZZO FLOORING*						
	Terrazzo	**17,650**	sf	40.00	706,000		
	Terrazzo base	**2,680**	lf	40.00	107,200		
	Floor protection	**17,650**	sf	1.25	22,063		
096700	*EPOXY FLOORING*						
	EPX-1, resinous epoxy w/ integral base	**9,170**	sf	26.00	238,420		
	Floor protection	**9,170**	sf	1.00	9,170		
096820	*CARPETING+ WOM*						
	Carpet tile	**8,475**	sf	7.00	59,325		
124810	*ENTRANCE FLOOR MAT AND FRAMES*						
	Walkoff carpet	**1,020**	sf	25.00	25,500		
	Walkoff grille	**995**	sf	120.00	119,400		
	SUBTOTAL					**2,906,810**	
C3030	**CEILING FINISHES**						
090003	*ACOUSTICAL TILE*						
	ACP-1A, 24x24 tile - Armstrong Ultima High NRC	**104,165**	sf	7.00	729,155		
	ACP-1B, 24x24 tile - Armstrong Calla, black	**1,030**	sf	12.00	12,360		
	ACP-4A, 24x24 tile - Kitchen zone	**2,410**	sf	7.50	18,075		
	ACP-7, Geometrix 2 x 2 in music rooms	**214**	ea	200.00	42,800		
	WD-1, Linear wood ceiling, Armstrong Metalworks	**7,015**	sf	50.00	350,750		
	WD-2, Linear wood ceiling; acoustic wood panels	**1,945**	sf	60.00	116,700		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
090007	*PAINTING*						
	Paint to GWB ceilings	**10,500**	sf	1.00	10,500		
	Paint all exposed structure, deck & mep/fp systems to be painted, incl at Tectum ceilings	**24,410**	sf	4.00	97,640		
092900	*GYPSUM BOARD ASSEMBLIES*						
	GWB ceiling	**8,685**	sf	18.00	156,330		
	GWB ceiling, 2 hour rated	**40**	sf	20.00	800		
	GWB sound isolation ceiling	**1,775**	sf	30.00	53,250		
	GWB soffits throughout	**5,930**	gsf	25.00	148,250		
098400	*ACOUSTIC ROOM COMPONENTS*				w/ 090003		
	Tectum panels attached to underside of deck	**11,980**	sf	26.00	311,480		
	SUBTOTAL					**2,048,090**	
	TOTAL - INTERIOR FINISHES						**$7,148,647**
D10	***CONVEYING SYSTEMS***						
D1010	**ELEVATOR**						
	Passenger elevator, 3 stop	**1**	ea	270,000.00	270,000		
	Pit ladders	**1**	ea	1,620.00	1,620		
	Sill angles	**1**	ea	3,000.00	3,000		
	Operator time	**30**	day	2,200.00	66,000		
	SUBTOTAL					**340,620**	
	TOTAL - CONVEYING SYSTEMS						**$340,620**
D20	***PLUMBING***						
D2000	**PLUMBING, GENERALLY**						
	Equipment						
	Domestic water service and meter - submeter SM-1	**1**	ea	15,000.00	15,000		
	Reduced pressure backflow preventer, 4"	**1**	ea	8,500.00	8,500		
	HVAC & Irrigation backflow preventers	**3**	ea	1,735.00	5,205		
	Domestic water heater EWH-1/2/3, 120 gal. / 90 KW	**3**	ea	40,000.00	120,000		
	SM-2,3, 2 1/2" Submeters, domestic hot water, kitchen hot water	**2**	ea	5,500.00	11,000		
	SM-4, 1 1/2" Submeter, irrigation	**1**	ea	3,500.00	3,500		
	TMV-1, Master mixing valve & temperature control station	**2**	ea	15,500.00	31,000		
	Expansion tank, 35 gal.	**1**	ea	2,500.00	2,500		
	Recirc. Pump	**2**	ea	1,800.00	3,600		
	Interior grease interceptor, 75 gpm	**2**	ea	4,200.00	8,400		
	Exterior grease interceptor - by div 33, connections by PC	**1**	ea	5,500.00	5,500		
	Elevator sump pump with oil separator	**1**	ea	9,500.00	9,500		
	Electronic trap primers, 8 port	**3**	ea	1,900.00	5,700		
	Electronic trap primers, 5 port	**5**	ea	1,500.00	7,500		
	Ware washer detail & RPBP1, 2	**1**	ls	1,800.00	1,800		
	Water filtration system	**1**	ls	15,000.00	15,000		
	Plumbing Fixtures & Specialties				-		
	Water closet P-1A, wall/manual	**74**	ea	1,900.00	140,600		
	Water closet P-1B, wall/manual	**12**	ea	1,900.00	22,800		
	Urinal P-2, P-2A, manual	**8**	ea	1,850.00	14,800		
	Lavatory P-3, P-3A, wall/sensor	**64**	ea	2,100.00	134,400		
	Lavatory P-3B, wall/sensor	**12**	ea	2,100.00	25,200		
	Countertop sink P-5, P-5A, w/ bubbler	**132**	ea	1,845.00	243,540		
	Electric water cooler with bottle fill P-6, bi-level	**7**	ea	4,450.00	31,150		
	Mop sink P-7	**7**	ea	1,750.00	12,250		
	Art room sink P-8, 8A w/solids interceptor	**5**	ea	2,100.00	10,500		
	Emergency shower & eyewash stations, P-9, P-9A	**2**	ea	1,725.00	3,450		
	Floor drain FD1	**23**	ea	1,100.00	25,300		
	Floor drain FD2	**12**	ea	1,200.00	14,400		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
691		Floor sinks - kitchen	**16**	ea	1,500.00	24,000		
692		Roof drain RD1, Overflow drain OD1	**90**	ea	1,400.00	126,000		
693		Downspout nozzle	**15**	ea	1,200.00	18,000		
694		Hose bibb HB	**20**	ea	350.00	7,000		
695		Freezeproof wall hydrant WH	**18**	ea	550.00	9,900		
696		Roof hydrant RH	**6**	ea	950.00	5,700		
697		Ice makers, refrigerator connections, etc.	**5**	ea	650.00	3,250		
698		Fixture rough ins	**321**	ea	300.00	96,300		
699		Domestic Water Type L Copper Pipe				-		
700		6" Domestic water piping with fittings & hangers	**230**	lf	95.00	21,850		
701		4" Domestic water piping with fittings & hangers	**90**	lf	75.00	6,750		
702		3" Domestic water piping with fittings & hangers	**160**	lf	65.00	10,400		
703		2 1/2" Domestic water piping with fittings & hangers	**250**	lf	55.00	13,750		
704		Domestic water, branch & distribution piping with fittings & hangers	**17,655**	lf	30.00	529,650		
705		Valve assemblies, specialties and trim	**1**	ls	100,899.00	100,899		
706		Rough-in & connection to kitchen equipment/fixtures	**1**	ls	25,000.00	25,000		
707		Sanitary W&V, Cast Iron Pipe				-		
708		6" Sanitary waste pipe with fittings below grade	**320**	lf	80.00	25,600		
709		4" Sanitary waste pipe with fittings below grade	**2,260**	lf	70.00	158,200		
710		3" Sanitary waste pipe with fittings below grade	**320**	lf	65.00	20,800		
711		2" Sanitary waste pipe with fittings below grade	**240**	lf	55.00	13,200		
712		4" Sanitary waste pipe with fittings & hangers above grade	**1,776**	lf	75.00	133,200		
713		2" Sanitary waste pipe with fittings & hangers above grade	**6,580**	lf	45.00	296,100		
714		Rough-in & connection to kitchen equipment/fixtures	**1**	ls	25,000.00	25,000		
715		Indirect AC drains & backwater valves	**1**	ls	10,000.00	10,000		
716		Thermal expansion joints	**4**	ea	2,000.00	8,000		
717		Storm Drainage, Cast Iron Pipe				-		
718		12" Storm piping with fittings, below grade	**220**	lf	125.00	27,500		
719		10" Storm piping with fittings, below grade	**420**	lf	115.00	48,300		
720		8" Storm piping with fittings, below grade	**420**	lf	100.00	42,000		
721		6" Storm piping with fittings, below grade	**495**	lf	80.00	39,600		
722		4" Storm piping with fittings, below grade	**250**	lf	70.00	17,500		
723		10" Storm piping with fittings, above grade	**20**	lf	120.00	2,400		
724		8" Storm piping with fittings, above grade	**300**	lf	110.00	33,000		
725		6" Storm piping with fittings, above grade	**1,986**	lf	90.00	178,740		
726		4" Storm piping with fittings, above grade	**380**	lf	75.00	28,500		
727		Pipe Insulation				-		
728		Domestic water pipe insulation	**18,155**	lf	8.00	145,240		
729		Stormwater pipe insulation, horizontal	**2,100**	lf	18.00	37,800		
730		Radon Mitigation System						
731		Radon ventilation fan	**14**	ea	1,200.00	16,800		
732		4" PVC (Below grade perforated)	**4,200**	lf	30.00	126,000		
733		4" PVC (Sched 40) Roof stacks	**14**	ea	1,500.00	21,000		
734		Misc. Radon Mitigation accessories	**1**	ls	9,000.00	9,000		
735		Miscellaneous						
736		Project management, safety, supervision, coordination and BIM	**1**	ls	80,530.60	80,531		
737		Testing and flushing	**1**	ls	11,040.00	11,040		
738		Access panels	**1**	ls	6,250.00	6,250		
739		Coring, cutting, sleeves & sealing	**1**	ls	18,800.00	18,800		
740		Hydraulic lifts/rigging	**1**	ls	15,000.00	15,000		
741		Commissioning Support	**1**	ls	10,350.00	10,350		
742		Municipal fees associated with construction				waived		
743		Premium time	**1**	ls	35,000.00	35,000		
744		SUBTOTAL					**3,570,995**	
745								
746		***TOTAL - PLUMBING***						**$3,570,995**
747								
748	***D30***	***HVAC***						
749								
750	**D3000**	**HVAC, GENERALLY**						
751		Heating & Cooling Equipment						
752		Heat pump chillers ASHP-1/2 (8 - 30 ton modules each)	**480**	ton	3,400.00	1,632,000		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
753		EB-1, 2, Electric hot water boilers, based on Fulton, 2,047 mbh, 600kW	**1**	ea	65,504.00	65,504		
754		HX-1, 2, Plate & frame heat exchangers	**2**	ea	28,500.00	57,000		
755		Expansion Tanks ET-1,2,3, 132 gallons	**3**	ea	7,600.00	22,800		
756		Buffer Tanks (700 gallon)	**2**	ea	15,400.00	30,800		
757		Buffer Tanks (1,040 gallon)	**2**	ea	22,000.00	44,000		
758		Air Separator, 8"	**2**	ea	6,700.00	13,400		
759		Air Separator, 6"	**2**	ea	5,600.00	11,200		
760		Chemical Shot Feeder - CSF-1/2/3/4, 7.5 gallon	**4**	ea	2,600.00	10,400		
761		Glycol feeder units GF-1/2/3/4	**4**	ea	4,600.00	18,400		
762		FCU, Fan coil units	**3**	ea	3,500.00	10,500		
763		Radiant panels - hydronic	**4,690**	lf	165.00	773,850		
764		Unit heaters - hydronic	**5**	ea	1,800.00	9,000		
765		Cabinet unit heaters - hydronic	**14**	ea	2,400.00	33,600		
766		Electric unit heaters	**1**	ea	2,000.00	2,000		
767		FTR, Fin tube radiation units	**70**	lf	125.00	8,750		
768		WRU, wall radiation units	**2**	ea	1,200.00	2,400		
769		DC-1 through 10, Ductless split systems, 1.5 tons & smaller	**9**	ea	9,500.00	85,500		
770		DC-3A/3/B, DC-11/12 Ductless split systems, 3 - 4.8 ton	**4**	ea	15,500.00	62,000		
771		Pumps						
772		Pumps P-1,2,3 w/VFD, 325 gpm, 7.5 hp	**3**	ea	9,750.00	29,250		
773		Pumps P-4,5,6, w/VFD, 565 gpm, 10 hp	**3**	ea	16,950.00	50,850		
774		Pumps P-7,8, w/VFD, 600 gpm, 20 hp	**2**	ea	18,000.00	36,000		
775		Pumps P-9,10,11, w/VFD, 530 gpm, 20 hp	**3**	ea	13,250.00	39,750		
776		Pumps P-12,13, w/VFD, 340 gpm, 10 hp	**2**	ea	10,200.00	20,400		
777		BP-1,2, Boiler pumps w/VFD	**2**	ea	6,400.00	12,800		
778		Condensate pumps	**13**	ea	300.00	3,900		
779		Air Distribution Equipment						
780		RTU-1, w/HW coil, CHW coil, ERW	**16,200**	cfm	24.50	396,900		
781		RTU-2, w/HW coil, CHW coil, ERW	**15,300**	cfm	24.50	374,850		
782		RTU-3, w/HW coil, CHW coil, ERW	**10,800**	cfm	24.50	264,600		
783		RTU-4, w/HW coil, CHW coil, ERW	**12,000**	cfm	24.50	294,000		
784		RTU-5, w/HW coil, CHW coil, ERW	**7,150**	cfm	24.50	175,175		
785		RTU-6, w/HW coil, CHW coil, ERW	**2,250**	cfm	24.50	55,125		
786		RTU-7, w/HW coil, CHW coil, ERW	**1,100**	cfm	24.50	26,950		
787		RTU-8, w/HW coil, CHW coil, ERW	**1,900**	cfm	24.50	46,550		
788		RTU-9, w/HW coil, CHW coil, ERW	**3,300**	cfm	24.50	80,850		
789		MAU-1, Roof mounted w/ HW coil, CHW coil	**4,400**	cfm	20.00	88,000		
790		Roof curbs / dunnage / supports	**10**	ea	7,500.00	75,000		
791		Exhaust Fans						
792		KEF-1, kitchen exhaust fan, 6,800 cfm, roof	**6,800**	cfm	3.00	20,400		
793		EF-1, receiving area, 600 cfm, roof	**600**	cfm	3.00	1,800		
794		EF-2/3, toilet rooms, roof	**4,260**	cfm	3.00	12,780		
795		EF-4, Art room, inline	**450**	cfm	3.00	1,350		
796		EF-5/6, laundry fans	**2**	ea	1,200.00	2,400		
797		Fan curbs	**4**	ea	350.00	1,400		
798		Sheet Metal & Accessories						
799		Galvanized steel ductwork and accessories	**161,301**	lb	18.00	2,903,418		
800		Phenolic roof duct	**4,200**	lb	28.00	117,600		
801		Welded kitchen duct	**6,200**	lb	20.00	124,000		
802		Kitchen hood connections	**14**	ea	600.00	8,400		
803		Registers, grilles & diffusers	**315**	ea	250.00	78,750		
804		Displacement diffusers	**235**	ea	325.00	76,375		
805		VAV terminal unit	**175**	ea	1,455.00	254,625		
806		CVR-1 through 8, Constant volume damper	**8**	ea	900.00	7,200		
807		PEV, Penthouse elevator vent	**1**	ea	1,500.00	1,500		
808		Sound attenuators	**19**	ea	5,500.00	104,500		
809		Duct accessories, misc. dampers, etc.	**165,035**	gsf	0.65	107,273		
810		Hydronic Piping						
811		8", Mains & Mechanical room piping	**560**	lf	135.00	75,600		
812		6", Mains & Mechanical room piping	**1,900**	lf	125.00	237,500		
813		4", Mains & distribution piping	**600**	lf	95.00	57,000		
814		3", Mains & distribution piping	**1,480**	lf	70.00	103,600		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	2 1/2", Mains & distribution piping	**1,820**	lf	65.00	118,300		
	2", Mains & distribution piping	**4,300**	lf	55.00	236,500		
	1-1/2", 1-1/4", Mains & distribution piping	**3,800**	lf	45.00	171,000		
	1", 3/4" branch & distribution piping	**15,900**	lf	31.00	492,900		
	Hot/chilled water fittings, valves and accessories	**1**	ls	268,632.00	268,632		
	Refrigerant Piping						
	Refrigerant piping - split system	**2,015**	lf	45.00	90,675		
	Condensate Drain Piping						
	Condensate piping with fittings & hangers	**585**	lf	35.00	20,475		
	Insulation						
	Duct insulation	**120,976**	sf	5.50	665,368		
	Fire wrap, kitchen duct	**4,030**	sf	9.00	36,270		
	Hydronic pipe insulation	**30,360**	lf	15.00	455,400		
	Condensate drain pipe insulation	**585**	lf	8.00	4,680		
	Refrigerant pipe insulation	**2,015**	lf	9.00	18,135		
	Automatic Temperature Controls						
	Automatic temperature controls DDC	**165,035**	gsf	8.15	1,345,035		
	Balancing						
	System testing & balancing	**165,035**	gsf	0.85	140,280		
	Miscellaneous						
	Testing and start-up	**1**	ls	18,400.00	18,400		
	Coring, cutting, sleeves & sealing	**1**	ls	24,150.00	24,150		
	Hydraulic lifts/rigging	**1**	ls	79,951.05	79,951		
	Project management, safety, supervision, coordination and BIM	**1**	ls	199,877.63	199,878		
	Glycol & chemical treatment	**1**	ls	52,830.96	52,831		
	Commissioning Support	**1**	ls	13,800.00	13,800		
	Municipal fees associated with construction				waived		
	Premium time	**1**	ls	35,000.00	35,000		
	SUBTOTAL					**13,749,185**	
	TOTAL - HVAC						**$13,749,185**
D40	***FIRE PROTECTION***						
D4000	**FIRE PROTECTION, GENERALLY**						
	Equipment						
	8" Fire service	**1**	ea	15,000.00	15,000		
	8" Double check valve assembly	**1**	ea	10,000.00	10,000		
	6" Wet alarm check valve assembly	**1**	ea	6,650.00	6,650		
	6" Butterfly valve w/ tampers	**5**	ea	2,665.00	13,325		
	2 1/2" dry alarm check valve assembly & compressor	**1**	ea	5,800.00	5,800		
	Electric bell	**2**	ea	800.00	1,600		
	Fire department connection	**2**	ea	2,650.00	5,300		
	Zone control valve assembly	**4**	ea	2,800.00	11,200		
	Fire department valve with cabinet	**14**	ea	1,200.00	16,800		
	Misc. Fire Protection valves, fittings & trim	**1**	ls	12,851.25	12,851		
	Sprinkler Heads & Distribution Piping						
	Sprinkler heads - Concealed pendant	**1,320**	ea	90.00	118,800		
	Sprinkler heads - Uprights (includes uprights where above coverage is	**415**	ea	80.00	33,200		
	Sprinkler heads - Custom color	**101**	ea	120.00	12,120		
	Sprinkler heads - Dry barrel	**22**	ea	600.00	13,200		
	Sprinkler heads - Sidewall	**12**	ea	90.00	1,080		
	Sprinkler wire guards	**225**	ea	10.00	2,250		
	6" Main piping & standpipe	**1,020**	lf	60.00	61,200		
	4" Main piping & standpipe	**5,200**	lf	55.00	286,000		
	3"" Main piping	**150**	lf	50.00	7,500		
	2 1/2"" Main piping	**420**	lf	45.00	18,900		
	2" Main piping	**450**	lf	40.00	18,000		
	1 1/2" & smaller distribution & branch piping	**17,578**	lf	32.00	562,496		
	Miscellaneous						
	Project management, supervision, coordination and BIM	**1**	ls	61,663.60	61,664		
	Hydraulic calculations	**1**	ls	6,600.00	6,600		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Coring, cutting, sleeves & sealing	**1**	ls	9,200.00	9,200		
	Hydraulic lifts/rigging	**1**	ls	12,332.72	12,333		
	Commissioning Support	**1**	ls	3,680.00	3,680		
	Municipal fees associated with construction				waived		
	SUBTOTAL					**1,326,749**	
	TOTAL - FIRE PROTECTION						**$1,326,749**
D50	***ELECTRICAL***						
D5010	**SERVICE & DISTRIBUTION**						
	Gear & Distribution						
	Early Procurement: ABB proposal price	**1**	ls	259,443.37	259,443		
	Electrical Distributor & Electrical Contractor mark-up				Included above		
	Installation labor early procurement items:						
	MSB-2 2500A 277/480V main switchboard	**1**	ea	33,440.00	33,440		
	MSB-1 2500A 277/480V main switchboard	**1**	ea	31,020.00	31,020		
	Switchgear budget price: ABB	**1**	ls	788,402.11	788,402		
	Electrical Distributor & Electrical Contractor mark-up				Included above		
	Installation labor package items:						
	400A 277/480V panelboard	**1**	ea	2,332.00	2,332		
	225A 277/480V panelboard	**4**	ea	1,991.00	7,964		
	100A 277/480V panelboard	**8**	ea	1,353.00	10,824		
	150KVA K-13 type transformer	**1**	ea	2,588.30	2,588		
	112.5KVA K-13 type transformer	**1**	ea	2,444.20	2,444		
	75KVA K-13 type transformer	**3**	ea	2,514.60	7,544		
	45KVA K-13 type transformer	**5**	ea	2,200.00	11,000		
	30KVA K-13 type transformer	**6**	ea	1,955.80	11,735		
	600A 120/208V double tub panelboard, EV	**1**	ea	5,500.00	5,500		
	400A 120/208V distribution panelboard	**1**	ea	5,060.00	5,060		
	400A 120/208V double tub panelboard	**2**	ea	4,664.00	9,328		
	250A 120/208V panelboard	**1**	ea	2,332.00	2,332		
	225A 120/208V DT panelboard	**7**	ea	3,982.00	27,874		
	100A 120/208V DT panelboard	**8**	ea	2,706.00	21,648		
	200A disconnect	**1**	ea	676.50	677		
	100A disconnect	**4**	ea	463.10	1,852		
	60A disconnect	**2**	ea	382.80	766		
	TVSS	**35**	ea	110.00	3,850		
	Emergency power off station	**2**	ea	500.00	1,000		
	Utility meter	**2**	ea	500.00	1,000		
	Submetering	**1**	ls	50,000.00	50,000		
	Feeders						
	500A AL feed	**20**	lf	179.21	3,584		
	400A AL feed	**30**	lf	167.83	5,035		
	225A AL feed	**1,350**	lf	72.88	98,388		
	200A AL feed	**60**	lf	60.85	3,651		
	150A AL feed	**420**	lf	47.72	20,042		
	100A AL feed	**1,940**	lf	32.27	62,604		
	400A CU feed	**20**	lf	197.45	3,949		
	300A CU feed	**70**	lf	132.54	9,278		
	225A CU feed	**50**	lf	83.57	4,179		
	150A CU feed	**180**	lf	54.36	9,785		
	100A CU feed	**1,200**	lf	39.51	47,412		
	60A CU feed	**490**	lf	26.10	12,789		
	Generator Power						
	Generator package, Milton Cat materials allowance	**1**	ls	400,000.00	400,000		
	Installation labor package items:						
	600KW diesel fueled generator set in weatherproof enclosure and	**1**	ls	25,000.00	25,000		
	Exterior quick connect with camlock & switches	**1**	ea	2,500.00	2,500		
	1000A 3 pole automatic transfer switch	**1**	ea	2,500.00	2,500		
	200A 3 pole automatic transfer switch	**1**	ea	1,200.00	1,200		
	Docking station	**1**	ea	2,500.00	2,500		
	Remote annunciator panel	**1**	ea	750.00	750		
	Emergency switchgear: included in ABB pricing above				Included above		
	Installation labor package items:						
	1000A 480/277V distribution panelboard	**1**	ea	11,220.00	11,220		
	400A 120/208V DT panelboard	**1**	ea	4,664.00	4,664		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
945		225A 277/480V panelboard	**1**	ea	1,991.00	1,991		
946		100A 277/480V panelboard	**5**	ea	1,353.00	6,765		
947		75KVA K-13 type transformer	**1**	ea	2,514.60	2,515		
948		45KVA K-13 transformer	**1**	ea	2,200.00	2,200		
949		30KVA K-13 transformer	**1**	ea	1,955.80	1,956		
950		225A 120/208V panelboard	**1**	ea	1,991.00	1,991		
951		100A 120/208V DT panelboard	**2**	ea	2,706.00	5,412		
952		100A 120/208V panelboard	**4**	ea	1,353.00	5,412		
953		60A 120/208V panelboard	**2**	ea	1,100.00	2,200		
954		TVSS	**15**	ea	110.00	1,650		
955		200A disconnect	**1**	ea	676.50	677		
956		100A disconnect	**2**	ea	463.10	926		
957		UPS 24KW 30KVA	**1**	ea	25,000.00	25,000		
958		Emergency power off station	**1**	ea	500.00	500		
959		Feeders						
960		200A AL feed	**60**	lf	60.85	3,651		
961		150A AL feed	**90**	lf	47.72	4,295		
962		1000A CU feed	**80**	lf	197.45	15,796		
963		400A CU feed	**40**	lf	197.45	7,898		
964		125A CU feed	**160**	lf	51.61	8,258		
965		100A CU feed	**150**	lf	39.51	5,927		
966		70A CU feed	**350**	lf	26.76	9,366		
967		60A CU feed	**360**	lf	26.10	9,396		
968		70A MI feed	**580**	lf	32.00	18,560		
969		Photovoltaic System						
970		PV system including disconnect switch & in-line meter				NIC		
971		Infrastructure for future system, allow: 2-4" & 2-1" conduit runs from	**1**	ls	7,500.00	7,500		
972		Pull box WP	**2**	ea	1,500.00	3,000		
973		Grounding and Lightning Protection						
974		Grounding	**1**	ls	55,000.00	55,000		
975		Telecom closet grounding				Included above		
976		Lightning protection system	**165,053**	sf	0.50	82,527		
977		Equipment Wiring						
978		ASHP 600A feed, connection & allow 600A FSS WP	**2**	ea	35,444.00	70,888		
979		ASHP CP 20A feed, connection & TS	**2**	ea	1,575.00	3,150		
980		ASHP interconnections 20A feed, connection & TS	**16**	ea	1,575.00	25,200		
981		BF 20A feed, connection & TS	**2**	ea	1,580.00	3,160		
982		BP 20A feed, connection & 30A FSS and VFD connection	**2**	ea	1,680.00	3,360		
983		Classroom partition feed, connection & 30A FSS with LV to control	**3**	ea	2,450.00	7,350		
984		Coiling door feed, connection & 30A FSS with LV to control station,	**1**	ea	3,300.00	3,300		
985		CP 20A feed, connection & TS	**13**	ea	1,575.00	20,475		
986		CUH 20A feed, connection & TS	**14**	ea	1,610.00	22,540		
987		DCUc 20A feed, connection & 30A FSS WP	**9**	ea	1,780.00	16,020		
988		DCUc 30A feed, connection & 60A FSS WP	**4**	ea	2,320.00	9,280		
989		DCUe 20A feed, connection & TS	**13**	ea	1,045.00	13,585		
990		DDC system power	**1**	ls	3,000.00	3,000		
991		Door motor 20A feed, connection, 30A FSS & LV to 2 push plates	**13**	ea	2,200.00	28,600		
992		EB BOILER 1000A feed, connection & 1200A FSS	**1**	ea	67,365.00	67,365		
993		EF 20A feed, connection & TS	**1**	ea	715.00	715		
994		EF 20A feed, connection & TS WP	**5**	ea	1,315.00	6,575		
995		Elevator 100A feed, connection & 100A FSS	**1**	ea	5,765.00	5,765		
996		Elevator cab 20A feed, connection & 30A FSS	**1**	ea	2,400.00	2,400		
997		EPO station	**5**	ea	350.00	1,750		
998		EPO WP station	**1**	ea	500.00	500		
999		ETP feed & connection, allow 20A	**7**	ea	1,070.00	7,490		
1000		EWH 100A feed, connection & 100A NFSS	**1**	ea	5,200.00	5,200		
1001		EWH 200A feed, connection & 200A NFSS	**2**	ea	7,405.00	14,810		
1002		EUH/FCU 20A feed, connection & TS	**6**	ea	1,580.00	9,480		
1003		FP air compressor 20A feed, connection & TS	**1**	ea	1,580.00	1,580		
1004		KEF 20A feed, connection & 30A FSS WP	**1**	ea	2,828.00	2,828		
1005		Kiln 50A feed, connection, 60A FSS & special purpose receptacle	**5**	ea	2,686.00	13,430		
1006		Library partition feed, connection & FSS, allow 30A	**1**	ea	2,506.00	2,506		
1007		Lift-auditorium feed, connection & FSS, allow 30A	**1**	ea	4,178.00	4,178		
1008		MAU 20A feed, connection & 30A FSS WP	**1**	ea	3,116.00	3,116		
1009		MAU 20A feed, connection & TS WP	**1**	ea	2,467.00	2,467		
1010		MLC 20A feed, connection & LV to 3 sets of shades	**5**	loc	2,400.00	12,000		
1011		MV 20A feed, connection & TS	**2**	ea	1,575.00	3,150		
1012		OMP 20A feed, connection & TS	**1**	ea	1,575.00	1,575		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Overhead door feed, connection & LV to control station, allow 30A	**1**	ea	2,200.00	2,200		
	Pumps 20A feed, connection & 30A FSS and connection to VFD	**3**	ea	1,967.00	5,901		
	Pumps 30A feed, connection & 30A FSS and connection to VFD	**4**	ea	1,860.00	7,440		
	Pumps 70A feed, connection & 100A FSS and connection to VFD	**6**	ea	3,782.00	22,692		
	Radon venting system 20A feed, connection & TS WP	**24**	ea	1,500.00	36,000		
	RP circulation pump 20A feed, connection & TS	**2**	ea	1,433.00	2,866		
	RTU 125A feed, connection & 200A FSS WP	**2**	ea	5,977.00	11,954		
	RTU 20A feed, connection & 30A FSS WP	**4**	ea	3,170.00	12,680		
	RTU 20A feed, connection & TS	**9**	ea	2,450.00	22,050		
	RTU 70A feed, connection & 100A FSS WP	**3**	ea	6,494.00	19,482		
	SP 20A feed, connection & TS	**1**	ea	1,865.00	1,865		
	SP CP 20A feed, connection & TS	**1**	ea	1,144.00	1,144		
	TM feed & connection, allow 20A	**2**	ea	1,430.00	2,860		
	UH 20A feed, connection & TS	**5**	ea	1,300.00	6,500		
	VAV 20A feed, connection & TS	**177**	ea	856.00	151,512		
	Projection screen feed, connection & LV to control station, allow	**1**	ls	2,000.00	2,000		
	Kitchen:						
	150A feed, connection & 200A FSS	**1**	ea	4,575.00	4,575		
	20A feed & connection	**31**	ea	780.00	24,180		
	20A feed, connection & 30A FSS	**1**	ea	1,245.00	1,245		
	20A feed, connection & TS	**16**	ea	855.00	13,680		
	250A feed, connection & 400A FSS	**1**	ea	9,200.00	9,200		
	30A feed, connection & 30A FSS	**1**	ea	1,445.00	1,445		
	50A feed, connection & 60A FSS	**1**	ea	1,875.00	1,875		
	70A feed, connection & 100A FSS	**1**	ea	2,905.00	2,905		
	Gymnasium:						
	Motorized back stop feed, connection, FSS & LV to control station	**6**	ea	3,000.00	18,000		
	Motorized curtain feed, connection, 2-FSS & LV to control station	**1**	ea	3,700.00	3,700		
	Motorized bleachers FSS	**2**		2,975.00			
	Scoreboard with controls and shot clock feed, connection, FSS & LV	**2**	ea	2,550.00	5,100		
	Fairplay scoreboard with shot clocks including installation labor	**2**	ea	12,000.00	24,000		
	Notes: not all equipment on schedule is on the floor plans. Feeder						
	Note: counts adjusted to match mechanical where needed						
	SUBTOTAL					**3,138,861**	
D5020	**LIGHTING & POWER**						
	Lighting						
	Boston Light Source budget pricing 9/5/26	**1**	ls	549,647.00	549,647		
	Type LR2	**65**	ea		Included above		
	Type LR4	**281**	ea		Included above		
	Type LR6	**68**	ea		Included above		
	Type LR6T	**7**	ea		Included above		
	Type LR8	**78**	ea		Included above		
	Type LR8T	**1**	ea		Included above		
	Type LR22	**24**	ea		Included above		
	Type LRB	**379**	lf		Included above		
	Type PC2	**30**	ea		Included above		
	Type RC1	**262**	ea		Included above		
	Type RC2	**83**	ea		Included above		
	Type SL7	**10**	ea		Included above		
	Type SL8	**58**	ea		Included above		
	Site Fixture SL1	**18**	ea		Included above		
	Site Fixture SL2	**3**	ea		Included above		
	Site Fixture SL3	**8**	ea		Included above		
	Site Fixture SL4	**35**	ea		Included above		
	Site Fixture SL9	**23**	ea		Included above		
	Installation labor BLS budgeted fixtures:						
	Fixture	**899**	ea	125.00	112,375		
	Linear fixture	**379**	lf	25.00	9,475		
	Site fixture				See Site Lighting		
	Light fixtures Estimator budget pricing:						
	Type LC1	**128**	lf	90.00	11,520		
	Type LDC	**21**	ea	350.00	7,350		
	Type LK22	**40**	ea	350.00	14,000		
	Type LP4	**33**	ea	350.00	11,550		
	Type LP6	**12**	ea	450.00	5,400		
	Type LP8	**305**	ea	650.00	198,250		
	Type LPA	**12**	lf	90.00	1,080		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail						
	Type LPB	**652**	lf	90.00	58,680		
	Type LPG	**30**	ea	400.00	12,000		
	Type LS2	**4**	ea	300.00	1,200		
	Type LS4	**19**	ea	430.00	8,170		
	Type LS6	**13**	ea	650.00	8,450		
	Type LS8	**37**	ea	865.00	32,005		
	Type LT1	**1,360**	lf	50.00	68,000		
	Type LTC	**6**	ea	350.00	2,100		
	Type PC1	**54**	ea	350.00	18,900		
	Type RC3	**20**	ea	350.00	7,000		
	Type UC	**232**	lf	70.00	16,240		
	J Rooftop fixture, allow	**12**	ea	400.00	4,800		
	Exit	**48**	ea	180.00	8,640		
	Installation labor Estimator budgeted fixtures:						
	Fixture	**606**	ea	125.00	75,750		
	Linear fixture	**2,384**	lf	25.00	59,600		
	Exit sign	**48**	ea	85.00	4,080		
	Site fixture				See Site Lighting		
	Lighting Control						
	Lighting control system	**165,035**	sf	1.50	247,553		
	Occupancy sensor	**458**	ea	225.00	103,050		
	Daylight sensor	**57**	ea	225.00	12,825		
	Single pole LV switch	**307**	ea	65.00	19,955		
	Single pole switch	**16**	ea	35.00	560		
	Single pole switch WP	**12**	ea	45.00	540		
	M master control station	**7**	ea	250.00	1,750		
	OSH	**22**	ea	250.00	5,500		
	PS partition sensor	**2**	ea	150.00	300		
	Photocell	**1**	ea	225.00	225		
	Lighting Circuitry						
	Device plate	**26**	ea	5.60	146		
	Device Box	**2,800**	ea	32.00	89,600		
	3/4" EMT	**9,500**	lf	7.50	71,250		
	#12 THHN	**56,000**	lf	0.95	53,200		
	12/2 MC	**28,000**	lf	5.00	140,000		
	Cat cabling	**41,100**	lf	1.80	73,980		
	Branch Devices						
	Duplex receptacle	**867**	ea	29.00	25,143		
	Double duplex receptacle	**283**	ea	58.00	16,414		
	Double duplex receptacle in floor box/poke thru	**18**	ea	58.00	1,044		
	GFI duplex receptacle	**246**	ea	45.00	11,070		
	Special purpose receptacle, telecom closets	**24**	ea	75.00	1,800		
	Connection to electric bell	**1**	ea	110.00	110		
	Conn EWC	**6**	ea	110.00	660		
	Connection to panel	**8**	ea	110.00	880		
	Connection to restroom sink	**2**	ea	90.00	180		
	Conn security door power supply	**1**	ea	110.00	110		
	Connection to flush valve	**86**	ea	90.00	7,740		
	Connection to flush valve transformer	**5**	ea	110.00	550		
	Conn classroom	**3**	ea	100.00	300		
	Conn classroom ceiling	**63**	ea	110.00	6,930		
	Conn heat trace	**3**	ea	110.00	330		
	Cord reel	**6**	ea	1,200.00	7,200		
	Floor box	**10**	ea	650.00	6,500		
	Poke thru	**8**	ea	750.00	6,000		
	Branch Circuitry						
	WP device plate	**10**	ea	21.70	217		
	Device plate	**1,440**	ea	5.60	8,064		
	Device Box	**1,625**	ea	32.00	52,000		
	3/4" EMT	**7,300**	lf	7.50	54,750		
	3/4" PVC in slab, allow to floor boxes	**200**	lf	10.00	2,000		
	#12 THHN	**47,200**	lf	0.95	44,840		
	MC cable	**22,000**	lf	5.00	110,000		
	4" sleeve	**8**	ea	250.00	2,000		
	2" sleeve	**124**	ea	150.00	18,600		
	1" sleeve	**124**	ea	100.00	12,400		
	Performance Lighting:						
	Barbizon Light Budget Price:	**1**	ls	110,000.00	110,000		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Echo DMX scene controller	**1**	ls		Included above		
	Installation labor	**1**	ea	1,500.00	1,500		
	Control:						
	Echo room controller	**1**	ls		Included above		
	Touch screen station	**1**	ea		Included above		
	DMX input station	**1**	ea		Included above		
	Console	**1**	ls		Included above		
	Installation labor	**4**	ea	500.00	2,000		
	Type TH1	**16**	ea		Included above		
	Type TR1	**60**	lf		Included above		
	DT-01+02+03+04	**4**	ea	assumed redundant with TRI track			
	Installation labor	**4**	ea	500.00	2,000		
	Rough-in						
	2-20A circuit in EMT	**400**	lf	35.00	14,000		
	Back box	**3**	ea	65.00	195		
	3/4" EMT	**300**	lf	7.50	2,250		
	Belden cabling	**800**	lf	1.80	1,440		
	#16/#14 THHN	**200**	lf	1.00	200		
	SUBTOTAL					**2,658,113**	
D5030	**COMMUNICATION & SECURITY SYSTEMS**						
	Telecommunications						
	Head-end: network switch electronics/PBX/system equipment - Cisco						
	Network switches, carried pervious allowance	**1**	ls	500,000.00	500,000		
	Telephone system, carried pervious allowance	**1**	ls	85,000.00	85,000		
	P phone	**157**	ea		Included above		
	MDF fit-out	**1**	ea	17,000.00	17,000		
	IDF fit-out	**2**	ea	7,500.00	15,000		
	1 Port data device	**22**	ea	25.50	561		
	2 Port data device	**146**	ea	51.00	7,446		
	2 Port data device in floor box	**5**	ea	51.00	255		
	3 Port tel/data device	**127**	ea	76.50	9,716		
	3 Port tel/data device in floor box	**3**	ea	76.50	230		
	4 Port data device	**1**	ea	102.00	102		
	4 Port data device in floor box	**1**	ea	102.00	102		
	AP wireless access point, 2-port ceiling	**160**	ea	750.00	120,000		
	AV blank plate	**211**	ea	6.00	1,266		
	AV in floor box	**4**	ea	6.00	24		
	Telephone port	**115**	ea	25.50	2,933		
	WAP 2-port wall	**2**	ea	51.00	102		
	Backbone cabling	**350**	lf	35.00	12,250		
	Cat cabling	**176,200**	lf	1.80	317,160		
	Rough-in						
	MDF rough-in	**1**	ea	7,000.00	7,000		
	IDF rough-in	**2**	ea	4,000.00	8,000		
	Device box with 2-1" conduit stub per detail T2.01	**270**	ea	250.00	67,500		
	4" square box with 1" & 1.25" conduit stub	**215**	ea	275.00	59,125		
	4" square box with 1.25"						
	3/4" PVC in slab, allow to floor boxes	**60**	lf	10.00	600		
	4" EMT, 2 runs from MDF to the IDFs	**460**	lf	62.00	28,520		
	4" EMT sleeve	**26**	ea	250.00	6,500		
	Cable tray	**170**	lf	55.00	9,350		
	Backboard	**3**	ea	750.00	2,250		
	Public address/Master clock system						
	Head-end	**1**	ls	25,000.00	25,000		
	PA console	**4**	ea	2,500.00	10,000		
	Clock	**164**	ea	127.50	20,910		
	Clock 16"	**2**	ea	165.00	330		
	Speaker, ceiling mount	**221**	ea	212.50	46,963		
	Speaker, wall mount	**29**	ea	212.50	6,163		
	Speaker TB talk back, ceiling mount	**62**	ea	250.00	15,500		
	Speaker V volume controlled, ceiling mount	**132**	ea	250.00	33,000		
	Speaker V volume controlled, wall mount	**1**	ea	250.00	250		
	Speaker WP	**12**	ea	500.00	6,000		
	CB call button	**62**	ea	120.00	7,440		
	Speaker cabling	**31,200**	lf	2.00	62,400		
	Rough-in						
	Speaker back box	**457**	ea	65.00	29,705		
	1 gang device box with 3/4" conduit stub	**165**	ea	110.00	18,150		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
1217		1 gang device box with 1" conduit stub	**104**	ea	140.00	14,560		
1218		MC circuitry, clock	**9,900**	lf	5.00	49,500		
1219		Audio/Visual						
1220		Pro AV budget allowance	**1**	ls	595,000.00	595,000		
1221		Café/Gym: equipment with installation labor & LV cabling	**1**	ls		Included above		
1222		Classroom speech reinforcement system: equipment with installation		loc		Included above		
1223		SR: classroom speech reinforcement system	**65**	ea		Included above		
1224		Mobil projection	**1**	ls		Included above		
1225		AVRK: audio visual system rack	**1**	ea		Included above		
1226		CI camera input plate	**1**	ea		Included above		
1227		Mic: microphone input	**12**	ea		Included above		
1228		P	**1**	ea		Included above		
1229		PC	**2**	ea		Included above		
1230		Projector	**3**	ea		Included above		
1231		S1: speaker ceiling mount	**16**	ea		Included above		
1232		S2: speaker wall mount	**2**	ea		Included above		
1233		S3: speaker wall mount	**1**	ea		Included above		
1234		W ass lis mic ant	**4**	ea		Included above		
1235		WA ass lis mic ant	**2**	ea		Included above		
1236		Rough-in:						
1237		Speaker ceiling mount back box, allow	**16**	ea	65.00	1,040		
1238		1 gang device box with 3/4" conduit stub	**12**	ea	110.00	1,320		
1239		1 gang device box with 1" conduit stub	**13**	ea	140.00	1,820		
1240		Caf additional AV Rough-in, allow for not yet detailed	**1**	ls	1,500.00	1,500		
1241		Gym additional AV Rough-in, allow for not yet detailed	**1**	ls	1,500.00	1,500		
1242		Classroom AV Rough-in, allow	**65**	ea	800.00	52,000		
1243		Digital signage Rough-in, allow	**1**	ls	20,000.00	20,000		
1244		Two-Way Communications						
1245		Area of refuge system head-end	**1**	ls	2,500.00	2,500		
1246		SRP smart rescue phone	**1**	ea	250.00	250		
1247		ARA area of assistance button	**2**	ea	250.00	500		
1248		Cabling	**800**	lf	1.50	1,200		
1249		Rough-in						
1250		Device box with conduit stub	**4**	ea	110.00	440		
1251		Bi-directional amplification system						
1252		Cell repeater system, allow	**1**	lsum	250,000.00	250,000		
1253		BDA/DAS system	**165,035**	sf	0.80	132,028		
1254		Annunciator	**1**	ea		Included above		
1255		Antenna	**1**	ea		Included above		
1256		Console	**2**	ea		Included above		
1257		LPSU	**2**	ea		Included above		
1258		Splitter	**12**	ea		Included above		
1259		Rough-in				Included above		
1260		Fire alarm system						
1261		Fire alarm control panel w/mass notification	**1**	ea	38,000.00	38,000		
1262		Fire alarm remote annunciator	**3**	ea	1,650.00	4,950		
1263		Terminal cabinet	**5**	ea	1,650.00	8,250		
1264		MNS local operator console	**3**	ea	2,975.00	8,925		
1265		MNS remote console	**1**	ea	2,975.00	2,975		
1266		MNS message board	**8**	ea	637.50	5,100		
1267		Master box with antenna	**1**	ea	1,445.00	1,445		
1268		Exterior beacon	**2**	ea	255.00	510		
1269		Exterior bell	**2**	ea	255.00	510		
1270		Knox box	**4**	ea	297.50	1,190		
1271		Manual pull station	**18**	ea	136.00	2,448		
1272		Smoke detector	**163**	ea	153.00	24,939		
1273		CO detector	**12**	ea	153.00	1,836		
1274		Duct smoke detector, allow	**18**	ea	637.50	11,475		
1275		Speaker/light, ceiling	**231**	ea	136.00	31,416		
1276		Speaker/light wp	**2**	ea	146.00	292		
1277		Visual device, wall mount	**37**	ea	119.00	4,403		
1278		Combo FA Mass not speaker/visual, wall mount	**46**	ea	165.00	7,590		
1279		Combo FA Mass not speaker/visual, wall mount WP	**5**	ea	175.00	875		
1280		Mass not visual, ceiling mount	**231**	ea	136.00	31,416		
1281		Mass not visual, wall mount	**37**	ea	136.00	5,032		
1282		Magnetic door holder	**32**	ea	165.00	5,280		
1283		FP equipment connection	**21**	ea	212.50	4,463		
1284		Kitchen connection	**1**	ea	212.50	213		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Elevator recall connection	**2**	ea	297.50	595		
	Connections to public address, AV etc.	**1**	ls	2,125.00	2,125		
	Monitoring/control module	**80**	ea	212.50	17,000		
	Testing and programming	**1**	ls	23,000.00	23,000		
	Device Box	**967**	ea	32.00	30,944		
	1" EMT	**650**	lf	9.00	5,850		
	3/4" EMT	**9,600**	lf	7.50	72,000		
	FA cable	**31,100**	lf	1.28	39,808		
	FAMC	**32,800**	lf	5.30	173,840		
	Security systems						
	Head-end	**1**	ls	75,000.00	75,000		
	CCTV camera	**34**	ea	1,250.00	42,500		
	CCTV camera 360	**49**	ea	1,750.00	85,750		
	CCTV camera 360 wp	**15**	ea	2,000.00	30,000		
	CCTV camera WP	**15**	ea	1,750.00	26,250		
	CCTV camera 270 wp Pole mount	**1**	ea	2,200.00	2,200		
	CCTV camera 360 wp Pole mount	**10**	ea	2,200.00	22,000		
	CR Card reader	**53**	ea	650.00	34,450		
	DC Door contact	**99**	ea	250.00	24,750		
	PB Push button,	**16**	ea	150.00	2,400		
	AI video intercom door station	**15**	ea	2,500.00	37,500		
	PIR Motion detector	**60**	ea	200.00	12,000		
	REX/EH connection at door, 1/door contact per detail on T2.09	**99**	ea	100.00	9,900		
	Security circuitry	**28,500**	lf	1.70	48,450		
	Rough-in:						
	Head-end, antenna etc. rough-in	**1**	ls	5,000.00	5,000		
	3/4" EMT	**1,000**	lf	7.50	7,500		
	Door junction box with 1" EMT to accessible ceiling	**53**	ea	170.00	9,010		
	1 gang device box with 3/4" conduit stub	**184**	ea	110.00	20,240		
	1 gang device box with 1" conduit stub	**83**	ea	140.00	11,620		
	SUBTOTAL					**3,760,176**	
D5040	**OTHER ELECTRICAL SYSTEMS**						
	Common Work Results for Electrical						
	Temporary power and lights	**165,035**	gsf	1.00	165,035		
	Spare parts/attic stock: Lighting, fire alarm, lighting controls	**1**	ls	15,000.00	15,000		
	Coordination, management, BIM & support	**1**	ls	120,000.00	120,000		
	Testing, studies & commissioning	**1**	ls	70,000.00	70,000		
	Seismic, labelling, firestopping, cutting & patching etc.	**1**	ls	75,000.00	75,000		
	Fees and permits				waived		
	Premium time	**1**	ls	50,000.00	50,000		
	SUBTOTAL					**495,035**	
	TOTAL - ELECTRICAL						**$10,052,185**
E10	***EQUIPMENT***						
114000	*FOODSERVICE EQUIPMENT*						
	Food service equipment, Crabtree & McGrath 1/6/26	**1**	ls	876,120.00	876,120		
110000	*EQUIPMENT*						
	Residential appliances, allow	**1**	ls	35,000.00	35,000		
	Art						
	Kiln	**2**	ea	5,000.00	10,000		
	Gym						
	Basketball backstops	**6**	ea	14,000.00	84,000		
	Volleyball sleeves				NR		
	Climbing wall, 36' x 8'	**1**	ea	43,200.00	43,200		
	Cargo nets				NR		
	Climbing rope system				NR		
	Score board in Gym				w/ Div 26		
	Divider curtain @ gym	**1**	ea	30,000.00	30,000		
	Wall pads - gym	**1,720**	sf	30.00	51,600		
	Wall pads - Calm rooms	**2,560**	sf	30.00	76,800		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
115213	*PROJECTION SCREENS*						
	Projection screens - Cafeteria & Gymnasium	**2**	ea	10,000.00	20,000		
116100	*THEATRICAL EQUIPMENT*						
	Rigging equipment, allowance - Cafeteria & Gymnasium	**1**	loc	75,000.00	75,000		
	SUBTOTAL					**1,301,720**	
	TOTAL - EQUIPMENT						**$1,301,720**
E20	***FURNISHINGS***						
E2010	**FIXED FURNISHINGS**						
122100	*WINDOW TREATMENT*						
	Window treatment, roller shades @ Exterior windows	**6,043**	sf	9.00	54,387		
	Motorized shades, allow	**1**	ls	35,000.00	35,000		
	Manual blackout shades at interior sidelights and borrowed lights	**2,174**	sf	8.00	17,392		
123000	*CASEWORK*						
	Cubbies						
	TSC-1; 36" x 50"	**50**	ea	1,650.00	82,500		
	TSC-1; 36" x 84"	**163**	ea	2,310.00	376,530		
	TSC-1; 45" x 84"	**16**	ea	2,887.50	46,200		
	TSC-2; 36" x 84"	**4**	ea	2,640.00	10,560		
	TSC-2; 45" x 84"	**16**	ea	3,300.00	52,800		
	Pre-K	**4**	rms		-		
	Base cabinet, SSM countertop	**32**	lf	605.00	19,360		
	Base cabinet, p'lam countertop	**36**	lf	550.00	19,800		
	Base cabinet, p'lam countertop; open shelves	**28**	lf	467.50	13,090		
	P'lam work counter	**12**	lf	247.50	2,970		
	Wall cabinet	**44**	lf	330.00	14,520		
	Teacher's wardrobe, 24"	**4**	ea	1,760.00	7,040		
	Tall storage, 36"	**16**	ea	2,640.00	42,240		
	Kindergarten	**7**	rms		-		
	Base cabinet, SSM countertop	**56**	lf	605.00	33,880		
	Base cabinet, p'lam countertop	**56**	lf	550.00	30,800		
	Base cabinet, p'lam countertop; open shelves	**49**	lf	467.50	22,908		
	P'lam work counter	**35**	lf	247.50	8,663		
	Wall cabinet	**91**	lf	330.00	30,030		
	Teacher's wardrobe, 24"	**7**	ea	1,760.00	12,320		
	Tall storage, 27"	**7**	ea	1,840.00	12,880		
	Tall storage, 36"	**28**	ea	2,400.00	67,200		
	Stages/Strides Classrooms	**7**	rms		-		
	Base cabinet, SSM countertop	**56**	lf	605.00	33,880		
	Base cabinet, p'lam countertop	**105**	lf	550.00	57,750		
	P'lam work counter	**28**	lf	247.50	6,930		
	Wall cabinet	**84**	lf	330.00	27,720		
	Open base cabinet - ABOF1	**21**	ea	1,500.00	31,500		
	Teacher's wardrobe, 24"	**28**	ea	1,760.00	49,280		
	Tall storage, 21"	**7**	ea	1,400.00	9,800		
	Tall storage, 36"	**21**	ea	2,400.00	50,400		
	1st Grade Classroom	**6**	rms		-		
	Base cabinet, SSM countertop	**48**	lf	605.00	29,040		
	Base cabinet, p'lam countertop	**108**	lf	550.00	59,400		
	Base cabinet, p'lam countertop; open shelves	**36**	lf	467.50	16,830		
	P'lam work counter	**24**	lf	247.50	5,940		
	Wall cabinet	**72**	lf	330.00	23,760		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
1409		Teacher's wardrobe, 24"	**6**	ea	1,760.00	10,560		
1410		Tall storage, 36"	**30**	ea	2,400.00	72,000		
1411		2nd, 3rd, 4th Grade Classroom	**18**	rms		-		
1412		Base cabinet, SSM countertop	**144**	lf	605.00	87,120		
1413		Base cabinet, p'lam countertop	**324**	lf	550.00	178,200		
1414		Base cabinet, p'lam countertop; open shelves	**108**	lf	467.50	50,490		
1415		P'lam work counter	**108**	lf	247.50	26,730		
1416		Wall cabinet	**252**	lf	330.00	83,160		
1417		Teacher's wardrobe, 24"	**18**	ea	1,760.00	31,680		
1418		Tall storage, 36"	**72**	ea	2,400.00	172,800		
1419		5th Grade Classroom	**6**	rms		-		
1420		Base cabinet, SSM countertop	**48**	lf	605.00	29,040		
1421		Base cabinet, p'lam countertop	**90**	lf	550.00	49,500		
1422		P'lam work counter	**24**	lf	247.50	5,940		
1423		Wall cabinet	**72**	lf	330.00	23,760		
1424		Teacher's wardrobe, 24"	**6**	ea	1,760.00	10,560		
1425		Tall storage, 36"	**24**	ea	2,400.00	57,600		
1426		STE Classroom	**1**	rms		-		
1427		Base cabinet, SSM countertop	**19**	lf	605.00	11,495		
1428		Base cabinet, SSM countertop; open shelves	**18**	lf	475.00	8,550		
1429		Wall cabinet	**19**	lf	330.00	6,270		
1430		Adjustable shelving, 2 tier	**15**	lf	150.00	2,250		
1431		Tall storage, 36" w/ drawers	**2**	ea	2,700.00	5,400		
1432		Tall tote storage, 24"	**8**	ea	1,800.00	14,400		
1433		Tall storage, 48" w/ markerboard surface	**5**	ea	3,600.00	18,000		
1434		Flex Classroom	**2**	rms		-		
1435		Base cabinet, SSM countertop	**16**	lf	605.00	9,680		
1436		Base cabinet, p'lam countertop; open shelves	**42**	lf	467.50	19,635		
1437		Wall cabinet	**16**	lf	330.00	5,280		
1438		Adjustable shelving, 5 tier	**28**	lf	375.00	10,500		
1439		Tall storage, 36"	**4**	ea	2,400.00	9,600		
1440		Music/Music Storage	**1**	rms		-		
1441		Base cabinet, p'lam countertop; open shelves	**36**	lf	467.50	16,830		
1442		Teacher's wardrobe, 24"	**1**	ea	1,600.00	1,600		
1443		Tall storage, 36"	**3**	ea	2,400.00	7,200		
1444		Music storage	**20**	lf	1,000.00	20,000		
1445		Pre-K/K ELA	**2**	rms		-		
1446		Base cabinet, SSM countertop	**26**	lf	605.00	15,730		
1447		Wall cabinet	**26**	lf	330.00	8,580		
1448		Instrumental Music/Music Storage	**1**	rms		-		
1449		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1450		Base cabinet, p'lam countertop; open shelves	**41**	lf	467.50	19,168		
1451		Wall cabinet	**5**	lf	330.00	1,650		
1452		Teacher's wardrobe, 24"	**1**	ea	330.00	330		
1453		Tall storage, 36"	**1**	ea	2,400.00	2,400		
1454		Music storage	**25**	lf	800.00	20,000		
1455		Health Classroom	**1**	rms		-		
1456		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1457		Base cabinet, p'lam countertop	**22**	lf	550.00	12,100		
1458		P'lam work counter	**10**	lf	247.50	2,475		
1459		Wall cabinet	**18**	lf	300.00	5,400		
1460		Teacher's wardrobe, 24"	**1**	ea	1,760.00	1,760		
1461		Tall storage, 33"	**1**	ea	2,200.00	2,200		
1462		Tall storage, 36"	**3**	ea	2,400.00	7,200		
1463		PT/OT						

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
		Building Detail						
1464		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1465		Base cabinet, p'lam countertop	**17**	lf	550.00	9,350		
1466		Base cabinet, p'lam countertop; open shelves	**8**	lf	467.50	3,740		
1467		Wall cabinet	**16**	lf	300.00	4,800		
1468		Teacher's wardrobe, 24"	**1**	ea	1,800.00	1,800		
1469		Tall storage, 18"	**1**	ea	1,200.00	1,200		
1470		Tall storage, 30"	**1**	ea	1,864.00	1,864		
1471		Tall storage, 36"	**4**	ea	2,400.00	9,600		
1472		Tall storage, 39"	**1**	ea	2,600.00	2,600		
1473		Art	**2**	rms		-		
1474		Base cabinet, SSM countertop	**60**	lf	605.00	36,300		
1475		SSM work counter	**12**	lf	250.00	3,000		
1476		Wall cabinet, open	**34**	lf	250.00	8,500		
1477		Teacher's wardrobe, 48"	**2**	ea	3,200.00	6,400		
1478		Tall storage, 36"	**6**	ea	2,400.00	14,400		
1479		Adjustable shelves, 3 rows	**16**	lf	225.00	3,600		
1480		Stages 3rd-5th	**1**	rms		-		
1481		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1482		Base cabinet, p'lam countertop	**14**	lf	550.00	7,700		
1483		Base cabinet, p'lam countertop; open shelves	**6**	lf	467.50	2,805		
1484		P'lam work counter	**4**	lf	247.50	990		
1485		Wall cabinet	**12**	lf	300.00	3,600		
1486		Teacher's wardrobe, 24"	**1**	ea	1,760.00	1,760		
1487		Tall storage, 36"	**4**	ea	2,400.00	9,600		
1488		Flex CR 257	**1**	rms		-		
1489		Base cabinet, SSM countertop	**40**	lf	605.00	24,200		
1490		SSM work counter	**6**	lf	250.00	1,500		
1491		Wall cabinet	**12**	lf	300.00	3,600		
1492		Teacher's wardrobe, 24"	**1**	ea	1,760.00	1,760		
1493		Tall storage, 36"	**3**	ea	2,400.00	7,200		
1494		Adjustable shelves, 3 rows	**8**	lf	225.00	1,800		
1495		ELL	**2**	rms		-		
1496		Base cabinet, SSM countertop	**30**	lf	605.00	18,150		
1497		Teacher's wardrobe, 24"	**1**	ea	1,600.00	1,600		
1498		Tall storage, 36"	**1**	ea	2,400.00	2,400		
1499		Teacher Collaboration/Wellness	**3**	rms		-		
1500		Base cabinet, SSM countertop	**93**	lf	605.00	56,265		
1501		P'lam work counter	**15**	lf	247.50	3,713		
1502		Wall cabinet	**71**	lf	300.00	21,300		
1503		Tall storage, 18"	**6**	ea	1,200.00	7,200		
1504		Staff lunch	**1**	rms		-		
1505		Base cabinet, SSM countertop	**9**	lf	605.00	5,445		
1506		Wall cabinet	**9**	lf	300.00	2,700		
1507		Tall microwave cabinet, 36"	**2**	ea	2,500.00	5,000		
1508		Nurses Suite	**1**	rms		-		
1509		Base cabinet, SSM countertop	**22**	lf	605.00	13,310		
1510		Wall cabinet	**19**	lf	300.00	5,700		
1511		Tall storage, 27"	**1**	ea	1,800.00	1,800		
1512		Tall storage, 30"	**1**	ea	2,000.00	2,000		
1513		Tall storage, 36"	**1**	ea	2,400.00	2,400		
1514		Library Workroom	**1**	rms		-		
1515		Base cabinet, SSM countertop	**13**	lf	605.00	7,865		
1516		Solid surface work counter	**30**	lf	200.00	6,000		
1517		Wall cabinet	**13**	lf	300.00	3,900		
1518		Adjustable shelves, 3 rows	**12**	lf	225.00	2,700		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Building Detail							
1519		Custodians/Storage	**1**	rms		-		
1520		Custodial bench	**8**	lf	500.00	4,000		
1521		Adjustable shelves, 3 rows	**8**	lf	225.00	1,800		
1522		Stage	**1**	rms		-		
1523		Base cabinet, p'lam countertop	**6**	lf	250.00	1,500		
1524		Wall cabinet	**6**	lf	300.00	1,800		
1525		Tall storage, 36"	**1**	ea	2,400.00	2,400		
1526		Small Group	**26**	rms		-		
1527		Base cabinet, p'lam countertop	**52**	lf	550.00	28,600		
1528		P'lam work counter	**156**	lf	247.50	38,610		
1529		Wall cabinet	**208**	lf	300.00	62,400		
1530		Tall storage, 36"	**26**	ea	2,400.00	62,400		
1531		Admin Work Space						
1532		P'lam work counter	**25**	lf	225.00	5,625		
1533		Tall storage, 36"	**4**	ea	2,400.00	9,600		
1534		Mail box cubbies	**1**	ls	12,000.00	12,000		
1535		Math	**3**	rms		-		
1536		Base cabinet, p'lam countertop	**22**	lf	550.00	12,100		
1537		P'lam work counter	**16**	lf	300.00	4,800		
1538		Wall cabinet	**10**	lf	225.00	2,250		
1539		Teacher's wardrobe, 18"	**3**	ea	1,200.00	3,600		
1540		Tall storage, 24"	**3**	ea	1,600.00	4,800		
1541		Read/Learning Center	**10**	rms		-		
1542		Base cabinet, p'lam countertop	**90**	lf	250.00	22,500		
1543		P'lam work counter	**80**	lf	247.50	19,800		
1544		Wall cabinet	**90**	lf	1,200.00	108,000		
1545		Teacher's wardrobe, 18"	**10**	ea	1,200.00	12,000		
1546		Tall storage, 24"	**10**	ea	1,600.00	16,000		
1547		Adjustment	**2**	rms		-		
1548		Base cabinet, p'lam countertop	**14**	lf	250.00	3,500		
1549		P'lam work counter	**42**	lf	247.50	10,395		
1550		Teacher's wardrobe, 18"	**2**	ea	1,200.00	2,400		
1551		Teacher's wardrobe, 24"	**2**	ea	1,600.00	3,200		
1552		Speech & Language	**3**	rms		-		
1553		Base cabinet, p'lam countertop	**27**	lf	250.00	6,750		
1554		P'lam work counter	**12**	lf	247.50	2,970		
1555		Wall cabinet	**27**	lf	1,600.00	43,200		
1556		Teacher's wardrobe, 18"	**3**	ea	1,200.00	3,600		
1557		Tall storage, 24"	**3**	ea	1,600.00	4,800		
1558		Language based 1st-2nd Grade	**1**	rms		-		
1559		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1560		Base cabinet, p'lam countertop	**18**	lf	550.00	9,900		
1561		P'lam work counter	**5**	lf	247.50	1,238		
1562		Wall cabinet	**13**	lf	330.00	4,290		
1563		Tall storage, open 24"	**2**	ea	1,400.00	2,800		
1564		Teacher's wardrobe, 24"	**1**	ea	1,760.00	1,760		
1565		Tall storage, 36"	**4**	ea	2,400.00	9,600		
1566		Language based 3rd-5th Grade	**1**	rms		-		
1567		Base cabinet, SSM countertop	**8**	lf	605.00	4,840		
1568		Base cabinet, p'lam countertop	**21**	lf	550.00	11,550		
1569		P'lam work counter	**5**	lf	247.50	1,238		
1570		Wall cabinet	**13**	lf	330.00	4,290		
1571		Tall storage, open 24"	**2**	ea	1,400.00	2,800		
1572		Teacher's wardrobe, 24"	**1**	ea	1,760.00	1,760		
1573		Tall storage, 36"	**4**	ea	2,400.00	9,600		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
	Teacher Workroom, Mail & Copy Room						
	Base cabinet, SSM countertop	**17**	lf	605.00	10,285		
	Base cabinet, p'lam countertop	**2**	lf	550.00	1,100		
	Base cabinet, p'lam countertop; open shelves	**28**	lf	425.00	11,900		
	P'lam work counter	**3**	lf	247.50	743		
	Wall cabinet	**22**	lf	330.00	7,260		
	Tall storage, 36"	**3**	ea	2,400.00	7,200		
	Cares Storage						
	P'lam work counter	**20**	lf	247.50	4,950		
	BCBA						
	P'lam work counter	**34**	lf	2,400.00	81,600		
	Adjustable shelves, 3 rows	**20**	lf	225.00	4,500		
	Media Center						
	Perimeter bookcase, metal BB02-21	**2**	ea	437.50	875		
	Perimeter bookcase, metal BB02-27	**3**	ea	500.00	1,500		
	Perimeter bookcase, metal BB02-30	**8**	ea	625.00	5,000		
	Perimeter bookcase, metal BB02-33	**11**	ea	687.50	7,563		
	Perimeter bookcase, metal BB02-36	**3**	ea	750.00	2,250		
	Perimeter bookcase, metal TBO-1872	**1**	ea	750.00	750		
	Perimeter bookcase, metal TBO-2772	**8**	ea	1,125.00	9,000		
	Perimeter bookcase, metal TBO-3072	**13**	ea	1,250.00	16,250		
	Perimeter bookcase, metal TBO-3372	**8**	ea	1,375.00	11,000		
	Perimeter bookcase, metal TBO-3672	**4**	ea	1,500.00	6,000		
	Freestanding mobile bookcase,BC3-36 double sided	**28**	ea	1,500.00	42,000		
	Bookcase end unit bookcase, metal BC3-EP	**22**	ea	400.00	8,800		
126100	*FIXED AUDIENCE SEATING*						
	Bleacher, motorized telescoping, 600 seat capacity	**1**	ls	225,000.00	225,000		
	SUBTOTAL					**3,986,032**	
E2020	**MOVABLE FURNISHINGS**						
	All movable furnishings to be provided and installed by owner				NIC		
	SUBTOTAL					-	
	TOTAL - FURNISHINGS						**$3,986,032**
F10	***SPECIAL CONSTRUCTION***						
F1000	**SPECIAL CONSTRUCTION**						
	No items in this section						
	SUBTOTAL					-	
	TOTAL - SPECIAL CONSTRUCTION						
F20	***SELECTIVE BUILDING DEMOLITION***						
F2010	**BUILDING ELEMENTS DEMOLITION**						
	See summary						
	SUBTOTAL					-	
F2020	**HAZARDOUS COMPONENTS ABATEMENT**						
	See summary						
	SUBTOTAL					-	
	TOTAL - SELECTIVE BUILDING DEMOLITION						

90% Construction Document Cost Estimate

Site Detail

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	G10 SITE PREPARATION						
G1010	**SITE CLEARING**						
311000	*GENERAL CONDITIONS*						
	Mobilization & Demobilization	**1**	ea	80,000.00	w_ERP1		
	Temporary signs	**1**	ls	20,000.00	w_ERP1		
	Wheel wash rack	**1**	ls	20,000.00	w_ERP1		
	Engineering/layout	**1**	ls	50,000.00	w_ERP1		
	As-builts	**1**	ls	5,000.00	w_ERP1		
	Concrete washout area	**1**	ea	2,500.00	w_ERP1		
	Dewatering allowance	**1**	ea	45,000.00	w_ERP1		
	Snow removal - allowance	**1**	ls	75,000.00	w_ERP1		
	Winter conditions - allowance	**1**	ls	125,000.00	w_ERP1		
	Police details	**1**	ls		GR's		
	Site security	**1**	ls		GR's		
	Job site construction trailer	**1**	ls		GR's		
	Temp utilities for job trailer	**1**	ls		GR's		
	Bridging allowance	**1**	ls	425,000.00	w_ERP1		
	Mass DEP appeal	**1**	ls	300,000.00	300,000		
	PHASING						
	Phase 1						
	Silt Fence; installation and removal	**3,260**	lf	20.00	w_ERP1		
	6' high site construction fence - installation	**3,260**	lf	20.00	w_ERP1		
	Site construction fence maintenance	**3,260**	lf	10.00	w_ERP1		
	6' high site construction fence sliding gate	**1**	loc	10,000.00	w_ERP1		
	Site construction entrance and removal/restoration	**1**	loc	12,000.00	w_ERP1		
	Relocate play equipment and site furnishings and furnish to owner	**1**	ls	25,000.00	w_ERP1		
	Remove existing irrigation from fields	**1**	ls	10,000.00	w_ERP1		
	Provide extended sidewalk for pedestrian access during construction	**1**	ls	25,000.00	w_ERP1		
	Provide connection to Salem street - sewer	**1**	ls	50,000.00	w_ERP1		
	Temporary drain line	**907**	lf	70.00	w_ERP1		
	Connect to existing drainage structure	**1**	ea	5,000.00	w_ERP1		
	Temporary gravel; 6" thick - contractor parking	*30,850*	*sf*				
	Cut and prep	**229**	cy	15.00	w_ERP1		
	gravel base; 6" thick	**571**	cy	48.00	w_ERP1		
	Phase 2						
	Site construction fence maintenance	**3,260**	lf	10.00	w_ERP1		
	Temporary paving; 2" thick - access road	**55,000**	sf		w_roadways		
	Phase 3						
	Demolish contractor parking	**30,850**	sf	0.55	w_ERP1		
	Remove temporary fence from phase 1	**3,260**	lf	5.00	w_ERP1		
	Silt Fence; installation and removal	**1,845**	lf	20.00	w_ERP1		
	6' high site construction fence - installation	**1,845**	lf	20.00	w_ERP1		
	Site construction fence maintenance	**1,845**	lf	10.00	w_ERP1		
	6' high site construction fence sliding gate	**1**	loc	10,000.00	w_ERP1		
	Site construction entrance and removal/restoration	**1**	loc	12,000.00	w_ERP1		
	Remove temporary drainage line	**907**	lf	25.00	w_ERP1		
	Phase 4						
	Remove temporary fence from phase 3	**1,845**	lf	5.00	w_ERP1		
	SITE SALVAGE ITEMS						
	Salvage soccer field plaque for relocation	**1**	ls	500.00	w_ERP1		
	Salvage memorial stone monument	**1**	ls	1,000.00	w_ERP1		
	Salvage playground memorial signage for relocation	**1**	ls	2,500.00	w_ERP1		
	Salvage bench	**2**	ea	500.00	w_ERP1		
	Salvage irrigation controller and well pump	**1**	ea	5,000.00	w_ERP1		
	SITE DEMOLITION AND RELOCATIONS						
	Demolish existing paving	**71,272**	sf	1.25	w_ERP1		
	Demolish existing concrete	**8,987**	sf	3.00	w_ERP1		
	Remove tennis court appurtenances	**4**	loc	2,500.00	w_ERP1		
	Demolish curbing	**1,536**	lf	6.00	w_ERP1		
	Demolish steps	**217**	lf	20.00	w_ERP1		
	Demolish fencing	**975**	lf	5.00	w_ERP1		
	Demolish existing handrails	**78**	lf	25.00	w_ERP1		
	Demolish existing school sign	**1**	loc	2,500.00	w_ERP1		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
	Miscellaneous site demolition; furnishings, concrete pads, signs etc.	**1**	ls	25,000.00	w_ERP1		
	UTILITY DEMOLITION						
	Demolish existing utility lines	**2,135**	lf	25.00	w_ERP1		
	Demolish existing utility structures	**12**	ea	500.00	w_ERP1		
	Removal of unforeseen septic system conditions	**1**	ls	70,000.00	w_ERP1		
	Demolish existing AC units	**5**	ea	500.00	w_ERP1		
	Cut/cap utility lines	**1**	ls	25,000.00	w_ERP1		
	ROADWAY WORK						
	Sawcut	**914**	lf	8.25	w_ERP1		
	Remove pavement	**347**	sf	3.50	w_ERP1		
	Temp pavement patching	**347**	sf	8.00	w_ERP1		
	Steel plates	**1**	ls	2,500.00	w_ERP1		
	Police details	**5**	dy	850.00	w_ERP1		
	Permanent pavement patch	**347**	sf	10.00	w_ERP1		
	VEGETATION & TOPSOIL MANAGEMENT						
	Clear and grub	**8**	acre	5,000.00	w_ERP1		
	Remove existing trees and stumps - 1/2 acre	**1**	ls	10,500.00	w_ERP1		
	Abutting tree allowance and limb clearing	**1**	ls	100,000.00	w_ERP1		
	Remove infield mix	**18,514**	sf	0.50	w_ERP1		
	Strip + dispose topsoil	**15,917**	cy	6.00	w_ERP1		
312000	*SOIL DISPOSAL - conversion factor 1.7 to tons*						
	Load excess soils for disposal	**15,917**	cy	2.50	w_ERP1		
	Disposal in Leicester	**27,059**	tn	15.00	w_ERP1		
	Street sweeping allowance during hauling	**12**	dys	1,500.00	w_ERP1		
	Allowance for arsenic soil disposal - premium - allowance for dump site if Leicester isn't an option	**1**	ls	250,000.00	w_ERP1		
	EROSION & SEDIMENT CONTROL						
	Silt Fence; installation and removal - shown on C1.00		lf	20.00	w_phasing		
	Silt Sacks; installation and removal	**30**	ea	250.00	w_ERP1		
	Street sweeping & dust control allowance	**1**	ls	50,000.00	w_ERP1		
	Erosion Control monitoring & maintenance	**1**	ls	25,000.00	w_ERP1		
	SUBTOTAL					300,000	
	BUILDING SOILS						
	SOIL DISPOSAL - conversion factor 1.7 to tons						
	Load excess soils for disposal				NR		
	Disposal in Leicester				NR		
	SOIL DISPOSAL - conversion factor 1.7 to tons						
	Load excess soils for disposal				NR		
	Disposal in Leicester				NR		
	SITE EARTHWORK						
	Site cut to design subgrade - phase 1	*1,341*	*cy*				
	Cut	**1,341**	cy	8.00	w_ERP1		
	Stockpile	**1,341**	cy	10.00	w_ERP1		
	Site fill to design subgrade - phase 1	*11,545*	*cy*				
	Fill - using site cut soils	**1,341**	cy	10.00	w_ERP1		
	Fill - imported; swell 25%	**12,755**	cy	48.00	w_ERP1		
	Site cut to design subgrade - phase 2	*4,455*	*cy*				
	Cut	**4,455**	cy	8.00	w_ERP1		
	Stockpile	**2,935**	cy	10.00	w_ERP1		
	Site fill to design subgrade - phase 2	*2,935*	*cy*				
	Fill - using cut soils	**2,935**	cy	10.00	w_ERP1		
	SOIL DISPOSAL - conversion factor 1.7 to tons						
	Load excess soils for disposal	**1,520**	cy	2.50	w_ERP1		
	Disposal in Leicester	**2,584**	tn	15.00	w_ERP1		
	SOIL DISPOSAL FOR SUBSURFACE SYSTEMS						
	SOIL DISPOSAL - conversion factor 1.7 to tons						
	Load excess soils for disposal	**12,087**	cy	2.50	w_ERP1		
	Disposal in Leicester	**20,548**	tn	15.00	w_ERP1		
	SOIL ALLOWANCES						
	Allowance for unsuitables	**500**	cy	100.00	w_ERP1		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
	Allowance for arsenic soil disposal - premium - allowance for dump site if Leicester isn't an option	**1**	ls	450,000.00	w_ERP1		
	ESTABLISHING GRADE						
	Sub grade establishment	**394,748**	sf	0.15	w_ERP1		
	Additional compaction due to fill soils high in fines/organics	**394,748**	sf	0.18	w_ERP1		
	Fine grading throughout the site	**394,748**	sf	0.25	w_ERP1		
	HAZARDOUS MATERIALS						
	Contaminated soil allowance - disposal	**100**	cy	250.00	w_ERP1		
	UST removal allowance	**1**	ls	50,000.00	w_ERP1		
	SUBTOTAL					300,000	
	TOTAL - SITE PREPARATION						**$300,000**
G20	***SITE IMPROVEMENTS***						
G2010	**ROADWAYS**						
321000	***ROADWAYS AND PARKING LOTS***						
	Asphalt Paving; parking lots and roadway	*137,959*	*sf*				
	dense grade; 18" thick - per geotech	**7,664**	cy	50.00	w_ERP1		
	asphalt top; 1.5" thick	**1,319**	tns	180.00	w_ERP1		
	asphalt binder; 3" thick	**2,638**	tns	160.00	w_ERP1		
320000	*CURBING*						
	VGC	**5,192**	lf	65.00	w_ERP1		
	PCC	**2,058**	lf	40.00	w_ERP1		
	ADA Curb cuts	**25**	ea	850.00	w_ERP1		
	Detectable warning cast iron	**921**	sf	125.00	115,125		
320000	*ROAD MARKINGS AND SIGNS*						
	Parking spot	**190**	ea	85.00	w_ERP1		
	Parking spot ADA	**6**	ea	250.00	w_ERP1		
	Pavement markings allowance	**1**	ls	20,000.00	w_ERP1		
	Crosswalk hatching	**12**	loc	2,500.00	w_ERP1		
	Traffic signs						
	Signs - new	**9**	ea	125.00	w_ERP1		
	Signs - mounting hardware	**9**	ea	225.00	w_ERP1		
	Signs - posts	**9**	ea	487.50	w_ERP1		
	SUBTOTAL					115,125	
321000	***PEDESTRIAN PAVING***						
	Concrete sidewalks	*51,317*	*sf*				
	gravel base; 12" thick - per geotech	**1,901**	cy	65.00	w_ERP1		
	Broom finish concrete paving; 6" thick	**51,317**	sf	14.00	718,438		
	Concrete pads	*491*	*sf*				
	gravel base; 18" thick - per geotech	**27**	cy	65.00	w_ERP1		
	Broom finish concrete paving; 8" thick	**491**	sf	19.00	w_ERP1		
	Hardscape play area	*2,278*	*sf*				
	gravel base; 18" thick - per geotech	**127**	cy	65.00	w_ERP1		
	asphalt top; 1" thick	**14**	tns	200.00	w_ERP1		
	asphalt binder; 1.5" thick	**22**	tns	190.00	w_ERP1		
	Allowance for painted games	**1**	ls	25,000.00	25,000		
	Concrete unit pavers	*10,453*	*sf*				
	gravel base; 12" thick - per geotech	**387**	cy	65.00	w_ERP1		
	Concrete slab paving; 4" thick	**10,453**	sf	9.00	94,077		
	Concrete pavers	**10,453**	sf	28.00	292,684		
	Geotextiles	**10,453**	sf	0.55	w_ERP1		
	Pervious pavement at tree well	*114*	*sf*				
	Porous asphalt paving; 3" thick	**114**	sf	40.00	4,560		
	subbase stone; 3" thick	**1**	cy	50.00	w_ERP1		
	SUBTOTAL					1,134,759	

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
323000	***SITE IMPROVEMENTS***						
	SITE FURNISHINGS						
	Bollards - steel	**58**	ea	1,200.00	69,600		
	School sign	**2**	ea	25,000.00	w_ERP1		
	Bike racks	**23**	ea	1,057.00	24,311		
	Raised planters	**6**	ea	2,500.00	15,000		
	Flagpole	**2**	ea	7,000.00	14,000		
	Flagpole foundation	**2**	ea	4,500.00	9,000		
	Trash and Recycling receptacles	**9**	ea	1,953.00	17,577		
	Benches - circular	**2**	ea	10,000.00	incl. below		
	Benches - sculptural	**1**	ea	2,500.00	incl. below		
	Benches - curved	**4**	ea	4,500.00	incl. below		
	Benches - vestre	**1**	ls	88,818.00	88,818		
	Benches - vestre - install	**1**	ls	35,527.20	35,527		
	Benches - vestre - freight	**1**	ls	11,546.00	11,546		
	Benches - free form - twig by landscape forms	**4**	ea	10,435.95	41,744		
	Benches - Backed w/arms - D1	**7**	ea	4,789.40	33,526		
	Benches - Buddy bench - D15	**5**	ea	3,500.00	17,500		
	Modular block seats - movable	**8**	ea	1,200.00	9,600		
	Tables with integral seats	**3**	ea	11,732.00	35,196		
	Lightpost foundations	**56**	ea	875.00	49,000		
	Leaf shade structure	**1**	ea	75,000.00	75,000		
	Foundations	**4**	ea	3,500.00	14,000		
	Metal shade structure	**1**	ea	50,000.00	50,000		
	Foundations	**3**	ea	3,500.00	10,500		
	Prefab shed	**1**	ea	27,500.00	27,500		
	Soccer goals	**2**	ea	4,500.00	9,000		
	Allowance to install salvaged items	**1**	ls	10,000.00	10,000		
	Freight - Forms + Surfaces	**1**	ls	15,283.13	15,283		
320000	*SPORTS COURTS*						
	Pavement areas	*11,682*	*sf*				
	gravel base; 8" thick	**290**	cy	65.00	w_ERP1		
	asphalt top; 1.5" thick	**110**	tns	225.00	w_ERP1		
	asphalt binder; 1.5" thick	**110**	tns	200.00	w_ERP1		
	Basketball hoops	**4**	ea	14,000.00	56,000		
	Basketball court color coating	**11,682**	sf	3.00	35,046		
	Player bench	**2**	ea	3,500.00	7,000		
	PLAY AREAS						
	Playgrounds	26,139	*sf*				
	gravel base; 18" thick	**1,452**	cy	65.00	w_ERP1		
	Play surfacing, multi-colored	**26,139**	sf	40.00	1,045,560		
	Drainage allowance				NR		
	Allowance for play equipment	**1**	ls	1,024,380.00	1,024,380		
	Allowance to reinstall salvaged play equipment				NR		
	Synthetic lawn - gathering area	4,831	*sf*				
	Synthetic lawn system	**4,831**	sf	25.00	120,775		
	Concrete pad; 6" thick - under furnishings in turf	**491**	sf	15.00	7,365		
	Synthetic lawn edging		lf		w_ERP1		
	FENCING						
	4' Ht - Ornamental	**990**	lf	225.00	222,750		
	4' Ht - Ornamental single gate	**4**	ea	2,800.00	11,200		
	4' Ht - Ornamental double gate - 6' wide	**1**	ea	3,800.00	3,800		
	4' Ht - Ornamental double gate - 12' wide	**3**	ea	6,500.00	19,500		
	6' ht - utility screen fence	**185**	lf	1,150.00	212,750		
	6' Ht - utility screen fence double gate	**3**	ea	10,000.00	30,000		
	8' Ht - Chain link fence - sports field	**277**	lf	95.00	26,315		
	8' Ht - Chain link single gate	**2**	ea	1,400.00	2,800		
	8' Ht - Chain link double gate	**1**	ea	3,500.00	3,500		
	10' Ht - Chain link fence - sport courts	**673**	lf	125.00	84,125		
	10' Ht - Chain link single gate	**2**	ea	2,700.00	5,400		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
		Site Detail						
251		10' Ht - Chain link double gate	**4**	ea	4,000.00	16,000		
252		Wood privacy fence	**897**	lf	65.00	58,305		
253		Vehicular gate - 24' ht. width	**1**	ea	7,500.00	7,500		
254		Vehicular gate - 26' ht. width	**1**	ea	8,500.00	8,500		
255		Vehicular gate - 28' ht. width	**1**	ea	9,500.00	9,500		
256		Vehicular gate - 40' ht. width	**1**	ea	15,000.00	15,000		
257		Vehicular guardrail	**583**	lf	275.00	160,325		
258	*329900*	*SITE WALLS*						
259		Masonry panel system seatwall - 1.5' ht (B1)	*81*	*lf*				
260		Concrete	**81**	lf	153.00	12,393		
261		Excavation	**17**	cy	100.00	w_ERP1		
262		Backfill - (assume using onsite soils)	**5**	cy	35.00	w_ERP1		
263		Veneer	**292**	sf	65.00	18,980		
264		Wall cap	**81**	lf	125.00	10,125		
265		Wall drain	**81**	lf	22.00	1,782		
266								
267		Monolithic granite seatwall - slab footer - 1.5' ht.	*185*	*lf*				
268		Granite seatwall	**185**	lf	2,000.00	370,000		
269		Concrete - below grade and to frost	**185**	lf	95.00	17,575		
270		Excavation	**39**	cy	100.00	w_ERP1		
271		Backfill - (assume using onsite soils)	**12**	cy	25.00	w_ERP1		
272		Wall drain	**185**	lf	22.00	4,070		
273								
274		Cast-in-place LOW retaining wall - 1' wide - K-2 and Pre-K	*463*	*lf*				
275		Concrete	**463**	lf	545.00	252,335		
276		Excavation	**96**	cy	100.00	w_ERP1		
277		Backfill - (assume using onsite soils)	**29**	cy	35.00	w_ERP1		
278		Wall drain	**463**	lf	22.00	10,186		
279								
280		Cast-in-place LOW retaining wall - 1' 6" wide	*223*	*lf*				
281		Concrete	**223**	lf	540.00	120,420		
282		Excavation	**46**	cy	100.00	w_ERP1		
283		Backfill - (assume using onsite soils)	**14**	cy	35.00	w_ERP1		
284		Wall drain	**223**	lf	22.00	4,906		
285		Coordination, bridging, premium time	**1**	ls	150,000.00	150,000		
286								
287		Segmental Wall- 4' ht. - between parking lot and basketball - per civil plans	*235*	*lf*				
288		Large block wall	**1,175**	sf	55.00	w_ERP1		
289		Excavate and prepare wall base	**52**	cy	100.00	w_ERP1		
290		Backfill wall - crushed stone	**35**	cy	65.00	w_ERP1		
291		Backfill-controlled placement; above grade - on-site soils no geogrid	**139**	cy	35.00	w_ERP1		
292		Geotextiles	**1,763**	sf	2.50	w_ERP1		
293		Wall drain	**235**	lf	22.00	w_ERP1		
294		Wall cap	**235**	lf	100.00	w_ERP1		
295		4' Ht Decorative aluminum fence - grouted into cap	**235**	lf	325.00	w_ERP1		
296		SUBTOTAL					4,849,396	
297								
298		**Landscaping**						
299	*329900*	*TOPSOIL*						
300		Topsoil - imported 6" thick; swell 25%	**5,069**	cy	70.00	354,830		
301		Soil and mulch at planting areas; 12" thick	**309**	cy	135.00	41,715		
302		Structural soils - includes tree pit with flexi-pave	**64**	cy	120.00	7,680		
303		Tree cells	**344**	sf	85.00	29,240		
304		Drip strip	*838*	*sf*				
305		Crushed top stone; 1.5" thick	**1**	cy	100.00	w_ERP1		
306		gravel base; 6" thick	**16**	cy	50.00	w_ERP1		
307		Edging	**553**	lf	18.00	9,954		
308	*329900*	*LAWN AND SEED*	*128,582*	*sf*				
309		Topsoil required - imported 6" thick	**2,381**	cy		incl. above		
310		Scarify subgrade	**128,582**	sf	0.25	32,146		
311		General lawn seed mix - non-irrigated	**94,290**	sf	0.35	33,002		
312		Shade lawn mix - non-irrigated	**5,179**	sf	0.35	1,813		
313		Low grow wildflower and grass mix - non-irrigated	**15,943**	sf	0.55	8,769		

	CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Site Detail							
314		Native wood mix - non-irrigated	**13,170**	sf	0.55	7,244		
315		Landscape curbing - concrete (A7)	**448**	lf	80.00	35,840		
316		Landscape curbing - granite (A8)	**996**	lf	150.00	w_ERP1		
317		Tree grates	**3**	ea	10,000.00	30,000		
318		Concrete ribbon curb at tree grates	**96**	lf	80.00	7,680		
319		Boulders	**81**	ea	500.00	w_ERP1		
320	*320000*	*ATHLETIC LANDSCAPING - Irrigated lawn*	*14,580*	*sf*				
321		Topsoil 8" thick - required - Irrigated field	**362**	cy		incl. above		
322		Clean fill	**362**	cy	60.00	21,720		
323		Geotextiles	**14,580**	sf	0.55	8,019		
324		Scarify subgrade	**14,580**	sf	0.25	3,645		
325		Planting maintenance - 1 year	**1**	ls	15,000.00	15,000		
326		Soccer fields - Irrigated with under drainage	*14,580*	*sf*				
327		Lawn seeding - change to sod	**14,580**	sf	2.50	36,450		
328		Double washed stone; 6" thick	**270**	cy	90.00	24,300		
329	*320000*	*ATHLETIC LANDSCAPING - Non-irrigated lawn*	*35,428*	*sf*				
330		Topsoil 12" thick - required - Non-irrigated field	**1,312**	cy		incl. above		
331		Scarify subgrade	**35,428**	sf	0.25	8,857		
332		Soccer fields -Non-irrigated; Informal athletic fields	*35,428*	*sf*				
333		Lawn seeding	**35,428**	sf	0.35	12,400		
334		Coarse sand drainage layer; 6" thick	**656**	cy	65.00	42,640		
335	*329900*	*TREES*						
336		Acer x freemanii 'Jeffersred' - 2/2.5"cal	**13**	ea	1,282.50	16,673		
337		Acer rubrum 'Franksred' - 3/3.5"cal	**22**	ea	2,387.50	52,525		
338		Acer saccharum Green Mountain® - 2.5/3"cal	**4**	ea	1,902.50	7,610		
339		Amelanchier canadensis / Serviceberry - 6/7'clump	**13**	ea	915.00	11,895		
340		Betula nigra 'Cully' - 14/16'clump	**18**	ea	2,287.50	41,175		
341		Carpinus caroliniana / American Hornbeam - 2.5/3"cal	**7**	ea	1,785.98	12,502		
342		Gleditsia tria. inermis 'Halka' / Halka Honeylocust - 2.5/3"cal	**11**	ea	1,785.98	19,646		
343		Liquidambar styraciflua / American Sweetgum - 2.5/3"cal	**8**	ea	1,785.98	14,288		
344		Liriodendron tulipifera / Tuliptree - 3/3.5"cal	**3**	ea	2,219.69	6,659		
345		Magnolia virginiana - 8/10'clump	**12**	ea	1,505.00	18,060		
346		Malus 'Spring Snow' / 'Spring Snow' Flowering Crabapple - 2/2.5"cal	**2**	ea	1,377.04	2,754		
347		Nyssa sylvatica - 2/2.5"cal	**2**	ea	1,445.00	2,890		
348		Nyssa sylvatica - 2.5/3"cal	**13**	ea	1,790.00	23,270		
349		Platanus x acerifolia 'Morton Circle' - 2/2.5"cal	**7**	ea	1,380.00	9,660		
350		Prunus subhirtella 'Autumnalis' - 2.5/3"cal	**3**	ea	1,362.50	4,088		
351		Quercus bicolor - 2.5/3"cal	**6**	ea	1,822.50	10,935		
352		Abies balsamea / Balsam Fir - 12/14'b&b	**12**	ea	3,539.38	42,473		
353		Abies concolor - 8/10'b&b	**3**	ea	2,025.00	6,075		
354		Larix laricina / Tamarack - 10/12'b&b	**13**	ea	2,324.25	30,215		
355		Picea glauca / White Spruce - 8/10'b&b	**7**	ea	1,492.75	10,449		
356		Thuja plicata 'Green Giant' - 10/12'b&b	**21**	ea	2,397.50	50,348		
357		Thuja occidentalis 'Nigra' / Dark American Arborvitae - 10/12'b&b	**39**	ea	2,324.25	90,646		
358	*329900*	*SHRUBS*						
359		Calycanthus floridus / Carolina Allspice - #10	**43**	ea	548.26	23,575		
360		Clethra alnifolia 'Hummingbird' - #5	**30**	ea	201.25	6,038		
361		Cornus sericea 'Farrow' - #3	**60**	ea	119.38	7,163		
362		Fothergilla gardenii - #3	**41**	ea	152.50	6,253		
363		Hamamelis virginiana / Common Witchhazel - 4/5'b&b	**24**	ea	536.71	12,881		
364		Itea virginica 'Henry's Garnet' / Henry's Garnet Sweetspire - #5	**36**	ea	230.44	8,296		
365		Rhus aromatica 'Gro-low' - #3	**4**	ea	124.38	498		
366		Spiraea japonica 'Little Princess' - #3	**13**	ea	100.00	1,300		
367		Syringa patula 'Miss Kim' / Miss Kim Dwarf Lilac - #7	**11**	ea	339.38	3,733		
368		Viburnum dentatum 'Christom' / Blue Muffin Arrowwood Viburnum - #5	**38**	ea	230.44	8,757		
369		Ilex glabra 'Compacta' / Compact Inkberry - #7	**20**	ea	339.38	6,788		
370		Ilex verticillata 'Jim Dandy' / Male Maryland Beauty Winterberry - #3	**3**	ea	140.82	422		
371		Ilex verticillata 'Maryland Beauty' / Female Maryland Beauty Winterberry - #3	**50**	ea	140.82	7,041		
372		Juniperus horiz. 'Bar Harbor' - #3	**180**	ea	97.50	17,550		
373		Pinus mugo 'Pumilio' - #3	**13**	ea	190.00	2,470		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
	Rhododendron yakushimanum / Rhododendron 'Yaku Princess' - #7	**15**	ea	339.38	5,091		
329900	*GROUNDCOVERS - GRASSES/PERENNIALS/VINES*						
	Allium 'Globemaster' / Globemaster Allium - #1	**33**	ea	40.81	1,347		
	Aster novae angliae 'Purple Dome' - #1	**31**	ea	33.13	1,027		
	Astilbe biternata / Appalachian False Goat's Beard - #1	**119**	ea	40.81	4,856		
	Athyrium filix femina - #1	**38**	ea	40.63	1,544		
	Chrysanthemum weyrichii 'White Bomb' / White Bomb Chrysanthemum - #1	**37**	ea	40.81	1,510		
	Hemerocallis 'Joan Senior' - #1	**84**	ea	33.13	2,783		
	Liriope spicata - 4"av pot	**441**	ea	17.25	7,607		
	Rudbeckia 'American Gold Rush' PP28498 - #1	**42**	ea	33.13	1,391		
	Salvia nemorosa 'Caradonna' / Caradonna Sage - #1	**18**	ea	40.81	735		
	Sedum rupestre 'Silver' / Silver Stonecrop - 4"av pot	**90**	ea	19.35	1,742		
	Thymus 'Elfin' - 4"av pot	**32**	ea	17.25	552		
	Festuca glauca 'Elijah Blue' - #1	**72**	ea	38.75	2,790		
	Panicum virgatum / Switch Grass - #2	**27**	ea	96.73	2,612		
	Pennisetum alop. 'Hamlen' / Dwarf Fountain Grass - #2	**21**	ea	96.73	2,031		
329900	*MAINTENANCE*						
	1-yr plant maintenance	**1**	ls	63,521.90	63,522		
	1-yr lawn maintenance	**1**	ls	10,000.00	10,000		
	Irrigation to establish lawn areas	**1**	ls	50,000.00	50,000		
328400	*IRRIGATION*						
	Sleeves	**69**	lf	25.00	1,725		
	Irrigation point of connection	**1**	loc	10,000.00	10,000		
	Rotary Nozzle Sprinklers	**22**	ea	575.00	12,650		
	Controller	**1**	ea	5,000.00	5,000		
	Zone Valves and Valve Boxes	**5**	ea	875.00	4,375		
	Isolation Valves and Valve Boxes	**3**	ea	875.00	2,625		
	Quick Couplers and Valve Boxes	**4**	ea	2,500.00	10,000		
	1-1/2" Master Valve	**1**	ea	1,200.00	1,200		
	Irrigation mainline	**468**	lf	5.00	2,340		
	Irrigation lateral line	**612**	lf	3.00	1,836		
	PVC Sleeves with Electrical Conduit	**510**	lf	28.00	14,280		
	Flow sensor	**1**	ea	3,500.00	3,500		
	Weather Sensor - tipping rain bucket	**1**	ea	275.00	275		
	Grounding Equipment	**1**	ea	3,250.00	3,250		
	SUBTOTAL					1,604,741	
	TOTAL - SITE IMPROVEMENTS						**$7,704,021**
G30	***SITE MECHANICALS***						
G3010	**WATER SUPPLY**						
331000	*WATER UTILITIES*						
	8" CLDI	**2,356**	lf	67.50	w_ERP1		
	6" CLDI	**85**	lf	49.64	w_ERP1		
	Fire department connection	**1**	ea	2,500.00	w_ERP1		
	Gate valve - 2"	**1**	ea	1,250.00	w_ERP1		
	Gate valve - 6"	**5**	ea	1,850.00	w_ERP1		
	Gate valve - 8"	**9**	ea	2,600.00	w_ERP1		
	Fire hydrant	**4**	ea	6,500.00	w_ERP1		
	Thrust blocks	**16**	ea	500.00	w_ERP1		
	6" CLDI	**40**	lf	49.64	w_ERP1		
	2" copper line for irrigation connection	**27**	lf	25.00	w_ERP1		
331000	*CONNECTIONS*						
	Connect to existing water line; 16" connection	**1**	ea	25,000.00	w_ERP1		
	Connect to existing water line; 12" connection	**1**	ea	20,000.00	w_ERP1		
312000	*EXCAVATION & BACKFILL*	*2,508*	*lf*				
	DI gravity piping excavation	**2,229**	cy	46.75	w_ERP1		
	Trench bedding	**502**	cy	38.50	w_ERP1		
	Pressure test & chlorinate	**2,508**	lf	5.00	w_ERP1		
	Allowance for temporary support of existing utilities	**1**	ea	15,000.00	NR		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
	SUBTOTAL					-	
G3020	**SANITARY SEWER**						
333000	*SANITARY SEWER*						
	8" PVC	**1,285**	lf	45.00	w_ERP1		
	SMH - 0-5' deep	**12**	ea	4,800.00	w_ERP1		
	Grease trap - 5,000 gal.	**1**	ea		w/ plumbing		
333000	*CONNECTIONS*						
	Connect to existing structure (inside site)	**1**	ea	10,000.00	w_ERP1		
312000	*EXCAVATION & BACKFILL - Gravity*	*1,285*	*lf*				
	PVC gravity piping excavation	**1,142**	cy	46.75	w_ERP1		
	Trench bedding	**381**	cy	38.50	w_ERP1		
	Pressure testing	**1,285**	lf	4.00	w_ERP1		
	Video Inspection	**1**	ls	10,000.00	NR		
	Grease trap; 5,000 gal. (e/b only) incl. shoring	**1**	ea	10,000.00	w_ERP1		
	Allowance for temporary support of existing utilities	**1**	ea	15,000.00	NR		
	SUBTOTAL					-	
G3030	**STORM SEWER**						
334000	*STORM DRAINAGE*						
	24" HDPE	**312**	lf	110.00	w_ERP1		
	18" HDPE	**366**	lf	100.00	w_ERP1		
	15" HDPE	**335**	lf	90.00	w_ERP1		
	12" HDPE	**1,797**	lf	70.00	w_ERP1		
	8" HDPE	**278**	lf	60.00	w_ERP1		
	6" Perf underdrains	**1,601**	lf	55.00	w_ERP1		
	4" Perf underdrains	**1,601**	lf	45.00	w_ERP1		
	Rigid underdrains	**1,601**	lf	50.00	w_ERP1		
	Rigid collector piping	**718**	lf	50.00	w_ERP1		
	4' Dia. DMH - 0-5' deep	**22**	ea	4,800.00	w_ERP1		
	4' Dia. DMH - 5-12' deep	**8**	ea	5,000.00	w_ERP1		
	DMH - 0-5' doghouse	**1**	ea	8,000.00	w_ERP1		
	DMH - 5-12' doghouse	**1**	ea	8,500.00	w_ERP1		
	WQS	**13**	ea	25,000.00	w_ERP1		
	OCS	**3**	ea	8,000.00	w_ERP1		
	CO	**2**	ea	1,200.00	w_ERP1		
	CB - 4' Dia.	**30**	ea	4,200.00	w_ERP1		
	DCB - 6' Dia.	**10**	ea	6,000.00	w_ERP1		
	Roof drain	**57**	lf	35.00	w_ERP1		
	Roof drain connections	**4**	ea	500.00	w_ERP1		
	ACO trench drain at soccer field	**125**	lf	190.00	w_ERP1		
334000	*CONNECTIONS*						
	Connect to existing structure - in road	**1**	ea	10,000.00	w_ERP1		
334000	*SUBSURFACE DRAINAGE SYSTEMS*						
	Underground recharger - Retain - It	*9,536*	*sf*				
	Materials & delivery	**1**	ls	1,131,063.00	w_ERP1		
	Installation - changed at recon due to bid package feedback	**1**	ls	113,106.30	w_ERP1		
	Underground recharger - Retain - It - UGI-5	*9,536*	*sf*				
	Materials & delivery	**1**	ls	1,131,063.00	incl. above		
	Excavate	**4,238**	cy	25.00	w_ERP1		
	Load excess soils for disposal	**4,238**	cy	2.50	w_earthwork		
	Clean non-regulated	**6,357**	tn	9.00	w_earthwork		
	Install stone base; 12" thick	**583**	tn	65.00	w_ERP1		
	Installation	**1**	ls	565,531.50	incl. above		
	Fine grade base	**9,536**	sf	0.25	w_ERP1		
	Back-fill infiltration bed with 1-2" crushed stone	**583**	tn	65.00	w_ERP1		
	Underground recharger - Retain - It - UGI-4	*3,241*	*sf*				
	Materials & delivery	**1**	ls	1,131,063.00	incl. above		
	Excavate	**1,080**	cy	25.00	w_ERP1		
	Load excess soils for disposal	**1,080**	cy	2.50	w_earthwork		
	Clean non-regulated	**1,620**	tn	9.00	w_earthwork		
	Install stone base; 12" thick	**198**	tn	65.00	w_ERP1		
	Installation	**1**	ls	565,531.50	incl. above		

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Site Detail							
	Fine grade base	**3,241**	sf	0.25	w_ERP1		
	Back-fill infiltration bed with 1-2" crushed stone	**198**	tn	65.00	w_ERP1		
	Underground recharger - Retain - It - UGI-3	*7,692*	*sf*				
	Materials & delivery	**1**	ls	1,131,063.00	incl. above		
	Excavate	**2,564**	cy	25.00	w_ERP1		
	Load excess soils for disposal	**2,564**	cy	2.50	w_earthwork		
	Clean non-regulated	**3,846**	tn	9.00	w_earthwork		
	Install stone base; 12" thick	**470**	tn	65.00	w_ERP1		
	Installation	**1**	ls	565,531.50	incl. above		
	Fine grade base	**7,692**	sf	0.25	w_ERP1		
	Back-fill infiltration bed with 1-2" crushed stone	**470**	tn	65.00	w_ERP1		
	Underground recharger - Retain - It	*15,137*	*sf*				
	Materials & delivery	**1**	ls	1,131,063.00	incl. above		
	Excavate	**4,205**	cy	25.00	w_ERP1		
	Load excess soils for disposal	**4,205**	cy	2.50	w_earthwork		
	Clean non-regulated	**6,308**	tn	9.00	w_earthwork		
	Install stone base; 12" thick	**925**	tn	65.00	w_ERP1		
	Installation	**1**	ls	565,531.50	incl. above		
	Fine grade base	**15,137**	sf	0.25	w_ERP1		
	Back-fill infiltration bed with 1-2" crushed stone	**925**	tn	65.00	w_ERP1		
	SUBTOTAL					-	
G3060	**FUEL DISTRIBUTION**						
220001	*NATURAL GAS*						
	No work in this section						
	SUBTOTAL					-	
	TOTAL - SITE MECHANICAL UTILITIES						
G40	***SITE ELECTRICAL UTILITY***						
G40	**ELECTRICAL**						
	Civil						
	Concrete:						
	Duct bank AA: Primary 2-4" PVC	**160**	lf	30.00	4,800		
	Duct bank DD: Primary Comm combo 9-4"	**400**	lf	45.00	18,000		
	Duct bank BB: 2x Primary 4-4" PVC	**160**	lf	30.00	4,800		
	Duct bank FF: Secondary 12-4" PVC	**70**	lf	45.00	3,150		
	Duct bank GG: Secondary/Gen 16-4" PVC	**210**	lf	45.00	9,450		
	Duct bank CC: Comm 5-4" PVC	**530**	lf	35.00	18,550		
	Concrete pad	**3**	ea	2,500.00	7,500		
	Light pole base	**29**	ea	650.00	18,850		
	Bollard base	**35**	ea	350.00	12,250		
	Excavation & Backfill:						
	Duct bank AA: Primary 2-4" PVC	**160**	lf		w_ERP1		
	Duct bank DD: Primary Comm combo 9-4"	**400**	lf		w_ERP1		
	Duct bank BB: 2x Primary 4-4" PVC	**160**	lf		w_ERP1		
	Duct bank FF: Secondary 12-4" PVC	**70**	lf		w_ERP1		
	Duct bank GG: Secondary/Gen 16-4" PVC	**210**	lf		w_ERP1		
	Duct bank CC: Comm 5-4" PVC	**530**	lf		w_ERP1		
	Lighting/Security/misc. circuitry, allow	**6,300**	lf		w_ERP1		
	EV conduit	**3,500**	lf		w_ERP1		
	Power						
	Power riser pole- connect to existing	**2**	ea	2,500.00	5,000		
	Manhole, new	**2**	ea	8,500.00	17,000		
	Duct bank AA: Primary 2-4" PVC	**160**	lf	63.00	10,080		
	Duct bank DD: Primary Comm combo 9-4"	**400**	lf	225.00	90,000		
	Duct bank BB: 2x Primary 4-4" PVC	**160**	lf	125.00	20,000		
	Primary cabling	**720**	lf		by utility co.		
	Transformer	**2**	ea		by utility co.		
	Transformer grounding (transformer by Util Co)	**2**	ea	1,000.00	2,000		
	Duct bank FF: Secondary 12-4" PVC with 2x 2000A feed	**70**	lf	1,050.00	73,500		

90% Construction Document Cost Estimate

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
	Site Detail						
	Duct bank GG: Secondary/Gen 16-4" PVC with 2x 2000A feeds & 1200A + 125A	**210**	lf	1,500.00	315,000		
	Generator grounding	**1**	ls	1,000.00	1,000		
	Site power connection Entry sign	**2**	ea	500.00	1,000		
	Sign circuitry, allow to pull box	**220**	lf	10.00	2,200		
	Receptacle at pole base	**11**	ea	350.00	3,850		
	Photovoltaic				NIC		
	Telecommunications						
	Comm pole- connect to existing	**1**	ea	1,500.00	1,500		
	Manhole, new	**4**	ea	8,500.00	34,000		
	Duct bank CC: Comm 5-4" PVC	**530**	lf	125.00	66,250		
	Comm cabling				NIC		
	Emergency call box	**1**	ls	10,500.00	10,500		
	Circuitry, allow	**100**	lf	15.00	1,500		
	Electric Vehicle Stations						
	Dual EV stations				Future		
	EV pull box	**8**	ea	750.00	6,000		
	Conduit for future EV stations, allow home run to main electric room from each pull	**3,500**	lf	28.00	98,000		
	Security						
	Site cameras with conduit & wiring, allow	**1**	ls	20,000.00	20,000		
	Site lighting						
	Site Fixture SL1	**18**	ea		See BLS quote in school		
	Site Fixture SL2	**3**	ea		See BLS quote in school		
	Site Fixture SL3				See BLS quote in school		
	Site Fixture SL4				See BLS quote in school		
	Site Fixture SL9				See BLS quote in school		
	Installation labor budgeted fixtures:						
	Site Fixture SL1	**18**	ea	1,500.00	27,000		
	Site Fixture SL2	**3**	ea	1,500.00	4,500		
	Site Fixture SL3	**8**	ea	1,500.00	12,000		
	Site Fixture SL4	**35**	ea	1,500.00	52,500		
	Site Fixture SL9	**23**	ea	500.00	11,500		
	Light fixtures Estimator budget pricing with installation labor						
	Fixture SL6 flagpole light	**6**	ea	650.00	3,900		
	Fixture SL10	**101**	lf	125.00	12,625		
	Fixture SL11	**6**	ea	650.00	3,900		
	Fixture grounding	**93**	ea	150.00	13,950		
	Pull box	**4**	ea	750.00	3,000		
	Site lighting & receptacle circuitry: 50A in 1" PVC	**7,000**	lf	15.00	105,000		
	SUBTOTAL					1,125,605	
	TOTAL - SITE ELECTRICAL UTILTIES						**$1,125,605**

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
ALTERNATES							
	1. SG5 ILO SG4 at L1 Exterior Glazing						
	BASE ESTIMATE						
	Premium for SG4	**(2,935)**	sf	75.00	(220,125)		
	ALTERNATE						
	Premium for SG5	**2,935**	sf	90.00	264,150		
	SUBTOTAL					44,025	
	SUBTOTAL				*ADD*		***$44,025***
	2. Ballistic L3 Glass ILO SG4 at L1 Windows, SG5 at Curtain Wall						
	BASE ESTIMATE						
	Premium for SG4	**(2,935)**	sf	75.00	(220,125)		
	ALTERNATE						
	Premium for Ballistic L3 windows	**2,160**	sf	200.00	432,000		
	Premium for SG5 Curtain Wall	**775**	sf	90.00	69,750		
	SUBTOTAL					281,625	
	SUBTOTAL				*ADD*		***$281,625***
	3. SG4 at interior sidelights						
	BASE ESTIMATE						
	Sidelight glass	**(1,183)**	sf	50.00	(59,150)		
	ADD ALTERNATE						
	SG4	**1,183**	sf	100.00	118,300		
	SUBTOTAL					118,300	
	SUBTOTAL				*ADD*		***$118,300***
	4. SG5 at interior sidelights						
	BASE ESTIMATE						
	Sidelight glass	**(1,183)**	sf	50.00	(59,150)		
	ADD ALTERNATE						
	SG5	**1,183**	sf	115.00	136,045		
	SUBTOTAL					136,045	
	SUBTOTAL				*ADD*		***$136,045***

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
ALTERNATES							
	5. SG4 at classroom borrowed lights						
	BASE ESTIMATE						
	Sidelight glass	**(982)**	sf	50.00	(49,100)		
	ADD ALTERNATE						
	SG4	**982**	sf	100.00	98,200		
	SUBTOTAL					98,200	
	SUBTOTAL				*ADD*		***$98,200***
	6. SG5 at borrowed lights						
	BASE ESTIMATE						
	Sidelight glass	**(982)**	sf	50.00	(49,100)		
	ADD ALTERNATE						
	SG5	**982**	sf	115.00	112,930		
	SUBTOTAL					112,930	
	SUBTOTAL				*ADD*		***$112,930***
	7. Ballistic Assembly at interior vestibule doors						
	BASE ESTIMATE						
	ADD ALTERNATE						
	Premium for Ballistic L3	**101**	sf	200.00	20,200		
	premium for ballistic doors	**5**	lvs	10,000.00	50,000		
	SUBTOTAL					70,200	
	SUBTOTAL				*ADD*		***$70,200***
	8. Ballistic Assembly at Cafeteria						
	BASE ESTIMATE						
	Premium for Schoolguard glazing at L1	**(250)**	sf	75.00	(18,750)		
	ADD ALTERNATE						
	SG5	**576**	sf	200.00	115,200		
	SUBTOTAL					115,200	
	SUBTOTAL				*ADD*		***$115,200***
	9. Ballistic door assemblies at exterior vestibule locations						
	BASE ESTIMATE						
	Premium for Schoolguard glazing at L1	**177**	sf	75.00	13,275		
	ADD ALTERNATE						
	Premium for Ballistic L3	**177**	sf	200.00	35,400		
	premium for ballistic doors	**9**	lvs	10,000.00	90,000		
	SUBTOTAL					125,400	
	SUBTOTAL				*ADD*		***$125,400***

PM&C

Wildwood Elementary School 46,287.00 22-Sep-26
Wilmington, MA

90% Construction Document Cost Estimate

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
ALTERNATES							
	10. Ballistic door assemblies at exterior stair locations						
	BASE ESTIMATE						
	Premium for Schoolguard glazing at L1	**33**	sf	75.00	2,475		
	Glass in doors and sidelights - IG4	**60**	sf	225.00	13,500		
	Premium for IG-4A, security glazing to doors	**(2)**	lvs	500.00	(1,000)		
	ADD ALTERNATE						
	Premium for Ballistic L3	**33**	sf	200.00	6,600		
	premium for ballistic doors	**8**	lvs	10,000.00	80,000		
	SUBTOTAL					86,600	
	SUBTOTAL				*ADD*		***$86,600***

APPENDIX X

July 22, 2026

Via email only: katie.cronin@MassSchoolBuildings.org

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

RE: Wilmington Elementary School (also known as Wildwood Elementary School)
District Response to MSBA 60% CD return comments

Dear Ms. Cronin:

On behalf of and in collaboration with the Town of Wilmington (Town), Wilmington Public Schools (WPS), and Dore + Whittier (Designer), LeftField submits the following written responses to the Massachusetts School Building Authority's review comments on the 60% Construction Documents submission for the above-referenced project. For ease of reference, the District's responses are shown in **bold red text.**

Sincerely,
Leftfield, LLC



David Saindon
Senior Director

Attachment: MSBA 60% Review Comments with Responses in **bold red font**

cc: Rani Philip, Dore + Whittier
Craig DiCarlo, LeftField
Judy O'Connell, Assistant Town Manager, Town of Wilmington/ Chair, SBC
File

APPENDIX 6B
MODULE 6 – 60% CONSTRUCTION DOCUMENTS REVIEW COMMENTS

District: *Town of Wilmington*
School: *Wildwood Elementary School*
Owner's Project Manager: *LeftField, LLC*
Designer Firm: *Dore + Whittier Architects, Inc.*
Submittal Received Date: *June 26, 2026*
Review Dates: *June 30 – July 13, 2026*
Reviewed by: *Gienapp Architects, K. Brown, K. Cronin, S. Garvey*

MSBA REVIEW COMMENTS

The following comments[1] on the 60% construction documents submittal are issued pursuant to a project submittal review document for the proposed project and presented as a 60% construction documents submission in accordance with the MSBA Module 6 Guidelines.

The MSBA will not provide submittal review comments for a project that has bid or is scheduled to issue bid documents for the majority of filed sub-bid as well as non-filed scope within two weeks of District receipt of MSBA review comments. In addition, the MSBA will not provide review comments for any portions of a project already bid as part of an "early bid package". Note that the MSBA requires the design team to include all early bid packages (if any) in each submittal, showing a complete project, to allow for MSBA coordination review for remaining portions of work that have not bid. If the scope of early bid packages is well advanced of the scheduled DD/CD review process, MSBA reserves the right to refrain from providing review comments, or to limit review comments to portions of the submittal that address conformance to the Project Scope and Budget Agreement.

The items listed below are to be included in each project submittal by the design team (OPM and Designer) to the extent that each item applies to the project, or the design team should include an explanation why an item doesn't apply. The project submittal may be rejected by MSBA if all items below are not fully addressed by the project team. Unless specifically stated otherwise in the review comments below, the OPM and Designer deliverables are included in the submission with no further comment from MSBA required.

6B.1 Summary Comments

		Comments
•	Basic Project Information:	
	o Provide an updated general introduction that presents a brief overview of the project details, describes the current status of the project, description and status of any early bid packages, any ongoing issues or new developments, any changes to the project since the previous submittal, how the district and design team are addressing these developments, and how these issues may affect the projects schedule, budget or conformance to the Project Scope and Budget Agreement.	
	o Enrollment - describe each of the following:	*755 Students Grades K-5; 100 Students PreK*

[1] The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project Designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

	▪ grade configuration ▪ design enrollment ▪ number of PK students (note "N/A" if not applicable)	
	○ GSF area- describe the following: ▪ GSF approved in the PFA ▪ GSF as currently proposed	*Design 165,035 (PFA); 165,035 (Current)*
	○ Project Type (all new, add/reno, reno)	*New Construction*
	○ Delivery method (DBB, CMR). If CMR, describe contract status	*CMR; Fontaine Brothers ("FBI") is currently under contract, working in the preconstruction phase and is scheduled to commence mobilization on the site towards the end of June 2026.*
	○ Provide any information regarding updates to the District's current project budget and anticipated construction cost, including any additional funding appropriations.	*Per the submission, the current budget, as of the issuance of this 60% construction document ("60% CD") Submittal, results in no change to the PFA budget. No additional funding appropriations are being considered.*
	○ For projects with Chapter 74 CVTE programs, OPM and Designer review and acknowledge requirements described here (Chapter 74 Meeting with MSBA and DESE following the 60% CD submission).	*Not applicable*

- Project Budget Compliance:
  - *The Project Funding Agreement ("PFA") has total project budget of $173,265,626. The submittal notes that the current total project budget is $173,265,626, and is within budget.*
  - *The PFA has an estimated construction cost of $137,743,666. The submittal notes that the OPM's current reconciled estimated construction cost is $137,457,680, and is within budget.*
  - *The (OPM/CMR)'s current construction cost estimate is $137,457,680 by (Fontaine). The Designer's current construction cost estimate is $135,711,493 by (PM+C).*
- General comments:
  - *The submission does not include the updated Architectural Narrative and explains this is due to there being no changes to the narrative provided in the last submission. All deliverables should be provided regardless of if they were included in previous submissions and remain unchanged.* ***Acknowledged.***
  - *Work included in early bid packages issued either before this submission or within 35 days of this submission is not included in this review. It appears there is one early bid package that includes site enabling, which is available to bidders within this time frame. Consequently, this item is not reviewed here.* ***Acknowledged.***

6B.2 OPM Deliverables:

	6B.2.1 OPM Submittal Review & Coordination	Comments
•	OPM's separate signed cover letter verifying each of the following: 1) the OPM has reviewed and coordinated the materials, 2) the submittal is complete and conforms to MSBA requirements, 3) the proposed project as documented within each submittal is within the District's budget, and 4) the District has approved the materials for submission to the MSBA.	
•	Coordinate design; include written recommendations to the Owner. Address each of the following items individually, and describe how the OPM evaluated each item:	

	○ Technical accuracy, coordination, & clarity	
	○ Efficiency & cost effectiveness	
	○ Operability	
	○ Constructability	
	○ Phasing	
	○ Bid ability	
	○ Site access during construction	
•	Coordinate Commissioning consultant's review:	
	○ Describe the commissioning consultant's review status.	
	○ Include a copy of the commissioning consultant's review & project team's response to each item.	
	○ Describe the consideration and incorporation of commissioning consultant's recommendations into the current submittal.	
•	Coordinate the District response to the MSBA comments of previous submittals:	
	○ Include a copy of the previous MSBA Design Development submittal review & District response, including any supplemental submittals and reviews.	
	○ Provide documentation of comments addressed and comments resolution outstanding.	
•	OPM provide confirmation that the District has submitted a completed Designer Evaluation Form to the Division of Capital Asset Management and Maintenance (DCAMM), using the DCAMM/DSB Autocene platform, upon completion of the Schematic Design phase (refer to MSBA Project Advisory #79 for information regarding DCAMM/DSB Designer evaluations).	*While the submission confirms completion of the DCAMM evaluation, it does not include the MSBA's Designer Evaluation Form that is part of the MSBA Project Advisory #79, linked to the left. The completed MSBA's Designer Evaluation Form should be included in the next submission.* ***Acknowledged.***

	6B.2.2 Project Schedule	Comments
•	The OPM is responsible for submitting a project schedule that conforms to the following requirements, whether the schedule is produced by the OPM or the CMR (if applicable). *A schedule that is limited to construction tasks is not acceptable and will be rejected*. All schedules should be presented in calendar days.	
•	Update project schedule: At a minimum, the schedule update should provide the same level of detail as was included in the Project Funding Agreement Exhibit C, expanded and updated to include milestones for Design Development, Bidding, Construction, and Closeout. The updated schedule should include proposed critical path and construction milestone information. In addition to the construction milestones, the schedule must also include the following information as listed in MSBA Module 7, Schedule Activities:	

	○ Punch list start and end dates	
	○ Project Registration date with the US Green Building Council ("USGBC")	
	○ Provisional/Design package submittal date to USGBC	
	○ MSBA 50% DCAMM Notification submittal date and MSBA 100% DCAMM Standard Contractor Evaluation Form notification date	
	○ Designer Evaluation Form submissions to DCAMM: 1). upon completion of Schematic Design, 2). completion of 100% construction documents, and 3). final GC/CM payment.	
	○ General Contractor/Construction Manager request for final payment	
	○ Commissioning Consultant inspection (substantial completion plus approximately 10 months)	
	○ Final Commissioning report to MSBA submittal date	
	○ Final Construction package to USGBC including the Final Commissioning Report submittal date	
	○ Anticipated final Green School Program Certification letter from USGBC issuance date	
	○ Commissioning Certificate of Completion submittal date to MSBA	
	○ Final reimbursement request submittal date to MSBA	
•	Include application submission and approval dates in the project schedule for the following approvals, *coordinated with the Designer's submittal information.* In addition, provide dates for any other state or federal approval not listed below (the following list is not a comprehensive itemization of required state approvals; other requirements may apply, and some items listed below might not be applicable to this project) Indicate "Non-Applicable" on the project schedule where appropriate:	
	○ DESE - Special Education approval by Department of Elementary and Secondary Education	
	○ MHC – Project Notification Form and approvals by MA Historical Commission	
	○ OIG - Construction Manager at Risk approval by the Office of Inspector General	
	○ Executive Office of Energy and Environmental Affairs/EEA:	
	▪ MEPA - MA Environmental Policy Act by Energy & Environmental Affairs:	
	• ENF - Environmental Notification Form	
	• EIR - Environmental Impact Report	
	▪ Article 97 Land Disposition Policy approval by Energy & Environmental Affairs	
	○ MA DEP - Massachusetts Department of Environmental Protection	
	○ MA DOT - Massachusetts Department of Transportation	

	○ MA DPH - Massachusetts Department of Public Health (typically relating to CH74 Medical / Dental functions)	
	○ EPA –NPDES National Pollutant Discharge Elimination System Notice of Intent approval by the US Environmental Protection Agency	
	○ MAAB - Accessibility variances by MA Architectural Access Board	
•	Indicate all required state reviews or permits on the milestone schedule including actual or planned approval dates which are required in order to maintain the planned bidding and construction schedule and milestones indicated therein. For required state reviews or permit approvals which have not been obtained on schedule, provide a separate (sub network) schedule depicting recovery actions to obtain required approvals in order to maintain the bidding and construction schedule.	
•	A letter on District letterhead confirming that the Project has undergone review and obtained all necessary state reviews and approvals by any departments or Commonwealth agencies required by law to review the Project, including but not limited to the approvals listed above. Attach such documentation letter evidencing such state reviews and approvals:	
	○ Identify any state reviews or permits for which approval has not been obtained as of the 60% Construction Documents submission date, and include in the District letter a status update including actions taken to date and actions planned to obtain the required approval(s) in order to comply with Project Funding Agreement (the "PFA") Section 4.12. and maintain the projected schedule milestones listed in OPM Deliverables.	
	○ PFA Section 4.12, executed between the District and the MSBA, requires that each project successfully undergo review and obtain all necessary approvals "prior to the solicitation of construction bids, by any departments or agencies of the Commonwealth required by law to review such projects..." In response to these 60% CD submission review comments, MSBA requires documentation that the District complies with this PFA requirement.	
•	The schedule is to be updated and submitted to MSBA as often as is required to reflect any changes, including any changes to milestone dates, but must be submitted with each design submittal (DD, 60% CD, 90% CD).	*The schedule included in the submission is dated March 20, 2026 and titled "DD Schedule". It is not clear if this is in error since the schedule identifies that the 60% CD Phase is 84% complete, and the footer indicates a more recent print date. Please confirm if this is for this, 60% CD, submission.* ***Yes, the schedule included as part of the 60% CD submission represents the updated schedule. The title was not changed and was in error.***

•	Indicate the date for the 60% Construction Documents and proposed 90% Construction Documents submission dates. The schedule is to incorporate 21 calendar day required duration for each MSBA submission review, and a minimum 14 calendar days for project team incorporation of MSBA review comments as well as all others into the project documents prior to the next submission due date or finalizing project documents to make available to bidders. 35 calendar days between each MSBA design submission (DD, 60%, 90%) is the minimum acceptable duration; if the project team believes additional time is required for any or all the submissions the durations for these activities are to be increased accordingly.	*There appears to be an inconsistency with the schedule. For example, line 188 "District response period" to the 90% CD submission ends 11/6/26. However, line 193 "100% CD / Bid package issued" is beforehand on 10/30/26. This should be reviewed and coordinated prior to the next submission.* ***Reviewed. The logic of these schedule ID tasks is that we anticipate receiving the MSBA 90% CD review comments on or before Monday, October 19, 2026. If, based on the MSBA review comments, there are items that would require the Project to incorporate or delay the issuance of the 100% documents for bidding purposes, the Project will assess at that time and decide to delay the issuance of the 100% CD set for bidding or provide an addendum as part of the bidding process. Thus, the District response period, which is 14 calendar days after receipt of the MSBA 90% CD review comments, does go beyond the issuance of the 100% CD bid set; however, they are not necessarily connected.***

6B.2.3 Project Scope and Budget		Comments
•	Develop project scope and budget, cost estimates and reconciliation:	
	○ OPM construction cost estimate using CSI MasterFormat 6-digit format to Level 3 and MGL c.149 s 44F (filed sub-bid) format showing unit rates and quantities; with escalation projected to the mid-point of construction.	
	○ OPM reconciliation of the OPM/CMR and Designer construction cost estimates including a description of the method to derive this reconciliation. Refer to this link for an example of the Cost Estimate Reconciliation Form.	
	○ Updated Cost Estimate Comparison Form. Refer to this link for an example of the Cost Estimate Comparison Form.	
•	CMR (if applicable):	
	○ If the Owner has not yet contracted with a Construction Manager (CM), the OPM must develop a construction cost estimate as described above for comparison with the Designer's cost estimate.	
	○ If the Owner has given the CM a Notice to Proceed, the OPM must review cost estimates provided by the Designer and CM and provide a Designer's and CM's construction cost estimates reconciliation as described above.	
•	Updated project budget in the MSBA total project budget format, based on the reconciled construction cost estimate. If the reconciled estimate is not used for the updated project budget, provide an explanation.	

•	Describe any early bid packages anticipated scope and schedule. Include any early bid packages (if applicable). *The submittal must include all early bid packages, showing a complete project, to allow for MSBA coordination review.* Provide bid tables for a completed sub-bid package.	
•	Value Engineering recommendations (if any):	
	○ Provide the list of potential and accepted Value Engineering recommendations, and associated costs of each item.	*The submission indicates both that the reconciled cost estimate is within budget, so no value engineering (VE) is needed and that a VE log has been developed, but it is not included as a part of the submission. Please include the VE log in future submissions for reference.* ***Acknowledged.***
	○ Value Engineering Summary Tracking Sheet completed and updated for this submittal indicating compliance with the PFA budget, and considerations or implementation of Value Engineering (if any). Refer to this link for the Value Engineering Summary Tracking Sheet. *Note that all project submittals must include a completed and current Value Engineering Summary Tracking Sheet in Excel format regardless of the status of the project's budget.*	
	○ For any Value Engineering recommendations which have been accepted, provide a copy of the Committee vote.	

6B.3 Designer Deliverables:

6B.3.1 General Requirements		Comments
•	Submit an updated work plan.	
•	Updated and expanded Basis of Design narrative description for each following discipline:	
	○ Architecture	*The submission indicates that the Architectural Narrative has remained relatively unchanged since the last submission and refers to the Design Development submission for details. All deliverables should be included regardless of whether they were in previous submissions and remain unchanged. Please include this in the next submission.* ***Acknowledged. The Architectural Narrative will be included in the next submission.***
	○ Structural: narrative must include lateral bracing methods and how earthquake code requirements will be met	
	○ Civil	
	○ MEP + FP	
	○ Data/Comms./Security	
•	Updated building code analysis	
•	Provide an updated description of all local "Green Communities" designations for this project (if any) and describe compliance measures to conform to related building or site requirements including the Stretch	

	Code, Municipal Opt-in Specialized "Net Zero Energy" Code, and any other locally required ordinances related to sustainability, based on local approvals required at the scheduled project permit date.	
•	Provide an updated LEED scorecard indicating current attempted credits, and a statement from the designer describing any changes in the project scope and/or LEED scorecard as compared to the sustainability goals identified in the Project Scope and Budget Agreement.	
•	Site vulnerability risk assessment / evaluation – provide a statement from the designer describing any changes to the project scope included in the Project Scope and Budget submittal based on the risk assessment of the selected site as described in the Module 3 Feasibility Study Guidelines.	
•	Provide an updated list of proprietary items under consideration.	
•	Describe proposed exterior and interior materials and finishes. Confirm that material, finish and color selections have been reviewed by the District for approval.	
•	Updated structural calculations	
•	Evidence that an independent structural design review is initiated or being arranged (an MSBA requirement for all projects with new construction over 10,000 sf). MSBA requires a structural engineering peer review submission as part of the Final (100%) Construction Documents submission, to include documentation of any issues identified by the Peer Reviewer and resolution. Actions are to be advanced well prior to the 90% CD submission to engage the peer reviewer, and that scheduling be arranged to allow final structural design drawings and calculations to be submitted to the peer reviewer at the completion of the 90% Construction Documents submittal, *or earlier as may be required for early (structural) bid packages,* in order to incorporate comments and response action reporting in the final construction documents and avoid delays. Confirm this process has been initiated.	
•	Updated energy model calculations	
•	Updated Life Cycle cost analysis for energy and water consuming devices	
•	Updated heat gain and loss calculations for Heating, Ventilating and Air Conditioning systems	
•	Updated calculations showing total electrical load	
•	Updated security and visual access requirements:	
	○ Confirmation that the persons responsible for the District's emergency procedures implementation, and responding emergency medical, fire protection, and police agency representatives have been consulted in the planning process and any associated requirements have been included in the project.	
	○ Identify other security related items particular to the District and/or the proposed project.	

	○ Verification that the following safety and security related issues have been reviewed and are in accordance with the District's procedures as noted above:	*For clarity in the following submission, suggest separating the Security and Visual Access Requirements section into the subsections below to show that each item has been addressed.* ***Acknowledged. The Security and Visual Access Requirements section will be separated into the subsections requested in the next submission.***
	▪ Main entrance design – describe District protocol for visitor entry and check-in related to the current design for visitors to remain in the vestibule versus a side sub-vestibule.	
	▪ Classroom lockset hardware - confirm hardware functions are compatible with the District's protocols related to lockdown.	*The submission indicates plans to use "classroom lockset hardware that allows doors to be locked quickly from the inside" but does not confirm hardware functions are compatible with the District's protocols related to lockdown. This information should be provided with the next submittal.* ***Acknowledged. The requested information will be provided in the next submission.***
	▪ Classroom / Instructional spaces visibility - confirm that the inclusion of sidelights at entrance locations is compatible with the District's current standards related to visibility from corridors and whether any related vision control option measures are to be incorporated.	
	▪ Alternative entry/exit locations - confirm project includes site and building signage, as may be required by District's emergency procedures, to identify locations where first responders may more directly reach a person needing medical attention; Knox Boxes; Fire Alarm Control Panels, and provisions for building plans to be delivered to local fire and response agencies.	
•	Facility and Maintenance requirements:	
	○ Confirmation that the district personnel responsible for maintenance have been consulted in the planning process and any associated requirements have been considered for this project. Describe maintenance related items particular to the District and/or the proposed project.	
	○ Confirmation that the district personnel responsible for maintenance have been consulted regarding any changes in the proposed design resulting from Value Engineering (if any).	
	○ Confirmation that the district personnel responsible for budgeting and maintenance have participated in discussions regarding the selection and long-term operational and maintenance costs of the mechanical systems and building maintenance system controls.	
	○ Confirmation that the district personnel responsible for the maintenance have participated in discussions regarding the proposed training program and that these discussions have determined that the hours and the schedule for training included in the contract	

	are sufficient to train the facility operational and maintenance personnel to operate the building management system, as designed. Confirmation that adequate hours have been scheduled both before the opening of the school and after the turnover of the building.	
	○ Verification that at a minimum the following issues have been reviewed:	
	▪ Training hours and scheduling	
	▪ HVAC systems	
	▪ Building Management Systems	
	▪ Lighting fixtures and controls	
	▪ Cleaning procedures and materials	
	▪ Access to all roof surfaces	
	▪ Mechanical room access	*Verification that the mechanical room access has been reviewed is not included. This information should be provided with the next submittal.* ***Acknowledged. The requested information will be provided in the next submission.***
•	Quality Control narratives, supporting plans and documents demonstrating each of the following *(a general / summary comment is not acceptable, the narrative must address each of the following):*	
	○ Ceiling clearances	
	○ Mechanical room and shaft sizes	
	○ Coordinate specifications and drawings	
	○ Filed sub-bid work	
	○ Scheduling	
	○ Equipment and power	
	○ Existing and new construction	
	○ Phasing	

6B.3.2 Space Summary				Comments		
Spaces	PFA Space Summary	DD Space Summary	60% CD Space Summary	90% CD Space Summary	Difference to PFA	Comments
Core Academic Spaces	47,700	47,526	47,494		(206)	This category has decreased by a total of 32 nsf since the last submittal.
Special Education	19,010	19,010	19,033		23	This category has increased by a total of 23 nsf since the last submittal.
Art and Music	5,075	5,064	5,042		(33)	This category has decreased by a total of 22 nsf since the last submittal.

Health and Physical Education	12,300	12,237	12,237		(63)	This category has remained the same since the last submittal.
Media Center	4,068	4,096	4,104		36	This category has increased by a total of 8 nsf since the last submittal.
Dining and Food Service	10,058	10,058	10,058		-	This category has remained the same since the last submittal.
Medical	710	698	701		(9)	This category has increased by a total of 3 nsf since the last submittal.
Administration and Guidance	3,548	3,587	3,587		39	This category has remained the same since the last submittal.
Custodial and Maintenance	2,355	2,344	2,344		(11)	This category has remained the same since the last submittal.
Other	5,500	5,459	5,458		(42)	This category has decreased by a total of 1 nsf since the last submittal.
Total Building Net	**110,324**	**110,079**	**110,058**		**(266)**	
Non Programmed						
Other Occupied Rooms	300	284	284		(16)	This category has remained the same since the last submittal.
Unoccupied MEP/FP	3,774	3,682	3,682		(92)	This category has remained the same since the last submittal.
Unoccupied Closets, Supply Rooms & Storage	1,498	1,590	1,589		91	This category has decreased by a total of 1 nsf since the last submittal.
Toilet Rooms	4,777	4,740	4,740		(37)	This category has remained the same since the last submittal.
Circulation	30,276	29,036	29,036		(1,240)	This category has remained the same since the last submittal.
Remaining	14,086	15,624	15,646		1,560	This category has increased by a total of 22 nsf since the last submittal.

Total Gross	**165,035**	**165,035**	**165,035**		**-**	
Grossing Factor	**1.50**	**1.50**	**1.50**		**-**	

•	Updated space summary and signed certification that reflects the current design	
•	Provide confirmation that the spaces conform to the MSBA minimum and maximum size range requirements described in the space summary including: ○ Classrooms & number of sinks ○ Science Labs ○ STE rooms (if applicable) ○ SPED spaces ○ Gymnasium ○ Auditorium (if applicable)	
•	Provide confirmation that the grossing factor in the submitted space summary does not exceed 1.50	
•	Comparison of the current design with the final educational program, and confirmation that there are no variations. If there are variations, the written summary must address the following:	
	○ Explain deviations within the space summary from the Project Funding Agreement. The MSBA will either: ▪ MSBA accepts this variation to the approved project with no further action required. ▪ Prior to MSBA accepting this variation to the project, the Designer must describe in detail the reason for the change.	*The MSBA will continue to monitor areas in excess of/or below the agreed upon GSF at PFA and may consider deviations over or under guidelines as either Ineligible at PFA Bid Amendment and/or requiring a decrease to the approved grant.* ***Acknowledged.***
	○ The MSBA considers that deviations include size changes of a specific space, the total program area nsf (e.g. general classrooms, voc tech, dining etc.), space location, surrounding space adjacencies and/or the intended room purpose. ▪ The submittal must clearly call out deviations to location and surrounding adjacencies using redlines or "clouding". ▪ The explanation should clearly identify the basis of the change identifying both architectural and/or programmatic reasons. ▪ If the basis of the change is programmatic, the submittal should include a red-lined version of the educational plan included in the Project Funding Agreement.	
•	Regarding DESE approved SPED spaces:	
	○ Include a copy of the most recent letter from DESE approving the current proposed SPED spaces.	
	○ Confirm that the DESE approved SPED spaces have not deviated, using the definition above; or: ▪ If the District wishes to submit a change to its DESE approved submittal, it must 1) confirm that all changes to SPED spaces are final; 2) provide a new SPED submittal to the MSBA in	*MSBA notes that DESE re-approval is required due to new changes in SPED spaces. Prior to MSBA forwarding the submitted SPED package, please confirm the following in the response to this review: 1). confirm that all changes to SPED spaces are final and 2) indicate how the project schedule can accommodate a DESE resubmittal and approval.* ***All changes to SPED spaces***

	the original submittal format (described in Module 4 Schematic Design Section 4.1.1 and Mod 4 Appendix 4B) noting any changes with clouded floor plans and red-lined narratives and tables; and 3) indicate how the project schedule can accommodate a potential DESE resubmittal and approval. Please provide a separate package for changes to DESE approved SPED spaces. ▪ If the District chooses not to change from the DESE approved submittal it should explain when and how the spaces will be returned to the approved size, configuration and location.	***are final and the project schedule can accommodate a DESE resubmittal and approval.***
•	Regarding DESE Approved Public Day Education spaces (Indicate "Not Applicable" if the project does not include DESE approved Public Day Education spaces):	
	○ If applicable, confirm that the DESE approved Public Day Education spaces have not deviated, using the definition above; or: ▪ If the District wishes to submit a change to its DESE approved submittal, it must 1) confirm that all changes to Public Day Education spaces are final; 2) provide a new submittal in the original submittal format, noting any changes with clouded floor plans and red-lined narratives and tables; and 3) indicate how the project schedule can accommodate a potential DESE resubmittal and approval. Please provide a separate package for changes to Public Day Education spaces. ▪ If the District chooses not to change from the DESE approved submittal it should confirm that the spaces are the same or explain when and how the spaces will be returned to the approved size, configuration and location.	
•	Regarding DESE approved Chapter 74 Program spaces (Indicate "Not Applicable" if the project does not include DESE approved Chapter 74 spaces):	*The submission does not include any information on Chapter 74 Program but also does not indicate "Not Applicable". This information should be provided with the next submittal.* ***Not Applicable***
	○ If applicable, confirm that the proposed Chapter 74 spaces conform to the current DESE Chapter 74 manual for Vocational Technical Education Programs.	
	○ Include a copy of the most recent letter from DESE approving the current proposed Chapter 74 Program spaces.	
	○ Confirm that a Chapter 74 Meeting has been scheduled with the MSBA and DESE following submittal of the 60% construction documents.	
	○ If applicable, confirm that the DESE approved Chapter 74 Program spaces have not deviated, using the definition above, or: ▪ If the District wishes to submit a change to its DESE approved submittal, it must 1) confirm that all changes to Chapter 74 Program spaces	

	are final; 2) provide a new submittal utilizing the original submittal format, noting any changes with clouded floor plans and red-lined narratives and tables; and 3) indicate how the project schedule can accommodate a potential DESE resubmittal and approval. Please provide a separate package for changes to the Chapter 74 Programming. ▪ If the District chooses not to change from the DESE approved submittal it should explain when and how the spaces will be returned to the approved size, configuration and location.	

	6B.3.3 Project Approvals	Comments
•	Describe the status of the following approvals. In addition, provide the status of any other state or federal approval not listed below (the following list is not a comprehensive itemization of required state approvals; other requirements may apply, and some items listed below may not be applicable to this project). Provide a copy of the appropriate application forms and/or approval letters where applicable. Indicate "Not Applicable" where appropriate and describe why each item is not applicable. For each agency approval required for this project, indicate the date when approval was received. All required approvals should have an associated approval date indicated as part of the 90% CD submission and prior to advertising for bids. Confirm that the required approvals are coordinated with the OPM's project schedule:	
	○ DESE - Special Education approval by Department of Elementary and Secondary Education	
	○ MHC – Project Notification Form and approvals by MA Historical Commission	
	○ OIG - Construction Manager at Risk approval by the Office of Inspector General	
	○ Executive Office of Energy and Environmental Affairs / EEA:	
	▪ MSBA- State Site Permit Tracking Worksheet (refer to Project Advisory 88 for additional information). *Note that all project submittals must include a completed and current State Site Permit Tracking Worksheet regardless of the status of the project's site approvals.*	
	▪ MEPA - MA Environmental Policy Act by Energy & Environmental Affairs:	
	• ENF - Environmental Notification Form	
	• EIR - Environmental Impact Report	
	▪ Article 97 Land Disposition Policy approval by Energy & Environmental Affairs	

	○ MA DEP - Massachusetts Department of Environmental Protection	
	○ MA DOT - Massachusetts Department of Transportation	
	○ MA DPH - Massachusetts Department of Public Health (typically relating to CH74 Medical / Dental functions)	
	○ EPA –NPDES National Pollutant Discharge Elimination System Notice of Intent approval by the US Environmental Protection Agency (or indicate as "by GC/CMR")	
	○ MAAB - Accessibility variances by MA Architectural Access Board	
•	Confirmation that the Project has undergone review and obtained all necessary approvals by any departments or Commonwealth agencies required by law to review the Project, including but not limited to the approvals listed above. Attach such documentation letters evidencing such reviews and approvals. In accordance with the Project Funding Agreement (the "PFA") Section 4.12, the District must obtain such reviews or approvals prior to the construction bids solicitation.	
•	For any required state reviews or permits for which approval has not been obtained as of the 60% Construction Documents submission date, provide a status update including actions taken to date and actions planned to obtain the required state reviews and permit approval(s) in order to comply with PFA Section 4.12 and maintain the projected schedule milestones listed in OPM Deliverables.	
•	List all target dates for all local zoning approvals, testing and permits.	
•	Provide a certification that all applicable utility officials have been contacted by the Designer regarding each basic utility connection.	

	6B.3.4 Cost Estimate	Comments
•	Provide a Designer's construction cost estimate based on the 60% Construction Documents, including cost estimates for general conditions, overhead and profit, insurance, bonds, and all other items; allowances expressed as percentage rates for construction contingencies, and other mutually agreed upon contingencies. Prepare the construction cost estimate using CSI MasterFormat 6-digit format to Level 3 and MGL c.149 s 44F (filed sub-bid) format showing unit rates and quantities; with escalation projected to the mid-point of construction.	
•	The estimate date should be no earlier than the 60% Construction Documents date.	
•	Provide summary sheets including the following:	

	○ Date that the estimate was prepared (value date)	
	○ Anticipated bid date	*Not included. This information should be provided in the next submission.* ***Acknowledged.***
	○ Project and contract number	
	○ Project title and location	
	○ Designer name	
	○ Estimator name	
	○ Site cost (including all utilities)	
	○ Building cost (including fixed equipment)	
	○ Estimated construction cost of each work phase, totaled	
	○ Items 1 and 2 work costs, as distinguished in the General Contractor's bid forms, individually totaled	

6B.3.5 Drawings (developed to 60% CD progress level)		Comments
•	Half-size drawings only. Confirm that text, symbols, shading and all drawings content are legible.	*Due to the current remote work, hard copies were not required. MSBA may request hard copies at a later time for the record.* ***Acknowledged.***
•	If applicable, include early bid package contract documents. *The submittal must include all early bid packages, showing a complete project, to allow for MSBA coordination review.*	*The drawing list indicates that all the civil drawings and all the irrigation drawings are part of Early Bid Package #1, which are included in the set. However, there is no information on what sheets (if any) are to be included in other early bid packages. This information should be provided in the next submission.* ***Acknowledged.***
•	Cover sheet showing a drawings list (the project title should be visible when the drawings are rolled)	
•	Sheet(s) containing all symbols, abbreviations and notes applicable to each discipline	*Although the structural drawings do include symbol legends on some sheets, they are not included on all sheets, and they are not included on the first sheet in the structural set that use those symbols. Suggest putting this information earlier in the set for clarity.* ***Acknowledged.***
•	Site and Utility drawings should show the following:	*This appears to be part of an early bid package; therefore, it is not reviewed here.* ***Acknowledged.***
	○ Proposed work layout and location with details	*See note above.*
	○ Existing and proposed contours	*See note above.*
	○ Building locations fixed and referenced from main survey baseline	*See note above.*
	○ Floor elevations at each entrance/exit and key exterior grades at perimeter showing drainage away from the building	*See note above.*
	○ Site Benchmarks	*See note above.*
	○ Boring locations	*See note above.*
	○ Retaining walls	*See note above.*
	○ All utility service lines, systems and structures for electricity, gas (if applicable) oil, water, steam, telephone, CATV, fire alarm, sanitary and storm drainage	*See note above.*

	○ Contract limit line and storage area for construction materials	*See note above.*
	○ Site survey which includes, but is not limited to, all existing foundations, obstructions and other site characteristics	*See note above.*
•	Mobilization and enabling works	*Mobilization work is not included in the submission. This should be reviewed and included in the next submission.* *Enabling work appears to be part of an early bid package; therefore it is not reviewed here.* ***Acknowledged.***
•	Architectural drawings showing the following:	
	○ Demolition drawings	
	○ Floor plans of each floor, with dimensions, column locations, floor elevations, door designations, partition types & fire-rated partitions and smoke partitions, built in furniture and equipment, keyed to other architectural drawings and coordinated with exterior grade elevations at all interior to exterior transitions	*The Code Plans indicate which walls are rated walls, but it is sometimes difficult to see the symbol. Suggest reviewing the graphics for clarity.* ***Acknowledged.***
	○ Key plans / overall plans where required	
	○ Large scale plans showing key areas e.g. lobby, special spaces. Indicate floor surface materials (minimum 1/4" = 1'-0" before reduction)	
	○ Roof plans showing the following:	
	▪ Proposed systems type	
	▪ Pitch and drainage pattern	
	▪ Roof drains, gutters and scuppers	
	▪ Skylights, penthouses, major equipment, chimneys	
	▪ Roof access and ladders	
	▪ Walk pads	
	▪ Rooftop Solar Readiness area, PV support and interconnection pathways	
	○ Building sections updated and coordinated with plans, elevations and rooftop equipment. Indicate floor to ceiling heights and floor-to-floor heights. Label all spaces.	*Ceiling heights are not included on the building sections. Suggest including them for clarity.* ***Acknowledged.***
	○ Building elevations showing the following:	
	▪ Full height elevations including roof structures, e.g., mechanical equipment, chimneys, and penthouses	
	▪ Floor elevations, floor-to-floor height, and overall height related to benchmarks on site plans	
	▪ Windows, storefront, and curtain wall systems	
	▪ All columns located on a centerline and coordinated with the structural drawings	

	▪ Materials indicating major control and expansion joints, and divisions of materials where required	*Materials expansion joints and building expansion joints are not identified in elevations. This was noted in the previous review and the District indicated they would be included in the next submission, which is this one. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
	▪ Exterior grades and topographical features in context	*It does not appear that the grades are shown correctly in the building elevations. For example, on drawing 3 on sheet A4.11, it appears there is a floating step at the front door, but none of the other documents indicate there being a step in that location. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
	○ Wall sections indicating dimensions, flashing, anchorage, reinforcing, masonry coursing, cladding, and all other conditions at wall, roof, foundation, interior floors; coordinated with exterior grade elevations	
	○ Details demonstrating continuous thermal insulation and thermal breaks between all conditioned interior spaces and unconditioned exterior spaces (including parking garages, loading zones and other open areas)	
	○ Exterior details, for roofing, flashing and other details showing all major conditions	
	○ Door, window, entrance, curtain wall and storefront, schedules, and details	
	○ Vertical circulation plans, sections and details including ramps, stairs, lifts and elevators	
	○ Guardrails and handrails including details	
	○ Interior elevations of all significant and typical spaces	*There do not appear to be any interior elevations in the lobby. Suggest adding interior elevations of this significant space for clarity.* ***Acknowledged. This will be considered for the next submission.***
	○ Interior details including casework, paneling surfacing and acoustical treatment	
	○ Reflected ceiling plans coordinated with fire protection, mechanical and electrical drawings	
	○ Ceiling details	
	○ Schedules:	
	▪ Finishes	
	▪ Doors	
	▪ Windows	
	▪ Partitions	
•	Structural drawings showing the following:	
	○ Structural drawings legend and/or graphical symbols	*Although the structural drawings do include symbol legends on some sheets, they are not included on all sheets, and they are not included on the first sheet in the structural set that use those symbols. Suggest putting this information earlier in the set for clarity.* ***Acknowledged.***

	○ Foundation plans with bottom grades showing all footing layouts, walls, slabs on grade including reinforcing, grade beams, and columns; include design soil bearing pressures and live loads for each area	
	○ Structural floor and roof plans including framing, finished floor elevations and depressed slab areas, with locations and dimensions for all openings and depressions, coordinated with the architectural drawings	*It does not appear that the top of slab and slab depressions are coordinated with the architectural drawings. Currently, the top of slab is noted as "(X'-X")", and locations of slab depressions, such as the elevators, do not have any notes or symbols indicating that area is depressed. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
	○ Floor and roof framing design loads	
	○ Complete foundation wall elevation and typical sections, with reinforcing indicating location, dimensions and grades for all footings, steps and wall openings	
	○ All lintels, beams, joists, and columns are identified (with typical sizes shown) on schedules or on drawings	
	○ All Structural supports required for mechanical equipment	
	○ General notes including the following information: class and 28 day concrete strength for each portion, structural steel and concrete reinforcing design stresses for each structural member type, concrete cover for each structural member type, shrinkage and temperature steel requirements, reinforcing laps for main reinforcing and temperature steel; bend point, cutoff, and hook locations for all members, minimum beam and lintel bearing.	
•	Fire protection drawings showing the following:	
	○ Fire protection drawings legend and/or graphical symbols	
	○ Standpipe systems, sprinkler systems, suppression systems, fire pump where required, accessories, and piping	
	○ All piping, equipment, fixtures, valves and devices	
	○ Design criteria shall be provided on the drawings in accordance with NFPA requirements.	
•	Plumbing drawings showing the following:	
	○ Plumbing drawings legend and/or graphical symbols	
	○ All work done by the Plumbing Subcontractor, which includes all water, gas (if applicable), sanitary and storm wastes, and accessories	
	○ Plumbing fixtures trapping and venting including floor drains	
	○ Dimensioned floor drain locations in coordination with the structural plan	*Floor drains are not dimensioned on the plumbing drawings. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
	○ Confirm any hazard or noxious contaminants such as chimneys, plumbing vents or cooling towers are	*The 25-foot clearance around air intakes are not identified on the plumbing drawings. Based on what is*

	located a minimum 25 feet from outside air intakes or such openings are a minimum two feet below the contaminant source and ten feet horizontally from the nearest edge of the air intake to the nearest edge of the contaminant source (refer to 780 CMR Massachusetts State Building Code in effect at the time of project approval). Consider adding filters to the contaminant source if necessary.	*shown on the roof plan, it looks like there may be conflicts. Suggest showing this information for clarity, and revising if necessary.* ***Acknowledged.***
	○ Water and gas (if applicable) supply sources, storm and sanitary discharge mains	
	○ All piping sizes shall be indicated on drawings and riser diagrams, including flow and pitch directions	
	○ All accessories, valves, fixtures including all drinking fountains and grease traps for kitchen waste	
	○ Verify eyewash stations with tepid water are provided in all areas where chemicals are stored or used.	
	○ All piping and connections required for other trades (e.g., kitchen equipment, HVAC make-up water, etc.)	
	○ Acid waste (where required), vents and neutralization systems for laboratories	
	○ Plumbing riser diagrams	
	○ Domestic water booster pumps, boiler feed water, meter locations, hose bibs	
	○ Domestic hot water: Storage tanks, piping material, hanger details	
	○ Backflow preventers, and cleanouts	
•	Heating, Ventilating and Air Conditioning Drawings showing the following:	
	○ Mechanical drawings legend and/or graphical symbols	
	○ Large scale plans of all mechanical & electrical spaces showing equipment to scale	
	○ All piping and ductwork systems located and sized. All ductwork is shown double line and drawn to scale	
	○ All piping and duct systems sized at all reductions and riser diagrams	
	○ All flow directions and pitch on piping, and duct systems indicate flow and volumes direction	*Flow direction is not shown on the piping drawings and only some are shown on the ductwork drawings. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
	○ All equipment shall have enough servicing and/or replacement space indicated on drawings	*Dashed lines appear around some equipment, but dashed lines are not in the legend and there are no notes indicating its purpose. It's possible this line represents clearance space, but some units have conflicting items in this space. For example, RTU 5 is inside of the dashed lines around RTU 6. Suggest defining the dashed lines, and if they are to indicate clearance space, suggest reviewing them to confirm there are no conflicts.* *Some equipment, such as RTU 7, appears to show clearances around the unit assuming that is the purpose*

		of the dashed lines. Other equipment, such as RTU 4, does not. Suggest all equipment indicate clearances. ***Acknowledged.***
	○ All equipment, accessories, valves and dampers identified as to type and size	
	○ Cooling system pumps, chillers, cooling towers, air handling units, ductwork system and dampers, fan details, temperature control system, air and hydronic balancing equipment, and schedules shall be indicated.	
	○ Confirm outside air intake openings are a minimum 25 feet from any hazard or noxious contaminants such as chimneys, plumbing vents, cooling towers, streets, alleys, parking lots and loading docks. When locating an air intake within 25 feet of a contaminant source is unavoidable, such opening shall be a minimum two feet below the contaminant source and ten feet horizontally from the air intake nearest edge to the contaminant source nearest edge. All intakes shall be six feet above landscaped grade including soil, lawn, shrubs, or any plant life within 1.5 feet horizontally.	*The 25-foot clearance around air intakes are not identified on the mechanical drawings. Based on what is shown on the plumbing roof plan, it looks like there may be conflicts. Suggest showing this information for clarity, and revising if necessary.* ***Acknowledged.***
	○ Cooling tower (where required) shall be indicated on the drawings showing site location, elevations and equipment layout floor plan and typical flow diagram as related to the total HVAC system.	
	○ Fire and smoke dampers	
	○ Mechanical room designs:	
	▪ Vent pipes for safety valves, relief valves, back pressure valves and tanks shall be extended above flat roofs in accordance with all governing authorities.	*The enlarged mechanical room drawing has a lot of information, but not a lot of notes. Consequently, it is difficult to tell if there could be any conflicts such as with the piping and the door to the roof. Suggest adding more information for clarity.* ***Acknowledged.***
	▪ In all designs for boiler and refrigeration plants, include a complete floor plan indicating all major mechanical equipment location and service space.	*See note above.*
	▪ In new and/or replacement boiler and refrigeration plants designs, provide a flow diagram detailing steam or hot water distribution systems, return systems, including all existing equipment and their function, as well as any proposed expansions with all necessary instrumentation and controls.	*See note above.*
•	Electrical Drawings showing the following:	
	○ Electrical drawings legend and/or graphical symbols	
	○ General arrangement: Outline each floor layout	
	○ Indicate interface with other systems. Identify any work by general contractor or other trades.	
	○ Interior lighting system: Light fixture schedules, circuiting location and fixture mounting heights, receptacle and switch outlets, lamp sizes and types, conduits, all other accessories and riser diagrams	

	shall be indicated on drawings. Designer shall specify that all electrical lighting fixtures be supported from the building structure, and shall be independent of ducts, pipes, ceilings and their supporting members. Comply with seismic design criteria.	
	○ Power system: Locations, types and control method for all motors, heaters, appliances, controllers, starters, branch circuits, feeder conductors and conduits. Indicate riser diagrams. Show electrical conduit supporting method and details. For larger projects, thermostats and control wiring are normally covered under the HVAC sub-contract, assure coordination.	
	○ Fire Alarm, Data, Communications, CATV/CCTV Systems: device types and locations, outlets and equipment, service connections, wiring diagrams, all other essential details	
	○ Services: location and details, whether overhead or underground, feeder sizes, switchgear and transformer plans and elevations, metering and service switchboard arrangements, wiring and ground fault diagram and bus ducts	
	○ Utility interconnection pathways to Solar Readiness areas	
	○ General stations and sub-stations: Location, size, connection method and generator protection, transformers, exciters, motor generators, switch gear, and associated equipment, current characteristics and equipment capacities. Indicate equipment connections with one line and/or wiring diagrams and schedule all major equipment and instruments items.	
	○ Underground work: manholes sizes and locations, cable types, duct number, sizes and locations, cable support sizes, types and locations, fireproofing, duct line profile, and one-line connection diagrams	
	○ Pole line work: Location, length, treatment and class of poles, guying, cross arms, insulators, circuiting, transformers, protective and switching devices, lightning arresters, special structures, diagrams, current characteristics and grounding	
	○ Exterior lighting: Location, size, and transformer types, luminary, poles, light standards, cables, ducts, and manholes, control equipment details and connection diagrams	
	○ Emergency system (where provided) details including transfer switch, fuel types	
	○ One-line diagram indicating load KVA, and available short circuit amperes at each transformer, switchboard, distribution panel board, branch circuit panel board, and at major equipment	
	○ Riser diagrams for all systems	

6B.3.6 Project Manual (developed to 60% CD progress level)		Comments
•	If applicable, include early bid package contract documents. *The submittal must include all early bid packages, showing a complete project, to allow for MSBA coordination review.*	*The Project Manual includes two Table of Contents: one for Early Bid Package #1 and one for the main project with Early Bid Package sections identified as "for EBP1". Some of the EBP1 sections are not included in the submission such as 00 22 00 Unit Prices. Additionally, no sections have been identified for other early bid packages. All early bid package documents should be identified and included in the next submission.* ***Acknowledged.***
•	The technical specifications format in CSI Master format (full-length, 3-part, 48 division current version) with separate sections for each class of work required by M.G.L. c. 149 §44F.	
•	Confirmation that the contract meets the applicable requirements of M.G.L. c. 149, § 44A (2)(g) and contains workforce participation goals for minorities and women. Confirm that the contract includes the processes and procedures to ensure compliance with the workforce participation goals, including reporting and enforcement provisions.	*The project manual contains specification sections for MBE and WBE workforce participation goals, however some percentages for certification categories are not specified. This should be reviewed and included in the next submission.* ***Acknowledged.***
•	Confirmation that the District consulted with the MA Supplier Diversity Office ("SDO") and local counsel to ensure that the contract meets the applicable requirements of M.G.L. c 7C, §6, M.G.L. c. 7, §61, and associated SDO guidelines and regulations; contains the applicable SDO-calculated, project-specific goals for Minority Business Enterprise ("MBE"), Women Business Enterprise ("WBE"), and Veteran Business Enterprise ("VBE")/Service-Disabled Veteran-Owned Business Enterprise ("SDVOBE") participation; and includes the processes and procedures to ensure compliance with the MBE, WBE, and VBE/SDVOBE goals, including reporting and enforcement provisions.	*The project manual contains specification sections for MBE and WBE workforce participation goals, however some percentages for certification categories are not specified. This should be reviewed and included in the next submission.* ***Acknowledged.***
•	For each material or equipment item, the specifications shall provide for a minimum three named material or equipment brands and the words "or equal" or a material or equipment description which can be met by a minimum three manufacturers or producers, and the words "or equal". Proprietary products shall not be specified except as provided by M.G.L. c. 30, § 39M; however, when they are specified, proprietary specifications are subject to the "or equal" provisions of c. 30, § 39M.	
•	Do not specify that a product or system shall require prequalification for use prior to bidding.	
•	Include a copy of the geotechnical report, including test boring hole locations and dates, and soil investigation results, including water levels, allowable solid bearing pressure recommendations, foundations and bottom grades of footing and slabs.	

•	Indicate all required filed sub-bids specification sections.	
•	Each filed sub-bid section shall detail all labor and materials required by the sub-trade.	
•	Staging, scaffolding, cutting and patching, refuse collection and disposal, demolition work and cleaning task, allocation policy and proposed language shall be carefully assigned to avoid duplication or omission.	*Cutting and patching requirements are included and mostly coordinated across sections. However, suggest further clarification of the ownership of cutting and patching of MEP/FP penetrations in CMU walls. For example, the HVAC specification section notes 12" by 12" or larger openings in CMU walls are by the Masonry subcontractor, while the Execution section item 3.06 B.1. notes the Masonry contractor is not responsible for cutting and patching to accommodate MEP/FP subtrade penetrations. This should be reviewed and, if necessary, adjusted in the next submission.* ***Acknowledged.***
•	Describe the work extent, the materials and workmanship, and include the work under the proper section. If any portion of work included in a specifications section is to be performed by a trade covered by another section, there shall be clear and distinct cross-referencing between the sections. Merely to state "by others" is not acceptable.	
•	All "Work by Others" specification references are coordinated.	
•	Specify work in appropriate Sections according to local trade jurisdiction.	
•	In sections for which filed sub-bids are required, refrain from using such terms as "the Contractor," the "Heating Contractor," or "the Plumbing Contractor," but where necessary for clarity refer to the "HVAC Subcontractor," the "General Contractor" and so on.	
•	Alternates, if approved in writing by the owner, shall be properly described and cross-referenced in the project manual and drawings.	*An Alternate section 01 2300 is included in the submission; however, the description of Alternate 1 is noted as "to be determined". Alternates, if applicable, should be described and cross-referenced in the next submission.* ***Acknowledged.***
•	Allowances are prohibited pursuant to M.G.L. c. 149, § 44G(A).	
•	Unit price items, if permitted or ordered by the owner, shall be properly described in the specifications.	*A schedule of Unit Prices is included; however, unit price amounts are not described/included in this submission. This should be reviewed and, if needed, adjusted in the next submission.* ***Acknowledged.***
•	Do not use general clauses intended to be all-inclusive in lieu of complete descriptions.	
•	Do not duplicate standard requirements that are contained in the contract form.	
•	Use consistency throughout. The word "will" shall be used to designate what the owner, authority, owner's project manager, or the Designer can be expected to do, and the word "shall" shall be used to designate what is mandatory for the contractor or subcontractors to do.	*There are some instances of inconsistent terminology used to describe the contractor's responsibilities using the term "will". This should be reviewed and adjusted in the next submission.* ***Acknowledged.***

•	Use the same term throughout for the same subject and the term shall be the same as that used on the drawings.	
•	Do not use the term "etc.".	
•	Avoid such terms as "to the satisfaction of the Designer", "as directed by the Designer", "as approved" and "as required".	
•	Do not give numbers both in words and figures. Numbers less than 10 shall be written in words, 10 and higher numbers shall be written in figures. In expressing dimensions, figures such as 2 in., 16 in., 7 ft., 6 in., shall be used.	*Numbers less than 10 are expressed in figures throughout the project manual. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
•	Specify materials mined or manufactured in Massachusetts first and the United States of America second whenever possible.	*It is not clear whether materials mined or manufactured in Massachusetts have been specified first. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***

	6B.3.7 Project Coordination	Comments
•	Verify the submittal is coordinated with any early-bid packages, if applicable.	*While the submission indicates information that is part of Early Release Package #1 (ERP1), there is no mention of what documents are part of other Early Release Packages (2, 2A). As ERP1 is already available to bidders, it is not reviewed here. All ERPs should be included in the next submission.* ***Acknowledged.***
•	Room names and numbers are coordinated between all disciplines.	
•	Finish grade elevations coordinated between all disciplines.	
•	Materials/soil terms used in the Earthwork specification is coordinated with architectural, structural and civil specifications and plans.	*It does not appear that the materials and soil terminology are coordinated. For example, it looks like only "structural fill" is consistent between the plans and the specifications. This should be reviewed and coordinated in the next submission.* ***Acknowledged.***
•	Structural dimensions match architectural drawings.	
•	Column grid lines and column orientation match Architectural drawings.	
•	Column locations and bearing walls coordinated with all other disciplines.	
•	Verify coursing dimensions at vertical masonry construction.	
•	Seismic detailing coordinated with architectural drawings.	*Seismic bracing appears to conflict with several doors and interior windows. For example, along gridline 2.22 between A.36 and A.38 on both the second and third floors. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
•	Confirm that there are no beams and columns protruding horizontally and vertically into stairwells, and other interior spaces.	
•	Slab depressions are indicated in the structural drawings and coordinated with the architectural finishes and plumbing drawings.	*It does not appear that the structural drawing information about top of slab and slab depressions are coordinated with the architectural drawings. Currently,*

		the top of slab is noted as "(X'-X")" in the structural drawings, and locations of slab depressions, such as the elevators, do not have any notes or symbols indicating those areas are depressed. This should be reviewed and adjusted in the next submission. ***Acknowledged.***
•	Verify that the structural, mechanical, or other disciplines, do not conflict with architectural plans or specifications.	*It appears there may be some conflicts between ductwork and structural elements. Drawing H3 on sheet A5.10 shows ductwork going through the bottom of a beam between Corridor 105 and Music Storage 106A. This should be reviewed and adjusted in the next submission.* ***Acknowledged.***
•	Room wall/floor/ceiling construction coordinated with the finish schedule.	
•	Coordinate thermal insulation and thermal breaks between conditioned interior spaces and unconditioned exterior spaces.	
•	Verify that architectural wall/partition type smoke and fire rating requirements are coordinated with the building code analysis floor plan information, and MEP/FP drawings indicate appropriate smoke/fire dampers and louvers where required.	
•	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.	*Access panels are not indicated on the architectural drawings, so coordination could not be assessed. Suggest including this information and coordinating it with the mechanical and plumbing systems.* ***Acknowledged.***
•	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.	*The 25-foot clearance around air intakes are not identified on either the plumbing or mechanical drawings. Based on what is shown on the plumbing roof plan, it looks like there may be conflicts. Suggest showing this information for clarity, and revising if necessary.* ***Acknowledged.***
•	Verify potential spatial conflicts in mechanical equipment.	*Dashed lines appear around some equipment, but dashed lines are not in the legend and there are no notes indicating its purpose. It's possible this line represents clearance space, but some units have conflicting items in this space. For example, RTU 5 is inside of the dashed lines around RTU 6. Suggest defining the dashed lines, and if they are to indicate clearance space, suggest reviewing them to confirm there are no conflicts.* *Some equipment, such as RTU 7, appears to show clearances around the unit assuming that is the purpose of the dashed lines. Other equipment, such as RTU 4, does not. Suggest all equipment indicate clearances.* ***Acknowledged.***
•	Coordinate roof plans with MEP drawings; indicate roof top systems, adequate access to all roof surfaces, walk pads to all equipment that requires maintenance, & guardrails.	*Mechanical equipment on the roof plans appear to conflict with architectural elements in the overlaid plan that is in background. However, the overlaid plan does not appear to match the architectural plans, so it is*

		possible no conflict exists. This should be reviewed and coordinated in the next submission. ***Acknowledged.***
•	Coordinate Solar Readiness areas on roof plans, structural plans and electrical/plumbing drawings.	
•	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	

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #44

Tuesday, June 16, 2026 In-person 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan
Michael Camoscio
Christine Holloran
Paul J. Melaragni
Christine Prendergast
R. Eric Slagle
Gregory B. Bendel
Justin Cusce
Craig P. Miner
David A. Ragsdale
Dr. David L. Thomson
Kate Bissell
Marianne Gallezzo
Dennis Kelley
Christine Murray
Stephen Turner
Kevin A. Caira
Nicholas Golden
Lilia Maselli
Judith L. O'Connell, Chair
Stacey Scott
Vivian Varbedian, Vice Chair

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan		Permanent Building Committee
Gregory B. Bendel	X	
Kate Bissell		Wildwood School, Principal
Kevin A. Caira	Remote	Select Board
Michael Camoscio	X	Permanent Building Committee
Justin Cusce	X	
Marianne Gallezzo	X	Finance Committee
Nicholas Golden	X	School Committee
Christine Holloran	Remote	Wildwood School, Teacher
Dennis Kelley	X	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	X	Select Board
Paul J. Melaragni	X	Permanent Building Committee
Craig P. Miner		
Christine Murray		
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Christine Prendergast	X	
David A. Ragsdale		School Committee

Stacy Scott	Remote	Woburn Street School, Principal
R. Eric Slagle	Partial	Town of Wilmington, Town Manager
Dr. David Thomson	Partial	Wilmington Public Schools, Superintendent
Stephen Turner	X	School Committee
Vivian Varbedian, Vice Chair	X	
Other Participants		
Angel Cartagena	Remote	Wilmington Public Schools
Donald Walter		Dore + Whittier Architects
Lee P. Dore		Dore + Whittier Architects
Rani Philip	X	Dore + Whittier Architects
Bryce Taft		Dore + Whittier Architects
David Fontaine, Jr.		Fontaine Brothers
Joel Kent		Fontaine Brothers
Pam Galeota	X	Fontaine Brothers
Mark Abdella		Fontaine Brothers
Chelsey Mutrie	X	Fontaine Brothers
Patrick Spellane		Fontaine Brothers
John Vukic	X	Fontaine Brothers
Jim Rogers		LeftField
David Saindon	X	LeftField
Craig DiCarlo	X	LeftField

1 – Call to Order

The chair of the building committee, Ms. O'Connell, called the meeting to order at 6:33pm.

Roll call was taken and a quorum was present.

2 – Approval of Previous Meeting Minutes

A motion to approve the minutes from the School Building Committee meeting held on May 19, 2026, as distributed, was made by Mr. Kelly and seconded by Mr. Bendel.

Ms. Prendergast identified a typo on page one, which LeftField will correct.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan				X	Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce	X				David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden			X		R. Eric Slagle				X
Christine Holloran	X				Dr. David Thomson				X

Dennis Kelley	X				Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 14-0-1 (Yes-No-Abstain).

3 – Administrative Actions

3a – Invoice Summary Review

LeftField presented invoice summary #28 including invoices from Dore + Whittier in the amount of $624,549.84, an invoice from Fontaine Brothers in the amount of $26,666.00, an invoice from Minuteman Press associated with the recent permitting submissions totaling $1,262.28, and an invoice from LeftField in the amount of $100,000.00, for a total of $752,478.12. Prior to the WSBC meeting, the Finance review group met and reviewed the invoice summary.

A motion to approve Invoice Summary #28 in the amount of $752,478.12, was made by Mr. Kelley and seconded by Ms. O'Connell.

There was no discussion. A roll call vote was taken. .

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan				X	Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce	X				David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden	X				R. Eric Slagle				X
Christine Holloran	X				Dr. David Thomson				X
Dennis Kelley	X				Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 15-0-0 (Yes-No-Abstain).

3b – Total Project Budget Update

LeftField reported that they provided a fully expanded budget as part of the committee packet, labeled item #3b. LeftField included a condensed version in tonight's slideshow presentation. The only changes to this budget from last month appear in the 'Expended' and 'Unspent' columns.

4 – Design Update

4a – Conservation Committee and Planning Board Update

LeftField reported that the initial stormwater design relied on the best groundwater data available at the time. However, continuous field monitoring has since recorded groundwater levels higher than those original baselines. To address these new findings, the stormwater calculations were updated to reflect the recent field

data. Consequently, the chamber system material is being upgraded from CULTEC plastic to concrete. Concrete allows for a shallower chamber configuration. The new design provides superior structural loading capacity. The refined system ensures a conservative, technically sound approach to local stormwater management.

LeftField reported the project received unanimous approval from the Planning Board for the Groundwater Protection District Special Permit after submission of revised stormwater management plans on June 2, 2026.

The Conservation Commission also unanimously approved the project and issued an Order of Conditions on June 3, 2026.

Town Counsel reported that MassDEP reviewed site documentation and determined that arsenic levels are consistent with naturally occurring conditions and that no further regulatory action is required at this time.

On June 15, 2026, a group of residents filed an appeal (Request for Superseding Order of Conditions) to MassDEP regarding the Conservation Commission approval. The Town is awaiting MassDEP's formal response. Project leadership stated that work will continue while respecting regulatory requirements and the appeal process.

4b – MSBA 60% Construction Documents Submission

Ms. O'Connell provided an update that the project team has been preparing the 60% Construction Documents (60% CD) MSBA Submission Package which is scheduled to be delivered to the MSBA on June 25, 2026, or thereabouts.

LeftField presented a brief overview of the contents of the 60% CD submission, including narratives covering topics such as the updated work plan, building system descriptions, code analysis, sustainability and green initiatives, site assessments, proprietary items under consideration, interior color theory, as well as various building system calculations and narratives related to security, access control, and overall facility operations. The package also includes appendices that provide supporting documentation for the design, permitting, cost estimating, and overall project coordination efforts completed during the 60% CD phase. These appendices include materials such as responses to MSBA comments, School Building Committee meeting minutes and presentations, technical studies and reports including traffic, geotechnical, environmental, hazardous materials, and wetland analyses, as well as permitting and regulatory approvals from agencies such as DESE, the Massachusetts Historical Commission, and the Office of the Inspector General. The appendices also include construction cost estimating documentation, cost reconciliation and comparison forms, updates to the MSBA 3011 budget worksheet, the project schedule, and value engineering tracking logs that document how the Project Team continues to refine the design while maintaining alignment with the approved project budget. Collectively, these appendices provide technical backup and supporting documentation for the Design Development submission and demonstrate the Project's continued advancement through the MSBA process.

LeftField summarized the takeaways of the 60% CD submission. First, the Project remains fully consistent with the scope approved by the voters. The overall gross square footage, educational program, construction phasing sequence, and project schedule remain unchanged from what was previously presented and approved. Second, as part of the 60% CD phase, the Project Team completed two independent construction cost estimates. One

estimate was prepared by PM+C, Dore + Whittier's cost estimator, and the second estimate was prepared by Fontaine.

The previous Design Development estimates came in at $135.4 million from PM+C and $137.6 million from Fontaine. These estimates were within 1.62% of each other. The updated 60% CD estimates came in at $135.7 million from PM+C and $137.4 million from Fontaine. These two independent estimates are within 1.28% of each other, indicating strong alignment and giving the team high confidence in the pricing at this stage of design. Both estimates also remain within the previously approved Schematic Design construction budget, showing an estimated underrun of approximately $2.0 million in the PM+C estimate and roughly $285,986 in the Fontaine estimate. The project scope remains unchanged, the schedule remains on track, and the Project continues to be on budget. While the estimates technically show an underrun, the appropriate strategy at this phase is to expect individual overruns and underruns on the awards for each file trade bid opening as well as buyout packages. All these values will be compared to the control budget and aligned if you want to review the awards collectively rather than focusing on individual awards.

The Project Team has accounted for potential market fluctuations within the estimate. Looking specifically at the Fontaine estimate, which we are utilizing as the 60% Construction Document control estimate, the Construction Manager is currently carrying 2.5% in escalation, or approximately $2.8 million, to account for anticipated market conditions as the project progresses toward bidding and construction. In addition to escalation, the estimate includes a 3% design and estimating contingency, or approximately $3.3 million, which provides additional flexibility as the design continues to be refined and finalized during the remaining Construction Documents phases. When viewed holistically, the Project currently carries over $6.1 million in combined escalation and contingency allowances. These are standard and appropriate risk management measures for a project at this stage and are intended to address the types of uncertainties that may arise in the marketplace. The combined escalation contingencies at the Design Document Phase were approximately $10 million. The Project Team continues to closely monitor market conditions, and the current estimate includes appropriate safeguards to manage potential volatility as we move forward.

A motion to authorize Dore + Whittier and LeftField, on behalf of the Town, to submit the 60% Construction Document (CD) submission as presented to be reviewed by the Massachusetts School Building Authority, was made by Ms. Varbedian and seconded by Ms. Maselli.

There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan				X	Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce	X				David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden	X				R. Eric Slagle				X
Christine Holloran	X				Dr. David Thomson				X
Dennis Kelley	X				Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 15-0-0 (Yes-No-Abstain).

5 – Construction Update

As the project officially transitions into the construction phase, Ms. O'Connell introduced a new standing construction update to the meeting agenda and turned the floor over to Pam Galeota, Project Executive for Fontaine.

Fontaine reported that the project achieved major milestones over the past month, notably reaching the 60% Construction Document phase and finalizing the submission package for the MSBA. Additionally, the team completed scope contents for the early release site package, placing Fontaine in a position to extend a formal letter of recommendation to the team for approval.

Looking ahead, site mobilization is anticipated to begin shortly after the 23rd. Fontaine noted that due to recent field conditions, initial work will strictly avoid any designated wetland areas. Instead, activity over the next week to a week and a half will focus entirely on early setup tasks, including installing erosion controls, routing utility power to the site, and mobilizing the infrastructure trailers. No major site work will advance outside of these activities until the outstanding field issues are fully resolved.

6 – Public Engagement Update

Ms. O'Connell reminded the Committee that as construction activities begin and Fontaine mobilizes on site, they will provide weekly project updates every Friday through a dedicated project website. Access to the site will be available via a QR code on both the Town and project websites and distributed to Building Committee members. These updates will also be publicly shared to ensure residents and stakeholders remain informed about ongoing construction activities, project progress, and upcoming work.

LeftField introduced a topic not on the agenda regarding invoice approval prior to the town fiscal year end on June 30, 2026, or when there is no quorum during a busy travel month. LeftField recommended a motion to designate the Town Manager, Mr. Slagle, to approve invoices if there is a need when this is no quorum or there is no meeting scheduled at the necessary time.

A motion to designate Town Manager, Eric Slagle, to approve invoices when there is no quorum and/or when needed due to the timing of yearend finances for the Town, was made by Ms. Varbedian and seconded by Ms. Kelley.

Mr. Caira stated he would be against a vote on this without Town Counsel review because this topic was not on the agenda for the meeting. Ms. O'Connell responded that this is something that had come up within the hour before the meeting in terms of the request from the finance director to handle the invoices in this manner to have it by June 30, 2026, the other option would be to hold another meeting with this committee before the end of the month to be able to approve the invoices in discussion. Ms. Varbedian asked if this was special approval for this one-time scenario. Ms. O'Connell responded that it is just a onetime vote for this specific scenario.

Mr. Bendel inquired what invoices would be included. LeftField responded the June package would include invoices for Leftfield, Fontaine, Dore + Whittier, and printing costs. Mr. Turner stated that the current motion

was for more than this one instance which he does not think will be a problem, but he would be in favor of a one-time authorization.

Mr. Turner moved to amend the motion to limit the authorization to this one instance. Ms. Varbedian seconded the amendment.

Mr. Melaragni stated he would support a motion for one time authorization; he would like to see more advance planning. Ms. O'Connell responded this was an idea to cover the last two weeks of June without a special meeting, but a special meeting can be held if that is the will of the committee. The committee supported a remote meeting on June 30, 2026, to review the June invoices. Mr. Golden spoke in favor of a remote meeting to review the June invoices. Mr. Cusce inquired whether the proposed meeting on June 30, 2026, could take the place of the regular July meeting. Ms. Varbedian responded that the interior subcommittee will not have enough time to be prepared to replace the July meeting with a meeting on June 30, 2026, and suggested holding two separate meetings. LeftField also responded that the regular July meeting should be held in addition to a special meeting on June 30, 2026. Ms. O'Connell stated after hearing the willingness of the committee to have a special meeting on June 30, 2026, she thinks that is the best way to move forward with the June invoice and fiscal year end.

Ms. Varbedian withdrew her original motion with the consent of Mr. Kelley. No vote was taken.

Ms. Varbedian suggested holding the meeting at 6:30PM on June 30, 2026, via Zoom.

7 – Discussion/Correspondence/New Items

Ms. O'Connell reported that the Town continues to receive various public records requests. Each is logged and processed by the Town Clerk's office, and a response is provided.

Ms. O'Connell provided the update that Principal Amy Lascone recently held two virtual Q&A sessions with parents. These sessions provided an opportunity to walk families through the current project logistics as they relate to school operations, including pick-up and drop-off, bus circulation, building entry, recess, and other day-to-day student logistics. Ms. O'Connell sat in on the meetings, and all our partners had representatives there as well.

Ms. O'Connell updated the committee that through Eric Slagle's office a directive letter notification will be sent to all parties that pertain to the project site giving them a preconstruction notification that Fontaine will be mobilizing on site around June 23, 2026. Those notices were sent out on Friday June 12, 2026 via certified mail.

LeftField introduced an item that was not on the agenda, Fontaine has a new project team member. John Vukic is a Senior Project Manager, and has been assigned to work on the Wilmington Elementary School Project. Mr. Vukic made an introduction and said he is ready to get started.

8 – Building Committee Questions

Ms. Gallezzo asked for a status update on neighbors' Order of Conditions appeal and how much this will delay the project. Ms. O'Connell said that the information has been submitted to our Town Counsel and we are proceeding with mobilizing and working through the planning and permitting process with the Town Counsel to

make sure we are not infringing on any wetland area. We don't have any development to report but, will provide the feedback when we receive it.

9 – Public Comments

Ms. O'Connell advised that a public sign-in sheet was circulated on a clipboard and asked members of the public who wish to speak at this meeting please add your name and address for the record.

Mr. Berube, 300R Salem Street, voiced concerns about tannery waste contamination of the site. He expressed the opinion that soils testing conducted by the project have been insufficient, there are inaccuracies in the Town's permit applications, and a previous instance of odors during excavation was not reported to MassDEP.

10 – Upcoming Meetings

The next WSBC meeting is scheduled for Tuesday, July 21, 2026, at 6:30pm in the Town Hall meeting room 101.

11 – Adjournment

A motion to adjourn the meeting was made by Mr. Golden and seconded by Mr. Slagle. There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan				X	Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce	X				David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden	X				R. Eric Slagle	X			
Christine Holloran	X				Dr. David Thomson	X			
Dennis Kelley	X				Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 17-0-0 (Yes-No-Abstain).

The meeting was adjourned at 7:25pm.

Documents and Exhibits

- Wildwood Early Childhood Center Project School Building Committee Meeting #44 slideshow presentation, dated June 16, 2026

Attachments

-

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #45

Tuesday, June 30, 2026 Remote via Zoom 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan
Michael Camoscio
Christine Holloran
Paul J. Melaragni
Christine Prendergast
R. Eric Slagle
Gregory B. Bendel
Justin Cusce
Craig P. Miner
David A. Ragsdale
Dr. David L. Thomson
Kate Bissell
Marianne Gallezzo
Dennis Kelley
Christine Murray
Stephen Turner
Kevin A. Caira
Nicholas Golden
Lilia Maselli
Judith L. O'Connell, Chair
Stacy Scott
Vivian Varbedian, Vice Chair

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	Remote	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell		Wildwood School, Principal
Kevin A. Caira	Remote	Select Board
Michael Camoscio	Remote	Permanent Building Committee
Justin Cusce		
Marianne Gallezzo	Remote	Finance Committee
Nicholas Golden		School Committee
Christine Holloran		Wildwood School, Teacher
Dennis Kelley	Remote	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni	Remote	Permanent Building Committee
Craig P. Miner		
Christine Murray		
Judith L. O'Connell, Chair	Remote	Town of Wilmington, Asst. Town Manager
Christine Prendergast	Remote	
David A. Ragsdale		School Committee

Stacy Scott	Remote	Woburn Street School, Principal
R. Eric Slagle	Remote	Town of Wilmington, Town Manager
Dr. David Thomson		Wilmington Public Schools, Superintendent
Stephen Turner		School Committee
Vivian Varbedian, Vice Chair	Remote	
Other Participants		
Angel Cartagena		Wilmington Public Schools
Donald Walter		Dore + Whittier Architects
Lee P. Dore	Remote	Dore + Whittier Architects
Rani Philip	Remote	Dore + Whittier Architects
Bryce Taft		Dore + Whittier Architects
David Fontaine, Jr.		Fontaine Brothers
Joel Kent		Fontaine Brothers
Pam Galeota	Remote	Fontaine Brothers
Mark Abdella		Fontaine Brothers
Chelsey Mutrie		Fontaine Brothers
Patrick Spellane		Fontaine Brothers
John Vukic	Remote	Fontaine Brothers
Jim Rogers		LeftField
David Saindon	Remote	LeftField
Craig DiCarlo		LeftField

1 – Call to Order

The chair of the building committee, Ms. O'Connell, called the meeting to order at 6:36pm.

Roll call was taken and a quorum was present.

2 – Administrative Actions

2a – Invoice Summary Review

LeftField presented Invoice Summary #29 for review and included it in the meeting packet distributed last Friday; it is labeled item #2a. Please note that the following invoices are for the period ending June 30, 2026, today. At our routine scheduled July SBC meeting, there will be no invoice approval as these invoices are being considered and approved tonight to accommodate the fiscal year end accounting for the Town. That said, the current summary includes invoices from Dore + Whittier totaling $629,884.14; an invoice from Fontaine Brothers totaling $26,666.00; an invoice from Projectdog totaling $595.00; and an invoice from LeftField totaling $100,000, for an invoice packet total of $757,145.14. The Finance Group did not meet ahead of this meeting to review the invoices. That said, there is no recommendation from the Finance Group. However, to stay with historical process, I will ask Dennis to move the following motion that I will read.

A motion to approve Invoice Summary #29 in the amount of $757,145.14, was made by Mr. Kelley and seconded by Ms. O'Connell.

Mr. Caira requested that LeftField confirm the correct value for invoice package #29. LeftField confirmed the total for the invoice package of $757,145.14.

Ms. Prendergast asked LeftField to provide a breakdown of the services performed under each invoice. LeftField stated Dore & Whittier progress invoice included approximately $600,000.00 for construction documents. Approximately $9,350.00 for UEC hazardous material testing. Two components for Terraink irrigation component was approximately $11,313.00. The Green Engineer for energy modeling totaling approximately $4,000.00. Permitting reimbursable for Terraink for approximately $5,000.00. Permitting reimbursable from CDW for approximately $3,700.00. Fontaines standard pre-construction monthly service invoice for $26,666.00. Projectdog electronic bidding associated with public bidding for materials testing for $595.00. LeftField invoice including construction contract documents for $75,000.00 and bidding for $25,000.00.

Ms. O'Connell asked what portions of the site will have irrigation. LeftField stated that this service is for under drainage as well but the only area on the site planned for irrigation is the soccer fields. Dore + Whittier mentioned that the under drainage is typically around the playground areas and under those zones.

Ms. Allan asked if Fontaine had started mobilizing on the site. LeftField said Fontaine is planning to do a soft mobilization sometime next week. They have launched their weekly website that will provide more context on what to expect over the next month. Fontaine has been in contact with Reading Municipal Light and meeting them this week to walk the site with the site work contactor. The office trailers have not been mobilized yet. Fontaine mentioned they are meeting with Reading Municipal Light for temp power for the project trailers and meeting with site subcontractor on Thursday morning to do a drone flyover to document the existing conditions and topography. The site contractor will begin to prepare the area where the construction trailers will be placed. Fontaine mentioned they are currently planning to be set up to receive the trailers on site around July 16th, depending on how smoothly the site fence and mobilization of site contractor goes to get the pads set for the trailers.

Ms. O'Connell stated the abutter notifications went out via U.S. Mail as certified mail to all the direct abutters informing them specifically that the contractor will be mobilizing giving an approximate date range. The police department has been made aware of the drone flight and the intention if they get calls with public concern.

Mr. Melaragni asked LeftField how anybody viewing this meeting can access Fontaines project website. LeftField mentioned that QR codes have been provided on the town website, district website and project website. If you click the QR code it will bring you to the Fontaine project website. The purpose of the website is to provide people with a one week look ahead on the construction schedule.

There was no additional discussion. A roll call vote was taken.

Voting Member	**Yes**	**No**	**Abstain**	**Not Pres.**	**Voting Member**	**Yes**	**No**	**Abstain**	**Not Pres.**
Diane M. Allan	X				Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce				X	David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden				X	R. Eric Slagle	X			
Christine Holloran				X	Dr. David Thomson				X

Dennis Kelley	X				Stephen Turner				X
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 13-0-0 (Yes-No-Abstain).

3 – Adjournment

A motion to adjourn the meeting was made by Mr. Melaragni and seconded by Mr. Kelley. There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner				X
Kate Bissell				X	Christine Murray				X
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast	X			
Justin Cusce				X	David A. Ragsdale				X
Marianne Gallezzo	X				Stacy Scott	X			
Nicholas Golden				X	R. Eric Slagle	X			
Christine Holloran				X	Dr. David Thomson				X
Dennis Kelley	X				Stephen Turner				X
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 13-0-0 (Yes-No-Abstain).

The meeting was adjourned at 6:52pm.

Attachments

- Wilmington Building Committee Packet date June 30, 2026.

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #46

Tuesday, July 21, 2026 In-person 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan
Gregory B. Bendel
Kate Bissell
Kevin A. Caira
Michael Camoscio
Justin Cusce
Marianne Gallezzo
Nicholas Golden
Christine Holloran
Dennis Kelley
Lilia Maselli
Paul J. Melaragni
Craig P. Miner
Christine Murray
Judith L. O'Connell, Chair
Matthew P. Poska*
Christine Prendergast
David A. Ragsdale
Stacy Scott
R. Eric Slagle
Stephen Turner
Vivian Varbedian, Vice Chair

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	X	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell	Remote	Wildwood School, Principal
Kevin A. Caira	X	Select Board
Michael Camoscio	Remote, partial	Permanent Building Committee
Justin Cusce		
Marianne Gallezzo		Finance Committee
Nicholas Golden	Remote, partial	School Committee
Christine Holloran		Wildwood School, Teacher
Dennis Kelley		Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni		Permanent Building Committee
Craig P. Miner	X	
Christine Murray	X	
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Matthew P. Poska*	X	Superintendent of Schools

Christine Prendergast		
David A. Ragsdale		School Committee
Stacy Scott	Remote	Woburn Street School, Principal
R. Eric Slagle	X	Town of Wilmington, Town Manager
Stephen Turner	X	School Committee
Vivian Varbedian, Vice Chair	Remote	
Other Participants		
Angel Cartagena		Wilmington Public Schools
Donald Walter		Dore + Whittier Architects
Lee P. Dore	Remote	Dore + Whittier Architects
Rani Philip	X	Dore + Whittier Architects
Bryce Taft		Dore + Whittier Architects
David Fontaine, Jr.		Fontaine Brothers
Joel Kent		Fontaine Brothers
Pam Galeota	X	Fontaine Brothers
Mark Abdella		Fontaine Brothers
Chelsey Mutrie	X	Fontaine Brothers
Patrick Spellane		Fontaine Brothers
Jim Rogers		LeftField
David Saindon	X	LeftField
Craig DiCarlo	X	LeftField
Trevor Fuce	Remote	LeftField

*The project awaits MSBA approval of the revised Wilmington Elementary School Building Committee roster.

1 – Call to Order

The chair of the building committee, Ms. O'Connell, called the meeting to order at 6:30pm.

Roll call was taken and a quorum was present.

2 – Approval of Previous Meeting Minutes

2a – Approval of June 16, 2026, Meeting Minutes

A motion to approve the minutes from the School Building Committee meeting held on June 16, 2026, as distributed, was made by Mr. Slagle and seconded by Ms. O'Connell.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan			X		Paul J. Melaragni				X
Gregory B. Bendel	X				Craig P. Miner			X	
Kate Bissell			X		Christine Murray			X	
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio				X	Christine Prendergast				X

Justin Cusce				X	David A. Ragsdale				X
Marianne Gallezzo				X	Stacy Scott	X			
Nicholas Golden				X	R. Eric Slagle	X			
Christine Holloran				X	Matthew Poska			X	
Dennis Kelley				X	Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 8-0-5 (Yes-No-Abstain).

2b – Approval of June 30, 2026, Meeting Minutes

A motion to approve the minutes from the School Building Committee meeting held on June 30, 2026, as distributed, was made by Mr. Slagle and seconded by Ms. Allan.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel	X				Craig P. Miner			X	
Kate Bissell			X		Christine Murray			X	
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio				X	Christine Prendergast				X
Justin Cusce				X	David A. Ragsdale				
Marianne Gallezzo				X	Stacy Scott	X			
Nicholas Golden				X	R. Eric Slagle	X			
Christine Holloran				X	Matthew Poska			X	
Dennis Kelley				X	Stephen Turner			X	
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 8-0-5 (Yes-No-Abstain).

3 – Administrative Actions

Ms. O'Connell introduced the new Superintendent of Schools, Mr. Matthew Poska. Mr. Poska welcomed the opportunity to meet with the group and shared his enthusiasm for participating in the project. He stated that the project presents a significant opportunity to benefit the community and looks forward to collaborating with the project team to support its successful implementation.

Ms. O'Connell reported that since the June invoice package was previously reviewed at the June 30, 2026, meeting, the committee does not need to review invoices again until the August meeting. Now I will turn things over to LeftField to present the budget update.

3a – Total Project Budget Update

LeftField reported per last month we provide a fully expanded budget as part of the committee packet, labeled item #3. We have included a condensed version in tonight's slideshow presentation. The only changes to this budget from last month appear in the 'Expended' and 'Unspent' columns.

4 – Design Update

Ms. O'Connell reported this evening, we have several reports on the project's progress, as well as updates on site design and interior design for the committee. Now I will turn things over to LeftField and Dore + Whittier to take us through it.

4a – Conservation Committee and Earth Removal Permit Update

LeftField reported a permitting update. As we all know, the Wilmington Conservation Commission previously completed its review of the Project and issued an Order of Conditions approving the work. Following that decision, a neighborhood group filed an appeal with MassDEP. This appeal is part of the established regulatory process and requires MassDEP to conduct its own review and issue a Superseding Order of Conditions.

Last Monday, July 13, various members of the Project Team, a representative from Town counsel, and representatives from the neighborhood group participated in a MassDEP-scheduled site walk. As a response to the appeal issued to the MassDEP and to address commentary from the neighborhood representatives who attended the site walk on July 14th, the Town, working with the District and Project Team, submitted its formal response to MassDEP on July 14th. The response essentially requests that MassDEP uphold the Conservation Commission's approval and concludes that the Project complies with the applicable Massachusetts stormwater requirements. In simple terms, the designed drainage system will improve the management and treatment of stormwater compared with the existing system on the school site. It will reduce the amount and rate of stormwater leaving the property, treat runoff before it leaves the site or enters the ground, provide more groundwater recharge than required, maintain the existing drainage patterns, and not adversely affect nearby wetlands. To further address the concerns raised by the neighborhood group, the Project Team also agreed to replace certain perforated drainage pipes with non-perforated pipes and add an additional water-quality treatment unit near a designated snow-storage area. While the appeal is pending, work has proceeded outside the regulated wetland areas. However, no work will occur within the 100-foot wetland buffer until MassDEP issues its decision and the applicable appeal period has concluded.

Separately, at this past Monday's meeting, the Select Board approved the Project's Earth Removal Permit. This was another important local approval and allows the Project to remove excess soil from the site in accordance with the conditions and requirements of that permit.

4b – 60% Construction Documents MSBA Submission

LeftField provided an update that the MSBA submission was sent on schedule, on June 25th. We received confirmation from the MSBA on the submission, and as of last Thursday, we received their return comments. The project team is planning to formally respond to the MSBA on or before July 29th.

4c – Letter of Recommendation #1 / CM Amendment #2

LeftField explained how the construction budget has evolved from the Schematic Design estimate, through the 60% Construction Documents, and now through the first actual sitework buyout. Before reviewing the numbers, it is important to clarify that these figures relate specifically to the construction portion of the budget—not the entire project budget.

At Schematic Design, the established construction control budget was approximately $137,800,000. This serves as the original baseline against which subsequent estimates and construction buyouts are measured. As the design advanced to the 60% Construction Document stage, the plans became more detailed, and the estimate was updated accordingly. At that point, the construction value was estimated at $137,457,681. This was approximately $285,000 below the original Schematic Design control budget. Therefore, even before the first major trade package was purchased, the construction budget remained slightly under budget. The next step was the actual buyout of the sitework package, identified as LOR Number 1. LOR means Letter of Recommendation. The term "buyout" simply means that we are replacing an estimated cost with a value established through the actual bidding and award process. Within the 60% Construction Document estimate, the sitework trade was budgeted at approximately $13,607,000. The actual sitework buyout value was $13,365,000. Therefore, the sitework trade itself came in roughly $242.000 below its budgeted value. When all other associated costs for the sitework package are included, the total sitework buyout was roughly $246,000 below the amount carried in the 60% CD control estimate.

For a little context, Fontaine Bros. received sitework bids from three highly reputable contractors. The apparent low bid from Guigli & Sons was approximately $13,552,000. Marois Brothers submitted a bid of approximately $13,580,000, and W.L. French submitted a bid of approximately $13,707,000.

The difference between the low and high bids was roughly $155,000, or approximately 1.14% of the low bid. This is an extremely tight grouping of bids, indicating that all three contractors were generally seeing and pricing the same scope of work. From personal experience, it is always somewhat nerve-racking when the low bid is dramatically lower than the other bids, or a tight grouping of bids, because that can raise questions about whether something was missed. The consistency of these bids gives me comfort and confidence in moving forward with the apparent low bidder.

Now, the sitework trade represents approximately 12.2% of the roughly $111,500,000 in total direct trade costs. When we combine the initial approximately $285,000 underrun variance achieved from the progression of the Schematic Design control estimate to the 60% CD estimate, then add the additional roughly $250,000 underrun variance from the sitework buyout, the project is currently projected to be approximately $532,000 below the original Schematic Design construction control budget. This is positive news. However, it is also important to recognize that this remains a current projection, not final project savings. Many trade packages remain to be purchased, and we will have ups and downs, which is normal. At this point, however, the available information indicates that the construction budget remains slightly under the original control budget.

4d – Site Design

Dore + Whittier provided a site design update to the Committee, noting that there have been no significant changes to the previously presented site plan. The presentation focused on the finalization and refinement of site features, playground layouts, outdoor learning areas, and site furnishings. Dore + Whittier explained that recent efforts have centered on incorporating feedback received from school administration, the Playground Committee, and accessibility stakeholders. Updated presentation materials were not included in the meeting packet and will be distributed to Committee members following the meeting.

The design team presented concepts for several outdoor areas surrounding the school, highlighting a variety of furnishings intended to support both structured and unstructured student activities. The area includes an outdoor classroom space and multiple seating arrangements to provide flexibility for students during instructional and recreational periods. Additional site furnishings throughout the campus include benches,

tables, and gathering spaces designed to accommodate different age groups and uses. The main plaza and cafeteria exterior areas were also reviewed. These spaces will include fixed benches, benches with tables, bike stands and other seating elements intended to create welcoming gathering areas for students, staff, and visitors. The design incorporates durable, permanently installed furnishings that complement the overall site layout.

Dore + Whittier reviewed the playground designs for the various grade levels, emphasizing that all playgrounds include buddy benches, a feature identified as important by school stakeholders. Accessibility remains a key design priority, with accessible seating and inclusive play features incorporated throughout each playground area. The designs were developed and refined through multiple review sessions with the Playground Committee and accessibility representatives.

Dore + Whittier presented the finalized playground layouts, which feature a wide variety of age-appropriate equipment. For the Pre-K playground, the design includes numerous sensory and movement-based play opportunities that support student interaction and accessibility. Dore + Whittier noted the extensive collaboration that occurred throughout the design process, including discussions regarding equipment selection and surface patterns. The K-2 playground includes climbing structures, slides, swings, and other developmentally appropriate equipment. Additional features include recreational elements such as four-square courts and raised garden beds located within adjacent courtyard spaces. These features were developed in consultation with district representatives, playground specialists, and members of the accessibility community. For students in grades three through five, the playground design incorporates larger-scale play structures, open recreational areas, and access to a soccer field. The equipment has been tailored to older elementary students and includes more challenging climbing opportunities and active play experiences while maintaining accessibility and inclusion.

Mr. Caira asked whether the playgrounds would be accessible to the public after school hours and during periods when school is not in session. Dore + Whittier responded that the project team and stakeholder groups have consistently discussed the playgrounds as community assets and that the intention is for these spaces to be available to community members outside of school hours. Questions were raised regarding the role of fencing and gates surrounding the playgrounds and how public access would be managed. Dore + Whittier explained that while the playground areas include fencing and gates that can be secured when necessary, the overall intent is for the spaces to remain accessible to the public after school hours. Any decisions regarding locking gates or restricting access would be operational decisions made by the school district. Mr. Caira expressed concerns regarding student safety during school hours while also supporting public access after school. Dore + Whittier clarified that school staff would supervise students whenever playgrounds are in use during the school day and during, before, and after-school programming. Mr. Slagle noted that some fencing elements are intended primarily to control vehicular access rather than to restrict pedestrian access. The discussion concluded with confirmation that the current operational intent is to allow community use of the playground facilities outside of school hours while maintaining appropriate supervision and safety measures during school operations.

4e – Interior Design

The Committee then received an update from the Interior Design Working Group. Ms. Varbedian provided an overview of the group's work throughout the Design Development and Construction Documents phases. She explained that the group has met regularly to evaluate interior finishes, flooring materials, color palettes, furniture and finish selections, and long-term durability considerations. Ms. Varbedian noted that the working

group reviewed a wide range of products and design options before ultimately narrowing selections through a collaborative process. Considerable discussion focused on creating a timeless interior environment through the use of neutral colors and durable materials while maintaining Wilmington's signature blue as a recurring accent throughout the building. Flooring materials, including terrazzo, linoleum, and carpet tile, were evaluated for both aesthetics and longevity. Wall protection systems, tile selections, and other finish materials were also reviewed with a focus on durability and ease of maintenance.

The design team presented material boards illustrating the interior finishes currently under consideration. Dore + Whittier explained that the group had evaluated numerous combinations before narrowing the selections to the preferred options. Particular attention was given to terrazzo flooring patterns, including detailed discussions about aggregate coloration and the percentage of blue incorporated into the flooring design. Wood finishes and accent materials were selected to complement the school's overall design theme while maintaining a clean and neutral aesthetic. Examples of key interior spaces were reviewed, including the cafeteria stair and library. The cafeteria stair design incorporates decorative lighting fixtures and resin panel elements that were carefully evaluated and refined through the design review process. The library features a neutral carpet tile system accented by strategically placed colors that help define the space while maintaining consistency with the overall building palette.

The Committee also reviewed the building's grade-level interior design themes. The first floor, serving the youngest students, is centered around themes of roots, water, and foundational growth. The design emphasizes grounding and early development through natural tones and materials. The second floor builds upon this concept with a theme focused on structure and growth, utilizing beige tones accented with yellow, green, and blue elements. Yellow serves as a primary accent color in this area and appears within both classroom and corridor environments. The third floor continues the progression with a theme centered on branching out and increasing independence, incorporating green accent colors and design elements intended to support students as they prepare for future educational experiences. Updated classroom renderings were presented, demonstrating the level of detail currently being finalized. Dore + Whittier noted that design decisions now extend to individual elements such as mounted fixtures, classroom storage solutions, air distribution components, and furnishings. There has been extensive coordination among stakeholders and the significant amount of discussion that has taken place to ensure that each space effectively supports educational programming and student needs.

The update concluded with a summary of the project's progress toward the 90% Construction Documents milestone. The design team continues to refine interior and exterior details while coordinating architectural, structural, and mechanical systems. Dore + Whittier stated that the project is progressing well and that the continued collaboration among the various working groups has been instrumental in advancing the design toward completion.

5 – Construction Updates

The committee received a construction update from Fontaine regarding recent and upcoming activities on the project site. Fontaine mobilized to the site on July 14, 2026, and began work by conducting a property survey. Following completion of the survey, the site contractor was fully mobilized and has nearly completed installation of the perimeter security fence. Screening has also been installed to help control dust, improve site privacy, and minimize visual impacts to neighboring properties. One minor discrepancy with the fence line has been

identified and remains under review; however, the project team expects to resolve the issue, complete the fencing, and fully secure the site within the next week.

Once the site is secured, Fontaine will begin bringing construction equipment onto the property and commence excavation activities. Preparations are also underway to create a pad for the construction trailers, with trailer delivery anticipated within the next several weeks. In coordination with Reading Municipal Light Department, the team is arranging for temporary electrical service to support trailer occupancy. Additionally, a school speed limit sign currently located at the construction entrance will be relocated in coordination with the Town and Department of Public Works to accommodate safe site access before the start of the school year.

The project team also reported receiving the final plans for relocation of the playground. Work to establish the new playground area in front of the school is expected to begin shortly and be completed within the next three to four weeks, in advance of the school year. Concurrently, Fontaine has initiated coordination meetings with the design team and consultants to review project plans and identify any potential conflicts among mechanical, electrical, and plumbing systems. This early coordination effort is intended to resolve any issues before issuance of the 90% construction documents.

Ms. O'Connell mentioned that increased site activity has generated questions from school and community members. It was noted that the site is still being organized and that temporary items, including portable facilities, may be relocated as construction progresses. Decisions regarding site layout, access, and logistics are being made by Fontaine and its project partners with a focus on safety, accessibility, and efficient project execution.

6 – Public Engagement

Ms. O'Connell reported that the Town continues to receive various public records requests. Each is logged and processed by the Town Clerk's office, and a response is provided.

Ms. O'Connell provided the update that as part of our ongoing public engagement efforts, the final "Thank You" slide includes two QR codes: one linking to the Project website and the other to Fontaine Bros.' weekly construction updates.

On July 10, 2026, a new series of Project FAQs was shared with the Building Committee as a courtesy before being posted to the Project website on July 15, 2026. These FAQs address questions, assertions, and inaccuracies circulating regarding site soils, the property's history and prior use, geoenvironmental testing, and off-site traffic improvements currently being studied and considered by the Town. It is important for the public to note that the off-site traffic improvements are separate from the Wilmington Elementary School Project.

7 – Discussion/Correspondence/New Items

Ms. O'Connell advised that this section was addressed under item seven on the agenda.

8 – Committee Questions

Mr. Miner asked if there will be dust monitoring at the site during the duration of construction. Ms. O'Connell advised that there will be dust monitoring throughout the duration of the project as well as vibration monitoring for certain activities. Once Fontaine is mobilized the monitors will be placed.

9 – Public Comments

Ms. O'Connell advised that a public sign-in sheet was circulated on a clipboard and asked members of the public who wish to speak at this meeting please add your name and address for the record.

Michelle Feeney, 5 Arlene Ave, read a letter to the building committee regarding independent soils testing, signed by Ms. Elizabeth Berube. Ms. Feeney stated her intention of reading the letter was to notify the SBC members of its contents and to enter it into the public record. Ms. O'Connell noted that the town has not received a copy of the letter.

Ms. Allan inquired with the project team if further soil testing is required at the project site. Ms. O'Connell responded that the project team has done what is considered due diligence and customary for a construction project like this. Nonetheless, the project will continue to test soils and follow all codes and regulations. The earth removal permit includes conditions that the construction manager will follow. Mr. Slagle added that the town has experts on the project team advising us to make the best decisions possible for the success of the project. LeftField added that other than the wetland buffer area, Fontaine is permitted to start construction activities on the project site. It is unknown when MassDEP will provide a superseding order of conditions.

Mr. Poska asked for confirmation that there are state guidelines that are already in place and that the project will continue to monitor conditions over the course of construction. Ms. O'Connell responded yes.

10 – Upcoming Meetings

The next WSBC meeting is scheduled for Tuesday, August 18, 2026, at 6:30pm in the Town Hall meeting room 101.

11 – Adjournment

A motion to adjourn the meeting was made by Mr. Slagle and seconded by Mr. Miner. There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel	X				Craig P. Miner	X			
Kate Bissell	X				Christine Murray	X			
Kevin A. Caira	X				Judith L. O'Connell	X			
Michael Camoscio	X				Christine Prendergast				X
Justin Cusce				X	David A. Ragsdale				X
Marianne Gallezzo				X	Stacy Scott	X			
Nicholas Golden				X	R. Eric Slagle	X			

Christine Holloran				X	Matthew Poska	X			
Dennis Kelley				X	Stephen Turner	X			
Lilia Maselli	X				Vivian Varbedian	X			

The motion carried 14-0-0 (Yes-No-Abstain).

The meeting was adjourned at 7:31pm.

Documents and Exhibits

- Wildwood Early Childhood Center Project School Building Committee Meeting #46 slideshow presentation, dated July 21, 2026

Attachments

- None

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #47

Tuesday, August 18, 2026 In-person 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan	Justin Cusce	Paul J. Melaragni	David A. Ragsdale
Gregory B. Bendel	Marianne Gallezzo	Craig P. Miner	Stacey Scott
Kate Bissell	Nicholas Golden	Christine Murray	R. Eric Slagle
Kevin A. Caira	Christine Holloran	Judith L. O'Connell, Chair	Stephen Turner
Michael Camoscio	Dennis Kelley	Matthew P. Poska*	Vivian Varbedian, Vice Chair
	Lilia Maselli	Christine Prendergast	Christine Bourne*

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	X	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell		Wildwood School, Principal
Christine Bourne*	X	School Department – Director of Finance
Kevin A. Caira	Remote	Select Board
Michael Camoscio		Permanent Building Committee
Justin Cusce	X	
Marianne Gallezzo	Remote	Finance Committee
Nicholas Golden	X	School Committee
Christine Holloran	Remote	Wildwood School, Teacher
Dennis Kelley	X	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni	X	Permanent Building Committee
Craig P. Miner	X	
Christine Murray		
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Matthew P. Poska*	X	Superintendent of Schools

Christine Prendergast	Remote	
David A. Ragsdale	X	School Committee
Stacey Scott	Remote	Woburn Street School, Principal
R. Eric Slagle	X	Town of Wilmington, Town Manager
Stephen Turner		School Committee
Vivian Varbedian, Vice Chair	Remote	
Other Participants		
Angel Cartagena	Remote	Wilmington Public Schools
Donald Walter		Dore + Whittier Architects
Lee P. Dore	Remote	Dore + Whittier Architects
Rani Philip	X	Dore + Whittier Architects
Bryce Taft		Dore + Whittier Architects
David Fontaine, Jr.		Fontaine Brothers
Joel Kent		Fontaine Brothers
Pam Galeota	X	Fontaine Brothers
John Vukic	X	Fontaine Brothers
Mark Abdella		Fontaine Brothers
Chelsey Mutrie		Fontaine Brothers
Patrick Spellane		Fontaine Brothers
Jim Rogers		LeftField
David Saindon	X	LeftField
Craig DiCarlo	X	LeftField
Trevor Fuce	X	LeftField

*Post-meeting: The MSBA approved the revised Wilmington Elementary School Building Committee roster on August 24, 2026.

1 – Call to Order

The chair of the building committee, Ms. O'Connell, called the meeting to order at 6:30pm.

Roll call was taken and a quorum was present.

Ms. O'Connell introduced a new member of the building committee, Christine Bourne. Christine recently started as the school department's Director of Finance. Welcome Christine.

LeftField introduced a new LeftField team member, Trevor Fuce. He will be supporting the project moving forward and has been working behind the scenes.

2 – Approval of Previous Meeting Minutes

A motion to approve the minutes from the School Building Committee meeting held on July 21, 2026, as distributed, was made by Mr. Slagle and seconded by Mr. Kelley.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni			X	
Gregory B. Bendel	X				Craig P. Miner	X			
Kate Bissell				X	Christine Murray				X
Christine Bourne			X		Judith L. O'Connell	X			
Kevin A. Caira	X				Christine Prendergast			X	
Michael Camoscio				X	David A. Ragsdale			X	
Justin Cusce			X		Stacey Scott	X			
Marianne Gallezzo			X		R. Eric Slagle	X			
Nicholas Golden			X		Matthew Poska	X			
Christine Holloran			X		Stephen Turner				X
Dennis Kelley	X				Vivian Varbedian	X			
Lilia Maselli	X								

The motion carried 11-0-8 (Yes-No-Abstain).

3 – Administrative Actions

Ms. O'Connell stated she will turn things over to LeftField to present the budget update.

3a – Invoice Summary Review

LeftField prepared Invoice Summary #30 for review tonight and included it in the meeting packet that was distributed last Friday, and it is labeled item #3a.

LeftField presented invoice summary #30 including invoices from Dore + Whittier totaling $596,602.26, an invoice from Fontaine Brothers totaling $26,666.00, an invoice from Minuteman Press totaling $355.39, an invoice from Projectdog totaling $295.00, an invoice from DM Berg totaling $3,600.00, and an invoice from LeftField totaling $150,000, for an invoice packet total of $777,518.65. Prior to the WSBC meeting, the Finance review group met and reviewed the invoice summary.

A motion to approve Invoice Summary #30 in the amount of $777,518.65, Was made by Mr. Kelley and seconded by Ms. Prendergast.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner			X	
Kate Bissell				X	Christine Murray				X
Christine Bourne			X		Judith L. O'Connell	X			
Kevin A. Caira	X				Christine Prendergast	X			
Michael Camoscio				X	David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo	X				R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran	X				Stephen Turner				X
Dennis Kelley	X				Vivian Varbedian	X			
Lilia Maselli	X								

The motion carried 17-0-2 (Yes-No-Abstain).

3b – Total Project Budget Update

LeftField reported that for this month instead of providing a rolled-up budget, we decided to include the detailed budget, which takes two slides. Again, the only changes to this budget from last month appear in the 'Expended' and 'Unspent' columns. This spreadsheet was included in the meeting packet distributed last Friday, and it is labeled item #3b.

4 – Project Updates

Ms. O'Connell provided the update that over the past month, the Project Team has coordinated with the geoenvironmental consultant and Licensed Site Professional to prepare an informational presentation regarding the Project's topsoil sampling program and evaluation. The purpose of tonight's presentation is to update the School Building Committee and the public and to provide additional context regarding the unauthorized private soil sampling disclosed at the Committee's July 21 meeting. With that, I will ask LeftField to begin the presentation.

4a – Soil Testing and Evaluation

LeftField stated that before presenting the following slides, we want to take a moment to briefly update the Committee and, more importantly, the public regarding the private soil-testing results presented at the School Building Committee meeting on July 21, 2026.

The samples were reportedly removed from Town-owned property without prior authorization. Neither the Town nor the Project Team knew that the sampling had occurred until the results were presented at the July 21, 2026, SBC meeting. The unauthorized, or the private soil sampling does not provide sufficient information to independently verify the sampling locations, the depths of the sampling, collection methods, sampler qualifications, or handling before laboratory delivery. Accordingly, the unauthorized sampling results cannot be directly compared with the Project's professionally controlled sampling program that you will hear about shortly.

The unauthorized testing also measured only total chromium, which does not distinguish between trivalent chromium, Cr(III), commonly found in soil and rock, and hexavalent chromium, Cr(VI), the more concerning form, or what I will call the "bad" chromium. A total chromium result alone does not establish that either chromium species exceeds its applicable MCP reportable concentration.

By comparison, the Project's planned topsoil sampling program was conducted under the direction of a Board-Certified Environmental Scientist and the Project's Licensed Site Professional, using documented procedures, professional oversight, and species-specific chromium testing. Hexavalent chromium was not detected. The maximum trivalent chromium concentration was 374 milligrams per kilogram, approximately 63 percent below the applicable 1,000 milligrams-per-kilogram reportable concentration. You will hear more about this in the coming slides.

The Project's report and laboratory findings were provided to MassDEP and discussed with the agency on August 6, 2026. As part of the call between the Town and the agency, MassDEP confirmed, based on the Project-controlled topsoil sampling program, that there is no reportable condition currently identified at the property.

LeftField presented two simplified, diagrammatic slides showing where the Project's samples were collected and how the sampling program was conducted.

LeftField called the committee's attention to a disclaimer: the information and graphics presented here were assembled solely to provide a simplified, diagrammatic explanation of the topsoil sampling program conducted on June 19, 2026, for presentation purposes to the Committee. They are not intended to replace, modify, or independently represent the sampling methodology, analytical results, or professional conclusions documented in the formal environmental report and supporting laboratory data.

LeftField presented the slides as a vehicle for communicating the information to the School Building Committee. LeftField advised they are not environmental subject-matter experts who conducted or evaluated the sampling program and were not in a position to provide technical opinions or interpretations beyond what has been documented by the Project's environmental professionals.

Dore + Whittier and LeftField offered to receive questions from the Committee concerning the sampling methodology, laboratory analysis, chromium results, or Massachusetts Contingency Plan requirements. If a technical question cannot be answered from the information already documented, Dore + Whittier will record the question and forward it to the appropriate environmental professional.

The purpose of the Project's topsoil sampling program was to characterize topsoil conditions in advance of construction and to support appropriate soil reuse and disposal decisions.

LeftField presented a diagrammatic map of the topsoil grab-sample locations associated with the Project Team's June 19, 2026, sampling program.

The aerial image is intended to show the sampling locations that occurred across the property. The sampling program included 20 topsoil grab samples collected from areas proposed for new construction and from areas surrounding the existing school. The 20 grab samples were distributed among three distinct sampling areas. Seven samples were collected from the area identified as Front, essentially around the existing school. Six samples were collected from the area identified as Field East, and seven samples were collected from the area identified as Field West.

LeftField presented a slide that illustrated the sampling program and presented it as a simplified sequence of stages moving from field collection, represented as stages 1 and 2, to the consolidation of the samples, represented as stage 3, and finally to the chromium results, represented as in the Results Summary.

The first stage shows the depth-specific collection process. Topsoil was collected to a depth of 12 inches below the ground using a Dutch auger.

The second stage shows the 20 individual grab samples collected across the property. Each sample was placed in a clean, resealable plastic bag in the field. The graphic organizes the individual bags by the three sampling areas shown on the previous sampling location map.

The third stage illustrates sample consolidation. Representative portions from the individual sample bags were combined into larger plastic bags based on the three distinct sampling areas. This resulted in three composite samples: one representing the Front area, one representing Field East, and one representing Field West.

The last stage is the Results Summary, which summarizes the species-specific chromium results. This distinction is important because total chromium is a combined measurement that does not identify how much chromium is

present as trivalent chromium, known as Cr(III), and how much is present as hexavalent chromium, known as Cr(VI).

Trivalent chromium is commonly found in rocks and soil, while Hexavalent chromium is the form associated with environmental and health concerns and is commonly associated with industrial use. The total chromium result alone does not establish that hexavalent chromium is present at an elevated or reportable concentration. As shown in the results summary, hexavalent chromium was not detected.

For trivalent chromium, the maximum concentration detected was 374 milligrams per kilogram. The applicable MCP reportable concentration is 1,000 milligrams per kilogram. Therefore, the highest result was approximately 37 percent of the reporting threshold, or approximately 63 percent below it. In plain terms, the maximum result was less than half of the applicable reportable concentration. For additional context, the other two composite samples had concentrations of only 223 and 225 milligrams per kilogram.

4b – Unauthorized Testing

Ms. O'Connell stated It has come to the town's attention that an individual who is not an authorized professional working for the project recently extracted soil samples from the town's property at the existing North Intermediate School. We have asked Town Counsel, Mark Reich from K.P. Law, to join us tonight to help clarify activities that are allowed and not allowed on public property.

Mr. Reich addressed the committee about unauthorized soil testing that the Town became aware of after it was conducted. Public properties have different uses and are held by the town and under control of various bodies within the town. Such properties are held for the benefit of the town under care and custody of town groups. There are different properties and spaces, such fire and police department properties, that the public may not freely access. Public parks allow for public access but for limited uses. School properties have limited access. Construction sites are specifically for construction activities, and the public is not allowed to access them because of liability and risk to public safety. Members of the public are not allowed to go on property that is not designated as open to the public. Members of the public coming onto a public construction site and doing unauthorized testing is illegal. This could result in damage to property and threat to public safety. This constitutes a trespass and results in claims for damages. The Wilmington Elementary School construction site has been completely enclosed with fence to prevent members of the public from entering the site. When public property is under the control of a construction manager, members of the public are not allowed to access it. Also, members of the public cannot remove property without prior authorization from the town.

Ms. O'Connell provided the update to remind the public that the portion of the North Intermediate School property located within the construction fence has been temporarily turned over to Fontaine Brothers and is under the construction manager's control. Unauthorized entry into the fenced construction area is strictly prohibited for safety and security reasons. Activities previously permitted on the fields behind the school, including walking, jogging, dog walking, and recreational sports, are not permitted within the fenced area during construction. Access is limited to authorized individuals only. These restrictions are in place to protect students, workers, and members of the public. We appreciate the community's cooperation throughout construction.

5 – Design Update

LeftField stated that the Design Team continues to make significant progress toward the next MSBA milestone, the 90% Construction Documents submission scheduled for the end of September. Their current efforts are

focused on advancing and coordinating the construction documents for that submission. To keep the Committee informed, Rani will provide an update on the team's recent activities and the work currently underway.

5a – Designer Activities

Dore + Whittier updated the committee on the different working processes from the Schematic Design to the 100% Construction Documents. Every phase we produce further developed drawings and specs. After each phase we hand over the packages to the project team and review all information with all parties and lots of input goes into each phase of the document development. Dore + Whittier is working with the School Department, Town and Staff to receive input for the drawings and specifications. We are continuing to develop construction documents and Construction administration has started with the early site package. As of Friday, we issued the 90% Construction Documents. LeftField and Fontaine brothers will provide estimates based on these documents. At the next SBC we will report on where we stand for the project's budget and estimates. Early package two released site, long lead item equipment. Early release package two will be reviewed in the next couple of weeks. Coordination for input from the commissioning agent, OPM, and Construction Manager is ongoing and will all provide comments 90% Construction Documents. Dore + Whittier is constantly checking for compliance with all applicable codes and regulations. The next big deliverable is the 90% Construction Documents MSBA Submission which will be in September 2026.

6 – Construction Update

Ms. O'Connell stated that shortly before the July School Building Committee meeting, Fontaine Brothers and its sitework subcontractor mobilized to begin construction activities while the remaining design work continues toward completion. Their initial efforts have focused on preparing the site for the major construction activities ahead. To update the Committee and the public on the progress made over the past month, I will now turn the presentation over to Fontaine.

Fontaine Brothers provided an update that the site fence has been completed, and the site is completely enclosed. Erosions controls have all been installed. Two trailers have been delivered and placed on the construction site. The site construction entrance will be completed this week. The contractor parking lot will be completed this week. Dust and vibration monitors have been installed.

7 – Public Engagement

7a – Groundbreaking Event, Wednesday, September 16, 2026

Ms. O'Connell stated many construction projects mark the start of construction with a ceremonial groundbreaking, and we are pleased to announce that the Wilmington Elementary School groundbreaking will be held on Wednesday, September 16, 2026, at 10:00 a.m.

The Town, School Department, and Project Team have selected this time to make it easier for the students and staff of the North Intermediate School, who are sharing their school grounds with the construction project, to participate in this important milestone.

We understand that a weekday morning may not be convenient for every member of the community. However, we felt it was especially important to emphasize student participation in this event. Additional community events will be held as the Project progresses, including a steel topping off ceremony and eventually a ribbon-cutting celebration at the completion of the new facility.

Dore + Whittier has prepared an invitation flyer that we will begin circulating within the next couple of weeks. The flyer will be posted on the Town, School Department, and Project websites, and printed copies will be available at several municipal buildings.

We hope that students, staff, families, and community members who are available will join us in celebrating this exciting milestone.

8 – Discussion/Correspondence/New Items

Ms. O'Connell reported that the Town continues to receive various public records requests. Each is logged and processed through the Town Clerk's Office, and responses are provided in accordance with the public records process. We have two we are working on now. Depending on the request some may take more time than others depending on the content.

9 – Committee Questions

Mr. Golden asked if the project team could explain what was tested for soil and anything else worth noting for the public. Mr. Reich responded that the town informed MassDEP of the unauthorized testing and the project team has followed all regulations regarding earth removal and soil testing. Representatives from the town and project team had walk with MassDEP. MassDEP determined that the project didn't exceed levels of arsenic and that no further action was needed. As soon as the Town became aware that private sampling was conducted, the town shared that information with MassDEP. They have reviewed all test results and other information provided by the town and project team. MassDEP wants the project team to continue to follow all processes for soil testing and earth removal. MassDEP wanted to be sure we are communicating properly to the public. That is why we have this presentation and the town's legal counsel here tonight. We are following all standards so that the school is healthy and safe for students and teachers. As we continue, the project team will follow all MassDEP regulations and earth removal conditions.

Mr. Golden asked if there were any new results in the tests conducted in June 2026. Ms. O'Connell responded that there were no new findings.

Mr. Ragsdale asked if the leadership team can explore a way for the committee to gain access to the Public Record Requests. He wants to be informed about what the public is asking about and to see the project team's responses. Ms. O'Connell responded that all the information shared for the Public Record Requests has also been provided to the School Building Committee. We will work to provide a summary. The Town Clerk's office is fully transparent. Some responses include a link with thousands of pages. If there are any specific concerns, please ask in SBC mtgs, email or phone call.

10 – Public Comments

Ms. O'Connell advised that a public sign-in sheet was circulated on a clipboard and asked members of the public who wish to speak at this meeting please add your name and address for the record. We also ask that the comments are kept within three minutes.

Michelle Feeney, 5 Arlene Ave, expressed her concerns about the project, including her opinion regarding stormwater permitting, soil testing, and a back-up plan for aging schools. She assured the committee that the abutters do not want to stop the school project, rather they want safety.

Elizabeth Berube, 300R Salem Street, expressed frustration and concerns with the project, including her opinions regarding the stormwater design, MassDEP regulations, the safety of the neighboring homes, arsenic in the imported subsurface fill.

Suzanne Sullivan, Lawrence Street, expressed her concerns with the project, including her opinions about the project, the health of neighbors, students, and water, high levels of arsenic and chromium in the soil, removal of arsenic-impacted soil, and soils testing.

11 – Upcoming Meetings

The next SBC meeting is scheduled for Tuesday, September 15, 2026, at 6:30pm in the Town Hall meeting room 101.

12 – Adjournment

A motion to adjourn the meeting was made by Mr. Slagle and seconded by Mr. Golden. There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni	X			
Gregory B. Bendel	X				Craig P. Miner	X			
Kate Bissell				X	Christine Murray				X
Christine Bourne	X				Judith L. O'Connell	X			
Kevin A. Caira	X				Christine Prendergast	X			
Michael Camoscio				X	David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo	X				R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran	X				Stephen Turner				X
Dennis Kelley	X				Vivian Varbedian	X			
Lilia Maselli	X								

The motion carried 19-0-0 (Yes-No-Abstain).

The meeting was adjourned at 7:27pm.

Documents and Exhibits

- Wildwood Early Childhood Center Project School Building Committee Meeting #47 slideshow presentation, dated August 18, 2026

Attachments

- None

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #48

Tuesday, September 15, 2026 In-person 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan	Justin Cusce	Paul J. Melaragni	David A. Ragsdale
Gregory B. Bendel	Marianne Gallezzo	Craig P. Miner	Stacey Scott
Kate Bissell	Nicholas Golden	Christine Murray	R. Eric Slagle
Kevin A. Caira	Christine Holloran	Judith L. O'Connell, Chair	Stephen Turner
Michael Camoscio	Dennis Kelley	Matthew P. Poska*	Vivian Varbedian, Vice Chair
	Lilia Maselli	Christine Prendergast	Christine Bourne*

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	X	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell	X	Wildwood School, Principal
Christine Bourne*	X	School Department – Director of Finance
Kevin A. Caira		Select Board
Michael Camoscio	X	Permanent Building Committee
Justin Cusce	X	
Marianne Gallezzo	Remote	Finance Committee
Nicholas Golden	Remote	School Committee
Christine Holloran		Wildwood School, Teacher
Dennis Kelley	X	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni		Permanent Building Committee
Craig P. Miner	Remote	
Christine Murray	X	
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Matthew P. Poska*	Remote	Superintendent of Schools

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Christine Prendergast		
David A. Ragsdale	X	School Committee
Stacey Scott	Remote	Woburn Street School, Principal
R. Eric Slagle	X	Town of Wilmington, Town Manager
Stephen Turner	X	School Committee
Vivian Varbedian, Vice Chair		
Other Participants		
Angel Cartagena	Remote	Wilmington Public Schools
Donald Walter		Dore + Whittier Architects
Lee P. Dore	Remote	Dore + Whittier Architects
Rani Philip	X	Dore + Whittier Architects
Bryce Taft		Dore + Whittier Architects
David Fontaine, Jr.		Fontaine Brothers
Joel Kent		Fontaine Brothers
Pam Galeota		Fontaine Brothers
John Vukic	X	Fontaine Brothers
Mark Abdella		Fontaine Brothers
Chelsey Mutrie		Fontaine Brothers
Patrick Spellane		Fontaine Brothers
Jim Rogers		LeftField
David Saindon	X	LeftField
Craig DiCarlo	X	LeftField
Trevor Fuce	Remote	LeftField

*Post-meeting: The MSBA approved the revised Wilmington Elementary School Building Committee roster on August 24, 2026.

1 – Call to Order

The chair of the building committee, Ms. O'Connell, called the meeting to order at 6:30pm.

Roll call was taken and a quorum was present.

2 – Approval of Previous Meeting Minutes

A motion to approve the minutes from the School Building Committee meeting held on August 18, 2026, as distributed, was made by Ms. Allan and seconded by Mr. Slagle.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel				X	Craig P. Miner	X			
Kate Bissell			X		Christine Murray			X	
Christine Bourne	X				Judith L. O'Connell	X			
Kevin A. Caira				X	Christine Prendergast				

Michael Camoscio			X		David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo				X	R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran				X	Stephen Turner			X	
Dennis Kelley	X				Vivian Varbedian				X
Lilia Maselli	X								

The motion carried 12-0-4 (Yes-No-Abstain).

3 – Administrative

Ms. O'Connell stated she will turn things over to LeftField to present the budget update.

3a – Invoice Summary Review

LeftField prepared Invoice Summary #31 for review tonight and included it in the meeting packet that was distributed last Friday, and it is labeled item #3a.

LeftField prepared Invoice Summary #31 for review tonight and included it in the meeting packet distributed last Friday, and it is labeled item #3a.

The current summary includes invoices from Dore + Whittier totaling $647,850.92; an invoice from Fontaine Brothers totaling $3,642,101.25; an invoice from ProjectDog totaling $890.00; and an invoice from LeftField totaling $150,000, for an invoice packet total of $4,440,842.17. Prior to the WSBC meeting, the Finance review group met and reviewed the invoice summary.

A motion to approve Invoice Summary #31 in the amount of $4,440,842.17, Was made by Mr. Kelley and seconded by Ms. O'Connell.

There was no further discussion. A roll call vote was taken.

Voting Member	**Yes**	**No**	**Abstain**	**Not Pres.**	**Voting Member**	**Yes**	**No**	**Abstain**	**Not Pres.**
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel				X	Craig P. Miner			X	
Kate Bissell	X				Christine Murray	X			
Christine Bourne	X				Judith L. O'Connell	X			
Kevin A. Caira				X	Christine Prendergast				X
Michael Camoscio	X				David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo	X				R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran				X	Stephen Turner	X			
Dennis Kelley	X				Vivian Varbedian				X
Lilia Maselli	X								

The motion carried 16-0-1 (Yes-No-Abstain).

3b – Total Project Budget Update

LeftField reported the next two slides include a snapshot of the detailed budget, which is too small to read on the screen, but was also included in the meeting packet distributed last Friday, labeled as item #3b. The only changes to this budget from last month appear in the 'Expended' and 'Unspent' columns.

Leftfield, before we move on, I'd like to briefly introduce one item that is not on tonight's agenda for the Committee's awareness. I am not asking the Committee to discuss, debate, or take any action on it this evening. As construction activity progresses, change events will arise for various reasons. These may include coordination issues, unforeseen conditions, code or regulatory requirements, design-related matters, or Owner-requested changes. Some of these events may be time-sensitive and may require direction before the Committee's next regularly scheduled meeting to avoid impacts to the project schedule, cost, risk, or construction sequencing. For that reason, the Project Team is developing a proposed Change Event Authorization Protocol for the Committee's future consideration. The intent is to establish, in advance, a clear and transparent process for evaluating, authorizing, documenting, and reporting change events. The protocol would distinguish between non-discretionary changes that may require timely action and discretionary changes that would generally come before the Committee for consideration and direction.

This is not intended to reduce the Committee's oversight. Rather, it is intended to establish clear responsibilities and avoid having to create a process in the middle of an urgent construction issue. Again, no discussion or action is requested tonight. I simply want to plant the seed so that when this is placed on a future agenda, the concept will not be coming to the Committee for the first time.

4 – Design Updates

Ms. O'Connell provided the update that the project team has been working hard to prepare and issue the 90% construction document submission to the MSBA, currently scheduled to be transmitted on or about September 28th. LeftField will provide a brief overview of the package and then seek a vote from the committee.

4a – 90% Estimate Reconciliation Update

LeftField stated that as the Committee may recall, at its June 16, 2026 meeting, we presented the table of contents for the 60% Construction Documents submission and requested authorization for LeftField and Dore + Whittier, on behalf of the Town, to transmit the submission to the MSBA for review. Prior to that, at the Committee's March 17, 2026 meeting, we presented the Design Development submission and received similar authorization to transmit that submission to the MSBA. This evening, we are asking the Committee to take the same action for the 90% Construction Documents submission. The 90% submission represents the continued advancement of the Construction Documents and incorporates the Project updates made since the March Design Development submission and the June 60% Construction Documents submission.

The table of contents shown on the screen is from the 90% CD submission. As we did in June for the 60% CD submission, I will briefly highlight the key elements of the 90% CD submission that are most important for the Committee to understand at this stage of the project.

Dore + Whittier and LeftField will collaborate on the Introduction and Executive Summary, which will summarize the full submission and identify the major updates since the 60% CD phase. LeftField will also provide a series of narratives addressing the reviews completed during the 90% CD phase. These include reviews of the 90% CD

drawings and specifications, the project schedule, scope confirmation, budget updates, early bid packages, and value-engineering opportunities.

Dore + Whittier will provide updated design narratives covering the work plan, building systems, code analysis, sustainability and green initiatives, and site assessments. Their submission will also include updates related to proprietary items under consideration, interior color theory, building system calculations, security, access control, and overall facility operations.

The Project Team will also assemble a series of appendices that provide the technical backup and supporting documentation for the submission. These include responses to MSBA comments, School Building Committee meeting minutes and presentations, updated technical studies and reports, new geotechnical and geo-environmental information, permitting and regulatory approvals, construction cost-estimating documentation, cost reconciliation forms, updates to the MSBA 3011 budget worksheet, the project schedule, and MSBA value-engineering tracking logs.

Collectively, these materials demonstrate the Project's continued advancement through the MSBA process and document how the Project Team continues to refine the design while maintaining alignment with the approved project scope, schedule, and budget.

The key takeaways from the 90% CD submission are as follows. First, the Project remains fully consistent with the scope approved by the voters. The overall gross square footage, educational program, construction phasing sequence, and project schedule remain unchanged from what was previously presented and approved. Second, as part of the 90% CD phase, the Project Team completed two independent construction cost estimates. One estimate was prepared by PM+C, Dore + Whittier's cost estimator, and the second was prepared by Fontaine.

As shown in the table, the Schematic Design construction budget was approximately $137.7 million. The updated 90% CD estimates are approximately $135.6 million from PM+C and $136.2 million from Fontaine.

The two independent estimates are within approximately 0.45% of each other, which indicates strong alignment and continued confidence in the pricing at this stage of design. Both estimates also remain within the previously approved Schematic Design construction budget. PM+C's estimate reflects an underrun of approximately $2.2 million, while Fontaine's estimate reflects an underrun of approximately $1.6 million.

The overall takeaway for the Committee is that the project scope remains unchanged, the schedule remains on track, and the Project continues to be on budget as we move forward into the next phase of Construction Documents. While the estimates technically show an underrun, the appropriate message at this stage is that the Project remains on budget. As the Project moves into additional buyout activities and future file trade bid openings, individual awards will show specific underruns and overruns. We will compare all awards to the control budget, and I remind everyone to look at the awards collectively rather than focusing on individual awards. This is normal during the buyout and award process.

As I noted in June, the Project Team continues to monitor volatility in global commodity markets, including crude oil prices and certain metals, such as aluminum, due in part to ongoing geopolitical conditions, in addition to what feels like week-to-week tariff implementations. We have accounted for these potential market fluctuations in the current estimate.

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Looking specifically at the Fontaine estimate, which we are using as the 90% CD control estimate, Fontaine is carrying 1.5% for escalation, or approximately $1.5 million, to account for anticipated market conditions as the Project advances toward bidding and construction. In addition to escalation, the estimate includes a 1% design and estimating contingency, or approximately $1 million, which provides additional flexibility as the design continues to be refined and finalized through the remaining Construction Documents phases. When viewed together, the Project is currently carrying approximately $2.5 million in combined escalation and contingency allowances. These are standard and appropriate risk-management measures for a project at this stage and are intended to address the types of uncertainties that may arise in the marketplace.

The key takeaway is that the Project Team continues to closely monitor market conditions, and the current 90% CD estimate includes appropriate safeguards to manage potential volatility as the Project moves forward.

4b – 90% CD Submission to the MSBA

LeftField stated, I would ask the Committee to consider the following motion. I will read the motion, but a committee member will need to move it forward.

Motion to authorize Dore + Whittier and LeftField, on behalf of the Town, to transmit the 90% construction document submission as presented reviewed to the Massachusetts School Building Authority.

A motion to authorize Dore + Whittier and LeftField, on behalf of the Town, to transmit the 90% construction document submission as presented reviewed to the Massachusetts School Building Authority, was made by Mr. Kelley and seconded by Mr. Turner.

Mr. Camoscio asked if there was a response to the 60% construction document comments. LeftField responded yes and a response will be provided by Dore + Whittier, but not certain whether it will be ready for next months meeting but will be shared before the 100% construction document set.

There was no further discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel				X	Craig P. Miner	X			
Kate Bissell	X				Christine Murray	X			
Christine Bourne	X				Judith L. O'Connell	X			
Kevin A. Caira				X	Christine Prendergast				X
Michael Camoscio	X				David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo	X				R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran				X	Stephen Turner	X			
Dennis Kelley	X				Vivian Varbedian				X
Lilia Maselli	X								

The motion carried 17-0-0 (Yes-No-Abstain).

Ms. O'Connell provided the update that the 90% CD submission is a major milestone in the MSBA process, but that is not the only design activity that is currently underway. D+W has prepared a slide to help explain the parallel streams of work they are managing.

Dore + Whittier stated that they are continuing to develop the 90% construction document set. They are also working on the 90% construction document package submission for the MSBA as mentioned earlier. Dore + Whittier is actively providing construction administration for early release package 1. They are descoping for early package release 2. Early release package 3 will be coming at the end of this month. They are continuing to refine details on all the construction documents. Dore + Whittier is working with all stakeholders to ensure the intent of the scope is captured in the construction documents. The team is moving toward the 100% construction documents.

5 – Construction Update

Ms. O'Connell stated that Fontaine and its sitework subcontractor continue sitework while the remaining design work continues toward completion. Their initial efforts have focused on preparing the site for the major construction activities ahead. To update the Committee and the public on the progress made over the past month, I will now turn the presentation over to Fontaine.

5a – General Construction Update

Fontaine updated the group on the current construction progress at the site. They have completed the removal of the existing tennis court. The phase 1 tree and shrub removal has been completed. They installed the added fence and gates for the temporary playground area which has also been completed. The subcontractor parking area has been installed. The phase 1 loam stripping and stock piling has been completed. The exporting of loam from phase 1 is ongoing.

LeftField updated the Committee on the dust-mitigation measures associated with the Project. Dust-mitigation and control requirements were planned as part of the Project from the outset. Dust control was not added in response to a particular concern or event. It was included as part of the Project's standard construction planning and environmental compliance requirements. Dust-control measures have been in place for some time and are always required before demolition or earthwork begins. Water is the primary method for controlling dust from exposed soil, disturbed areas, and project roadways. In addition, four dust monitors have been positioned around the active construction area, including between the work zone and the existing occupied school. The monitors may be repositioned as construction progresses to remain appropriately located in relation to the work. The monitors continuously measure PM10, which consists of very small airborne particles. The Project's action level is set at 0.10 milligrams per cubic meter, approximately 33 percent below the EPA's 24-hour standard. If the action level is reached, the Project Team will be notified and will review work activities and monitoring results to determine whether additional dust-control measures are needed. If those measures are not effective, the activity causing the dust may be temporarily stopped. The Team evaluates readings over time rather than relying on a single brief spike, which does not necessarily indicate an air-quality concern. Weekly monitoring results are available to the public on the Project's webpage.

6 – Public Engagement

6a – FAQ Update

LeftField mentioned that a few new FAQ's have been added to the Project webpage as of August 28, 2026. The three newly added FAQ's are:

1. Privately obtained soil samples and chromium

2. School operations/ construction separation
3. Dust monitoring

6b – Groundbreaking Event, Wednesday September 16, 2026

Ms. O'Connell stated as a reminder, a ceremonial groundbreaking event is scheduled for tomorrow, Wednesday, September 16, 2026, at 10:00 a.m. The invitation flyer has been posted on the Town, School Department, and Project websites, and printed copies are available at several municipal buildings. We hope that students, staff, families, and community members who are available will join us in celebrating this exciting milestone.

7 – Discussion/Correspondence/New Items

Ms. O'Connell reported that the Town continues to receive various public records requests. Each is logged and processed through the Town Clerk's Office, and responses are provided in accordance with the public records process. We have two we are working on now. Depending on the request some may take more time than others depending on the content. Regarding the previously requested public record request data for committee members, we are currently focused on answering the requests that are coming in and then we can look at this request with the Town Clerks Office.

Ms. O'Connell mentioned the meeting packet distributed last Friday included a letter from Superintendent Matt Poska to staff, students, and parents of North Intermediate about measures the school department is taking to limit building occupants' exposure to dust from the neighboring construction site. The letter was labeled as item #4 in the packet. Ms. O'Connell explained that her understanding is that dust and noise monitors have always been a part of the project scope. Noted that the school had an upgraded air filtration systems installed during COVID. The Superintendents letter was reinforcing the expectations and was not in response to anything. The project team has been working with Shelley Newhouse, the Wilmington Director of Public Health. Mr. Kelley explained that there are measures in place that have been ongoing since 2020, including MERV-8 air filters that can capture particles as small as the COVID virus. This is a proactive approach rather than reactive. Mr. Poska reiterated what Ms. O'Connell said, memorializing best practices and consistency at the building level. Using air filtration and purification systems consistently. Mr. Kelley mentioned the facilities team does annual air quality testing and is an ongoing practice.

8 – Committee Questions

Mr. Ragsdale asked what measures could be put in place if the dust monitoring threshold is exceeded in a twenty-four-hour period. LeftField responded that the response could include additional watering on site. They could move the activity to a different location on site. This is a case-by-case scenario. Fontaine mentioned that since monitoring began over a month ago, they have not seen any spikes that were close to exceeding the threshold and this site work currently is the biggest dust causing activity for the project. If there were a spike Fontaine is committed to reacting and coordinating in the field efficiently and they are highly sensitive to this topic. LeftField mentioned that there are reports on the project website for people to reference. The standard being used for this project is less than the standard set by the EPA.

9 – Public Comments

Ms. O'Connell advised that a public sign-in sheet was circulated on a clipboard and asked members of the public who wish to speak at this meeting to please add your name and address for the record. We also ask that the comments are kept within three minutes.

Steve Berube, 300 R Salem Street, inquired about where the dust monitors are located on the site. LeftField mentioned that the last report posted on the project website includes a map with the locations. Mr. Berube asked for an update on the gas line leak. LeftField provided the update that at approximately 12:32 p.m., during site-preparation work near the construction entrance, an excavator contacted an existing natural gas service line. The line had been marked through Dig Safe but was unexpectedly shallow, approximately eight inches below the surface, and did not have sand encasement or warning tape above it. Work stopped immediately, and the contractor contacted Wilmington Public Safety Dispatch and National Grid. Wilmington Police and Fire personnel responded promptly. National Grid representative responded quickly. The gas was shut off within approximately 10 minutes of the initial call. National Grid then repaired and pressure-tested the line and restored gas service to the building. The incident was addressed quickly and safely, with no evacuation required. We appreciate the prompt and coordinated response of the contractor, National Grid, the Wilmington Police and Fire Departments, Town personnel, and school staff. National Grid promptly shut off the service (within ten minutes of getting the call), repaired and pressure-tested the line, and restored gas service to the building. The boilers were returned to operation that day, and Fontaine subsequently confirmed that the kitchen appliances were also in good working order by Monday AM. Ms. O'Connell mentioned that all parties contacted her immediately including Fontaine, LeftField, Dore + Whittier, Wilmington Fire Department and the Wilmington Police Department. On August 19, 2026, the police log mentioned the highway was shut down. This was not accurate. The whole event was taken care of within minutes, and we understand reading the police log was alarming. DigSafe was called, the line was shallower than expected and it was fortunate that NGRID was able to take care of it quickly, even before neighbors became aware. Ms. O'Connell at the time asked the Chief to provide further context on the matter. They did not need to shut the highway down and no evacuation was necessary. Mr. Berube asked who was responsible and if there is an official report on this. Fontaine responded that they filed an internal report with the site contractor. The site contractor had a standdown meeting in response for safety training. Mr. Slagel mentioned this was between the construction manager and their site contractor. Mr. Berube mentioned the unauthorized soil testing and that not all the steps were followed during the Towns soil testing and should have been done properly. He mentioned no one on the project asked about the neighbor's soil testing and they did not test the topsoil. He mentioned that toxic waste was dumped on the site between 1910 and 1950. Mr. Berube stated that chromium 3 and arsenic are from tannery waste.

10 – Upcoming Meetings

The next SBC meeting is scheduled for Tuesday, October 20, 2026, at 6:30pm in the Town Hall meeting room 101.

11 – Adjournment

Ms. O'Connell mentioned there are QR codes to access the project website on the slide.

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A motion to adjourn the meeting was made by Mr. Kelley and seconded by Mr. Slagle. There was no discussion. A roll call vote was taken.

Voting Member	Yes	No	Abstain	Not Pres.	Voting Member	Yes	No	Abstain	Not Pres.
Diane M. Allan	X				Paul J. Melaragni				X
Gregory B. Bendel				X	Craig P. Miner	X			
Kate Bissell	X				Christine Murray	X			
Christine Bourne	X				Judith L. O'Connell	X			
Kevin A. Caira				X	Christine Prendergast				X
Michael Camoscio	X				David A. Ragsdale	X			
Justin Cusce	X				Stacey Scott	X			
Marianne Gallezzo	X				R. Eric Slagle	X			
Nicholas Golden	X				Matthew Poska	X			
Christine Holloran				X	Stephen Turner	X			
Dennis Kelley	X				Vivian Varbedian				X
Lilia Maselli	X								

The motion carried 17-0-0 (Yes-No-Abstain).

The meeting was adjourned at 7:16pm.

Documents and Exhibits

- Wildwood Early Childhood Center Project School Building Committee Meeting #48 slideshow presentation, dated September 15, 2026

Attachments

- None

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WILMINGTON PUBLIC SCHOOLS

Wildwood Early Childhood Center Project

School Building Committee Meeting #45

July 21, 2026

Massachusetts School Building Authority

Left Field

DORE + WHITTIER

FONTAINE



Agenda

1. Call to Order
2. Approval of Minutes – June 16 and June 30, 2026 – Vote
3. Administrative:
    a. Total Project Budget Update
4. Design Update:
    a. Conservation Commission & Earth Removal Permit
    b. 60% Construction Documents MSBA Submission
    c. Letter of Recommendation #1 / CM Contract Amendment #2
    d. Site Design
    e. Interior Design
5. Construction Update
6. Public Engagement
7. Discussion/Correspondence/New Items
8. Committee Questions
9. Public Comments
10. Next Meeting Date and Time - Tuesday, August 18, 2026
11. Adjournment

Approval of Minutes



Approve Meeting Minutes – June 16 and June 30, 2026

LeftField
THE RIGHT CHOICE IN PROJECT MANAGEMENT

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #44

Tuesday, June 16, 2026 | In-person | 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan	R. Eric Slagle	Kate Bissell	Nicholas Golden
Michael Camoscio	Gregory B. Bendel	Marianne Gallezzo	Lilia Maselli
Christine Holloran	Justin Cusce	Dennis Kelley	Judith L. O'Connell, Chair
Paul J. Melaragni	Craig P. Miner	Christine Murray	Stacey Scott
Christine Prendergast	David A. Ragsdale	Stephen Turner	Vivian Varbedian, Vice Chair
	Dr. David L. Thomson	Kevin A. Caira	

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan		Permanent Building Committee
Gregory B. Bendel	X	
Kate Bissell		Wildwood School, Principal
Kevin A. Caira	Remote	Select Board
Michael Camoscio	X	Permanent Building Committee
Justin Cusce	X	
Marianne Gallezzo	X	Finance Committee
Nicholas Golden	X	School Committee
Christine Holloran	Remote	Wildwood School, Teacher
Dennis Kelley	X	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	X	Select Board
Paul J. Melaragni	X	Permanent Building Committee
Craig P. Miner		
Christine Murray		
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Christine Prendergast	X	
David A. Ragsdale		School Committee

LeftField
THE RIGHT CHOICE IN PROJECT MANAGEMENT

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #45

Tuesday, June 30, 2026 | Remote via Zoom | 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan	R. Eric Slagle	Kate Bissell	Nicholas Golden
Michael Camoscio	Gregory B. Bendel	Marianne Gallezzo	Lilia Maselli
Christine Holloran	Justin Cusce	Dennis Kelley	Judith L. O'Connell, Chair
Paul J. Melaragni	Craig P. Miner	Christine Murray	Stacey Scott
Christine Prendergast	David A. Ragsdale	Stephen Turner	Vivian Varbedian, Vice Chair
	Dr. David L. Thomson	Kevin A. Caira	

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	Remote	Permanent Building Committee
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Kate Bissell		Wildwood School, Principal
Kevin A. Caira	Remote	Select Board
Michael Camoscio	Remote	Permanent Building Committee
Justin Cusce		
Marianne Gallezzo	Remote	Finance Committee
Nicholas Golden		School Committee
Christine Holloran		Wildwood School, Teacher
Dennis Kelley	Remote	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni	Remote	Permanent Building Committee
Craig P. Miner		
Christine Murray		
Judith L. O'Connell, Chair	Remote	Town of Wilmington, Asst. Town Manager
Christine Prendergast	Remote	
David A. Ragsdale		School Committee

Administrative



Total Project Budget – Rolled Up

Wildwood Elementary School - BUDGET TRACKING

MSBA ID: 202003420015
Wildwood Elementary School
Project Director / Manager: David Saindon / Craig DiCarlo

Period Ending	6/30/2026
MSBA Reimbursement Package	29
Includes GC/CM Requisition	N/A

Current Budget

LeftField
THE RIGHT CHOICE IN PROJECT MANAGEMENT

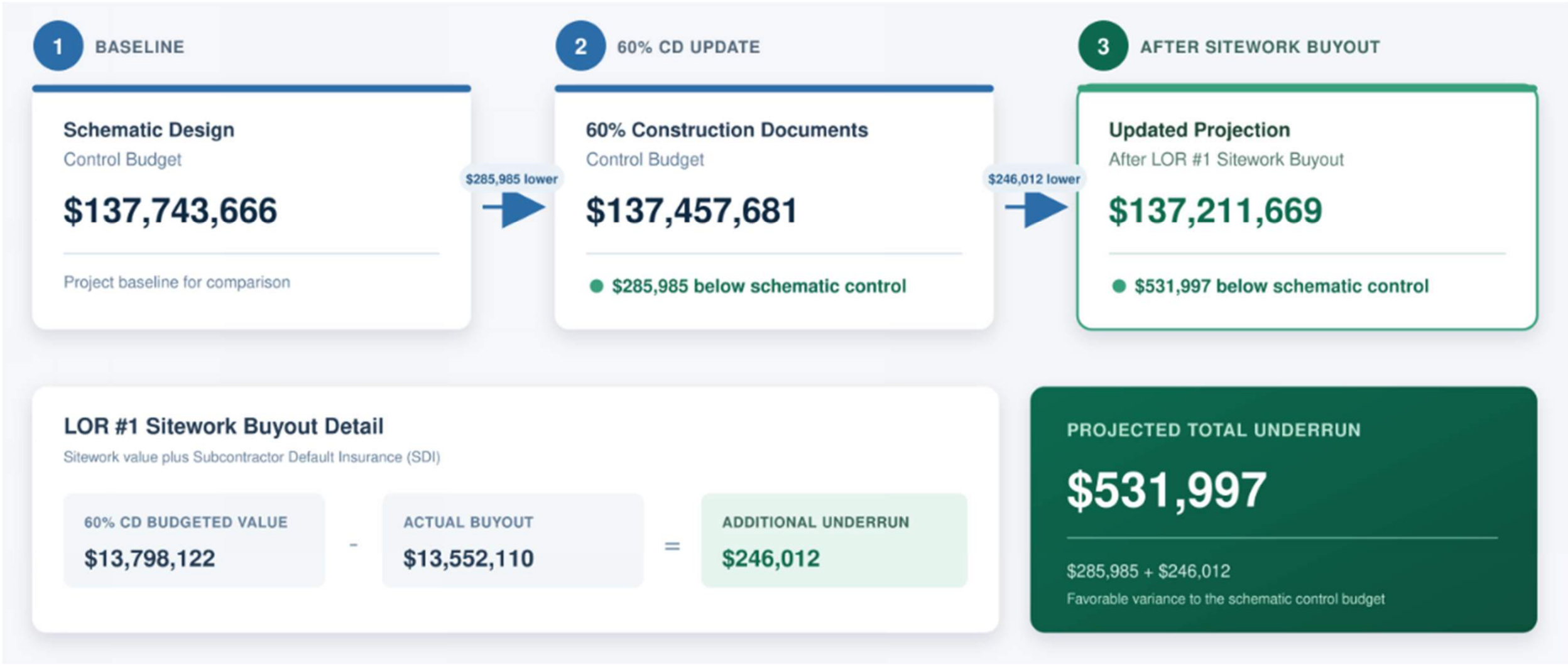
			PFA Budget [A]	Budget Changes [B]	Rev. PFA Budget [C]	Committed Costs [D]	Expended [E]	Unspent [F]=[D]-[E]	Remaining Budget [G]=[C]-[D]	% Complete (against committ'd) [H]=[E]/[J]	CTC (beyond committed) [I]	Anticipated C @ C [J]=[D]+[I]	Variance (Under) / Over [K]=[C]-[J]
0000	0000	FEASIBILITY STUDY AGREEMENT	$1,215,000	$0	$1,215,000	$1,205,180	$1,189,117	$16,063	$9,820	99%	($5,528)	$1,199,652	($15,348)
0100	0000	ADMINISTRATION	$5,520,000	($5,000)	$5,515,000	$4,790,724	$680,724	$4,110,000	$724,275		$724,275	$5,515,000	$0
0101	0000	Legal Fees	$100,000	$0	$100,000	$0	$0	$0	$100,000		$100,000	$100,000	$0
0102	0000	Owner's Project Manager (Leftfield)	$4,780,000	$0	$4,780,000	$4,780,000	$675,000	$4,105,000	$0	14%	$0	$4,780,000	$0
0103	0000	Aministration/ Misc Costs	$640,000	($10,130)	$629,870	$595	$595	$0	$629,275		$629,275	$629,870	$0
0199	0000	Printing (Minuteman Press)	$0	$5,129	$5,129	$5,129	$5,129	$0	$0	100%	$0	$5,129	$0
0200	0000	ARCHITECTURE & ENGINEERING	$15,141,622	($240,000)	$14,901,622	$14,901,622	$6,054,618	$8,847,004	$0		$0	$14,901,622	$0
0201	0000	Basic Services (Dore & Whittier)	$13,811,622	($175,000)	$13,636,622	$13,636,622	$5,795,565	$7,841,057	$0	43%	$0	$13,636,622	$0
0203	0000	Reimbursable and Other Services (Dore & Whittier)	$1,330,000	($65,000)	$1,265,000	$1,265,000	$259,053	$1,005,947	$0	20%	$0	$1,265,000	$0
0500	0000	CONSTRUCTION CONTRACT	$138,063,666	$0	$138,063,666	$11,535,529	$239,994	$11,295,535	$126,528,137		$126,528,137	$138,063,666	$0
0500	9999	Adjustment	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0501	0000	Pre-Construction Services (Fontaine)	$320,000	$0	$320,000	$320,000	$239,994	$80,006	$0	75%	$0	$320,000	$0
0502	0000	Construction											
0502	0000	Construction Budget	$137,743,666	($11,215,529)	$126,528,137	$0	$0	$0	$126,528,137		$126,528,137	$126,528,137	$0
0502	0010	GMP - Fee	$0	$2,720,000	$2,720,000	$2,720,000	$0	$2,720,000	$0	0%	$0	$2,720,000	$0
0502	0100	Division 1 - General Conditions	$0	$8,495,529	$8,495,529	$8,495,529	$0	$8,495,529	$0	0%	$0	$8,495,529	$0
0600	0000	MISCELLANEOUS PROJECT COSTS	$1,050,000	$0	$1,050,000	$250,000	$0	$250,000	$800,000		$800,000	$1,050,000	$0
0700	0000	FURNISHINGS & EQUIPMENT	$3,322,000	$0	$3,322,000	$0	$0	$0	$3,322,000		$3,322,000	$3,322,000	$0
0701	0000	Furnishings & Equipment (FF+E)	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0703	0000	Technology	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0800	0000	OWNER'S CONTINGENCY	$8,953,338	$240,000	$9,193,338	$0	$0	$0	$9,193,338		$9,208,686	$9,208,686	$15,348
0801	0000	Owner's Contingency (soft)	$2,066,155	$240,000	$2,306,155	$0	$0	$0	$2,306,155		$2,321,503	$2,321,503	$15,348
0507	0000	Owner's Construction Contingency (hard)	$6,887,183	$0	$6,887,183	$0	$0	$0	$6,887,183		$6,887,183	$6,887,183	$0
		PROJECT TOTALS [MSBA PFA]	$173,265,626	($5,000)	$173,260,626	$32,683,055	$8,164,453	$24,518,602	$140,577,571		$140,577,570	$173,260,626	($0)

Design Updates



Early Bid Package – Sitework Buyout

What was purchased and what does it mean for the budget?



Share of Direct Construction Purchased

Share of Direct Trade Costs Purchased

Based on the sitework buyout value



Calculation

Sitework buyout divided by total direct trade costs

TOTAL DIRECT TRADE COSTS

$111,458,741

60% CD control

÷

SITEWORK BUYOUT

$13,607,615

Excludes SDI

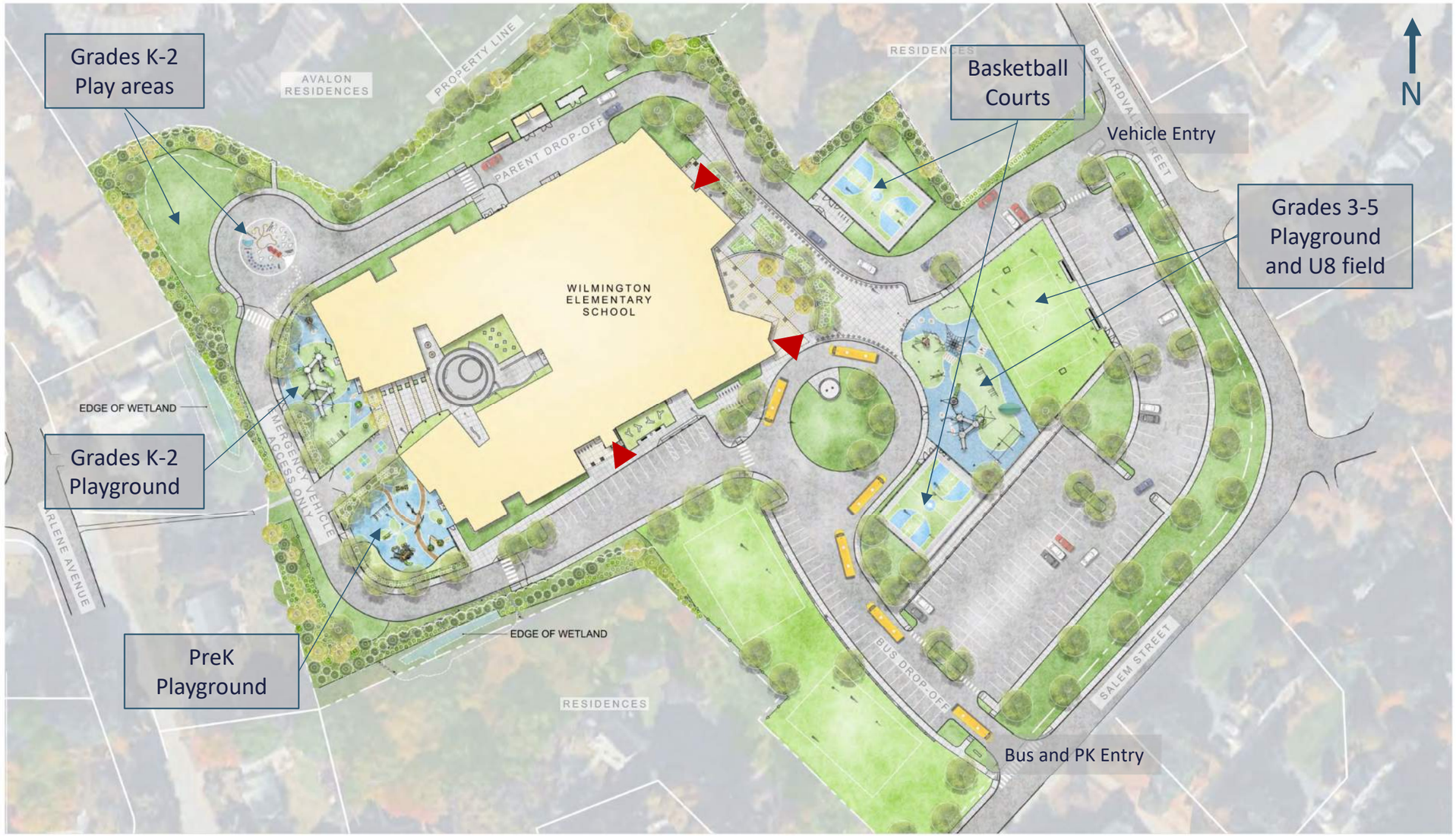
$13,607,615 ÷ $111,458,741 = 12.21%

Approximately 87.8% of direct trade costs remain to be bought out.

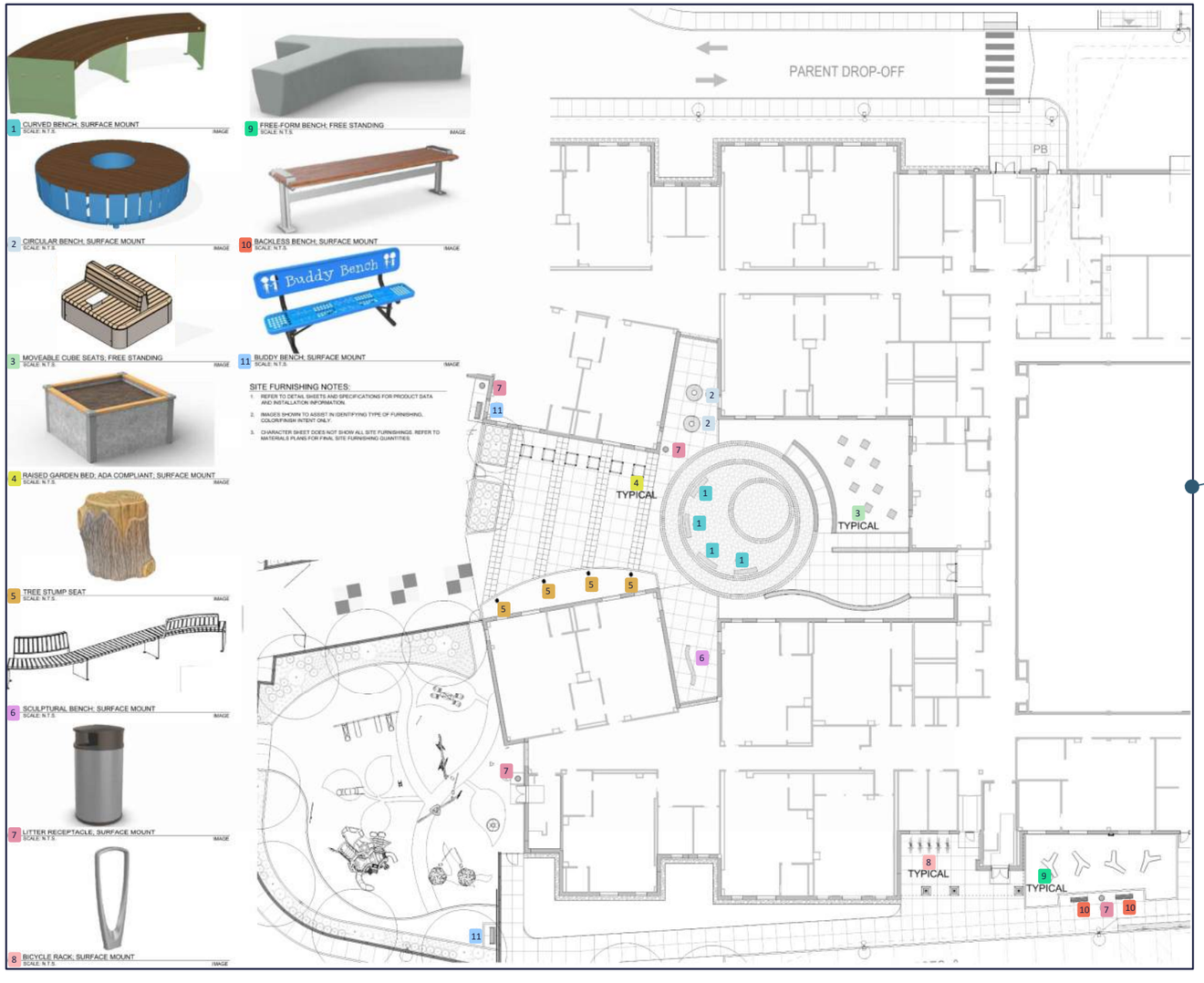
Design Updates



Site Plan Update



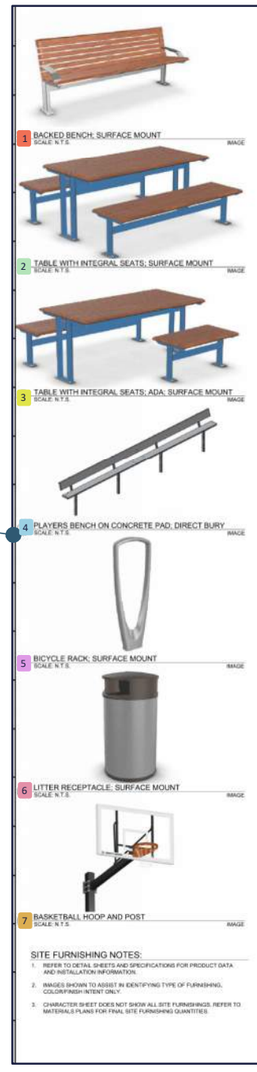
Site – Site Furnishings





Site – Site Furnishings







Site – Site Furnishings





PreK Playground





1 ACTIVE PLAY: STRUCTURES AND SWINGS





2 IMAGINATIVE PLAY





3 ACTIVE PLAY: TEAMWORK





K-2 Playground





1 ACTIVE PLAY: TEAMWORK





2 IMAGINATIVE AND INCLUSIVE PLAY



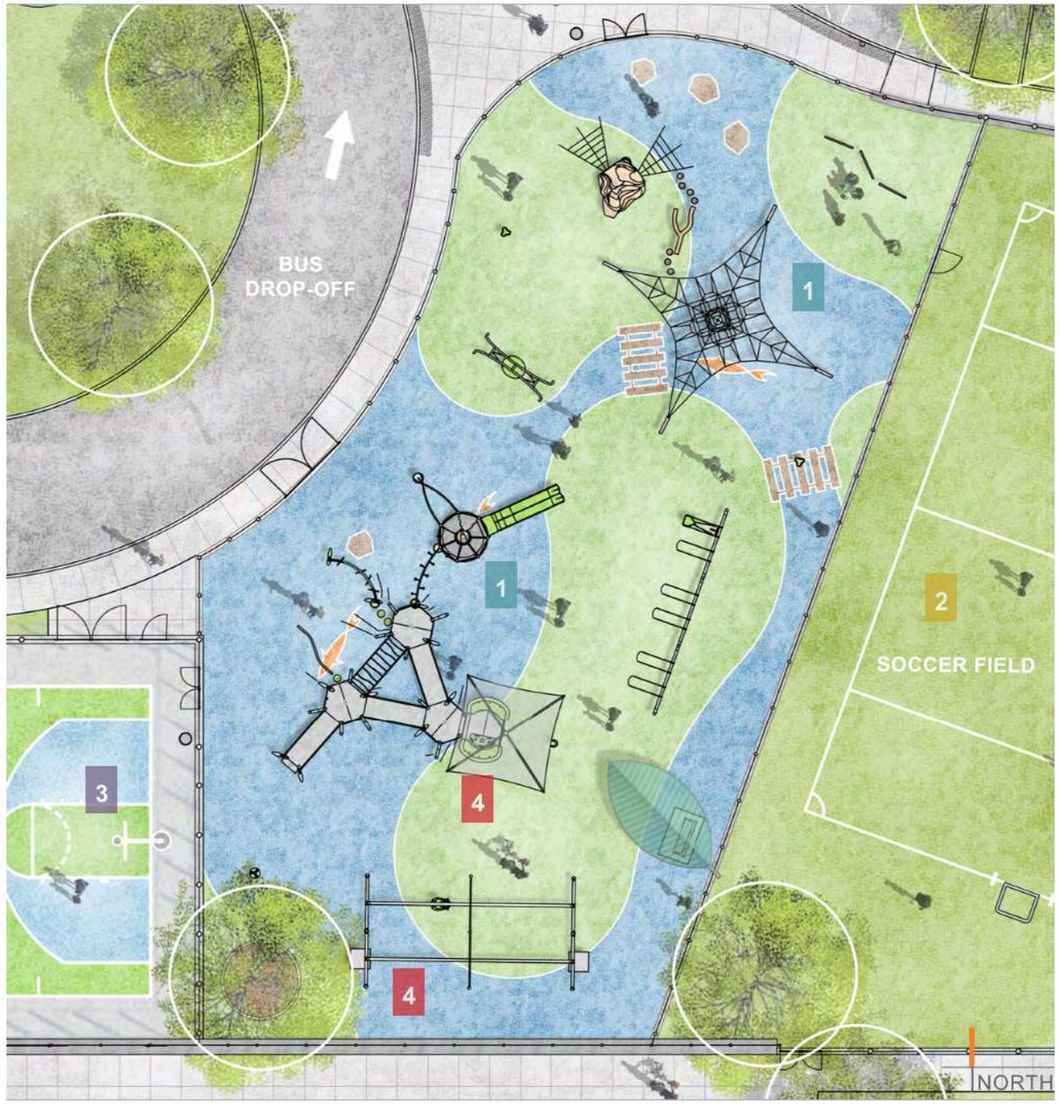


3 SPIN MOTION PLAY EQUIPMENT





Gr. 3-5 Playground





1 ACTIVE PLAY: CLIMBERS AND STRUCTURES





2 ACTIVE PLAY: OPEN FIELD



3 ACTIVE PLAY: HARD COURT



4 INCLUSIVE PLAY





Interiors Update

FLOORING

Terrazzo — cafeteria reduced to two patterns: a neutral field with a with a blue accent at circulation nodes
Linoleum — single field color across classrooms and public circulation; accent colors at strategic locations
Carpet Tile — herringbone pattern in library with color zones; zones; neutral tile in admin
Rubber — stairs, art, music rooms, calming rooms

WALLS, WAINSCOT & CEILINGS

Wainscot — wood in classroom wings; tile in main thoroughfares
Monumental stair — resin infill panels with stainless steel support and a wood top rail
Wood slat in cafeteria with acoustical backing
Wood plank in library ceiling and circulation areas with acoustical backing
Toilet rooms — full-height wall tile

COLOR & THEME IDENTITY

Neutral Palette — blue, yellow and green accents
Wayfinding — waterways, trees, animals

COUNTERS & SURFACES

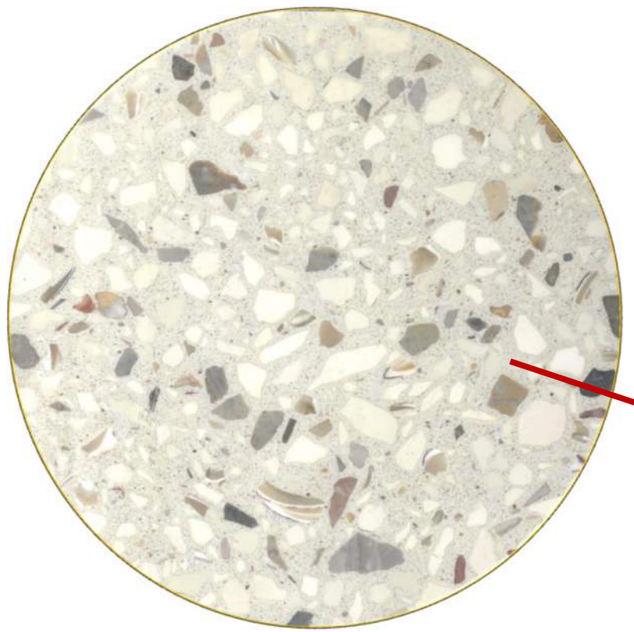
Solid surface at all counters with sinks
Solid surface at art and STE rooms
Plastic laminate at non-sink counters

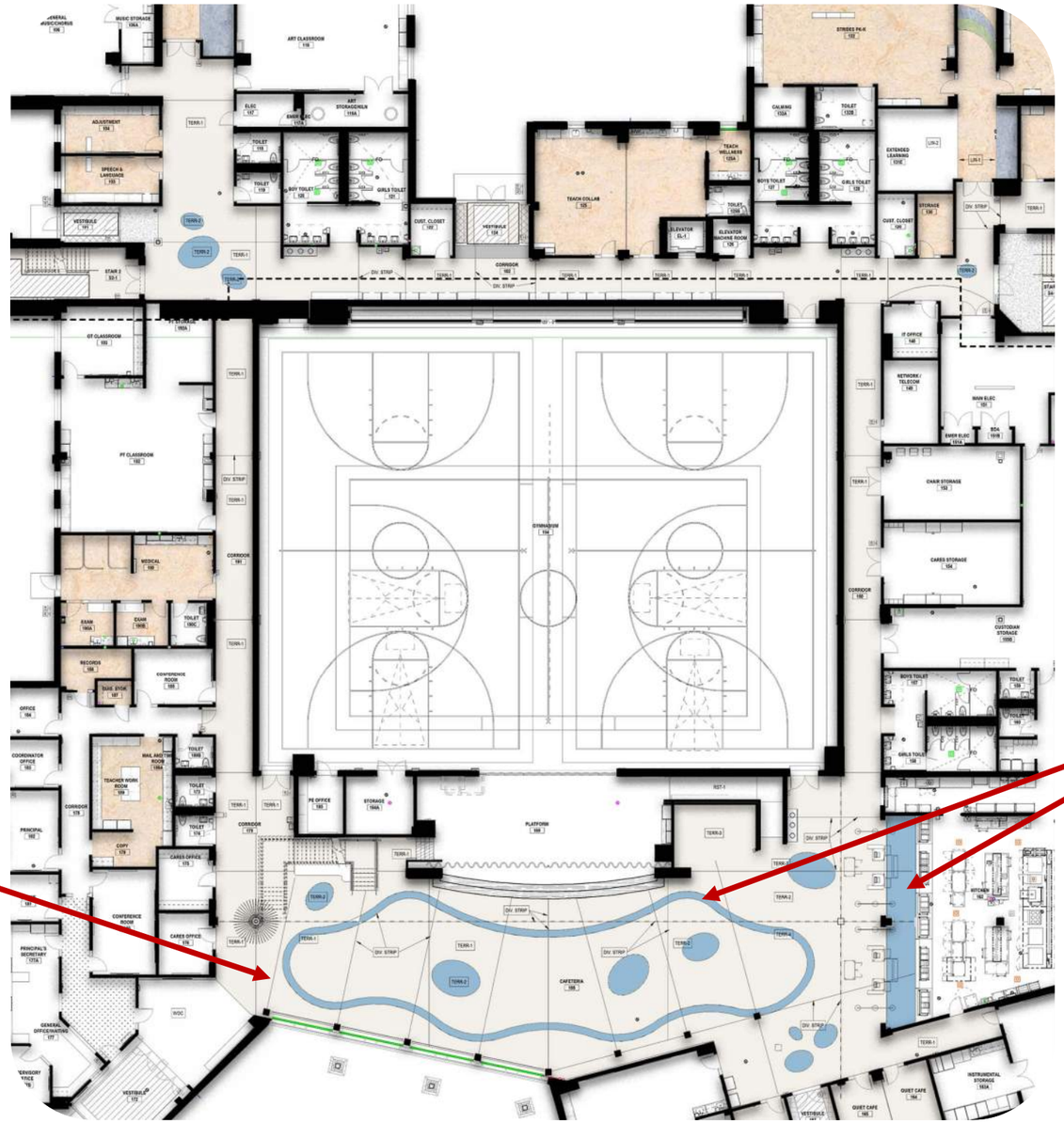
WINDOW TREATMENTS

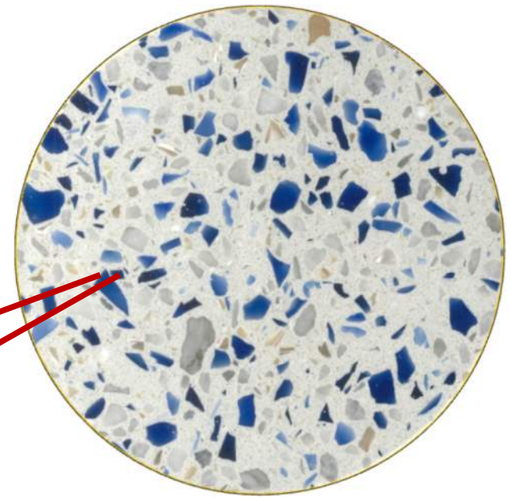
All exterior windows — dual manual shades (1% + blackout)
Cafeteria — motorized double roller (blackout + 1%)
Interior sidelights —manual shades 1%

Level 1: Terrazzo Flooring





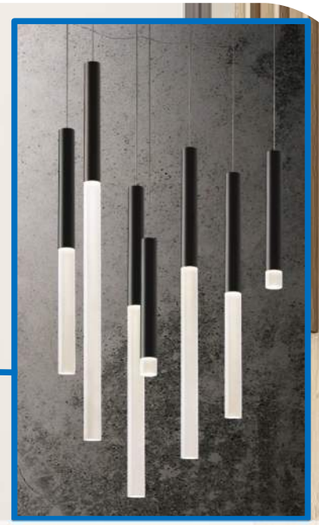




Cafeteria + Stair



Cafeteria + Stair

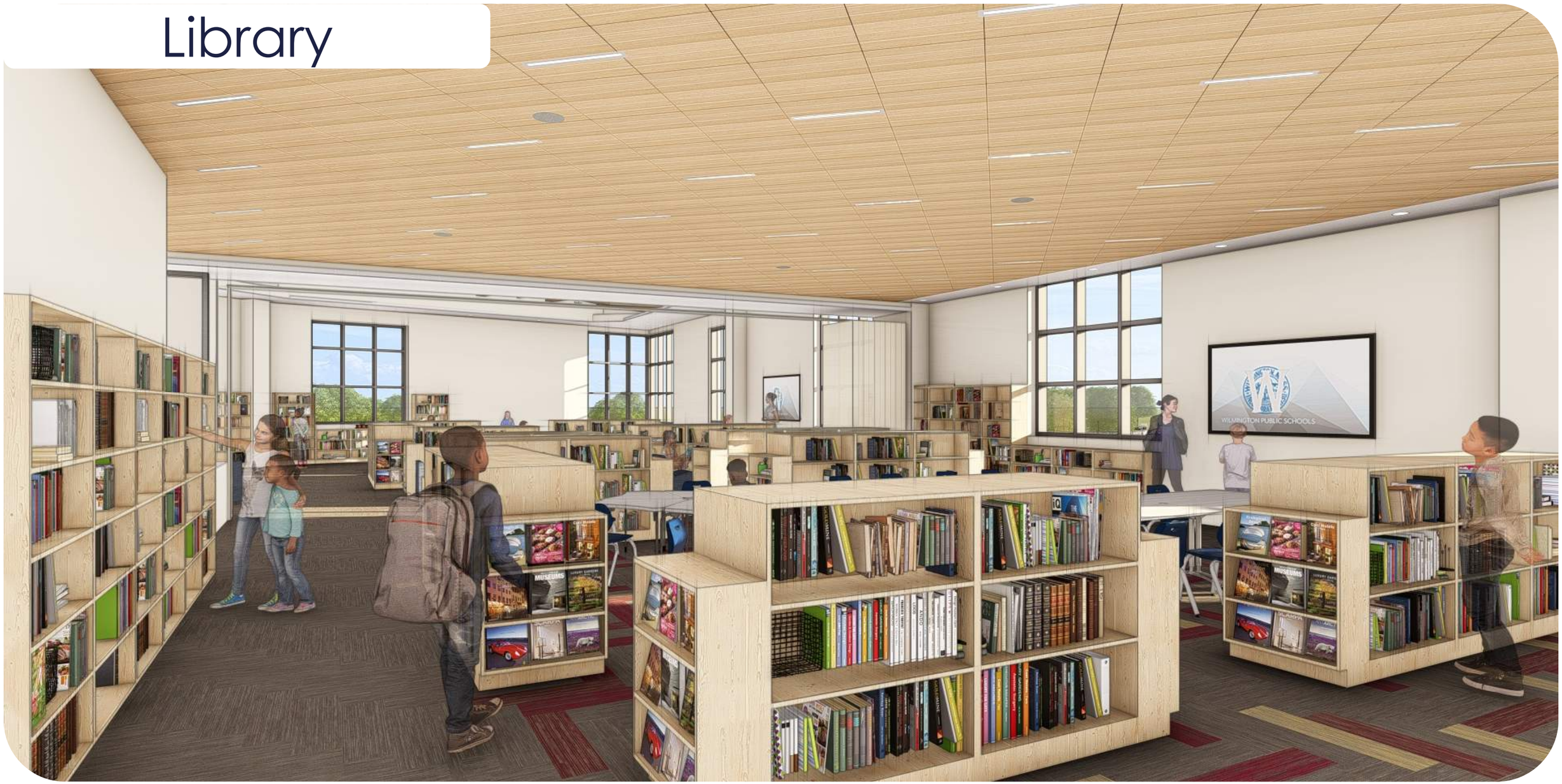


Cascading pendant lighting



Resin panel

Library



Interior Design Concept & Framework

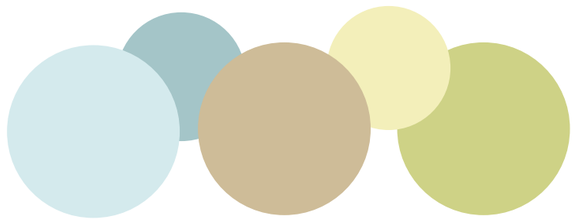
The school's vertical organization is inspired by the growth of a tree, mirroring a student's educational journey from a firm foundation to a broader perspective



Level 1:
Roots & Water







Pre K | General Classroom



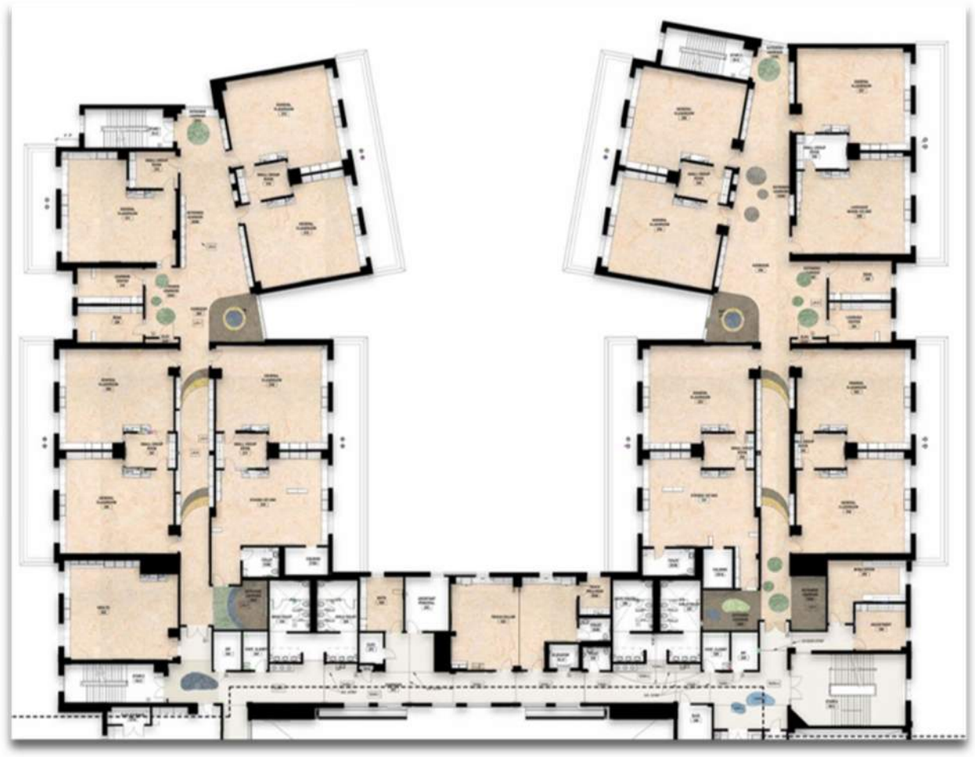


Interior Design Concept & Framework

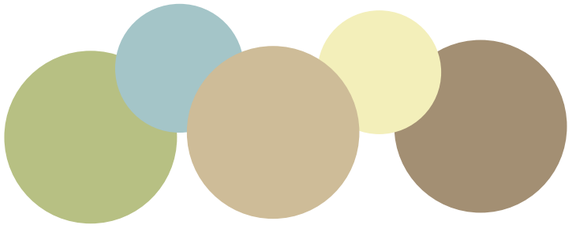
The school's vertical organization is inspired by the growth of a tree, mirroring a student's educational journey from a firm foundation to a broader perspective



Level 2:
Structure & Branching







2nd Floor | General Classroom



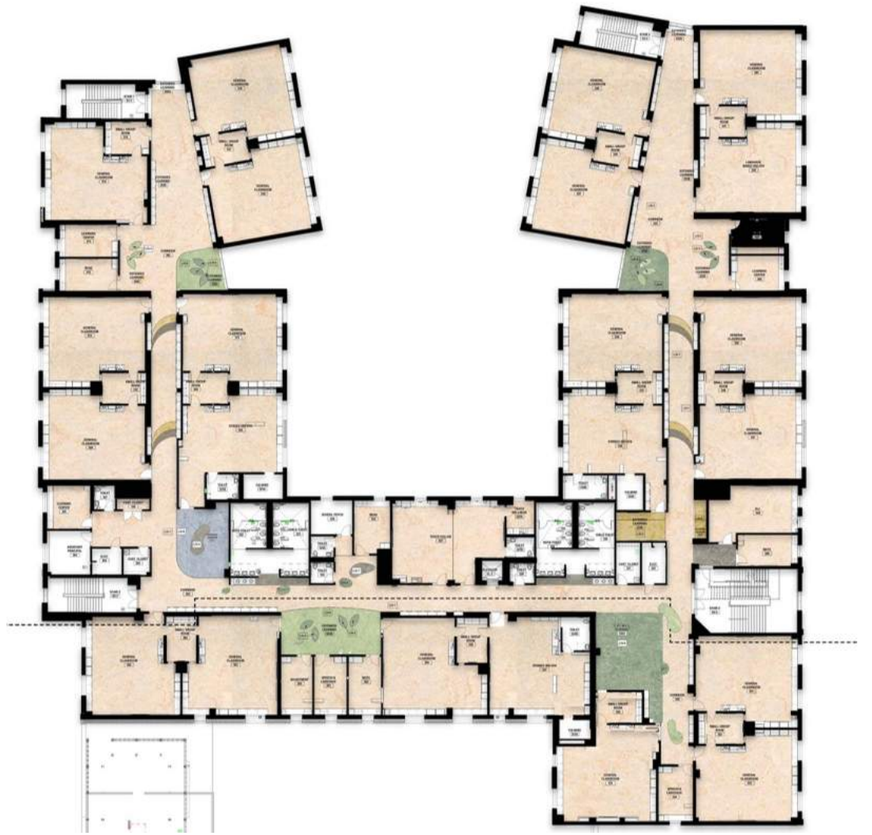


Interior Design Concept & Framework

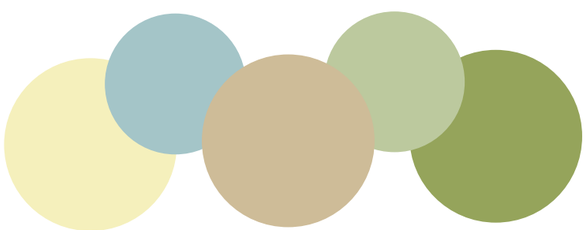
The school's vertical organization is inspired by the growth of a tree, mirroring a student's educational journey from a firm foundation to a broader perspective



Level 3:
Canopy & Outlook

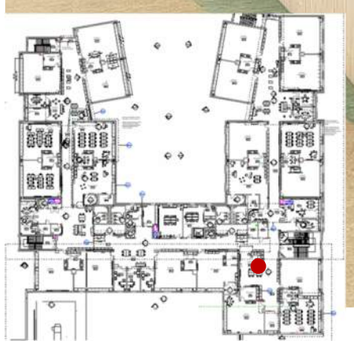






3rd Floor – Extended Learning Area













Construction Updates



Agenda

1. Call to Order
2. Approval of Minutes – June 16 and June 30, 2026 – Vote
3. Administrative:
    a. Total Project Budget Update
4. Design Update:
    a. Conservation Commission & Earth Removal Permit
    b. 60% Construction Documents MSBA Submission
    c. Letter of Recommendation #1 / CM Contract Amendment #2
    d. Site Design
    e. Interior Design
5. Construction Update
6. Public Engagement
7. Discussion/Correspondence/New Items
8. Committee Questions
9. Public Comments
10. Next Meeting Date and Time - Tuesday, August 18, 2026
11. Adjournment

Public Engagement



Discussion/ Correspondence/ New Items



Committee Questions



Public Comment



Upcoming Meetings



Upcoming WSBC Meetings

- Tuesday, **August 18th** at 6:30 p.m.
- Tuesday, **September 15th** at 6:30 p.m.



THANK YOU

Project Website

Construction Activities

Massachusetts School Building Authority

Left Field PROJECT MANAGEMENT

DORE + WHITTIER

FONTAINE

WILMINGTON PUBLIC SCHOOLS

Wildwood Early Childhood Center Project

School Building Committee Meeting #47

August 18, 2026

Massachusetts School Building Authority

Left Field

dw DORE & WHITTIER

FONTAINE



Agenda

1. Call to Order
2. Approval of Minutes – July 21, 2026 – Vote
3. Administrative:
    a. Invoice Summary - Vote
    b. Total Project Budget Update
4. Project Updates
    a. Soil Testing and Evaluation
    b. Unauthorized Testing
5. Design Updates
    a. Design Team Activities
6. Construction Update
7. Public Engagement
    a. Groundbreaking Event, Wednesday September 16, 2026
8. Discussion/Correspondence/New Items
9. Committee Questions
10. Public Comments
11. Next Meeting - Tuesday, September 15, 2026, at 6:30 PM
12. Adjournment - Vote

Approval of Minutes



Approve Meeting Minutes – July 21, 2026



LeftField

THE RIGHT CHOICE IN PROJECT MANAGEMENT

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #46

Tuesday, July 21, 2026 | In-person | 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan
Gregory B. Bendel
Kate Bissell
Kevin A. Caira
Michael Camoscio
Justin Cusce
Marianne Gallezzo
Nicholas Golden
Christine Holloran
Dennis Kelley
Lilia Maselli
Paul J. Melaragni
Craig P. Miner
Christine Murray
Judith L. O'Connell, Chair
Matthew P. Poska*
Christine Prendergast
David A. Ragsdale
Stacy Scott
R. Eric Slagle
Stephen Turner
Vivian Varbedian, Vice Chair

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	X	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell	Remote	Wildwood School, Principal
Kevin A. Caira	X	Select Board
Michael Camoscio	Remote, partial	Permanent Building Committee
Justin Cusce		
Marianne Gallezzo		Finance Committee
Nicholas Golden	Remote, partial	School Committee
Christine Holloran		Wildwood School, Teacher
Dennis Kelley		Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni		Permanent Building Committee
Craig P. Miner	X	
Christine Murray	X	
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Matthew P. Poska*	X	Superintendent of Schools

DRAFT

Wildwood School Building Committee Meeting Minutes
Page 1 of 10

Administrative



Invoice Summary #30

Wildwood Elementary School (Wilmington)

MSBA Data Entry Sheet

Date 8/12/2026

Period Ending: 7/31/2026

MSBA Reimbursement Package #: ***Invoice Summary #30***

Invoice #	*Invoice Date*	*Vendor*	*Cost Code*	*Value*	
36	7/31/2026	Dore & Whittier - Construction Documents	0201 0500	$596,602.26	
			Subtotal:	**$596,602.26**	Invoice Total $596,602.26
App #11	7/31/2026	Fontaine Bros., Inc. - Preconstruction Services	0501 0000	$26,666.00	
			Subtotal:	**$26,666.00**	Invoice Total $26,666.00
177857	6/11/2026	Minutemen Press - Printing Services	0199 0000	$355.39	
			Subtotal:	**$355.39**	Invoice Total $355.39
23671	8/1/2026	Projectdog Inc. - Electronic Bidding - Prequal of Trades	0103 0000	$295.00	
			Subtotal:	**$295.00**	Invoice Total $295.00
39881	7/31/2026	DM Berg - Structural Peer Review - 60% CD's	0199 0000	$3,600.00	
			Subtotal:	**$3,600.00**	Invoice Total $3,600.00
196289	7/31/2026	Leftfield - OPM Services - Construction Contract Docs	0102 0400	$75,000.00	
196289	7/31/2026	Leftfield - OPM Services - Bidding	0102 0600	$25,000.00	
196289	7/31/2026	Leftfield - OPM Services - Construction Administration	0102 0700	$50,000.00	
			Subtotal:	**$150,000.00**	Invoice Total $150,000.00
			Total of Invoices Submitted	$777,518.65	

Total Project Budget – Detail

Wildwood Elementary School - BUDGET TRACKING

MSBA ID: 202003420015
Wildwood Elementary School
Project Director / Manager: David Salindon / Craig DiCarlo
Period Ending 7/31/2026
MSBA Reimbursement Package 36

Current Budget

LeftField
THE RIGHT DECISION IS BUDGET MANAGEMENT

		PFA Budget [A]	Budget Changes [B]	Rev. PFA Budget [C]	Committed Costs [D]	Expended [E]	Unspent [F]=[D]-[E]	Remaining Budget [G]=[C]-[D]	% Complete [H]=[E]/[J]	CTC [I]	Anticipated C @ C [J]=[D]+[I]	Variance (Under) / Over [K]=[C]-[J]
0000 0000	**FEASIBILITY STUDY AGREEMENT**	**$1,215,000**	**$0**	**$1,215,000**	**$1,205,180**	**$1,189,117**	**$16,063**	**$9,820**		**($5,528)**	**$1,199,652**	**($15,348)**
0001 0000	OPM Feasibility Study (SMMA)	$200,000	($50,000)	$150,000	$150,000	$150,000	$0	$0	100%	$0	$150,000	$0
0002 0000	A&E Feasibility Study (Dore & Whittier)	$900,000	$53,920	$853,920	$853,920	$853,920	$0	$0	100%	$0	$853,920	$0
0003 0000	Environmental & Site (Subconsultants)	$100,000	$45,076	$145,076	$145,076	$129,013	$16,063	$0	89%	($5,528)	$139,548	($5,528)
0004 0000	Other	$115,000	($48,996)	$66,004	$56,184	$56,184	$0	$9,820	100%	$0	$56,184	($9,820)
0100 0000	**ADMINISTRATION**	**$5,520,000**	**($0)**	**$5,520,000**	**$4,791,019**	**$834,619**	**$3,956,400**	**$728,980**		**$728,980**	**$5,520,000**	**$0**
0100 9999	Adjustment	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0101 0000	Legal Fees	$100,000	$0	$100,000	$0	$0	$0	$100,000		$100,000	$100,000	$0
0102 0000	Owner's Project Manager (Leftfield)											
0102 0400	Design Development	$400,000	$0	$400,000	$400,000	$400,000	$0	$0	100%	$0	$400,000	$0
0102 0500	Construction Contract Docs	$600,000	$0	$600,000	$600,000	$300,000	$300,000	$0	50%	$0	$600,000	$0
0102 0600	Bidding	$250,000	$0	$250,000	$250,000	$75,000	$175,000	$0	30%	$0	$250,000	$0
0102 0700	Construction Contract Administration	$3,170,000	$80,000	$3,250,000	$3,250,000	$50,000	$3,200,000	$0	2%	$0	$3,250,000	$0
0102 0800	Closeout	$140,000	$80,000	$220,000	$220,000	$0	$220,000	$0	0%	$0	$220,000	$0
0102 0900	Extra Services	$140,000	($140,000)	$0	$0	$0	$0	$0		$0	$0	$0
0102 1000	Reimbursable & Other Services	$80,000	($20,000)	$60,000	$60,000	$0	$60,000	$0	0%	$0	$60,000	$0
0103 0000	Advertising	$20,000	$0	$20,000	$890	$890	$0	$19,110	100%	$19,110	$20,000	$0
0104 0000	Permitting Fees	$120,000	$0	$120,000	$0	$0	$0	$120,000		$120,000	$120,000	$0
0105 0000	Owner's Insurance	$300,000	$0	$300,000	$0	$0	$0	$300,000		$300,000	$300,000	$0
0199 0000	Other Administrative Costs	$200,000	($10,130)	$189,870	$0	$0	$0	$189,870		$189,870	$189,870	$0
0199 0000	Printing (Minuteman Press)	$0	$5,129	$5,129	$5,129	$5,129	$0	$0	100%	$0	$5,129	$0
0199 0000	Structural Peer Review (DM Berg)	$0	$5,000	$5,000	$5,000	$3,600	$1,400	$0	72%	$0	$5,000	$0
0200 0000	**ARCHITECTURE & ENGINEERING**	**$15,141,622**	**($240,000)**	**$14,901,622**	**$14,901,622**	**$6,651,220**	**$8,250,402**	**$0**		**$3**	**$14,901,625**	**$3**
0200 9999	Adjustment	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0201 0000	Basic Services (Dore & Whittier)											
0201 0400	Design Development	$3,409,156	$0	$3,409,156	$3,409,156	$3,409,156	$0	$0	100%	$0	$3,409,156	$0
0201 0500	Construction Contract Documents	$4,772,818	$0	$4,772,818	$4,772,818	$2,983,011	$1,789,807	$0	63%	$0	$4,772,818	$0
0201 0600	Bidding	$681,831	$0	$681,831	$681,831	$0	$681,831	$0	0%	$0	$681,831	$0
0201 0700	Construction Contract Administration	$4,090,986	$0	$4,090,986	$4,090,986	$0	$4,090,986	$0	0%	$0	$4,090,986	$0
0201 0800	Closeout	$681,831	$0	$681,831	$681,831	$0	$681,831	$0	0%	$0	$681,831	$0
0201 9900	Other Basic Services	$175,000	($175,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 0000	Reimbursable and Other Services (Dore & Whittier)											
0203 0100	Construction Testing	$25,000	($25,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 0200	Printing (over minimum)	$40,000	($40,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 9900	Other Reimbursable Costs	$630,000	($501,729)	$128,271	$128,271	$0	$128,271	$0	0%	$0	$128,271	$0
0203 9900	Acoustic Verification	$0	$8,600	$8,600	$8,600	$0	$8,600	$0	0%	$0	$8,600	$0
0203 9900	Permitting (Terrain)	$0	$19,800	$19,800	$19,800	$16,638	$3,162	$0	84%	$0	$19,800	$0
0203 9900	Standard Energy Modeling (GGD)	$0	$13,750	$13,750	$13,750	$0	$13,750	$0	0%	$0	$13,750	$0
0203 9900	Enhanced Energy Modeling /TEDI (TGE)	$0	$29,150	$29,150	$29,150	$22,000	$7,150	$0	75%	$0	$29,150	$0
0203 9900	Automation (IDS)	$0	$61,600	$61,600	$61,600	$0	$61,600	$0	0%	$0	$61,600	$0
0203 9900	FF&E Procurement	$0	$216,810	$216,810	$216,810	$0	$216,810	$0	0%	$0	$216,810	$0
0203 9900	Technology Procurement	$0	$162,140	$162,140	$162,140	$0	$162,140	$0	0%	$0	$162,140	$0
0203 9900	Irrigation (Terrain)	$0	$43,560	$43,560	$43,560	$30,432	$13,129	$0	70%	$0	$43,560	$0
0203 9900	Hydrant Flow Test	$0	$2,695	$2,695	$2,695	$2,695	$0	$0	100%	$0	$2,695	$0
0203 9900	CDW NOI Permitting (Amend #6)	$0	$14,960	$14,960	$14,960	$11,220	$3,740	$0	75%	$0	$14,960	$0
0203 9900	Emissions Sampling (Nitsch/UEC) (Amend #5)	$0	$3,740	$3,740	$3,740	$1,980	$1,760	$0	53%	$0	$3,740	$0
0203 9900	Terrain/D&W Temp Playground Fence (Amend #7)	$0	$2,750	$2,750	$2,750	$0	$2,750	$0	0%	$1	$2,751	$1
0203 9900	CDW NOI Permitting (Amend #7)	$0	$7,150	$7,150	$7,150	$0	$7,150	$0	0%	$2	$7,152	$2
0204 0000	Sub-Consultants											

Total Project Budget – Detail

Wildwood Elementary School - BUDGET TRACKING

MSBA ID: 202003420015
Wildwood Elementary School
Project Director / Manager: David Salmon / Craig DiCarlo

Period Ending 7/31/2025
MSBA Reimbursement Package 30

Current Budget

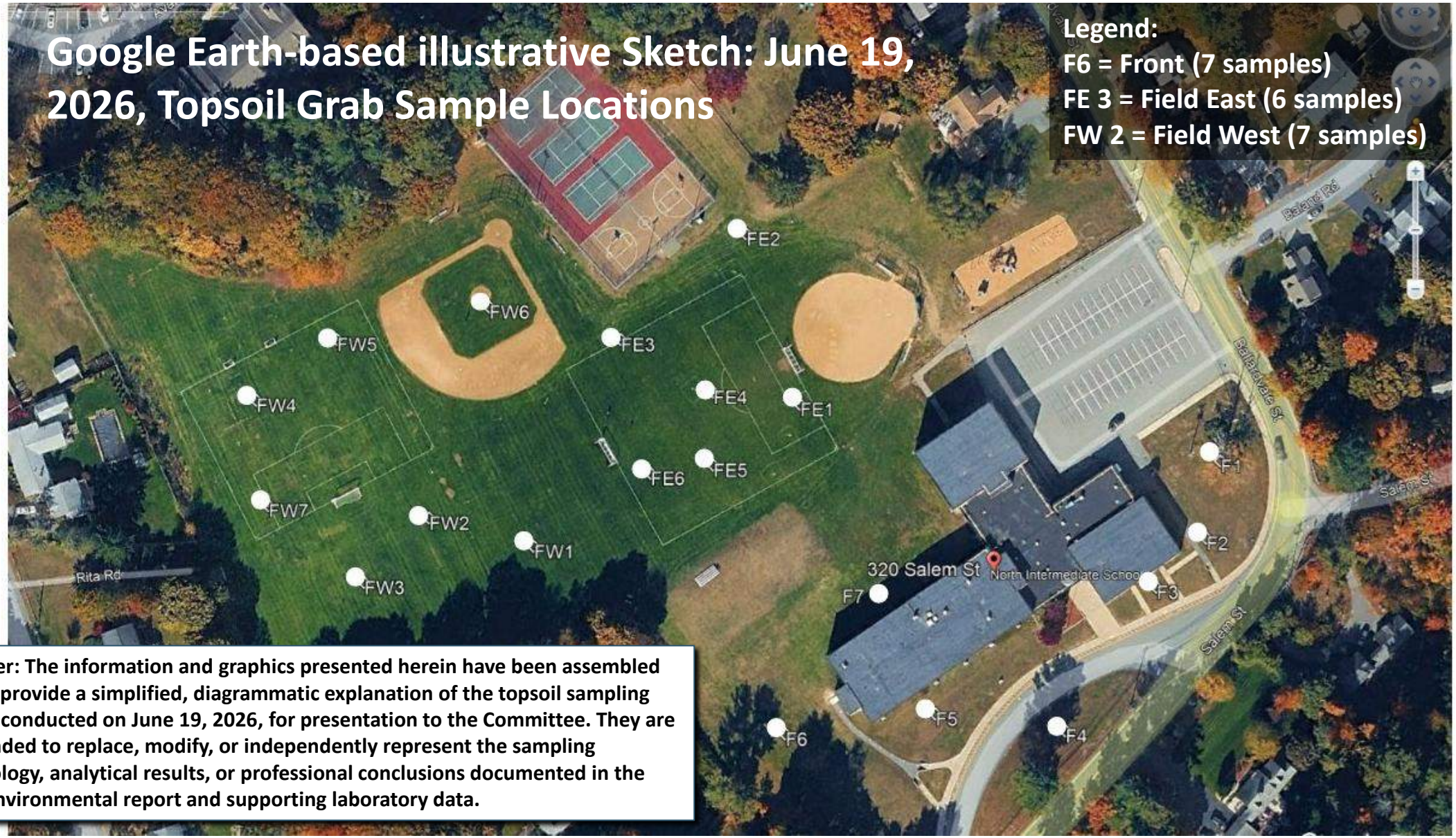
LeftField
THE RIGHT ORDER IS BUDGET MANAGEMENT

		PFA Budget [A]	Budget Changes [B]	Rev. PFA Budget [C]	Committed Costs [D]	Expended [E]	Unspent [F]=[D]-[E]	Remaining Budget [G]=[C]-[D]	% Complete (earned value/rev.) [H]=[E]/[J]	CTC (based on plan) [I]	Anticipated C @ C [J]=[D]+[I]	Variance (Under) / Over [K]=[C]-[J]
0204 0200	Hazardous Materials (survey,reporting and monitoring) (UEC)	$300,000	($116,300)	$183,700	$183,700	$24,200	$159,500	$0	13%	$0	$183,700	$0
0204 0300	GeoTechnical & Geo-Environmental	$250,000	($250,000)	$0	$0	$0	$0	$0		$0	$0	$0
0204 0300	GeoTechnical (LGCI)	$0	$194,585	$194,585	$194,585	$79,907	$114,678	$1	41%	$1	$194,585	$0
0204 0300	GeoEnvironmental (PEER)	$0	$122,039	$122,039	$122,040	$23,232	$98,808	($1)	19%	($1)	$122,039	$0
0204 0300	Additional Soils Testing	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 0400	Site Survey	$25,000	($25,000)	$0	$0	$0	$0	$0		$0	$0	$0
0204 0400	Site Survey (CR markers)	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 0500	Wetlands (certified plot plan, subsurface utility investigation)	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 1200	Traffic Studies (Nitsch)	$60,000	($8,300)	$51,700	$51,700	$46,750	$4,950	$0	90%	$0	$51,700	$0
0500 0000	**CONSTRUCTION CONTRACT**	**$138,063,666**	**$0**	**$138,063,666**	**$26,137,408**	**$266,660**	**$25,870,748**	**$111,926,258**		**$111,926,258**	**$138,063,666**	**$0**
0501 0000	Pre-Construction Services (Fontaine)	$320,000	$0	$320,000	$320,000	$266,660	$53,340	$0	83%	$0	$320,000	$0
0502 0000	Construction											
0502 0000	Construction Budget	$137,743,666	($25,817,408)	$111,926,258	$0	$0	$0	$111,926,258		$111,926,258	$111,926,258	$0
0502 0010	GMP - Fee	$0	$2,720,000	$2,720,000	$2,720,000	$0	$2,720,000	$0	0%	$0	$2,720,000	$0
0502 0020	GMP - Insurance (Builder's Risk, CCIP, GL, Surety Bonds)	$0	$187,000	$187,000	$187,000	$0	$187,000	$0	0%	$0	$187,000	$0
0502 0030	CM Contingency	$0	$265,250	$265,250	$265,250	$0	$265,250	$0	0%	$0	$265,250	$0
0502 0100	Division 1 - General Conditions	$0	$8,495,529	$8,495,529	$8,495,529	$0	$8,495,529	$0	0%	$0	$8,495,529	$0
0502 0100	Division 1 - General Requirements	$0	$784,629	$784,629	$784,629	$0	$784,629	$0	0%	$0	$784,629	$0
0502 3100	Division 31 - Earthwork	$0	$13,365,000	$13,365,000	$13,365,000	$0	$13,365,000	$0	0%	$0	$13,365,000	$0
0502 9900	Retainage	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0508 0000	Change Orders	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0600 0000	**MISCELLANEOUS PROJECT COSTS**	**$1,050,000**	**$0**	**$1,050,000**	**$250,000**	**$0**	**$250,000**	**$800,000**		**$800,000**	**$1,050,000**	**$0**
0601 0000	Utility Company Fees	$200,000	$0	$200,000	$0	$0	$0	$200,000		$200,000	$200,000	$0
0602 0000	Testing Services	$500,000	$0	$500,000	$250,000	$0	$250,000	$250,000	0%	$250,000	$500,000	$0
0603 0000	Swing Space/Modulars	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0699 0000	Other Project Costs (Moving, etc.)	$350,000	$0	$350,000	$0	$0	$0	$350,000		$350,000	$350,000	$0
0700 0000	**FURNISHINGS & EQUIPMENT**	**$3,322,000**	**$0**	**$3,322,000**	**$0**	**$0**	**$0**	**$3,322,000**		**$3,322,000**	**$3,322,000**	**$0**
0701 0000	Furnishings & Equipment (FF+E)	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0703 0000	Technology	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0800 0000	**OWNER'S CONTINGENCY**	**$8,953,338**	**$240,000**	**$9,193,338**	**$0**	**$0**	**$0**	**$9,193,338**		**$9,208,686**	**$9,208,686**	**$15,348**
0801 0000	Owner's Contingency (soft)	$2,066,155	$240,000	$2,306,155	$0	$0	$0	$2,306,155		$2,321,503	$2,321,503	$15,348
0507 0000	Owner's Construction Contingency (hard)	$6,887,183	$0	$6,887,183	$0	$0	$0	$6,887,183		$6,887,183	$6,887,183	$0
	PROJECT TOTALS (MSBA PFA)	**$173,265,626**	**($0)**	**$173,265,626**	**$47,285,229**	**$8,941,616**	**$38,343,613**	**$125,980,397**		**$125,980,399**	**$173,265,629**	**$3**

Project Updates



Topsoil Sampling Program – Map



Disclaimer: The information and graphics presented herein have been assembled solely to provide a simplified, diagrammatic explanation of the topsoil sampling program conducted on June 19, 2026, for presentation to the Committee. They are not intended to replace, modify, or independently represent the sampling methodology, analytical results, or professional conclusions documented in the formal environmental report and supporting laboratory data.

Topsoil Sampling Program – Summary

Disclaimer: The information and graphics presented herein have been assembled solely to provide a simplified, diagrammatic explanation of the topsoil sampling program conducted on June 19, 2026, for presentation to the Committee. They are not intended to replace, modify, or independently represent the sampling methodology, analytical results, or professional conclusions documented in the formal environmental report and supporting laboratory data.

1 DEPTH-SPECIFIC COLLECTION

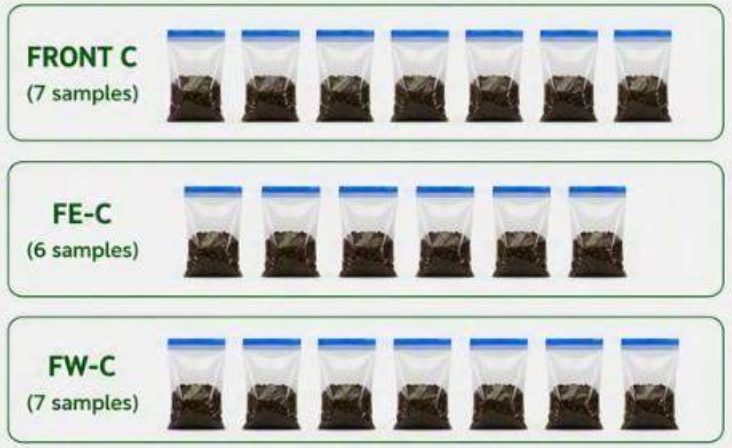
Topsoil was collected to 12 inches below the ground using a Dutch auger.



✓ The auger was decontaminated after each sampling location.

2 GRAB SAMPLES COLLECTED ACROSS THE SITE

20 topsoil samples were collected on the subject property in areas proposed for new construction, and in areas surrounding the existing school building.



20 grab samples (each in a resealable plastic bag)

✓ Samples were placed in clean resealable plastic bags in the field.

3 SAMPLE CONSOLIDATION

Representative aliquots from each individual plastic bag were composited into a larger plastic bag based on the 3 distinct sampling locations.



3 composite samples
(one for each sampling location)

RESULTS SUMMARY

Parameter	Max Detected Level (in mg/kg)	MCP RCS-1 (Reportable Concentration)	Result
Hexavalent Chromium (Cr VI)	NOT DETECTED (ND)	100 mg/kg	NOT DETECTED (ND)
Trivalent Chromium (Cr III)	374 mg/kg	1,000 mg/kg	✓ Below Limit

Design Updates



SCHEMATIC DESIGN → 100% CD

Design team scope progress at 90% CD

SCHEMATIC DESIGN | DESIGN DEVELOPMENT | 60% CD · ERP 1 | 90% CD · ERP 2 | BID SET · 100% CD

01

Drawings & Schedules

Floor plans, RCPs, and roof plan

Enlarged plans for cores, restrooms, kitchens

Wall types and door/window schedules

Interior elevations and millwork sections

Typical details

02

Specifications

Refine three-part sections

Schedule and product substitutions

Lighting and plumbing fixture cut sheets

FF&E, signage, and proprietary specs *-under review*

03

Coordination

Structural and MEP clash review

Code, egress, and accessibility clearances

Consultant set cross-referencing

Internal QA/QC redlines

Construction administration for ERP 1

04

Owner review

Cx, OPM, CM and Owner comments from the 60% set

Permitting sets and municipal pre-submittal

DEP appeal

Plan-check and zoning compliance

ERP 2 issued

05

MSBA submission

Assembling 90% CD submission package

Confirming program and space summary

Reconciling cost estimate

Checking area conformance

Review of MSBA comments

90% CD Issue date — 08 / 14 / 26

Next milestone — 100% CD

Construction Updates



Construction Update

Recent and Ongoing Construction Activities Onsite:

- Installation of the site fence - COMPLETE
- Installation of the erosion control measures – COMPLETE
- Required meeting with Conservation Agent and DPW was held on 8/7/26 and all pre-construction conditions were satisfied – COMPLETE
- Delivery and installation of the two jobsite trailers – COMPLETE
- Final preparation of the construction entrance anticipated complete the week of 8/17-8/21/26
- Contractor parking area work start the week of 8/17-8/21/26
- Dust and vibration monitoring equipment is installed in the Phase 1 locations and be activated the week of 8/17-8/21/26

Agenda

1. Call to Order
2. Approval of Minutes – July 21, 2026 – Vote
3. Administrative:
    a. Invoice Summary - Vote
    b. Total Project Budget Update
4. Project Updates
    a. Soil Testing and Evaluation
    b. Unauthorized Testing
5. Design Updates
    a. Design Team Activities
6. Construction Update
7. **Public Engagement**
    a. **Groundbreaking Event, Wednesday September 16, 2026**
8. **Discussion/Correspondence/New Items**
9. **Committee Questions**
10. **Public Comments**
11. **Next Meeting - Tuesday, September 15, 2026, at 6:30 PM**
12. **Adjournment - Vote**

Public Engagement



Discussion/ Correspondence/ New Items



Committee Questions



Public Comment



Upcoming Meetings



Upcoming WSBC Meetings

- Tuesday, **September 15th** at 6:30 PM
- Tuesday, **October 20th** at 6:30 PM
- Tuesday, **November 17th** at 6:30 PM



THANK YOU

Project Website

Construction Activities

Massachusetts School Building Authority

Left Field PROJECT MANAGEMENT

DORE + WHITTIER

FONTAINE

WILMINGTON PUBLIC SCHOOLS

Wildwood Early Childhood Center Project

School Building Committee Meeting #48

September 15, 2026

Massachusetts School Building Authority

Left Field

DORE + WHITTIER

FONTAINE



Agenda

1. Call to Order
2. Approval of Minutes – August 18, 2026 – Vote
3. Administrative Report
    a. Invoice Summary - Vote
    b. Total Project Budget Update
4. Design Report
    a. 90% CD Submission to the MSBA & Reconciled Cost Estimate – Vote
5. Construction Report
    a. General Construction Update
6. Public Engagement
    a. Groundbreaking Event, Wednesday September 16, 2026
7. Discussion/Correspondence/New Items
8. Committee Questions
9. Public Comments
10. Next Meeting - Tuesday, October 20, 2026, at 6:30 PM
11. Adjournment - Vote

Approval of Minutes



Approve Meeting Minutes – August 18, 2026



LeftField
THE RIGHT CHOICE IN PROJECT MANAGEMENT

WILDWOOD ELEMENTARY SCHOOL PROJECT – Wilmington, MA

SCHOOL BUILDING COMMITTEE MEETING #47

Tuesday, August 18, 2026 In-person 6:30pm

Wilmington Town Hall
146 Middlesex Ave, Wilmington, MA
Great Hall, Room 101

Committee Members

Diane M. Allan	Justin Cusce	Paul J. Melaragni	David A. Ragsdale
Gregory B. Bendel	Marianne Gallezzo	Craig P. Miner	Stacey Scott
Kate Bissell	Nicholas Golden	Christine Murray	R. Eric Slagle
Kevin A. Caira	Christine Holloran	Judith L. O'Connell, Chair	Stephen Turner
Michael Camoscio	Dennis Kelley	Matthew P. Poska*	Vivian Varbedian, Vice Chair
	Lilia Maselli	Christine Prendergast	Christine Bourne*

Meeting Minutes

A publicly posted meeting of the Wildwood School Building Committee was held at the above listed date, time, and location. Committee members and other participants were:

Voting Members (Quorum = 12)	Present	Notes
Diane M. Allan	X	Permanent Building Committee
Gregory B. Bendel	Remote	
Kate Bissell		Wildwood School, Principal
Christine Bourne*	X	School Department – Director of Finance
Kevin A. Caira	Remote	Select Board
Michael Camoscio		Permanent Building Committee
Justin Cusce	X	
Marianne Gallezzo	Remote	Finance Committee
Nicholas Golden	X	School Committee
Christine Holloran	Remote	Wildwood School, Teacher
Dennis Kelley	X	Town of Wilmington, Supt. of Public Buildings, Permanent Building Committee
Lilia Maselli	Remote	Select Board
Paul J. Melaragni	X	Permanent Building Committee
Craig P. Miner	X	
Christine Murray		
Judith L. O'Connell, Chair	X	Town of Wilmington, Asst. Town Manager
Matthew P. Poska*	X	Superintendent of Schools

Wildwood School Building Committee Meeting Minutes
Page **1** of **9**

DRAFT

Administrative



Invoice Summary #31

Wildwood Elementary School (Wilmington)

MSBA Data Entry Sheet

Date 9/9/2026

Period Ending: 8/31/2026

MSBA Reimbursement Package #: ***Invoice Summary #31***

Invoice #	*Invoice Date*	*Vendor*	*Cost Code*	*Value*	
37	8/31/2026	Dore & Whittier - Construction Documents	0201 0500	$596,602.26	
37	8/31/2026	Dore & Whittier - Geotechnical (LGCI)	0204 0300	$1,082.62	
37	8/31/2026	Dore & Whittier - GeoEnvironmental (PEER)	0204 0300	$13,387.51	
37	8/31/2026	Dore & Whittier - Permitting (Terraink)	0203 9900	$2,041.88	
37	8/31/2026	Dore & Whittier - Automation (IDS)	0203 9900	$14,300.00	
37	8/31/2026	Dore & Whittier - Permitting (CDW)	0203 9900	$3,740.00	
37	8/31/2026	Dore & Whittier - Mass DEP Appeal (PEER/CDW)	0203 9900	$16,696.65	
			Subtotal:	**$647,850.92**	Invoice Total $647,850.92
App #12	8/31/2026	Fontaine Bros., Inc. - Preconstruction Services	0501 0000	$26,666.00	
App #12	8/31/2026	Fontaine Bros., Inc. - CM Fee	0502 0010	$87,742.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Insurance - Bonds	0502 0020	$945,200.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Insurance - Builders Risk	0502 0020	$261,938.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Insurance - General Liability	0502 0020	$1,489,200.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Insurance - Polution	0502 0020	$65,800.00	
App #12	8/31/2026	Fontaine Bros., Inc. - General Conditions	0502 0100	$184,948.00	
App #12	8/31/2026	Fontaine Bros., Inc. - General Requirements	0502 0100	$41,276.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Sitework	0502 3100	$557,875.00	
App #12	8/31/2026	Fontaine Bros., Inc. - Retainage	0502 9900	-$18,543.75	
			Subtotal:	**$3,642,101.25**	Invoice Total $3,642,101.25
23701	8/30/2026	Projectdog Inc. - Electronic Bidding - Prequal of Trades - Early Release Package	0103 0000	$595.00	
23719	8/31/2026	Projectdog Inc. - Electronic Bidding - Prequal of Trades - Early Release Package	0103 0000	$295.00	
			Subtotal:	**$890.00**	Invoice Total $890.00
198608	8/31/2026	Leftfield - OPM Services - Construction Contract Docs	0102 0500	$75,000.00	
198608	8/31/2026	Leftfield - OPM Services - Bidding	0102 0600	$25,000.00	
198608	8/31/2026	Leftfield - OPM Services - Construction Administration	0102 0700	$50,000.00	
			Subtotal:	**$150,000.00**	Invoice Total $150,000.00
			Total of Invoices Submitted	**$4,440,842.17**	

Total Project Budget – Detail

Wildwood Elementary School - BUDGET TRACKING

MSBA ID: 202003420015
Wildwood Elementary School
Project Director / Manager: David Saindon / Craig DiCarlo
Period Ending 8/31/2026
MSBA Reimbursement Package 31

LeftField
THE RIGHT CHOICE IS PROJECT MANAGEMENT

Current Budget

		PFA Budget [A]	Budget Changes [B]	Rev. PFA Budget [C]	Committed Costs [D]	Expended [E]	Unspent [F]=[D]-[E]	Remaining Budget [G]=[C]-[D]	% Complete (actual expended) [H]=[E]/[J]	CTC (actual committed) [I]	Anticipated C @ C [J]=[D]+[I]	Variance (Under) / Over [K]=[C]-[J]
0000 0000	**FEASIBILITY STUDY AGREEMENT**	**$1,215,000**	**$0**	**$1,215,000**	**$1,205,180**	**$1,189,117**	**$16,063**	**$9,820**		**($5,528)**	**$1,199,652**	**($15,348)**
0001 0000	OPM Feasibility Study (SMMA)	$200,000	($50,000)	$150,000	$150,000	$150,000	$0	$0	100%	$0	$150,000	$0
0002 0000	A&E Feasibility Study (Dore & Whittier)	$800,000	$53,920	$853,920	$853,920	$853,920	$0	$0	100%	$0	$853,920	$0
0003 0000	Environmental & Site (Subconsultants)	$100,000	$45,076	$145,076	$145,076	$129,013	$16,063	$0	89%	($5,528)	$139,548	($5,528)
0004 0000	Other	$115,000	($48,996)	$66,004	$56,184	$56,184	$0	$9,820	100%	$0	$56,184	($9,820)
0100 0000	**ADMINISTRATION**	**$5,520,000**	**($0)**	**$5,520,000**	**$4,791,019**	**$985,509**	**$3,805,510**	**$728,980**		**$728,980**	**$5,520,000**	**$0**
0100 9999	Adjustment	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0101 0000	Legal Fees	$100,000	$0	$100,000	$0	$0	$0	$100,000		$100,000	$100,000	$0
0102 0000	Owner's Project Manager (Leftfield)											
0102 0400	Design Development	$400,000	$0	$400,000	$400,000	$400,000	$0	$0	100%	$0	$400,000	$0
0102 0500	Construction Contract Docs	$600,000	$0	$600,000	$600,000	$375,000	$225,000	$0	63%	$0	$600,000	$0
0102 0600	Bidding	$250,000	$0	$250,000	$250,000	$100,000	$150,000	$0	40%	$0	$250,000	$0
0102 0700	Construction Contract Administration	$3,170,000	$80,000	$3,250,000	$3,250,000	$100,000	$3,150,000	$0	3%	$0	$3,250,000	$0
0102 0800	Closeout	$140,000	$80,000	$220,000	$220,000	$0	$220,000	$0	0%	$0	$220,000	$0
0102 0900	Extra Services	$140,000	($140,000)	$0	$0	$0	$0	$0		$0	$0	$0
0102 1000	Reimbursable & Other Services	$80,000	($20,000)	$60,000	$60,000	$0	$60,000	$0	0%	$0	$60,000	$0
0103 0000	Advertising	$20,000	$0	$20,000	$890	$1,780	($890)	$19,110	200%	$19,110	$20,000	$0
0104 0000	Permitting Fees	$120,000	$0	$120,000	$0	$0	$0	$120,000		$120,000	$120,000	$0
0105 0000	Owner's Insurance	$300,000	$0	$300,000	$0	$0	$0	$300,000		$300,000	$300,000	$0
0199 0000	Other Administrative Costs	$200,000	($10,130)	$189,870	$0	$0	$0	$189,870		$189,870	$189,870	$0
0199 0000	Printing (Minuteman Press)	$0	$5,129	$5,129	$5,129	$5,129	$0	$0	100%	$0	$5,129	$0
0199 0000	Structural Peer Review (DM Berg)	$0	$5,000	$5,000	$5,000	$3,600	$1,400	$0	72%	$0	$5,000	$0
0200 0000	**ARCHITECTURE & ENGINEERING**	**$15,141,622**	**($190,000)**	**$14,951,622**	**$14,951,622**	**$7,299,071**	**$7,652,551**	**$0**		**$0**	**$14,951,622**	**$0**
0200 9999	Adjustment	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0201 0000	Basic Services (Dore & Whittier)											
0201 0400	Design Development	$3,409,156	$0	$3,409,156	$3,409,156	$3,409,156	$0	$0	100%	$0	$3,409,156	$0
0201 0500	Construction Contract Documents	$4,772,818	$0	$4,772,818	$4,772,818	$3,579,614	$1,193,204	$0	75%	$0	$4,772,818	$0
0201 0600	Bidding	$681,831	$0	$681,831	$681,831	$0	$681,831	$0	0%	$0	$681,831	$0
0201 0700	Construction Contract Administration	$4,090,986	$0	$4,090,986	$4,090,986	$0	$4,090,986	$0	0%	$0	$4,090,986	$0
0201 0800	Closeout	$681,831	$0	$681,831	$681,831	$0	$681,831	$0	0%	$0	$681,831	$0
0201 9900	Other Basic Services	$175,000	($175,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 0000	Reimbursable and Other Services (Dore & Whittier)											
0203 0100	Construction Testing	$25,000	($25,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 0200	Printing (over minimum)	$40,000	($40,000)	$0	$0	$0	$0	$0		$0	$0	$0
0203 9900	Other Reimbursable Costs	$630,000	($501,729)	$128,271	$128,271	$0	$128,271	$0	0%	$0	$128,271	$0
0203 9900	Acoustic Verification	$0	$6,600	$6,600	$6,600	$0	$6,600	$0	0%	$0	$6,600	$0
0203 9900	Permitting (Terrain)	$0	$19,800	$19,800	$19,800	$18,679	$1,121	$0	94%	$0	$19,800	$0
0203 9900	Standard Energy Modeling (GGD)	$0	$13,750	$13,750	$13,750	$0	$13,750	$0	0%	$0	$13,750	$0
0203 9900	Enhanced Energy Modeling /TEDI (TGE)	$0	$29,150	$29,150	$29,150	$22,000	$7,150	$0	75%	$0	$29,150	$0
0203 9900	Automation (IDS)	$0	$61,600	$61,600	$61,600	$14,300	$47,300	$0	23%	$0	$61,600	$0
0203 9900	FF&E Procurement	$0	$216,810	$216,810	$216,810	$0	$216,810	$0	0%	$0	$216,810	$0
0203 9900	Technology Procurement	$0	$162,140	$162,140	$162,140	$0	$162,140	$0	0%	$0	$162,140	$0
0203 9900	Irrigation (Terrain)	$0	$43,560	$43,560	$43,560	$30,432	$13,129	$0	70%	$0	$43,560	$0
0203 9900	Hydrant Flow Test	$0	$2,695	$2,695	$2,695	$2,695	$0	$0	100%	$0	$2,695	$0
0203 9900	CDW NOI Permitting (Amend #6)	$0	$14,960	$14,960	$14,960	$14,960	$0	$0	100%	$0	$14,960	$0
0203 9900	Emissions Sampling (Nitech/UEC) (Amend #5)	$0	$3,740	$3,740	$3,740	$1,980	$1,760	$0	53%	$0	$3,740	$0
0203 9900	Terrain/D&W Temp Playground Fence (Amend #7)	$0	$2,750	$2,750	$2,750	$0	$2,750	$0	0%	$0	$2,750	$0
0203 9900	CDW NOI Permitting (Amend #7)	$0	$7,150	$7,150	$7,150	$0	$7,150	$0	0%	$0	$7,150	$0
0203 9900	Mass DEP Appeal Process (Amend #8)	$0	$50,000	$50,000	$50,000	$16,697	$33,303	$0	33%	$0	$50,000	$0
0204 0000	Sub-Consultants											

Total Project Budget – Detail

Wildwood Elementary School - BUDGET TRACKING

MSBA ID: 202003420015
Wildwood Elementary School
Project Director / Manager: David Saindon / Craig DiCarlo
Period Ending 8/31/2026
MSBA Reimbursement Package 31

Current Budget

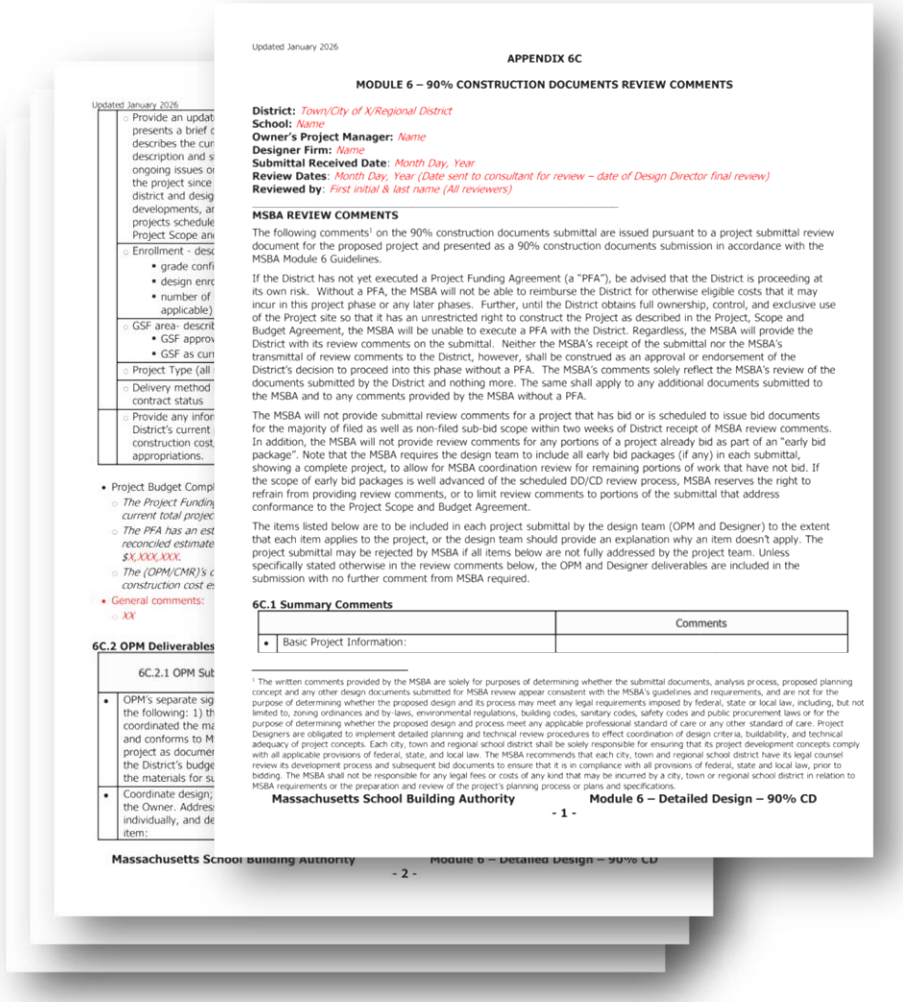
LeftField
THE RIGHT ORDER IS PROJECT MANAGEMENT

		PFA Budget [A]	Budget Changes [B]	Rev. PFA Budget [C]	Committed Costs [D]	Expended [E]	Unspent [F]=[D]-[E]	Remaining Budget [G]=[C]-[D]	% Complete [H]=[E]/[J]	CTC [I]	Anticipated C @ C [J]=[D]+[I]	Variance (Under) / Over [K]=[C]-[J]
0204 0200	Hazardous Materials (survey reporting and monitoring) (UEC)	$300,000	($116,300)	$183,700	$183,700	$24,200	$159,500	$0	13%	$0	$183,700	$0
0204 0300	GeoTechnical & Geo-Environmental	$250,000	($250,000)	$0	$0	$0	$0	$0		$0	$0	$0
0204 0300	GeoTechnical (LGCI)	$0	$194,585	$194,585	$194,585	$80,989	$113,595	$1	42%	$1	$194,585	$0
0204 0300	GeoEnvironmental (PEER)	$0	$122,039	$122,039	$122,040	$36,619	$85,420	($1)	30%	($1)	$122,039	$0
0204 0300	Additional Soils Testing	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 0400	Site Survey	$25,000	($25,000)	$0	$0	$0	$0	$0		$0	$0	$0
0204 0400	Site Survey (CR markers)	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 0500	Wetlands (certified plot plan, subsurface utility investigation)	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0204 1200	Traffic Studies (Nitsch)	$60,000	($8,300)	$51,700	$51,700	$46,750	$4,950	$0	90%	$0	$51,700	$0
0500 0000	**CONSTRUCTION CONTRACT**	**$138,063,666**	**$0**	**$138,063,666**	**$26,137,408**	**$3,906,761**	**$22,228,647**	**$111,926,258**		**$111,926,258**	**$138,063,666**	**$0**
0501 0000	Pre-Construction Services (Fontaine)	$320,000	$0	$320,000	$320,000	$293,326	$26,674	$0	92%	$0	$320,000	$0
0502 0000	Construction											
0502 0000	Construction Budget	$137,743,666	($25,817,408)	$111,926,258	$0	$0	$0	$111,926,258		$111,926,258	$111,926,258	$0
0502 0010	GMP - Fee	$0	$2,720,000	$2,720,000	$2,720,000	$87,742	$2,632,258	$0	3%	$0	$2,720,000	$0
0502 0020	GMP - Insurance (SDI, BR, GL, P&P Bond, and Polution Insurances)	$0	$2,949,138	$2,949,138	$2,949,138	$2,762,138	$187,000	$0	94%	$0	$2,949,138	$0
0502 0030	CM Contingency	$0	$265,250	$265,250	$265,250	$0	$265,250	$0	0%	$0	$265,250	$0
0502 0100	Division 1 - General Conditions	$0	$5,733,391	$5,733,391	$5,733,391	$184,948	$5,548,443	$0	3%	$0	$5,733,391	$0
0502 0100	Division 1 - General Requirements	$0	$784,629	$784,629	$784,629	$41,276	$743,353	$0	5%	$0	$784,629	$0
0502 3100	Division 31 - Earthwork	$0	$13,365,000	$13,365,000	$13,365,000	$557,875	$12,807,125	$0	4%	$0	$13,365,000	$0
0502 9900	Retainage	$0	$0	$0	$0	-$18,544	$18,544	$0		$0	$0	$0
0508 0000	Change Orders	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0600 0000	**MISCELLANEOUS PROJECT COSTS**	**$1,050,000**	**$0**	**$1,050,000**	**$250,000**	**$0**	**$250,000**	**$800,000**		**$800,000**	**$1,050,000**	**$0**
0601 0000	Utility Company Fees	$200,000	$0	$200,000	$0	$0	$0	$200,000		$200,000	$200,000	$0
0602 0000	Testing Services	$500,000	$0	$500,000	$250,000	$0	$250,000	$250,000	0%	$250,000	$500,000	$0
0603 0000	Swing Space/Modulars	$0	$0	$0	$0	$0	$0	$0		$0	$0	$0
0699 0000	Other Project Costs (Moving, etc.)	$350,000	$0	$350,000	$0	$0	$0	$350,000		$350,000	$350,000	$0
0700 0000	**FURNISHINGS & EQUIPMENT**	**$3,322,000**	**$0**	**$3,322,000**	**$0**	**$0**	**$0**	**$3,322,000**		**$3,322,000**	**$3,322,000**	**$0**
0701 0000	Furnishings & Equipment (FF+E)	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0703 0000	Technology	$1,661,000	$0	$1,661,000	$0	$0	$0	$1,661,000		$1,661,000	$1,661,000	$0
0800 0000	**OWNER'S CONTINGENCY**	**$8,953,338**	**$240,000**	**$9,193,338**	**$0**	**$0**	**$0**	**$9,193,338**		**$9,208,686**	**$9,208,686**	**$15,348**
0801 0000	Owner's Contingency (soft)	$2,066,155	$240,000	$2,306,155	$0	$0	$0	$2,306,155		$2,321,503	$2,321,503	$15,348
0507 0000	Owner's Construction Contingency (hard)	$6,887,183	$0	$6,887,183	$0	$0	$0	$6,887,183		$6,887,183	$6,887,183	$0
	PROJECT TOTALS [MSBA PFA]	**$173,265,626**	**$50,000**	**$173,315,626**	**$47,335,229**	**$13,382,458**	**$33,952,771**	**$125,980,397**		**$125,980,396**	**$173,315,626**	**($0)**

Design Updates



90% Construction Documents Submission



Updated January 2026

APPENDIX 6C

MODULE 6 – 90% CONSTRUCTION DOCUMENTS REVIEW COMMENTS

District: *Town/City of X/Regional District*
School: *Name*
Owner's Project Manager: *Name*
Designer Firm: *Name*
Submittal Received Date: *Month Day, Year*
Review Dates: *Month Day, Year (Date sent to consultant for review – date of Design Director final review)*
Reviewed by: *First initial & last name (All reviewers)*

MSBA REVIEW COMMENTS

The following comments[1] on the 90% construction documents submittal are issued pursuant to a project submittal review document for the proposed project and presented as a 90% construction documents submission in accordance with the MSBA Module 6 Guidelines.

If the District has not yet executed a Project Funding Agreement (a "PFA"), be advised that the District is proceeding at its own risk. Without a PFA, the MSBA will not be able to reimburse the District for otherwise eligible costs that it may incur in this project phase or any later phases. Further, until the District obtains full ownership, control, and exclusive use of the Project site so that it has an unrestricted right to construct the Project as described in the Project, Scope and Budget Agreement, the MSBA will be unable to execute a PFA with the District. Regardless, the MSBA will provide the District with its review comments on the submittal. Neither the MSBA's receipt of the submittal nor the MSBA's transmittal of review comments to the District, however, shall be construed as an approval or endorsement of the District's decision to proceed into this phase without a PFA. The MSBA's comments solely reflect the MSBA's review of the documents submitted by the District and nothing more. The same shall apply to any additional documents submitted to the MSBA and to any comments provided by the MSBA without a PFA.

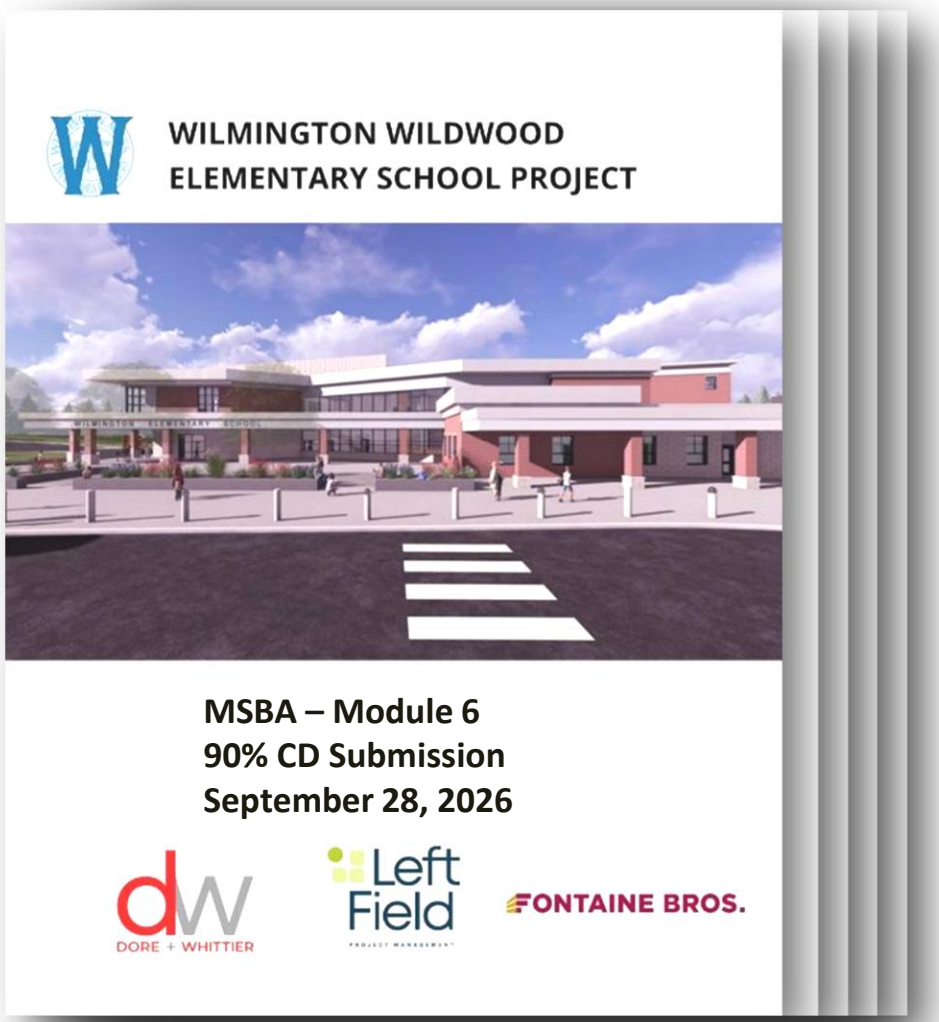
The MSBA will not provide submittal review comments for a project that has bid or is scheduled to issue bid documents for the majority of filed as well as non-filed sub-bid scope within two weeks of District receipt of MSBA review comments. In addition, the MSBA will not provide review comments for any portions of a project already bid as part of an "early bid package". Note that the MSBA requires the design team to include all early bid packages (if any) in each submittal, showing a complete project, to allow for MSBA coordination review for remaining portions of work that have not bid. If the scope of early bid packages is well advanced of the scheduled DD/CD review process, MSBA reserves the right to refrain from providing review comments, or to limit review comments to portions of the submittal that address conformance to the Project Scope and Budget Agreement.

The items listed below are to be included in each project submittal by the design team (OPM and Designer) to the extent that each item applies to the project, or the design team should provide an explanation why an item doesn't apply. The project submittal may be rejected by MSBA if all items below are not fully addressed by the project team. Unless specifically stated otherwise in the review comments below, the OPM and Designer deliverables are included in the submission with no further comment from MSBA required.

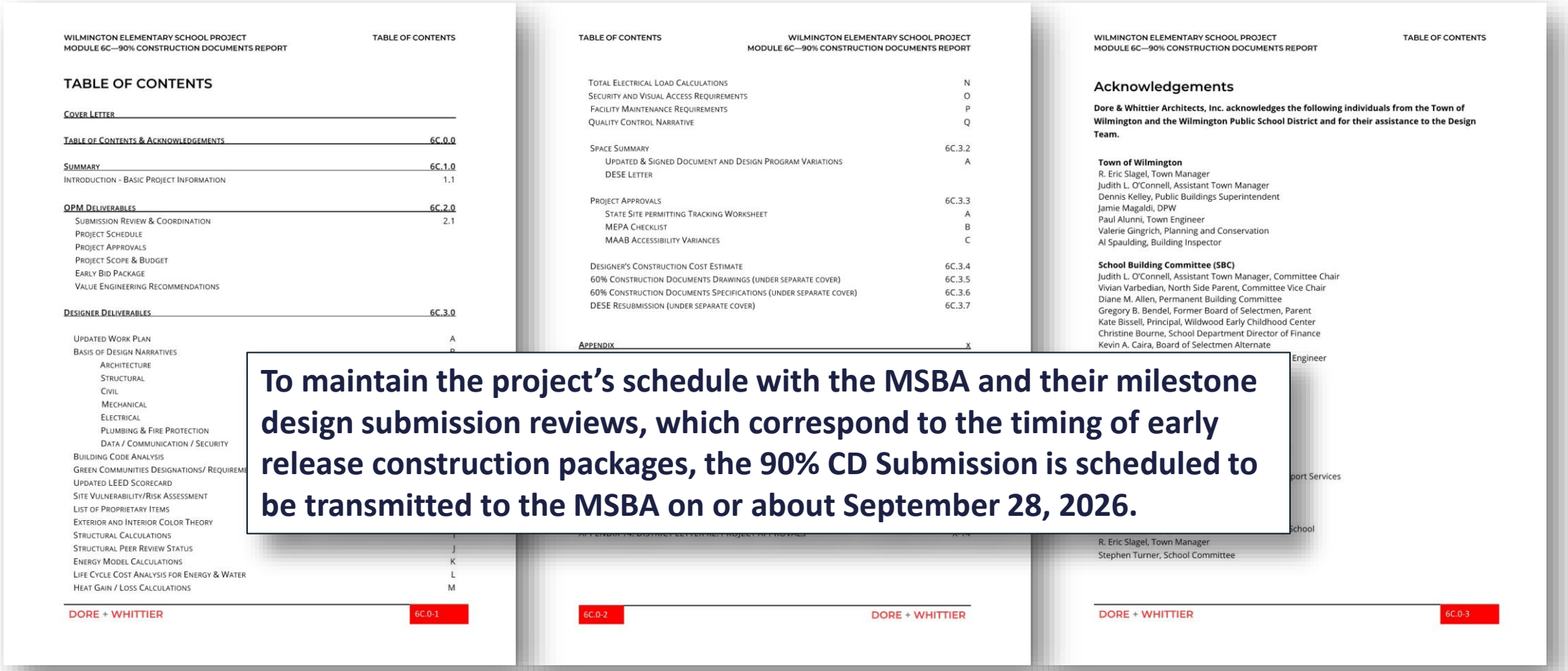
6C.1 Summary Comments

	Comments
• Basic Project Information:	

[1] The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project Designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.



90% Construction Documents Submission Contents



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Acknowledgements

Dore & Whittier Architects, Inc. acknowledges the following individuals from the Town of Wilmington and the Wilmington Public School District and for their assistance to the Design Team.

Town of Wilmington
R. Eric Slagel, Town Manager
Judith L. O'Connell, Assistant Town Manager
Dennis Kelley, Public Buildings Superintendent
Jamie Magaldi, DPW
Paul Alunni, Town Engineer
Valerie Gingrich, Planning and Conservation
Al Spaulding, Building Inspector

School Building Committee (SBC)
Judith L. O'Connell, Assistant Town Manager, Committee Chair
Vivian Varbedian, North Side Parent, Committee Vice Chair
Diane M. Allen, Permanent Building Committee
Gregory B. Bendel, Former Board of Selectmen, Parent
Kate Bissell, Principal, Wildwood Early Childhood Center
Christine Bourne, School Department Director of Finance
Kevin A. Caira, Board of Selectmen Alternate
Engineer
port Services
School
R. Eric Slagel, Town Manager
Stephen Turner, School Committee

DORE + WHITTIER 6C.0-3

To maintain the project's schedule with the MSBA and their milestone design submission reviews, which correspond to the timing of early release construction packages, the 90% CD Submission is scheduled to be transmitted to the MSBA on or about September 28, 2026.

90% Construction Documents Phase Takeaways

The Project remains consistent with the scope approved by the voters. The gross square footage, educational program, construction phasing sequence, and overall schedule remain unchanged. In addition, two independent cost estimates have been completed and are within 0.45% of each other, confirming that the Project is currently ON BUDGET.

Estimate Reconciliation Summary as compared to the Schematic Design Construction Budget

PFA Schematic Design Construction Budget	90% Reconciled Estimates		% Δ Between Estimates
	PM+C	Fontaine	
$137,743,666	$135,560,400	$136,174,844	0.45%
Underrun >>	$2,183,266	$1,568,822	

SCHEMATIC DESIGN → 100% CD

Design team scope progress at 90% CD



01

Drawings & Schedules

Floor plans, RCPs, and roof plan
Enlarged plans for cores, restrooms, kitchens
Wall types and door/window schedules
Interior elevations and millwork sections
Typical details

02

Specifications

Refine three-part sections

Schedule and product substitutions

Lighting and plumbing fixture cut sheets

FF&E, signage, and proprietary specs — *under review*

03

Coordination

Structural and MEP clash review
Code, egress, and accessibility clearances
Consultant set cross-referencing
Internal QA/QC redlines
Construction administration for ERP 1

04

Owner review

Cx, OPM, CM and Owner comments from the 60% set

Permitting sets and municipal pre-submittal

DEP appeal

Plan-check and zoning compliance

ERP 2 issued with the 90% CD set

ERP 3 — *in progress*

05

MSBA submission

Assembling 90% CD submission package
Confirming program and space summary
Reconciling cost estimate
Checking area conformance
Review of MSBA comments

90% CD Issue date — 08 / 14 / 26

Next milestone — issue ERP 3

Construction Updates



Construction Update

Recent and Ongoing Construction Activities Onsite:

- Removal of the existing tennis courts was completed.
- Removal of all accessible Phase I trees and shrubs has been completed.
- Installation of the added fencing and gates, to create the temporary recess / playground area, has been completed.
- The subcontractor and jobsite trailer parking areas were completed.
- The loam stripping activating in the accessible Phase I area has been completed.
- The removal of the loam from the accessible Phase I area from the project site is in progress and is scheduled to complete week of 9.21.26.

Agenda

1. Call to Order
2. Approval of Minutes – August 18, 2026 – Vote
3. Administrative Report
    a. Invoice Summary - Vote
    b. Total Project Budget Update
4. Design Report
    a. 90% CD Submission to the MSBA & Reconciled Cost Estimate – Vote
5. Construction Report
    a. General Construction Update
6. **Public Engagement**
    a. **Groundbreaking Event, Wednesday September 16, 2026**
7. **Discussion/Correspondence/New Items**
8. **Committee Questions**
9. **Public Comments**
10. **Next Meeting - Tuesday, October 20, 2026, at 6:30 PM**
11. **Adjournment - Vote**

Public Engagement



Discussion/ Correspondence/ New Items



Committee Questions



Public Comment



Upcoming Meetings



Upcoming WSBC Meetings

- Tuesday, **October 20th** at 6:30 PM
- Tuesday, **November 17th** at 6:30 PM
- Tuesday, **December 15th** at 6:30 PM



THANK YOU

Project Website

Construction Activities

Massachusetts School Building Authority

Left Field PROJECT MANAGEMENT

DORE + WHITTIER

FONTAINE

Wilmington - Early Release Package (ERP) Definition and Schedule Matrix - Updated for 90% CD Submision

(All dates are plus/ minus by a few days)

Early Release Package	Drawing Package Issued To Estimators	Drawing Package Issued to MSBA	MSBA review Comments Received	Anticipated Trade Bidding	Package/ Scope Awards	Comments/ Clarifications	Package Clarification/Amendment Inclusions
MSBA DD Submission No scope is planned to be awarded on this drawing set	2/6/2026	21 calendar days 3/20/2026	4/10/2026	N/A	N/A		
ERP 1 - (MSBA 60% Submission) Enabling, full sitework	5/15/2026	21 calendar days 6/25/2026	7/16/2026	Non-trade bidding 5/19/26 - 6/8/26	Late June	Please note, award of ERP-1 (sitework) is currently targeted to take place prior to the receipt of MSBA comments. However, MSBA DD submission comments will have been received.	BP 31-1: Full site package
ERP 2 - (MSBA 90% Submission) Concrete foundations and flatwork, structural steel, foundation waterproofing, elevator, and switchgear	8/14/2026	21 calendar days 9/28/2026	10/19/2026	Trade and non-trade bidding 8/18/26 - 9/7/26	Late Sept	Please note, award of ERP-2 (superstructure) is currently targeted to take place prior to the receipt of MSBA comments. However, MSBA DD and 60% submission comments will have been received.	BP 3-1: Concrete BP 5-2: Structural Steel BP 7-1: Foundation Waterproofing BP 14-1: Elevator
ERP 3 - Limited underground electrical associated with u/g primary power ductbank	N/A	N/A	N/A	Trade Bidding 10/7/2026 - 10/26/2026	Late October	Interim package decided upon based on continued analysis of work sequencing and the project schedule.	Limited underground electrical associated with u/g primary power ductbank
ERP 4 - (MSBA 100% CD Submission) All remaining scope	N/A	10/30/2026	N/A	Trade and non-trade bidding 11/3/26 - 11/30/26	December 2026 through January 2027	Please note that bidding/trade package awards associated with this package will be awarded after receipt of MSBA review comments from the DD, 60, and 90 CD submissions	Bid package numbers to be assigned at a later date. All MEP & FP All major interior trades

Wilmington Elementary School

OPM Review Comment Tracking Form

Review Date: 2/6/26-2/27/26

Reviewed By: Brendan Walsh, Jay Faxon, T Connolly, Craig DiCarlo

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
1	Project Manual Volume 1	DD 2/6/26	00 01 10	In a future version of the TOC, consider indicating the classes of work that will be by trade contractors with an asterisk or footnote [CAD]	**Trade Bid Summary Sections are included for their Trade Divison. D+W**		**Closed**
2	Project Manual Volume 1	DD 2/6/26	00 21 16	LeftField awaits a response from the SDO regarding project specific participation goals - we will share that once it is available, for inclusion in the documents. [CAD]	**To be included once received. D+W**	Done.	**Closed**
3	Project Manual Volume 1	DD 2/6/26	00 31 00	Item 9 indicates the letter from UEC in section 00 31 09 is followed by the haz mat inspection report in that section, however the original report was unchanged and lives in section 00 31 01. [CAD]	**Section to be updated in forthcoming submissions. D+W**		**Closed**
4	Project Manual Volume 1	DD 2/6/26	00 43 09	The heading of this section indicates Addendum No. 3 which seems to be a left-over from a previous project. [CAD]	**Confirmed, reference removed. D+W**		**Closed**
5	Project Manual Volume 1	DD 2/6/26	01 20 00	Paragraph 1.02-D, to prevent frontloading, recommend for each SOV line item for mobilization there also be a separate line item for demobilization in an amount that is at least 50% of the mobilization cost. [CAD]	**Language to be reviewed. D+W** **Paragraph language updated for forthcoming submission. D+W**		**Closed**
6	Supplemental	DD 2/6/26	31 60 00	Paragraph 1.07-B, recommend explicitly stating "delegated design". [CAD]	**Language to be reviewed. D+W** **Section requires design specific drawings and calculations submitted by a Professional Engineer, licensed in the State of Massachusetts. D+W**		**Closed**
7	Project Manual Volume 2	DD 2/6/26	14 24 00	Consider traction elevators i.l.o. hydraulic - less energy use, reduced noise, smaller machine room. [CAD]	**Pros and cons to both types. Type to be reviewed. D+W** **Elevator type has been reviewed with Wilmington Fire Deputy Chief to accommodate for weight capacity, increased cab size and associated stretcher. D+W**		**Closed**
8	Project Manual Volume 2	DD 2/6/26	10 22 13	Pragraph 2.03-B-1, replace "by others" with the division responsible to install the cylinder lock. [CAD]	**Hardware included in Section 08 71 00. D+W**	Remove "by others" and include explicit instrucitons.	**Open**
9	Project Manual Volume 3	DD 2/6/26	27 50 00	Consider including a Distributed Antenna System (DAS) to boost cell phone coverage within the building - both for conveneince and emergency situations. [CAD]	**$250k is held in the project budget for DAS within the building. D+W**	Agreed - the town wants 3 cell phone DAS in the project. Please include in the 90% CD specifications.	**Open**
10	Project Manual Volume 3	DD 2/6/26	31 21 13	Can the radon mitigation system be installed by the sitework sub or is it required to be installed by the plumbing or HVAC trade contractor?	**Sub-Slab Ventilation to be assigned to Plumbing Trade Bid. Updates in forthcoming submissions. D+W**		**Open**
11	Volume 1 Cover	DD 2/6/26	Location Map	Provide attribution to GoogleMaps for the image. [CAD]	**Confirmed, text added. D+W**		**Closed**
12	Volume 1 Cover	DD 2/6/26	Page Layout	On a recent LeftField project, the MSBA DD dedsign review comments returned with a request that the cover sheet layout include the project name and submission info displayed vertically along the right edge of the drawing, so that a printed set could be easily identified when rolled up. This is certainly not a requirement, but doing so could avoid a repeat of that comment. [CAD]	**Confirmed, sheet layout adjusted. D+W**		**Closed**
13	EX-1.1	DD 2/6/26	Inset plan of #34 Ballardvale St	Note indicates possible encroachment of abutter's chicken coop and patio on the school property. [CAD]	**Owner to review abutter's encroachment prior to contractor sitework enabling. D+W**	Encroachment confirmed, but outside the Limit of Work. The issue has been turned over to the Town to handle, nothing more needed by the project team.	**Closed**
14	C-series	DD 2/6/26		Outside the northwest corner of the proposed building, there appears to be some missing or hidden graphics that would show the curbline as the drive aisle turns west. [CAD]	**The site layout has been revised to show all curb lines**		**Closed**

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15	C-series	DD 2/6/26		In later versions, show the Limit of Work line. [CAD]	**We will include the Limit of Work line in the civil plan set**		**Closed**
16	C2.01	DD 2/6/26		In later versions, show control points to position the structure on the site. [CAD]	**Control points will be added in later versions**		**Open**
17	C3.01	DD 2/6/26		In later versions, show spot elevations at the exterior doors. [CAD]	**Spot elevations will be included in later versions**		**Open**
18	C5.00	DD 2/6/26	7 & 8	Tree protection details are duplicative with drawing L0.01. [CAD]	**The tree protection details have been removed from this sheet**		**Closed**
19	C5.03	DD 2/6/26	6	Does the Town require locking covers for the gate valves? [CAD]	**Requirement to be confirmed with the Town**	Designer to review with DPW.	**Open**
20	L-series	DD 2/6/26		Drawing orientation does not match civil drawings. [CAD]	**TI response -Our standard practice is to orient our sheets with north facing up, however, we will further coordinate with the civil team for the CD phase**		**Closed**
21	L4.05	DD 2/6/26	4	Some notes are cut off on the right side. [CAD]	**TI response - this will be fixed**		**Closed**
22	IR-series	DD 2/6/26		Drawing orientation does not match civil drawings or the landscape drawings. [CAD]	**TI response - to coordinate for the CD phase**		**Closed**
23	S0.01	DD 2/6/26		Notes missing for glulam beams and DLT decking. [CAD]	**Design to updated in forthcoming submission. D+W**		**Open**
24	S1.33	DD 2/6/26		The layout of the splayed glulam beams in the cafeteria do not match the layout on architectural reflected ceiling plan - 21 beams shown on the structural drawing, 18 shown on the architectural drawing. [CAD]	**Design to updated in forthcoming submission. D+W**		**Closed**
25	A-series	DD 2/6/26		Project North being more than 90-degrees from True North may cause confusion. Recommend Project North be at 3 o'clock / page right. [CAD]	**Confirmed, the bold line identifying North with the corresponding True North has been updated. D+W**		**Closed**
26	AG0.01	DD 2/6/26	Abbreviations	Graphic conflict between V and W. [CAD]	**Confirmed, updated. D+W**		**Closed**
27	A1.70	DD 2/6/26	Accessory Sched.	Toilet paper dispensers, Paper towel dispensers, Soap dispensers, and Hand Sanitizer Dispensers are listed at Contractor furnished; designer to confirm the Town does not have a vendor that will furnish these items. [CAD]	**Confirmed, Accessory Schedule reviewed with Owner as noted. D+W**		**Closed**
28	A2.22	DD 2/6/26	RCP Legend	Several light fixtures appear to be missing from the legend. [CAD]	**Fixture types are ongoing and will be updated in forthcoming submissions. D+W**		**Closed**
29	A3.10	DD 2/6/26		In later versions, note the approximate area of each solar ready zone. [CAD]	**Design to updated in forthcoming submission. D+W**		**Closed**
30	A3.10	DD 2/6/26		Several low roof areas appear difficult to access for maintenace of roof drains, etc. [CAD]	**The low roof locations required by a ground ladder or scissor lift are PreK & Kindergarten extensions and Entry Canopies. D+W**	Designer to review with Town/Dennis Kelley to confirm the town does not take exception to accessing with ground ladder or scissor lift.	**Open**
31	A4.10	DD 2/6/26		In later versions, include the ground line on exterior elevations. [CAD]	**Design to updated in forthcoming submission. D+W**		**Closed**
32	A4-series	DD 2/6/26		In later versions, consider an enlarged exterior elevation at the main entrance and other areas to provide dimenstions to the locations of push paddles, card readers, security intercoms, fire department beacons, Knox boxes, etc. [CAD]	**Devices and locations are ongoing and will have dedicated referenced elevations. D+W**		**Open**
33		DD 2/6/26	A7.10	Does the school wanted an oversized cab - this appears to be a standard size cab. [CAD]	**Cab size will be reviewed with the FD. The hoistway shaft size will hold a rated net capacity of 4000lbs. The cab could accommodate a 23x81 stretcher at full length along with required rescue crew.**		**Closed**
34	A8.20	DD 2/6/26		Glazing legend appears to be missing. [CAD]	**Glazing tags to be updated in forthcoming submissions. D+W**		**Closed**
35	A9.11	DD 2/6/26	General Notes	Note 2 refers to sheet A9/01 which does not appear to be included in the set. [CAD]	**Confirmed, updated reference. D+W**		**Closed**
36	A9.11	DD 2/6/26	Gymnasium	Will the athletic striping design include any school logos. [CAD]	**An allowance shall be held in the construction budget Wood Athletic Floor Marking logos as location identified on drawing A10.12**		**Closed**

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37	A10-series	DD 2/6/26		Show NIC FF&E dashed or greyed out. [CAD]	**Layout to be reviewed. D+W**		**Closed**
38	FP2.12	DD 2/6/26	Gymnasium	Some sprinkler heads appear to be blocked by basketball backboards in the stored / UP position. [CAD]	**Locations to updated per final location of**		**Closed**
39	E2.12	DD 2/6/26		Coordinate electrical requirements for telescoping bleachers. [CAD]	**Will review Arch drawings and add necessary power. GGD**		**Closed**
40	P1-22	DD 2/6/26	mech room	pleas insure floor drains are near equipment ,WH, pumps,Ect. [JF]	**Will include in the next submission. AKAL**		**Closed**
41	P1-41	DD 2/6/26	roof	pleas add Hose bibs or roof hydrant for equipment service. [JF]	**Will include in the next submission. AKAL**		**Closed**
42	M0-14	DD 2/6/26		Ductless split refrigeration detail out dated. [JF]	**Detail has been revised. - GGD**		**Closed**
43	M0-18	DD 2/6/26		MAU-1 20% glycol, low supply air temp concerns, will the ASHP be able to supply 130 degree glycol and maintain 68 DA during defrost or very cold weather. See unit specs in schedual. [JF]	**The MAU is designed for a heating DAT up to 71.3°F on a design day. The modules of thee ASHP will stage defrost in separate increments and sufficient buffer tank volume will be included in design to "ride out" defrost cycles. - GGD**		**Closed**
44	M4-18	DD 2/6/26	RTU sequence	can we clairafy mixed air temp sequence and freeze stat after heating coil, no protection for chilled water coil? [JF]	**Freeze stat location has been revised. - GGD**		**Closed**
45	Schedule	DD 2/6/26	RTU's	Are the heating coils sized for heat wheel failure? [JF]	**The design of the coils are not sized for energy recovery failure. GGD**		**Closed**
46	RTU sequence	DD 2/6/26		Exstream weather Mode? [JF]	**We have included the extreme weather mode on certain projects recently which closes the OA damper and EA dampers at the RTUs under high wind speed conditions as extra precaution to try to protect equipment. It is optional and part of programming. GGD**		**Closed**
47	specs 23000	DD 2/6/26		Can we require before the job starts contractor must show proof of manufactures certification to install equipment and or RLS/Zoom. [JF]	**We require that contractors be certified to install any equipment and especially refrigerant carrying systems. If the desire is to not allow compression type fittings on refrigerant lines we can also specify that they must be brazed. GGD**		**Closed**
48	General	DD 2/6/26	ALL: MEP	Drawings are well developed for this stage of design and estimating- noting that the design team has done a nice job at this stage to incorporate major elements and a fair amount of detail in comparison to other projects at DD. Likewise, spec is well developed and training for MEPs has been detailed to a fair degree at this stage. BW/ LF	**Comment much appreciated. Design Team**		**Closed**
49	General	DD 2/6/26	Exterior/ Courtyard	Please review Security and egress scheme at Courtyard/ Outdoor Learning area. There seems to be a single entry/ exit to the building at Vestibule 124 inside of the courtyard. Anyone facing a threat from the open side of the courtyard has little means of cover, building re-entry or escape at this area in its current configuration/ where open to the driveway side. BW/ LF	**The design team has reviewed the site plan with public safety officials. The building meets the requirements for all means of egress and accessible routes. Cameras, gates and emergency call box are located in the courtyard for security. D+W**		**Closed**
50	L Series	DD 2/6/26	Isolated Vegetative Wetland	Is Isolated Vegetative Wetland an existing feature, or something to be constructed similar to a "biodiversity" area for the site? Please review- many of these types of features tend to hold water when water table levels are elevated and may pose a hazard to young students playing around this area or using the playground during school, or afterhours. Other projects have installed barrier fencing to these features as a result. BW/ LF	**TI response: this is an existing feature, fencing could be added if required by the town/permitting agencies, if there is evidence of standing water.**		**Closed**

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51	L1.01	DD 2/6/26	Bus Drop Off/ Overhangs and Columns Sight-lines	Select carryover from SD comments: Overhang support columns adjacent bus drop-off loop at main drop-off/ entry (shown Column Line A.10) are at the curb line and may present a visual obstruction for oncoming drivers to see pedestrians or students passing the curb line/ please review for possible buffer/ barrier or curb offset/ or shifting of loop. BW/ LF	**TI response: will coordinate with architecture and civil engineering teams.**		**Closed**
52	FP Series	DD 2/6/26	Fire Service	No Fire Pump is included in this design- have flows been confirmed?	**Confirmed, no fire pump is required. D+W**		**Closed**
53	FS2.01	DD 2/6/26	Kitchen	Please coordinate Floor Pan & Grate and Walk-In locations with slab and P Series drawings- commonly missed coordination's. BW/ LF	**Coordination is ongoing in forthcoming submissions. D+W**		**Closed**
54	P1.21/ P Series	DD 2/6/26	Toilet Rooms	Floor drains missing from some areas and toilet rooms. Please review and indicate locations in next submission. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**
55	P Series	DD 2/6/26	General	Please develop major riser and branch isolation valve locations into next sets for all DWH and DCW piping. All major/ floor level riser take offs and major branches should be served by isolation valves and general areas of location noted. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**
56	P Series	DD 2/6/26	General	No sheet General Notes are shown at this stage. Will review in future sets. BW/ LF	**Will include in the next submission. AKAL**		**Closed**
57	P Series	DD 2/6/26	General/ Mop Sinks	Please review Mop Sink locations shown as P-7 fixture and provide backflow prevention where detergent dispensers are to be installed. BW/ LF	**Will include in the next submission. AKAL**		**Open**
58	P Series	DD 2/6/26	EWH	EWH locations are scheduled at Custodial, thought they are shown at Mechanical Pump Room- please review.	**Updated and in the latest drawings. AKAL**		**Closed**
59	P1.11	DD 2/6/26	Courtyard	Please review number of hose bibb shown at Courtyard. Single shown at end of courtyard- would be beneficial to have additional at interior of Courtyard as well. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**
60	P1.11	DD 2/6/26	Kindergarten, 1 & 2 Toilets	Coordination of handicap grab bars and paper toilet paper dispensers will be required: The lower height of grab bars at K and 1st & 2nd grade classrooms typically impedes installation of a standard toilet paper dispenser. Please advise- can the grab bar be segmented around dispenser locations or otherwise coordinated? Please also coordinate lower blocking for all walls with Arch at toilet rooms to accommodate lower fixture and accessory heights. BW/ LF	**Will coordinate with Architect. AKAL**		**Closed**
61	P1.12	DD 2/6/26	Girls Toilet 158 and Kitchen	Floor drains shown in conflict with toilet partition supports and walk ins. Please review. Also- provide floor drains at kitchen for floor washing/ as necessary. BW/ LF	**Updated and in the latest drawings. AKAL**		**Open**
62	P1.22	DD 2/6/26	Mechanical Pump Room 247	Please provide hose bibb at mechanical room for servicing. Also please review if utility sink is required by Facilities for personnel in this room/ for hand washing and cleanup. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**
63	P1.22	DD 2/6/26	Mechanical Pump Room 247	Mechanical drawings and Plumbing drawings are not coordinated at Mech Room. EWH 1/2/3 (Plum) are located in the same location as EB 1/ 2 (Mech) and their pad at the floor plans. Please coordinate and review room size and layout with owner/ for servicing needs. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**

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64	P1.41	DD 2/6/26	Plumbing Roof Plan	Plumbing Roof plan does not show Hose Bibbs for servicing. Please provide adequate number and spacing to service the ASHPs, condensers and AHUs in the future. BW/ LF	**Updated and in the latest drawings. AKAL**		**Closed**
65	M0.13	DD 2/6/26	Radiant Panel Details	Radiant panel connections from hard to soft copper should be fashioned with flex connections at S/R piping and unions for servicing radiant panels to allow movement (especially important in hard ceilings). We also do not like to see ProPress/ press type connections on soft copper- other projects have had issues with this detail. Please specify shop brazed hard copper stubs to panel soft copper or other suitable method to provide a robust connection at supply and return to each panel. BW/ LF	**Details have been updated per this comment. - GGD**		**Closed**
66	M0.13	DD 2/6/26	Radiant Panel Ceiling Details	Please review angle details and add note to "provide proper bearing at wall angle- coordinate with others" (need a wider 15/16 angle at a minimum as typical). Other projects have had issues with slim angles and panels becoming dislodged/ dropping out of opening supports. BW/ LF	**This should be discussed in further detail. The angle is an item to be provided by the CM - GGD**		**Closed**
67	M0.13	DD 2/6/26	Radiant Panel Ceiling Details	Hard ceiling opening constructability as drawn is in question. Detail shows an overhang of gyp board as the bearing surface wrapped in a J channel. Gyp board is not designed to support structure or equipment. This detail typically requires general trades to coordinate opening sizes with mechanical trades to frame a "rough opening, drywalled at the inside edges and with an "L" shaped/ wall angle picture framing the openings to drop into (and supported by aircraft cable above). BW/ LF	**This is a detail from the panel manufacturer which has been used on numerous School projects throughout Massachusetts. Theweight is being support from structure by aircraft cable, the intent is not to have the GWB ceiling bear the load of the panel. We are open to feedback from the CM regarding constructability of the detail. - GGD**		**Closed**
68	M0.14	DD 2/6/26	CUH Detail	Please indicate DAT sensor and fan status at CUH details. Shows control valve, but no other devices are called out. BW/ LF	**What is the goal for a DAT sensor at the CUH? This is atypical in our experience and not a factory option. ATC contractor would need to fit a sensor into the CUH cabinet. - GGD**	Goal would be at any stairwell CUH units, to provide feedback to operator that CUH units are operating properly. Often times, landing area CUH units will be operational, but space temp will drop (when door seals are poor, or door is opened often). At other projects, space temp alarms have been added at such locations following completion. BW/ LF	**Closed**
69	M0.15	DD 2/6/26	Duct Thru Exterior Wall Detail	Duct through exterior wall detail needs review. There is caulking shown to insulation passing through wall plane and metal angle that do not align with typical means and methods. Also, intumescent caulking is contraindicated at any duct that may have and SFD or OAD as the duct may deform in the event of a fire, impeding the operation of a damper. Can the duct be fire-foamed around the exterior opening for insulation and air sealing/ caulked with primary bead at exterior, with metal angle fastened to the duct, sealed with stripping and caulking/ and insulation over that? Is any let-in thru-wall metal required as a head flashing for this detail? Please develop into next drawing sets. BW/ LF	**GGD will review adjustment to this detail. - GGD**		**Closed**

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70	M0.16	DD 2/6/26	Displacement Diffuser Details	DD Details require review with Arch/ and edits- there is a note on one detail that states "cut out necessary wall framing for duct connection & offset supply duct as required". Mechanical trades should not be cutting any framing members to fit duct to DD's. Instead, the note should read similar to "Provide inlet boot details and connections at displacement diffusers to allow offset and duct connection behind framing members- coordinate diffuser details and openings with General Trades". Arch details should presumably show stud framing on the "flat" at the header and any mid span framing at DD openings. Also- use of the term "MUD FRAME" is controversial, as this is a Price specific label that has been viewed on other projects as "proprietary spec". Please revise language to incorporate "factory supplied or custom fabricated mud frame, or finished trim for drywall assemblies to accommodate a flush, moldable finish" or something similar. BW/ LF	**Language has been updated. - GGD**		**Closed**
71	M1.12	DD 2/6/26	Gymnasium	Supply ductwork at Gymnasium appears in conflict with support structure for Gym equipment/ basketball hoops. Please coordinate locations accordingly with Arch/ Structural. BW/ LF	**Conversations regarding the swing of the basketball hoops are ongoing with the Architect. Lateral swing options are being explored. - GGD**		**Closed**
72	M Series	DD 2/6/26	General/ Piping	Please develop and identify general locations of major isolation valves into next design set- this should include riser take off locations and major branches to segment each floor as necessary for future service. BW/LF	**This shall be developed. - GGD**		**Closed**
73	E Series	DD 2/6/26	Roof Plan/ Fire Alarm	No Fire Alarm drawings shown for roof areas- please review need for horn strobes and pull stations that may be required at roof level, and provide in future drawings. BW/ LF	**Pullstations to be added to starwells at top level, and exterior strobes at stair towers. GGD**		**Open**
74	E3.04	DD 2/6/26	Detail 5	Rath Rescue phone may need to exploration of spam call blocker at areas of refuge/ repeater bases. Other projects have experienced spam calls being auto picked up by the Rath system and projecting calls over the speaker, when connected to building telephone system. Please explore options into future drawing design. BW/ LF	**GGD to look at the spam call blocker options for the Rath system. GGD**	Closed for now- will revisit during construction phase as necessary. BW/ LF	**Closed**
75	E4.01	DD 2/6/26	Detail 2	Provide monitoring contact or end switch at elevator shaft smoke damper to indicate position- may need to add note to this sheet or coordinate with Mech/ control drawings for point coordination. BW/ LF	**GGD to add monitor module to smoke damper. GGD**		**Closed**
76	E3.01	DD 2/6/26	One-Line Riser	Does drawing assume that NEDP is feeding all main distribution and branch panels on Emergency backup? NEDP does not cleary show downstream connections. Please clarify intent of systems on Emergency backup as fed by ATS/ Genset. BW/ LF	**Emergency systems have not been coordinated yet, NEDP will feed emergency panels throughout the school and pick local items where emergency power is required. GGD**		**Closed**
77	E3.07	DD 2/6/26	Detail 2 (E6.15)	If Ansul system requires remote pull, provide scope for EC to path conduit and provide note for Ansul corner pulleys/ ID location of pull for pathway at E drawings. Also detail number may need to be corrected on sheet. BW/ LF	**The entire Ansul system shall be owned by the kitchen equipment contractor not the E.C. the E.C. shall own only the connection of the ansul system into the FACP. GGD**		**Closed**
78	E4.21	DD 2/6/26	Courtyard	No FA/ Horns, Strobes or Pull Stations indicated at Courtyard- please review and develop into next drawing set. BW/ LF	**Will add WP Horn/Strobes to couryard. GGD**		**Closed**

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79	General	DD 2/6/26	ALL: Electrical/ Utility and Distributed Power	*NOTE: With the quantity of electrified infrastructure in the Wildwood ES building, along with the level of sophisticated digital equipment planned, the project should consider incorporation of voltage and harmonic conditioning equipment, or design space and pathways to incorporate future equipment following a formal Power Quality Study (following startup of equipment), when the building is under load. Major equipment failure risk should be discussed as it relates to poor power quality, or power distribution harmonics with the quantity of non-linear loads. EOR to advise. BW/ LF	**We own surge protection for voltage and K-13 rated transformers for improved harmonics which is standard for our school designs at this size. We shouldn't need any additional protection for our electrical equipment. GGD**	Closed for now- will request carry comment into 90% review for GMP hold for power quality study following startup of all systems. BW/ LF	**Closed**
80	T Series	DD 2/6/26	ALL	Lockdown and any Mass Notification scheme is unclear, along with programming and interconnectivity of Security, Access Control, FA and other systems. Please develop approach into next drawing set in concert with district standards. BW/ LF	**Design Team has shared an example of Mass Notification Sequences to the Owner. A forthcoming Owner meeting will be held to review project specific sequences. D+W**	Will await further discussion. BW/ LF	**Closed**
81	C2.00	DD 2/6/26		The gates to isolate the drive behind the building show the gate posts in the dive. Consider enlarging the gate to place the posts out of the drive behind the curb to allow the plows to pass by the gate posts.	**The gates shown on the Layout and Materials sheets are referenced in the Landscape drawings. We will coordinate with the LA to resolve this issue. CDW**		
82	C2.01	DD 2/6/26		I like how the gates at the dumpster pad align with the curb to clear the snow with the plow. Consider an exact detail for the setback of the gate in relation to the curb for clarity.	**The dumpster pad fence and gates are to be specified by the LA. CDW**		
83	C2.01	DD 2/6/26		On the East and West edges of the building there appears to be a graphic along the edge of the building that shows a stone mulch. Considering the age groups would a softer material be considered?	**The stone mulch in this plan is from the LA drawings. We will coordinate with the LA on this item. CDW**		
84	C2.02	DD 2/6/26		The traffic patter may require both signage and line striping arrows.	**We will include signage and line stripping in later versions of the plans. CDW**		
85	C3.00	DD 2/6/26		At the three underground chambers on site, coordinate the access / cleanout locations with the site elements.	**The access locations will be coordinated with the site elements. CDW**		
86	C3.01	DD 2/6/26		On the North side of the building at the roof drain to DMH-21, a cleanout should be located at the building.	**We will look into adding a cleanout to this line. CDW**		
87	C3.01	DD 2/6/26		At DMH-21 - will a vac truck be able to get within the gate to service the manhole?	**The DMH-21 has been moved to roadway. CDW**		
88	C3.00 & C3.01	DD 2/6/26		What is the drainage strategy for the relatively level area at the main entrance?	**Part of the main entrance will flow to a catch basin that has been added in the area. Other portion will flow to the proposed Silva Cells as designed by the LA. CDW**		
89	C3.01	DD 2/6/26		What is the drainage strategy for the courtyard area?	**Catch basins are proposed in the courtyard area to collect surface runoff and discharge into the underground system. CDW**		
90	C3.02	DD 2/6/26		The parking and drop off areas do not appear to have a snow shelf especially between the access road and the parking lot. What is the snow plowing strategy? Has this been reviewed with facilities?	**We typically show snow storage areas for reference, as requested by the Planning Board and Conservation Commission in areas where there is open space. CDW**		
91	C4.01	DD 2/6/26		Is it possible to shift the fire hydrant on the West side of the site a little East out of the walkway?	**Hydrants are typically located 1.5' off the edge of the pavement. CDW**		
92	C5.02	DD 2/6/26		Consider a detail for the continuous detectable warning line at the drop off at the front of the school. Can the panels shown be placed butt jointed and maintain the 2.35" spacing.	**The continuous detectable warning line at the drop-off at the front of the school is in the LA's scope. CDW**		
93	C5.02	DD 2/6/26	12	Detail 12 - Coordinate the drain tie-in with site drainage.	**The drainage tie-in will be coordinated with site drainage. CDW**		
94	L1.03	DD 2/6/26		The North side of the soccer field has a 4' chain link fence. Should a high fence be considered as a backstop for soccer balls? For example the sport courts have a 10' fence.	**TI response: we will evaluate and discuss the preference of the school/town recreation department.**		

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95	L1.03 / L1.05	DD 2/6/26		Please review the planning bed at the entrance to the school. Some facilities find maintenance of these beds difficult.	**TI response: we will evaluate and discuss with the school/town facilities department.**		
96	L3.03	DD 2/6/26		Similar comment to above. The extensive planting beds require a lot of maintenance and should be reviewed with facilities.	**TI response: we will evaluate and discuss with the school/town facilities department.**		
97	S0.01 / GC1.00	DD 2/6/26		Note on the Code Summary - Roof Construction and Secondary Members: States heavy Timer construction. Drawing S1.41 shows WF framing. Am I missing the heavy timber construction in an area?	**Design to updated in forthcoming submissions. D+W**		
98	S1.33 / A0.32	DD 2/6/26		I think the 6-1/2" slab depression area needs to be coordinated with the structural drawings.	**6-1/2" depression corresponds with acoustic isolated slab system on top of the structural 5-1/4" elevated deck. D+W**		
99	A4.00	DD 2/6/26		Structural details are needed for the roof equipment enclosures.	**Design to updated in forthcoming submissions. D+W**		
100	A4.10	DD 2/6/26		I don't see a joint pattern for some of the larger cast stone panels. The structural drawings need to include tieback points and details for the	**Design to updated in forthcoming submissions. D+W**		
101	A6.70	DD 2/6/26	H7, A14	The attachment of the MCM Panels and Cast Stone look like they are structural connections. The loads and connections should be reviewed with the structural engineer.	**Coordination is ongoing for all associated materials impacting structure. MCM and Cast Stone anchors are specificed to be Engineered along with structural calculations.**		
102	A1.13 / FS2.01	DD 2/6/26		The walk in freezer and cooler typically require a slab depression for the insulated floor. I do not see this indicated on the structural drawings. Is this required?	**Depressed slabs are required. Coordination is ongoing in forthcoming submissions. D+W**		
103	T1.11	DD 2/6/26		I would have difficulty locating some of the devices on the walls. Please consider elevations coordinated with the architectural to locate backboxes for the devices on the walls.	**Coordination is ongoing in forthcoming submissions. D+W**		

Wilmington Elementary School

OPM Review Comment Tracking Form

Review Date: 5/15/26-6/16/26

Reviewed By: Brendan Walsh, Jay Faxon, T Connolly, Craig DiCarlo

*****A/E team - Please respond to the 60% CD comments here as well as the comments in the 100% DD tab noted as "Open".*****

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
1	Volume 1 00 21 14	60% CD 5/15/26	1.01 A	Projectdog project code for trade contractor bids is #874893 [CAD]	**Spec language to be updated for 90% Pricing. D+W**		**Closed**
2	Volume 1 00 31 05	60% CD 5/15/26	Flow Test Report	Dated 10/20/2025 which is more than 6 months ago, so another may be required. [CAD]	**The flow tests are valid for one year. Once the project is bid, the FP contractor shall conduct a new flow test to start coordination drawings per FP contract documents and specifications. D+W**		**Closed**
3	Volume 1 00 31 00	60% CD 5/15/26	Items 9, 10, 11	These 3 documents are listed as "available at the owner's offices", 2 traffic impact studies and Phase 1 ESA. Understandbly there are large documents, so include them as exhibits which can be viewed electronically but not printed. [CAD]	**The file size limits the functional PDF viewing capability. The (3) documents can be made available upon request. D+W**	LeftField is concerned that requiring certain documents to be reviewed only at a physical location could create unequal access for bidders, particularly those farther from D+W's office, and may increase the risk of a bid protest. Instead, D+W could provide electronic files through a shared folder so all bidders have equal access, regardless of file size. Hard copies could still be made available as a supplemental option.	**Open**
4	Volume 1 01 30 01	60% CD 5/15/26	RFI Form	Remove this section; Fontaine will use Procore for RFIs. [CAD]	**Section 01 30 01 is included in the Project Manual as an optional means of distrubition by FBI. D+W**		**Closed**
5	Volume 1 01 79 00	60% CD 5/15/26	1.02 D	The Town (Dennis) does not want video recordings; they do not use them. He would rather extra attention be put into comprehensive, high-quality, and well-organized O&M manuals. [CAD]	**Request further discussion with FBI Team and expectations of O&Ms if Video Recordings paragraph to be removed. D+W**	Not addressed in 90% CDs	**Open**
6	Volume 1 01 81 19	60% CD 5/15/26	IAQ Requirements	Confirm this section and the scorecard include the IAQ points required to satisfy the MSBA's Green Schools Program. [CAD]	**See Designer Deliverables 6A3.1E - Sustainability Narrative. The Project is following the MSBA's Green Schools Program, Project Advisory 81, dated June 2023 and is targeting a minimum of LEED for Schools v4 'Silver' level of certification. The Project will achieve a minimum total of three of seven available points related to indoor air quality and will be designed to, at a minimum, meet the minimum energy efficiency requirements described in the MA DOER "Stretch Code Green Community" standards. D+W**		**Closed**
7	Volume 2 02 41 01	60% CD 5/15/26	Salvage spreadsheet	This is not the latest version. See the version dated 5/27/26 sent by LeftField (David Saindon). [CAD]	**Spreadsheet to be updated for 90% Pricing. D+W**	90% CDs still include an older version of the list.	**Open**
8	Volume 2 04 00 01	60% CD 5/15/26	1.03 C	List of sections owned by masonry trade contractor does not seem to include 04 43 00 Stone Site Masonry or 04 43 13 Stone Masonry Wall Panel [CAD]	**Sections 04 43 00 and 04 43 13 have been reviewed with FBI and will be bought out by Div 32. D+W**		**Closed**
9	Volume 2 11 30 13	60% CD 5/15/26	1.01	Add multiple microwaves to each teacher collaboration rooms. The principals said 'no' to dishwashers. [CAD]	**Spec scope to be updated for 90% Pricing. D+W**		**Closed**
10	Volume 2 12 24 00	60% CD 5/15/26	2.04 D(2)	The Town is not satisfied with the window shade translucency at the new Town Hall. Spec calls for 1% openness factor for this project, but D+W to show Town samples and request direction on the openness factor for the 100% CDs. [CAD]	**Window shade design has been reviewed and confirmed with the Owner. D+W**		**Closed**
11	L1.03, L1.04, L1.07, L1.08, L1.09, L4.05	60% CD 5/15/26		Consider replacing the color graphics with black & white graphics or configure the color graphics to be legible in greyscale. [CAD]	**The color graphics represent the colors being selected and is valuable information to be shown visually. We find that contractors are refereing to the set in a digitail format (not in a greyscale printed version). Terraink**		**Closed**
12	IR-series	60% CD 5/15/26		Consider replacing the color graphics with black & white graphics or configure the color graphics to be legible in greyscale. [CAD]	**We are of the opinion that using color is the clearest way to convey the information, and digital copies are often being viewed. Aqueous:**		**Closed**
13	IR-301	60% CD 5/15/26	Playground shown in purple	Is the purple area in the playground duplicate information of the underdrain system show on drawing IR-103? [CAD]	**Yes. For clarity we are showing the irrigation system and the underdrainage systems on different drawings, as they will likley be installed by different contractors. Aqueous**		**Closed**

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
14	A1.12	60% CD 5/15/26	Gym	Spec section 11 66 23 calls for volleyballnets and posts, but volleyball sleeves and lines are not shown in plan. [CAD]	**Design to updated in forthcoming submission. D+W**		**Closed**
15	A3.11 & A3.12	60% CD 5/15/26		Show roof screen structure in plan to help with coordination - A3.10 shows kickers in conflict with several access paths and some HVAC services lines. [CAD]	**Design coordination of RTUs, Structure and Roof Screens are ongoing. D+W**	Not addressed in 90% CDs	**Open**
16	P1.31	60% CD 5/15/26	Teach Collab 327	Add water line to refrigerator in each Teacher Collaboration Room. [CAD]	**Coordination scope is ongoing. D+W**	Not addressed in 90% CDs	**Open**
17	E2.12	60% CD 5/15/26	Servery	Do the electrical floor boxes for the cash registers need to include data connections? No data connections are indicated. [CAD]	**See Technology Drawings for data locations. Coordination scope is ongoing. D+W**		**Closed**
18	FP Drawings	60% CD 5/15/26	General	No comments at this time- FP drawings are well developed for this stage of design. [BW]	**Comment appreciated. Design Team**		**Closed**
19	Arch	60% CD 5/15/26	Mechanical 247	Coordinate water containment details at Mechanical Room to provide containment where located at Level 2. Include curbs at door openings as necessary. Floors should have an integral wall base detail that is continuous with flooring and slopes to floor drains. Also provide water resistant gyp or waterproof board at lower wall elevation to protect in the event of a leak or flood. [BW]	**Coordination scope is ongoing. D+W**	Not addressed in 90% CD. BW/ LF	**Open**
20	P Series	60% CD 5/15/26	General/ Valves	Isolation has been developed since last set- we appreciate the additional detail from the design team. [BW]	**Comment appreciated. Design Team**		**Closed**
21	P Series	60% CD 5/15/26	General	No backflow preventers shown at Janitors closet's for detergent dispenser connection- please review and develop. P-7 schedule does not indicate fixture type or other provisions at mop sink. [BW]	**Backflow preventers shall be provided at mop sinks per the plumbing specifications. AKAL**	Not included at 90% CD. Comment has been carried over to next tab. BW/ LF	**Open**
22	P1.12	60% CD 5/15/26	Recycleing Trash 155A	No hose bibb or barrel washing provisions at 155A. Please review needs with Facilities/ School Department. [BW]	**A dedicated Hose Bibb is located adjacent door 149C. D+W**		**Closed**
23	P1.21	60% CD 5/15/26	Boys Toilet 226 & Girls Toilet 227	FD1 locations appear to be in conflict with partition support locations. Review and coordinate. [BW]	**This has been updated in the latest plans. AKAL**	Appears to still exist in conflict. Please review. BW/ LF	**Open**
24	P1.31	60% CD 5/15/26	Boys Toilet 329 & Girls Toilet 330	FD1 locations appear to be in conflict with partition support locations. Review and coordinate. [BW]	**This has been updated in the latest plans. AKAL**	Appears to still exist in conflict. Please review. BW/ LF	**Open**
25	P Series	60% CD 5/15/26	Flush Valves	Flush valves are not identified at Plumbing Schedule for urinals and toilets. E Series indicates line voltage through 6V transformer to flushometers. Coordinate fixtures and submittals to match. [BW]	**Wired flush valves shall be provided per the plumbing specifications. AKAL**	No valves are scheduled- please review Fixture Schedule with proper remarks. BW/LF	**Open**
26	P1.33	60% CD 5/15/26	Kitchen	No indoor grease trap is shown. Please confirm. [BW]	**Indoor grease traps are shown on the latest plans. AKAL**		**Closed**
27	M Series	60% CD 5/15/26	Piping/ General	Mechanical piping drawings do not show development of major isolation valve locations. Please add isolation to all floor level mains and major branches/ hydronic piping serving radiant panels/ CUHs etc. [BW]	**Isolation valve locations are being added to the piping plans. GGD**		**Closed**
28	T1.12	60% CD 5/15/26	Main Elec 151	No DC shown at egress droo from Main Elec. This door should be monitored, along with all exterior doors at level 1. Please review. [BW]	**Coordination scope is ongoing. D+W**		**Closed**
29	Mechanical	60% CD 5/15/26		Need to add labeling on all piping. [JF]	**Piping tags and type labels are being added and will continue to be developed as design progresses. GGD**		**Closed**
30	Mechanical	60% CD 5/15/26		I would recommend that the electric boiler has a SCR controller or TRIAC controller to modulate heaters instead of contactors. [JF]	**GGD wil confirm the specifiable controller options for the electric boiler.**		**Closed**
31	Mechanical	60% CD 5/15/26		I see a compensated radiant chilled water loop sequence on M4-11 a two-pipe supply and return to radiant panel loop, but the piping drawings show what I think is HW and CHW piping to a six-way valve then to the radiant panels. [JF]	**The six-way valves serving the radiant panels shall be fed with hot water and compensated chilled water, not chilled water. GGD**		**Closed**
32	Mechanical	60% CD 5/15/26		Details only show heating radiant panels. [JF]	**Applicable details & control diagrams for heating and cooling panels are being added. GGD**		**Closed**

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
33	Mechanical	60% CD 5/15/26		M4-17 only speak of a two-way valve. [JF]	**Applicable details & control diagrams for heating and cooling panels are being added. GGD**		**Closed**
34	Mechanical	60% CD 5/15/26		If six-way valves or two way are used, can we try and keep them all in the hallways for uniform access. [JF]	**Best efforts will be made to keep control valves in corridors wher spatial constraints allow. GGD**		**Closed**
35	Mechanical	60% CD 5/15/26		Is emergency power on to the ASHP at all times? for crankcase heaters. [JF]	**No, only one ASHP is connected to emergency power due to limitations on generator sizing. GGD**		**Closed**
36	Mechanical	60% CD 5/15/26		M4-11 emergency power sequence, Air source heat pumps sometimes will go into defrost or oil return even if locked out by the BMS, this could be a unexpected currant draw on the generator. [JF]	**The sequencing of this lockout during emergency power is being coordinated with the ASHP manufacturer and will be indicated in the final control sequences. GGD**		**Closed**
37	Plumbing	60% CD 5/15/26		Plumbing let's try and keep hot water recirculation tie in as close to the fixtures as possible, this ensures hot water sooner and saves water. Preferably right at the fixture. [JF]	**This has been optimized in the drawing set. AKAL**		**Closed**
38	GP1.10	60% CD 5/15/26	PH 1 Notes	Phase 1 General Notes - The note that states that fencing must be a minimum of 6' from a structure conflicts with the graphic showing the fence line at the edge of the parking area. If the need of the full parking area this note may need to be revised to indicate the fence line on the edge of the parking to maintain the spaces not a distance off the building. [TC]	**Notes to be updated in forthcoming submission. D+W**		
39	PH 1 Notes	60% CD 5/15/26	PH 1 Notes	Phase 1 Note number 1 indicates stockade fencing. Having a graphic to indicate the location / extent of the 6' stockade fence is needed. The option for wood panels should be reviewed. It is likely that the fence will be plywood if panels are allowed. The intent appears to be an outward facing stockade fence. Is this clarified in the temporary protection Specification? [TC]	**Site contractor has installed fencing with scrim. D+W**		
40	EX1.1	60% CD 5/15/26	EX1.1	The North West corner has a note indicating a patio, chicken coop and lawn. Is there documentation in the drawings for what the contractor is to do with these items? Relocation, removal? The Phase 1 Drawing shows this area getting fenced in but Demolition Drawing C1.00 does not show anything happening the patio, coop or lawn. [TC]	**See Encroachment confirmed, but outside the Limit of Work. The issue has been turned over to the Town to handle, nothing more needed by the project team.**		
41	C1.00	60% CD 5/15/26	C1.00	If the existing gas line is to remain, it may be best to label this line as remaining during construction / protect and remove at building demolition similar to the drain line note. [TC]	**The existing gas line is to be removed up to the sidewalk, with an approximate Cut & Cap location, as shown on Sheet C1.00. CDW**		
42	C1.00	60% CD 5/15/26	C1.00	What is the 6" PVC line near the relocated playground equipment and doe anything need to be done with this? [TC]	**The 6-inch PVC line is an existing sanitary sewer serving the existing school building that connects to the municipal sewer in the street. The Contractor will need to coordinate construction activities and temporarily relocate or adjust portions of the existing sewer, as necessary, to avoid conflicts with the proposed work until the existing building is demolished. CDW**		
43	C1.00	60% CD 5/15/26	C1.00	Are there any monuments or dedication trees that need to be salvaged and relocated? [TC]	**See drawing sheet L0.01 and Section 02 41 01 Salvage Schedule. D+W**		
44	C1.00	60% CD 5/15/26	C1.00	The erosion control shown appears to address the construction as a whole rather than in phases. Can two erosion control plans be provided to isolate the construction phase form the demolition phase? It would not be desirable to have erosion control measures around the occupied school during the construction phase. [TC]	**The erosion control plan represents the overall erosion and sediment control requirements for the project. As noted on the plans, the Contractor is responsible for preparing a Construction Management Plan (CMP) and SWPPP identifying the construction phasing, staging areas, and erosion control measures between phases. Erosion controls shall be installed in accordance with the approved phasing and limited to the active work areas during each phase. CDW**		

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
45	C2.00	60% CD 5/15/26	C2.00	The shed and dumpster pad fencing paper to be on the 6' wide sidewalk. Should these be set back to keep the walk clear? Will the dumpster location and the shed require a curb cut? [TC]	**The proposed sidewalk terminates at the 10-foot-wide crosswalk and does not extend along the frontage of the dumpster enclosure, shed, transformer, or generator. Therefore, the dumpster enclosure and shed fencing do not encroach into the pedestrian route. A curb cut in front of the dumpster enclosure will be incorporated into a forthcoming plan revision. CDW**		
46	C2.00	60% CD 5/15/26	C2.00	I see bollards around the generator but not the transformer. Typically the power company requires bollards. Please review. [TC]	**The bollards for both the transformer and generator are shown in Sheet E0.04 Electrical Site Plan. CDW**		
47	C2.00	60% CD 5/15/26	C2.00	The new construction is within the 100' buffer zone in the Southeast corner. This appears to be intentional. Are there special approvals needed to be within the buffer zone?	**The project has completed the permitting process and obtained all required permits and/or waivers. CDW**		
48	C3.00	60% CD 5/15/26	C3.00	The Southeast corner of the building is within the 100' wetlands buffer zone. Are there any special approvals needed for this overlap? [TC]	**The project has completed the permitting process and obtained all required permits and/or waivers. CDW**		
49	C3.00	60% CD 5/15/26	C3.00	Zoning table shows not meeting the maximum building height. Does the new construction have an exception to the zoning requirement. [TC]	**The project has completed the permitting process and obtained all required permits and/or waivers. CDW**		
50	L0.01	60% CD 5/15/26	L0.01	In the Northwest corner the site a limit of work line is shown that does not align with the phasing drawings and the construction fence line. In particular at the chicken coop and shed area. There appears to be a new fence sectioning off this area. If this area is to be protected during construction, this area needs to be clarified on all drawings. [TC]	**Civil and Landscape Teams have coordination the Limit of Work Line. Terraink**		
51	L1.01	60% CD 5/15/26	L1.01	Electronically operated vehicular gate refers to the electoral plans and details. Drawing E0.04 Electrical Site Plan does not show power to the gate location. E0.06 Electrical Site Details does not have gate details. Please provide details and coordination for the fence operation. [TC]	**Electronically Operated Vehicular Gates are no longer proposed within the design. Terraink**		
52	L1.01	60% CD 5/15/26	L1.01	The loading area bollards are lighted but this is not incited on L1.01 and my cause bidding confusion on if these are a site item or electrical item. Who owns these should be clarified to avoid a double scope. [TC]	**Bollard scope is under review with the Owner. D+W**		
53	L1.01	60% CD 5/15/26	L1.01	Drawing E0.04 indicates that lighted bollards SL5 have six removable bollards. The site details and electrical details need to be documented for the removal and power disconnect to accomplish this safe removal. [TC]	**Bollard scope is under review with the Owner. D+W**		
54	L1.01	60% CD 5/15/26	L1.01	The Materials Drawings in the PreK Dropoff parking area seams to be missing PB as shown on E0.04. Site lighting detail 6 E0.03 indicates a 7 pin twist lock receptacle provided by others. This could create a scope gap. [TC]	**Coordination scope is ongoing. D+W**		
55	L1.01	60% CD 5/15/26	L1.01	The location of the emergency call box is on the North side of the play area on the Materials Drawing L1.01. The location on Electrical Drawing E0.04 is on the South side of the play area. The location needs to be reconciled between the two drawings. [TC]	**Coordination scope is ongoing. Electrical shall match the landscape drawings for the location of the Emergency Call Box location. Terraink**		
56	L1.01	60% CD 5/15/26	L1.01	Two double swing traffic gates are shown. One is labeled C17 at the play area. The second is indicated to be an electronically operated gate but does not have a material tag. This will cause a scope gap. The note indicates to refer to the electrical drawings and as mentioned above there are no details on the electrical drawings and without a tag - a site contractor may not include this gate in their scope. [TC]	**Electrically Operated Vehicular Gates are no longer proposed within the design. Terraink**		

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
57	L1.01	60% CD 5/15/26	L1.01	The site light at the D8 Utility Shed is in the shed. The electrical drawing shows this fixture between the shed and dumpster pad. In general the Layout Drawings and the Electrical Drawings should be reconciled for locations and power requirements. [TC]	**Coordination scope is ongoing. D+W**		
58	L1.02	60% CD 5/15/26	L1.02	Electrical drawing E0.04 show two EV Charger locations. The site material layout does not show these provisions. The concern is that the electrical location is on the back side of the vehicular guardrail and the back side of the sidewalk. As shown in plan the charging cord will cross over the sidewalk. These details and location should be developed. [TC]	**Coordination scope is ongoing with the Owner. D+W**		
59	E0.04	60% CD 5/15/26		Site Light SL-4 with Note 5 calls for a wall mounted fixture with not mention of a pole. This should be clarified. [TC]	**Site light SL4 is not a wall mounted fixture and note 5 does not refer to it. GGD**		
60	L1.02	60% CD 5/15/26	L1.02	In the Pre-K drop-off area a note indicates EV Charging Stations and to see Electrical Plans and Details. Electrical Drawing E0.04 shows four PB's but these are not specially labeled for EV. No Plans and Details are provided on the Electrical Drawings. [TC]	**We have updated our notes to correctly locate and refer to the Electrical Drawings for the proposed EV charging station locations. Terraink**		
61	L1.02	60% CD 5/15/26	L1.02	In the Pre-K drop-off area an Electronically Operated Vehicular Gate is shown. No electrical provisions for this gate or details are provided on the Electrical Drawings. [TC]	**Electronically Operated Vehicular Gates are no longer proposed within the design. Terraink**		
62	L1.08	60% CD 5/15/26	L1.08	Detail 11 Buddy Bench. The plans call to relocate the Buddy Bench. Are there both new and relocated Buddy Benches? [TC]	**Per DPW's request all proposed Buddy Benches within the project are to be new. Terraink**		
63	L2.00	60% CD 5/15/26	L2.00	At the three traffic gates. They all appear to swing into the crosswalk path of travel in the open position. Can this be studied? [TC]	**Gates are shown swinging outwards in the open postion; away from the crosswalk path of travel. Terraink**		
64	IR-301	60% CD 5/15/26	IR-301	IR-301 Irrigation Layout and E0.04 show different requirements for pipe sleeves, grounding wires and conduit. The electrical drawings call for 2 ea. 3/4" conduit and the IR Plans call for 4" sleeves. The IR drawings call for Data lines but the electrical drawings do not show data. [TC]	**The (2) ¾" conduits are for power and data, and are shown on the electrical drawings only. The 4" sleeves on the irrigation drawing are for the irrigation mainline and valve wire/grounding only. So, all 4 sleeves will be needed and are shown on the appropriate drawings currently. Aqueous**		
65	IR-301	60% CD 5/15/26	IR-301	The irrigation meter and controller are located in an irrigation enclosure. There are no details for this enclosure but the note suggests that it's located on and equipment pad. This is a poor location for a pad mounted enclosure in the island as this will be susceptible to getting hit with both a pushed snow load and possible a snow plow once buried in a snow pile. [TC]	**Meter and Controller Enclosure have been reviewed and accepted by the the Owner. Per request by Owner, an extra isolation valve to accommodate removal of the meter and add in a winterization port with a compressor fitting in the enclosure. Aqueous/D+W**		
NEW REVIEW COMMENTS FROM MICHAEL CAMOSCIO AFTER 60% CD SUBMISSION [AUGUST 2026]							
66	220700	60% CD 5/15/26		2.01.A indicates to comply with Part 3 schedule for insulation materials. Confirm where insulation by pipe type and system type will be shown.			
67	P0.01	60% CD 5/15/26		P0.01 schedule shows sump pump and P1.01 shows elevator sump pump, however P3.01 shows elevator sump to an oil water seperator. Please confirm intent for oil water seperator.			
68	P1.02	60% CD 5/15/26		Confirm size of domestic water service with civil and indicate who final connection is by.			
69	P1.02	60% CD 5/15/26		Confirm venting for grease inteceptor back to building, also confirm plumbing owns final connections.			
70	P1.33	60% CD 5/15/26		Confirm grease trap access as location shown is below storage racks.			
71	P1.22	60% CD 5/15/26		Backflow preventers for mechanical room?			
72	P1.41	60% CD 5/15/26		Confirm plumbing vents are cordinated with mechanical intakes.			

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
73	FP0.02	60% CD 5/15/26		Detail 7 Inspector Test Connection note, splash block, to be coordinated with FP1.12 which is calling for splash block by fire protection contractor.			
74	Fire Protection - General	60% CD 5/15/26		Coordinate under duct sprinkler head requirements in Gym and other open areas.			
75	Mechanical - General	60% CD 5/15/26		Confirm capacity of EB-1 boiler and what system capacity is on emergency generator with respect to design day.			
76	230010	60% CD 5/15/26		Confirm building management system compatability with other town buildings. Is a sole source integration required?			
77	M4.16	60% CD 5/15/26		Please confirm location of BMS workstation within building. Please confirm if informational kiosk is in project and where located within building.			
78	M3.11 and M3.12	60% CD 5/15/26		Please provide RTU access and access door information in next submission.			
79	M3.11 and M3.12	60% CD 5/15/26		Please confirm if there will be 1/2 Ton or similar hoist in Stair at A.50 / 2.22 for bringing equipment to high roof.			
80	M0.18	60% CD 5/15/26		Any AHU's to be on emergency power? (note 7)			
81	E0.04	60% CD 5/15/26		Light poles close to curb in parking areas, confirm foundation is tall enough and designed to resist vehicle impact (Detail 1 in E0.06).			
82	E0.04	60% CD 5/15/26		Confirm light poles at bus drop off loop are far enough from curb to prevent strike by turning buses. Consider other locations where poles can be shifted away from curb lines with no other impact to project.			
83	C2.02	60% CD 5/15/26		Why no sidewalk on both sides of Salem Street driveway opening?			
84	23 00 10	60% CD 5/15/26		Section 23 00 10 – 3.05 Installation of Mechanical Identification (page 356 of 666 in Volume 3). Spacing for pipe markers is called out in subsection C, please clarify if same spacing and locations required for ductwork markings.			

Wildwood Elementary School

OPM Review Comment Tracking Form

Review Date: 8/18/26-9/4/26

Reviewed By: Brendan Walsh, Jay Faxon, T Connolly, Craig DiCarlo

*****A/E team - Please respond to the 90% CD comments here as well as the comments in the 100% DD and 60% CD tabs noted as "Open".*****

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
1	Volume 1 00 21 14	90% CD 8/14/26	1.01 A	Since the 60% CD review comments, Projectdog has upgraded to a new platform, this section needs to be revised to show the new URL, terminology, and project ID: **www.Projectdoc.com, Project ID 261329** [CAD]			
2	22 00 01	90% CD 8/14/26		The sub-slab ventilation system (31 21 13) appears to be missing from the plumbing trade contractor's scope. [CAD]			
3	Div 27	90% CD 8/14/26		Where in the documents is the DAS for 3 cellular carriers included? [CAD]			
4	General	90% CD 8/14/26		Some of the bookmark links are broken and/or point to the wrong drawings- e.g., Dwg Vol1 GC-series, GD-series, C-series, L-series, S-series. [CAD]			
5	AG0.04 & C2.02	90% CD 8/14/26		In Leadership meetings, the town said they are open to a monumental sign, but needed more discussion. Was direction given by the town on the location shown. [CAD]			
6	C2.02	90% CD 8/14/26		Plans show former / superseded drop-off layout with flush curbs and bollards. [CAD]			
7	S-series	90% CD 8/14/26		General notes for glulam and DLT decking appear to be missing. [CAD]			
8	A3.10	90% CD 8/14/26		Several solar-ready zones appear to have interrupting MEP elements such as Plumbing vent pipes. [CAD]			
9	A7.52	90% CD 8/14/26		Consider making guardrails 1" taller than the code required minimum height to account for constrution tolerances. [CAD]			
10	A10.71	90% CD 8/14/26	A21	Consider relocating acoustical wall panels in locations that are not accessible from the top row of the bleachers. [CAD]			
11	C1.02	90% CD 8/14/26	Soccer Plaque	The soccer field monument sign calls to be salvaged. Is this to be reinstalled? If so, is there a new location? [TC]			
12	C4.01	90% CD 8/14/26	Utilities	This is more of a coordination item. On the North side of the site were the water and electrical utilities turn into the building, there is a base for the fence and a light pole. [TC]			
13	L1.05 L1.06	90% CD 8/14/26	Courtyard	"In Process" is stamped across the courtyard layout. Is information needed to complete this layout? [TC]			
14	A9.60	90% CD 8/14/26	Signage	The signage package is basically for code signs. I do not see a detail for the school sign by the street. Is there an interior graphics package? [TC]			
15	FS 5.01	90% CD 8/14/26	Kitchen	Please note vertical closure panels required for wall closure at each end of walk in opening- ceiling closure only noted and detailed. BW/ LF			
16	FS 4.01	90% CD 8/14/26	Kitchen/ Ventilation	Kitchen Ventilation Plan shows a design that is pressure positive by 1200 CFM. Kitchen should have a negative pressure design to contain odor/ smoke/ vapors- please review. BW/ LF			
17	FP 1.11	90% CD 8/14/26	Stair Landings	Please note wire guards at sprinkler heads below stair landings. BW/ LF			
18	P 0.01	90% CD 8/14/26	Plumbing Fixtures	Plumbing Fixture Schedule/ BOD manufacturer and model are not scheduled. Needs development. BW/ LF			
19	P 1.0	90% CD 8/14/26	Recycling/ Trash 155A	No Floor Drain/ W&T up is shown in Recycling/ Trash at underground plumbing plan- please review requirements for cleaning/ barrel washing etc. Hose Bibb has now been included in design. BW/ LF			
20	A 9.90	90% CD 8/14/26	Recycling/ Trash 155A	Resilient base should be caulked/ sealed to concrete floor at the Trash/ Recycling Room to waterproof against future spills and washing. Please review. BW/ LF			

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
21	P Series	90% CD 8/14/26	Floor Drains/ Pitch	Provide notes and proper detail to represent floor sloping at all floor drains. BW/ LF			
22	P 3.01	90% CD 8/14/26	Emergency Eye Wash	Detail 6 does not indicate EW discharge to a floor drain and appears to drain directly onto floor, and no flow indicator is shown (some owners prefer a flow switch with audible or visual indicator, or BMS point to indicate flow condition). Please review Emergency Eyewash/ Shower details with Owner/ Facilities. BW/ LF			
23	P 3.02	90% CD 8/14/26	Detail 3/ Mop sink and fixture	Backflow device is not shown at mop sink fixtures, and only an atmospheric vacuum breaker is shown to prevent siphon contamination. Please review detergent dispenser used by Wilmington Facilities Vendor and provide backflow prevention, if air gap type dispenser is not used (Some dispensers direct connect to hose end at fixture/ remain under pressure and can create the potential to contaminate the domestic water supply). BW/ LF			
24	M 0.12	90% CD 8/14/26	Automatic Fire Damper Detail	Please note to use largest possible duct access door at all fire dampers/ especially where utilizing fusible links. Detail shows a small door that would be useless in replacing a fusible link. Links cannot be replaced through a small door- two hands and visual access are required to reset a fusible link damper. 12x12 is NFPA minimum- larger is preferred and should be noted. BW/ LF			
25	M 0.13	90% CD 8/14/26	Radiant Panel Details	Radiant Panel details do not specify soft copper connection to braided hose- please indicate sweat or braze connections at soft copper to fittings (other projects have had failures where ProPress has been used at soft copper). BW/ LF			
26	M 0.15 & Spec 23 00 10-155	90% CD 8/14/26	Roof Mounted Exterior Ductwork & Detail	Please clarify intent for exterior ductwork. Specfication offers Phenolic Exteior Ductwork, though details shown metal duct. Also, duct insulation is not noted as rigid insulation in the M 0.15 detail- please clarify intent (Flex Clad or other weather barrier will require rigid board). BW/ LF			
27	M 0.16	90% CD 8/14/26	Kiln Duct Detail	Please note Fan Kit/ control intent on this detail (Wall timer, relay contact closure (onboard kiln controller) etc if by ATC or other. BW/ LF			
28	M Series/ Piping	90% CD 8/14/26	General/ T Stats	T stats are not shown at all rooms- please review all sheets and provide locations as required. Example M2.21 General Classroom 217 and M2.32 (only a handful of T stats shown- mostly missing). BW/ LF			
29	Spec 23 00 10-95	90% CD 8/14/26	Combination Fire/ Smoke Dampers	Fire/ Smoke damper spec reads to include a "Frangible Link including an explosive charge connected in series with fusible link". This is not typical for this type of facility (used in mission critical applications). Please review and clarify fire/ smoke damper product details. BW/ LF			
30	M 4.16	90% CD 8/14/26	ATC Front End Interface Diagram	ATC Front End diagram does not show/ indicate local dedicated UPS that should accompany the work station. Please review. BW/ LF			
31	Spec 28 10 00 - 20	90% CD 8/14/26	Integrated Security Spec	Security Spec indicates systems integrator provided by the Owner- please review: security and systems integration for access control and MNS/ FA should be included under contract of the project to merge system functionality and commision all systems. BW/ LF			
32	FA Series	90% CD 8/14/26	Roof Plans	No FA roof plan is provided- please review requirements for notification/ horn strobes etc required at roof level. BW/ LF			
33	E2.12 & T1.12	90% CD 8/14/26	Gymnasium	Please note wire guards or protective enclosures at all wall and ceiling mounted devices at Gymnasium to include scoreboard and shot clocks as necessary. Also coordinate details with M Series wall devices (T Stats / CO2 metering). BW/ LF			

Ctrl. No.	Drawing/Spec Ref.#	Drawing Revision	Room/ Detail #	Reviewer's Comments	Architect's / Engineer's Response	Follow-Up Action	Open or Closed
34	T 0.01	90% CD 8/14/26	Site/ Tel Data	Confirm no exterior WAPs are required to satisfy program or owner requirements. BW/ LF			
35	T 2.03 & T 2.04	90% CD 8/14/26	Rack Elevations	UPS equipment is not identified at tel data racks/ details. Please review requirements and any owner provided equipment for reserving of rack space. BW/ LF			
36	E Series & Spec	90% CD 8/14/26	All	With the abundance of electrified infrastructure and issues that have arisen with the inconsistent quality of utility power, LF requests a hold in the GMP for a final power quality study by EC/ 3rd party vendor and coordinated by the CM. Other projects have faced failures due to poor utility power quality. Comment at DD set (carryover) as reply was marginal mitigation using SPDs and K-13 specific transformer type. Please setup discussion with CM. BW/ LF			
37	M 0.19	90% CD 8/14/26	Hydronic System Makeup	In a closed loop system with capped makeup water (desinged as a glycol fed system) how will operator be alerted to leaks or low fluid condition/ where makeup water system is capped and not connected as a safety for makeup of the system? BW/ LF			
38	M Series/ ATC	90% CD 8/14/26	ATC	Confirm requirements for integration of ATC in the existing town operational environment. Is this standalone, or is this integrated with other town buildings? BW/ LF			
39	P 1.33	90% CD 8/14/26	Indoor Grease Traps	Confirm Indoor Grease Traps are coordinated for access to cleaning- West most grease trap appears to sit partially under kitchen equipment. BW/ LF			

DESIGN REVIEW

90% CD SET REVIEW – MEP COMMISSIONING

WILMINGTON ELEMENTARY SCHOOL

320 SALEM STREET

WILMINGTON, MA

PREPARED FOR:

MASSACHUSETTS SCHOOL BUILDING AUTHORITY

10 POST OFFICE SQUARE, SUITE S400

BOSTON, MA 02109

SEPTEMBER 11TH, 2026

ICO ENERGY AND ENGINEERING

Integrate. Conserve. Optimize.

Cover Letter

ICO Energy and Engineering is providing the Commissioning Services for the New Wilmington Elementary School. ICO is submitting the 90% Construction Development (CD) Set review comments as part of the commissioning scope of work. The 90% CD set was issued on 08/07/2026. ICO has completed a detailed review of the drawings and specifications for the mechanical, electrical, and plumbing systems that fall within the commissioning requirements for this project.

Our review focused on how well the CD documents align with the Owner's Project Requirements (OPR), Basis of Design (BOD), and all applicable codes, standards, and best practices.

During the review of the 90% CD Set, it was noted that the control drawings for several systems, including the rooftop air handling units, exhaust fans, and other equipment, have not been fully finalized. As a result, ICO was unable to fully review the associated control sequences. Finalization and coordination of the control drawings and sequences should be completed prior to construction.

Included with this letter are ICO's review comments. Comments are intended to assist the design team in confirming that the systems are properly coordinated, fully commissionable, and positioned to meet the project's performance and sustainability objectives.

Design Packages Reviewed			
Drawings Set	**Review Date**	**Reviewed By**	**Scope**
100% DD Set	02/26/2026	Matt Tobichuk & Kevin Spates (ICO)	MEP Cx
60% CD Set	05/20/2026	Matt Tobichuk & Kevin Spates (ICO)	MEP Cx
60% CD Set	06/08/2026	Craig Andrade & Cynthia Staats (BES)	BECx
90% CD Set	09/09/2026	Matt Tobichuk & Kevin Spates (ICO)	MEP Cx
90% CD Set	06/08/2026	Craig Andrade & Austin Clark (BES)	BECx

Attached Items

1. ICO MEP Cx Design Review comments spreadsheet and PDF.
2. BES BE Cx Design Review comments tracking log, cover letter, and drawing markups.

Sincerely,



Kevin Spates, P.E., CxA, CEM
ICO Energy and Engineering, Inc.
Direct: (774) 217-0176

Wilmington Elementary School 90% CD Review / 60% CD Backcheck

ICO ENERGY AND ENGINEERING
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Item #	Drawing Set	Drawing	Equipment/Location	Issue	Noted By	Note Date	Responsibility	Comment Response	Status
1	100% DD	N/A	Owner's Project Requirements	Has an Owner's Project Requirement document been developed per the LEED criteria for ICO Cx to review and comment. The DD Design Deliverable and Cost Estimate has some of the necessary information spread throughout but not consolidated in an OPR document. Please review and confirm where the information is provided to satisfy the OPR requirements of LEED.	ICO	02/27/26	GGD		Closed
2	100% DD	Spec 230010 - 19	Emergency Eye / Shower	Eyewash station is called to have a flow switch tied into the BMS. This is not described on the drawings.	ICO	02/27/26	GGD		Closed
3	100% DD	P0.01	Emergency Eye / Shower	Please confirm if an eyewash station will be located in the mechanical pump room. There is an eye wash station listed on P0.01, however there is not one on P1.22 nor is there tepid water piping.	ICO	02/27/26	GGD		Closed
4	100% DD	Mech - General	Air Balance	A building air balance to be conducted once airflows are set in order to ensure between SA, RA, EA we are maintaining a positive building. Airflows appear to be in progress and will be reviewed at the next drawing set.	ICO	02/27/26	GGD		Closed
5	100% DD	Mech - General	Condensate Lines	Condensate lines from the DCUs do not appear to be located yet. Is the intention for condensate to slope to drain or are the CPs that will be installed be used entirely?	ICO	02/27/26	GGD	05.18.2026 - No condensate pumps or condensate lines are shown on the drawings, internal pumps listed on schedule. 08.21.2026 - Intention is for condensate to slope following CP's. GGD	Closed
6	100% DD	Mech - General	Note 30 Emergency Restriction	There is a note stating "during emergency restriction or emergency power, supply fan to run; mechanical cooling shall be de-energized" Please confirm which SF this is referring to or if it for the AHUs.	ICO	02/27/26	GGD		Closed
7	100% DD	Mech - General	Note 36 AHU Condensate Pump	Note 36 is specific to DCUs, but there is calls for AHUs to also have condensate pumps. These are not included on the points list for the AHUs	ICO	02/27/26	GGD		Closed
8	100% DD	M1.11	Teach Wellness 125A	Please confirm if this is a teaching room and if this would require continuous ventilation. Currently there is no SA to the room.	ICO	02/27/26	GGD		Closed
9	100% DD	M1.22	Learning Center 210	Please confirm that this room will require SA. There does not appear to be SA in this space.	ICO	02/27/26	GGD		Closed
10	100% DD	M1.22	Read 209	Please confirm that this room will require SA. There does not appear to be SA in this space.	ICO	02/27/26	GGD		Closed
11	100% DD	M4.15	Controls	Please ensure the controls provided reflect the equipment in the building. It appears that some of the controls are from a different building.	ICO	02/27/26	GGD	05.18.2026 - Reference exhaust fans and RTUs 08.21.2026 -Control diagrams will be reviewedand updated as design progresses. GGD 09.09.2026 - Not revised as of 90% Set.	Open
12	100% DD	M4.16	Lighting Control	Lighting control is called to be integrated with BMS, however the occ sensors are not included in any sequencing. Please confirm how lighting control will be achieved through BMS and how it will be used in terminal unit sequencing.	ICO	02/27/26	GGD		Closed
12	100% DD	E1.11, E1.12, E1.21, E1.22, E1.31, E1.32	Room Names and Emergency Lighting	Please include room names in all rooms throughout the lighting plans to confirm emergency lighting locations.	ICO	02/27/26	GGD		Closed
13	100% DD	E4.11, E4.12, E4.21, E4.22, E4.31, E4.32 and all Electrical Drawings	Room Names	Please include room names in all rooms throughout the electrical and fire alarm plans for device verification	ICO	02/27/26	GGD		Closed
14	100% DD	E4.11	Speaker / Visual "ADA" Compliant Signal and Mass Notification Signal Devices	Please confirm if fire alarm and mass notification devices should be present in Adjustment 104	ICO	02/27/26	GGD		Closed
15	100% DD	E4.11, E4.21, E4.31	Smoke Detector for Elevator Recall	Please confirm if the smoke detector located near Elevator EL-1, EL-2, EL-3 and the smoke detector in the elevator machine room 328 should have an "E" to indicate elevator recall	ICO	02/27/26	GGD		Closed
16	100% DD	E3.02, E3.05, E3.06, E3.07, M0.18, M0.19	Electrical & Mechanical Schedules	Please confirm if completed schedules for equipment verification and coordination will be provided	ICO	02/27/26	GGD	05.18.2026 - There are still schedules incomplete. To be backchecked at 90% submission. 08.21.2026 - Equipment schedules will be coordinated and verifeid before final submissions. GGD	Open
17	100% DD	Mech - General	Schedules	Equipment schedules are incomplete at the DD level, understandably. Equipment sizing and calcs will need to be completed in the next set of plans when schedules are further developed.	ICO	02/27/26	GGD		Closed
18	100% DD	Mech - General	Load Calcs	Have load calculations been provided?	ICO	02/27/26	GGD		Closed
19	100% DD	Elec - General	Generator Load and Equipment	What is anticipated to be on the Emergency Generator for equipment? Has this all been confirmed to date?	ICO	02/27/26	GGD	08.21.2026 - This has not been fully coordinated yet, we are expecting the standard emergency lighting, freeze protection, fire alarm system, various HVAC equipment, security. GGD 09.09.2026 - See AHU Schedule, there is mention in the notes that there is emergency power to some RTUs but not in the remarks section. Electric boiler is not listed as emergency power, electrical schedule for mechanical equipment is incomplete.	Open
20	100% DD	Mech - General	Single Line/Riser Diagrams	Provide single line diagrams / risers of the airside and waterside system	ICO	02/27/26	GGD	08.21.2026 - Design documentation will continue to be developed as design progresses. GGD	Closed
21	100% DD	Mech - General	Equipment and Diffuser tags	Equipment tags to be provided with the progression of the drawings and schedules in order to understand spaces served	ICO	02/27/26	GGD	08.21.2026 - Design documentation will continue to be developed as design progresses. GGD	Closed
22	100% DD	Mech - General	Metering	Confirm the metering approach for the Mechanical system, no metering is indicated on mech	ICO	02/27/26	GGD	08.21.2026 - There is kWh and BTU metering indicated on the Central Plant diagram on Controls I. GGD	Closed
23	100% DD	Plum - General	Metering	Confirm the metering approach for the Plumbing system, no metering is indicated on plum	ICO	02/27/26	GGD	08.21.2026 - Any required Plumbing meters will be provided by Div 22 and integrated into the BMS by the ATC Contractor. GGD	Closed
24	100% DD	M3.12	Roof space	Roof area B below column line B.26 shows a bunch of RTUs that do not seem to fit and work in this area on the roof.	ICO	02/27/26	GGD	08.21.2026 - Adjustments will be made as required to ensure required clearances and distances between intakes and exhaust are met. GGD	Closed
25	60% CD	P3.01	Dishwasher Detail	It does not appear the dishwasher detail accurately depicts the dishwasher for this project.	ICO	05/18/26	GGD	09.09.2026 - No comment provided by GGD	Open
26	60% CD	M0.11	AHU detail	There is an AHU detail and an RTU detail however only the RTU detail is applicable. This should be adjusted.	ICO	05/18/26	GGD	AHU detail is required, will be updated to indicate "RTU" and relevant detailing for side connection RTU's.	Open
27	60% CD	M4.19	RTU-19 DNE	There is a control drawing for RTU-19 however, that unit does not exist.	ICO	05/18/26	GGD	Control drawings to be revised. 09.09.2026 - Not revised as of 90% Set.	Open
28	60% CD	M4.13	RTU Freezestat	The freezestat for the general RTU control drawing is located before the cooling coil. Please confirm if that is an accurate location. In a reheat system, it should be after both coils.	ICO	05/18/26	GGD	Freezestat to be located on the discharge of the cooling coil. Locating after the heating coil would not protect the cooling coil. This was not addressed in the 90% CD Set. Freezestats ae still located before any coils.	Open
29	60% CD	M1.31	Language based 3rd-5th 342	Language based 3rd-5th 342. Please confirm the balanced airflow. It does not appear to be balanced neutral.	ICO	05/18/26	GGD	Balancing will be updated.	Closed
30	60% CD	M1.31	General Classroom 339	Exhaust diffuser in general classroom 339 needs to include "typ. 2"	ICO	05/18/26	GGD	Layout has been updated.	Closed
31	60% CD	-	RTU Sequences	The RTU sequences do not list the RTU that is being controlled. There a multiple different sequences, some of which may not apply. These should be looked at.	ICO	05/18/26	GGD	Control drawings to be revised. 09.09.2026 - Not revised as of 90% Set.	Open
32	60% CD	M1.11	Classroom 116	The modulating damper (MD) is shown at the supply VAV, but it should be pointing the return. Please address.	ICO	05/18/26	GGD	MD no longer included. 09.09.2026 - Moved to return	Closed
33	60% CD	E3.07	Walk-in Cooler on BMS	There is mention of the BMS monitoring the walk-in cooler and walk-in freezer, this should be listed in the controls diagrams.	ICO	05/18/26	GGD	Walk in alarms are shown in the misc points on M4.15	Closed
34	60% CD	M4.16	Propeller Unit Heater Sequence	The propeller unit heater sequence mentions shutting down during fire alarm. Please confirm if this is accurate.	ICO	05/18/26	GGD	Confirmed.	Closed

Wilmington Elementary School 90% CD Review / 60% CD Backcheck

Item #	Drawing Set	Drawing	Equipment/Location	Issue	Noted By	Note Date	Responsibility	Comment Response	Status
35	60% CD	M4.16	Metering BOD and System	What type of system and software is being designed for the continuous energy measuring, monitoring, recording, displaying and reporting requirement of this M4.16 measure? ICO would like to further discuss this as the Cx Agent to ensure the design incorporates the necessary metering as well as discuss implementation of the metering and monitoring approach, potentially through the use of ICO Vision software. We can help develop the specification language to ensure this scope is met.	ICO	05/18/26	GGD	The main electric meter & hydronic meters will be integrated to the ATC provided Tridium Niagara building management system. The electrical meters will be stored and monitored via their own cloud based platform.	Closed
36	60% CD	E1.11, E1.12, E1.21, E1.22, E1.31, E1.32	Emergency Lighting	Please confirm if emergency lighting will be present in any classrooms, flex classrooms, quiet cafes or any room where multiple occupants will be.	ICO	5/20/2026	GGD	Only Egress pathways are required for emergency lighting and we will have emergency lights in any rooms without windows to the exterior. ICO 09.09.2026 - There are two egresses in general classrooms (between classrooms). Can this be confirmed as well?	Open
37	60% CD	E1.12	Emergency Lighting	Please confirm if the LR4 lighting fixture within Vestibule 167 should be half shaded to indicate emergency	ICO	5/20/2026	GGD	The only two vestibules are 100 and 160 and both have emergency fixtures.	Closed
38	60% CD	E1.12	Emergency Lighting	Please confirm if any of the RCI or LR4 lighting fixtures within Corridor 191 should be half shaded to indicate emergency	ICO	5/20/2026	GGD	All corridors will have emergency lighting.	Closed
39	60% CD	E1.11	Exit Signs	Please confirm if there should be exit signs present at the two sets of double doors at Vestibule 124, in Corridor 131 and at the double doors at Stair 3 S3-1	ICO	5/20/2026	GGD	Exit Signs will be added.	Closed
40	60% CD	E1.11	Stairwell Lighting (Stair 3 S3-1)	Please confirm if another LR8 lighting fixture should be added	ICO	5/20/2026	GGD	No under the stairs is blocked off no lighting required.	Closed
41	60% CD	E4.31	Fire Alarm Devices	Please confirm if Toilet 334B should have fire alarm devices present	ICO	5/20/2026	GGD	This has been added.	Closed
42	60% CD	Fire Alarm Drawings	Fire Alarm Devices	Please confirm if the Calming Rooms need fire alarm devices present? Some levels have fire alarm devices in these rooms and other levels do not.	ICO	5/20/2026	GGD	Calming rooms do not need FA devices.	Closed
43	90% CD	M4.16	Missing Plumbing Meters	Not all plumbing meters are include in the energy metering system. There are 4 plumbing sub meters according to P0.01 and E.306. If the BMS is tying into these meters, it should be described in the controls portion of the mechanical set. Missing the kitchen meter and irrigation meters.	ICO	9/9/2026	GGD		Open
44	90% CD	M4.16	BMS UPS	There is mention of the BMS being on emergency power, is there a requirement for a UPS to be installed?					
45	90% CD	M4.16	Electrical Submeters	There are 103 electrical submeters listed on the mechanical set; however, this quantity is not reflected in the electrical drawings.	ICO	9/9/2026	GGD		Open
46	90% CD	M4.16	Owner's Informational Kiosk	The intention is to keep the kiosk in a place for the general public? Where will this be located? This is not identified on the drawings.	ICO	9/9/2026	GGD		Open
47	90% CD	M4.16	Owner's Kiosk points	There is mention of the HRHP with adiabatic dry coolers and a geothermal system. Do these exist? They are not included on the equipment schedule.	ICO	9/9/2026	GGD		Open
48	90% CD	M4.15	TMV on BMS	Theres call for the TMVs to be on the BMS, but based on the plumbing equipment schedule there is none.	ICO	9/9/2026	GGD		Open
49	90% CD	M4.15	Acid Neutralizer on BMS	An acid neutralizer is listed under miscellaneous points but does not exist on the mechanical schedule.	ICO	9/9/2026	GGD		Open
50	90% CD	M4.15	SP Quantity	There are two (2) SPs listed under points, but only one (1) exists according to the plumbing drawings.	ICO	9/9/2026	GGD		Open
51	90% CD	M4.15	Sewer Pump Station	This is listed as a miscellaneous point, however; it is unclear where these are located. Could not be found on the civil plans.	ICO	9/9/2026	GGD		Open
52	90% CD	M4.15	Sewage Ejector Pump	This is listed as a miscellaneous point, however; it is unclear where these are located. Could not be found on the plumbing plans.	ICO	9/9/2026	GGD		Open
53	90% CD	M4.15	FSD for RTU only	Is the intention for the BMS to monitor the FSDs only that are tied to an RTU? This is unclear. This is listed as the typical FSD detail.	ICO	9/9/2026	GGD		Open
54	90% CD	P0.01	Instantaneous DHW	The domestic hot water heaters listed on the schedule is storage type, however the school wants instantaneous according to the OPR.	ICO	9/9/2026	GGD		Open
55	90% CD	Mech - General	Setpoints	There are setpoints and parameters listed in the OPR that are not included in the design drawings. These should be included such that all information can be provided to any contractors.	ICO	9/9/2026	GGD		Open
56	90% CD	Mech - General	Occupancy Schedule	There areoccupancy schedules listed in the OPR that are not included in the design drawings. These should be included such that all information can be provided to any contractors.	ICO	9/9/2026	GGD		Open
57	90% CD	E0.03	Lighting Vacancy Schedules	The OPR details the requirements for vacancy which do not match E0.03. The drawing should match the OPR.	ICO	9/9/2026	GGD		Open
58	90% CD	E0.03	Lighting Levels	The OPR details the requirements for light levels which do not match E0.03. The drawing should match the OPR.	ICO	9/9/2026	GGD		Open
59	90% CD	M2.12	DCU-3A:C issues	It appears there are DCU-3A:C located in chair storage, DCU-3C does not exist according to the schedule.	ICO	9/9/2026	GGD		Open
60	90% CD	M2.12	Network/Telecom No AC	There is no DCU-e serving the network/Telecom room. This requires redundant ACs.	ICO	9/9/2026	GGD		Open
61	90% CD	M2.12	DCUe-2 and DCUe-1	There are 2 DCUe's located in this electrical room. Is that a necessity for load? From the OPR town does wants to limit this if it is not necessary. Could one larger AC unit be used?	ICO	9/9/2026	GGD		Open
62	90% CD	M2.11	DCUe in small Electric Rms	The town notes in the OPR that they do not want AC units installed in small elec rooms with only a small transformer. Currently these are included on the plans.	ICO	9/9/2026	GGD		Open
63	90% CD	M4.17	CO2 Levels	The OPR identifies CO2 level requirements which should be included in the design. Currently they are not the same.	ICO	9/9/2026	GGD		Open
64	90% CD	M4.15	Gen Fuel Level on BMS	It was requested in the OPR that the emergency generator fuel level should be on the BMS. This is not indicated in the design.	ICO	9/9/2026	GGD		Open
65	90% CD	Mech - General	High Outdoor Air Exchange Mode	The OPR requires a high outdoor air exchange program to account for situations where max OA is available. This could not be found in the RTU sequence.	ICO	9/9/2026	GGD		Open

September 10,2026

CLIENT	PROJECT
Mr. Mark Warren	**Wilmington Elementary School**
ICO Energy and Engineering	320 Salem Street
77 Summer Street	Wilmington, MA 01887
10th Floor	
Boston, MA 02110	BES Project No.: P2294

RE: BUILDING ENCLOSURE COMMISSIONING (BECx) 90% CD PLAN REVIEW

Dear Mr. Warren:

In accordance with the agreement for services, dated October 13, 2025, Building Enclosure Science, LLC, has performed a back check review of the 90% Construction Documents noted below.

Comments are offered for the architect's consideration. The documents were reviewed for constructability, systems interfacing, material's sequencing, and individual system's performance as it relates to the collective performance of the building envelope. Due to our limited involvement in this project as the Building Envelope Commissioning Provider (BECx), we do not have control or authority over the actual design, materials selection or construction. Please ensure that comments and recommendations are reviewed for the designer of record's consideration.

Documents Reviewed

- Project Manual (90% CD Set), developed by Dore + Whittier Architects, dated August 14, 2026
- Architectural Drawings (90% CD Set), developed by Dore + Whittier Architects, dated August 14, 2026

Comments

General Comments

For brevity sake, several comments are offered in the attached marked up abbreviated set of drawings and are not listed below. Also, not all details are commented upon for typical conditions. All comments should be considered relevant for all "like" conditions, even if not specifically noted.

1. Responses to the 60%CD BECx Plan Review were received. The majority of the items were closed out; however, some items remain. Refer to the attached tracking log for updates.

2. The building envelope field test matrix has been updated in the BECx plan, and must be reviewed by the OPM, Architect, and BES prior to project bid to ensure any contractor responsibility items are included in the bids.
    a. The mock up panel appears to be conducive for field testing, which is the best timing for vetting construction and material related issues, and should be included in the schedule.

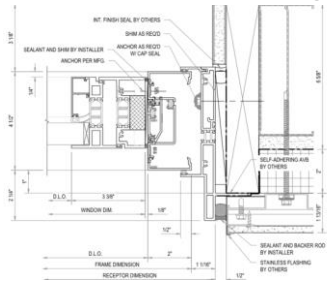
3. In Reference to Item 60%CD-7, from the 60%CD review, the top of wall (coping) conditions have not been significantly revised and BES has concerns with the components as illustrated. Further discussion regarding the materials and configurations are needed. The following must be considered (Ref H8/A6.70):
    - It appears additional framing (and potentially sheathing) might be needed to support the width of the eyebrow.
    - The MCM panel fasteners penetrate the membrane at an upward facing condition.
    - The top of the parapet (membrane) is not protected.
    - Verify if ANSI/SPRI ES-1 requirements are applicable

    The architect noted that the project team intends to vet out possible solutions with the CM and product manufacturer.

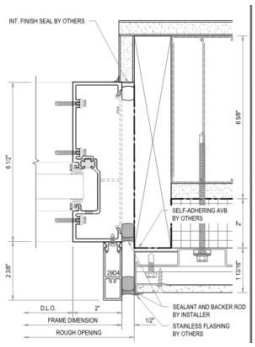
4. At the window/door areas that include CMU as the interior finish, providing the air seal connection directly from the window to the air barrier is not feasible. The CMU will need to be incorporated as part of the air barrier assembly. The air barrier membrane flashing in the RO should be terminated with sealant, at/or just short of the window interior sealant joint. (Ref A14/A8.51)

5. The air barrier connections at the louvers/ductwork is not clear. This appears to be a future RFI when more definitive product information is available. Consider adding a note that indicates an air seal is needed and silicone sheets applied from the RO to the ducts sleeve schematically added. (Ref R20/A8.51)

6. The primary air and water sealant joint location at the windows occurs at the interior frame to RO within the masonry cavity. The ideal location would occur further out at the frame shoulder to air barrier, where the foam stop is currently located. (Ref A7/8.60)
    a. BES recently completed a school project with similar window profiles. Two differing configurations were used and are offered below for the architect's consideration. This is not a recommendation and will not be tracked, but may be considered alternates.
        - A receptor with integral nail fin was used. It included the extended panning to the cladding. The nail fin option is a slightly more reliable seal to the air barrier than sealant joints and may include some cost savings.



- A similarly designed SF system sealing methodology, but the panning was added to the frame using mechanical attachment, post install. The benefit of this system was that the masonry could be installed prior to the windows.



7. The TWF location at windows with stone "lintels" is located above the stone and is not well placed for water management and does not adequately protect the steel lintels. The ideal location is directly above the steel lintel, similar to the full stone veneer details. (Ref F14/A8.60)
    a. Additionally, and likely related, the stone strap anchors are shown penetrating the steel lintel. Alternate attachment of the stone should be researched to allow the straps to occur above the lintel.

8. Window sill details illustrate a full metal pan flashing. The flashing is a thermal bridge and does not offer any significant redundancy and creates additional sealant requirements. BES recommends considering the following alterations: (Ref L7/A8.60)
    a. Form "pan" flashing using self adhered air barrier membrane. Turn the membrane up onto the edge of the stool blocking. Seal ends to jamb membrane flashing.
    b. IF a metal drip edge is used, terminate the flashing beneath the window and do not strip the flashing in to all water in the RO to drain to the masonry cavity. In our opinion, the flashing could be omitted altogether.
    c. Install primary air seal between the sill "pan" flashing back leg and window frame. A minimum ¼" wide joint should be provided and properly configured. This joint must be different from the "painter's" bead at the stool.

<u>Specification Comments</u>

Refer to the Envelope Commissioning Plan, Table 5, Field Matrix for comments related to field testing requirements

Section 019119 – Building Enclosure Commissioning

- Part 1.01.B – References "Appendix B" for the envelope field testing. Change to BECx Plan, Table 5. Consider cutting and pasting the Test Matrix Table 6 from the BECx plan and adding at the end of the section.

Please review the above comments as well as the attached abbreviated drawings set notes and comments and feel free to reach out direct with any questions. After you have had the opportunity to review all comments, a meeting with the design team and owner (or OPM) should be scheduled to review any outstanding items or clarifications.

Sincerely,

BES



Craig Andrade, RRO, RRC, CEI, CxA+BE, BECxP
Consultant V / Project Manager

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LOCATION MAP





VOLUME 1

SHEET NUMBER	SHEET NAME	MILESTONE
GENERAL		
G0.00	COVER SHEET	
GC1.00	CODE SUMMARY	
GC1.10	CODE PLANS	
GC1.11	CODE PLANS	
GD1.01	DEMOLITION - OVERALL PLANS	
GD1.02	DEMOLITION - OVERALL PLANS	
GD1.03	DEMOLITION - OVERALL PLANS	
GD1.04	DEMOLITION - BUILDING IMAGES	
GD1.05	DEMOLITION - BUILDING IMAGES	
GP1.10	PHASING PLANS	
SURVEY		
EX-1.0	EXISTING CONDITIONS PLAN	(ISSUED IN ERP1)
EX-1.1	EXISTING CONDITIONS PLAN	(ISSUED IN ERP1)
CIVIL		
C1.00	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C1.01	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C1.02	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C2.00	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C2.01	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C2.02	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C3.00	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C3.01	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C3.02	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C4.00	UTILITIES PLAN	(ISSUED IN ERP1)
C4.01	UTILITIES PLAN	(ISSUED IN ERP1)
C4.02	UTILITIES PLAN	(ISSUED IN ERP1)
C5.00	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.01	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.02	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.03	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.04	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
LANDSCAPE		
L0.01	TREE PROTECTION AND REMOVAL PLAN	(ISSUED IN ERP1)
L0.02	LAYOUT AND MATERIALS - SOUTHEAST	(ISSUED IN ERP1)
L0.04	LAYOUT AND MATERIALS - KEY PLAN, NOTES, AND LEGENDS	(ISSUED IN ERP2)
L0.05	LAYOUT AND MATERIALS - WEST	(ISSUED IN ERP2)
L0.06	LAYOUT AND MATERIALS - SOUTHEAST	(ISSUED IN ERP2)
L0.07	ENLARGEMENT - K-2ND GRADE PLAYGROUND	(ISSUED IN ERP2)
L0.08	ENLARGEMENT - PRE-K PLAYGROUND	(ISSUED IN ERP2)
L0.09	ENLARGEMENT - COURTYARD AND OUTDOOR CLASSROOM	(ISSUED IN ERP2)
L0.10	ENLARGEMENT - ARRIVAL COURT PLAZA	(ISSUED IN ERP2)
L0.11	ENLARGEMENT - 3RD AND 5TH GRADE PLAYGROUND	(ISSUED IN ERP2)
L0.12	DETAILS	(ISSUED IN ERP2)
L0.13	DETAILS	(ISSUED IN ERP2)
L0.14	DETAILS	(ISSUED IN ERP2)
L0.15	DETAILS	(ISSUED IN ERP2)
L0.16	DETAILS	(ISSUED IN ERP2)
L0.17	DETAILS	(ISSUED IN ERP2)
L0.18	DETAILS - SOIL CELLS	(ISSUED IN ERP2)
L0.19	DETAILS - PLANTING	(ISSUED IN ERP2)
L1.00	LAYOUT AND MATERIALS - KEY PLAN, NOTES, AND LEGENDS	
L1.01	LAYOUT AND MATERIALS - WEST	
L1.02	LAYOUT AND MATERIALS - SOUTHEAST	
L1.03	ENLARGEMENT - K-2ND GRADE PLAYGROUND	
L1.04	ENLARGEMENT - PRE-K PLAYGROUND	
L1.05	ENLARGEMENT - COURTYARD AND OUTDOOR CLASSROOM	
L1.06	ENLARGEMENT - ARRIVAL COURT PLAZA	
L1.07	ENLARGEMENT - 3RD AND 5TH GRADE PLAYGROUND	
L1.08	SITE FURNISHINGS - WEST	
L1.09	SITE FURNISHINGS - NORTHEAST	
L1.10	SITE FURNISHINGS - SOUTHEAST	
L1.11	PLAYGROUND EQUIPMENT	
L1.12	SECTION ELEVATIONS - SOUTHERN BASKETBALL COURT AND EASTERN SOCCER FIELD EDGES	
L1.13	STONE SCHEDULE	
L1.14	STONE SCHEDULE PLAN	
L1.15	FENCES AND GATES LAYOUT KEY PLAN	
L2.00	GRADING - KEY PLAN, NOTES, AND LEGENDS	
L2.01	GRADING - WEST	
L2.02	GRADING - SOUTHEAST	
L2.03	ENLARGEMENTS - WESTERN PLAYGROUNDS, AND COURTYARD	
L2.04	ENLARGEMENTS - 3RD AND 5TH GRADE PLAYGROUND, AND ARRIVAL COURT PLAZA	
L3.00	PLANTING - TREES AND TURF	
L3.01	PROPERTY LINE SCREEN PLANTING - WEST	
L3.02	PROPERTY LINE SCREEN PLANTING - SOUTHEAST	
L3.03	ENLARGEMENT - K-2ND AND PRE-K PLAYGROUNDS	
L3.04	ENLARGEMENT - ARRIVAL COURT PLAZA AND 3RD-5TH GRADE PLAYGROUND	
L4.01	DETAILS	
L4.02	DETAILS	
L4.03	DETAILS	
L4.04	DETAILS	
L4.05	DETAILS	
L4.06	DETAILS	
L4.07	DETAILS - SOIL CELLS	
L4.08	DETAILS - PLANTING	
IR-100	OVERALL UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-101	WEST UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-102	CENTRAL UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-103	EAST UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-200	UNDERDRAIN DETAILS	(ISSUED IN ERP1)
IR-300	IRRIGATION LAYOUT PLAN	
IR-301	IRRIGATION LAYOUT PLAN	
IR-400	IRRIGATION DETAILS	
STRUCTURAL		
S0.01	GENERAL NOTES	(ISSUED IN ERP2)
S0.02	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.03	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.04	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.05	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.06	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.07	TYPICAL DETAILS	(ISSUED IN ERP2)
S1.11	FOUNDATION PLAN - AREA A	(ISSUED IN ERP2)
S1.12	FOUNDATION PLAN - AREA B	(ISSUED IN ERP2)
S1.21	LEVEL 2 FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.22	LEVEL 2 FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.31	LEVEL 3 FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.32	LEVEL 3 FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.41	ROOF FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.42	ROOF FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.51	ROOF SCREEN FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.52	ROOF SCREEN FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S2.01	DETAILS	(ISSUED IN ERP2)
S2.02	DETAILS	(ISSUED IN ERP2)
S3.01	DETAILS	(ISSUED IN ERP2)
S3.02	DETAILS	(ISSUED IN ERP2)
S3.03	DETAILS	(ISSUED IN ERP2)
S4.01	BRACED FRAME ELEVATIONS - AREA A	(ISSUED IN ERP2)
S4.02	BRACED FRAME ELEVATIONS AND SHEAR WALLS - AREA B	(ISSUED IN ERP2)
S4.03	SHEAR WALLS - AREA B	(ISSUED IN ERP2)
S4.04	BRACED FRAME DETAILS	(ISSUED IN ERP2)
S4.05	BRACED FRAME DETAILS	(ISSUED IN ERP2)
S5.01	TRUSS ELEVATIONS AND DETAILS	(ISSUED IN ERP2)

SHEET NUMBER	SHEET NAME	MILESTONE
ARCHITECTURAL		
AG0.01	ABBREVIATIONS SYMBOLS MATERIALS AND LEGEND	
AG0.02	WALL TYPES, NOTES AND DETAILS	
AG0.03	LEVEL 1, 2 AND 3 ACOUSTICAL SEPARATION DIAGRAMS	
AG0.04	ENTRY SIGN PLAN, ELEVATIONS, SECTIONS, DETAILS	
AG0.05	CONSTRUCTION MOCKUP	
A0.11	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA A	(ISSUED IN ERP2)
A0.12	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA B	(ISSUED IN ERP2)
A0.21	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA A	(ISSUED IN ERP2)
A0.22	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA B	(ISSUED IN ERP2)
A0.31	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA A	(ISSUED IN ERP2)
A0.32	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA B	(ISSUED IN ERP2)
A1.10	LEVEL 1 OVERALL PLAN	
A1.11	LEVEL 1 - AREA A	
A1.12	LEVEL 1 - AREA B	
A1.20	LEVEL 2 OVERALL PLAN	
A1.21	LEVEL 2 - AREA A	
A1.22	LEVEL 2 - AREA B	
A1.30	LEVEL 3 OVERALL PLAN	
A1.31	LEVEL 3 - AREA A	
A1.32	LEVEL 3 - AREA B	
A1.50	TYPICAL PLAN DETAILS	
A1.51	PLAN DETAILS	
A1.52	PLAN DETAILS	
A1.53	PLAN DETAILS	
A1.54	PLAN DETAILS	
A1.55	PLAN DETAILS	
A1.56	PLAN DETAILS	
A1.60	PLAN DETAILS - INTERIOR	
A1.61	PLAN DETAILS - INTERIOR	
A1.62	PLAN DETAILS - INTERIOR	
A1.70	ENLARGED TOILET ROOM PLANS	
A1.71	ENLARGED TOILET ROOM PLANS	
A1.72	ENLARGED TOILET ROOM PLANS	
A1.73	ENLARGED TOILET ROOM PLANS	
A1.74	ENLARGED TOILET ROOM PLANS	
A1.75	ENLARGED TOILET ROOM PLANS	
A1.80	ENLARGED PLANS	
A2.11	LEVEL 1 REFLECTED CEILING PLAN - AREA A	
A2.12	LEVEL 1 REFLECTED CEILING PLAN - AREA B	
A2.21	LEVEL 2 REFLECTED CEILING PLAN - AREA A	
A2.22	LEVEL 2 REFLECTED CEILING PLAN - AREA B	
A2.31	LEVEL 3 REFLECTED CEILING PLAN - AREA A	
A2.32	LEVEL 3 REFLECTED CEILING PLAN - AREA B	
A2.50	CEILING DETAILS	
A2.51	CEILING DETAILS	
A3.10	OVERALL ROOF PLAN	
A3.11	ROOF PLAN - AREA A	
A3.12	ROOF PLAN - AREA B	
A3.13	PARTIAL ROOF PLANS	
A3.50	ROOF DETAILS	
A4.00	EXTERIOR AXONS	
A4.10	OVERALL EXTERIOR ELEVATIONS	
A4.11	EXTERIOR ELEVATIONS	
A4.12	EXTERIOR ELEVATIONS	
A4.13	EXTERIOR ELEVATIONS	
A4.14	EXTERIOR ELEVATIONS	
A4.15	EXTERIOR ELEVATIONS	
A5.10	BUILDING SECTIONS	
A5.11	BUILDING SECTIONS	
A5.12	BUILDING SECTIONS	
A5.13	BUILDING SECTIONS	
A6.10	WALL SECTIONS	
A6.11	WALL SECTIONS	
A6.12	WALL SECTIONS	
A6.13	WALL SECTIONS	
A6.14	WALL SECTIONS	
A6.15	WALL SECTIONS	
A6.16	WALL SECTIONS	
A6.17	WALL SECTIONS	
A6.18	WALL SECTIONS	
A6.19	WALL SECTIONS	
A6.20	WALL SECTIONS	
A6.50	BASE OF WALL DETAILS	
A6.51	BASE OF WALL DETAILS	
A6.60	MID WALL DETAILS	
A6.61	MID WALL DETAILS	
A6.62	MID WALL DETAILS	
A6.63	MID WALL DETAILS	
A6.70	TOP OF WALL DETAILS	
A6.71	TOP OF WALL DETAILS	
A6.72	TOP OF WALL DETAILS	
A6.73	TOP OF WALL DETAILS	
A7.01	ELEVATOR PLANS, SECTIONS, AND DETAILS	(ISSUED IN ERP2)
A7.10	STAIR PLANS AND SECTIONS	
A7.11	STAIR PLANS AND SECTIONS	
A7.12	STAIR PLANS AND SECTIONS	
A7.13	STAIR PLANS AND SECTIONS	
A7.14	STAIR PLANS AND SECTIONS	
A7.50	STAIR DETAILS	
A7.51	STAIR AND RAMP DETAILS	
A7.52	RAILING DETAILS	
A7.53	LADDER AND MISC. DETAILS	
A7.54	SHAFT ENCLOSURES AND DETAILS	
A8.10	DOOR SCHEDULE, DOOR AND BL TYPES	
A8.11	DOOR SCHEDULE AND DOOR TYPES	
A8.20	CURTAINWALL TYPES	
A8.30	WINDOW AND STOREFRONT TYPES	
A8.50	DOOR AND BL FRAME DETAILS	
A8.51	DOOR AND LOUVER DETAILS	
A8.60	WINDOW DETAILS	
A8.70	CURTAINWALL DETAILS	
A8.71	CURTAINWALL DETAILS	
A8.80	STOREFRONT DETAILS	
A9.11	LEVEL 1 FINISH PLAN - AREA A	
A9.12	LEVEL 1 FINISH PLAN - AREA B	
A9.21	LEVEL 2 FINISH PLAN - AREA A	
A9.22	LEVEL 2 FINISH PLAN - AREA B	
A9.31	LEVEL 3 FINISH PLAN - AREA A	
A9.32	LEVEL 3 FINISH PLAN - AREA B	
A9.50	INTERIOR DETAILS	
A9.51	INTERIOR DETAILS	
A9.52	INTERIOR DETAILS	
A9.60	INTERIOR SIGNAGE TYPES AND DETAILS	
A9.90	FINISH SCHEDULE - LEVEL 1	
A9.91	FINISH SCHEDULE - LEVEL 2 AND 3	
A10.11	LEVEL 1 EQUIPMENT PLANS - AREA A	
A10.12	LEVEL 1 EQUIPMENT PLANS - AREA B	
A10.21	LEVEL 2 EQUIPMENT PLANS - AREA A	
A10.22	LEVEL 2 EQUIPMENT PLANS - AREA B	
A10.31	LEVEL 3 EQUIPMENT PLANS - AREA A	
A10.32	LEVEL 3 EQUIPMENT PLANS - AREA B	
A10.50	CASEWORK PLANS AND ELEVATIONS	
A10.51	CASEWORK PLANS AND ELEVATIONS	
A10.52	CASEWORK PLANS AND ELEVATIONS	
A10.53	CASEWORK PLANS AND ELEVATIONS	
A10.54	CASEWORK PLANS AND ELEVATIONS	
A10.55	CASEWORK PLANS AND ELEVATIONS	
A10.56	CASEWORK PLANS AND ELEVATIONS	
A10.57	CASEWORK PLANS AND ELEVATIONS	
A10.58	CASEWORK PLANS AND ELEVATIONS	
A10.59	CASEWORK PLANS AND ELEVATIONS	
A10.60	CASEWORK PLANS AND ELEVATIONS	
A10.61	CASEWORK PLANS AND ELEVATIONS	
A10.62	CASEWORK PLANS AND ELEVATIONS	
A10.63	CASEWORK PLANS AND ELEVATIONS	
A10.64	CASEWORK PLANS AND ELEVATIONS	
A10.65	CASEWORK PLANS AND ELEVATIONS	
A10.66	CASEWORK PLANS AND ELEVATIONS	
A10.67	CASEWORK PLANS AND ELEVATIONS	
A10.71	INTERIOR ELEVATIONS	
A10.72	INTERIOR ELEVATIONS	
A10.73	INTERIOR ELEVATIONS	
A10.74	INTERIOR ELEVATIONS	
A10.80	MILLWORK DETAILS	
A10.81	MILLWORK DETAILS	
A10.82	MILLWORK DETAILS	
A10.90	CASEWORK SCHEDULE	
A10.91	CASEWORK SCHEDULE	

VOLUME 2

SHEET NUMBER	SHEET NAME	MILESTONE
FOODSERVICE		
FS1.12	LEVEL 1 - AREA B FOODSERVICE EQUIPMENT PLAN	
FS2.01	ENLARGED FOODSERVICE EQUIPMENT PLAN	
FS3.01	FOODSERVICE EQUIPMENT ROUGH-IN PLAN	
FS4.01	FOODSERVICE EQUIPMENT VENTILATION ROUGH-IN PLAN	
FS5.01	FOODSERVICE EQUIPMENT SPECIAL CONDITIONS PLAN	
FIRE PROTECTION		
FP0.01	FIRE PROTECTION LEGENDS, NOTES & ABBREVIATIONS	
FP0.02	FIRE PROTECTION DETAILS	
FP1.11	FIRE PROTECTION LEVEL 1 - AREA A	
FP1.12	FIRE PROTECTION LEVEL 1 - AREA B	
FP2.11	FIRE PROTECTION LEVEL 2 - AREA A	
FP2.12	FIRE PROTECTION LEVEL 2 - AREA B	
FP3.11	FIRE PROTECTION LEVEL 3 - AREA A	
FP3.12	FIRE PROTECTION LEVEL 3 - AREA B	
PLUMBING		
P0.01	PLUMBING LEGEND AND SCHEDULES	
P1.00A	RADON PIPING AREA A	
P1.00B	RADON PIPING AREA B	
P1.01	UNDERSLAB PLUMBING- LEVEL 1 - AREA A	
P1.02	UNDERSLAB PLUMBING- LEVEL 1 - AREA B	
P1.11	PLUMBING- LEVEL 1 - AREA A	
P1.12	PLUMBING- LEVEL 1 - AREA B	
P1.21	PLUMBING- LEVEL 2 - AREA A	
P1.22	PLUMBING- LEVEL 2 - AREA B	
P1.31	PLUMBING- LEVEL 3 - AREA A	
P1.32	PLUMBING- LEVEL 3 - AREA B	
P1.33	PLUMBING KITCHEN UNDERSLAB	
P1.41	PLUMBING ROOF PLAN	
P2.01	PLUMBING WASTE AND VENT RISER DIAGRAM	
P2.02	PLUMBING DOMESTIC WATER RISER DIAGRAM	
P2.02	PLUMBING DOMESTIC WATER RISER DIAGRAM	
P3.01	PLUMBING DETAILS	
P3.02	PLUMBING DETAILS 2	
P3.03	PLUMBING DETAILS 3	
MECHANICAL		
M0.11	LEGEND, NOTES & DETAILS I	
M0.12	DETAILS II	
M0.13	DETAILS III	
M0.14	DETAILS IV	
M0.15	DETAILS V	
M0.16	DETAILS VI	
M0.17	DETAILS VII	
M0.18	AIRFLOW RISER DIAGRAM	
M0.19	HYDRONIC RISER DIAGRAM	
M0.20	SCHEDULES I	
M0.21	SCHEDULES II	
M1.11	LEVEL 1 AREA A - DUCTWORK	
M1.12	LEVEL 1 AREA B - DUCTWORK	
M1.21	LEVEL 2 AREA A - DUCTWORK	
M1.22	LEVEL 2 AREA B - DUCTWORK	
M1.31	LEVEL 3 AREA A - DUCTWORK	
M1.32	LEVEL 3 AREA B - DUCTWORK	
M2.11	LEVEL 1 AREA A - PIPING	
M2.12	LEVEL 1 AREA B - PIPING	
M2.21	LEVEL 2 AREA A - PIPING	
M2.22	LEVEL 2 AREA B - PIPING	
M2.31	LEVEL 3 AREA A - PIPING	
M2.32	LEVEL 3 AREA B - PIPING & ENLARGED MECH RM	
M3.11	ROOF AREA A	
M3.12	ROOF AREA B	
M4.11	CONTROLS I	
M4.12	CONTROLS II	
M4.13	CONTROLS III	
M4.14	CONTROLS IV	
M4.15	CONTROLS V	
M4.16	CONTROLS VI	
M4.17	CONTROLS VII	
M4.18	CONTROLS VIII	
M4.19	CONTROLS IX	
VS1.11	VIBRATION & SEISMIC	
ELECTRICAL		
E0.01	ELECTRICAL SYMBOL LIST	
E0.02	LIGHTING FIXTURE SCHEDULE	
E0.03	ALCS RISER & DETAILS	
E0.04	ELECTRICAL SITE PLAN	
E0.05	ELECTRICAL SITE DETAILS	
E0.06	ELECTRICAL SITE DETAILS	
E1.11	LEVEL 1 AREA A - LIGHTING	
E1.12	LEVEL 1 AREA B - LIGHTING	
E1.21	LEVEL 2 AREA A - LIGHTING	
E1.22	LEVEL 2 AREA B - LIGHTING	
E1.31	LEVEL 3 AREA A - LIGHTING	
E1.32	LEVEL 3 AREA B LIGHTING	
E2.11	LEVEL 1 AREA A - POWER	
E2.12	LEVEL 1 AREA B - POWER	
E2.21	LEVEL 2 AREA A - POWER	
E2.22	LEVEL 2 AREA B - POWER	
E2.31	LEVEL 3 AREA A - POWER	
E2.32	LEVEL 3 AREA B - POWER	
E2.40	ROOF PLAN	
E3.00	ELECTRICAL ROOM PART PLANS	
E3.01	ELECTRICAL ONE LINE RISER	
E3.02	ELECTRICAL PANEL SCHEDULES	
E3.03	ELECTRICAL DETAILS	
E3.04	ELECTRICAL DETAILS	
E3.05	MECHANICAL EQUIPMENT SCHEDULE	
E3.06	PLUMBING EQUIPMENT SCHEDULE	
E3.07	KITCHEN SCHEDULE	
E3.08	TELECOM RISER DIAGRAM	
E3.09	BDA SYSTEM DIAGRAM	
E3.10	LIGHTNING PROTECTION DETAILS	
E4.01	FIRE ALARM RISER	
E4.11	LEVEL 1 AREA A - FIRE ALARM	
E4.12	LEVEL 1 AREA B - FIRE ALARM	
E4.21	LEVEL 2 AREA A - FIRE ALARM	
E4.22	LEVEL 2 AREA B - FIRE ALARM	
E4.31	LEVEL 3 AREA A - FIRE ALARM	
E4.32	LEVEL 3 AREA B - FIRE ALARM	
E5.01	EARLY RELEASE RISER DIAGRAM	(ISSUED IN ERP2)
E5.02	EARLY RELEASE SWITCHBOARD SCHEDULES	(ISSUED IN ERP2)
TECHNOLOGY		
T0.01	SITE PLAN EXTERIOR CAMERAS TECHNOLOGY	
T1.11	LEVEL 1 - AREA A TECHNOLOGY	
T1.12	LEVEL 1 - AREA B TECHNOLOGY	
T1.21	LEVEL 2 - AREA A TECHNOLOGY	
T1.22	LEVEL 2 - AREA B TECHNOLOGY	
T1.31	LEVEL 3 - AREA A TECHNOLOGY	
T1.32	LEVEL 3 - AREA B TECHNOLOGY	
T1.41	ROOF - AREA A TECHNOLOGY	
T1.42	ROOF - AREA B TECHNOLOGY	
T2.01	DETAIL SHEET TECHNOLOGY	
T2.02	DETAIL SHEET TECHNOLOGY	
T2.03	DETAIL SHEET TECHNOLOGY	
T2.04	DETAIL SHEET TECHNOLOGY	
T2.05	DETAIL SHEET TECHNOLOGY	
T2.06	DETAIL SHEET TECHNOLOGY	
T2.07	DETAIL SHEET TECHNOLOGY	
T2.08	DETAIL SHEET TECHNOLOGY	
T2.09	DETAIL SHEET TECHNOLOGY	
T2.10	DETAIL SHEET TECHNOLOGY	
T2.11	DETAIL SHEET TECHNOLOGY	

WILMINGTON ELEMENTARY SCHOOL

D&W PROJECT # 23-0847

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WILMINGTON, MA 01887
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VOLUME 1

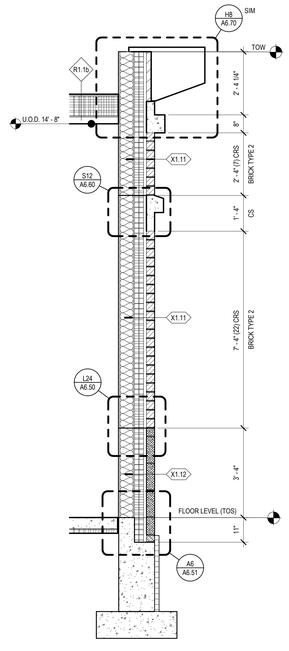
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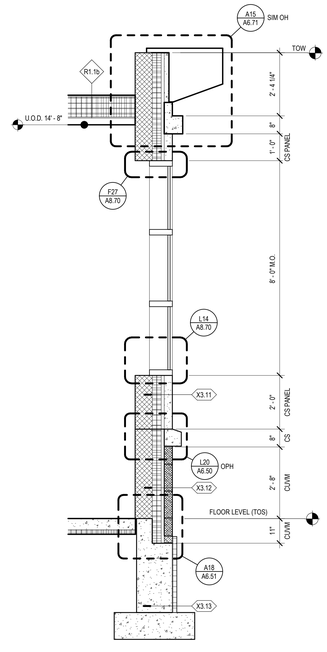
☒ REVIEWED WITH COMMENTS
☐ REVIEWED WITH NO COMMENTS

REVIEWED BY: CraigAndrade
REVIEW DATE: 09/10/2026

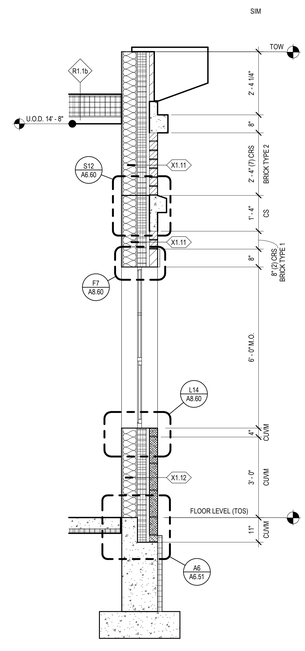
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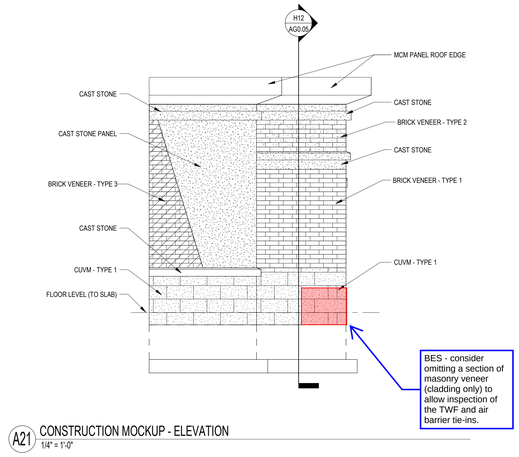
H12 CONSTRUCTION MOCKUP - SECTION
1/2" = 1'-0"



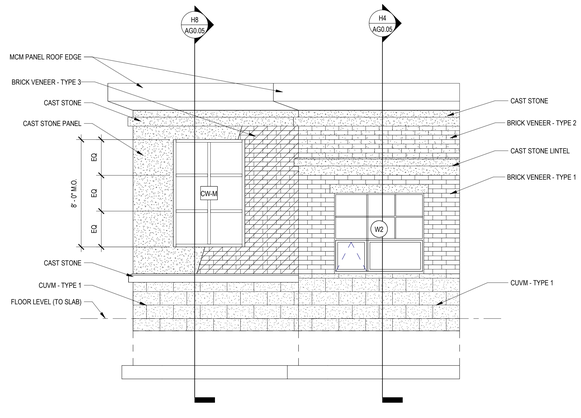
H8 CONSTRUCTION MOCKUP - SECTION
1/2" = 1'-0"



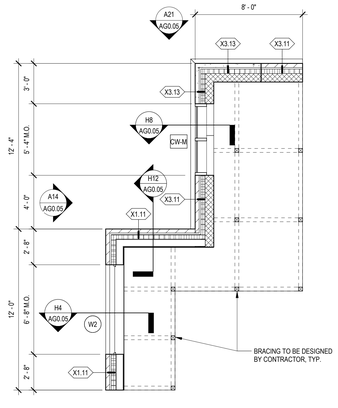
H4 CONSTRUCTION MOCKUP - SECTION
1/2" = 1'-0"



A21 CONSTRUCTION MOCKUP - ELEVATION
1/4" = 1'-0"



A14 CONSTRUCTION MOCKUP - ELEVATION
1/4" = 1'-0"



A6 CONSTRUCTION MOCKUP - PLAN
1/4" = 1'-0"

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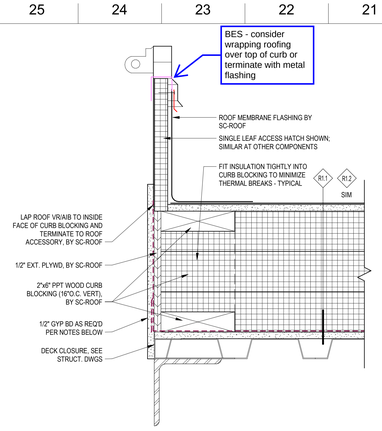
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KEY PLAN

ORIENTATION AND SCALE:

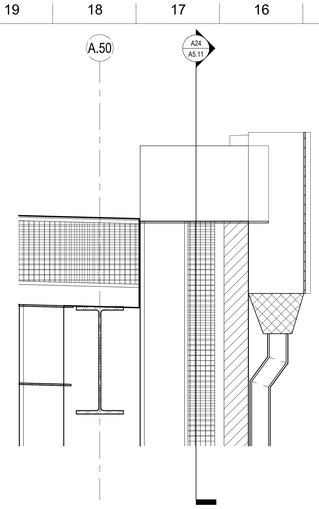
SHEET TITLE:
CONSTRUCTION MOCKUP

SHEET NUMBER:
AG0.05

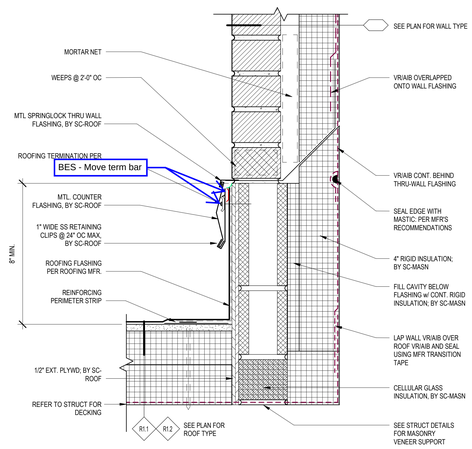


NOTES:
1. IT SHALL BE ASSUMED THAT ROOF DECK IS SLOPED TO DRAIN AND, THEREFORE, THE HEIGHT OF THE CURB BLOCKING WILL VARY ON EACH SIDE OF THE COMPONENT. TOP OF CURB BLOCKING SHALL BE LEVEL.
2. WHERE TOP OF BLOCKING CURB IS ABOVE COVER BOARD PROVIDE CANT TRANSITION.
3. WHERE INSIDE OF CURB IS EXPOSED TO VIEW (ACCESS HATCH, SMOKE VENT, SKYLIGHT, OR OTHER SIMILAR COMPONENT) PROVIDE 1/2" GYP BD FINISH OVER VR/AIB UNLESS SPECIFICALLY DETAILED OTHERWISE.

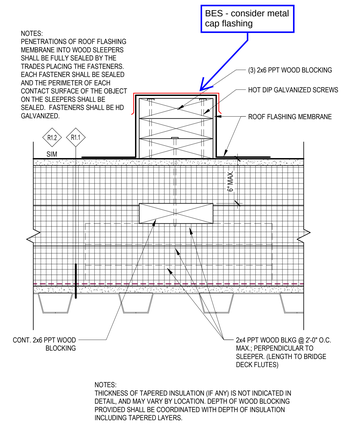
R25 TYPICAL TYPE R1.1 / R1.2 ROOF CURB BLOCKING
3" = 1'-0"



R19 SCUPPER / COLLECTION BOX DETAIL
1 1/2" = 1'-0"



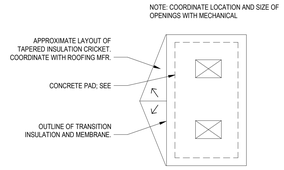
R13 TYPICAL TYPE R1.1 / R1.2 ROOF TO BRICK VENEER TRANSITION
3" = 1'-0"



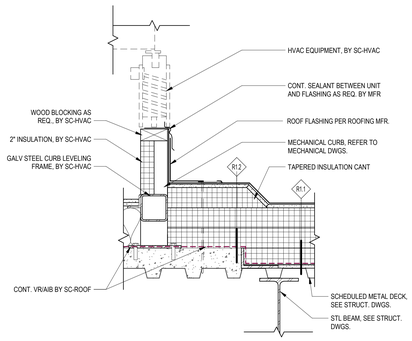
NOTES:
PENETRATIONS OF ROOF FLASHING MEMBRANE INTO WOOD SLEEPERS SHALL BE FULLY SEALED BY THE TRADES PLACING THE FASTENERS. EACH FASTENER SHALL BE SEALED AND THE PERIMETER OF EACH CONTACT SURFACE OF THE OBJECT ON THE SLEEPERS SHALL BE SEALED. FASTENERS SHALL BE HD GALVANIZED.

NOTES:
THICKNESS OF TAPERED INSULATION (IF ANY) IS NOT INDICATED IN DETAIL, AND MAY VARY BY LOCATION. DEPTH OF WOOD BLOCKING PROVIDED SHALL BE COORDINATED WITH DEPTH OF INSULATION INCLUDING TAPERED LAYERS.

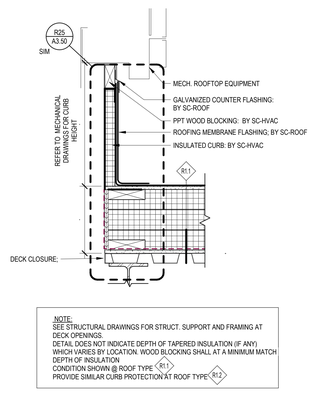
K7 TYPICAL TYPE R1.1 / R1.2 PROTECTED WOOD SLEEPER
3" = 1'-0"



K27 TYPICAL ENLARGED ROOF PLAN @ CONCRETE PAD
N.T.S.

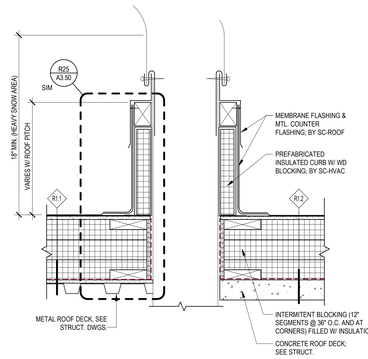


K23 TYPE R1.1 / R1.2 ROOF TERMINATION AT MECHANICAL VIBRATION CURB
1 1/2" = 1'-0"

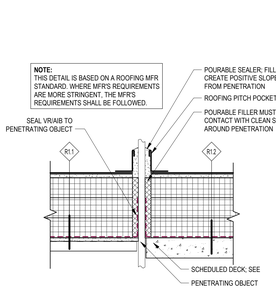


NOTE:
SEE STRUCTURAL DRAWINGS FOR STRUCT. SUPPORT AND FRAMING AT DECK OPENINGS.
DETAIL DOES NOT INDICATE DEPTH OF TAPERED INSULATION (IF ANY) WHICH VARIES BY LOCATION. WOOD BLOCKING SHALL AT A MINIMUM MATCH DEPTH OF INSULATION
CONDITION SHOWN @ ROOF TYPE R1.1
PROVIDE SIMILAR CURB PROTECTION AT ROOF TYPE R1.2

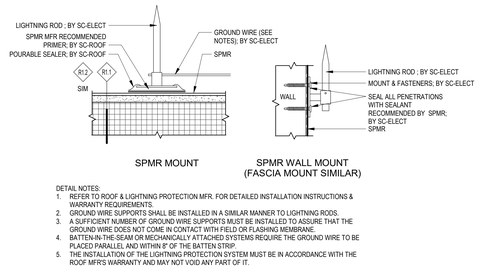
K17 TYPICAL TYPE R1.1 / R1.2 ROOF TERMINATION AT MECHANICAL CURB
1 1/2" = 1'-0"



K12 TYPICAL TYPE R1.1 / R1.2 DUCT PENETRATION
1 1/2" = 1'-0"

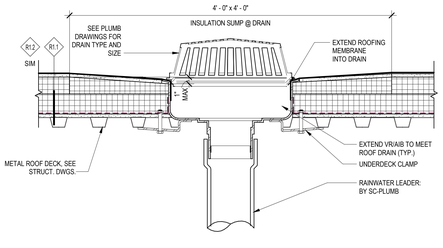


E27 TYPICAL TYPE R1.1 / R1.2 PITCH POCKET DETAIL
1 1/2" = 1'-0"

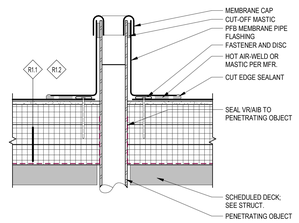


DETAIL NOTES:
1. REFER TO ROOF & LIGHTNING PROTECTION MFR. FOR DETAILED INSTALLATION INSTRUCTIONS & WARRANTY REQUIREMENTS.
2. GROUND WIRE SUPPORTS SHALL BE INSTALLED IN A SIMILAR MANNER TO LIGHTNING RODS.
3. A SUFFICIENT NUMBER OF GROUND WIRE SUPPORTS MUST BE INSTALLED TO ASSURE THAT THE GROUND WIRE DOES NOT COME IN CONTACT WITH FIELD OR FLASHING MEMBRANE.
4. BATTEN-IN-THE-SEAM OR MECHANICALLY ATTACHED SYSTEMS REQUIRE THE GROUND WIRE TO BE PLACED PARALLEL AND WITHIN 8" OF THE BATTEN STRIP.
5. THE INSTALLATION OF THE LIGHTNING PROTECTION SYSTEM MUST BE IN ACCORDANCE WITH THE ROOF MFR'S WARRANTY AND MAY NOT VOID ANY PART OF IT.

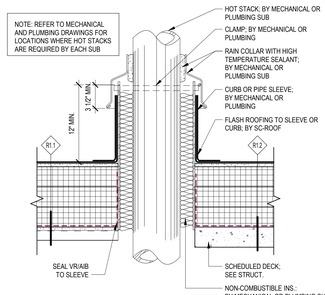
E23 TYPICAL R1.1 / R1.2 LIGHTNING ROD MOUNTING DETAILS
3" = 1'-0"



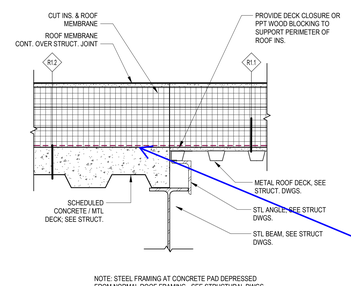
E17 TYPICAL TYPE R1.1 / R1.2 ROOF DRAIN
1 1/2" = 1'-0"



E11 TYPICAL TYPE R1.1 / R1.2 VENT STACK DETAIL
1 1/2" = 1'-0"

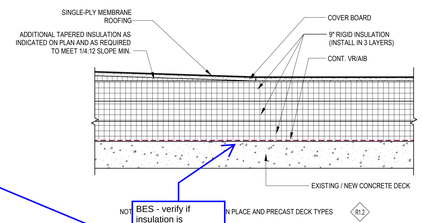


E6 TYPICAL TYPE R1.1 / R1.2 HOT STACK DETAIL
1 1/2" = 1'-0"

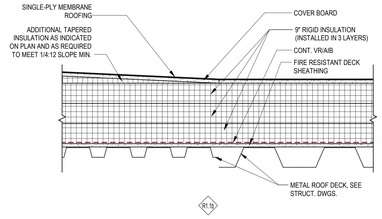


NOTE: STEEL FRAMING AT CONCRETE PAD DEPRESSED FROM NORMAL ROOF FRAMING - SEE STRUCTURAL DWGS

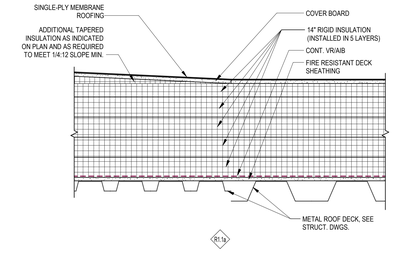
A27 TYPICAL TYPE R1.1 TO TYPE R1.2 ROOF TRANSITION
1 1/2" = 1'-0"



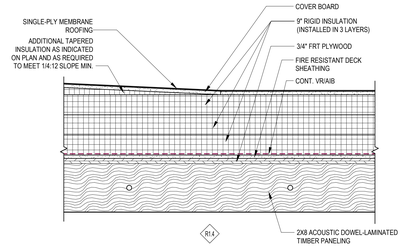
A22 TYPE R1.2 ROOF AS
1 1/2" = 1'-0"



A16 TYPE R1.1b ROOF ASSEMBLY
1 1/2" = 1'-0"



A11 TYPE R1.1a ROOF ASSEMBLY
1 1/2" = 1'-0"



A6 TYPE R1.4 ROOF ASSEMBLY
1 1/2" = 1'-0"

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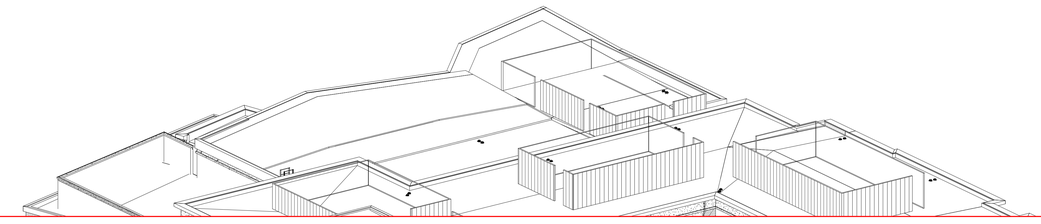
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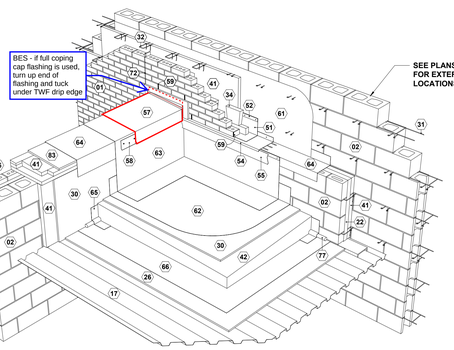
KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
ROOF DETAILS

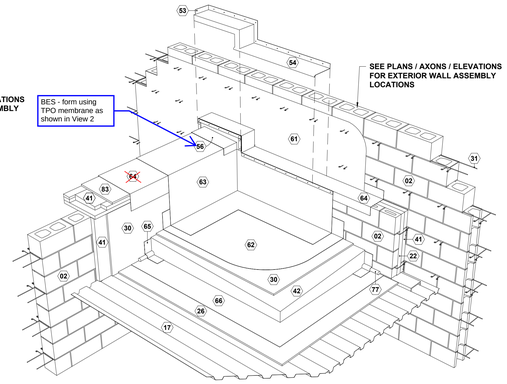
SHEET NUMBER:
A3.50





VIEW 6

FACE BRICK, WEEP VENTS, BRICK EXPANSION JOINT, METAL COPING



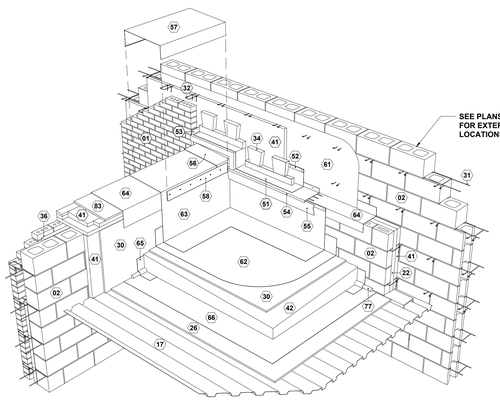
VIEW 3

SADDLE FLASHING; PREP FOR RECEIVER

KEY NOTES

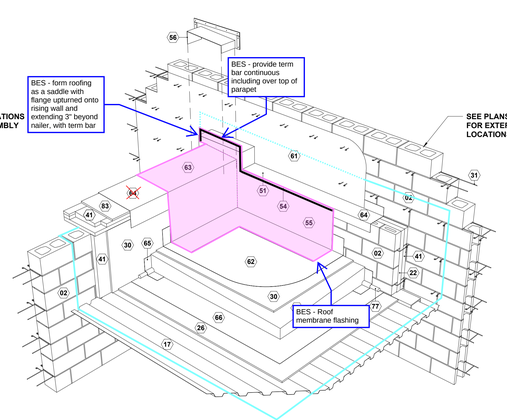
01	BRICK VENEER
02	CONCRETE MASONRY
03	SUPPORT FOR SADDLE FLASHING
17	ROOF DECKING
22	GROUT / FILLER
26	SHEATHING, DECK
30	COVER BOARD
31	HORIZ. JOINT REINFORCEMENT
32	VENEER ANCHOR
34	CAVITY DRAINAGE MATERIAL
36	DRAINAGE SPACE
41	INSULATION, WALL
42	INSULATION, ROOF
51	THROUGH-WALL FLASHING
52	TERMINATION BAR W/ SEALANT
53	END DAM, FULLY SEALED / SOLDERED
54	SHEET METAL RECEIVER
55	COUNTERFLASHING
56	SADDLE FLASHING, FULLY SEALED
57	METAL COPING, SLOPED
58	METAL CLEAT
59	WEEP VENTS
61	AIR / WATER / VAPOR CONTROL AS REQ'D
62	ROOF MEMBRANE
63	ADHERED MEMBRANE
64	TRANSITION MEMBRANE, WALL (STRIP-IN)
65	TRANSITION MEMBRANE, ROOF
66	VAPOR CONTROL LAYER AS REQ'D
72	BRICK EXPANSION JOINT
77	PERIMETER AIR SEAL
83	SLOPED FRAMING FOR COPING

GENERAL NOTE: SEQUENCING MAY VARY



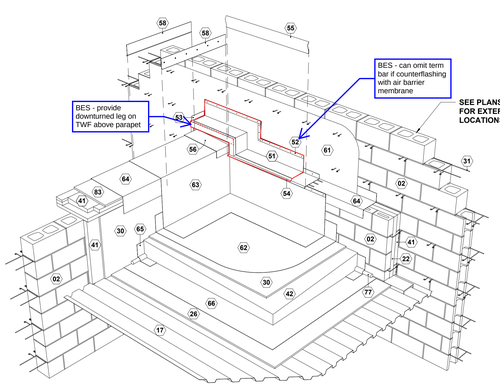
VIEW 5

COUNTERFLASHING, DRAINAGE MATERIAL, CLEATS, FACE BRICK; PREP FOR COPING



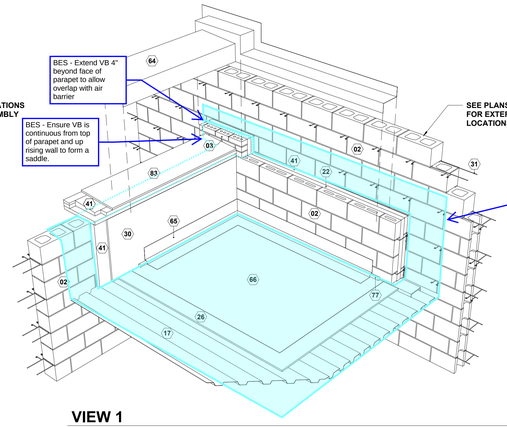
VIEW 2

ROOF ASSEMBLY, TRANSITION MEMBRANE, AIR BARRIER, ADHERED MEMBRANE; PREP FOR SADDLE FLASHING



VIEW 4

SHEET METAL RECEIVER, THROUGH-WALL FLASHING W/ TERMINATION BAR; PREP FOR COUNTERFLASHING & CLEATS

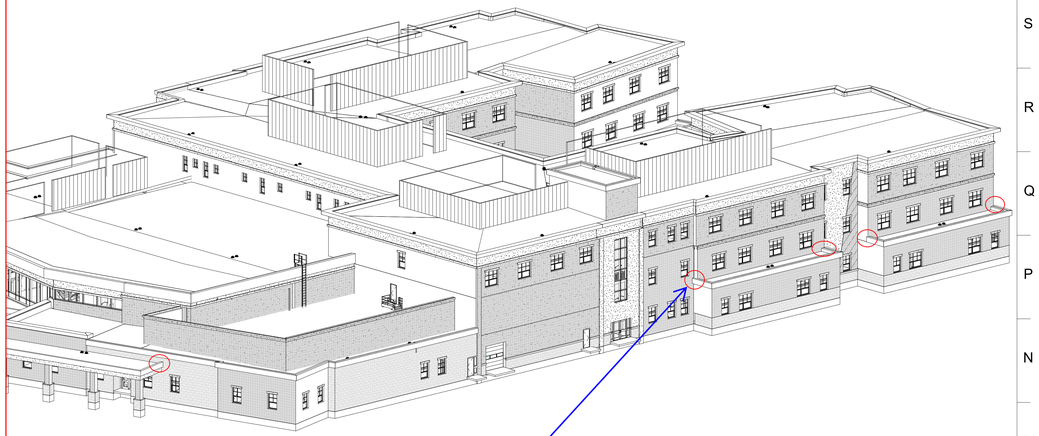


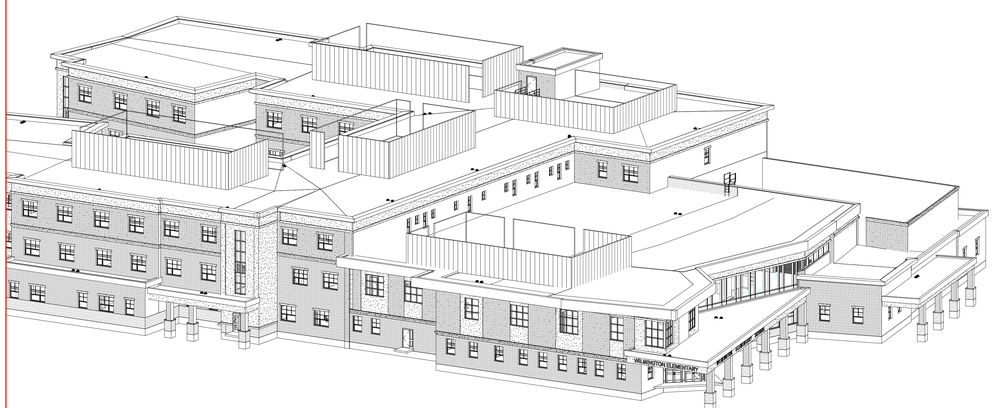
VIEW 1

CMU BACKUP, SADDLE FLASHING SUPPORT, FRAMING FOR COPING, INSULATED PARAPET COVER BOARD, DECK SHEATHING; PREP FOR TRANSITION MEMBRANE

SADDLE FLASHING DETAIL -

NOTE: DIAGRAMS FOR SADDLE FLASHING CONDITIONS ONLY.





A15 EXTERIOR AXON - SOUTHEAST

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MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
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WILMINGTON ELEMENTARY SCHOOL

320 SALEM STREET
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

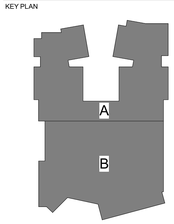
NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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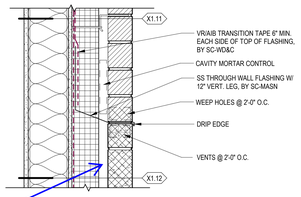
KEY PLAN



ORIENTATION AND SCALE:

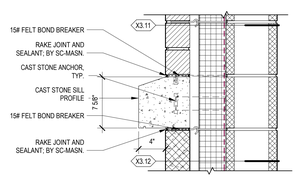
SHEET TITLE:
EXTERIOR AXONS

SHEET NUMBER:
A4.00

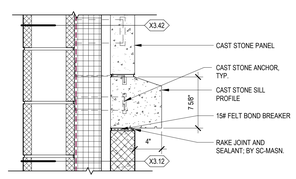


BES - Confirm the condition. If "base of wall" solid grouting of the cavity below the TWF is needed, as shown on E11 and E16

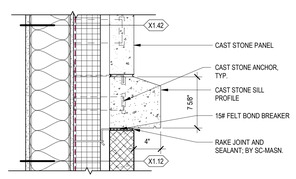
L24 BASE OF WALL - X1.11 / X1.12 WALL
1 1/2" = 1'-0"



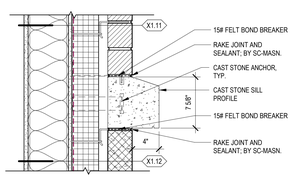
L20 BASE OF WALL - CAST STONE SILL PROFILE AT X3.12 / X3.11 WALL
1 1/2" = 1'-0"



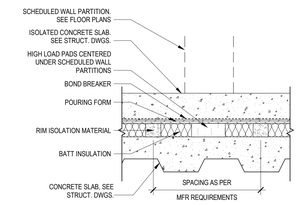
L15 BASE OF WALL - CAST STONE SILL PROFILE AT X3.12 / X3.42 WALL
1 1/2" = 1'-0"



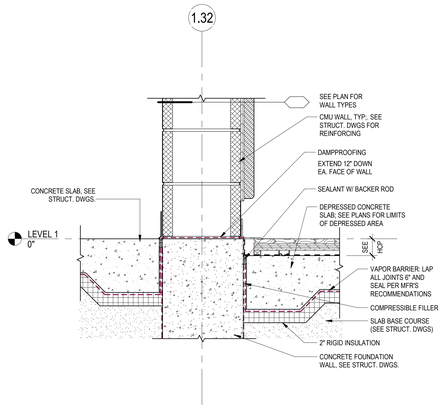
L10 BASE OF WALL - CAST STONE SILL PROFILE AT X1.12 / X1.42 WALL
1 1/2" = 1'-0"



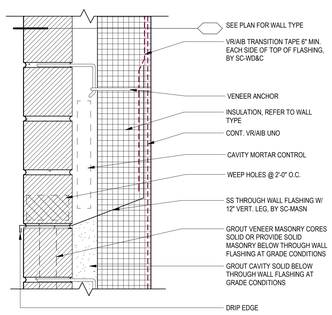
L5 BASE OF WALL - CAST STONE SILL PROFILE AT X1.11 / X1.12 WALL
1 1/2" = 1'-0"



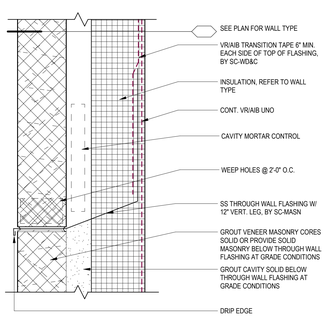
E26 TYPICAL RIM ISOLATION SLAB SYSTEM
1 1/2" = 1'-0"



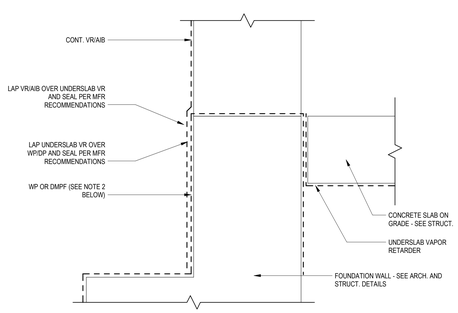
E21 BASE OF WALL - TYP. BEARING / SHEAR WALL CONDTION AT DEPRESSED SLAB
1 1/2" = 1'-0"



E16 THROUGH WALL FLASHING AT BRICK MASONRY AT FOUNDATION
3" = 1'-0"



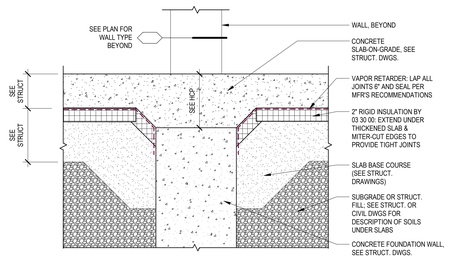
E11 THROUGH WALL FLASHING AT CSMU AT FOUNDATION
3" = 1'-0"



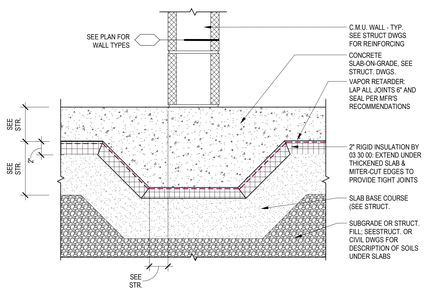
NOTES:
1. THIS DETAIL IS INTENDED TO SHOW A SIMPLIFIED VERSION OF THE OVERLAPPING / TERMINATION OF THE UNDERSLAB VAPOR RETARDER, VR/AIB, AND WATERPROOFING / DAMPPROOFING. WHERE DETAILS OF SPECIFIC FOUNDATION CONDITIONS DIFFER FROM THIS DETAIL THE SPECIFIC CONDITION SHALL GOVERN.

2. WHERE THE INTERIOR SLAB IS ABOVE ADJACENT GRADE THERE SHALL BE DAMPPROOFING FROM THE TOP OF FOUNDATION WALL TO TOE OF BRICK SHELF. WHERE THE INTERIOR SLAB IS BELOW ADJACENT GRADE THERE SHALL BE WATERPROOFING FROM THE TOP OF FOUNDATION WALL TO THE TOE OF THE FOOTING.

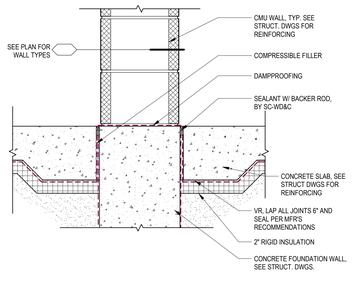
E6 SECTION DETAIL - TYPICAL VB / VR/AIB / DP / WP TRANSITION @ FOUNDATION
3" = 1'-0"



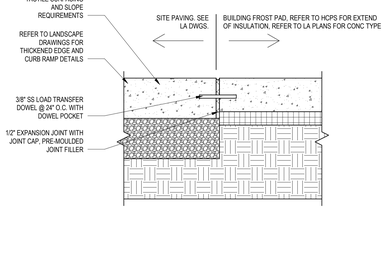
A26 BASE OF WALL - THICKENED SLAB ON GRADE DETAIL @ OPENINGS
1 1/2" = 1'-0"



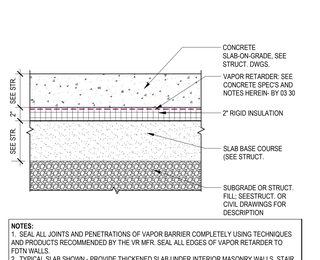
A20 BASE OF WALL - TYP THICKENED SLAB ON GRADE DETAIL
1 1/2" = 1'-0"



A15 BASE OF WALL - TYP. BEARING / SHEAR WALL CONDITION
1 1/2" = 1'-0"



A10 TYPICAL FROST PAD TO SIDEWALK PIN
1 1/2" = 1'-0"



NOTES:
1. SEAL ALL JOINTS AND PENETRATIONS OF VAPOR BARRIER COMPLETELY USING TECHNIQUES AND PRODUCTS RECOMMENDED BY THE VR MFR. SEAL ALL EDGES OF VAPOR RETARDER TO FDTN WALLS.
2. TYPICAL SLAB SHOWN - PROVIDE THICKENED SLAB UNDER INTERIOR MASONRY WALLS, STAIR STRINGER BEARING POINTS, AND OTHER LOCATIONS AS SHOWN ON STRUCT. DRAWINGS AND DETAILS HEREIN.

A5 TYPICAL SLAB ON GRADE CONSTRUCTION
1 1/2" = 1'-0"

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WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

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KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:

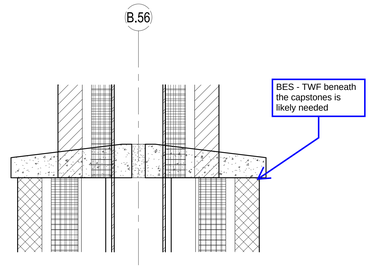
BASE OF WALL DETAILS

SHEET NUMBER:

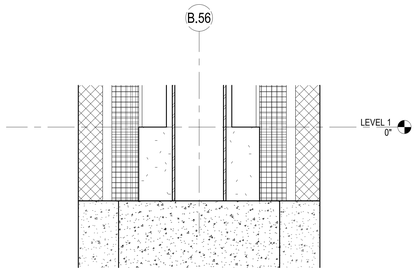
A6.50

BES - incomplete

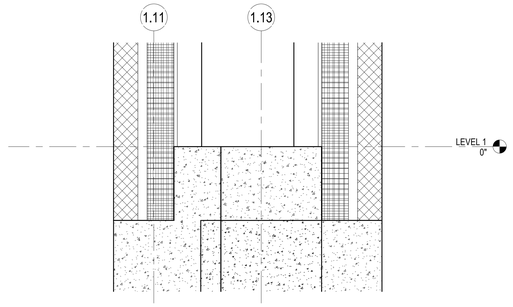
BES - TWF beneath the capstones is likely needed



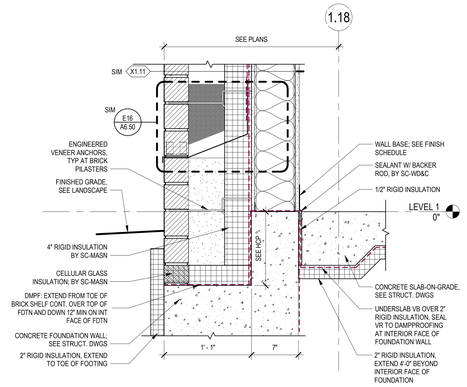
T25 Detail 13
1 1/2" = 1'-0"



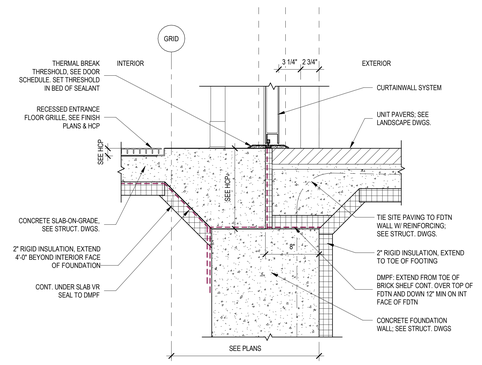
T21 Detail 17
1 1/2" = 1'-0"



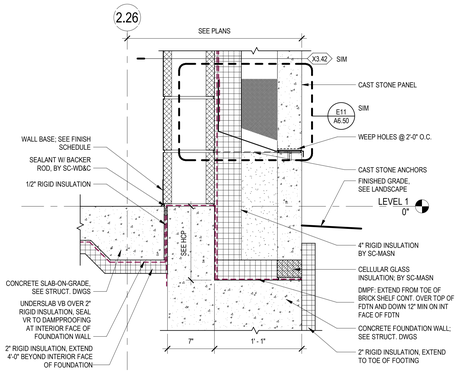
T14 Detail 90
1 1/2" = 1'-0"



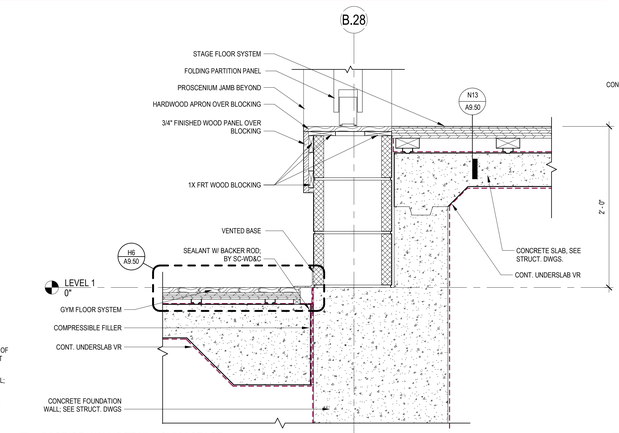
T6 BASE OF WALL DETAIL - X1.11 WALL AT PILASTER
1 1/2" = 1'-0"



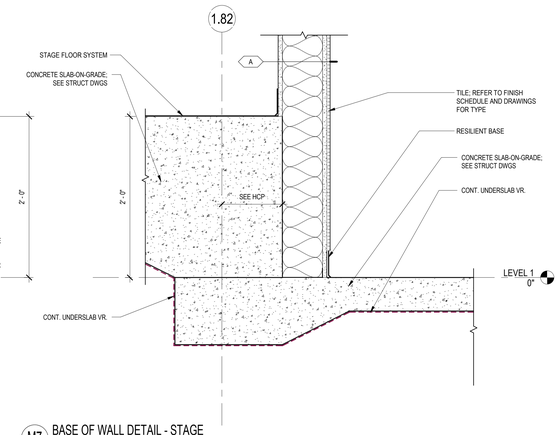
M27 BASE OF WALL DETAIL - CW / SF DOOR ENTRANCE ENTRY VESTIBULE
1 1/2" = 1'-0"



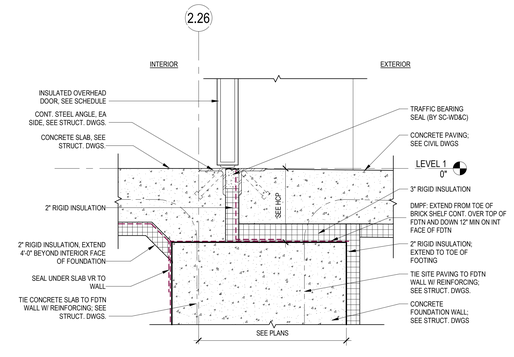
M23 BASE OF WALL DETAIL - X3.42 WALL AT PILASTER
1 1/2" = 1'-0"



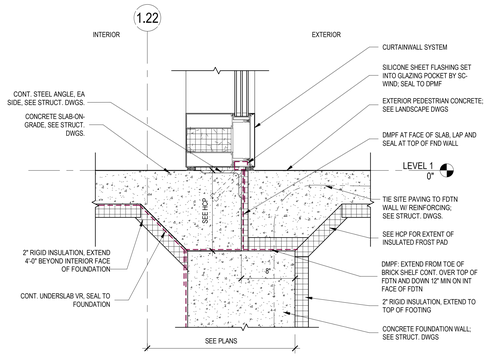
M16 BASE OF WALL DETAIL - GYM / STAGE
1 1/2" = 1'-0"



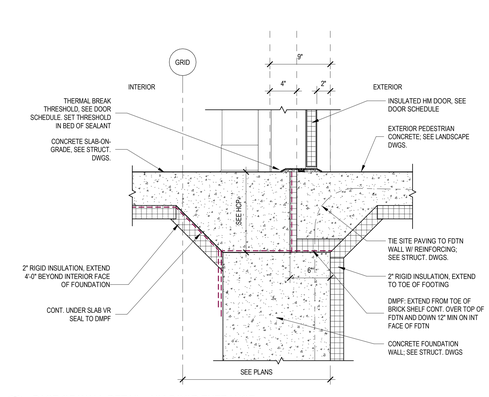
M7 BASE OF WALL DETAIL - STAGE
1 1/2" = 1'-0"



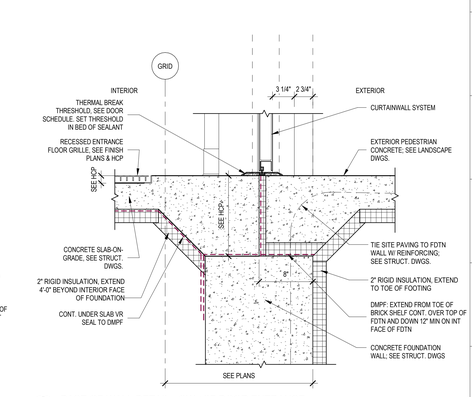
G25 BASE OF WALL DETAIL - SECTIONAL OVERHEAD DOOR
1 1/2" = 1'-0"



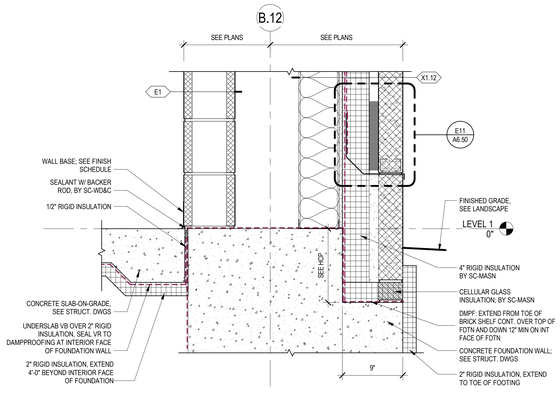
G18 BASE OF WALL DETAIL - CW HARDSCAPE
1 1/2" = 1'-0"



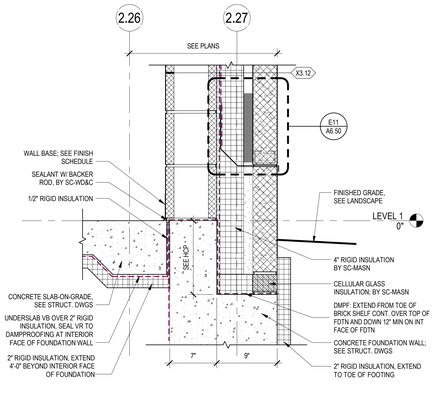
G12 BASE OF WALL DETAIL - HM DOOR ENTRANCE
1 1/2" = 1'-0"



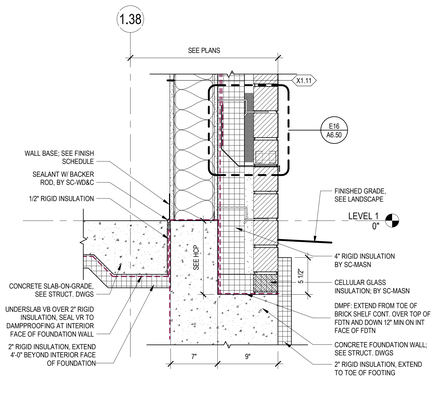
G6 BASE OF WALL DETAIL - CW / SF DOOR ENTRANCE
1 1/2" = 1'-0"



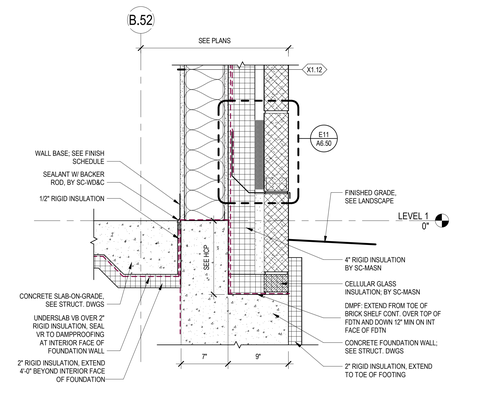
A25 BASE OF WALL DETAIL - X1.12 / E1 WALL
1 1/2" = 1'-0"



A18 BASE OF WALL DETAIL - X3.12 WALL
1 1/2" = 1'-0"



A12 BASE OF WALL DETAIL - X1.11 WALL
1 1/2" = 1'-0"



A6 BASE OF WALL DETAIL - X1.12 WALL
1 1/2" = 1'-0"

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WILMINGTON ELEMENTARY SCHOOL

320 SALEM STREET
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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KEY PLAN

ORIENTATION AND SCALE:

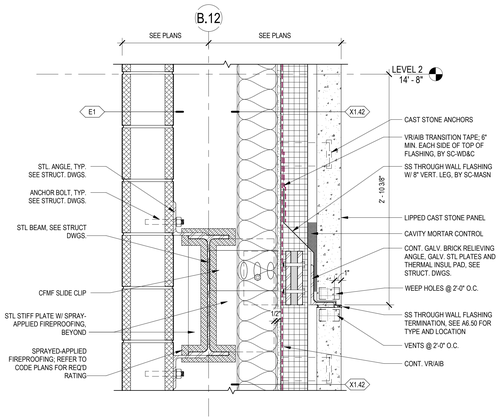
SCALE: AS INDICATED

SHEET TITLE:

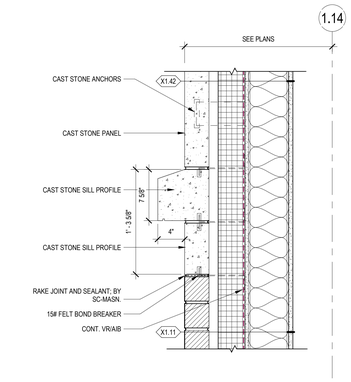
BASE OF WALL DETAILS

SHEET NUMBER:

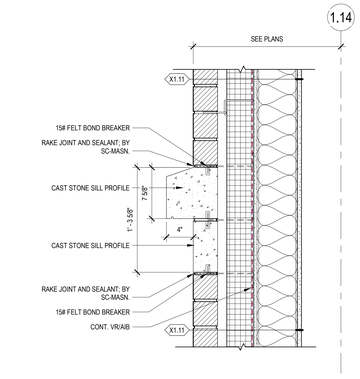
A6.51



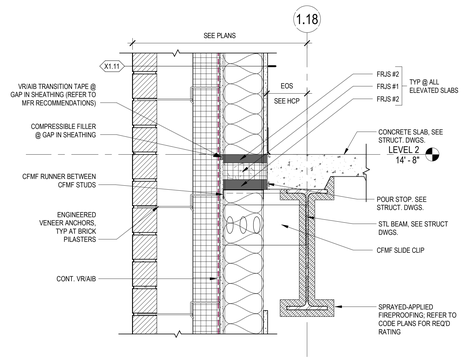
S23 MID WALL DETAIL - X1.42 / E1 WALL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"



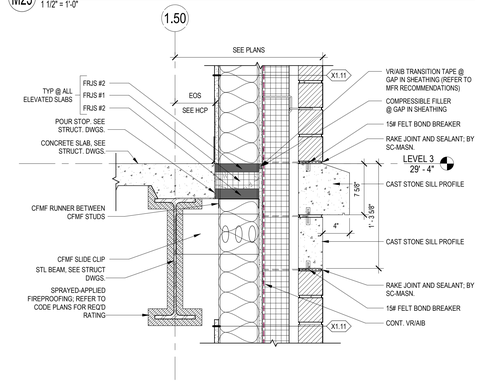
S17 MID WALL DETAIL - X1.11 / X1.42 WALL W/ CAST STONE SILL
1 1/2" = 1'-0"



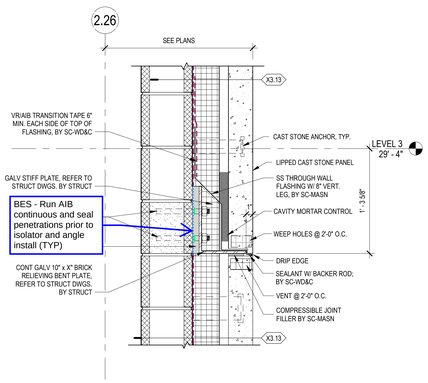
S12 MID WALL DETAIL - X1.11 WALL W/ CAST STONE SILL
1 1/2" = 1'-0"



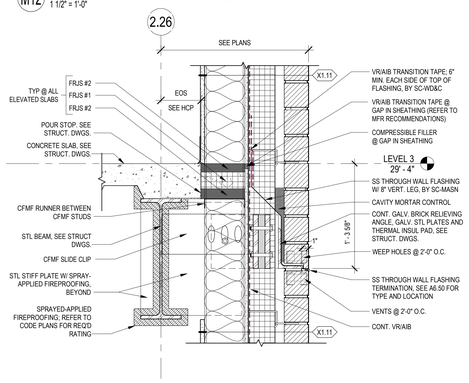
S6 MID WALL DETAIL - X1.11 WALL AT PILASTER
1 1/2" = 1'-0"



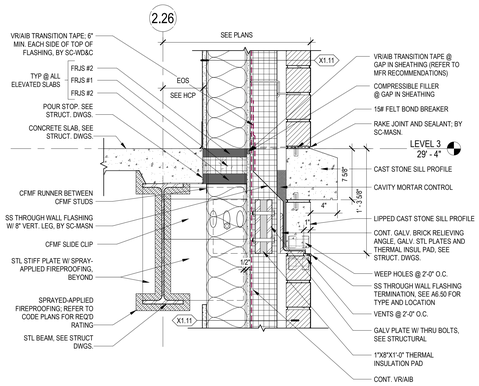
M23 MID WALL DETAIL - X1.42 WALL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"



M17 MID WALL DETAIL - SHEAR WALL @ TWO STORY SPACE
1 1/2" = 1'-0"



M12 MID WALL DETAIL - ELEVATED SLAB @ CMU
1 1/2" = 1'-0"



M6 MID WALL DETAIL - X3.11 WALL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"

G23 MID WALL DETAIL - X1.11 WALL W/ CAST STONE SILL
1 1/2" = 1'-0"

G17 MID WALL DETAIL - X3.13 WALL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"

G12 MID WALL DETAIL - X1.11 WALL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"

G6 MID WALL DETAIL - X1.11 WALL W/ CAST STONE SILL AT BRICK RELIEVING ANGLE
1 1/2" = 1'-0"

A23 MID WALL DETAIL - X1.42 WALL
1 1/2" = 1'-0"

A17 MID WALL DETAIL - CW @ SPANDREL
1 1/2" = 1'-0"

A12 MID WALL DETAIL - X1.11 WALL
1 1/2" = 1'-0"

A6 MID WALL DETAIL - X1.11 WALL
1 1/2" = 1'-0"

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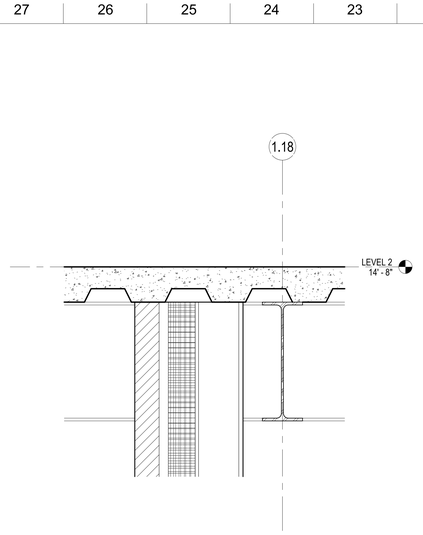
KEY PLAN

ORIENTATION AND SCALE:

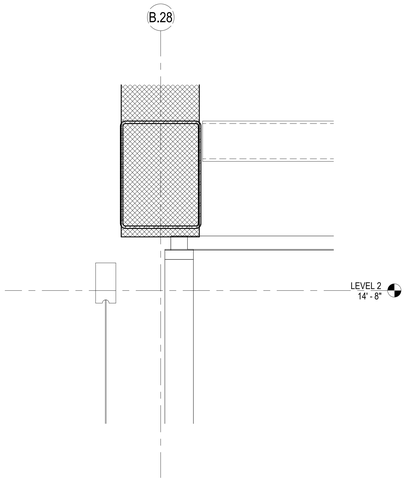
SCALE: AS INDICATED

SHEET TITLE:
MID WALL DETAILS

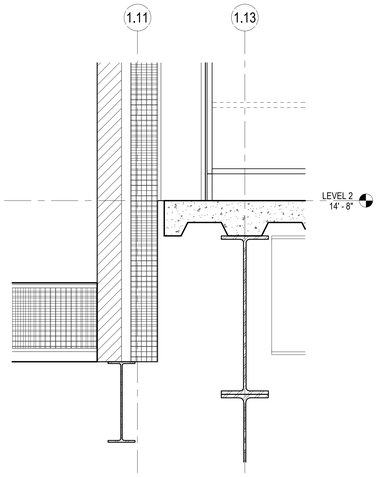
SHEET NUMBER:
A6.60



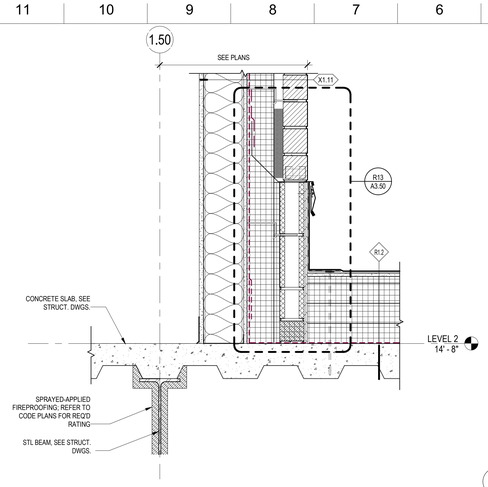
R27 Detail 18
1 1/2" = 1'-0"



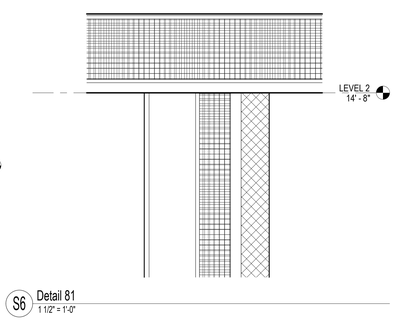
R22 Detail 8
1 1/2" = 1'-0"



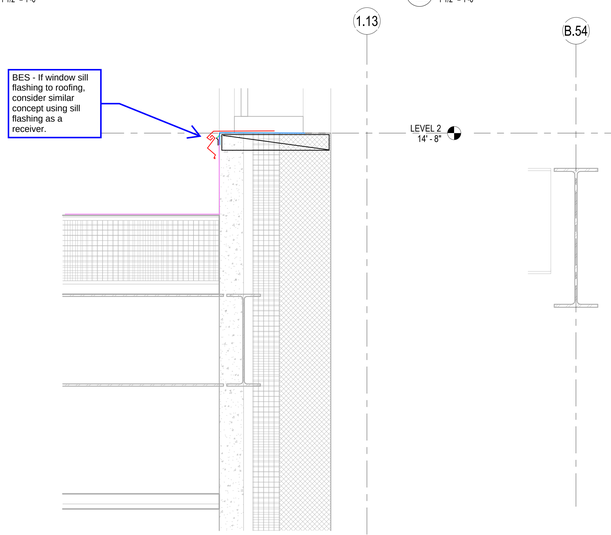
R17 Detail 11
1 1/2" = 1'-0"



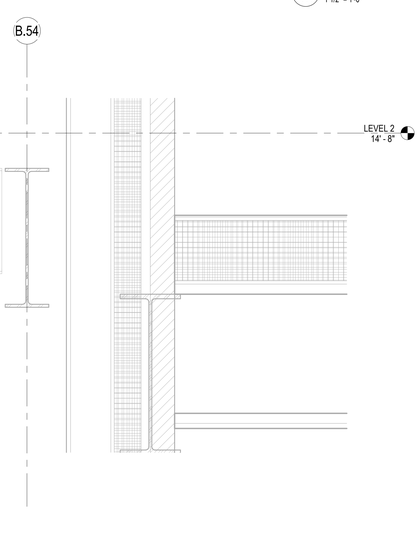
R12 MID WALL DETAIL - X1.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"



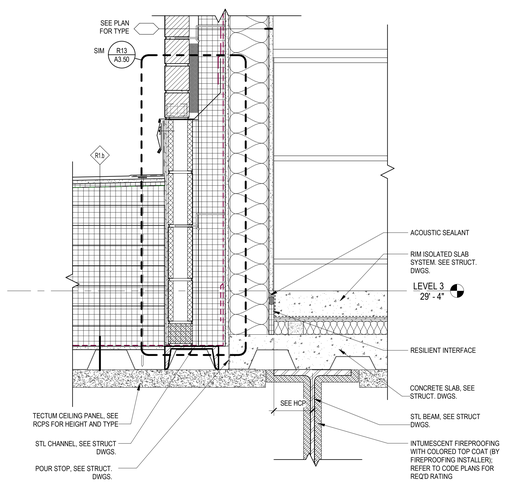
S6 Detail 81
1 1/2" = 1'-0"



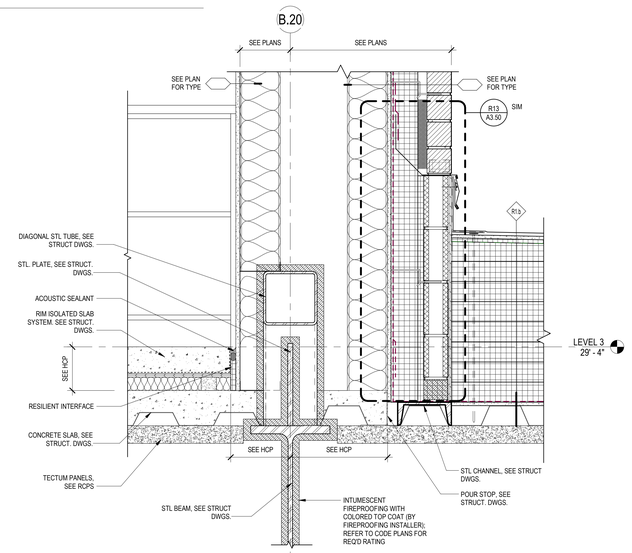
J27 Detail 16
1 1/2" = 1'-0"



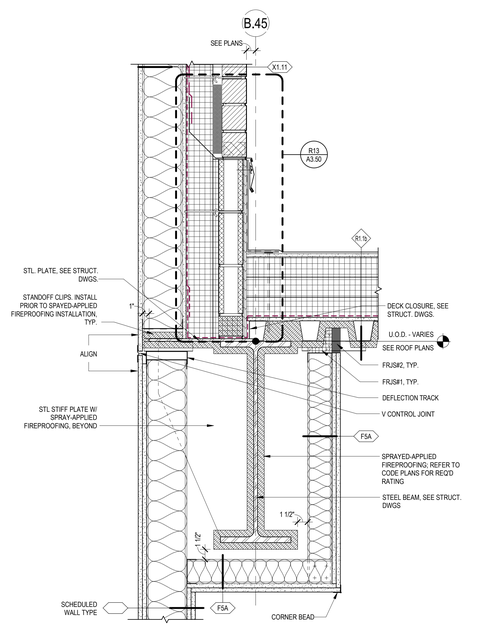
J21 Detail 7
1 1/2" = 1'-0"



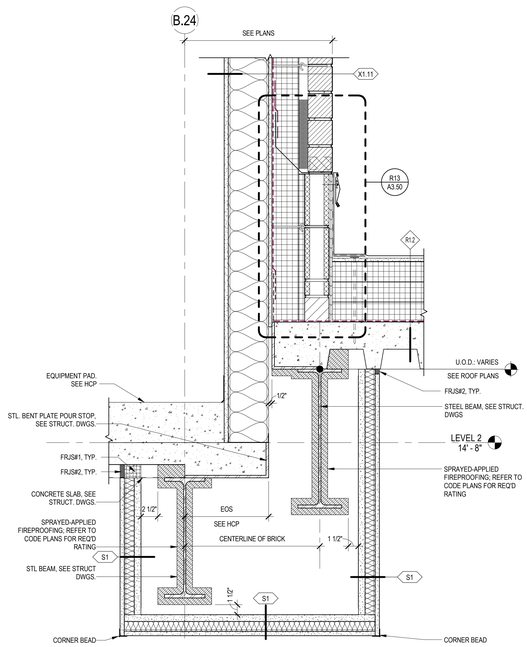
J15 MID WALL DETAIL - RIM ISOLATION SLAB / X1.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"



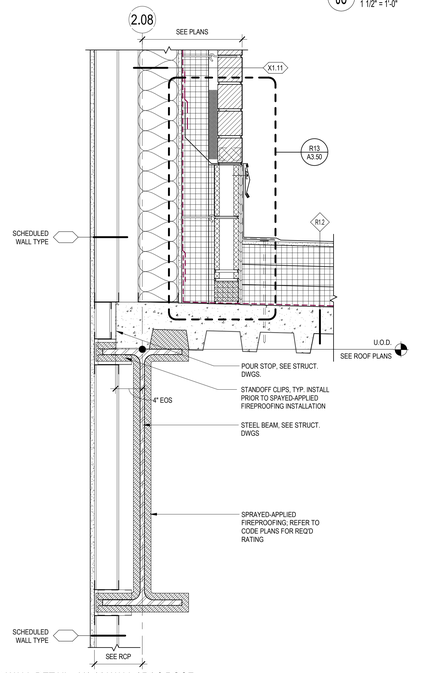
J8 MID WALL DETAIL - RIM ISOLATION SLAB / X1.11 WALL / R1.2 ROOF/TRUSS
1 1/2" = 1'-0"



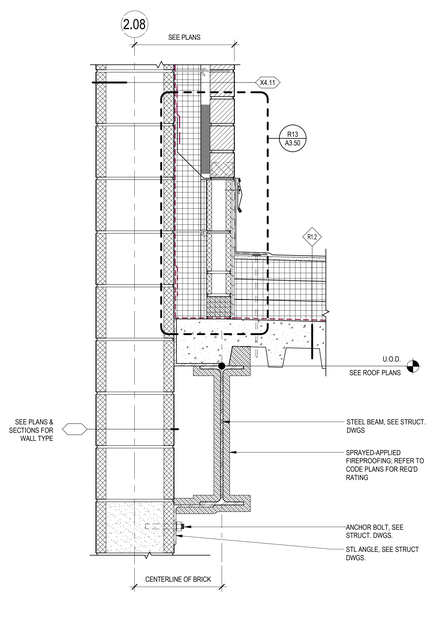
A25 MID WALL DETAIL - X1.11 WALL / R1.1b ROOF
1 1/2" = 1'-0"



A18 MID WALL DETAIL - X1.11 WALL / R1.2 ROOF W/ S1 DRAFT STOPPING
1 1/2" = 1'-0"



A12 MID WALL DETAIL - X1.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"



A6 MID WALL DETAIL - X4.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"

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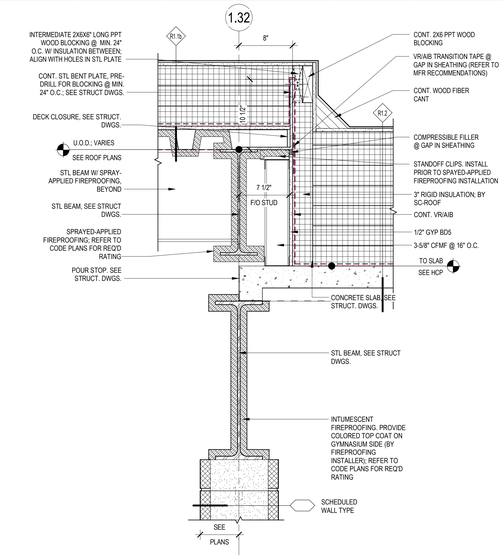
KEY PLAN

ORIENTATION AND SCALE:

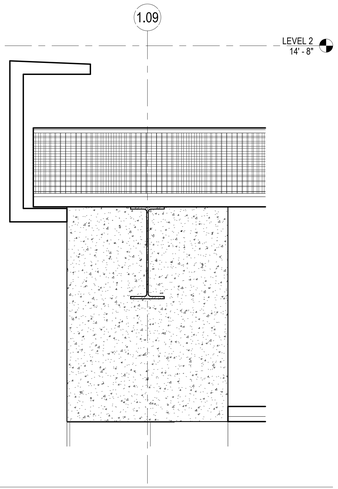
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SHEET TITLE:
MID WALL DETAILS

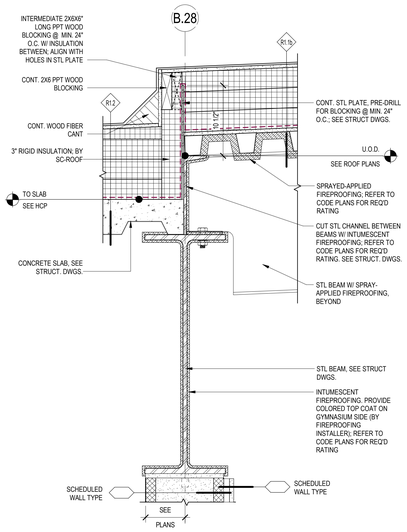
SHEET NUMBER:
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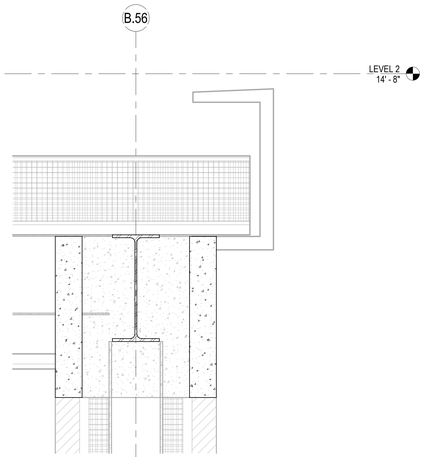
Q26 TOP OF WALL DETAIL - R1.2 / R1.1b ROOF
1 1/2" = 1'-0"



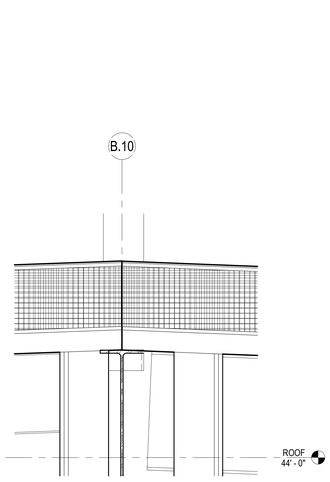
S20 Detail 12
1 1/2" = 1'-0"



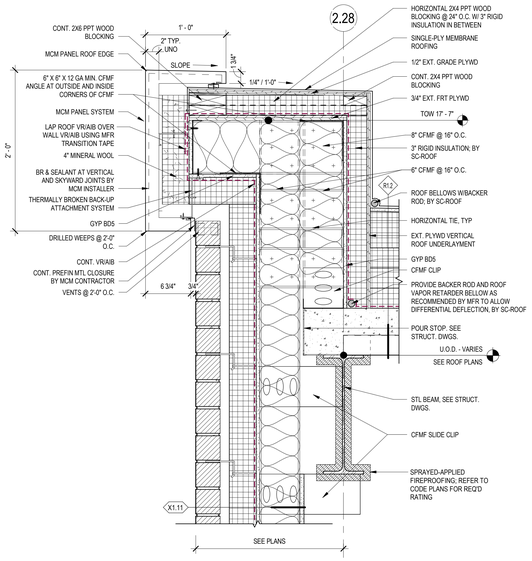
R13 TOP OF WALL DETAIL - R1.2 / R1.1b ROOF
1 1/2" = 1'-0"



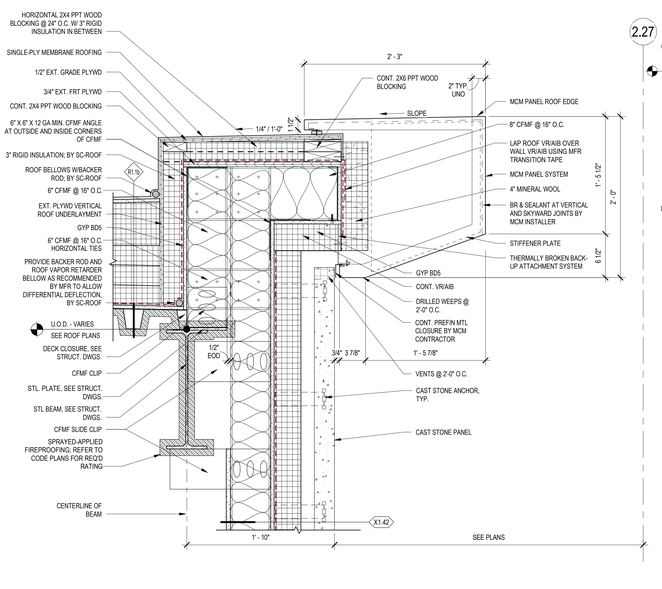
S7 Detail 6
1 1/2" = 1'-0"



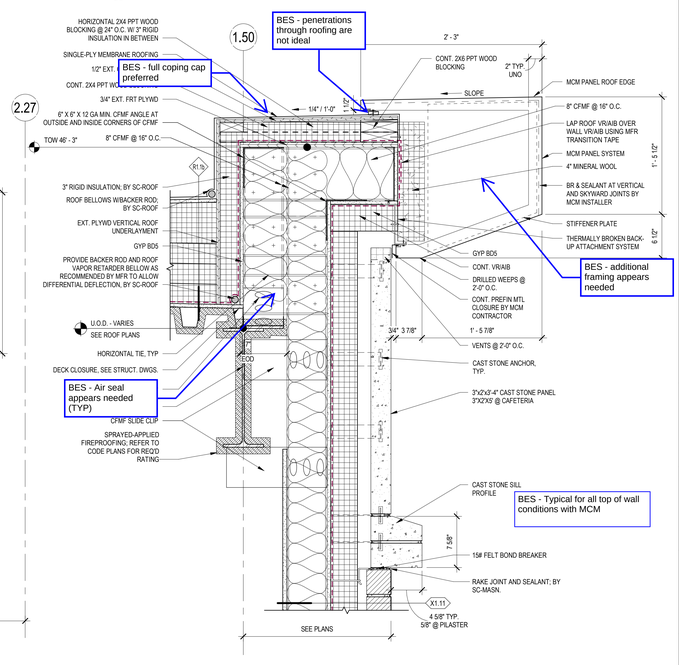
H27 Detail 85
1 1/2" = 1'-0"



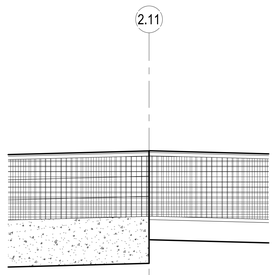
H22 TOP OF WALL DETAIL - MCM / X1.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"



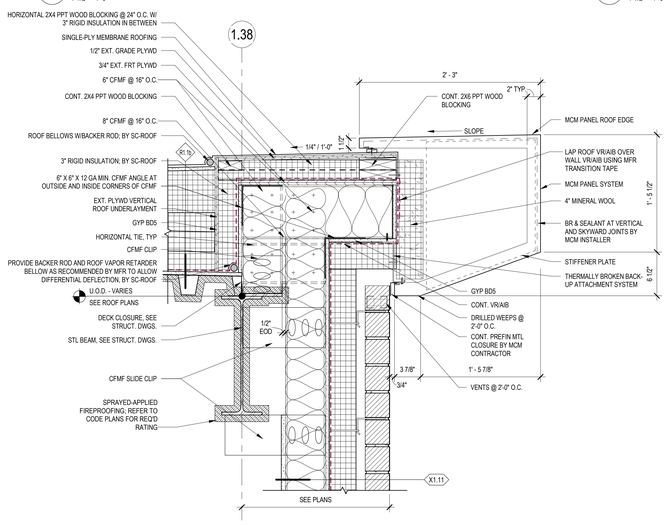
H16 TOP OF WALL DETAIL - MCM / X1.42 WALL / R1.1b ROOF
1 1/2" = 1'-0"



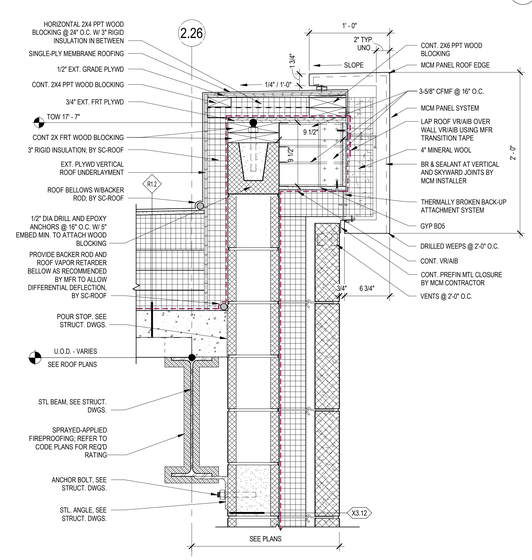
H8 TOP OF WALL DETAIL - MCM / CAST STONE / X1.11 WALL / R1.1b ROOF
1 1/2" = 1'-0"



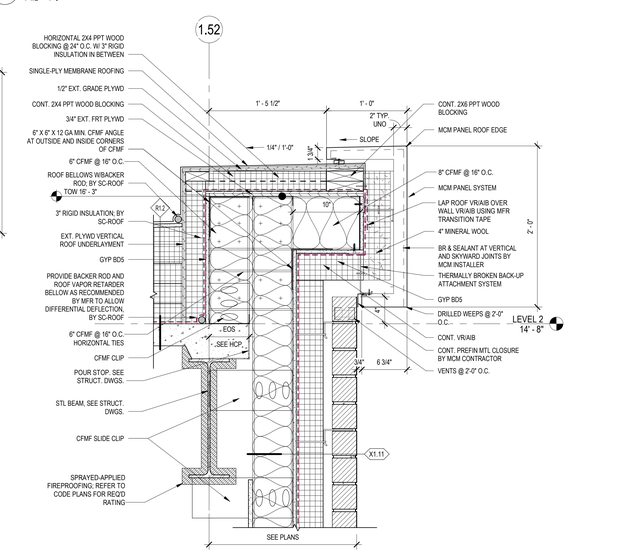
A27 Detail 67
1 1/2" = 1'-0"



A22 TOP OF WALL DETAIL - MCM / X1.11 WALL / R1.1b ROOF
1 1/2" = 1'-0"



A14 TOP OF WALL DETAIL - MCM / X3.12 WALL / R1.2 ROOF
1 1/2" = 1'-0"



A7 TOP OF WALL DETAIL - MCM / X1.11 WALL / R1.2 ROOF
1 1/2" = 1'-0"

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KEY PLAN

ORIENTATION AND SCALE:

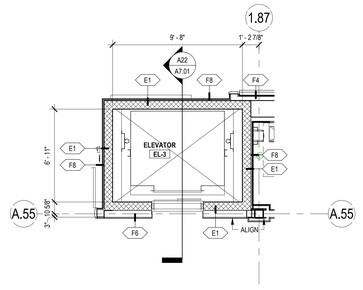
SCALE: AS INDICATED

SHEET TITLE:
TOP OF WALL DETAILS

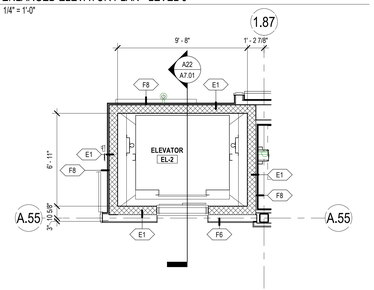
SHEET NUMBER:
A6.70

VERTICAL CIRCULATION GENERAL NOTES

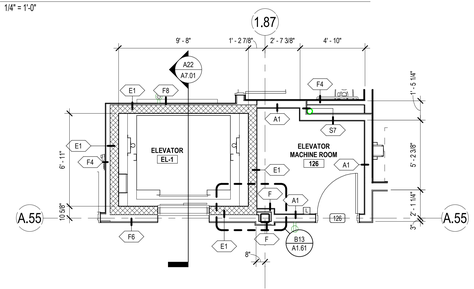
1. UNLESS SPECIFICALLY NOTED, ALL METAL WORK ON THIS STAIR AND ELEVATOR DRAWING SHALL BE PROVIDED AND INSTALLED BY THE MISC METALS CONTRACTOR.
2. ALL STAIR CONSTRUCTION SHALL BE DESIGNED BY THE INSTALLING CONTRACTOR. SUBMITTALS SHALL INCLUDE SHOP DRAWINGS AND ENGINEERING DESIGN CALCULATIONS STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF MASSACHUSETTS.
3. ALL STAIRS SHALL INCLUDE BRUSHED FINISH STAINLESS STEEL HANDRAIL GRIP SURFACES.
4. ALL CARBON STEEL COMPONENTS OF INTERIOR STAIR CONSTRUCTION SHALL BE SHOP PRIMED FOR FIELD PAINTING BY THE PAINTING SUBCONTRACTOR UNLESS INDICATED AS OTHERWISE.
5. ALL CARBON STEEL COMPONENTS OF EXTERIOR STAIRS AND HANDRAILS SHALL BE GALVANIZED STEEL AND SHOP PRIMED WITH EXTERIOR GRADE PRIMER COMPATIBLE WITH PAINT SYSTEM INDICATED IN DIVISION 9 SPECIFICATIONS, FOR FIELD PAINTING BY THE PAINTING SUBCONTRACTOR, UNLESS INDICATED AS OTHERWISE.
6. ALL CUTS THROUGH GALVANIZED METAL STAIR COMPONENTS SHALL BE TOUCHED UP WITH GALVANIZING TOUCH UP PAINT PRIOR TO APPLICATION OF PRIMER. TOUCH UP PAINTING SHALL BE PERFORMED BY THE MISCELLANEOUS METALS SUBCONTRACTOR.
7. ALL WELDS IN STAIR COMPONENTS SHALL BE GROUND SMOOTH. WHERE PARTIAL OR INTERMITTENT WELDS ARE USED, THE REMAINDER OF THE JOINT BETWEEN COMPONENTS SHALL BE FILLED WITH AUTOMOTIVE RESIN-TYPE BODY FILLER SO THAT PARTIAL LENGTH WELD LOCATIONS ARE NOT APPARENT.
8. PEASTONE CONCRETE FILL AT TREADS AND LANDINGS SHALL BE PROVIDED AND INSTALLED BY THE CONCRETE TOPPINGS CONTRACTOR.
9. WHERE MEMBER SIZES ARE INDICATED IN THE DOCUMENTS, THE DESIGN OF THE STAIRS SHALL USE THOSE SIZES OR DIMENSIONS OF STEEL MEMBERS AS MINIMUM DIMENSIONAL CRITERIA.
10. THE MISC METALS CONTRACTOR SHALL COORDINATE THE CONNECTION AND SUPPORT REQUIREMENTS OF ITEMS PROVIDED WITH THE STRUCTURAL STEEL AND MASONRY CONTRACTORS.
11. REACTIONS AT CONNECTION POINTS TO STRUCTURAL STEEL FRAMING SHALL BE COORDINATED WITH THE STRUCTURAL STEEL CONTRACTOR. THE MISC METALS CONTRACTOR SHALL PROVIDE STIFFENING PLATES, GUSSETS, AND OTHER REINFORCEMENT TO STRUCTURAL STEEL FRAMING REQUIRED TO ACCOMMODATE REACTIONS AND TRANSFER LOADS TO THE STRUCTURAL STEEL AT THE CONNECTION POINTS. ALL BEARING PLATES AND ANCHORS REQUIRED FOR INSTALLATION IN MASONRY CONSTRUCTION SHALL BE COORDINATED WITH AND PROVIDED TO THE MASONRY CONTRACTOR FOR INSTALLATION.
12. STAIRS SHALL BE DESIGNED TO RESIST THE FOLLOWING LOADS AS REQUIRED BY THE STATE BUILDING CODE:
    a. ALL STAIRS SHALL BE DESIGNED TO SUPPORT A UNIFORM LIVE LOAD OF 100 POUNDS PER SQUARE FOOT ON LANDINGS AND TREADS.
    b. HANDRAILS AND GUARDS SHALL BE DESIGNED TO RESIST A UNIFORM LOAD OF 50 POUNDS PER LINEAR FOOT APPLIED IN ANY DIRECTION AT THE TOP AND TO TRANSFER THIS LOAD THROUGH THE SUPPORTS TO STRUCTURE.
    c. HANDRAILS AND GUARDS SHALL BE DESIGNED TO RESIST A SINGLE CONCENTRATED LOAD OF 200 POUNDS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP, AND TO TRANSFER THIS LOAD THROUGH THE SUPPORTS TO THE STRUCTURE. THIS LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY WITH THE 50 POUND UNIFORM LOAD LISTED ABOVE.
    d. INTERMEDIATE RAILS, BALUSTERS, AND GUARD INFILL PANELS SHALL BE DESIGNED TO WITHSTAND A HORIZONTALLY APPLIED NORMAL LOAD OF 50 POUNDS ON AN AREA EQUAL TO 1 SQUARE FOOT OF GUARD AREA, INCLUDING OPENINGS AND SPACES BETWEEN COMPONENTS. THIS LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY WITH THE LOADS LISTED ABOVE.
13. REQUIREMENTS FOR ELEVATOR PIT LADDERS AND ELEVATOR DOOR SILL SUPPORTS SHALL BE COORDINATED BY THE MISC METALS CONTRACTOR WITH THE ELEVATOR MANUFACTURER'S REQUIREMENTS. THE COMPONENTS PROVIDED SHALL MEET THE ELEVATOR MANUFACTURER'S REQUIREMENTS WHETHER OR NOT IN AGREEMENT WITH THE DETAILS PROVIDED.



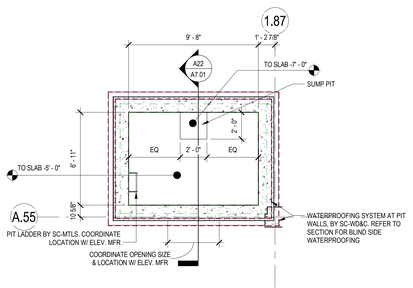
P17 ENLARGED ELEVATOR PLAN - LEVEL 3
1/4" = 1'-0"



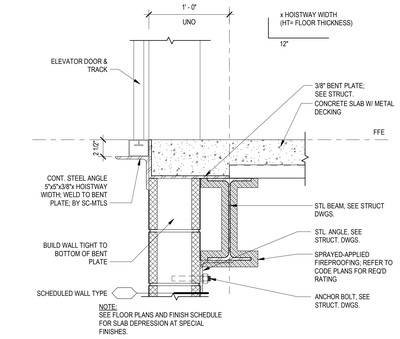
K17 ENLARGED ELEVATOR PLAN - LEVEL 2
1/4" = 1'-0"



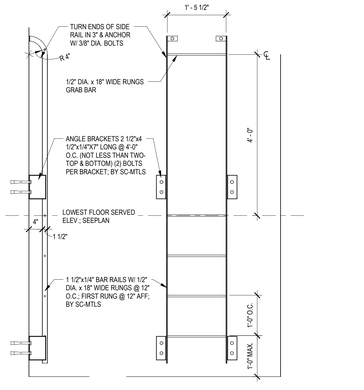
F17 ENLARGED ELEVATOR PLAN - LEVEL 1
1/4" = 1'-0"



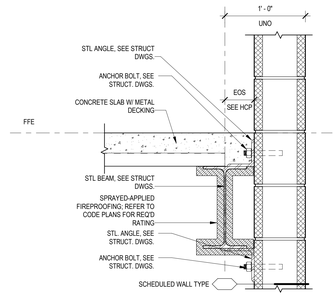
A17 ENLARGED ELEVATOR PLAN - PIT
1/4" = 1'-0"



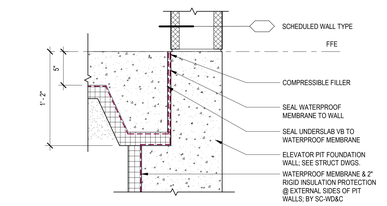
K10 TYPICAL ELEVATOR DOOR SILL @ ELEVATED SLAB
1 1/2" = 1'-0"



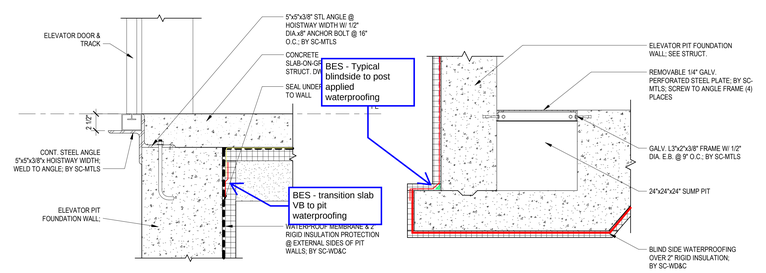
K6 TYPICAL ELEVATOR PIT ACCESS LADDER
3/4" = 1'-0"



F10 TYPICAL ELEVATOR HOISTWAY @ ELEVATED SLAB
1 1/2" = 1'-0"

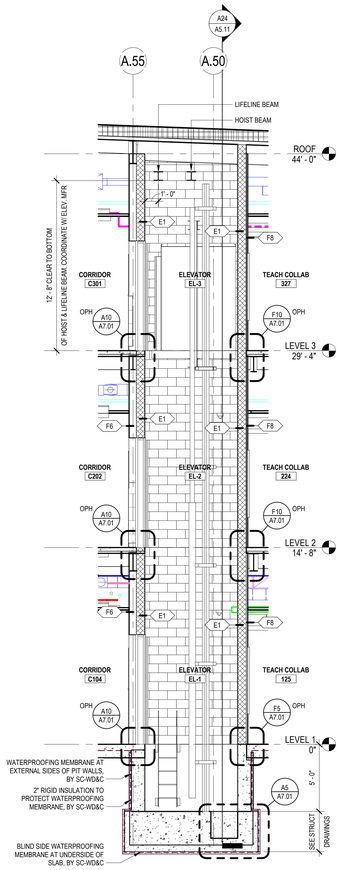


F5 TYP ELEVATOR WALL @ SLAB ON GRADE
1 1/2" = 1'-0"



A10 TYPICAL ELEVATOR DOOR SILL @ SLAB ON GRADE
1 1/2" = 1'-0"

A5 TYPICAL ELEVATOR SUMP PIT & COVER
3/4" = 1'-0"



A22 ENLARGED SECTION - ELEVATOR EL-1
1/4" = 1'-0"

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WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

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KEY PLAN

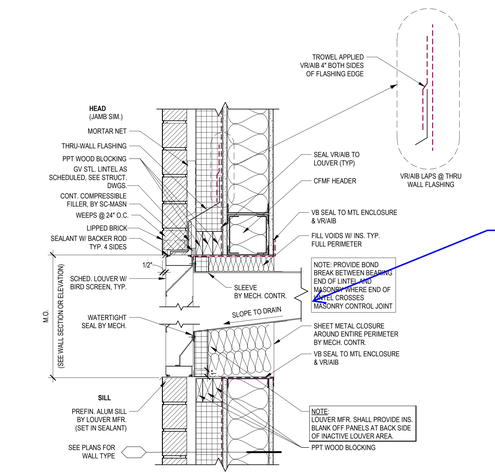
ORIENTATION AND SCALE:

PROJECT NORTH — TRUE NORTH — SCALE: 1/4"=1'-0" — 0 2' 4' 8' GRAPHIC SCALE

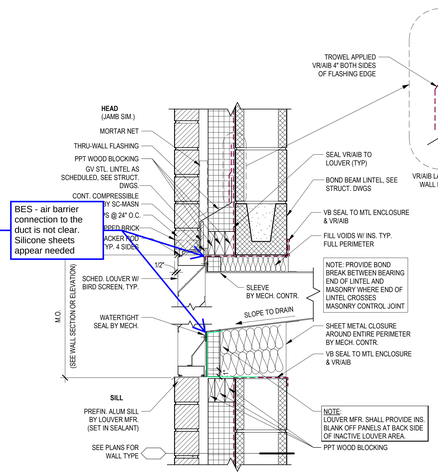
SHEET TITLE:
ELEVATOR PLANS, SECTIONS, AND DETAILS

SHEET NUMBER:
A7.01

THIS SHEET WAS PREVIOUSLY ISSUED AS PART OF EARLY RELEASE PACKAGE 2

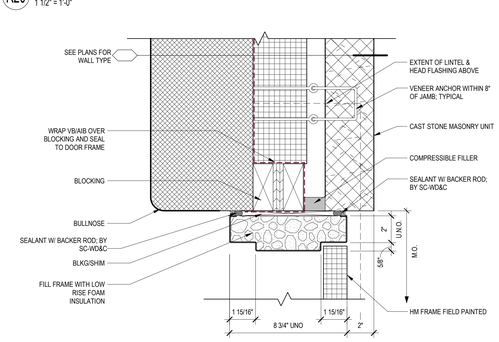


R26 LOUVER IN X1.11 / X1.12 WALL
1 1/2" = 1'-0"

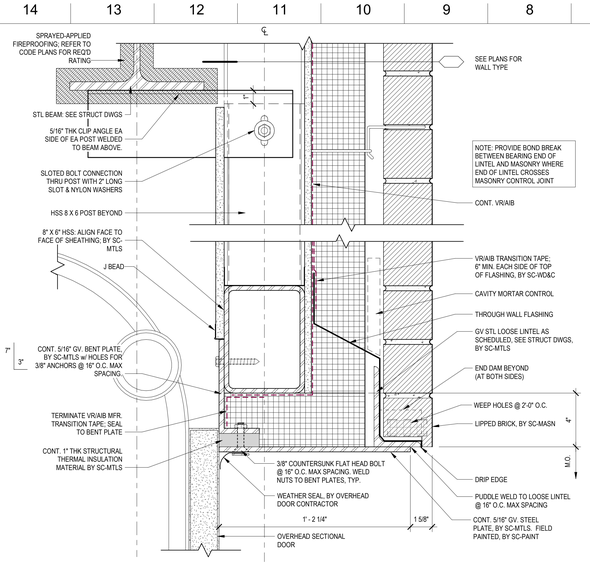


BES - air barrier connection to the duct is not clear. Silicone sheets appear needed

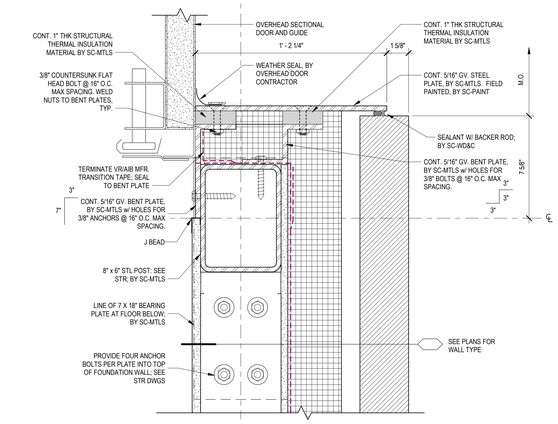
R20 LOUVER IN X3.11 / X3.12 / X4.11 WALL
1 1/2" = 1'-0"



R14 OVERHEAD DOOR DETAIL @ X1.11 / X1.12 - HEAD
3" = 1'-0"



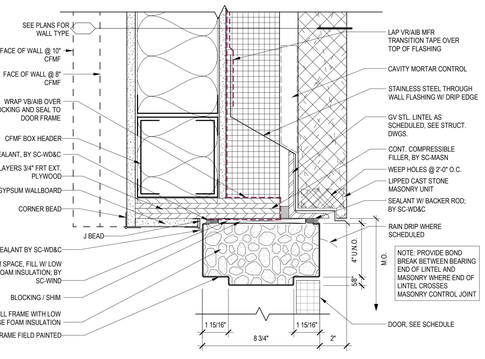
R7 OVERHEAD DOOR DETAIL @ X1.11 / X1.12 - JAMB
3" = 1'-0"

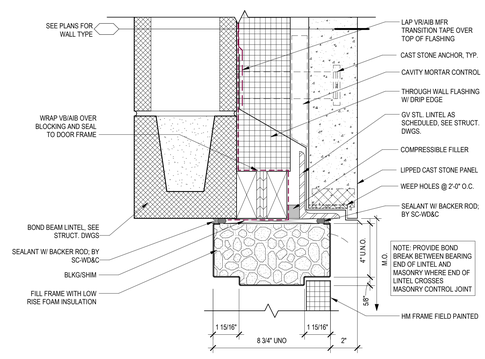


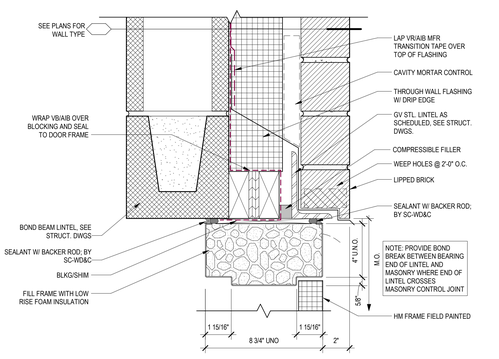
HM METAL 4 SIDED DOOR FRAME @ X1.11 / X1.12 / X2.11 / X2.12 / X5.11 / X5.12 WALL, ROOF FLASHING & STAIR LANDING- SILL
3" = 1'-0"

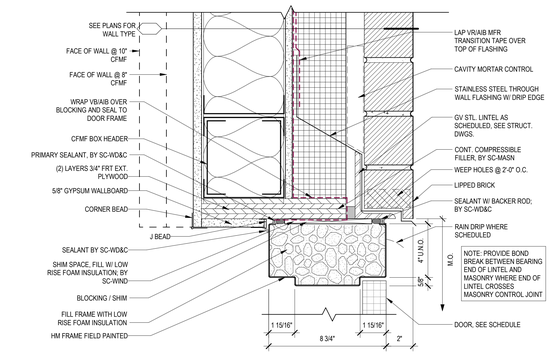
M7

M20 TYPICAL HM DOOR FRAME @ X3.12 WALL - JAMB
3" = 1'-0"

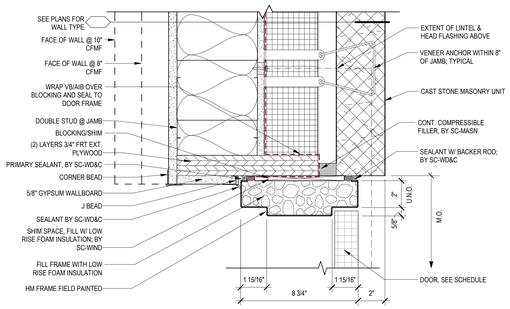




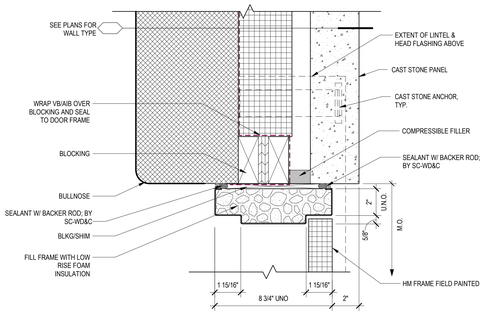




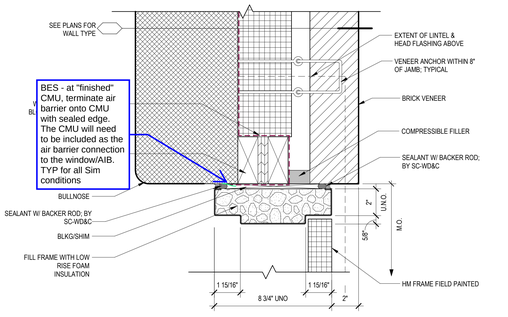
F26 TYPICAL HM DOOR FRAME @ X1.12 WALL - HEAD
3" = 1'-0"



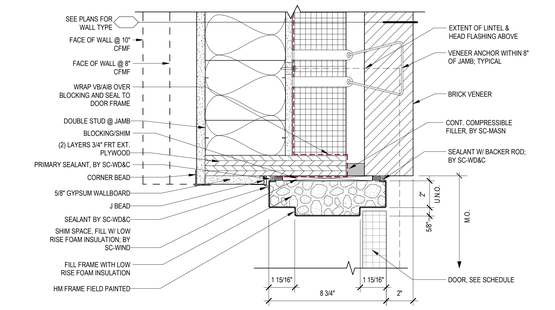
F20 TYPICAL HM DOOR FRAME @ X3.42 WALL - HEAD
3" = 1'-0"



F14 TYPICAL HM DOOR FRAME @ X3.11 / X4.11 WALL - HEAD
3" = 1'-0"



F7 TYPICAL HM DOOR FRAME @ X1.11 / X2.11 / X5.11 WALL - HEAD
3" = 1'-0"



A26 TYPICAL HM DOOR FRAME @ X1.12 WALL - JAMB
3" = 1'-0"

A20 TYPICAL HM DOOR FRAME @ X3.42 WALL - JAMB
3" = 1'-0"

A14 TYPICAL HM DOOR FRAME @ X3.11 / X4.11 WALL - JAMB
3" = 1'-0"

A7 TYPICAL HM DOOR FRAME @ X1.11 / X2.11 / X5.11 WALL - JAMB
3" = 1'-0"

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WILMINGTON ELEMENTARY SCHOOL

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PROJECT NUMBER: 23-0847

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KEY PLAN

ORIENTATION AND SCALE:

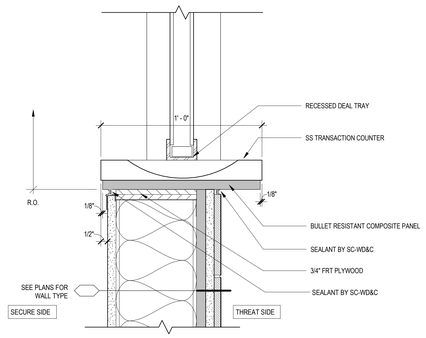
SCALE: AS INDICATED

SHEET TITLE:

DOOR AND LOUVER DETAILS

SHEET NUMBER:

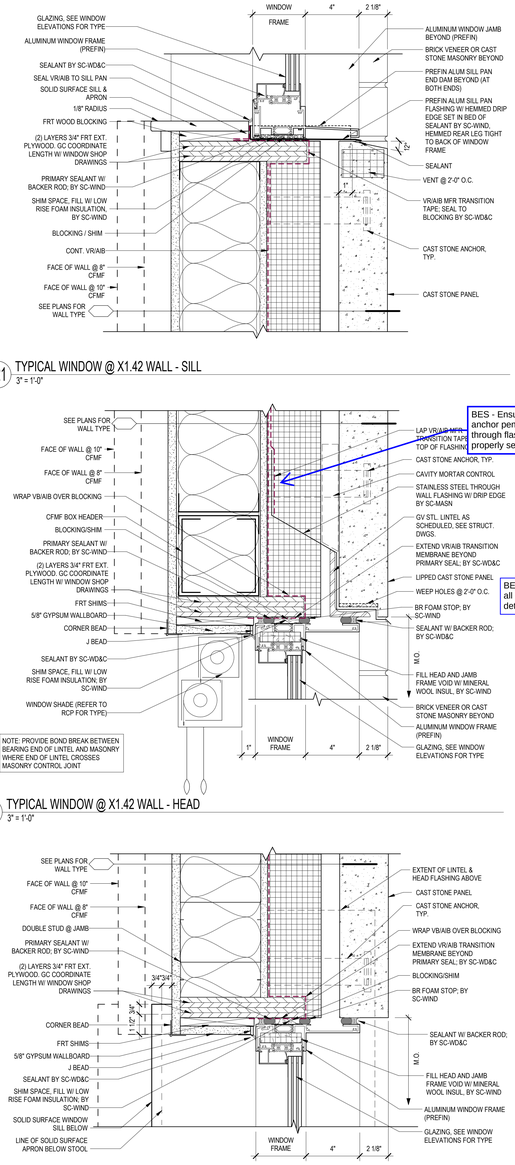
A8.51



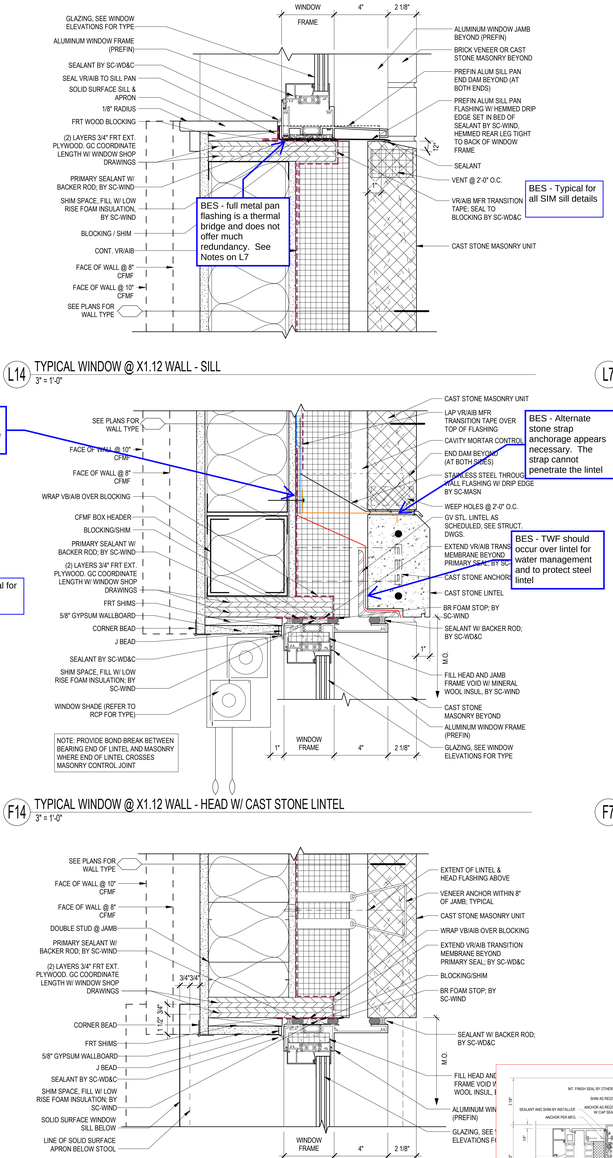
L26 BALLISTIC TRANSACTION WINDOW SILL DETAIL
3" = 1'-0"

A26 BALLISTIC TRANSACTION WINDOW JAMB DETAIL
3" = 1'-0"

F26 BALLISTIC TRANSACTION WINDOW HEAD DETAIL
3" = 1'-0"



F21 TYPICAL WINDOW @ X1.42 WALL - HEAD
3" = 1'-0"



L21 TYPICAL WINDOW @ X1.42 WALL - SILL
3" = 1'-0"

BES - Ensure stone anchor penetrations through flashings are properly sealed

BES - Typical for all SIM head details

R14 TYPICAL WINDOW @ X1.12 WALL W/ CAST STONE SILL PROFILE - SILL
3" = 1'-0"

L14 TYPICAL WINDOW @ X1.12 WALL - SILL
3" = 1'-0"

BES - Alternate stone strap anchorage appears necessary. The strap cannot penetrate the lintel

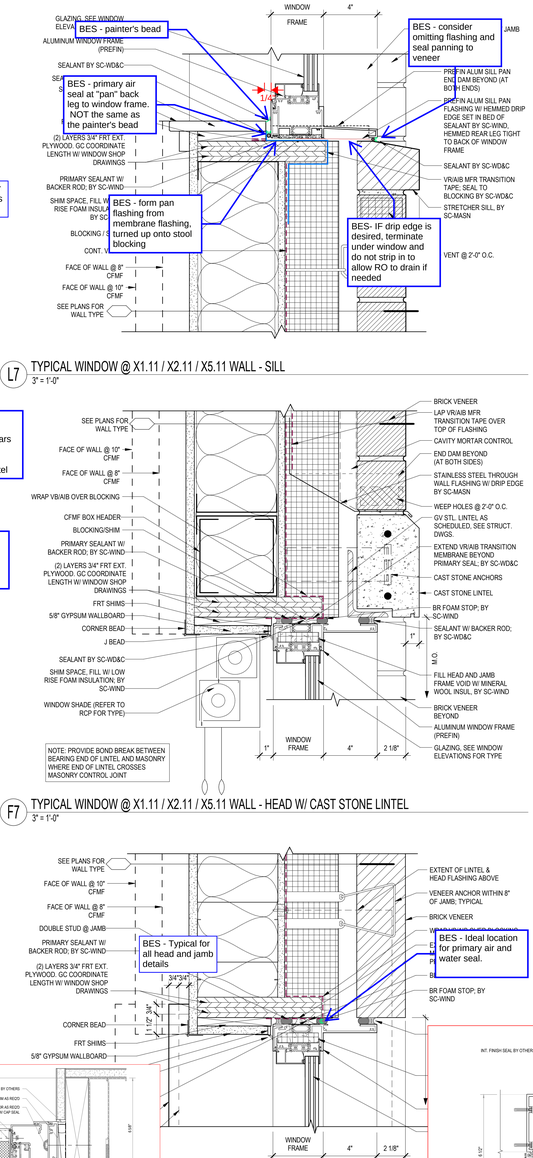
BES - TWF should occur over lintel for water management and to protect steel lintel

F14 TYPICAL WINDOW @ X1.12 WALL - HEAD W/ CAST STONE LINTEL
3" = 1'-0"

F7 TYPICAL WINDOW @ X1.11 / X2.11 / X5.11 WALL - HEAD W/ CAST STONE LINTEL
3" = 1'-0"

BES - Typical for all head and jamb details

BES - Ideal location for primary air and water seal.



L7 TYPICAL WINDOW @ X1.11 / X2.11 / X5.11 WALL - SILL
3" = 1'-0"

BES - painter's bead

BES - primary air seal at "pan" back leg to window frame. NOT the same as the painter's bead

BES - consider omitting flashing and seal panning to veneer

BES - full metal pan flashing is a thermal bridge and does not offer much redundancy. See Notes on L7

BES - form pan flashing from membrane flashing, turned up onto stool blocking

BES- IF drip edge is desired, terminate under window and do not strip in to allow RO to drain if needed

BES - Alternate framing for consideration

A21 TYPICAL WINDOW @ X1.42 WALL - JAMB
3" = 1'-0"

A14 TYPICAL WINDOW @ X1.12 WALL - JAMB
3" = 1'-0"

R7 TYPICAL WINDOW @ X1.11 / X2.11 / X5.11 WALL - HEAD
3" = 1'-0"

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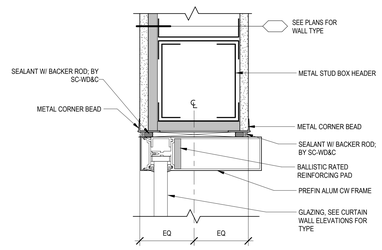
KEY PLAN

ORIENTATION AND SCALE:

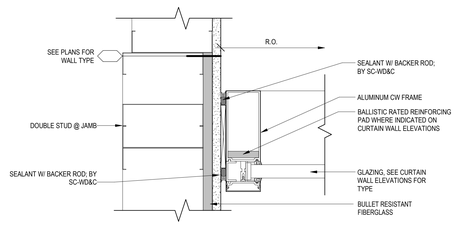
SCALE: AS INDICATED

DETAILS

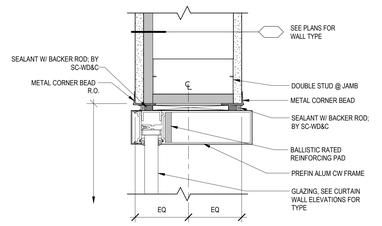
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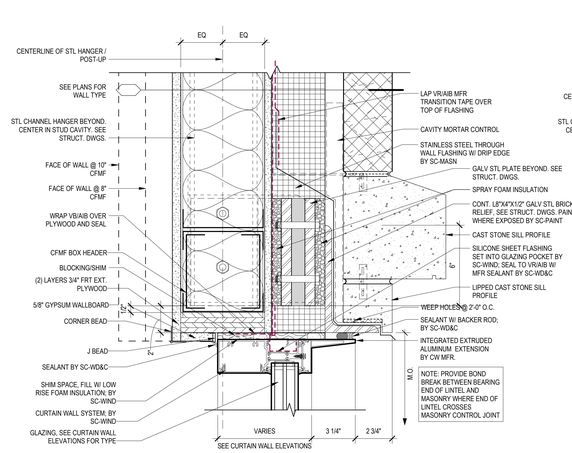
T26 TYPICAL CURTAINWALL @ MTL STUD - HEAD - BALLISTIC
3" = 1'-0"

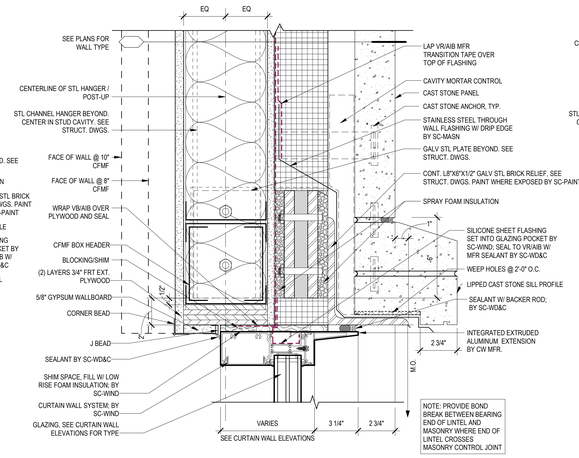


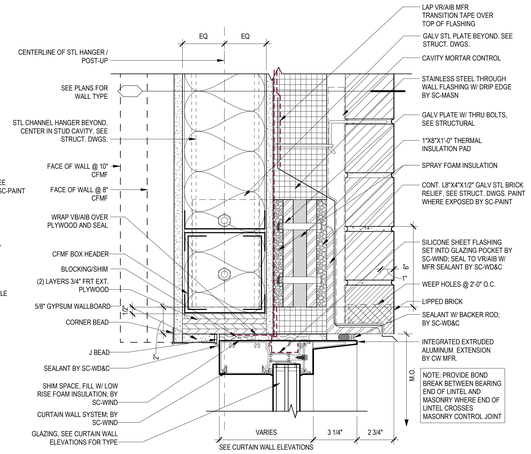
P26 TYPICAL CURTAINWALL @ MTL STUD - JAMB - BALLISTIC
3" = 1'-0"



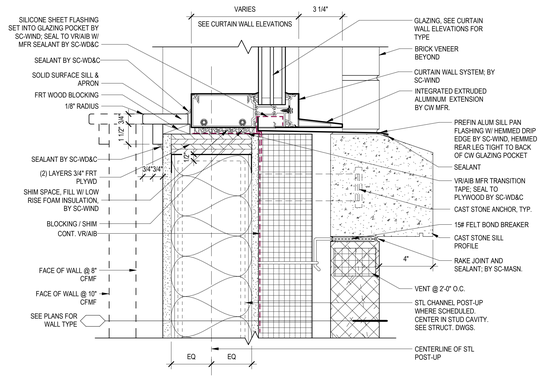
L26 TYPICAL CURTAINWALL @ MTL STUD - JAMB - BALLISTIC
3" = 1'-0"



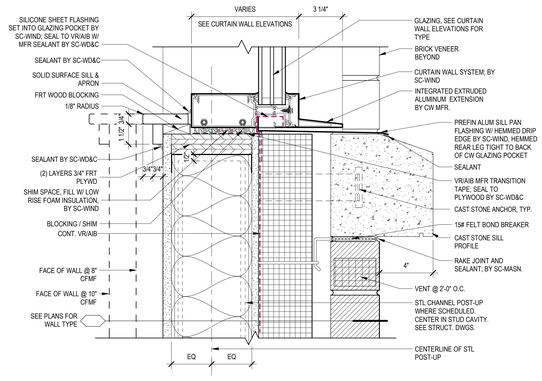




L21 TYPICAL CURTAIN WALL @ X1.12 WALL W/ CAST STONE - HEAD W/ STRUCT BRICK RELIEF
3" = 1'-0"

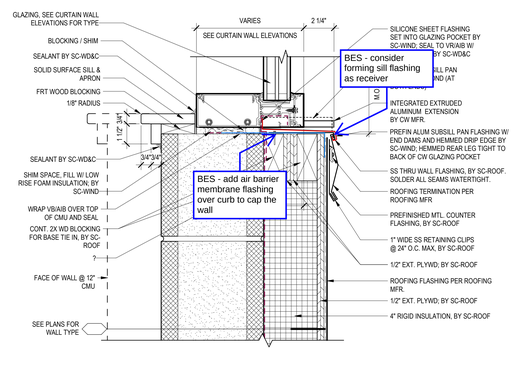


F27 TYPICAL CURTAIN WALL @ X1.12 WALL W/ CAST STONE SILL PROFILE - SILL
3" = 1'-0"

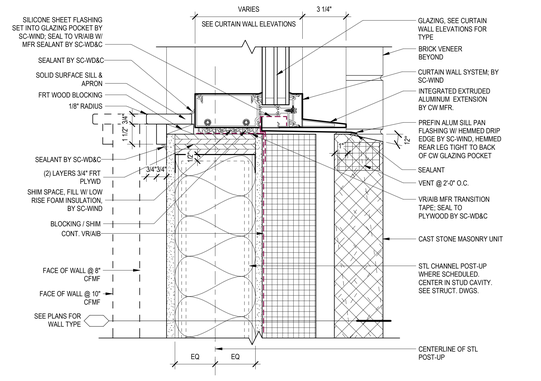


F21 TYPICAL CURTAIN WALL @ X1.11 WALL W/ CAST STONE SILL PROFILE - SILL
3" = 1'-0"

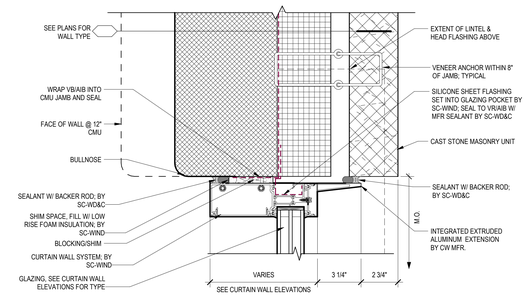
L14 TYPICAL CURTAIN WALL @ X1.11 WALL W/ CAST STONE - HEAD W/ STRUCT BRICK RELIEF
3" = 1'-0"



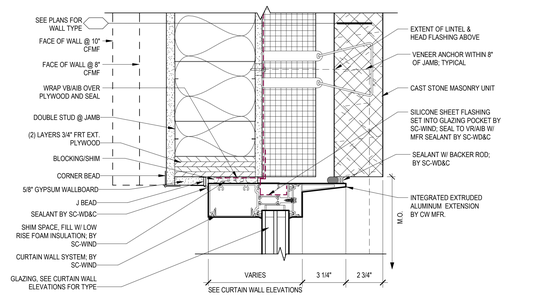
L7 TYPICAL CURTAIN WALL @ X1.11 WALL - HEAD W/ STRUCT BRICK RELIEF
3" = 1'-0"



F14 TYPICAL CURTAIN WALL @ MEMBRANE ROOF FLASHING - SILL
3" = 1'-0"



A14 TYPICAL CURTAIN WALL @ X3.12 WALL - JAMB
3" = 1'-0"



A7 TYPICAL CURTAIN WALL @ X1.12 WALL - JAMB
3" = 1'-0"

DORE + WHITTIER

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WILMINGTON ELEMENTARY SCHOOL

320 SALEM STREET
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CD PRICING
08/14/2026

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KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
CURTAINWALL DETAILS

SHEET NUMBER:
A8.71

Design Issues Tracking Log

Date: 9/10/2026
BES Project No: P2294
Project: Wilmington Elementary School
320 Salem Street
Wilmington, MA 01887

Design Issues

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
60%CD-1	6/8/2026	General – GC1.00		Confirm Energy Code Stipulations	Verify if all of the Specialized Opt-in Code requirements will be followed, such as Derating and Thermal Bridges, Performance Energy Modeling, the execution of whole building air testing, etc. OR if only the wall assemblies were designed per the reference code.	Confirmed. The final TEDI model has been completed incorporating vertical envelope derating, final ventilation calculations, and assumed air infiltration rate. Whole building infiltration is specified in Section 01 81 10. The project demonstrates compliance with heating and cooling TEDI requirements.	Closed
60%CD-2	6/8/2026	AG0.02		Masonry wall sections identify 4” of rigid insulation	Verify the assemblies (including the air barrier) are NFPA 285	Confirmed.	Closed

					compliant with the insulation thicknesses and types shown.		
60%CD-3	6/8/2026	A6.51		Masonry is shown supported/set on insulation	Verify the insulation can support the masonry dead load.	Confirmed. The specified Cellular Glass insulation in section 07 21 00 is intended to support the masonry veneer dead load.	Closed
60%CD-4	6/8/2026	A3.10		Parapet walls intersect perpendicularly with rising walls	BES recommends an isometric detail to be provided to illustrate the materials sequence and dimensions. The base of wall detail (wall to roof) should be similar above the parapet intersections, with a through wall flashing above the parapets.	Noted. Not all conditions are reflected with isometric details, but isometric views are provided on sheet A4.00 to convey the building geometry. **BES 90%CD Update: Some considerations from another project have been pasted onto Sheet A4.00**	Closed
60%CD-5	**6/8/2026**	**A4.10**		**Control joints not depicted on elevations**	**Ensure control joint layouts are illustrated on the elevations. Refer to BIA technical Notes. Spacing should not exceed 17-20' and within 10' of corners. It appears a shelf angle is needed between the 3rd levels to support the masonry, per ACI 530 requirements.**	**Noted and agreed. Final control joint locations will be indicated on exterior building elevations as part of the final bid documents. Control joints will be laid out in accordance with BIA techical notes.** **BES 90%CD Update: Not Added**	**Open**

60%CD-6	**6/8/2026**	**A6.70, A6.72**		**The balloon framing provides the potential for condensation if moist interior air enters the parapet assemblies**	**It appears that an air/vapor seal is needed at the roofline. Consider the use of closed cell SPF insulation to provide the seal.**	**Agreed. A spray foam or similar air barrier will be provided at the roof deck to parapet framing condition.** **BES 90%CD Update: Not Added**	**Open**
60%CD-7	**6/8/2026**	**A6.70**	**A14**	**The top of wall (coping) conditions illustrate the MCM panels to function as a coping, with fasteners penetrating the top of the parapet wall**	**BES prefers a full break metal coping cap, provided by the roof manufacturer, as described in Section 076200. If the MCM is used as a coping, the configuration should be altered to fully cap the top of the parapet and to provide fastening through a self-sealing membrane (ASTM D1970). Also, the MCM joints at the parapet would need to be fully sealed with sealant joints.**	**MCM top of wall condition will be substantially revised to incorporate BES, CM, and product rep feedback.** **BES 90%CD Update: Agreed**	**Open**
60%CD-8	6/8/2026	A8.70		Interior perimeter sealant joints are not shown at the curtain walls	Consider the addition of interior seals applied at the air barrier to window frame to reduce condensation potential and to provide an additional air seal.	Low expansion spray foam is indicated at the perimeter. This serves as an air seal and prevents an air space where condensation could form.	Closed
60%CD-9	6/8/2026	AG0.02		Wall assemblies do not provide U-values	Consider adding wall, roof and floor assembly U-values.	Wall assembly U-values are all individually derated based on location and context. Generic clear-field derated assembly U-values do not add any useful information	Closed

						for the contractor or AHJ.	
60%CD-10	6/8/2026	AG0.04	J6	Horizontal stone joints	All horizontal stone joints should have the mortar raked back and sealed with non-staining silicone sealant.	Agreed. Notes will be added.	Closed
60%CD-11	6/8/2026	AG0.04	J6	Material recommendation	The VR/AIB could be replaced with dampproofing at this location.	Agreed, either would be acceptable. Will change to dampproofing.	Closed
60%CD-12	**6/8/2026**	**AG0.05**	**A6**	**Jamb detail callouts not depicted**	**Consider adding jamb detail callouts.**	**Agreed. Callouts will be added.** **BES 90%CD Update: Have not been added**	**Open**
60%CD-13	6/8/2026	A1.54	R7	Transition membrane not depicted	Transition membrane is needed over dissimilar materials.	This may or may not be requried depending on VR/AIB material. This condition will be addressed in specifications.	Closed
60%CD-14	6/8/2026	A3.10			Verify materials transition are continuous.	Comment is not understood. Parapet materials will be consistent at similar conditions.	Closed
60%CD-15	**6/8/2026**	**A3.50**	**R13**	**Termination bar**	**Consider moving termination bar as illustrated and seal along the top.**	**Agreed. This drafting error will be corrected.** **BES 90%CD Update: Not moved – Occurs at several details (A6.61, A6.62, A6.63)**	**Open**

60%CD-16	6/8/2026	A3.50	K7	Sleeper fasteners not depicted	Recommend showing fastener penetration on sleeper, location of sealant, and specify type of compatible sealant.	Agreed. Graphic depiction will be added.	Closed
60%CD-17	6/8/2026	A3.50	K7	Potential sequencing conflict	Wood assembly within compact roof assembly to be coordinated with trades. Potential sequencing conflict.	There are several ways to provide thermally broken equipment attachment. This detail can remain to own scope at equipment and a final solution negotiated with roofing filed sub-bid contractor during pre-con.	Closed
60%CD-18	6/8/2026	A3.50	K17, K23	Roof membrane termination	Roof membrane to be fastened by either a termination bar or wrap blocking.	Agreed. Note and detail component to be added.	Closed
60%CD-19	6/8/2026	A3.50	E27	Pitch pocket	BES recommends installing pre-fabricated flashing boots or manufacturer-approved penetration flashings in lieu of pitch pockets where feasible to improve long-term watertightness.	Agreed. Prefabricated flashings can be specified for round penetrating elements and pitch pockets used only at irregular shaped penetrations.	Closed
60%CD-20	6/8/2026	A3.50	E27	Roofing AVB termination	Extend AVB to the top of the roofing membrane plane.	Will revise.	Closed
60%CD-21	6/8/2026	A6.51	A6	Masonry load	Confirm insulation depicted can support the masonry load.	Confirmed. The specified Cellular Glass insulation in section 07 21 00 is intended to support the masonry veneer dead load.	Closed

60%CD-22	6/8/2026	A6.60	S23	Installation sequence	Verify installation sequence with air barrier and structural thermal insulation pads.	Design team will review with CM to confirm sequencing.	Closed
60%CD-23	**6/8/2026**	**A6.60**	**G17**	**Mid wall detail**	**Detail around this area so as to not to leave discontinuities in AVB.**	**This is a drafting error. AVB will be shown as continuous.** **BES Update: Not corrected**	**Open**
60%CD-24	6/8/2026	A6.70	Q26	Insulation requirements	Verify that this meets minimum insulation requirements.	Additional insulation will be provided at the vertial offset.	Closed
60%CD-25	6/8/2026	A6.70	H7	Top of wall detail	Additional framing may be needed to support MCM panels.	MCM profile is intended to be gusseted for stiffness. Notation can be added for framing as contractor option.	Closed
60%CD-26	6/8/2026	A6.70, A6.72	Typical	Air seal not depicted	Air / vapor seal appears to be needed.	Agreed. Detail revised	Closed
60%CD-27	6/8/2026	A6.73	Typical	Roof height	Consider raising the height of parapet to allow for a proper roofing termination. Revise details to isolate trades instead of overlapping systems by different trades.	Development of this detail is ongoing. This condition will be reviewed with CM	Closed
60%CD-28	6/8/2026	A8.60	L7	End dam install	Consider adding note to strip in end dam with air barrier membrane.	Agreed. Note to be added.	Closed
60%CD-29	6/8/2026	A8.60	L7	Primary air seal not depicted	A primary air seal is needed between flashing back leg and frame. Allow 1/4" gap.	This is depicted with the note"seal VR/AIB to sill pan"	Closed
60%CD-30	**6/8/2026**	**A8.60**	**F7, F14**	**Attachment straps**	**Verify the attachment straps will not penetrate the lintel and flashing.**	**Detail be be revised; components are overlapping.**	**Open**

60%CD-31	**6/8/2026**	**A8.60**	**F7, F14**	**Flashing at lintel**	**Flashing should occur at lintel to minimize corrosion potential and flash water to the exterior**	**Detail be be revised and coordinated with comment above.**	**Open**
60%CD-32	6/8/2026	A8.71	Typical	Extend AVB	Extend the AVB past the curtainwall plane at heads and jambs. Terminate the AVB onto the wood blocking at sills.	Will revise.	Closed
60%CD-33	6/8/2026	A8.80	Typical	AVB not depicted	Consider depicting AVB terminations at storefront details.	AVB is not used at exteior conditions. No AVB will be used here.	Closed
60%CD-34	6/8/2026	01 40 00 – Mock-Ups	Part 3		Verify if field testing of the mock up assembly components (air barrier and fenestrations) is required.	Testing will be performed as described in Section 01 91 19, provided by BES, as noted in Section 01 40 00. Please provide schedule of tests intended to be performed on the mock-up.	Closed
60%CD-35	6/8/2026	03 45 00 – Precast Architectural Concrete			Assume flashing, jointing, etc. as defined in Section 042000.	**Correct. Text to be added to 03 45 00 to provide flashings per 04 20 00.** **BES Update: Not Yet added**	**Open**
60%CD-36	6/8/2026	04 20 00 - Unit Masonry	Part 2.07		Calls for fabric coated copper flashings and SS, which might suggest a combination type flashing configuration. Drawings appear to identify a single piece metal (SS). Clarify the design	The intent is to provide solid single-piece stainless steel through-wall flashing. Specs will be revised to reflect this.	Closed

					intent. BES prefers a 1 piece flashing where practical.	**BES Update: Not Yet updated**	
60%CD-37	6/8/2026	04 72 00 - Cast Stone Masonry	Part 3		Consider adding verbiage to pre-saturate pallets of stone to provide Saturated Surface Dry conditions to minimize mortar separation.	We can include this in Part 3 as a contractor option during dry conditions.	Closed
60%CD-38	6/8/2026	06 10 00 - Rough Carpentry	Part 3.03		Consider adding language to install blocking in accordance with ANSI/SPRI ES-1 requirements.	This requirement is in section 07 62 00 since it is an assembly requirement.	Closed
60%CD-39	6/8/2026	07 13 00 - Sheet Waterproofing	Part 2.01B		Verify if blind side waterproofing will be used throughout the building or only at elevator conditions.	Only at elevator conditions.	Closed
60%CD-40	6/8/2026	07 14 00 – Fluid-Applied Waterproofing	Part 2.01		Verify the use of the fluid applied material trigger points. Sheet goods are preferred where feasible due to less quality control related concerns.	This section has been deleted from the set.	Closed
60%CD-41	6/8/2026	07 21 00 – Thermal Insulation	Part 3		Recommend a schedule to be provided to clarify where the differing insulation board types will be used.	Additional notation has been added to the drawings with respect to type and location.	Closed
60%CD-42	6/8/2026	07 21 19 - Foamed-In-Place Insulation	Part 3.01		Consider adding moisture reading requirements prior to installation of <0.6% for gypsum and <15% for wood substrates.	Installation requirements are covered broadly in Part 3. Specifying certain percentages may unintentially restrict available products. Contracts must prepare and accept surfaces in accordance	Closed

						with manufacturer requirements.	
60%CD-43	6/8/2026	07 27 00 - Vapor Retarder / Air Infiltration Barriers	Part 2.03		Consider specifying material type and minimum thickness. Asphaltic material recommended at 0.040” thickness.	Type and thickness is specified. Asphaltic coatings are generally not compatible with silicone sealants and/or require more products and preparation to ensure proper adhesion.	Closed
60%CD-44	6/8/2026	07 42 14 - Metal Composite Material Wall Panels	Part 2.01		Consider adding language for an FR (Fire Rated) panel.	Fire performance is based on assembly compliance with NFPA 285.	Closed
60%CD-45	6/8/2026	07 91 00 – Preformed Joint Seals	Part 2.03		Add sealant accessory (silicone)	Section 07 91 00 will be deleted from the project. These are not used.	Closed
60%CD-46	6/8/2026	07 92 00 - Joint Sealants	Part 3.03.I.3		Recommend silicone sheets installed to the window and the substrates by window installer to avoid conflict/responsibility dispute.	This will be discussed with the CM & OPM. Regardless of assignment, there is an inheirant overlap of responsibility. D+W has no opinion as to which trade is the lowest-risk assignment.	Closed
60%CD-47	6/8/2026	08 43 13 - Aluminum-Framed Storefronts	Part 2.02		Recommend adding water penetration resistance requirements (10.0 psf recommended).	Exterior storefront systems are not used and will be removed from this section. Exterior entries are curtain wall systems.	Closed

60%CD-48	6/8/2026	08 51 13 - Aluminum Windows	Part 2.03.D and E		Part 2.03.D and .E do not match.	Testing pressures will be coordinated to 12.11 psf.	Closed
60%CD-49	**6/8/2026**	**08 51 13 - Aluminum Windows**	**Part 2.03.F**		**AW grade products require air leakage testing at 6.24 psf. (also 3.04.D.4).**	**Agreed. This will be corrected.** **BES Update: Not Yet updated**	**Open**
60%CD-50	**6/8/2026**	**08 51 13 - Aluminum Windows**	**Part 2.03.D and E**		**Values do not meet Stretch Code requirements.**	**(Assumed ref. to 2.03-I). Prescriptive values are not applicable for component alternative compliance. Still, these U-values are much higher than anticipated for this project. Spec will be revised to incorporate more reasonable values.** **BES Update: Not Yet updated**	**Open**

Continue to Next Page for 90%CD Comments

Design Issues Tracking Log

Date: 9/10/2026
BES Project No: P2294
Project: Wilmington Elementary School
320 Salem Street
Wilmington, MA 01887

Design Issues

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
90%CD-1	9/10/2026	General	N/A	Responses to the 60%CD BECx Plan Review were received. The majority of the items were closed out; however, some items remain. Refer to the attached tracking log for updates	No action specific to this item necessary		Closed
90%CD-2	9/10/2026	BECx Plan	Field Test Matrix	The building envelope field test matrix has been updated in the BECx plan	The table must be reviewed by the OPM, Architect, and BES prior to project bid to ensure any contractor responsibility items are included in the bids.		Open
90%CD-3	9/10/2026	Top of Wall	Ref H8/A6.70	In Reference to Item 60%CD-7, from the 60%CD review, the top of wall (coping) conditions have not been significantly revised and BES has concerns with the components as illustrated.	Further discussion regarding the materials and configurations are needed. The architect noted that the project team intends to vet out possible solutions with the CM and product manufacturer.		Open

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
90%CD-4	9/10/2026	Window and CW Details	Ref A14/A8.51	At the window/door areas that include CMU as the interior finish, providing the air seal connection directly from the window to the air barrier is not feasible.	The air barrier membrane flashing in the RO should be terminated with sealant, at/or just short of the window interior sealant joint.		Open
90%CD-5	9/10/2026	Door and Louver Details	Ref R20/A8.51	The air barrier connections at the louvers/ductwork is not clear. This appears to be a future RFI when more definitive product information is available.	Consider adding a note that indicates an air seal is needed and silicone sheets applied from the RO to the ducts sleeve schematically added.		Open
90%CD-6	9/10/2026	Window Details	Ref A7/8.60	The primary air and water sealant joint location at the windows occurs at the interior frame to RO within the masonry cavity.	The ideal location would occur further out at the frame shoulder to air barrier, where the foam stop is currently located.		Open
90%CD-7	9/10/2026	Window Details/Masonry TWF	Ref F14/A8.60	The TWF location at windows with stone “lintels” is located above the stone and is not well placed for water management and does not adequately protect the steel lintels.	The ideal location is directly above the steel lintel, similar to the full stone veneer details.		Open

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
90%CD-8	9/10/2026	Window Details	Ref L7/A8.60	Window sill details illustrate a full metal pan flashing. The flashing is a thermal bridge and does not offer any significant redundancy and creates additional sealant requirements.	a. Form "pan" flashing using self adhered air barrier membrane. Turn the membrane up onto the edge of the stool blocking. Seal ends to jamb membrane flashing. b. IF a metal drip edge is used, terminate the flashing beneath the window and do not strip the flashing in to all water in the RO to drain to the masonry cavity. In our opinion, the flashing could be omitted altogether. c. Install primary air seal between the sill "pan" flashing back leg and window frame. A minimum ¼" wide joint should be provided and properly configured. This joint must be different from the "painter's" bead at the stool.		Open
90%CD-9	9/10/2026	Construction Mock up	A21/ AG0.05	Viewing of air barrier, transitions, and masonry flashing for quality and configuration is critical	Consider omitting a section of masonry veneer (cladding only) to allow inspection of the TWF and air barrier tie-ins.		Open
90%CD-10	9/10/2026	Roof Details	A22/A3.50	Mechanical attachment of roofing to concrete decks can be laborious	Verify if insulation is mechanically attached or adhesively at concrete decks		Open
90%CD-11	9/10/2026	Roof Detail	K7/A3.50	Sleeper membrane could be damaged from abrasion	Consider adding metal cap		Open

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
90%CD-12	9/10/2026	Roof Detail	K7/A3.50	Roof termination at curbs is inconsistent	Consider wrapping membrane over top of curb or terminate using counterflashing and grommeted fasteners		Open
90%CD-13	9/10/2026	Exterior Axions	A.400	Isometric view of parapet to rising walls are beneficial for trade coordination and sequencing	Example of Isometrics provided for reference but must not be considered project specific.		Open
90%CD-14	9/10/2026	A6.51 Base of Wall Detail	T14, T21, T25/A6.51	Flashings are typically needed beneath masonry caps	Recommend through wall flashing as described on T25.		Open
90%CD-15	9/10/2026	Mid Wall Detail	G17/A6.60	Air barrier continuity needed at thermally broken steel attachments	Run AIB continuous and seal penetrations prior to isolator and angle install		Open
90%CD-16	9/10/2026	Mid Wall Detail	J27/ A6.61	Window sill to roofing detail is incomplete	If window sill flashing to roofing, consider using sill flashing as a receiver.		Open
90%CD-17	9/10/2026	Elevator Pit Details	A5/ A7.01	Blind side to post applied waterproofing detailing is not illustrated	Transition should occur at outside face of footing.		Open
90%CD-18	9/10/2026	Elevator Pit Details	A10/ A7.01	Underslabb VB to post applied waterproofing is not illustrated	Recommend transition slab VB to pit waterproofing using manufacturer’s tape		Open

Item No	Date Identified	Drawing Sheet or Spec Section	Part or Detail	Description	BES Recommendation	Design Team Response	Status
90%CD-19	9/10/2026	Door/Window sill Detail at Roof Curb	M7/A8.51 and F14/A8.71	Roof curb is vulnerable to water intrusion in the event of metal flashing failure and/or condensation	Recommend adding AIB membrane to cap the roof curb.		Open
90%CD-20	9/10/2026	Window Detail	F14A8.60	Stone anchors might penetrate critical flashings	Ensure stone anchor penetrations through flashings are properly sealed		Open
90%CD-21	9/10/2026	Door/Window sill Detail at Roof Curb	F14/A8.71	Additional flashing can be reduced	Consider forming sill flashing as a receiver		Open

After your review of this information, please do not hesitate to contact us with any questions, comments or concerns.

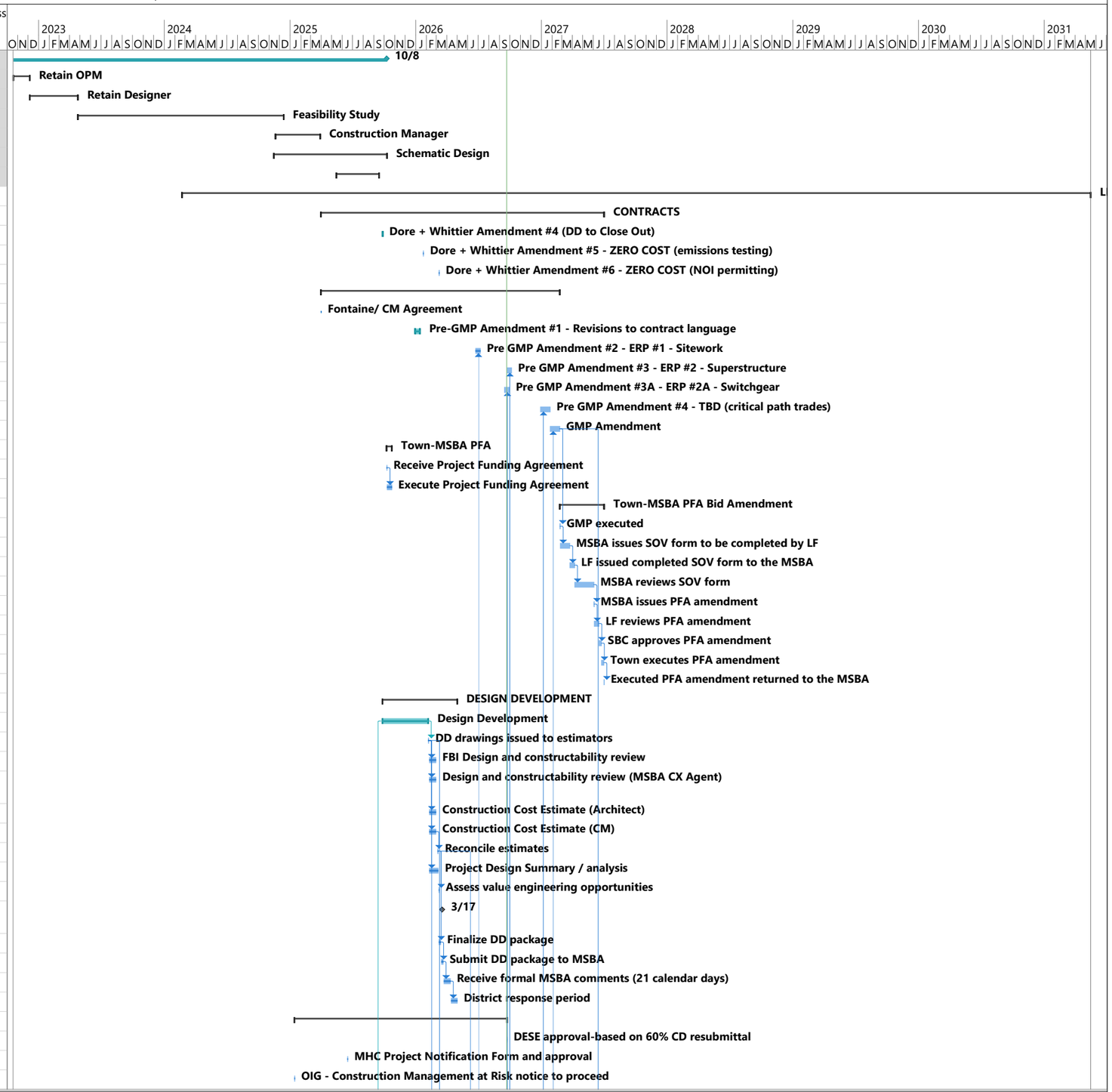
Sincerely,

BES

Wilmington Elementary School - 90% CD Schedule

September 28, 2026

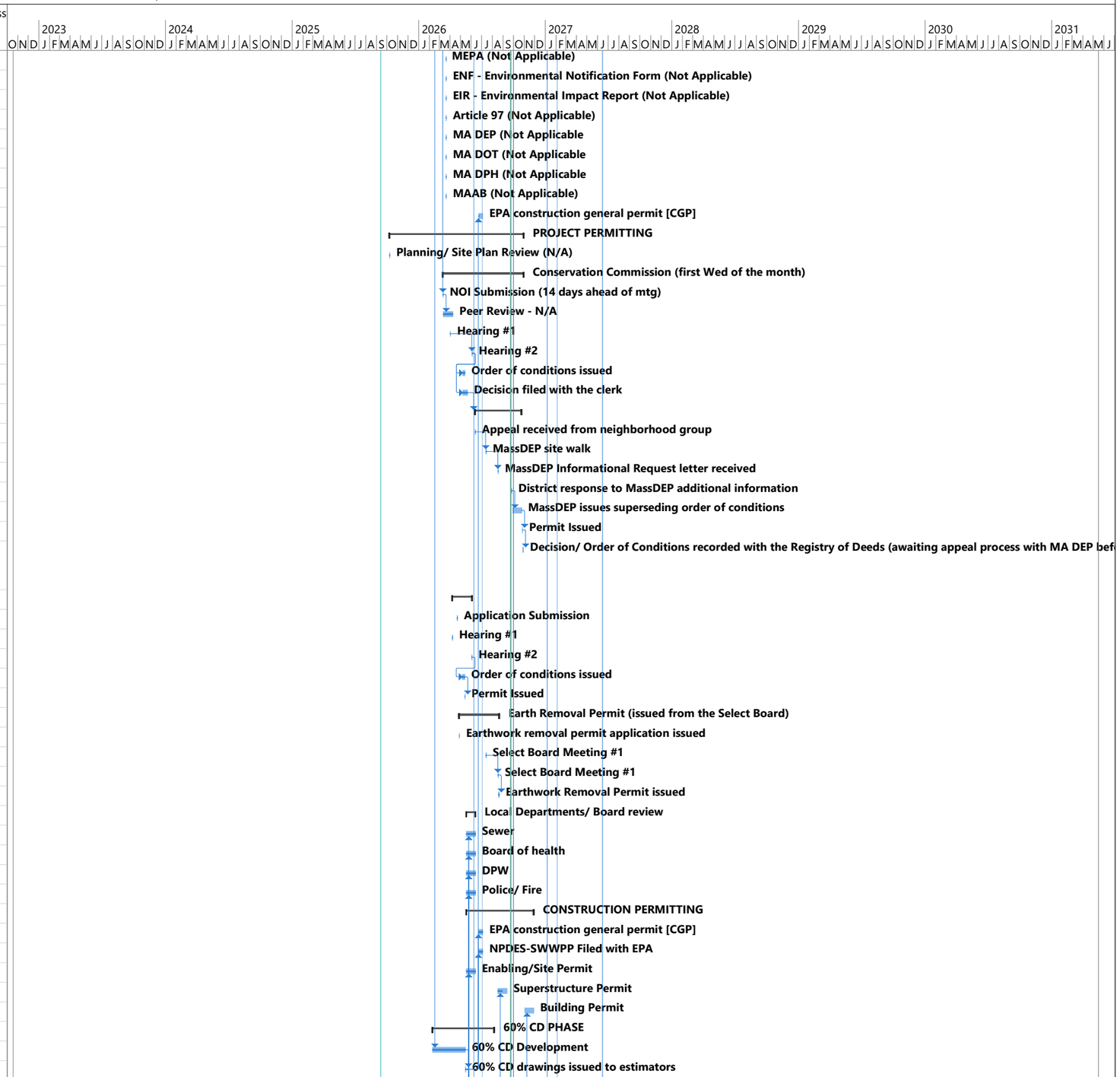
ID	Task Mode	% Complete	Task Name	Duration	Start	Finish	Predecessors
1		**100%**	**SCHEDULE - PRE LEFTFIELD ENGAGEMENT**	**0 days?**	**Wed 10/8/25**	**Wed 10/8/25**	
2		**100%**	**Retain OPM**	**34 days**	**Wed 10/19/22**	**Tue 12/6/22**	
9		**100%**	**Retain Designer**	**100 days**	**Tue 12/6/22**	**Mon 4/24/23**	
19		**100%**	**Feasibility Study**	**428 days**	**Tue 4/25/23**	**Fri 12/13/24**	
37		**100%**	**Construction Manager**	**94 days**	**Tue 11/19/24**	**Fri 3/28/25**	
49		**100%**	**Schematic Design**	**235 days**	**Thu 11/14/24**	**Wed 10/8/25**	
62		**100%**	**Project Scope & Budget**	**88 days**	**Thu 5/15/25**	**Tue 9/16/25**	
71		**29%**	**LEFTFIELD SCHEDULE**	**1887 days?**	**Wed 2/21/24**	**Thu 5/15/31**	
72		**19%**	**CONTRACTS**	**589 days**	**Mon 3/31/25**	**Thu 7/1/27**	
73		100%	Dore + Whittier Amendment #4 (DD to Close Out)	1 day	Fri 9/26/25	Fri 9/26/25	
74		100%	Dore + Whittier Amendment #5 - ZERO COST (emissions testin	1 day	Thu 1/22/26	Thu 1/22/26	
75		100%	Dore + Whittier Amendment #6 - ZERO COST (NOI permitting)	1 day	Mon 3/9/26	Mon 3/9/26	
76		**26%**	**Fontaine**	**496 days**	**Mon 3/31/25**	**Mon 2/22/27**	
77		100%	Fontaine/ CM Agreement	1 day	Mon 3/31/25	Mon 3/31/25	
78		100%	Pre-GMP Amendment #1 - Revisions to contract language	10 days	Tue 12/30/25	Mon 1/12/26	
79		100%	Pre GMP Amendment #2 - ERP #1 - Sitework	10 days	Tue 6/23/26	Mon 7/6/26	224
80		0%	Pre GMP Amendment #3 - ERP #2 - Superstructure	10 days	Tue 9/22/26	Mon 10/5/26	228
81		0%	Pre GMP Amendment #3A - ERP #2A - Switchgear	10 days	Tue 9/15/26	Mon 9/28/26	231
82		0%	Pre GMP Amendment #4 - TBD (critical path trades)	20 days	Tue 12/29/26	Mon 1/25/27	236
83		0%	GMP Amendment	20 days	Tue 1/26/27	Mon 2/22/27	237
84		**100%**	**Town-MSBA PFA**	**11 days**	**Wed 10/8/25**	**Wed 10/22/25**	
85		100%	Receive Project Funding Agreement	1 day	Wed 10/8/25	Wed 10/8/25	
86		100%	Execute Project Funding Agreement	10 days	Thu 10/9/25	Wed 10/22/25	85
87		**0%**	**Town-MSBA PFA Bid Amendment**	**93 days**	**Tue 2/23/27**	**Thu 7/1/27**	
88		0%	GMP executed	1 day	Tue 2/23/27	Tue 2/23/27	83
89		0%	MSBA issues SOV form to be completed by LF	20 days	Wed 2/24/27	Tue 3/23/27	88
90		0%	LF issued completed SOV form to the MSBA	10 days	Wed 3/24/27	Tue 4/6/27	89
91		0%	MSBA reviews SOV form	40 days	Wed 4/7/27	Tue 6/1/27	90
92		0%	MSBA issues PFA amendment	1 day	Wed 6/2/27	Wed 6/2/27	91
93		0%	LF reviews PFA amendment	10 days	Thu 6/3/27	Wed 6/16/27	92
94		0%	SBC approves PFA amendment	5 days	Thu 6/17/27	Wed 6/23/27	93
95		0%	Town executes PFA amendment	5 days	Thu 6/24/27	Wed 6/30/27	94
96		0%	Executed PFA amendment returned to the MSBA	1 day	Thu 7/1/27	Thu 7/1/27	95
97		**100%**	**DESIGN DEVELOPMENT**	**155 days**	**Fri 9/26/25**	**Thu 4/30/26**	
98		100%	Design Development	95 days	Fri 9/26/25	Thu 2/5/26	
99		100%	DD drawings issued to estimators	1 day	Fri 2/6/26	Fri 2/6/26	98
100		100%	FBI Design and constructability review	15 days	Mon 2/9/26	Fri 2/27/26	99
101		100%	Design and constructability review (MSBA CX Agent)	15 days	Mon 2/9/26	Fri 2/27/26	99
102		100%	Construction Cost Estimate (Architect)	15 days	Mon 2/9/26	Fri 2/27/26	99
103		100%	Construction Cost Estimate (CM)	15 days	Mon 2/9/26	Fri 2/27/26	99
104		100%	Reconcile estimates	2 days	Thu 3/5/26	Fri 3/6/26	103
105		100%	Project Design Summary / analysis	20 days	Mon 2/9/26	Fri 3/6/26	99
106		100%	Assess value engineering opportunities	1 day	Mon 3/9/26	Mon 3/9/26	104
107		100%	School Building Committee mtg (approve DD scope, sched and budget)	1 day	Tue 3/17/26	Tue 3/17/26	
108		100%	Finalize DD package	5 days	Mon 3/9/26	Fri 3/13/26	104
109		100%	Submit DD package to MSBA	5 days	Mon 3/16/26	Fri 3/20/26	108
110		100%	Receive formal MSBA comments (21 calendar days)	15 days	Mon 3/23/26	Fri 4/10/26	109
111		100%	District response period	14 days	Mon 4/13/26	Thu 4/30/26	110
112		**62%**	**MISC PROJECT APPROVALS**	**442 days**	**Mon 1/13/25**	**Tue 9/22/26**	
113		100%	DESE approval-based on 60% CD resubmittal	1 day	Tue 9/22/26	Tue 9/22/26	
114		100%	MHC Project Notification Form and approval	1 day	Mon 6/16/25	Mon 6/16/25	
115		100%	OIG - Construction Management at Risk notice to proceed	1 day	Mon 1/13/25	Mon 1/13/25	



Wilmington Elementary School - 90% CD Schedule

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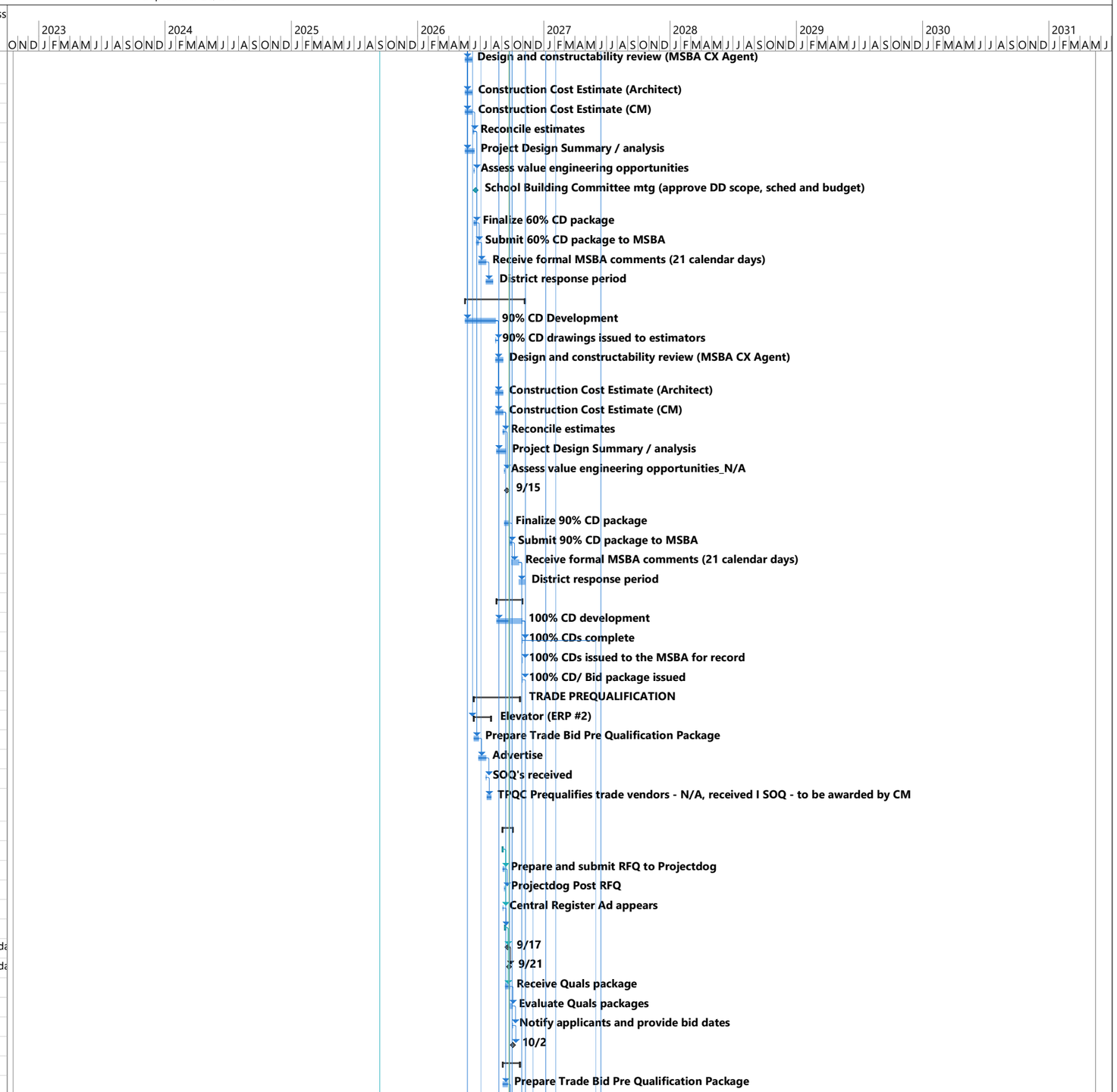
ID	Task Mode	% Complete	Task Name	Duration	Start	Finish	Predecessors
116		100%	MEPA (Not Applicable)	1 day	Fri 3/20/26	Fri 3/20/26	
117		100%	ENF - Environmental Notification Form (Not Applicable)	1 day	Fri 3/20/26	Fri 3/20/26	
118		100%	EIR - Environmental Impact Report (Not Applicable)	1 day	Fri 3/20/26	Fri 3/20/26	
119		100%	Article 97 (Not Applicable)	1 day	Fri 3/20/26	Fri 3/20/26	
120		100%	MA DEP (Not Applicable	1 day	Fri 3/20/26	Fri 3/20/26	
121		100%	MA DOT (Not Applicable	1 day	Fri 3/20/26	Fri 3/20/26	
122		100%	MA DPH (Not Applicable	1 day	Fri 3/20/26	Fri 3/20/26	
123		100%	MAAB (Not Applicable)	1 day	Fri 3/20/26	Fri 3/20/26	
124		20%	EPA construction general permit [CGP]	10 days	Mon 6/22/26	Fri 7/3/26	166
125		**85%**	**PROJECT PERMITTING**	**277 days**	**Wed 10/8/25**	**Thu 10/29/26**	
126		100%	Planning/ Site Plan Review (N/A)	1 day	Wed 10/8/25	Wed 10/8/25	
127		**85%**	**Conservation Commission (first Wed of the month)**	**167 days**	**Wed 3/11/26**	**Thu 10/29/26**	
128		100%	NOI Submission (14 days ahead of mtg)	1 day	Wed 3/11/26	Wed 3/11/26	99
129		100%	Peer Review - N/A	20 days	Thu 3/12/26	Wed 4/8/26	128
130		100%	Hearing #1	1 day	Wed 4/1/26	Wed 4/1/26	
131		100%	Hearing #2	1 day	Wed 6/3/26	Wed 6/3/26	130
132		100%	Order of conditions issued	5 days	Thu 5/7/26	Wed 5/13/26	131
133		100%	Decision filed with the clerk	10 days	Thu 5/7/26	Wed 5/20/26	131
134		**16%**	10-day [calendar days] appeal period.	**96 days**	**Fri 6/12/26**	**Fri 10/23/26**	**133**
135		100%	Appeal received from neighborhood group	1 day	Fri 6/12/26	Fri 6/12/26	
136		100%	MassDEP site walk	1 day	Mon 7/13/26	Mon 7/13/26	135
137		100%	MassDEP Informational Request letter received	1 day	Mon 8/17/26	Mon 8/17/26	136
138		90%	District response to MassDEP additional information	1 day	Fri 9/25/26	Fri 9/25/26	
139		0%	MassDEP issues superseding order of conditions	20 days	Mon 9/28/26	Fri 10/23/26	138
140		0%	Permit Issued	1 day	Mon 10/26/26	Mon 10/26/26	139
141		0%	Decision/ Order of Conditions recorded with the Registry of Deeds (awaiting appeal process with MA DEP before filing with registry)	3 days	Tue 10/27/26	Thu 10/29/26	140
142		**100%**	**Special Permit Ground Water Protection District (Planning**	**41 days**	**Tue 4/7/26**	**Tue 6/2/26**	
143		100%	Application Submission	1 day	Tue 4/21/26	Tue 4/21/26	
144		100%	Hearing #1	1 day	Tue 4/7/26	Tue 4/7/26	
145		100%	Hearing #2	1 day	Tue 6/2/26	Tue 6/2/26	
146		100%	Order of conditions issued	5 days	Wed 5/6/26	Tue 5/12/26	145
147		100%	Permit Issued	1 day	Wed 5/13/26	Wed 5/13/26	146
148		**100%**	**Earth Removal Permit (issued from the Select Board)**	**84 days**	**Mon 4/27/26**	**Thu 8/20/26**	
149		100%	Earthwork removal permit application issued	1 day	Mon 4/27/26	Mon 4/27/26	
150		100%	Select Board Meeting #1	1 day	Mon 7/13/26	Mon 7/13/26	
151		100%	Select Board Meeting #1	1 day	Mon 8/17/26	Mon 8/17/26	150
152		100%	Earthwork Removal Permit issued	3 days	Tue 8/18/26	Thu 8/20/26	151
153		**100%**	**Local Departments/ Board review**	**20 days**	**Mon 5/18/26**	**Fri 6/12/26**	
154		100%	Sewer	20 days	Mon 5/18/26	Fri 6/12/26	166
155		100%	Board of health	20 days	Mon 5/18/26	Fri 6/12/26	166
156		100%	DPW	20 days	Mon 5/18/26	Fri 6/12/26	166
157		100%	Police/ Fire	20 days	Mon 5/18/26	Fri 6/12/26	166
158		**63%**	**CONSTRUCTION PERMITTING**	**140 days**	**Mon 5/18/26**	**Fri 11/27/26**	
159		100%	EPA construction general permit [CGP]	10 days	Mon 6/22/26	Fri 7/3/26	166
160		100%	NPDES-SWWPP Filed with EPA	10 days	Mon 6/22/26	Fri 7/3/26	166
161		100%	Enabling/Site Permit	20 days	Mon 5/18/26	Fri 6/12/26	166
162		50%	Superstructure Permit	20 days	Mon 8/17/26	Fri 9/11/26	180
163		0%	Building Permit	20 days	Mon 11/2/26	Fri 11/27/26	194
164		**100%**	**60% CD PHASE**	**128 days**	**Mon 2/9/26**	**Wed 8/5/26**	
165		100%	60% CD Development	69 days	Mon 2/9/26	Thu 5/14/26	99
166		100%	60% CD drawings issued to estimators	1 day	Fri 5/15/26	Fri 5/15/26	165



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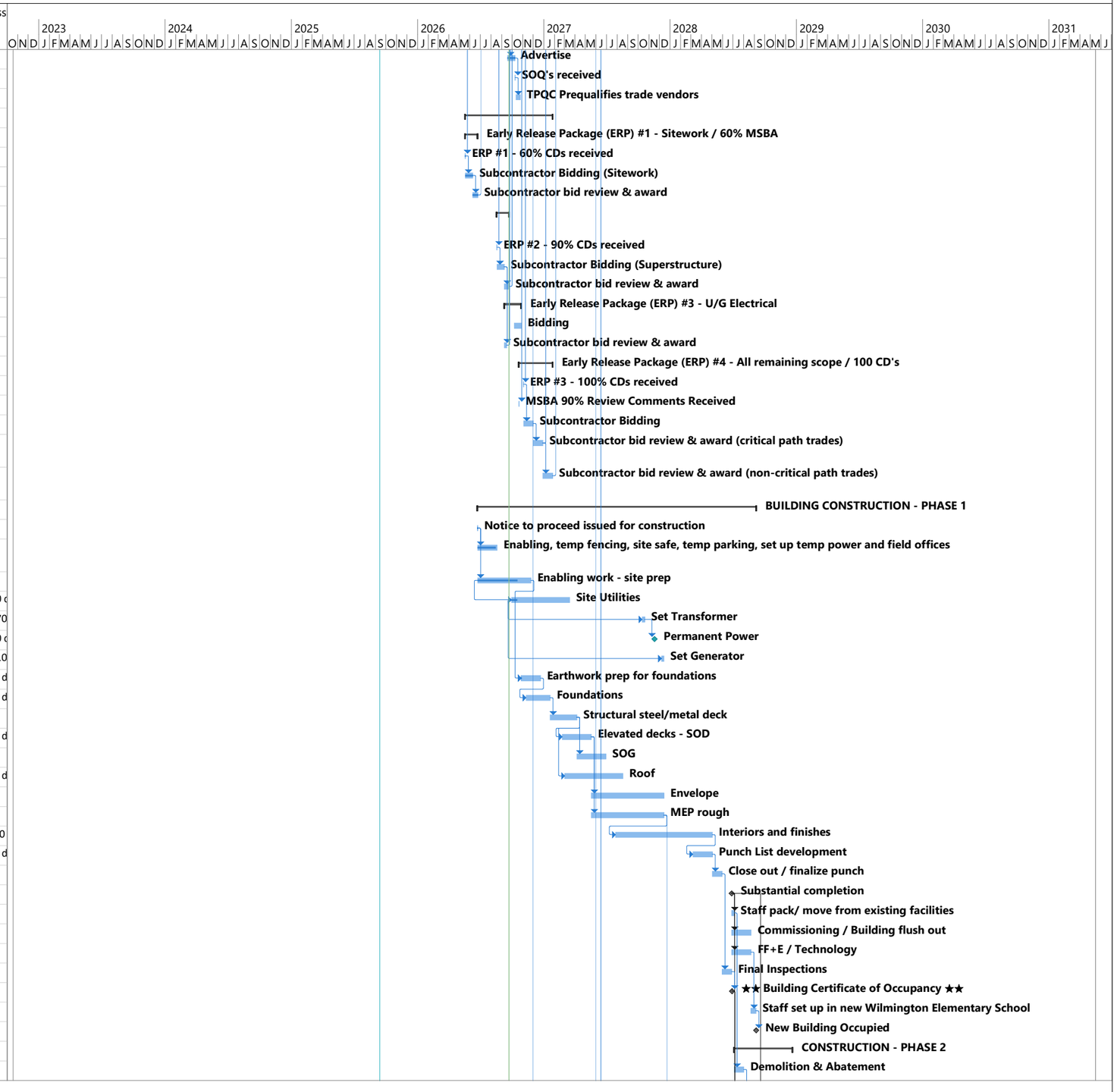
ID	Task Mode	% Complete	Task Name	Duration	Start	Finish	Predecessors
167		100%	Design and constructability review (MSBA CX Agent)	15 days	Mon 5/18/26	Fri 6/5/26	166
168		100%	Construction Cost Estimate (Architect)	15 days	Mon 5/18/26	Fri 6/5/26	166
169		100%	Construction Cost Estimate (CM)	15 days	Mon 5/18/26	Fri 6/5/26	166
170		100%	Reconcile estimates	2 days	Wed 6/10/26	Thu 6/11/26	169
171		100%	Project Design Summary / analysis	20 days	Mon 5/18/26	Fri 6/12/26	166
172		100%	Assess value engineering opportunities	1 day	Fri 6/12/26	Fri 6/12/26	170
173		100%	School Building Committee mtg (approve DD scope, sched and budget)	1 day	Tue 6/16/26	Tue 6/16/26	
174		100%	Finalize 60% CD package	5 days	Fri 6/12/26	Thu 6/18/26	170
175		100%	Submit 60% CD package to MSBA	5 days	Fri 6/19/26	Thu 6/25/26	174
176		100%	Receive formal MSBA comments (21 calendar days)	15 days	Fri 6/26/26	Thu 7/16/26	175
177		100%	District response period	14 days	Fri 7/17/26	Wed 8/5/26	176
178		**84%**	**90% CD PHASE**	**125 days**	**Mon 5/18/26**	**Fri 11/6/26**	
179		100%	90% CD Development	64 days	Mon 5/18/26	Thu 8/13/26	166
180		100%	90% CD drawings issued to estimators	1 day	Fri 8/14/26	Fri 8/14/26	179
181		100%	Design and constructability review (MSBA CX Agent)	15 days	Fri 8/14/26	Thu 9/3/26	179
182		100%	Construction Cost Estimate (Architect)	15 days	Fri 8/14/26	Thu 9/3/26	179
183		100%	Construction Cost Estimate (CM)	15 days	Fri 8/14/26	Thu 9/3/26	179
184		100%	Reconcile estimates	2 days	Fri 9/4/26	Mon 9/7/26	183
185		100%	Project Design Summary / analysis	20 days	Mon 8/17/26	Fri 9/11/26	180
186		100%	Assess value engineering opportunities_N/A	1 day	Tue 9/8/26	Tue 9/8/26	184
187		100%	School Building Committee mtg (approve DD scope, sched and budget)	1 day	Tue 9/15/26	Tue 9/15/26	
188		100%	Finalize 90% CD package	10 days	Tue 9/8/26	Mon 9/21/26	
189		100%	Submit 90% CD package to MSBA	5 days	Tue 9/22/26	Mon 9/28/26	188
190		0%	Receive formal MSBA comments (21 calendar days)	15 days	Tue 9/29/26	Mon 10/19/26	189
191		0%	District response period	14 days	Tue 10/20/26	Fri 11/6/26	190
192		**47%**	**100% CD PHASE**	**55 days?**	**Mon 8/17/26**	**Fri 10/30/26**	
193		50%	100% CD development	54 days	Mon 8/17/26	Thu 10/29/26	180
194		0%	100% CDs complete	1 day	Fri 10/30/26	Fri 10/30/26	193
195		0%	100% CDs issued to the MSBA for record	1 day?	Fri 10/30/26	Fri 10/30/26	193
196		0%	100% CD/ Bid package issued	1 day?	Fri 10/30/26	Fri 10/30/26	193
197		**80%**	**TRADE PREQUALIFICATION**	**96 days**	**Fri 6/12/26**	**Fri 10/23/26**	
198		**100%**	**Elevator (ERP #2)**	**36 days**	**Fri 6/12/26**	**Fri 7/31/26**	**104**
199		100%	Prepare Trade Bid Pre Qualification Package	10 days	Fri 6/12/26	Thu 6/25/26	170
200		100%	Advertise	15 days	Fri 6/26/26	Thu 7/16/26	199
201		100%	SOQ's received	1 day	Fri 7/17/26	Fri 7/17/26	200
202		100%	TPQC Prequalifies trade vendors - N/A, received I SOQ - to be awarded by CM	10 days	Mon 7/20/26	Fri 7/31/26	201
203		**64%**	**U/G Electrical (ERP #3)**	**22 days**	**Thu 9/3/26**	**Fri 10/2/26**	
204		100%	Submit Ad to Central Register	1 day	Thu 9/3/26	Thu 9/3/26	
205		100%	Prepare and submit RFQ to Projectdog	2 days	Fri 9/4/26	Mon 9/7/26	204
206		100%	Projectdog Post RFQ	1 day	Tue 9/8/26	Tue 9/8/26	205
207		100%	Central Register Ad appears	1 day	Fri 9/4/26	Fri 9/4/26	204
208		100%	Ad appears in Town Crier	1 day	Thu 9/10/26	Thu 9/10/26	207
209		100%	Last day for RFIs	0 days	Thu 9/17/26	Thu 9/17/26	208FS+5 da
210		100%	Last Addendum	0 days	Mon 9/21/26	Mon 9/21/26	209FS+2 da
211		80%	Receive Quals package	10 days	Fri 9/11/26	Thu 9/24/26	208
212		0%	Evaluate Quals packages	5 days	Fri 9/25/26	Thu 10/1/26	211
213		0%	Notify applicants and provide bid dates	1 day	Fri 10/2/26	Fri 10/2/26	212
214		0%	Advertise results	0 days	Fri 10/2/26	Fri 10/2/26	213
215		**69%**	**All Remaining Filed Sub Trades (ERP #4)**	**36 days**	**Fri 9/4/26**	**Fri 10/23/26**	
216		100%	Prepare Trade Bid Pre Qualification Package	10 days	Fri 9/4/26	Thu 9/17/26	183



Wilmington Elementary School - 90% CD Schedule

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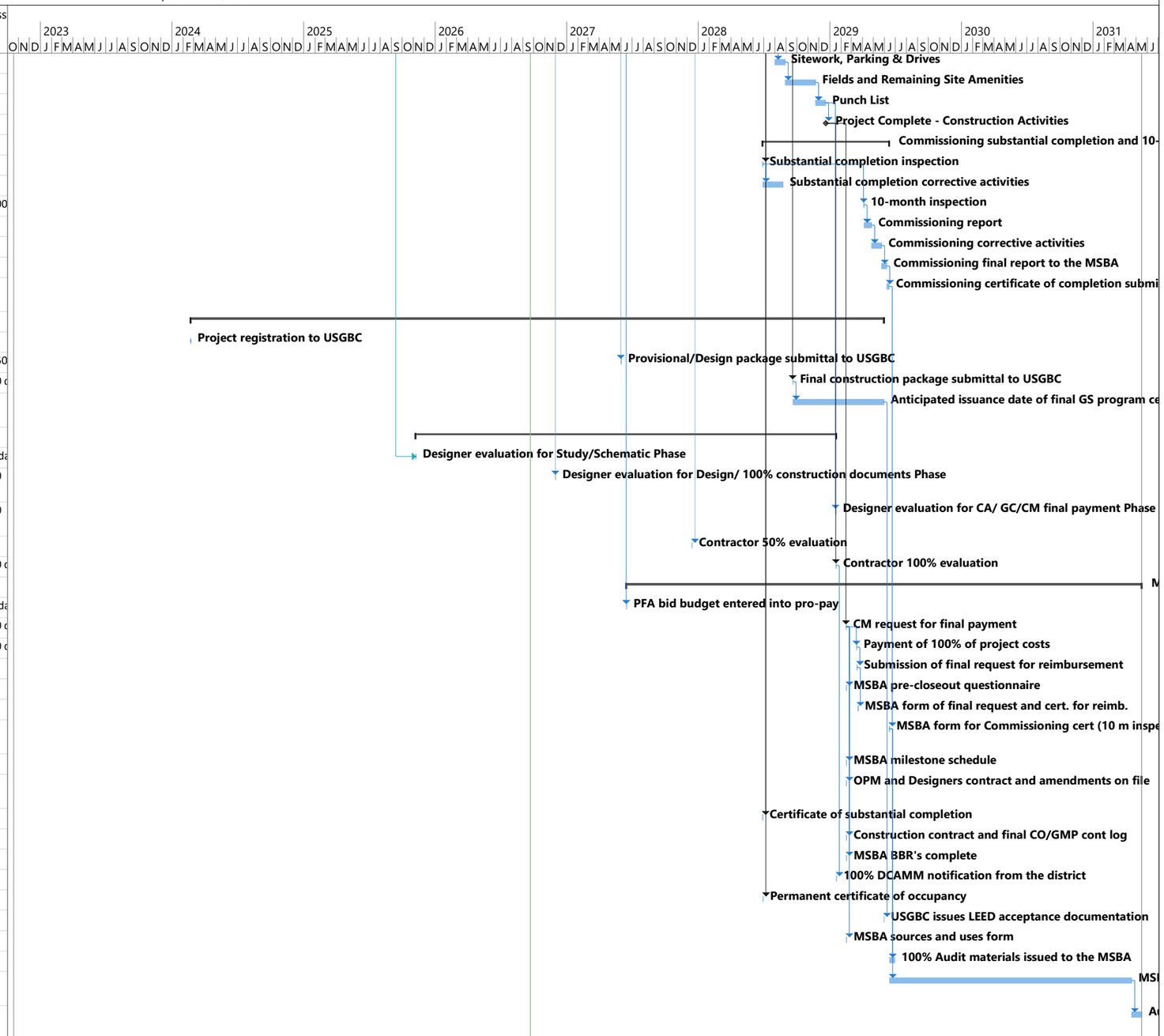
ID	Task Mode	% Complete	Task Name	Duration	Start	Finish	Predecessors
217		100%	Advertise	15 days	Fri 9/18/26	Thu 10/8/26	216
218		0%	SOQ's received	1 day	Fri 10/9/26	Fri 10/9/26	217
219		0%	TPQC Prequalifies trade vendors	10 days	Mon 10/12/26	Fri 10/23/26	218
220		**20%**	**EARLY RELEASE PACKAGES FOR BIDDING**	**181 days**	**Mon 5/18/26**	**Mon 1/25/27**	
221		**100%**	**Early Release Package (ERP) #1 - Sitework / 60% MSBA**	**26 days**	**Mon 5/18/26**	**Mon 6/22/26**	
222		100%	ERP #1 - 60% CDs received	1 day	Mon 5/18/26	Mon 5/18/26	166
223		100%	Subcontractor Bidding (Sitework)	15 days	Tue 5/19/26	Mon 6/8/26	222
224		100%	Subcontractor bid review & award	10 days	Tue 6/9/26	Mon 6/22/26	223
225		**0%**	**Early Release Package (ERP) #2 - Concrete, Damproofing, Steel, and Elevator / 90% MSBA**	**26 days**	**Mon 8/17/26**	**Mon 9/21/26**	
226		0%	ERP #2 - 90% CDs received	1 day	Mon 8/17/26	Mon 8/17/26	180
227		0%	Subcontractor Bidding (Superstructure)	15 days	Tue 8/18/26	Mon 9/7/26	226
228		0%	Subcontractor bid review & award	10 days	Tue 9/8/26	Mon 9/21/26	227
229		**0%**	**Early Release Package (ERP) #3 - U/G Electrical**	**35 days**	**Tue 9/8/26**	**Mon 10/26/26**	
230		0%	Bidding	14 days	Wed 10/7/26	Mon 10/26/26	
231		0%	Subcontractor bid review & award	5 days	Tue 9/8/26	Mon 9/14/26	227
232		**0%**	**Early Release Package (ERP) #4 - All remaining scope / 100 CD**	**70 days**	**Tue 10/20/26**	**Mon 1/25/27**	
233		0%	ERP #3 - 100% CDs received	1 day	Mon 11/2/26	Mon 11/2/26	196
234		0%	MSBA 90% Review Comments Received	1 day	Tue 10/20/26	Tue 10/20/26	190
235		0%	Subcontractor Bidding	20 days	Tue 11/3/26	Mon 11/30/26	233
236		0%	Subcontractor bid review & award (critical path trades)	20 days	Tue 12/1/26	Mon 12/28/26	235
237		0%	Subcontractor bid review & award (non-critical path trades)	20 days	Tue 12/29/26	Mon 1/25/27	236
238		**10%**	**BUILDING CONSTRUCTION - PHASE 1**	**577 days**	**Mon 6/22/26**	**Tue 9/5/28**	
239		100%	Notice to proceed issued for construction	1 day	Mon 6/22/26	Mon 6/22/26	
240		95%	Enabling, temp fencing, site safe, temp parking, set up temp power and field offices	40 days	Tue 6/23/26	Mon 8/17/26	239
241		75%	Enabling work - site prep	110 days	Tue 6/23/26	Mon 11/23/26	239
242		10%	Site Utilities	120 days	Tue 9/29/26	Mon 3/15/27	241SS+70 d
243		0%	Set Transformer	5 days	Tue 10/12/27	Mon 10/18/27	242SS+270
244		0%	Permanent Power	1 day	Tue 11/16/27	Tue 11/16/27	243FS+20 d
245		0%	Set Generator	5 days	Tue 12/7/27	Mon 12/13/27	242SS+310
246		2%	Earthwork prep for foundations	40 days	Tue 10/27/26	Mon 12/21/26	241FS-20 d
247		0%	Foundations	50 days	Tue 11/10/26	Mon 1/18/27	246FS-30 d
248		0%	Structural steel/metal deck	55 days	Tue 1/19/27	Mon 4/5/27	247
249		0%	Elevated decks - SOD	60 days	Tue 2/23/27	Mon 5/17/27	248FS-30 d
250		0%	SOG	60 days	Tue 4/6/27	Mon 6/28/27	248
251		0%	Roof	120 days	Tue 3/2/27	Mon 8/16/27	248FS-25 d
252		0%	Envelope	150 days	Tue 5/18/27	Mon 12/13/27	249
253		0%	MEP rough	150 days	Tue 5/18/27	Mon 12/13/27	249
254		0%	Interiors and finishes	200 days	Tue 7/27/27	Mon 5/1/28	253FS-100
255		0%	Punch List development	40 days	Tue 3/7/28	Mon 5/1/28	254FS-40 d
256		0%	Close out / finalize punch	20 days	Tue 5/2/28	Mon 5/29/28	255
257		0%	Substantial completion	1 day	Mon 6/26/28	Mon 6/26/28	
258		0%	Staff pack/ move from existing facilities	5 days	Tue 6/27/28	Mon 7/3/28	257
259		0%	Commissioning / Building flush out	40 days	Tue 6/27/28	Mon 8/21/28	257
260		0%	FF+E / Technology	40 days	Tue 6/27/28	Mon 8/21/28	257
261		0%	Final Inspections	20 days	Tue 5/30/28	Mon 6/26/28	256
262		0%	★★ Building Certificate of Occupancy ★★	1 day	Tue 6/27/28	Tue 6/27/28	261
263		0%	Staff set up in new Wilmington Elementary School	10 days	Tue 8/22/28	Mon 9/4/28	260
264		0%	New Building Occupied	1 day	Tue 9/5/28	Tue 9/5/28	263
265		**0%**	**CONSTRUCTION - PHASE 2**	**121 days**	**Tue 7/4/28**	**Tue 12/19/28**	
266		0%	Demolition & Abatement	20 days	Tue 7/4/28	Mon 7/31/28	258



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ID	Task Mode	% Complete	Task Name	Duration	Start	Finish	Predecessors
267		0%	Sitework, Parking & Drives	20 days	Tue 8/1/28	Mon 8/28/28	266
268		0%	Fields and Remaining Site Amenities	60 days	Tue 8/29/28	Mon 11/20/28	267
269		0%	Punch List	20 days	Tue 11/21/28	Mon 12/18/28	268
270		0%	Project Complete - Construction Activities	1 day	Tue 12/19/28	Tue 12/19/28	269
271		**0%**	**Commissioning substantial completion and 10-month**	**252 days**	**Tue 6/27/28**	**Wed 6/13/29**	
272		0%	Substantial completion inspection	1 day	Tue 6/27/28	Tue 6/27/28	257
273		0%	Substantial completion corrective activities	40 days	Wed 6/28/28	Tue 8/22/28	272
274		0%	10-month inspection	1 day	Wed 4/4/29	Wed 4/4/29	272FS+200
275		0%	Commissioning report	15 days	Thu 4/5/29	Wed 4/25/29	274
276		0%	Commissioning corrective activities	20 days	Thu 4/26/29	Wed 5/23/29	275
277		0%	Commissioning final report to the MSBA	10 days	Thu 5/24/29	Wed 6/6/29	276
278		0%	Commissioning certificate of completion submission to the MSBA	5 days	Thu 6/7/29	Wed 6/13/29	277
279		**1%**	**LEED Documentation**	**1375 days**	**Wed 2/21/24**	**Tue 5/29/29**	
280	✓	100%	Project registration to USGBC	1 day	Wed 2/21/24	Wed 2/21/24	
281		0%	Provisional/Design package submittal to USGBC	1 day	Mon 5/31/27	Mon 5/31/27	194FS+150
282		0%	Final construction package submittal to USGBC	1 day	Tue 9/19/28	Tue 9/19/28	257FS+60 d
283		0%	Anticipated issuance date of final GS program certification letter from USGBC	180 days	Wed 9/20/28	Tue 5/29/29	282
284		**20%**	**DCAMM Documentation**	**834 days**	**Fri 11/7/25**	**Wed 1/17/29**	
285	✓	100%	Designer evaluation for Study/Schematic Phase	1 day	Fri 11/7/25	Fri 11/7/25	98SS+30 da
286		0%	Designer evaluation for Design/ 100% construction documents Phase	1 day	Mon 11/30/26	Mon 11/30/26	194FS+20 days
287		0%	Designer evaluation for CA/ GC/CM final payment Phase	1 day	Tue 1/16/29	Tue 1/16/29	269FS+20 days
288		0%	Contractor 50% evaluation	1 day	Tue 12/14/27	Tue 12/14/27	253
289		0%	Contractor 100% evaluation	1 day	Wed 1/17/29	Wed 1/17/29	270FS+20 d
290		**0%**	**MSBA AUDIT - TARGET DATES**	**1023 days**	**Tue 6/15/27**	**Thu 5/15/31**	
291		0%	PFA bid budget entered into pro-pay	1 day	Tue 6/15/27	Tue 6/15/27	83FS+80 da
292		0%	CM request for final payment	1 day	Wed 2/14/29	Wed 2/14/29	270FS+40 d
293		0%	Payment of 100% of project costs	1 day	Thu 3/15/29	Thu 3/15/29	292FS+20 d
294		0%	Submission of final request for reimbursement	1 day	Fri 3/16/29	Fri 3/16/29	293
295		0%	MSBA pre-closeout questionnaire	1 day	Thu 2/15/29	Thu 2/15/29	292
296		0%	MSBA form of final request and cert. for reimb.	1 day	Mon 3/19/29	Mon 3/19/29	294
297		0%	MSBA form for Commissioning cert (10 m inspection)	1 day	Thu 6/14/29	Thu 6/14/29	278
298		0%	MSBA milestone schedule	1 day	Thu 2/15/29	Thu 2/15/29	292
299		0%	OPM and Designers contract and amendments on file	1 day	Thu 2/15/29	Thu 2/15/29	292
300		0%	Certificate of substantial completion	1 day	Tue 6/27/28	Tue 6/27/28	257
301		0%	Construction contract and final CO/GMP cont log	1 day	Thu 2/15/29	Thu 2/15/29	292
302		0%	MSBA BBR's complete	1 day	Thu 2/15/29	Thu 2/15/29	292
303		0%	100% DCAMM notification from the district	1 day	Thu 1/18/29	Thu 1/18/29	289
304		0%	Permanent certificate of occupancy	1 day	Wed 6/28/28	Wed 6/28/28	262
305		0%	USGBC issues LEED acceptance documentation	1 day	Wed 5/30/29	Wed 5/30/29	283
306		0%	MSBA sources and uses form	1 day	Thu 2/15/29	Thu 2/15/29	292
307		0%	100% Audit materials issued to the MSBA	10 days	Fri 6/15/29	Thu 6/28/29	297
308		0%	MSBA audit report acceptance form - will be issued by the MSBA, may take upwards of 2 years.	480 days	Fri 6/15/29	Thu 4/17/31	297
309		0%	Audit complete and remaining reimbursement retainage is released by the MSBA	20 days	Fri 4/18/31	Thu 5/15/31	308



FONTAINE BROS., INC.

WILMINGTON ELEMENTARY SCHOOL

RECONCILED 90% CD ESTIMATE

Project #2633
Wilmington, MA

September 9, 2026

Wilmington Elementary School

Wilmington, Massachusetts

Deliverable

90% CD Documents Cost Estimate

Key Project Stakeholders

Owners Project Manager: LeftField

Architect: Dore + Whittier

Design Document Details

90% CD Drawings Dated August 14, 2026

90% CD Specifications Dated August 14, 2026



Fontaine Bros., Inc.

Springfield Office
510 Cottage Street
Springfield, Massachusetts 01104
(413) 781-2020

Worcester Office
12 East Worcester Street
Worcester, MA 01604

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- CSI MASTERFORMAT COST ESTIMATE

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- UNIFORMAT COST ESTIMATE - SUMMARY

TAB 3

- UNIFORMAT COST ESTIMATE - DETAIL

1

Fontaine Bros. CSI Summary - Combined

CSI Division			Cost/SF		Total Amount
02-0000	*EXISTING CONDITIONS & DEMO*	165,035 sf	13.49 /sf	$	2,226,600
03-0000	*CONCRETE*	165,035 sf	29.19 /sf	$	4,818,076
04-0000	*MASONRY*	165,035 sf	48.03 /sf	$	7,925,940
05-0000	*METALS*	165,035 sf	59.51 /sf	$	9,821,120
06-0000	*ROUGH CARPENTRY*	165,035 sf	13.09 /sf	$	2,159,575
06-2000	*FINISH CARPENTRY*	165,035 sf	6.57 /sf	$	1,083,686
07-0000	*THERMAL & MOIST PROTECT*	165,035 sf	53.24 /sf	$	8,786,037
08-0000	*DOORS & WINDOWS*	165,035 sf	24.10 /sf	$	3,977,910
09-0000	*FINISHES*	165,035 sf	83.99 /sf	$	13,861,158
10-0000	*SPECIALTIES*	165,035 sf	6.13 /sf	$	1,010,915
11-0000	*EQUIPMENT*	165,035 sf	8.42 /sf	$	1,390,275
12-0000	*FIXED FURNISHINGS*	165,035 sf	25.51 /sf	$	4,210,061
14-0000	*CONVEYING SYSTEMS*	165,035 sf	1.85 /sf	$	306,000
21-0000	*FIRE SUPRESSION*	165,035 sf	8.12 /sf	$	1,340,368
22-0000	*PLUMBING*	165,035 sf	21.67 /sf	$	3,575,580
23-0000	*HVAC*	165,035 sf	83.77 /sf	$	13,825,376
26-0000	*ELECTRICAL*	165,035 sf	64.58 /sf	$	10,657,192
31-0000	*EARTHWORK*	165,035 sf	1.82 /sf	$	300,000
32-0000	*EXTERIOR IMPROVEMENTS*	165,035 sf	45.22 /sf	$	7,463,049
33-0000	*UTILITIES*	165,035 sf	7.22 /sf	$	1,191,129
			Total Direct Cost	**$**	**99,930,047**
			Design Contingency	$	999,300
			Escalation	$	1,498,951
			Construction Contingency	$	2,498,251
			Sub Default Insurance	$	740,000
			Early Release Package #1 - Sitework	$	13,552,110
			General Requirements	$	5,737,083
			General Conditions	$	5,733,391
			Preconstruction Services	$	-
			General Liability Insurance	$	1,491,115
			Performance Bonds	$	946,415
			Builder's Risk Insurance	$	262,817
			Pollution Insurance	$	65,364
			Building Permit	$	-
			CM Fee (OH&P)	$	2,720,000
			Project Total	**$**	**136,174,844**

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
02-0000.000	***EXISTING CONDITIONS & DEMO***					
110	Demolition	1.00	ls	600,000.00	/ls	600,000
110	Premium Time	1.00	ls	150,000.00	/ls	150,000
30	Hazardous Material Abatement - Includes 2,500 tons of Bulk Load	1.00	ls	1,476,600.00	/ls	1,476,600
30	Hazardous Material Abatement - Roofing Assumption					
	EXISTING CONDITIONS & DEMO			***13.492/sf***		***2,226,600***
	165,035.00 sf					
03-0000.000	***CONCRETE***					
05	Stage Ramp - adjusted per recon	1.00	ls	10,000.00	/ls	10,000
105	Stairs and Intermediate Landings, Stair 1	2.00	Flt	4,500.00	/Flt	9,000
105	Stairs and Landings, Stair 2 - removed per recon					
105	Stairs and Intermediate Landings, Stair 3	2.00	Flt	4,500.00	/Flt	9,000
105	Stairs and Landings, Stair 4 - removed per recon					
105	Stairs and Landings, Cafeteria, Stair 5 - removed per recon					
105	Stairs and Intermediate Landings, Stage, Corridor & Stair 6	1.25	Flt	4,500.00	/Flt	5,625
105	Intermediate Landings, Stairs 2, 4 & 5 - added per recon	3.00	loc	2,500.00	/loc	7,500
125	Concrete Form & Place - Footings	3,424.00	sfca	20.00	/sfca	68,480
125	Concrete Form & Place - Spread Footings	13,112.00	sfca	20.00	/sfca	262,240
125	Concrete Form & Place - Frost Walls	15,086.00	sfca	20.00	/sfca	301,720
125	Concrete Form & Place - Masonry Stub Walls	3,122.00	sfca	20.00	/sfca	62,440
125	Concrete Form & Place - Piers	4,317.00	sfca	20.00	/sfca	86,340
125	Concrete Form & Place - Brick Shelf	1,886.00	lf	30.00	/lf	56,580
125	Concrete Form & Place - Elevator Pit	1.00	ls	25,000.00	/ls	25,000
125	Concrete 90%-100 CD Bridging Allowance	1.00	ls	100,000.000	/ls	100,000
125	General Concrete - Weather Conditions	1.00	ls	300,000.00	/ls	300,000
125	Concrete Premium Time Allowance	1.00	ls	50,000.00	/ls	50,000
100	Place & Finish - SOD, RTU Pads, 7" Normal Weight - adjusted unit cost per Recon	3,165.00	sf	13.00	/sf	41,145
100	Place & Finish - SOD, 5-1/4" Light Weight	88,000.00	sf	8.00	/sf	704,000
100	Place & Finish - SOD, 3" Light Weight, Acoustic Topping Slab	9,011.00	sf	10.00	/sf	90,110
100	Place & Finish - SODs - House Keeping Pads, Allow	250.00	sf	30.00	/sf	7,500
100	Place & Finish - SOD, 5-1/4" Light Weight @ Roof	12,816.00	sf	10.00	/sf	128,160
12	15 mil Vapor Barrier under SOG	76,300.00	sf	1.50	/sf	114,450
12	Acoustic Matt - Pliteq GenMatt FF50 below 3" Topping Slab	9,011.00	sf	13.00	/sf	117,143
20	2" Rigid Foundation Insulation - Vertical	6,245.00	sf	3.00	/sf	18,735
120	2" Rigid Insulation Under Slab, Full Coverage - adjusted to include 4' perimeter per recon & ADD01	15,000.00	sf	3.50	/sf	52,500

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	14	Re-Bar, Footings, Piers, Walls	112.70	tons	2,500.00 /tons	281,750
	14	Re-Bar, SOG	10.00	tons	2,500.00 /tons	25,000
	14	Re-Bar, SOD	22.00	tons	2,500.00 /tons	55,000
	14	Re-Bar, SOD, RTU Pads	6.00	tons	2,500.00 /tons	15,000
----		6" Roof MEP Pad				
	20	Concrete - SOD, Light Weight	1,443.20	cy	190.00 /cy	274,208
	20	Concrete - SOD Roof Top Units	59.40	cy	180.00 /cy	10,692
	20	Concrete - Footings, Includes Mat / Spread Footings	1,263.00	cy	180.00 /cy	227,340
	20	Concrete - Walls, Frost	414.70	cy	180.00 /cy	74,646
	20	Concrete - Walls, Masonry Stub	63.80	cy	180.00 /cy	11,484
	20	Concrete - Brick Shelf, 6" Tall x 8" Width				
	20	Concrete - SOG 5" (Includes Thickened & Haunched)	1,351.25	cy	180.00 /cy	243,225
	20	MVRA Premium	1,351.25	cy	50.00 /cy	67,563
	10	Place & Finish SOG - 5"	76,300.00	sf	10.00 /sf	763,000
	500	Grout Elevator Sill Angles	3.00	ea	500.00 /ea	1,500
	500	Set Anchor Bolts & Column Base Plates	175.00	ea	300.00 /ea	52,500
	500	Grout Column Base Plates	175.00	ea	500.00 /ea	87,500
		CONCRETE			***29.194/sf***	***4,818,076***
		165,035.00 sf				
04-0000.000		***MASONRY***				
	!	Cast Stone Lintels	1,065.00	lf	135.00 /lf	143,775
	2	Cast Stone Cap - 2'4" w x 12'4" l x 5" d - Exterior Monument Signage	12.40	sf	160.00 /sf	1,984
	2	Cast Stone Panels	15,245.00	sf	160.00 /sf	2,439,200
	2	Cast Stone Veneer & Banding				
	2	Cast Stone Canopy Soffits	880.00	sf	160.00 /sf	140,800
	2	Exterior Mockup per AG0.05 - Masonry				
	2	Cast Stone Lintels	90.00	lf	135.00 /lf	12,150
	2	Cast Stone Panels	175.00	sf	160.00 /sf	28,000
	110	Brick Veneer Types 1 & 2 - Belden Brick, Smoky Gray Velour & Belcrest 550	44,120.00	sf	50.00 /sf	2,206,000
	110	Brick Veneer Type 3 - Glen Gery, Bermuda Blue Glazed	3,020.00	sf	60.00 /sf	181,200
	110	Brick Veneer - Exterior Monument Signage	105.00	sf	46.00 /sf	4,830
	110	Exterior Mockup per AG0.05 - Masonry				
	110	Brick Veneer Type 1 & 2 - Belden Brick, Smokey Gray Velour & Belcrest 550	150.00	sf	50.00 /sf	7,500
	110	Brick Veneer Type 3 - Glen Gery, Bermuda Blue Glazed	80.00	sf	60.00 /sf	4,800
	102	Interior CMU Walls				
	102	4" CMU - added per recon	1,800.00	sf	32.00 /sf	57,600
	102	6" CMU	1,620.00	sf	34.00 /sf	55,080
	102	8" CMU	2,190.00	sf	38.00 /sf	83,220
	102	8" CMU, 1HR - adjusted per recon	12,100.00	sf	38.00 /sf	459,800
	102	12" CMU	14,510.00	sf	42.00 /sf	609,420

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
02	Exterior CMU Backup Walls				
102	12" CMU -- adjusted per recon from 6" to 12"	665.00	sf	42.00 /sf	27,930
102	Exterior 6" CMU Wall - Exterior Monument Signage	22.00	sf	34.00 /sf	748
102	Exterior 12" CMU Wall - Exterior Monument Signage	22.00	sf	42.00 /sf	924
102	Exterior CUVM Veneer - Custom Cast Stone, Light Buff - Exterior Monument Signage	12.00	sf	70.00 /sf	840
102	Exterior 6" CMU Wall	320.00	sf	34.00 /sf	10,880
102	Exterior 8" CMU Wall	475.00	sf	38.00 /sf	18,050
102	8" CMU - added per recon, includes bulk of Kitchen/Servery and Stairwells	5,500.00	sf	40.00 /sf	220,000
102	Includes Columns				
102	Exterior CUVM Veneer - Custom Cast Stone, Light Buff	7,330.00	sf	70.00 /sf	513,100
102	Exterior Mockup per AG0.05 - Masonry				
102	Exterior CUVM Veneer - Custom Cast Stone, Light Buff	170.00	sf	70.00 /sf	11,900
5	Masonry Staging - Exterior	70,595.00	sf	6.25 /sf	441,219
5	Masonry Staging - Interior	32,220.00	sf	4.50 /sf	144,990
5	Weather Conditions - Masonry	1.00	ls	100,000.000 /ls	100,000
	MASONRY			***48.026/sf***	***7,925,940***
	165,035.00 sf				

05-0000.000 METALS

01	Floor Framing, HSS Shapes, Columns	299.43	tn	5,000.00 /tn	1,497,150
a 01	Floor Framing, HSS Shapes, Bracing	50.17	tn	5,000.00 /tn	250,850
a 01	Floor Framing, W Shapes, Beams	516.99	tn	5,000.00 /tn	2,584,950
a 01	Floor Framing, Connections Allowance - 5%	43.33	tn	5,000.00 /tn	216,650
a 01	Gym Framing, HSS Shapes, Trusses	5.14	tn	5,000.00 /tn	25,700
a 01	Gym Framing, HSS Shapes, Beams	90.22	tn	5,000.00 /tn	451,100
a 01	Gym Framing, L Shapes, Bracing	3.87	tn	5,000.00 /tn	19,350
a 01	Gym Framing, Connections Allowance - 5%	10.28	tn	5,000.00 /tn	51,400
a 01	Roof Framing, HSS Shapes, Beams	164.69	tn	5,000.00 /tn	823,450
a 01	Roof/ Screen Framing, HSS Shapes, Columns	85.70	tn	5,000.00 /tn	428,500
a 01	Roof Screen Framing, HSS Shapes, Kickers - Incl Above				
a 01	Roof Screen Framing, Unsized X Bracing per 7/S0.07 - Allowance	1.00	ls	30,000.00 /ls	30,000
a 01	Roof Framing, Connections Allowance - 5%	12.52	tn	5,000.00 /tn	62,600
a 01	Mechanical Couplers per 3/S0.05 (1,350 LF)	1.00	ls	10,000.00 /ls	10,000
a 01	Welded Couplers per 7/S0.05, 1,5/S0.06 (2,170 LF)	1.00	ls	10,000.00 /ls	10,000
a 01	Structural Steel - Coordination Allowance, Floors	1.00	ls	100,000.000 /ls	100,000
a 01	Structural Steel - Coordination Allowance, Roof	1.00	ls	50,000.00 /ls	50,000
a 01	Structural Steel - 90%-100% CD Bridging Allowance	1.00	ls	150,000.00 /ls	150,000
a 01	Exterior Mockup per AG0.05 - Structural Steel				
a 01	Floor Framing, HSS Bracing	1.00	ls	25,000.00 /ls	25,000
a 01	Structural Steel - Premium Time Allowance	1.00	ls	30,000.00 /ls	30,000

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
320	Metal Roof Decking -3" - 20 Gage	40,670.94	sf	6.50	/sf	264,361
320	Metal Roof Decking -3" - Lightweight	4,701.770	sf	7.00	/sf	32,912
320	Metal Roof Decking -5-1/4" - Gage	7,659.24	sf	7.00	/sf	53,615
320	Metal Roof Decking -7" - Gage	2,322.62	sf	7.00	/sf	16,258
320	Metal Roof Decking - Acoustic - NIC					
618	Metal Floor Deck - 3"	12,852.70	sf	7.00	/sf	89,969
618	Metal Floor Deck - 3" - Lightweight	8,912.34	sf	7.00	/sf	62,386
618	Metal Floor Deck - 5-1/4"	97,526.78	sf	7.00	/sf	682,687
618	Acoustic Metal Floor Deck - Gym					
618	Exterior Mockup per AG0.05 - Structural Steel Decking					
618	Metal Floor Deck - 3" Assumed	152.00	sf	7.00	/sf	1,064
10	Stair 1 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
10	Stair 2 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
10	Stair 3 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
10	Stair 4 - Stair and Railings	3.00	Flt	75,000.00	/Flt	225,000
10	Stair 4 - Roof Landing and Stair	1.00	ls	10,000.00	/ls	10,000
10	Stair 4 - Wire Mesh Panels	122.00	sf	250.00	/sf	30,500
10	Stair 5 - Feature Railing above Cafeteria	55.00	lf	650.00	/lf	35,750
10	Stair 5 - Feature Stair and Railings, Cafeteria	1.00	Flt	65,000.00	/Flt	65,000
10	Stair 6 - Stage Stair and Ramp Rails	1.00	Flt	12,500.00	/Flt	12,500
10	Roof Access Stair and Platform at Mechanical Pump Room	1.00	ls	20,000.00	/ls	20,000
10	Roof Ladder	1.00	ea	10,000.00	/ea	10,000
10	Misc. Metals Allowance	165,035.00	sf	2.00	/sf	330,070
10	Misc. Metals Coordination	1.00	ls	125,000.00	/ls	125,000
10	Bollards - w Landscaping	58.00	ea			
10	Stair 5 Tree Column Support Steel per A10.81 - Allowance	1.00	ls	50,000.00	/ls	50,000
140	Misc Metals - Exterior Walls	165,035.00	sf	0.50	/sf	82,518
140	Loose Lintels - Masonry	990.00	lf	35.00	/lf	34,650
140	Exterior Louvers - Allowance - removed per recon					
140	Curtainwall Support Angle	1.00	ls	50,000.00	/ls	50,000
140	Misc Metals - Floor Construction	165,035.00	sf	0.75	/sf	123,776
140	Overhead Door supports	3.00	ea	5,000.00	/ea	15,000
140	Misc. Folding Door Support	6.00	ea	3,500.00	/ea	21,000
140	Patient Lift Support - Assume Nurses office / PT - removed per Recon					
140	Unistrut Ceiling Systems - None Shown					
140	Misc Metals - Roof	165,035.00	sf	0.75	/sf	123,776
140	Misc. Masonry Support Steel	165,035.00	sf	0.75	/sf	123,776
22	Sill Angles	3.00	ea	1,750.00	/ea	5,250
22	Sump Pit Frame Grate	1.00	ea	1,200.00	/ea	1,200
22	Hoist Beam & Lifeline Beam	2.00	ea	1,800.00	/ea	3,600
22	Pit Ladders	1.00	ea	2,800.00	/ea	2,800
	METALS			***59.509/sf***		***9,821,120***
	165,035.00 sf					

06-0000.000 ROUGH CARPENTRY

2	General Roof Blocking	86,976.00	sf	1.00	/sf	86,976

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	2	Roof Blocking Perimeter	2,940.00	lf	18.00	/lf	52,920
	2	Canopy Roof Blocking Perimeter	245.00	lf	18.00	/lf	4,410
	2	Window Blocking	5,763.00	lf	15.00	/lf	86,445
	2	Interior Borrowed Light Blocking	90.75	lf	15.00	/lf	1,361
	2	In-Wall Blocking	165,035.00	sf	0.85	/sf	140,280
	2	Misc. Blocking	1.00	ls	50,000.00	/ls	50,000
	2	Temporary Safety and Railings - w GRs					
	2	RIM Insulated Slab System scope, including neoprene gaskets, insulation, and plywood - w/ Concrete	9,062.00	sf			
	2	Exterior Mockup per AG0.05 - Rough Carpentry					
	2	Window/Curtainwall Blocking	52.00	lf	15.00	/lf	780
	2	General Rough Carpentry Blocking	165,035.00	sf	1.50	/sf	247,553
	2	Sleeper System at Platform Stairs	170.00	lf	65.00	/lf	11,050
	2	Framing at Roof Edge & Canopies - added per recon	22,385.00	sf	24.00	/sf	537,240
2x04	RL	Heavy Timber Construction					
2x04	RL	Glulam Timber Beams	900.00	lf	245.00	/lf	220,500
2x04	RL	Glu-Lam 16" x 16" x 28" - Columns	240.00	lf	315.00	/lf	75,600
2x04	RL	Dowel-Laminated Timber Paneling w 3/4" APA-Rated Sturd-I-Floor Tongue & Groove Sheathing	6,620.00	sf	45.00	/sf	297,900
2x04	RL	Glu-Lam Installation	6,620.00	sf	38.00	/sf	251,560
2x04	RL	Glu-Lam Connections - Allowance	1.00	ls	50,000.00	/ls	50,000
2x04	RL	Glu-Lam Temporary Protection	1.00	ls	30,000.00	/ls	30,000
2x04	RL	Glu-Lam Premium Time	1.00	ls	15,000.00	/ls	15,000
		ROUGH CARPENTRY			***13.086/sf***		***2,159,575***
		165,035.00 sf					
06-2000.000		***FINISH CARPENTRY***					
	2	Interior Finish Carpentry					
	2	Library Circulation Desk per A5/A10.80	1.00	ls	40,000.00	/ls	40,000
	2	Solid Surface Counters					
	2	Brackets					
	2	Die-wall					
	2	Main Entry Bench per Q21/A10.80	13.14	lf	625.00	/lf	8,213
	2	Stair 5 Built-in Seating per A10.80	13.89	lf	650.00	/lf	9,029
	2	Gym Corridor Wood Benches per Q21/A10.80	50.54	lf	250.00	/lf	12,635
	2	Custodial Benches per D13/A10.80	10.37	lf	250.00	/lf	2,593
	2	Extended Learning Built-in Benches w Storage per Q26/A10.80	64.80	lf	325.00	/lf	21,060
	2	Library Built-in Stepped Seating per A27/A10.80	68.88	lf	625.00	/lf	43,050
	2	Custom Trash/Recycling Stations	49.50	lf	650.00	/lf	32,175
	2	Wood Wainscot	1,221.50	sf	85.00	/sf	103,828
	2	Wood Trim at Tile	4,000.00	lf	30.00	/lf	120,000
	2	Display Cases	48.50	lf	375.00	/lf	18,188
	2	Wood Trim - LEGO Walls @ Corridors	31.25	lf	65.00	/lf	2,031

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	3/4" Millwork Grade Plywood Backing - LEGO Walls @ Corridors	101.45	sf	55.00	/sf	5,580
2	3-Tier Open Wall Shelving	90.00	lf	105.00	/lf	9,450
2	5-Tier Open Wall Shelving	120.00	lf	175.00	/lf	21,000
2	Mailbox Cubbies - w Manufactured Casework	1.00	ls			
2	Stair 5 Tree Column Arms per A10.81 - Allowance	1.00	ls	75,000.00	/ls	75,000
2	Attachment to Structure - w Misc Metals					
2	Wood Stage Risers	170.00	lf	50.00	/lf	8,500
2	Includes LED Strip Lighting - w Electrical	150.00	lf			
2	Wood Slat Wall Panels w Acoustic Felt Backing - w Acoustical Panels	1,735.00	sf			
2	Solid Surface Window Sills & Aprons	1,070.00	lf	120.00	/lf	128,400
2	Restroom Entrance Solid Surface Wall Panels	185.00	sf	95.00	/sf	17,575
2	Laser-cut Lettering Premium	1.00	ls	15,000.00	/ls	15,000
2	Restroom Signage Attachment Method - Allowance	12.00	loc	300.00	/loc	3,600
2	Prep and Coordination Screws					
2	Wood Veneer @ Library Bookcases - adjusted per recon	393.00	lf	250.00	/lf	98,250
2	Market Adjustment to Allow VBE Opportunities	1.00	ls	100,000.000	/ls	100,000
2	Millwork Not Yet Designed	165,035.00	sf	0.90	/sf	148,532
2	Millwork and FF&E Protection	1.00	ls	40,000.00	/ls	40,000
	FINISH CARPENTRY			***6.566/sf***		***1,083,686***
	165,035.00 sf					
07-0000.000	***THERMAL & MOIST PROTECT***					
	Elevator Pit Crystalline Waterproofing					
2	Elevator Pit waterproofing membrane & 2" Rigid insulation	1.00	ls	20,000.00	/ls	20,000
2	Foundation Sheet Waterproofing					
2	Damproofing at Foundation Wall/Brick Shelf	6,228.00	sf	5.00	/sf	31,140
2	Damproofing at Interior Bearing Walls					
2	Foundation Bituminous Dampproofing - Fluid / Liquid					
2	Exterior Mockup per AG0.05 - Foundation Damproofing					
2	Foundation Bituminous Dampproofing - Fluid / Liquid	145.00	sf	2.50	/sf	363
2	Backer Rod & Double Sealants - added per recon	5,763.00	lf	15.00	/lf	86,445
2	2" Rigid insulation at Exterior Foundation Walls (3'6" Height)	6,650.00	sf	6.00	/sf	39,900
2	4" Rigid insulation at MCM Panel Roof Edge	15,377.00	sf	6.00	/sf	92,262
2	4" Rigid Cavity Wall Insulation (Brick Veneer)	69,715.00	sf	6.00	/sf	418,290
2	Exterior Mockup per AG0.05 - Insulation					
2	4" Rigid Cavity Wall Insulation (Brick Veneer)	250.00	sf	6.00	/sf	1,500
2	4" Rigid insulation at MCM Panel Roof edge	90.00	sf	6.00	/sf	540
10	Air Vapor Barrier - Exterior Walls	69,715.00	sf	8.50	/sf	592,578
10	Air Vapor Barrier @ Roof - w Roofing Assembly	86,976.00	sf			
10	Air Vapor Barrier at canopy columns and soffits	9,520.00	sf	8.50	/sf	80,920
10	Air Vapor Barrier / Flashing at windows	5,763.00	lf	16.00	/lf	92,208

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
10	Air Vapor Barrier - At roof edge / Overhang	13,765.00	sf	8.50 /sf	117,003
10	Exterior Mockup per AG0.05 - Air Vapor Barrier				
10	Air Vapor Barrier - Exterior Walls	560.00	sf	8.50 /sf	4,760
10	Air Vapor Barrier - At roof edge / Overhang	86.00	sf	8.50 /sf	731
10	Air Vapor Barrier / Flashing at windows	52.00	lf	16.00 /lf	832
2	MCM Composite Panels - Allucabond - None Shown				
2	MCM Composite Panels @ Roof Edges & Flats	18,650.00	sf	80.00 /sf	1,492,000
2	MLT Springlock/ Counter Flashing	1,300.00	sf	25.00 /sf	32,500
2	Roof Screen w/Acoustic Metal Panel - 12' Height - adjusted per recon	11,800.00	sf	85.00 /sf	1,003,000
2	Linear Metal Ceilings at Canopies	3,735.00	sf	65.00 /sf	242,775
2	PFN Metal Siding on 4" CFMF Duct Enclosures	491.00	sf	100.00 /sf	49,100
2	Corrugated Metal Panels @ Roof Screen - confirmed to be included per recon	2,256.00	sf	75.00 /sf	169,200
2	Exterior Mockup per AG0.05 - Composite Panels				
2	MCM Composite Panels @ Roof Edges & Flats	125.00	sf	100.00 /sf	12,500
	THERMAL & MOIST PROTECT			***27.755/sf***	***4,580,546***
	165,035.00 sf				
07-5000.000	***MEMBRANE ROOFING***				
2	R1.1a TPO Roofing, 14" Rigid Insulation (5 Layers), Deck Sheathing - adjusted per recon	1,353.00	sf	32.00 /sf	43,296
2	R1.1b TPO Roofing, 9" Rigid Insulation, Deck Sheathing (Includes Vertical Faces with 9" Ins) - adjusted per recon	67,393.00	sf	30.00 /sf	2,021,790
2	R1.2 TPO Roofing, 9" Rigid Insulation, Deck Sheathing - adjusted per recon	9,939.00	sf	30.00 /sf	298,170
2	R1.4 TPO Roofing, 9" Rigid Insulation (3 Layers), Deck Sheathing - adjusted per recon	8,291.00	sf	30.00 /sf	248,730
2	Premium for FR deck sheathing 1/2" at R1.1a, R1.1b, & R1.4	77,037.00	sf	2.25 /sf	173,333
2	Miscellaneous flashings and sealants - adjusted per recon	86,976.00	sf	0.50 /sf	43,488
2	Exterior Mockup per AG0.05 - MCM Panel				
2	Exterior Mockup per AG0.05 - MCM Panel Roof Edge	86.00	sf	28.00 /sf	2,408
	MEMBRANE ROOFING			***17.155/sf***	***2,831,215***
	165,035.00 sf				
07-7000.000	***ROOF & WALL ACCESSORIES***				

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
0	Elevator Vents - None Shown					
10	Roof Walkway Pads (24" width)	2,901.00	sf	30.00	/sf	87,030
20	Roof Hatch	2.00	ea	3,500.00	/ea	7,000
20	Roof Protection/Railing System - Allowance (3,038 LF)	1.00	ls	250,000.00	/ls	250,000
	ROOF & WALL ACCESSORIES			***2.085/sf***		***344,030***
	165,035.00 sf					

07-8000.000 FIRE & SMOKE PROTECTION

02	Misc. Fire Stopping w/ Trades					
2	Fireproofing - Columns, Beams, Floor Decking, Roofing Decking, Braced Framing - 1 Hr.	165,035.00	sf	2.30	/sf	379,581
2	Fireproofing, Low -> Medium Density - Premium	165,035.00	sf	0.80	/sf	132,028
2	Gymnasium, Intumescent Paint - Allowance - adjusted per recon	1.00	ls	125,000.00	/ls	125,000
2	Building Wrap and Weather Protection, for Fireproofing Work	1.00	ls	75,000.00	/ls	75,000
2	1-Hour Fireproofing - Structural Steel in hatched areas only per A0.11 - A0.32 - 2 Hr.	40.00	sf	3.00	/sf	120
2	2-Hour Fireproofing - Structural Steel in hatched areas only per A0.11 - A0.32 - 2 Hr.	1,630.00	sf	5.50	/sf	8,965
2	Patch Days	10.00	cds	3,200.00	/cds	32,000
2	Fireproofing Premium Time	1.00	ls	30,000.00	/ls	30,000
40	Misc. Interior Joint/Control & Caulking	165,035.00	sf	0.50	/sf	82,518
2	Misc. Exterior Joint/Control & Caulking	165,035.00	sf	1.00	/sf	165,035
	FIRE & SMOKE PROTECTION			***6.243/sf***		***1,030,246***
	165,035.00 sf					

08-0000.000 DOORS & WINDOWS

220	Interior Doors					
220	HM Doors					
220	Type - 1 HM, 3'0" x 7'0" Single	2.00	lvs	650.00	/lvs	1,300
220	Type - 1B HM, 4'0" x 7'0" Single (S4-4)	1.00	lvs	650.00	/lvs	650
220	Type - 3A HM, 3'0" x 7'0" Single	5.00	lvs	650.00	/lvs	3,250
220	Wood Doors					
220	Type - 1 Wood, 3'0" x 7'0" Single - Width Ranges from 3' to 4'	99.00	lvs	650.00	/lvs	64,350

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
220	Type - 1 Wood, 3'0" x 7'0" Single Ranges from 3' to 4' Width - 45 MIN	3.00	lvs	800.00	/lvs	2,400
220	Type - 1 Wood, 3'0" x 7'0" Single Ranges from 3' to 4' Width - 90MIN	3.00	lvs	1,000.00	/lvs	3,000
220	Type - 1 Wood, 6'0" x 7'0" Double	14.00	pair	750.00	/pair	10,500
220	Type - 1 Wood, 6'0" x 7'0" Double - 45 MIN	1.00	pair	825.00	/pair	825
220	Type - 1 Wood, 6'0" x 7'0" Double - 90 MIN	2.00	pair	900.00	/pair	1,800
220	Type - 1A Wood, 6'0" x 7'0" Double	6.00	pair	1,000.00	/pair	6,000
220	Type - 1A Wood, 6'0" x 7'0" Double - 60 MIN	8.00	pair	1,200.00	/pair	9,600
220	Type - 1B Wood, 3'0" x 7'0" Single - Width Ranges from 3' to 4'	1.00	lvs	650.00	/lvs	650
220	Type - 1C Wood, 3'0" x 7'0" Single	10.00	lvs	650.00	/lvs	6,500
220	Type - 3 Wood, 3'0" x 7'0" Single	1.00	lvs	650.00	/lvs	650
220	Type - 3A Wood, 3'0" x 7'0" Single	103.00	lvs	650.00	/lvs	66,950
220	Type - 3B Wood, 3'0" x 7'0" Single (G100A)	1.00	lvs	650.00	/lvs	650
220	Type - Unknown Wood, 3'0" x 7'0" Single Width Ranges from 3' to 4' (156-4, 252G)	2.00	lvs	650.00	/lvs	1,300
220	Unknown Type Doors	0.00	ITEM			
220	Type - 1 Unknown, 3'0" x 7'0" Double	6.00	lvs	1,000.00	/lvs	6,000
220	Type - 1A Unknown, 6'0" x 7'0" Double - 60 MIN	1.00	pair	1,200.00	/pair	1,200
220	Type - 1C Unknown, 3'0" x 7'0" Single	1.00	lvs	1,000.00	/lvs	1,000
220	Type - 3A Unknown, 3'0" x 7'0" Double	4.00	lvs	1,000.00	/lvs	4,000
220	Premium for Interior STC 53 HM Doors	3.00	lvs	12,000.00	/lvs	36,000
220	Install Interior Door and HW - adjusted per recon	306.00	lvs	500.00	/lvs	153,000
220	Interior Door Frames					
220	Interior Door Frame Installation - w Drywall	274.00	ea			
220	Type 1 - HM 3'0" x 7'0" - Single - Width Ranges from 3' to 4'	106.00	ea	600.00	/ea	63,600
220	Type 1 - HM 3'0" x 7'0" - Single - 45 MIN	3.00	ea	600.00	/ea	1,800
220	Type 1 - HM 3'0" x 7'0" - Single - Width Ranges from 3' to 4' - 90 MIN	5.00	ea	600.00	/ea	3,000
220	Type 1 - HM 6'0" x 7'0" - Double	14.00	ea	800.00	/ea	11,200
220	Type 1 - HM 6'0" x 7'0" - Double - 45 MIN	1.00	ea	800.00	/ea	800
220	Type 1 - HM 6'0" x 7'0" - Double - 90 MIN	2.00	ea	600.00	/ea	1,200
220	Type 1A - HM 6'0" x 7'0" Double	6.00	ea	600.00	/ea	3,600
220	Type 1A - HM 6'0" x 7'0" Double - 60 MIN	8.00	ea	600.00	/ea	4,800
220	Type 1B - HM 3'0" x 7'0" - Single Ranges from 3' to 4' Width	2.00	ea	800.00	/ea	1,600
220	Type 1C - HM 3'0" x 7'0" Single	10.00	ea	600.00	/ea	6,000
220	Type 3 - HM 3'0" x 7'0" Single	2.00	ea	600.00	/ea	1,200
220	Type 3B - HM 3'0" x 7'0" Single	1.00	ea	600.00	/ea	600
220	Type 3A - HM 3'0" x 7'0" Single	112.00	ea	600.00	/ea	67,200
220	Type Unknown - HM 3'0" x 7'0" Single (156-4, 252G)	2.00	ea	600.00	/ea	1,200
220	Borrowed Lite Frames	867.00	lf	45.00	/lf	39,015
220	Exterior Doors					
220	Type - 1 Wood, 3'0" x 7'0" - Single	1.00	lvs	750.00	/lvs	750
220	Type - 1A Wood, 6'0" x 7'0" - Double	3.00	pair	850.00	/pair	2,550
220	Type - 1A Wood, 6'0" x 7'0" - Double - 60 MIN	1.00	pair	850.00	/pair	850
220	Type - 3B Wood, 3'0" x 7'0" - Single	2.00	lvs	850.00	/lvs	1,700
220	Install Exterior Door and HW	11.00	lvs	1,800.00	/lvs	19,800
220	Exterior Door Frames					
220	Exterior Door Frame Installation - w Drywall	7.00	ea			
220	Type 1 - HM 3'0" x 7'0" - Single	1.00	ea	1,500.00	/ea	1,500
220	Type 1A - HM 6'0" x 7'0" - Double	3.00	ea	2,000.00	/ea	6,000
220	Type 1A - HM 6'0" x 7'0" - Double - 60 MIN	1.00	ea	2,000.00	/ea	2,000
220	Type 3B - HM 3'0" x 7'0" - Single	2.00	ea	1,500.00	/ea	3,000
220	Access Doors and Misc Allowances					
220	Premium for Ballistic Doors (4 Leaves)	4.00	lvs	12,000.00	/lvs	48,000

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
220	Premium for Ballistic Doors (28 Lvs per Alts G throuhg J)					
30	OH-D1 - Overhead Section Door 10' x 10' - Receiving/General Supply 153-2	1.00	ea	19,000.00	/ea	19,000
30	OH-G - Overhead Coiling Grille 20'-4" x 11'-5" - Kitchen 156-1	1.00	ea	25,000.00	/ea	25,000
30	OH-G - Overhead Coiling Grille 20'-4" x 11'-5" - Kitchen 156-2	1.00	ea	25,000.00	/ea	25,000
30	OH - Overhead Coiling Door 4' x 4' - Kitchen 156-4	1.00	ea	10,000.00	/ea	10,000
10	Interior Storefront Assemblies	985.00	sf	150.00	/sf	147,750
10	1 HR Fire Rated Interior Storefront Premium	450.00	sf	300.00	/sf	135,000
001	Storefront Entrances-Single	1.00	ea	7,500.00	/ea	7,500
300	Storefront Entrances-Pair	4.00	ea	12,000.00	/ea	48,000
005	Interior Aluminum Doors					
005	Aluminum, Single Doors - removed per Recon (duplicate)					
005	Aluminum, Double Doors - removed per Recon (duplicate)					
005	Interior Curtainwall Assembly	165.00	sf	150.00	/sf	24,750
005	Interior Curtainwall Double Doors	4.00	lvs	8,000.00	/lvs	32,000
005	Exterior Aluminum Doors					
005	Aluminum, Single Doors	1.00	lvs	12,500.00	/lvs	12,500
005	Aluminum, Double Doors	10.00	lvs	12,500.00	/lvs	125,000
005	Aluminum, Double Doors - Ballistic premium removed per recon					
005	Level 1 School Guard Glazing Premium - adjusted to include entire assembly	2,935.00	sf	75.00	/sf	220,125
005	Exterior Curtainwall Assembly	4,970.00	sf	185.00	/sf	919,450
005	Exterior Mockup per AG0.05 - Curtainwall					
005	Exterior Curtainwall Assembly	70.00	sf	185.00	/sf	12,950
10	Exterior Aluminum Windows					
10	W1, W1a, W2, W3, W4 Windows - adjusted per recon	5,880.00	sf	160.00	/sf	940,800
10	Includes additional Ballistic Glazing for designated openings - removed per recon					
10	CW-10 - removed per recon	1.00	ea			
10	CW-11 - removed per recon	1.00	ea			
10	CW-12 - removed per recon	1.00	ea			
10	Exterior Mockup per AG0.05 - Windows					
10	W2 Window	40.00	sf	175.00	/sf	7,000
10	HW 01, Single - Electrified Panic Hardware + Automatic Operator + Access Control	1.00	ea	1,200.00	/ea	1,200
10	HW 02, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Access Control	5.00	ea	1,200.00	/ea	6,000
10	HW 03, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Access Control	3.00	ea	1,200.00	/ea	3,600
10	HW 04, Single – Storeroom Lock + Closer + Full Gasketing/Sweep/Threshold + Security Contact	3.00	ea	1,200.00	/ea	3,600
10	HW 05, Single – Storeroom Lock + Closer + Full Gasketing/Sweep/Threshold – Roof Egress	1.00	ea	1,200.00	/ea	1,200
10	HW 06, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Full Gasketing	4.00	ea	1,200.00	/ea	4,800
10	HW 07, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Full Gasketing	1.00	ea	1,200.00	/ea	1,200
10	HW 08, Single – Passage Set Only + Silencers	15.00	ea	1,200.00	/ea	18,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
0	HW 08A, Single – Passage Set Only + Reduced Hinge/Silencer Quantity				
10	HW 09, Single – Privacy Lock + Silencers	13.00	ea	1,200.00 /ea	15,600
10	HW 10, Single – Entrance Lock + FSIC Core + Silencers	14.00	ea	1,200.00 /ea	16,800
10	HW 11, Single – Classroom Lock + FSIC Core + Silencers	7.00	ea	1,200.00 /ea	8,400
10	HW 12, Single – Classroom Lock + Gasketing + Door Bottom + Threshold	3.00	ea	1,200.00 /ea	3,600
10	HW 13, Single – Entrance Lock with Inside Indicator + Seals	33.00	ea	1,200.00 /ea	39,600
10	HW 14, Single – Entrance Lock with Inside Indicator + Overhead Stop + Seals	1.00	ea	1,200.00 /ea	1,200
10	HW 15, Single – Entrance Lock + Gasketing + Door Bottom + Threshold	111.00	ea	1,200.00 /ea	133,200
10	HW 16, Single – STC Door + STC Manufacturer Seals + Door Bottom + Threshold	2.00	ea	1,200.00 /ea	2,400
10	HW 17, Single – Privacy Lock + Surface Closer + Kick Plate + Silencers	13.00	ea	1,200.00 /ea	15,600
10	HW 18, Single – Entrance Lock + Surface Closer + Kick Plate + Silencers	2.00	ea	1,200.00 /ea	2,400
10	HW 19, Single - Single – Entrance Lock + Surface Closer + Kick Plate + Gasketing	2.00	ea	1,200.00 /ea	2,400
10	HW 20, Single – Classroom Lock + Surface Closer + Kick Plate + Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 21, Single – Entrance Lock with Inside Indicator + Closer + Gasketing	2.00	ea	1,200.00 /ea	2,400
10	HW 22, Single – Storeroom Lock + Closer + Kick Plate + Silencers	2.00	ea	1,200.00 /ea	2,400
10	HW 23, Single – Storeroom Lock + Closer + Kick Plate + Gasketing	12.00	ea	1,200.00 /ea	14,400
10	HW 24, Single – Storeroom Lock (8RO) + Closer + Kick Plate + Gasketing	9.00	ea	1,200.00 /ea	10,800
10	HW 25, Single – Electrified Mortise Lock + Automatic Operator + Access Control	2.00	ea	1,200.00 /ea	2,400
10	HW 26, Single – Storeroom Lock + Closer + Kick Plate + Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 27, Single – Fire Exit Hardware + Closer + Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 28, Pair – Classroom Lock + Manual Flush Bolt + Silencers	6.00	ea	1,200.00 /ea	7,200
10	HW 29, Pair – Storeroom Lock + Manual Flush Bolt + Silencers	1.00	ea	1,200.00 /ea	1,200
10	HW 30, Pair – Storeroom Lock + Manual Flush Bolt + Closers + Kick Plates	2.00	ea	1,200.00 /ea	2,400
10	HW 31, Pair – Storeroom Lock + Flush Bolts + Coordinator + Dual Closers + Astragal/Gasketing	5.00	ea	1,200.00 /ea	6,000
10	HW 32, Pair – Panic Hardware + Multiple Cylinders/Cores + Dual Closers				
10	HW 33, Pair – Fire Exit Hardware + Dual Closers + Mullion Seal + Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 34, Pair – Electrified Fire Exit Hardware + Access Control + Dual Closers + Astragal	4.00	ea	1,200.00 /ea	4,800
10	HW 35, Pair – Fire Exit Hardware + Magnetic Hold-Open Devices + Astragal/Gasketing	4.00	ea	1,200.00 /ea	4,800
10	HW 36, Pair – Fire Exit Hardware + Magnetic Hold-Open Devices + Astragal/Gasketing	12.00	ea	1,200.00 /ea	14,400
10	HW 37, Revolving Unit – Mortise Cylinder; Balance of Hardware by Door Manufacturer	3.00	ea	1,200.00 /ea	3,600
10	HW 38, FLD Door – No Hardware Required	4.00	ea	1,200.00 /ea	4,800

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
0	HW 39, Cased Opening – No Hardware Required					
10	HW G1, Gate – Gate Hinges + Panic Hardware + Cylinder + Gate Closer					
10	Unload & Organize Door Hardware	1.00	ls	20,000.00	/ls	20,000
100	Borrowed Lites BL1	400.00	sf	85.00	/sf	34,000
100	Borrowed Lites BL2 - None Shown					
100	Borrowed Lites BL3 - None Shown					
100	Borrowed Lites BL-4, Safety Glass	480.00	sf	85.00	/sf	40,800
100	Borrowed Lites BL-5, Bullet Resistant Transaction Window	1.00	ea	7,500.00	/ea	7,500
100	Type N - Door Lite Glazing - Not Shown or Specified					
100	Type G - Door Lite Glazing (60 EA)	300.00	sf	85.00	/sf	25,500
100	Type FG - Door Lite Glazing (21 EA)	168.00	sf	85.00	/sf	14,280
100	Door Transom & Sidelight Glazing					
100	Transom & Sidelight Glazing S-2 Safety Glass Type 3 (2 EA)	34.00	sf	85.00	/sf	2,890
100	Transom & Sidelight Glazing S-2 Safety Glass Type 3A (122 EA)	854.00	sf	85.00	/sf	72,590
100	Transom & Sidelight Glazing S-2 Safety Glass Type 3B (3 EA)	21.00	sf	85.00	/sf	1,785
100	School Guard Glazing allowance at ALL Interior Sidelight (SG4 & SG5) - w Alternates					
100	PT Mirrors - Allowance	1.00	ls	5,000.00	/ls	5,000
100	Ballistic Glazing at all Classroom Door Side Lites - Not Shown or Specified					
	DOORS & WINDOWS			***24.103/sf***		***3,977,910***
	165,035.00 sf					
09-0000.000	***FINISHES***					
00	Interior Walls					
100	A, 1 Layer GWB ea Face, Acoustical Insul, 6" Studs	17,205.00	sf	18.00	/sf	309,690
100	A1, 1 Layer GWB ea Face, Acoustical Insul, 6" Studs - 1 HR	1,592.00	sf	20.50	/sf	32,636
100	A1A, 1 Layer GWB ea Face 1 Additional Layer on Either side, Acoustical Insul, 6" Studs	885.00	sf	20.00	/sf	17,700
100	A2, 2 Layer GWB ea Face, Acoustical Insul, 6" Studs - 2 HR	3,513.00	sf	20.50	/sf	72,017
100	A2A, 2 Layer GWB ea Face, Acoustical Insul, 6" Studs - Non-Rated Acoustic Barrier	91,375.00	sf	25.00	/sf	2,284,375
100	B, 1 Layer GWB ea Face, Acoustical Insul, 3-5/8" Studs	305.00	sf	22.00	/sf	6,710
100	B1, 1 Layer GWB ea Face, Acoustical Insul, 3-5/8" Studs - 1 HR - None Shown					
100	BR, 1 Layer GWB ea Face, 1 Side Bullet Resistant Fiberglass, Acoustical Insul, 6" Studs	470.00	sf	75.00	/sf	35,250
100	C, 1 Layer GWB ea Face, Acoustical Insul, 8" Studs - None Shown					

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
00	C1, 1 Layer GWB ea Face, Acoustical Insul, 8" Studs - 1 HR - None Shown					
100	D, 4" CMU - None Shown					
100	F, 1 Side GWB, Acoustical Insul, 2-1/2" Studs	586.00	sf	12.00	/sf	7,032
100	F2, 1 Side 2 Layers GWB, Acoustical Insul, 2-1/2" Studs - None Shown					
100	F4, 1 Side GWB, Acoustical Insul, 3-5/8" Studs	35,311.00	sf	12.50	/sf	441,388
100	F4A, 1 Side GWB, Acoustical Insul, 3-5/8" Studs - Non-Rated Acoustic Barrier - None Shown					
100	F5, 1 Side 2 Layers GWB, Acoustical Insul, 3-5/8" Studs	10,578.00	sf	15.00	/sf	158,670
100	F5A, 1 Side 2 Layers GWB, Acoustical Insul, 3-5/8" Studs	151.00	sf	13.00	/sf	1,963
100	F6, 1 Side 1 Layer GWB, Acoustical Insul, 6" Studs	13,672.00	sf	22.00	/sf	300,784
100	F6A - Not Shown on AGO.02F6A, 1 Side 1 Layer GWB, Acoustical Insul, 6" Studs - Non-Rated Acoustic Barrier - None Shown					
100	F7, 1 Side 2 Layer GWB, Acoustical Insul, 6" Studs	28,853.00	sf	11.00	/sf	317,383
100	F8, 1 Side 1 Layer GWB, 7/8" Hat Channel	873.00	sf	35.00	/sf	30,555
100	HA, 6" CMU, Acoustic Barrier - None Shown					
100	HF8, 6" CMU, 1 Layer GWB, 7/8" Hat Channel - None Shown					
100	S1, 1 Side 1 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 2-1/2" Studs - 1 HR - None Shown					
100	S2, 1 Side 2 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 2-1/2" Studs - 2 HR - None Shown					
100	S6, 1 Side 2 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 6" Studs - 2 HR	79.00	sf	22.00	/sf	1,738
100	S7, 1 Side 1 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 6" Studs - 1 HR	3,433.00	sf	22.00	/sf	75,526
100	S10, 2 Layers GYP Coreboard, 2" Channel Framing Brace - 2 HR - None Shown					
100	Exterior Walls					
100	EXT WALL Back Up, 8" or 6" LGMF, GWB interior Face, Batt Insul	61,910.00	sf	22.00	/sf	1,362,020
100	Exterior Wall - Densglass Sheathing	61,910.00	sf	6.00	/sf	371,460
100	FRP - Allowance	1.00	ls	5,000.00	/ls	5,000
100	Exterior Mockup per AG0.05 - Drywall					
100	1/2" GWB BD5 & 5/8" GWB Backup Walls	320.00	sf	24.00	/sf	7,680
100	Drywall General Conditions					
100	General Carp / Labor	165,035.00	sf	2.00	/sf	330,070
100	Lifts & Staging	1.00	ls	45,000.00	/ls	45,000
100	Miscellaneous					
100	Wall and Soffit Coordination	1.00	ls	50,000.00	/ls	50,000
100	Misc. Touchup and Patching Allowance	1.00	ls	50,000.00	/ls	50,000
100	Misc. Engineering & Associated Work	1.00	ls	25,000.00	/ls	25,000
100	Exterior Wall Premium Time	1.00	ls	30,000.00	/ls	30,000
100	Interior Framing Premium Time	1.00	ls	50,000.00	/ls	50,000
50	Ceramic Wall Tile					
50	Wall Tile - Restrooms	26,467.00	sf	32.00	/sf	846,944
50	Wall Tile - Corridors	9,725.00	sf	32.00	/sf	311,200
50	Wall Tile - Cafeteria/Stage	230.00	sf	32.00	/sf	7,360
50	Wall Tile - Backsplash	135.00	sf	32.00	/sf	4,320
2	Terrazzo Flooring					
2	Terrazzo Flooring	16,578.00	sf	40.00	/sf	663,120
2	Terrazzo Pattern Installation Premium	3,316.00	sf	10.00	/sf	33,160

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
2	Terrazzo inlays - Allowance	1.00	ls	12,000.00	/ls	12,000
2	Floor Protection	19,894.00	sf	1.50	/sf	29,841
2	Terrazzo Treads - Stair 2	50.00	ea	850.00	/ea	42,500
2	Terrazzo Treads - Stair 4	82.00	ea	850.00	/ea	69,700
2	Terrazzo Treads - Stair 5	24.00	ea	850.00	/ea	20,400
2	Terrazzo Landings	1,500.00	sf	50.00	/sf	75,000
2	Stair Floor Protection	3,055.00	sf	1.50	/sf	4,583
2	QZT-1 Quartz Tile	1,226.00	sf	7.00	/sf	8,582
2	Wax and Seal Quartz Tile	1,226.00	sf	1.50	/sf	1,839
2	Floor Protection	1,226.00	sf	0.75	/sf	920
2	Drywall Ceilings					
2	GWB Ceilings (GYP BD6)	6,730.00	sf	15.00	/sf	100,950
2	GWB Ceilings, 2 HR	5.00	sf	15.00	/sf	75
2	GWB Ceilings - Mold and Abuse Resistant (GYP BD3) - None Shown					
2	GWB Soffiting Allowance	165,035.00	sf	1.00	/sf	165,035
2	GWB Ceilings (GYP BD6) - Stairs	2,930.00	sf	15.00	/sf	43,950
2	GWB Ceiling Clouds					
2	GWB Ceilings, Exterior Soffits (GYP BD5)	1,050.00	sf	20.00	/sf	21,000
2	Acoustical Ceilings					
2	ACP-1a, Ultima High NRC by Armstrong, Color White	104,805.00	sf	7.00	/sf	733,635
2	ACP-1a, Ultima High NRC by Armstrong, Color White @ Stairs	1,370.00	sf	7.00	/sf	9,590
2	ACP-1b, Calla by Armstrong, Color Black @ Stage Ceiling only	750.00	sf	7.50	/sf	5,625
2	ACP-2, Ultima High NRC by Armstrong - None Shown					
2	ACP-4, Mineral fiber with scrubbable finish, Kitchen Zone by Armstrong - None Shown					
2	ACP-5, Ceramaguard Fine Fissured by Armstrong - None Shown					
2	ACP-6, Glass fiber panels, Soundscapes Shapes by Armstrong - None Shown					
2	ACP-7, Geometrix 3-Dimensional Metal Panels; Preformed aluminum by USG	1,235.00	sf	35.00	/sf	43,225
2	ACP-8, PT Sound Isolation Ceiling @ Mechanical Room	1,745.00	sf	35.00	/sf	61,075
2	WD-1, 108" x 6" planks, 3/4" thick, BOD: Armstrong Metalworks or equal	6,670.00	sf	55.00	/sf	366,850
2	WD-2, Acoustic Wood Panels, BOD: Woodworks Tegular panels by Armstong or equal - adjusted per Recon	1,720.00	sf	60.00	/sf	103,200
2	Floors Moisture Mitigation Testing - NIC per Recon, but adding in value per Pam & John	10.00	loc	400.00	/loc	4,000
2	Floors Moisture Mitigation - Epoxy & Gym					
2	Common Work Results for Flooring - adjusted per recon	165,035.00	sf	1.50	/sf	247,553
145	2-1/2" Wood Athletic Flooring System - Gymnasium	12,000.00	sf	30.00	/sf	360,000
145	Future Owner Logos - Allowance	12,000.00	sf	1.00	/sf	12,000
145	Stair 6/Platform Treads - Stage	320.00	sf	45.00	/sf	14,400
145	Floor Protection	12,320.00	sf	1.50	/sf	18,480
2	Resilient Flooring					
2	LIN - Linoleum Flooring, BOD = Forbo - adjusted unit cost per Recon	81,860.00	sf	7.50	/sf	613,950
2	ESD Static Control Tile (SDT-1)	175.00	sf	15.00	/sf	2,625
2	RAF-1 - Rubber Athletic Flooring, 6mm Thick	2,313.00	sf	26.00	/sf	60,138
2	RSF-1 Resilient Sheet Flooring, BOD = Nora Systems Norament	6,317.00	sf	8.00	/sf	50,536

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	?	Resilient Flooring Pattern Installation Premium - adjusted unit cost per Recon	90,665.00	sf	1.00	/sf	90,665
	2	Floor Protection	90,665.00	sf	0.75	/sf	67,999
	2	Resilient Base	19,180.00	lf	4.00	/lf	76,720
	2	Vented Base	455.00	lf	3.50	/lf	1,593
	2	Resilient Sheet Landings & Treads	4.00	flts	6,250.00	/flts	25,000
	002	Seal Concrete	6,045.00	sf	2.75	/sf	16,624
	002	Floor Protection	6,045.00	sf	0.75	/sf	4,534
	002	Sealed Concrete Prep - Allowance	6,045.00	sf	1.50	/sf	9,068
	10	Epoxy Flooring - Dur-A-Flex	9,245.00	sf	28.00	/sf	258,860
	10	Flakes @ Restrooms					
	10	Floor Protection	9,245.00	sf	1.50	/sf	13,868
f 10		Carpet Tile	946.00	sy	60.00	/sy	56,760
f 10		Carpet Pattern Installation Premium	3,903.00	sf	10.00	/sf	39,030
f 10		Floor Protection	8,513.00	sf	0.75	/sf	6,385
	2	Metal Grating Frames, Vestibule	925.00	sf	170.00	/sf	157,250
	2	Walk Off Mats	950.00	sf	15.00	/sf	14,250
	2	1/4" Floor Prep	1.00	ls	10,000.00	/ls	10,000
	2	Digitally Printed Wallcoverings (3,380 SF)	1.00	ls	40,000.00	/ls	40,000
	2	DPW-1 - Extended Learning 105D					
	2	DPW-2 - Extended Learning 105E					
	2	DPW-3 - Extended Learning 131E					
	2	DPW-4 - Extended Learning 131C					
	2	DPW-5 - Office 182					
	2	DPW-6 - Corridor 102					
	2	DPW-7 - Extended Learning 205C					
	2	DPW-8 - Extended Learning 230C					
	2	DPW-9 - Extended Learning 205E					
	2	DPW-10 - Extended Learning 230F					
	2	DPW-11 - Extended Learning 230E					
	2	DPW-12 - Cafeteria 168 - w Acoustical Panels					
	2	DPW-13 - Extended Learning 301A					
	2	DPW-14 - Extended Learning 301B					
	2	DPW-15 - Extended Learning 350A					
	2	DPW-16 - Extended Learning 333E					
	2	DPW-17 - Extended Learning 333F					
	2	DPW-18 - Extended Learning 333C					
	2	DPW-19 - Extended Learning 302C					
	2	DPW-20 - Lobby adjacent to Vestibule 172					
	2	DPW-21 - Library Tiered Seating					
	2	Stainless Steel Wall Panels - STE Classroom	60.00	sf	15.00	/sf	900
	2	Corner Guard Installation	184.00	ea	125.00	/ea	23,000
	2	Acoustical Wall Panels					
	2	AWP1, Acoustical Wall Panels @ Gym	2,900.00	sf	35.00	/sf	101,500
	2	AWP1, Acoustical Wall Panels @ Flex Classroom	8.00	sf	35.00	/sf	280
	2	AWP2, Acoustical Wall Panels @ Music/Chorus & Flex Classroom	240.00	sf	80.00	/sf	19,200
	2	Tectum Panels w/Custom Images @ Cafeteria/Auditorium	315.00	sf	82.00	/sf	25,830
	2	2" Tectum Ceiling Panels @ Gym - team confirming which BP this will belong to (ACT or AWP)	11,995.00	sf	30.00	/sf	359,850
	2	Wood Slat Wall Panels w Acoustic Felt Backing	1,735.00	sf	85.00	/sf	147,475
	10	Painting					
	10	Paint Exterior HM Doors and Frames	11.00	lvs	350.00	/lvs	3,850
	10	Paint Walls - Interior Only	411,270.00	sf	0.95	/sf	390,707
	10	Paint Touch up Allowance	1.00	ls	25,000.00	/ls	25,000
	20	Paint Exposed Ceilings	13,100.00	sf	3.50	/sf	45,850
	30	Paint GWB Ceilings	6,735.00	sf	3.50	/sf	23,573
	30	Paint GWB Ceilings - Stairs	2,930.00	sf	3.50	/sf	10,255

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
10	Paint Interior Doors and Frames	294.00	lvs	350.00	/lvs	102,900
40	Paint Pan Stairs & Rails	12.50	Flt	5,000.00	/Flt	62,500
40	Painting Sequencing Allowance	1.00	ls	20,000.00	/ls	20,000
40	Painting MEP Allowance	1.00	ls	20,000.00	/ls	20,000
40	Exterior Mockup per AG0.05 - Painting					
40	Paint Exterior Walls	320.00	sf	2.75	/sf	880
	FINISHES			***83.989/sf***		***13,861,158***
	165,035.00 sf					
10-0000.000	***SPECIALTIES***					
2	Visual Display Units					
2	Magnetic White Boards 4' x 5'	1.00	ea	360.00	/ea	360
2	Magnetic White Boards 5' x 5'	11.00	ea	450.00	/ea	4,950
2	Magnetic White Boards 6' x 5'	160.00	ea	540.00	/ea	86,400
2	Tackboards 3' x 3'	7.00	ea	225.00	/ea	1,575
2	Tackboards 4' x 3'	18.00	ea	300.00	/ea	5,400
2	Tackboards 4' x 4'	147.00	ea	400.00	/ea	58,800
2	Tackboards 4' x 5'	3.00	ea	500.00	/ea	1,500
2	Tackboards 5' x 3'	10.00	ea	375.00	/ea	3,750
2	Tackboards 6' x 1'-6"	168.00	ea	225.00	/ea	37,800
2	Tackboards 6' x 4'	10.00	ea	600.00	/ea	6,000
2	Tackboards 6' x 5'	29.00	ea	750.00	/ea	21,750
2	Tackboards 6' x 6'-6"	10.00	ea	975.00	/ea	9,750
2	Tackboards 8' x 2'	34.00	ea	400.00	/ea	13,600
2	Tackboards 12' x 1'-6"	1.00	ea	450.00	/ea	450
2	Wall Hung TV - by others					
110	Interior Signage					
110	Signage, TYPE-A (Typical Room)	112.00	ea	60.00	/ea	6,720
110	Signage, TYPE-B (Classroom/Office)	77.00	ea	100.00	/ea	7,700
110	Signage, TYPE-C (Entrance to Suite of Rooms)	5.00	ea	60.00	/ea	300
110	Signage, TYPE-D.1 (Male Toilet)	7.00	ea	55.00	/ea	385
110	Signage, TYPE-D.2 (Female Toilet)	7.00	ea	55.00	/ea	385
110	Signage, TYPE-E (Unisex Toilet)	36.00	ea	60.00	/ea	2,160
110	Signage, TYPE-F (Electric, Emergency Electric, IDF/MDF, & Elevator Machine Rooms)	17.00	ea	60.00	/ea	1,020
110	Signage, TYPE-G (Use at Elevators)	3.00	ea	70.00	/ea	210
110	Signage, TYPE-H (Use at Stair Landing)	12.00	ea	150.00	/ea	1,800
110	Signage, TYPE-J (Use at all Corridor Side of All Stair Doors)	12.00	ea	55.00	/ea	660
110	Signage, TYPE-K (Use at all communicating doors)	4.00	ea	60.00	/ea	240
110	Signage, TYPE-T (Use at all Elevator Machine Rooms)	1.00	ea	100.00	/ea	100
110	Signage, TYPE-L	10.00	ea	45.00	/ea	450
110	Signage, TYPE-M	15.00	ea	55.00	/ea	825
110	Signage, TYPE-N	10.00	ea	65.00	/ea	650
110	Signage, TYPE-O	5.00	ea	70.00	/ea	350
110	Signage, TYPE-S	2.00	ea	140.00	/ea	280
110	LEED Plaques	3.00	ea	850.00	/ea	2,550
110	36x42 Dedication Plaque	3.00	ea	8,000.00	/ea	24,000

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
10	Misc. Signage	1.00	ls	15,000.00	/ls	15,000
110	Design & PE Fee	1.00	ls	15,000.00	/ls	15,000
110	Installation	341.00	ea	100.00	/ea	34,100
110	Exterior Signage					
110	Time Capsule Plaque	1.00	ea	800.00	/ea	800
110	6" Aluminum Lettering	54.00	letter	70.00	/letter	3,780
110	18" Aluminum Lettering, Face Lit - 'WILMINGTON ELEMENTARY SCHOOL' & 'WILMINGTON ELEMENTARY'	46.00	letter	240.00	/letter	11,040
110	1-Sided Monument Signage	1.00	ls	6,000.00	/ls	6,000
110	Includes Exterior 5" Fabricated Letter, Aluminum "WILMINGTON ELEMENTARY SCHOOL"	26.00	ea			
110	Includes Exterior 4" Fabricated Letter, Aluminum "320 SALEM STREET"	14.00	ea			
110	Includes LED Outdoor Signage - 33" x 66" x 10"	1.00	ea			
110	Includes aluminum mounting insert	1.00	ea			
110	38" X 84" MDF Project Signage - Allowance	1.00	ls	1,300.00	/ls	1,300
110	Signage Attachment Method Unknown per S21, S26/A9.50 at Gang Restroom Entrances - w Finish Carpentry					
110	Signage Not Yet Designed - Allowance	1.00	ls	15,000.00	/ls	15,000
2	Toilet Partitions					
2	Plastic Toilet Partitions - Standard Height, 55"	34.00	ea	1,200.00	/ea	40,800
2	Plastic Toilet Partitions - ADA	14.00	ea	1,800.00	/ea	25,200
2	Urinal Screen	1.00	ea	500.00	/ea	500
2	Toilet Partition Installation	1.00	ls	30,000.00	/ls	30,000
2	Curtains & Track	3.00	ea	3,000.00	/ea	9,000
2	Operable Partition - 35' x 10' @ Library	1.00	ea	70,000.00	/ea	70,000
2	Operable Partition - 23' x 8' @ Teacher Collab	3.00	ea	45,000.00	/ea	135,000
2	Operable Partition - 12' x 8' @ Quiet Cafe	1.00	ea	20,000.00	/ea	20,000
2	Operable Partition - 29'-4" x 13'-4" @ Platform	1.00	ea	40,000.00	/ea	40,000
001	Corner Guards, Metal - Kitchen/Servery/Dishwashing - Allowance	184.00	ea	75.00	/ea	13,800
001	Corner Guards, Installation - By GWB					
2	Toilet Accessories (Including Standard, Child, and Pre-K sizes)					
2	42" Grab Bars	100.00	ea	125.00	/ea	12,500
2	Toilet Paper Dispensers	83.00	ea	75.00	/ea	6,225
2	Paper Towel Dispensers	204.00	ea	100.00	/ea	20,400
2	Mirror, framed 18' x 30'	76.00	ea	375.00	/ea	28,500
2	Janitor Mop Racks	8.00	ea	275.00	/ea	2,200
2	Changing Table - Pre-K / K Toilets	13.00	ea	850.00	/ea	11,050
2	Sanitary Napkin Disposal, Single Bathrooms	13.00	ea	100.00	/ea	1,300
2	Waste Receptacles	63.00	ea	100.00	/ea	6,300
2	Soap Dispensers	201.00	ea	100.00	/ea	20,100
2	Sharps Container	1.00	ea	250.00	/ea	250
2	Hand Sanitizer Stations - None Shown					
2	Janitor's Closet Mop/Broom Holders	8.00	ea	175.00	/ea	1,400
2	Toilet Accessories - Installation	1.00	ls	42,000.00	/ls	42,000
30	Fire Extinguisher and Cabinets					
30	Semi-Recessed Fire Extinguisher Cabinets - Allowance	40.00	ea	615.00	/ea	24,600
30	AED and Cabinets - Allowance	12.00	ea	2,500.00	/ea	30,000
20	Fire Department Knox Box	2.00	ea	125.00	/ea	250
10	Metal Lockers					
10	Lockers, 18" x 15" x 72" - LK-T1	9.00	ea	625.00	/ea	5,625
10	Lockers, 18" x 15" x 72" - LK-T1-ADA	1.00	ea	625.00	/ea	625
10	Lockers, 12" x 12" x 60" - LK-T2	3.00	ea	525.00	/ea	1,575
10	Lockers, 12" x 12" x 60" - L-T2B	5.00	ea	525.00	/ea	2,625
10	Lockers, 12" x 12" x 60" - LK-T5	8.00	ea	525.00	/ea	4,200

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
50	Metal Storage Shelving					
	SPECIALTIES			***6.125/sf***		***1,010,915***
	165,035.00 sf					
10-7000.000	***SUN CONTROL DEVICES***					
001	Custom Exterior Horizontal Sunshade Outriggers - (502 LF) South Elevations only - removed per recon					
001	Exterior Sunshade Connection - Allowance - removed per recon					
	SUN CONTROL DEVICES					***0***
	165,035.00 sf					
11-0000.000	***EQUIPMENT***					
;0	Residential Appliances					
50	Refrigerators	10.00	ea	1,800.00	/ea	18,000
50	Microwaves	9.00	ea	355.00	/ea	3,195
50	Front Load Washer - None Shown					
50	Front Load Dryer - None Shown					
50	Freight	1.00	ls	1,500.00	/ls	1,500
50	Unload, Unwrap, and Drop Appliances in Place	19.00	ea	500.00	/ea	9,500
2	Food Service Equipment - Allowance	1.00	ls	876,120.00	/ls	876,120
2	Vending Machines, Including Freight & Setting in Place - removed per recon					
001	Smart Board & Short Throw Projectors					
001	Smart Board & Throw Projectors - PreK/ K Classrooms					
001	Smart Board & Throw Projectors - Classrooms					
001	Smart Board & Throw Projectors - Art Classrooms					
001	Smart Board & Throw Projectors - Music Classrooms					
001	Smart Board & Throw Projectors - Staff					
001	Smart Board & Throw Projectors - Media / Library					
010	Auditorium Stage Rigging and Curtains					
010	Rigging and Curtain System	1.00	ls	75,000.00	/ls	75,000
010	Projection Screens	2.00	ea	15,000.00	/ea	30,000
010	Theatrical Lighting Package - Barbizon Budget	1.00	ls	110,000.00	/ls	110,000
10	Interior Gymnasium Equipment					
10	Motorized Basketball Hoops, Winch, Connectors	6.00	ea	13,000.00	/ea	78,000
10	Motorized Divider Curtain in Gym	1.00	ea	23,000.00	/ea	23,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
0	Volley Ball Equipment - Allowance - removed per recon				
10	Pickle Ball Equipment - Allowance				
38	Wall Pads - 6' tall x 2' wide, Fire Rated - Gym	1,565.00	sf	42.00 /sf	65,730
38	Interior Scoreboard w/Shot Clock				
38	Traverse Wall, Climbing Wall - 8' Height	200.00	sf	100.00 /sf	20,000
38	Climbing Ropes				
38	Adaptive Swings & Hooks - Gym				
38	Calming Room Wall Padding - 6' Height	1,315.00	sf	42.00 /sf	55,230
38	Pull up bar - None Shown				
38	PT Platform Swing - None Shown	1.00	ea	6,500.00 /ea	6,500
001	Kiln	2.00	ea	9,000.00 /ea	18,000
001	Owner Training - Kiln Vendor	1.00	ls	500.00 /ls	500
	EQUIPMENT			***8.424/sf***	***1,390,275***
	165,035.00 sf				
12-0000.000	***FIXED FURNISHINGS***				
!	Window Treatments				
2	Type WS1a, manual (1,570 SF)	170.00	ea	225.00 /ea	38,250
2	Type WS3, motorized (4,710 SF)	15.00	ea	575.00 /ea	8,625
2	Type WS5, manual (5,900 SF)	183.00	ea	400.00 /ea	73,200
2	Exterior Mockup per AG0.05 - Window Treatments				
2	Type WS1, manual (10 SF)	1.00	ea	400.00 /ea	400
2	Type WS2, motorized (17 SF)	1.00	ea	550.00 /ea	550
001	Manufactured Casework				
001	Standard Door Base Cabinets w Plam Tops	1,080.25	lf	545.800 /lf	589,601
001	Standard Door Base Cabinets w Plam Tops, Island	7.25	lf	764.121 /lf	5,540
001	Open Base Cabinets w Plam Tops	400.00	lf	502.136 /lf	200,854
001	Open Base Cabinets w Plam Tops, Slim	116.00	lf	360.228 /lf	41,786
001	Plam Tops w Brackets	771.00	lf	65.496 /lf	50,497
001	Standard Door Base Cabinets w Solid Surface Tops	644.50	lf	605.838 /lf	390,463
001	Multi-Drawer Base Cabinets w Solid Surface Tops (Art Classroom)	22.00	lf	731.372 /lf	16,090
001	Solid Surface Tops w Brackets	63.00	lf	92.786 /lf	5,846
001	Solid Surface Transaction Counter - None Shown				
001	Typical Tall Cabinetry (381 ea)	1,000.00	lf	911.486 /lf	911,486
001	Tall Microwave Cabinetry (2 ea)	6.00	lf	818.70 /lf	4,912
001	STE Tall Cabinetry (10 ea)	22.00	lf	999.901 /lf	21,998
001	Tall Storage Cubbies (260 ea)	808.50	lf	911.486 /lf	736,937
001	EPI Pen & Inhaler Storage	1.00	ea	791.42 /ea	791
001	Mail Cubbies (Assumed to be standardized)	16.00	lf	152.824 /lf	2,445
001	Standard Door Wall Cabinets	1,131.50	lf	350.00 /lf	396,025
001	Open Wall Cabinets	45.50	lf	325.00 /lf	14,788
001	Open Wall Shelving @ Library	11.75	lf	195.00 /lf	2,291
001	Narcotics Cabinet	1.00	ea	280.00 /ea	280
001	Student Tables on Casters @ STE Classrooms - NIC	24.00	ea		

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	Metal Bookcases w Wood Veneer	393.00	lf	585.00 /lf	229,905
001	Short Bookcases (25 ea)	65.25	lf		
001	Tall Bookcases (35 ea)	87.75	lf		
001	Freestanding Bookcases on Casters (62 ea)	186.00	lf		
001	Freestanding Endpiece Bookcases (24 ea)	54.00	lf		
001	Wood Veneer @ Metal Bookcases - w/ Millwork	393.00	lf		
001	Market Adjustment to Allow VBE Opportunities	1.00	ls	200,000.000 /ls	200,000
001	Instrument & Music Library Storage System - Allowance	1.00	ls	36,500.00 /ls	36,500
001	MS-23	1.00	ea		
001	MS-72	3.00	ea		
001	MS-73	1.00	ea		
001	MS-75	6.00	ea		
001	MS-OG	2.00	ea		
001	MS-PO	1.00	ea		
001	MS-SI	2.00	ea		
10	Telescopic Bleachers - Gym, 84' Length, 600 Seat	1.00	ls	230,000.00 /ls	230,000
	FIXED FURNISHINGS			***25.510/sf***	***4,210,061***
	165,035.00 sf				
14-0000.000	***CONVEYING SYSTEMS***				
?	Elevator Usage - Operator Time for Adjacent Trades	15.00	day	2,200.00 /day	33,000
2	Elevator Usage - Operator Time for FF&E	15.00	day	2,200.00 /day	33,000
2	Elevator, Holeless Hydraulic, 4,000lbs	3.00	stop	80,000.00 /stop	240,000
2	Elevator, Cab Flooring - See Div 09 65 00, Resilient Flooring				
2	Elevator, Cab Walls - MFG Full Line of PLAM on plywood				
	CONVEYING SYSTEMS			***1.854/sf***	***306,000***
	165,035.00 sf				
21-0000.000	***FIRE SUPRESSION***				
	Fire Protection General Conditions				
1	Hydraulic Calculations	1.00	ls	2,600.00 /ls	2,600
1	Testing & Inspection	1.00	ls	2,200.00 /ls	2,200
1	Drain & Fill System	1.00	ls	2,800.00 /ls	2,800
1	Coordination and Management	1.00	ls	68,625.00 /ls	68,625
1	Commissioning Assistance	1.00	ls	8,000.00 /ls	8,000
1	Permits and fees ($10/$1,000)				

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	Coordination Drawings / BIM	1.00	ls	25,000.00	/ls	25,000
1	Seismic Restraints / Bracing - includes design	1.00	ls	12,000.00	/ls	12,000
1	Fire Protection Standpipe					
1	2-1/2" Dry Alarm Check Valve w/ Compressor	1.00	ea	6,300.00	/ea	6,300
1	6" Fire Sprinkler Pipe w/ Fittings & Hangers	810.00	lf	73.25	/lf	59,333
1	6" Fire Standpipe Riser	280.00	lf	75.85	/lf	21,238
1	6" Alarm Riser Check Valve Assembly	1.00	ea	7,200.00	/ea	7,200
1	4" Sprinkler Horizontal Standpipe w/ Fittings & Hangers	320.00	lf	56.60	/lf	18,112
1	2-1/2" Sprinkler Drain Pipe w/ Fittings & Hangers	440.00	lf	37.25	/lf	16,390
1	FDC-1 - Fire Department Connection Valve	1.00	ea	3,200.00	/ea	3,200
1	4" Zone Control Valve Assembly - adjusted per recon	4.00	ea	3,650.00	/ea	14,600
1	2-1/2" FDV in Recessed Cabinet	14.00	ea	1,120.00	/ea	15,680
1	Fire Hose Cabinet (Stage Area) - removed per recon					
1	Fire Protection Sprinkler System					
1	Sprinkler Head - Custom Color Head Allowance	1.00	ls	8,000.00	/ls	8,000
1	Sprinkler Head - Protection (Wire Guards)	1.00	ls	5,000.00	/ls	5,000
1	Sprinkler Head - Upright Pendent	7.00	ea	105.00	/ea	735
1	Sprinkler Head - Up & Down Concealed Pendent	460.00	ea	100.00	/ea	46,000
1	Fire Suppression Water Supply and Equipment					
1	8" Fire Sprinkler Pipe - Incoming Service Main	30.00	lf	106.60	/lf	3,198
1	8" Backflow Preventer	1.00	ea	14,225.00	/ea	14,225
1	Sprinkler Head - Concealed Pendent	1,285.00	ea	110.00	/ea	141,350
1	Dry Sprinkler Head - Concealed Pendent - adjusted per recon for 2.5" line	30.00	ea	115.00	/ea	3,450
1	Sprinkler Head - Sidewall	12.00	ea	115.00	/ea	1,380
1	6" Wet Sprinkler Main Piping w/ Fittings & Hangers	685.00	lf	62.35	/lf	42,710
1	Coring & Patching / Firestopping	1.00	ls	4,500.00	/ls	4,500
1	4" Wet Sprinkler Main Piping w/ Fittings & Hangers	4,730.00	lf	56.60	/lf	267,718
1	3" Wet Sprinkler Main Piping w/ Fittings & Hangers	280.00	lf	50.40	/lf	14,112
1	2-1/2" Wet Sprinkler Pipe	510.00	lf	38.56	/lf	19,666
1	2" Wet Sprinkler Pipe	360.00	lf	27.17	/lf	9,781
1	1-1/2" Wet Sprinkler Pipe	5,640.00	lf	23.18	/lf	130,735
1	1-1/4" Wet Sprinkler Pipe	10,960.00	ls	19.25	/ls	210,980
1	Combination Test Connection and Drain Valve	4.00	ea	525.00	/ea	2,100
1	6" Butterfly Valve w/ Tamper Switch	5.00	ea	1,250.00	/ea	6,250
1	4" Butterfly Valve w/ Tamper Switch	4.00	ea	1,050.00	/ea	4,200
1	6" Water alarm check valve - removed per recon					
1	6" OS&Y Gate Valve - removed per recon					
1	4" OS&Y Gate Valve - removed per recon					
1	4" Check Valve	4.00	ea	1,250.00	/ea	5,000
1	4" Storz Connection	1.00	ea	560.00	/ea	560
1	4" PRV Valve - removed per recon					
1	EB-1 - Electric Bell - adjusted per recon	2.00	ea	525.00	/ea	1,050
1	Tamper Switch	12.00	ea	485.00	/ea	5,820
1	Flow Switch	6.00	ea	380.00	/ea	2,280
1	2-1/2" Dry Sprinkler Pipe	220.00	lf	58.85	/lf	12,947
1	2" Dry Sprinkler Pipe	190.00	lf	48.45	/lf	9,206
1	1-1/2" Dry Sprinkler Pipe	120.00	lf	42.10	/lf	5,052
1	1-1/4" Dry Sprinkler Pipe	310.00	lf	37.65	/lf	11,672
1	Misc. Valves, Tags & Fittings	1.00	ls	42,415.00	/ls	42,415
1	Hoisting & Rigging / Floor Loading	1.00	ls	25,000.00	/ls	25,000

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	FIRE SUPRESSION			***8.122/sf***		***1,340,368***
	165,035.00 sf					
22-0000.000	***PLUMBING***					
	Gas Piping					
1	Gas Piping, Devices and Equipment - Excluded					
1	Kitchen Plumbing Connections					
1	3-Compartment Sink - C&HW & Indirect Waste Connection Only	1.00	ea	1,210.00	/ea	1,210
1	Hose Reel CW/HW Connections Only	2.00	ea	880.00	/ea	1,760
1	Convection Steamer CW Connection	1.00	ea	650.00	/ea	650
1	Forty-Gallon Tilting Braining Pan	1.00	ea	420.00	/ea	420
1	Double Oven	1.00	ea	1,200.00	/ea	1,200
1	Cooks Table w/ Sink - Connection Only	1.00	ea	880.00	/ea	880
1	Walk-in Cooler Indirect Waste Connection	1.00	ea	450.00	/ea	450
1	Plumbing Fixtures					
1	P-1 - Water Closet (Wall Hung)	34.00	ea	1,325.00	/ea	45,050
1	P-1A - ADA Water Closet (Wall Hung)	40.00	ea	1,400.00	/ea	56,000
1	P-1B - ADA Water Closet (Wall Hung)	12.00	ea	1,400.00	/ea	16,800
1	P-2 - Urinal	1.00	ea	1,380.00	/ea	1,380
1	P-2A - Urinal	7.00	ea	1,550.00	/ea	10,850
1	P-3A - ADA Lavatory (Wall Hung)	64.00	ea	1,620.00	/ea	103,680
1	P-3B - ADA Lavatory (Wall Hung)	12.00	ea	1,620.00	/ea	19,440
1	P-5 - Sink w/ Integral Bubbler / Faucet (Recessed)	52.00	ea	2,100.00	/ea	109,200
1	P-5A - ADA Sink w/ Integral Bubbler / Faucet (Recessed)	80.00	ea	1,100.00	/ea	88,000
1	P-6 - Water Cooler / Bottle Fill	7.00	ea	2,280.00	/ea	15,960
1	P-7 - Mop Sink	7.00	ea	1,550.00	/ea	10,850
1	P-8A - Art Room SinkFaucet / Drain (Sink By Others) Solid InterceptorArt Room Sink	2.00	ea	1,900.00	/ea	3,800
1	Emergency Shower / Eyewash Station (Kitchen)	2.00	ea	3,650.00	/ea	7,300
1	Wall Carrier	170.00	ea	565.00	/ea	96,050
1	Domestic Water Distribution					
1	6" Domestic Water Pipe - Mains	45.00	lf	92.20	/lf	4,149
1	4" Domestic Water Pipe - Mains	220.00	lf	78.80	/lf	17,336
1	3" Domestic Water Pipe - Mains	190.00	lf	68.45	/lf	13,006
1	2-1/2" Domestic Water Pipe - Mains	180.00	lf	52.20	/lf	9,396
1	2" Domestic Water Pipe - Mains	1,880.00	lf	46.40	/lf	87,232
1	1-1/2" Domestic Water Pipe - Mains	890.00	lf	39.85	/lf	35,467
1	1-1/4" Domestic Water Pipe - Mains	290.00	lf	35.25	/lf	10,223
1	1" Domestic Water Pipe - Mains	1,260.00	lf	33.30	/lf	41,958
1	3/4" Domestic Water Pipe - Branch	2,220.00	lf	31.20	/lf	69,264
1	1/2" Domestic Water Pipe - Branch (Type "L" Cu.)	9,980.00	lf	29.60	/lf	295,408
1	Misc. Valves,Tags & Fittings	1.00	ls	144,822.13	/ls	144,822
1	Pipe Insulation - (1/2" - 1-1/4")	13,750.00	lf	9.90	/lf	136,125
1	Pipe Insulation - (1-1/2" - 4")	3,360.00	lf	23.50	/lf	78,960
1	Sanitary Waste & Vent Piping (Under Ground)					
1	6" Sanitary Waste & Vent Pipe (U)	260.00	lf	66.60	/lf	17,316
1	Storm Drainage Piping					
1	RD-1 - 15" Round Roof Drain / 6" Hub	45.00	ea	1,385.00	/ea	62,325
1	OD-1 - 15" Round Roof Overflow Drain / 6" Hub	45.00	ea	1,385.00	/ea	62,325

Item	Description	Takeoff Qty		Total Unit Cost	Amount
	DN-1 - Downspout Outlet	16.00	ea	950.00 /ea	15,200
1	12" Storm Pipe (U)	245.00	lf	92.45 /lf	22,650
1	10" Storm Pipe (U)	420.00	lf	86.25 /lf	36,225
1	8" Storm Pipe (U)	440.00	lf	73.55 /lf	32,362
1	8" Storm Pipe (A)	120.00	lf	82.40 /lf	9,888
1	6" Storm Pipe (U)	480.00	lf	64.10 /lf	30,768
1	6" Storm Pipe (A)	1,990.00	lf	72.15 /lf	143,579
1	4" Storm Pipe (U)	210.00	lf	50.50 /lf	10,605
1	Disposer - CW & Waste Connection Only	1.00	ea	880.00 /ea	880
1	Fill Faucet - HW Connection Only	2.00	ea	585.00 /ea	1,170
1	Freezer Indirect Waste Connection	1.00	ea	250.00 /ea	250
1	Hand Sink - Connection Only	4.00	ea	625.00 /ea	2,500
1	Hand Sprayer - C&HW Connection Only	2.00	ea	950.00 /ea	1,900
1	Hot Food Well - H&CW & Indirect Waste Connection	10.00	ea	600.00 /ea	6,000
1	Cold Food Well - H&CW & Indirect Waste Connection	4.00	ea	600.00 /ea	2,400
1	Prep Table w/ Double Sink - Connection Only	1.00	ea	650.00 /ea	650
1	Steamer Unit, CW & Indirect Waste Connection	1.00	ea	950.00 /ea	950
1	Domestic Water Equipment				
1	BFP-1 - 4" Backflow Preventer	1.00	ea	7,250.00 /ea	7,250
1	1-1/2" RPBP - Reverse Backflow Preventer	1.00	ea	1,400.00 /ea	1,400
1	TM-1 - Thermostatic Mixing Valve	1.00	ea	12,000.00 /ea	12,000
1	TM-2 - Thermostatic Mixing Valve	1.00	ea	12,000.00 /ea	12,000
1	RP-1 - In-Line Recirc Pump (16 GPM / 1/4 HP)	1.00	ea	1,650.00 /ea	1,650
1	RP-2 - In-Line Recirc Pump (5 GPM / 1/8 HP)	1.00	ea	1,650.00 /ea	1,650
1	HB - Hose Bib	18.00	ea	390.00 /ea	7,020
1	FPHB - Frostproof Hose Bib	22.00	ea	480.00 /ea	10,560
1	EWH-1 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00 /ea	32,650
1	EWH-2 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00 /ea	32,650
1	EWH-3 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00 /ea	32,650
1	ETP-1 - Expansion Tank	1.00	ea	4,800.00 /ea	4,800
1	ETP-2 - Expansion Tank	1.00	ea	4,800.00 /ea	4,800
1	ETP-3 - Expansion Tank	1.00	ea	4,800.00 /ea	4,800
1	Elevator Sump Pump / Oil Separator	1.00	ea	4,800.00 /ea	4,800
1	SM-1 - 4" Domestic Water Meter	1.00	ea	4,800.00 /ea	4,800
1	SM-2,3 - 2-1/2" Domestic Water Meter	2.00	ea	2,850.00 /ea	5,700
1	SM-4 - 1-1/2" Irrigation Water Meter	1.00	ea	2,400.00 /ea	2,400
1	Washing Machine Valve Box and Connection	1.00	ea	880.00 /ea	880
1	Water Filter Assembly (FBO) 3/4" CW Connection	2.00	ea	245.00 /ea	490
1	4" Water Meter	1.00	ea	9,625.00 /ea	9,625
1	4" Sanitary Waste & Vent Pipe (U)	1,690.00	lf	58.85 /lf	99,457
1	4" Kitchen Waste & Vent Pipe (U)	300.00	lf	58.85 /lf	17,655
1	3" Sanitary Waste & Vent Pipe (U)	330.00	lf	49.75 /lf	16,418
1	2" Kitchen Waste & Vent Pipe (U)	160.00	lf	36.60 /lf	5,856
1	Cleanout	29.00	ea	395.00 /ea	11,455
1	Sanitary Waste & Vent Piping (Above Ground)				
1	4" Sanitary Waste & Vent Pipe (A)	1,840.00	lf	58.85 /lf	108,284
1	3" Sanitary Waste & Vent Pipe (A)	820.00	lf	49.75 /lf	40,795
1	2" Sanitary Waste & Vent Pipe (A)	5,640.00	lf	36.60 /lf	206,424
1	1-1/2" Sanitary Waste & Vent Pipe (A)	3,930.00	lf	28.80 /lf	113,184
1	4" Kitchen Waste & Vent Pipe (A)	420.00	lf	46.80 /lf	19,656
1	2" Kitchen Waste & Vent Pipe (A)	810.00	lf	29.60 /lf	23,976
1	1-1/2" Kitchen Waste & Vent Pipe (A)	480.00	lf	28.80 /lf	13,824
1	Floor / Wall Cleanout	16.00	ea	425.00 /ea	6,800
1	Sanitary and Vent Equipment				
1	GI-1 - Grease Interceptor - Exterior				
1	Recessed Grease Interceptor 150 Lbs. / 75 Gallon)	2.00	ls	5,110.00 /ls	10,220
1	FS-1 - Floor Sink	16.00	ea	1,290.00 /ea	20,640

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	FD1- 2" Floor Drain	20.00	ea	440.00	/ea	8,800
1	FD2- 3" Floor Drain	15.00	ea	545.00	/ea	8,175
1	Trap Primer	52.00	ea	885.00	/ea	46,020
1	4" Storm Pipe (A)	480.00	lf	58.85	/lf	28,248
1	Drain Pipe Insulation	1,800.00	lf	21.75	/lf	39,150
1	Water Softener System - added per recon	1.00	ea	15,000.00	/ea	15,000
1	Radon Mitigation System					
1	Radon In-Line Exhaust Fan	14.00	ea	850.00	/ea	11,900
1	4" PVC (Sched 40) - Perforated Pipe	3,830.00	lf	38.80	/lf	148,604
1	4" PVC (Sched 40) - Risers	660.00	lf	38.80	/lf	25,608
1	Crushed Stone					
1	Labeling	1.00	ls	800.00	/ls	800
1	Fireproof Roof Seal / Boot	16.00	ea	240.00	/ea	3,840
1	Plumbing General Conditions					
1	Testing & Disinfection	1.00	ls	18,000.00	/ls	18,000
1	Coordination & Management	1.00	ls	80,000.00	/ls	80,000
1	Commissioning	1.00	ls	45,000.00	/ls	45,000
1	Plumbing Premium Time	1.00	ls	35,000.00	/ls	35,000
1	Permits and fees ($10/$1,000) - Waived					
1	Coordination Drawings / BIM	1.00	ls	75,000.00	/ls	75,000
1	Seismic Restraints / Bracing	1.00	ls	18,000.00	/ls	18,000
1	Coring & Patching / Firestopping	1.00	ls	15,000.00	/ls	15,000
1	Hoisting & Rigging / Floor Loading	1.00	ls	15,000.00	/ls	15,000
1	Equipment start up and inspection	1.00	ls	25,000.00	/ls	25,000
1	Access Panels - Furnish Only	1.00	ls	10,000.00	/ls	10,000
	PLUMBING			***21.666/sf***		***3,575,580***
	165,035.00 sf					

23-0000.000 HVAC

	Chilled Water Systems					
1	ASHP-1 - Air Source Heat Pump Chiller (223 Tons)	1.00	ls	758,200.00	/ls	758,200
1	HVAC Air Distribution					
1	Ductwork Galvanized	162,343.00	lbs	18.50	/lbs	3,003,346
1	Phenolic Ductwork - Roof Mounted	6,200.00	lbs	28.50	/lbs	176,700
1	Kitchen Grease Duct	1.00	ls	131,225.00	/ls	131,225
1	Kitchen Dishwasher Aluminum Duct	1.00	ls	18,000.00	/ls	18,000
1	Displacement Diffuser	182.00	ea	465.00	/ea	84,630
1	RGD's - adjusted per Recon	356.00	sf	215.00	/sf	76,540
1	Constant Volume Damper	8.00	ea	650.00	/ea	5,200
1	Misc. Ductwork Accessories - Volume Dampers, Fire Dampers, Volume Dampers etc.	165,000.00	sf	0.45	/sf	74,250
1	Refrigerant Piping (Includes Hangers & Supports)					
1	Refrigerant Piping -	1,965.00	lf	42.65	/lf	83,807
1	Misc. Valves, Tags & Fittings	1.00	ls	8,380.73	/ls	8,381
1	Condensate Piping					
1	Condensate Drain Pipe (Type "L" Cu.)	580.00	lf	28.50	/lf	16,530
1	Hydronic Piping & Pumps (Includes Hangers & Supports)					
1	Hydronic CW/HW Piping - Mains (Blk Stl. Welded)	11,300.00	lf	71.65	/lf	809,645

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	Hydronic CW/HW Piping - Branch (Type "L" Cu.)	17,500.00	lf	38.85	/lf	679,875
1	6-Way Hydronic Control Valve	156.00	ea	490.00	/ea	76,440
1	BP-1 - ECOCIRC Pump (165 GPM)	1.00	ea	12,500.00	/ea	12,500
1	CP-1 - Condensate Pump (5 GPH)	13.00	ea	625.00	/ea	8,125
1	P-1 - Heat Pump Heating Hot Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
1	Heating & Cooling Terminal Equipment					
1	CUH-01 - thru CUH-14 - HW Cabinet Unit Heater	14.00	ea	2,850.00	/ea	39,900
1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [18 MBH]	3.00	ea	3,625.00	/ea	10,875
1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [54 MBH]	2.00	ea	9,720.00	/ea	19,440
1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [9 MBH]	6.00	ea	1,620.00	/ea	9,720
1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [36 MBH]	2.00	ea	6,480.00	/ea	12,960
1	DCUe - Ductless Cooling Unit (Condenser Unit) [18 MBH]	3.00	ea	2,340.00	/ea	7,020
1	DCUe - Ductless Cooling Unit (Condenser Unit) [54 MBH]	2.00	ea	7,020.00	/ea	14,040
1	DCUe - Ductless Cooling Unit (Condenser Unit) [9 MBH]	6.00	ea	1,170.00	/ea	7,020
1	Testing & Balancing					
1	Testing & balancing	165,000.00	sf	0.75	/sf	123,750
1	HVAC General Requirements					
1	Commissioning Support	1.00	ls	45,000.00	/ls	45,000
1	Coordination & Management	1.00	ls	200,580.00	/ls	200,580
1	HVAC Premium Time	1.00	ls	35,000.00	/ls	35,000
1	Permits and fees ($10/$1,000) - Waived					
1	Coordination / BIM	1.00	ls	80,000.00	/ls	80,000
1	Seismic restraints / bracing	1.00	ls	38,000.00	/ls	38,000
1	Coring & patching / firestopping	1.00	ls	20,000.00	/ls	20,000
1	Hoisting & rigging / floor loading	1.00	ls	100,000.000	/ls	100,000
1	Equipment start up and inspection	1.00	ls	25,000.00	/ls	25,000
1	ASHP-2 - Air Source Heat Pump Chiller (223 Tons)	1.00	ls	758,200.00	/ls	758,200
1	P-2 - Heat Pump Heating Hot Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
1	P-3 - Heat Pump Chilled Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
1	P-4 - Heat Pump Chilled Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
1	P-5 - Building Hot Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
1	P-6 - Building Hot Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
1	Heating Generating Equipment					
1	EB-1 - Electric Hot Water Boiler (1,633 MBH)	1.00	ea	65,000.00	/ea	65,000
1	HX-1 - Plate & Frame Heat Exchanger	1.00	ea	24,550.00	/ea	24,550
1	AS-1 - Air Separator	1.00	ea	6,500.00	/ea	6,500
1	AS-3 - Air Separator	1.00	ea	6,500.00	/ea	6,500
1	BT-1 - Heating Hot Water Buffer Tank (700 Gallon)	1.00	ea	14,000.00	/ea	14,000
1	BT-2 - Heating Hot Water Buffer Tank (700 Gallon)	1.00	ea	14,000.00	/ea	14,000
1	CSF-1 - Chemical Shot Feeder	1.00	ea	3,200.00	/ea	3,200
1	ET-1 - Heating Hot Water Expansion Tank	1.00	ea	6,800.00	/ea	6,800
1	ET-2 - Heating Hot Water Expansion Tank	1.00	ea	6,800.00	/ea	6,800
1	GF-1 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900
1	GF-3 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	25% Glycol System Fill (Heating)	1.00	ls	15,000.00	/ls	15,000
1	HX-2 - Plate & Frame Heat Exchanger	1.00	ea	24,550.00	/ea	24,550
1	AS-2 - Air Separator	1.00	ea	9,500.00	/ea	9,500
1	AS-4 - Air Separator	1.00	ea	9,500.00	/ea	9,500
1	BT-3 - Chilled Water Buffer Tank (1040Gallon)	1.00	ea	20,000.00	/ea	20,000
1	BT-4 - Chilled Water Buffer Tank (1040Gallon)	1.00	ea	20,000.00	/ea	20,000
1	CSF-2 - Chemical Shot Feeder	1.00	ea	3,200.00	/ea	3,200
1	CSF-4 - Chemical Shot Feeder	1.00	ea	3,200.00	/ea	3,200
1	ET-3 - Chilled Water Expansion Tank	1.00	ea	6,800.00	/ea	6,800
1	ET-4 - Chilled Water Expansion Tank	1.00	ea	6,800.00	/ea	6,800
1	GF-2 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900
1	GF-4 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900
1	P-7 - Building Chilled Water Pump (600 GPM / 20 HP)	1.00	ea	16,150.00	/ea	16,150
1	P-8 - Building Chilled Water Pump (600 GPM / 20 HP)	1.00	ea	16,150.00	/ea	16,150
1	P-9 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00	/ea	14,850
1	P-10 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00	/ea	14,850
1	P-11 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00	/ea	14,850
1	P-12 - CCHW Water Pump (340 GPM / 10 HP)	1.00	ea	13,365.00	/ea	13,365
1	P-13 - CCHW Water Pump (340 GPM / 10 HP)	1.00	ea	13,365.00	/ea	13,365
1	VFD-1 thru 13 - Variable Frequency Drive	13.00	ea	2,400.00	/ea	31,200
1	25% Glycol System Fill (Cooling)	1.00	ea	15,000.00	/ea	15,000
1	Pump Housekeeping Pads	13.00	ea	1,100.00	/ea	14,300
1	Insulation					
1	Duct wrap insulation	121,757.00	sf	5.75	/sf	700,103
1	Duct Liner	1.00	ls	25,000.00	/ls	25,000
1	Grease Duct Fire Wrap	3,000.00	sf	14.85	/sf	44,550
1	Hydronic Pipe Insulation - Mains	11,300.00	lf	16.00	/lf	180,800
1	Hydronic Pipe Insulation - Branch	17,500.00	lf	10.20	/lf	178,500
1	Condensate Pipe Insulation	580.00	lf	9.45	/lf	5,481
1	Refrigerant Pipe Insulation	1,965.00	lf	8.25	/lf	16,211
1	Exhaust Fans					
1	EF-1 - Receiving Exhaust Fan (600 Cfm)	1.00	ea	1,650.00	/ea	1,650
1	EF-2 - Toilet Exhaust Fan - Roof Mounted (2,040 Cfm)	1.00	ea	6,050.00	/ea	6,050
1	EF-3 - Toilet Exhaust Fan - Roof Mounted (2,220 Cfm)	1.00	ea	6,050.00	/ea	6,050
1	EF-4 - Art Room Exhaust Fan - Roof Mounted (450 Cfm)	1.00	ea	1,462.50	/ea	1,463
1	BF-5 / BF-6 - Kitchen / Laundry Exhaust	2.00	ea	10,250.00	/ea	20,500
1	KEF-1 - Kitchen Exhaust (6,800 Cfm)	1.00	ea	12,250.00	/ea	12,250
1	PEV-1 - Penthouse Elevator Vent	1.00	ea	1,800.00	/ea	1,800
1	Central Air Handling Equipment					
1	RTU-1 - Custom Air Handler Unit (CW/HW Coils - 16,200 Cfm)	1.00	ea	396,900.00	/ea	396,900
1	RTU-2 - Custom Air Handler Unit (CW/HW Coils -15,300 Cfm)	1.00	ea	374,850.00	/ea	374,850
1	RTU-3 - Custom Air Handler Unit (CW/HW Coils - 10,300 Cfm)	1.00	ea	252,350.00	/ea	252,350
1	RTU-4 - Custom Air Handler Unit (CW/HW Coils - 12,000 Cfm)	1.00	ea	294,000.00	/ea	294,000
1	RTU-5 - Custom Air Handler Unit (CW/HW Coils - 7,150 Cfm)	1.00	ea	175,175.00	/ea	175,175
1	RTU-6 - Custom Air Handler Unit (CW/HW Coils - 2,250 Cfm)	1.00	ea	55,125.00	/ea	55,125
1	RTU-7 - Custom Air Handler Unit (CW/HW Coils - 1,100 Cfm)	1.00	ea	26,950.00	/ea	26,950
1	RTU-8 - Custom Air Handler Unit (CW/HW Coils - 1,900 Cfm)	1.00	ea	46,550.00	/ea	46,550

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
	RTU-9 - Custom Air Handler Unit (CW/HW Coils - 3,300 Cfm)	1.00	ea	80,850.00	/ea	80,850
1	MAU-1 - Make-up Air Unit (CW/HW Coils - 4,400 Cfm)	1.00	ls	96,800.00	/ls	96,800
1	Roof Curbs and Dunnage	10.00	ea	5,500.00	/ea	55,000
1	Sound Attenuation	19.00	ea	5,250.00	/ea	99,750
1	DCUe - Ductless Cooling Unit (Condenser Unit) [36 MBH]	2.00	ea	4,680.00	/ea	9,360
1	FCU-1-1 - thru FCU-1-6 - Fan Coil	6.00	ea	3,200.00	/ea	19,200
1	RP-1 - HW Radiant Ceiling Panel - 24" - adjusted per recon	4,815.00	lf	165.00	/lf	794,475
1	UH-01 - thru UH-05 - Unit Heater	5.00	ea	2,150.00	/ea	10,750
1	CUH-01 - thru CUH-14 - Unit Heater	14.00	ea	2,885.00	/ea	40,390
1	VAV - Variable Air Volume Box	168.00	ea	1,685.00	/ea	283,080
1	WRU-1 - Wall Radiation Unit (Runtal)	16.00	ea	3,185.00	/ea	50,960
1	Access panels - furnish only	1.00	ls	5,000.00	/ls	5,000
20	Building Management System					
20	Building Management System	165,000.00	sf	8.15	/sf	1,344,750
	HVAC			***83.772/sf***		***13,825,376***
	165,035.00 sf					
26-0000.000	***ELECTRICAL***					
	Normal Power and Distribution					
2	Switchboard MSB 2500/2500A MCB 277/480v 3-section	1.00	ea	180,000.00	/ea	180,000
2	Switchboard MSB2 2500/2500A MCB 277/480v 3-section	1.00	ea	180,000.00	/ea	180,000
2	Check metering modules	1.00	ea	20,000.00	/ea	20,000
2	-Panel EV 600A MLO 120/208v 60p	1.00	ea	14,400.00	/ea	14,400
2	-Panel KHP 400A MLO 277/480v 42p	1.00	ea	5,289.57	/ea	5,290
2	-Panel KPP 250A MLO 120/208v 60p	1.00	ea	4,601.50	/ea	4,602
2	-Panel LP1A 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	-Panel LP1B 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	-Panel LP2A 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	-Panel LP2B 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	-Panel LP2B2 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	Panel LP3A 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	Panel LP3B 100A MLO 277/480v 30p	1.00	ea	3,525.16	/ea	3,525
2	Panel MHP2B 400A MLO 277/480v 42p	1.00	ea	5,289.57	/ea	5,290
2	Theater Lighting					
2	Theater lighting & dimming equipment , included in equipment section	1.00	ls			
2	Theater lighting system circuits & installation	1.00	allw	25,000.00	/allw	25,000
2						
2	Device Branch					
2	20A 125V 3W Single receptacle, box & plate	128.00	ea	111.695	/ea	14,297
2	20A 125V Duplex receptacle, box & plate	280.00	ea	99.053	/ea	27,735
2	20A 125V Duplex GFCI receptacle, box & plate	149.00	ea	116.766	/ea	17,398
2	20A 125V Duplex GFCI receptacle, box & WP plate	10.00	ea	123.65	/ea	1,237

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
2	20A 125V Controlled duplex receptacle, box & plate	587.00	ea	99.053 /ea	58,144
2	(2) 20A 125V Duplex controlled receptacle, box & plate	242.00	ea	144.995 /ea	35,089
2	(2) 20A 125V Duplex receptacle, box & plate	38.00	ea	145.006 /ea	5,510
2	15-50R 250V 4W Kiln receptacle, box & plate	2.00	ea	240.105 /ea	480
2	PT** Poke thru w/ branch circuits & raceways 1	8.00	ea	3,012.69 /ea	24,102
2	[FB1] 8 Gang floor box w/ branch & Telcom raceways	6.00	ea	1,842.11 /ea	11,053
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate	24.00	ea	149.552 /ea	3,589
2	[ADO] Automatic door operator & connection	12.00	ea	591.647 /ea	7,100
2	[PP] Door push plate & circuit	24.00	ea	427.758 /ea	10,266
2	20A Cord reel w/ 25' cable	6.00	ea	1,390.693 /ea	8,344
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate IDF closet	24.00	ea	149.552 /ea	3,589
2	-Panel MHP2B2 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	Panel MHP3A 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	Panel MHP3B 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	-Panel MP1A 250A MLO 120/208v 60p REVISED	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP1B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP2A2 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP2B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP2B2 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP2A3 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP3B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel OLP 100A MLO 277/480v 30p	1.00	ea	3,323.56 /ea	3,324
2	-Panel PP1A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,442.95 /ea	4,443
2	-Panel PP1B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP3B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel PP2A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2A2 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel PP2B2 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2A3 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Electrical Demolition				
2	Panel PP3A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel TEP1B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,442.95 /ea	4,443
2	-Panel TEP2B 100A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	2,913.29 /ea	2,913
2	-Panel TEPA2 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,339.32 /ea	3,339
2	T-5 45KVA K-13 Transformer 480-120/208v	9.00	ea	11,122.76 /ea	100,105
2	T-6 75KVA K-13 Transformer 480-120/208v	7.00	ea	14,402.76 /ea	100,819
2	T-9 225KVA K-13 Transformer 480-120/208v	1.00	ea	26,212.16 /ea	26,212
2	100A Disc 600v 3p Fused	2.00	ea	863.93 /ea	1,728
2	30KVA UPS MDF Room	1.00	ea	39,463.72 /ea	39,464
2					
2	Lightning and Power Specialties				
2	Building & service grounding	1.00	ls	30,000.00 /ls	30,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
2	Lighting protection	1.00	ls	125,000.00 /ls	125,000
2	Disconnect , cut & make safe electric service in footprint of new building	1.00	ls	20,000.00 /ls	20,000
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate MDF racks	24.00	ea	149.552 /ea	3,589
2	30A 250/600V DSN SW NON-FUS - NEMA 1	2.00	ea	408.80 /ea	818
2	Auto flush/faucet valve connection	110.00	ea	213.559 /ea	23,492
2	Basketball backstop receptacle & connection	6.00	ea	1,162.413 /ea	6,974
2	Bleacher driver motor connection	2.00	ea	413.71 /ea	827
2	Shot clock & scoreboard connection	2.00	ea	1,530.74 /ea	3,061
2	Emergency pull switch & light	3.00	ea	947.857 /ea	2,844
2	Hand Dryer connection	43.00	ea	198.924 /ea	8,554
2	Motorized shade connection	18.00	ls	229.154 /ls	4,125
2	Motorized shade control connection	7.00	ea	325.210 /ea	2,276
2	Movable partition motor 30A 208v onnection	3.00	ea	1,100.00 /ea	3,300
2	Overhead coiling door operator connection	3.00	ea	709.413 /ea	2,128
2	3/4" - EMT 3#12	1,600.00	lf	16.034 /lf	25,654
2	3/4" - EMT 5#12	700.00	lf	14.02 /lf	9,814
2	3/4" - EMT 7#12	4,600.00	lf	15.126 /lf	69,581
2	3/4" - EMT 3#10	500.00	lf	16.014 /lf	8,007
2	3/4" - EMT 7#10	5,250.00	lf	16.93 /lf	88,883
2	#10/3C MC Cable	2,400.00	lf	5.399 /lf	12,957
2	#12/2C MC Cable	18,720.00	lf	4.084 /lf	76,447
2	#12/3C MC Cable	32,000.00	lf	5.202 /lf	166,467
2	60A 4w Feeder EMT copper	75.00	lf	27.808 /lf	2,086
2	Gymnasium circuit 3/4" - EMT 4#12	586.00	lf	12.612 /lf	7,391
2	Backstop circuits 3/4" - EMT 5#12	803.00	lf	13.615 /lf	10,933
2	3/4" - EMT 5#12 IDF closet circuits	250.00	lf	17.812 /lf	4,453
2	100A 3w Feeder EMT copper	2,000.00	lf	48.275 /lf	96,550
2	100A 4w Feeder EMT copper	2,300.00	lf	54.65 /lf	125,695
2	125A 3w Feeder EMT copper	1,500.00	lf	37.353 /lf	56,029
2	150A 3w Feeder EMT copper	1,100.00	lf	31.852 /lf	35,037
2	150A 4w Feeder EMT copper	60.00	lf	47.104 /lf	2,826
2	225A 4w Feeder EMT copper	400.00	lf	82.534 /lf	33,013
2	250A 4w Feeder EMT copper	100.00	lf	98.323 /lf	9,832
2	400A 3w Feeder EMT copper	61.00	lf	145.326 /lf	8,865
2	400A 4w Feeder EMT copper	1,700.00	ea	149.41 /ea	253,997
2	Feeder Pri/sec 45KVA 3PH Transformer	9.00	ea	1,331.84 /ea	11,987
2	Feeder Pri/sec 75KVA 3PH Transformer	7.00	ea	1,860.08 /ea	13,021
2	Feeder Pri/sec 225KVA 3PH Transformer	1.00	ea	8,610.60 /ea	8,611
2	4" & 2" Empty raceways for future PV system	200.00	lf	75.00 /lf	15,000
2	PV Systems Based on 500kw - Future Design				
2	Machine and Equipment Power				
2	ASHP-1 Air source heat pump 600a 480v connection	1.00	ea	4,473.96 /ea	4,474
2	ASHP-2 Air source heat pump 600A 480v connection	1.00	ea	4,473.96 /ea	4,474
2	BP-1 Boiler circ pump 20A 208v connection	1.00	ea	1,568.19 /ea	1,568
2	CUH-1**14 Hot water cabinet unit heaters 20A 120v connection	14.00	ea	730.606 /ea	10,228
2	DCUc-1 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-10 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-11 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-12 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-13 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-2 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-3A Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-3B Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-4 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-5 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
2	DCUc-6 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-7 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-8 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-9 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUe/-4 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe/-6 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-1 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-10 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-11 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-12 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-13 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-2 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-3A Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-3B Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-5 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-7 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-8 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-9 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	EB-1 Electric boiler 800A 480v connection	1.00	ea	5,564.55 /ea	5,565
2	EB-2 Electric boiler 800A 480v connection	1.00	ea	5,564.55 /ea	5,565
2	EF-1 Exhaust fan 20A 480v connection	1.00	ea	957.00 /ea	957
2	EF-2 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EF-3 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EF-4 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EWH-1 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	EWH-2 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	EWH-3 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	FCU-1**6 Fan coil units 20A 208v 2p connection	6.00	ea	780.47 /ea	4,683
2	KEF-1 Kitchen hood fan 30A 480v connection	1.00	ea	1,389.94 /ea	1,390
2	MAU-1 Make up air 20A 480v connection	1.00	ea	1,180.71 /ea	1,181
2	MV-1 Mixing valve 20A 10v connection	1.00	ea	325.00 /ea	325
2	MV-2 Mixing valve 20A 10v connection	1.00	ea	325.00 /ea	325
2	OMP-1 Oil monitoring panel 20A 120v connection	1.00	ea	425.00 /ea	425
2	P-1 HP-HHW Heating hot water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-10 -CCHW Condenser water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-12 Water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-13 Water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-2 HP-HHW Heating hot water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-3 HP-CHW Chilled water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-4 HP-CHW Chilled water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-5 BLDG HHW-Heating hot water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-7 BLDG-CHW Chilled water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-8 BLDG-CHW Chilled water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-9 -CCHW Condenser water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	RP-1 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RP-2 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RP-3 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RTU-1 Roof top unit 100A 480v connection	1.00	ea	3,052.74 /ea	3,053
2	RTU-2 Roof top unit 100A 480v connection	1.00	ea	3,052.74 /ea	3,053
2	RTU-3 Roof top unit 60A 480v connection	1.00	ea	2,126.77 /ea	2,127
2	RTU-4 Roof top unit 80A 480v connection	1.00	ea	2,647.71 /ea	2,648
2	RTU-5 Roof top unit 40A480v connection	1.00	ea	1,995.09 /ea	1,995

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	RTU-6 Roof top unit 20A 480v connection	1.00	ea	1,478.49 /ea	1,478
2	RTU-7 Roof top unit 20A 480v connection	1.00	ea	1,345.38 /ea	1,345
2	RTU-8 Roof top unit 20A 480v connection	1.00	ea	1,345.38 /ea	1,345
2	RTU-9 Roof top unit 20A 480v connection	1.00	ea	1,343.31 /ea	1,343
2	SM-1**4 Water sub metering 20A 120v connection	4.00	ea	325.00 /ea	1,300
2	SP-1 Elevator sump pump 20A 208v 2p connection	1.00	ea	375.00 /ea	375
2	SPCP-1 Elevator sump pump control panel 20A 120v connection	1.00	ea	425.00 /ea	425
2	UH-1**5 Hot water unit heaters 20A 120v connection	5.00	ea	564.450 /ea	2,822
2	VAV-** Variable air volume 20A 120v connection (96)	160.00	ea	429.60 /ea	68,736
2	Radon venting j-box & circuit	24.00	ea	1,040.00 /ea	24,960
2	3/4" - EMT 3#12	2,400.00	lf	11.42 /lf	27,408
2	3/4" - EMT 4#12	1,775.00	lf	11.736 /lf	20,831
2	3/4" - EMT 5#12	1,000.00	lf	13.429 /lf	13,429
2	3/4" - EMT 3#10	2,200.00	lf	12.42 /lf	27,324
2	3/4" - EMT 4#10	1,000.00	lf	13.888 /lf	13,888
2	3/4" - EMT 5#10	500.00	lf	14.623 /lf	7,311
2	1" EMT - 4 # 8	550.00	lf	17.587 /lf	9,673
2	60A Feeder EMT copper EMT	155.00	ea	27.578 /ea	4,275
2	100A Feeder EMT copper	465.00	lf	53.562 /lf	24,906
2	600A 4w Feeder EMT copper	240.00	lf	284.573 /lf	68,297
2	800A Feeder EMT copper	240.00	lf	449.157 /lf	107,798
2	#12/3C MC Cable	5,500.00	lf	5.056 /lf	27,808
2	Emergency Power and Distribution				
2	600KW Diesel genset , weather proof enclosure w/200KW load bank	1.00	ea	650,000.00 /ea	650,000
2	100A 4p 480v Generator quick connect switch				
2	100A 4p 480v Generator quick connect switch				
2	ATS-LS 200A 4' ISO bypass transfer switch 277/480v				
2	ATS-OS 1000A 4p 277/480v transfer switch	1.00	ea	3,321.85 /ea	3,322
2	-Dist. Panel NEDP 1000A MLO 277/480v	1.00	ea	26,440.46 /ea	26,440
2	Panel EHP3B 400A MLO 277/480v 42p	1.00	ea	5,075.53 /ea	5,076
2	-Panel ELP1A 100A MLO 277/480v 42p	1.00	ea	3,809.34 /ea	3,809
2	-Panel ELP2A 100A MLO 277/480v 42p	1.00	ea	3,809.34 /ea	3,809
2	-Panel ELP2B 100A MLO 277/480v 42p	1.00	ea	3,809.34 /ea	3,809
2	-Panel ELP2B2 100A MLO 277/480v 42p	1.00	ea	3,809.34 /ea	3,809
2	Panel EL3B 100A MLO 277/480v 42p	1.00	ea	3,809.34 /ea	3,809
2	-Panel EP1A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,333.52 /ea	3,334
2	-Panel EP1B 100A MLO 120/208v 72p 200% Neutral	1.00	ea	3,333.52 /ea	3,334
2	-Panel EP2A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68 /ea	3,335
2	-Panel EP2B 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68 /ea	3,335
2	-Panel EP2B2 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68 /ea	3,335
2	-Panel EP3A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,333.52 /ea	3,334
2	-Panel EP3B 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68 /ea	3,335
2	T-6 75KVA K-13 Transformer 480-120/208v	2.00	ea	14,402.68 /ea	28,805
2	# 3 MI cable feeder	1,350.00	ea	85.00 /ea	114,750
2	100A 4w Feeder EMT copper	1,000.00	ea	56.45 /ea	56,450
2	125A 3w Feeder EMT copper	400.00	ea	54.15 /ea	21,660
2	225A 4w Feeder EMT copper	325.00	lf	91.90 /lf	29,868

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
2	400A 4w Feeder EMT copper	183.00	lf	204.57	/lf	37,436
2	Feeder Pri/sec 75KVA 3PH Transformer	2.00	ea	1,860.08	/ea	3,720
2	Lighting and Branch Lighting					
2	Lighting fixture budget	1.00	ls	935,000.00	/ls	935,000
2	Lighting unit prices include installations & supports					
2	Type LC1 LED 30' Flexibel tape ceiling cove	1.00	ea	1,850.00	/ea	1,850
2	Type LC1 LED 50' Flexible tape under stair tread	1.00	ea	2,362.50	/ea	2,363
2	Type LC1 LED 60' Flexible tape under stair tread	1.00	ea	2,835.00	/ea	2,835
2	Type LDC LED Flexible tape in 8' corner mounted channel	36.00	ea	378.00	/ea	13,608
2	Type LK22 LED 2x2 recessed food prep grade	40.00	ea	132.56	/ea	5,302
2	Type LP2 LED 4' pendant dir/ind	2.00	ea	195.75	/ea	392
2	Type LP4 LED 4' pendant dir/ind	43.00	ea	195.75	/ea	8,417
2	Type LP6 LED 6' pendant dir/ind	8.00	ea	222.75	/ea	1,782
2	Type LP8 LED 8' pendant dir/ind	315.00	ea	222.75	/ea	70,166
2	Type LPA LED 12' pendant dir/ind	1.00	ea	249.75	/ea	250
2	Type LPB LED 2' pendant dir/ind	2.00	ea	155.25	/ea	311
2	Type LPB LED 4' pendant dir/ind	1.00	ea	195.75	/ea	196
2	Type LPB LED 6' pendant dir/ind	2.00	ea	222.75	/ea	446
2	Type LPB LED 8' pendant dir/ind	1.00	ea	222.75	/ea	223
2	Type LPB LED 10' pendant dir/ind	1.00	ea	249.75	/ea	250
2	Type LPB LED 12' pendant dir/ind	3.00	ea	276.75	/ea	830
2	Type LPB LED 16' pendant dir/ind	2.00	ea	330.75	/ea	662
2	Type LPB LED 18' pendant dir/ind	1.00	ea	384.75	/ea	385
2	Type LPB LED 20' pendant dir/ind	1.00	ea	384.75	/ea	385
2	Type LPB LED 22' pendant dir/ind	1.00	ea	438.75	/ea	439
2	Type LPB LED 26' pendant dir/ind	3.00	ea	519.75	/ea	1,559
2	Type LPB LED 28' pendant dir/ind	8.00	ea	519.75	/ea	4,158
2	Type LPB LED 30 pendant dir/ind	3.00	ea	560.25	/ea	1,681
2	Type LPB LED 32' pendant dir/ind	3.00	ea	560.25	/ea	1,681
2	Type LPB LED 34' pendant dir/ind	1.00	ea	614.25	/ea	614
2	Type LPG LED Gym high bay	30.00	ea	222.75	/ea	6,683
2	Type LR2 LED 2"x2' recessed linear	80.00	ea	108.00	/ea	8,640
2	Type LR22 LED 2x2 recessed	12.00	ea	81.00	/ea	972
2	Type LR4 LED 2"x4' recessed linear	279.00	ea	108.00	/ea	30,132
2	Type LR6 LED 2"x6 recessed linear	67.00	ea	135.00	/ea	9,045
2	Type LR6T LED 2"x6 recessed linear	6.00	ea	135.00	/ea	810
2	Type LR8 LED 2"x8 recessed linear	83.00	ea	162.00	/ea	13,446
2	Type LR8T LED 2"x8 recessed linear	2.00	ea	162.00	/ea	324
2	Type LRB LED 2"x6' recessed linear wet location	46.00	ea	182.25	/ea	8,384
2	Type LRB LED 2"x10' recessed linear wet location	15.00	ea	195.75	/ea	2,936
2	Type LRA LED 2"x 12' recessed linear wet location	8.00	ea	222.75	/ea	1,782
2	Type LS2 LED 2' x 2" Utility strip	5.00	ea	87.75	/ea	439
2	Type LS4 LED 4' x 2" Utility strip	19.00	ea	121.50	/ea	2,309
2	Type LS6 LED 6' x 2" Utility strip	15.00	ea	121.50	/ea	1,823
2	Type LS8 LED 2' x 8" Utility strip	43.00	ea	148.50	/ea	6,386
2	Type LT1 LED 4' pendant dir/ind	2.00	ea	195.75	/ea	392
2	Type LT1 LED 6' pendant dir/ind	1.00	ea	222.75	/ea	223
2	Type LT1 LED 8' pendant dir/ind	15.00	ea	222.75	/ea	3,341
2	Type LT1 LED 10' pendant dir/ind	2.00	ea	249.75	/ea	500
2	Type LT1 LED 14' pendant dir/ind	1.00	ea	330.75	/ea	331
2	Type LT1 LED 16' pendant dir/ind	4.00	ea	330.75	/ea	1,323
2	Type LT1 LED 18' pendant dir/ind	1.00	ea	384.75	/ea	385
2	Type LT1 LED 20' pendant dir/ind	3.00	ea	384.75	/ea	1,154
2	Type LT1 LED 22' pendant dir/ind	2.00	ea	425.25	/ea	851
2	Type LT1 LED 24' pendant dir/ind	1.00	ea	425.25	/ea	425
2	Type LT1 LED 26' pendant dir/ind	5.00	ea	479.25	/ea	2,396
2	Type LT1 LED 28' pendant dir/ind	15.00	ea	479.25	/ea	7,189

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
?	Type LT1 LED 30' pendant dir/ind	8.00	ea	533.25 /ea	4,266
2	Type LT1 LED 32' pendant dir/ind	5.00	ea	533.25 /ea	2,666
2	Type LT1 LED 34' pendant dir/ind	1.00	ea	560.25 /ea	560
2	Type LTC LED pendant dir/ind multi drop clustrers	6.00	ea	650.00 /ea	3,900
2	Type PC1 LED architectural pendant	54.00	ea	303.75 /ea	16,403
2	Type PC2 LED architectural pendant	43.00	ea	303.75 /ea	13,061
2	Type RC1 LED 4" recessed down light	245.00	ea	135.00 /ea	33,075
2	Type RC2 LED 4" recessed down light	88.00	ea	135.00 /ea	11,880
2	Type RC3 LED 2" recessed down light	20.00	ea	121.50 /ea	2,430
2	Type RC4 LED 6" recessed down light - None Shown				
2	Type SL4 LED Single head on 12.5' pole	21.00	ea	810.00 /ea	17,010
2	Type SL7 LED Wall mount exterior flood	11.00	ea	337.50 /ea	3,713
2	Type SL8 LED 4" recessed down light exterior canopy	37.00	ea	168.75 /ea	6,244
2	Type TH1 LED theatrical spot	16.00	ea	540.00 /ea	8,640
2	Type TR1 LED 30' theatrical track /track mount adapter	2.00	ea	540.00 /ea	1,080
2	Type UC LEC 30" undercabinet	93.00	ea	135.00 /ea	12,555
2	Type X1 LED Exit edge lit single face	27.00	ea	135.00 /ea	3,645
2	Type X1W LED Exit edge lit single face wall mount	24.00	ea	135.00 /ea	3,240
2					
2	(L) Slv Wall lighting control	301.00	ea	146.886 /ea	44,213
2	(OS] Ceiling occupancy senser	459.00	ea	182.286 /ea	83,669
2	[LTS] Wall scene controller	7.00	ea	306.329 /ea	2,144
2	[OS-HB] Hi-bay Ceiling occupancy senser	22.00	ea	182.286 /ea	4,010
2	[PS] Lighting photo control	60.00	ea	195.596 /ea	11,736
2	[PS] Partition senser lighting control	2.00	ea	413.71 /ea	827
2	[R] Emergency lighting relay	22.00	ea	512.353 /ea	11,272
2	[RC] Room controller	68.00	ea	767.706 /ea	52,204
2	20A 120-277V S/P Switch , box & plate	17.00	ea	94.924 /ea	1,614
2	25' CAT 6 Lighting control cable	872.00	ea	58.509 /ea	51,020
2	Lighting control wall box	314.00	ea	69.550 /ea	21,839
2	3/4" - EMT 5#12	150.00	lf	13.387 /lf	2,008
2	3/4" - EMT 7#12	2,000.00	lf	14.698 /lf	29,397
2	3/4" - EMT 5#10	675.00	lf	14.70 /lf	9,923
2	3/4" - EMT 5#12-2#16 10vdc	2,000.00	lf	29.197 /lf	58,394
2	Luminary cable MC 12/2 & 14/2 1-10VDC	32,550.00	lf	7.548 /lf	245,674
2	Lighting controls programming	160,731.00	sf	0.15 /sf	24,110
2	3/4" - EMT 5#12 MDF Rack circuits	283.00	lf	17.073 /lf	4,832
2	Kitchen equipment connections 20A 3w allowance	1.00	ls	25,000.00 /ls	25,000
	ELECTRICAL			***36.573/sf***	***6,035,849***
	165,035.00 sf				

27-0000.000 COMMUNICATIONS

)01	Miscellaneous Systems				
001	Temporary power and lights	1.00	ls	225,000.00 /ls	225,000
001	Subcontractor general conditions	1.00	ls	350,000.00 /ls	350,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	BIM Coordination	1.00	ls	45,000.00 /ls	45,000
001	Electrical Premium Time	1.00	ls	50,000.00 /ls	50,000
001	Testing and Commissioning				
001	Testing and Commissioning	1.00	ls	50,000.00 /ls	50,000
001	Telephone and Communications Systems				
001	Telecomm wall sleeve 1" - EMT	335.00	lf	125.00 /lf	41,875
001	Telcom backbone (2) 4" EMT w/hangers	500.00	lf	118.054 /lf	59,027
001	Telcom closet ground 1/0 THHN 1" EMT	320.00	lf	18.791 /lf	6,013
001	1/4"x 4"x 3' Copper ground bar	4.00	ea	491.82 /ea	1,967
001	Telcom wall & floor sleeves 4" x 12"	33.00	ea	235.817 /ea	7,782
001	12" Wx 3" Dx 9" Spacing Alum cable tray	130.00	ea	68.912 /ea	8,959
001	12x 12x 6" BOX HNGD CVR - NEMA 3R	9.00	ea	378.387 /ea	3,405
001	MDF Closet 4-post rack,	3.00	ea	1,800.00 /ea	5,400
001	IDF racks horizontal wire management	6.00	ea	763.928 /ea	4,584
001	IDF Closet 2-post rack, 45u	3.00	ea	601.557 /ea	1,805
001	48 Port 1-RMU FO Patch panel	2.00	ea	380.43 /ea	761
001	48 Port CAT6 UTP Patch panel	32.00	ea	339.129 /ea	10,852
001	(CAM) 1-CAT 6A Devices , termination & testing	121.00	ea	84.58 /ea	10,234
001	(W) 1-CAT 6A Devices , termination & testing	130.00	ea	84.58 /ea	10,995
001	1-CAT 6A Devices , termination & testing	3.00	ea	84.58 /ea	254
001	2-CAT 6A Devices , termination & testing	70.00	ea	148.72 /ea	10,410
001	2-CAT 6A Devices , termination & testing FP location	81.00	ea	148.72 /ea	12,046
001	3-CAT 6A Devices , termination & testing	93.00	ea	216.57 /ea	20,141
001	4-CAT 6A Devices , termination & testing	3.00	ea	280.44 /ea	841
001	(WAP) 2-CAT 6A Devices , termination & testing	158.00	ea	86.638 /ea	13,689
001	CORD - 10' 1F PATCH ST>SC MM	1,150.00	ea	46.586 /ea	53,573
001	CORD - 10' PATCH CMR CAT6A BLU	100.00	ea	36.792 /ea	3,679
001	CBL - CMP CAT6A UTP BLU	225,000.00	lf	1.65 /lf	371,250
001	FO Cable 24F MM OM4 Armored	350.00	lf	7.20 /lf	2,520
001	FO Cable 24F SM OS2 Armored	350.00	lf	4.65 /lf	1,628
001	FO Terminations	288.00	ea	68.654 /ea	19,772
001	Electronic technology equipment budget	1.00	ls	585,000.00 /ls	585,000
001	AV System				
001	AV Equipment & installation	1.00	budget	350,000.00 /budget	350,000
001	AV wall sleeve (1) 1" & (1) 1-1/4" - EMT & box	208.00	ea	325.00 /ea	67,600
001	[L1] ALS Antennae backbox & wall sleeve	3.00	ea	209.277 /ea	628
001	[S1] Gymnasium speaker backbox & wall sleeve	11.00	ea	260.222 /ea	2,862
001	AV Ceiling projector location box & 1" sleeve	152.00	ea	209.715 /ea	31,877
001	Cafeteria AV 1-1/4" wall sleeve	21.00	ea	341.392 /ea	7,169
001	AV raceway rough in for classrooms	63.00	ea	500.00 /ea	31,500
001	16" Wx 4" D Wire mesh cable tray	90.00	lf	45.00 /lf	4,050
001	[SR] Classroom sound reinforcement speaker	66.00	ea	3,200.00 /ea	211,200
001	Digital signs	1.00	ls	25,000.00 /ls	25,000
001	Public Address Systems				
001	(TB) Classroom talk back 8" Ceiling speaker	62.00	ea	315.00 /ea	19,530
001	[CB] classroom call station	64.00	ea	619.172 /ea	39,627
001	Paging 8" ceiling speaker	225.00	ea	260.00 /ea	58,500
001	PA speaker w/volume control	133.00	ea	185.730 /ea	24,702
001	One way wall mounted Speaker	30.00	ea	215.13 /ea	6,454
001	One way exterior wall mounted Speaker	8.00	ea	325.00 /ea	2,600
001	Exterior wall mount speaker	1.00	ea	405.00 /ea	405
001	Gymnasium sound system raceways	660.00	lf	13.485 /lf	8,900
001	Gymnasium One way ceiling mounted box Speaker	12.00	ea	450.00 /ea	5,400
001	#18- 2P Twisted pr cable	30,000.00	lf	1.27 /lf	38,100
001	Gymnasium sound system	1.00	ls	25,000.00 /ls	25,000
001	Public address Systems equipment & installation	1.00	ls	25,000.00 /ls	25,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	Program Clock System				
001	Equipment & programming allowance	1.00	ls	20,000.00 /ls	20,000
001	12" Surface wireless clock	160.00	ea	410.00 /ea	65,600
001	16" Surface wireless clock w/wire guard	2.00	ea	600.00 /ea	1,200
001	DAS Radio Repeater System				
001	Distributed access Amplifier system	1.00	allw	250,000.00 /allw	250,000
001	Radio repeater system allowance	1.00	ls	125,000.00 /ls	125,000
001	Security Access Control &CCTV				
001	[CR] Car reader raceway, device	59.00	ea	720.130 /ea	42,488
001	Security door rough-in raceways & boxes	59.00	ea	439.905 /ea	25,954
001	[DC] Door contact	102.00	ea	124.849 /ea	12,735
001	[REX] Request to exit	58.00	ea	185.00 /ea	10,730
001	[DJ] 8x8x4 Door security junction box	58.00	ea	110.893 /ea	6,432
001	[EL] Electric door lock	58.00	ea	115.00 /ea	6,670
001	[DH] Door transfer hinge	58.00	ea	75.00 /ea	4,350
001	[KP] Digital key pad , raceway	2.00	ea	673.42 /ea	1,347
001	[LD] Local down em button	11.00	ea	388.419 /ea	4,273
001	[MO] Ceiling motion sensor & cable	60.00	ea	142.618 /ea	8,557
001	[MS] Master call station	1.00	ea	676.23 /ea	676
001	[IC] Voice intercom station	45.00	ea	489.236 /ea	22,016
001	[P] Panic call button, & raceway sleeve	16.00	ea	220.00 /ea	3,520
001	[CCTV] Ceiling mount dome camera	49.00	ea	460.00 /ea	22,540
001	[CCTV] Wall mount fixed camera	35.00	ea	460.00 /ea	16,100
001	[CCTV] Exterior wall mount camera	8.00	ea	2,480.00 /ea	19,840
001	[CCTV] Exterior wall mount 360d camera	18.00	ea	3,780.00 /ea	68,040
001	[CCTV] Exterior 270d pole mounted	1.00	ea	3,780.00 /ea	3,780
001	[CCTV] Exterior 360d pole mounted	10.00	ea	3,780.00 /ea	37,800
001	Fiber Optics to power converter w/FO termination	11.00	ea	1,015.00 /ea	11,165
001	#18- 1P Communication cable	4,000.00	lf	1.331 /lf	5,326
001	#18- 2P Communication cable	1,000.00	lf	1.708 /lf	1,708
001	#18/6C Shielded communication cable	15,000.00	lf	3.764 /lf	56,453
001	#22- 2P Communication cable	1,000.00	lf	1.601 /lf	1,601
001	#22/2C Communication cable	2,000.00	lf	1.343 /lf	2,687
001	#22/4C Communication cable	3,000.00	lf	1.471 /lf	4,412
001	Access control & CCTV head end equipment , programming & commissioning	1.00	ea	175,000.00 /ea	175,000
001	Fire Alarm System				
001	Equipment ,devices and programming	1.00	ls	135,000.00 /ls	135,000
001	F/A Addressable control panels per section	1.00	ea	4,621.72 /ea	4,622
001	F/A Radio master box	1.00	ea	866.57 /ea	867
001	F/A Remote annunciator	3.00	ea	577.713 /ea	1,733
001	F/A Mass notification local control panel	8.00	ea	577.715 /ea	4,622
001	F/A Graphic display	1.00	ea	433.28 /ea	433
001	F/A Knox box	1.00	ea	554.35 /ea	554
001	F/A Terminal cabinet	5.00	ea	577.714 /ea	2,889
001	Mass notification message board	4.00	ea	577.715 /ea	2,311
001	F/A Exterior rotating beacon	1.00	ea	774.07 /ea	774
001	F/A Pull station installed w/back box	18.00	ea	279.017 /ea	5,022
001	F/A CO detector installed w/.back box	12.00	ea	206.739 /ea	2,481
001	F/A Smoke detector installed w/back box	163.00	ea	475.823 /ea	77,559
001	F/A Smoke detector installed w/elevator relay base & back box	2.00	ea	475.825 /ea	952
001	F/A Mass notification strobe ceiling mount installed w/back box	222.00	ea	239.907 /ea	53,259
001	F/A Mass notification strobe wall mount installed w/back box	36.00	ea	266.269 /ea	9,586
001	F/A Combo Mass Notification Speaker/strobe wall mount installed w/back box	55.00	ea	223.628 /ea	12,300
001	F/A Speaker/strobe ceiling mount installed w/back box	229.00	ea	326.047 /ea	74,665

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	F/A Strobe wall mount installed w/back box	34.00	ea	179.859 /ea	6,115
001	F/A Tamper switch & monitor module	16.00	ea	454.794 /ea	7,277
001	F/A Door holder installed w/back box	33.00	ea	546.872 /ea	18,047
001	F/A Flow switch & monitor module	5.00	ea	452.936 /ea	2,265
001	F/A Control/ monitor module relay	10.00	ea	353.696 /ea	3,537
001	F/A SLC/NAC 3/4" EMT & loop circuits	4,400.00	lf	11.386 /lf	50,098
001	F/A SLC/NAC RISER 1" EMT & loop circuits	1,500.00	lf	13.655 /lf	20,483
001	F/A 14/4 FPLP/MC cable	14,200.00	lf	4.165 /lf	59,136
001	F/A 16/2 FPLP/MC cable	6,500.00	lf	3.081 /lf	20,028
001					
001	Area of refuge	1.00	ea	25,000.00 /ea	25,000
001	F/A 16/2 FPLP/MC cable	2,200.00	lf	3.257 /lf	7,166
	COMMUNICATIONS			***28.002/sf***	***4,621,343***
	165,035.00 sf				
31-0000.000	***EARTHWORK***				
0	Early Release Pacakge #1 Sitework - See Totals Page				
10	Mass DEP Appeal Drainage Design Bridging Allowance	1.00	ls	300,000.00 /ls	300,000
	EARTHWORK			***1.818/sf***	***300,000***
	165,035.00 sf				
32-0000.000	***EXTERIOR IMPROVEMENTS***				
25	A5/A6, Concrete Unit Pavers - Pedestrian w pattern	10,400.00	sf	28.00 /sf	291,200
6	Site Concrete, Foundations	3,250.00	sf	40.00 /sf	130,000
6	Site Concrete - Flatwork				
6	Site Concrete, Flatwork, P&F - Sidewalks, 6" Thickness	47,030.00	sf	14.00 /sf	658,420
6	Site Concrete, Flatwork, P&F - Paver Base, 4" Thickness	10,700.00	sf	10.00 /sf	107,000
6	Site Concrete, Flatwork Materials	964.00	cy	155.00 /cy	149,420
6	Site Concrete				
6	Granite Slab Bench Footings, 1' thick x 2'6 width, F&P	190.00	lf	100.00 /lf	19,000
6	Granite Slab Bench Footings, Material	13.00	cy	155.00 /cy	2,015
6	Bench Footings	10.00	ea	1,500.00 /ea	15,000
6	Trash / Recycling Footings	9.00	ea	250.00 /ea	2,250
6	Table Footings	3.00	ea	2,500.00 /ea	7,500

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
)	Circular Bench Footings	2.00	ea	2,500.00	/ea	5,000
6	Free Form Bench Footings	4.00	ea	2,500.00	/ea	10,000
6	Shed Footing Mat Slab 1' Thick, 10'x20'	200.00	sf	11.00	/sf	2,200
6	Shed Footing Mat Slab , Material	8.00	cy	171.00	/cy	1,368
6	Raised Garden Bed 6" Thick, 4'x4'	6.00	ea	500.00	/ea	3,000
6	Main Entry Sign (AG0.04) - Form And Place, Footings & Wall	191.00	sfca	20.00	/sfca	3,820
6	Main Entry Sign (AG0.04) - Material	5.50	cy	171.00	/cy	941
6	Main Entry Sign (AG0.04) - Rigid Insulation, 3"	78.00	sf	3.00	/sf	234
6	CIP Low Retaining Walls 1'-0" wide	450.00	lf	485.00	/lf	218,250
6	CIP Low Retaining Walls 1'-6" wide	240.00	lf	485.00	/lf	116,400
6	Site Concrete 90%-100% Bridging Allowance	1.00	ls	150,000.00	/ls	150,000
2	Precast Concrete Curbing	2,650.00	lf	50.00	/lf	132,500
2	Precast Concrete Curbing - Turf Edger - removed per recon					
2	CIP Concrete Curbing - Fence Strip	670.00	lf	65.00	/lf	43,550
2	Granite Curbing - w ERP#1 - Sitework	1,000.00	lf			
6	Painted Courts	2.00	ea	30,000.00	/ea	60,000
6	Painted 4-Square	3.00	ea	3,000.00	/ea	9,000
6	Parent Round About Play Graphics	1.00	ea	12,500.00	/ea	12,500
001	Basketball Hoops	4.00	ea	10,000.00	/ea	40,000
001	Soccer Goals	2.00	ea	8,500.00	/ea	17,000
001	E9, Player Benches	2.00	ea	2,500.00	/ea	5,000
20	Rubber Play Surfacing @ Playground - unit cost adjusted per Recon to include color/design installation	27,103.00	sf	40.00	/sf	1,084,120
20	A10, Synthetic Turf, Play Shock Pad	4,805.00	sf	25.00	/sf	120,125
20	A11, Synthetic Turf, Play Shock Pad	480.00	sf	25.00	/sf	12,000
001	D1, 6' Long Benches w Arms	7.00	ea	8,000.00	/ea	56,000
001	D2, 6' Long Backless Benches	3.00	ea	7,500.00	/ea	22,500
001	D3, Table w Integral Seats	2.00	ea	7,725.00	/ea	15,450
001	D4, Table w Integral Seats & ADA Seat	1.00	ea	7,000.00	/ea	7,000
001	D5, Litter Receptacles	9.00	ea	5,000.00	/ea	45,000
001	D6, Bicycle Racks	23.00	ea	977.00	/ea	22,471
001	D7, Aluminum Flagpole, Internal Halyard	2.00	ea	15,000.00	/ea	30,000
001	D8, 10' x 20' Prefabricated Shed	1.00	ea	25,000.00	/ea	25,000
001	D9, Raised Garden Beds, ADA Compliant	6.00	ea	1,835.00	/ea	11,010
001	D10, Free-Form Benches	4.00	ea	7,425.00	/ea	29,700
001	D11, Sculptural Benches	1.00	ea	13,275.00	/ea	13,275
001	D12, Backless Curved Benches	4.00	ea	1,700.00	/ea	6,800
001	D13, Movable Cube Seats, Free-Standing	8.00	ea	175.00	/ea	1,400
001	D14, Circular Benches	2.00	ea	1,500.00	/ea	3,000
001	D15, Buddy Benches - adjusted per recon	5.00	ea	1,500.00	/ea	7,500
001	E18, Shade Structure - adjusted per recon	2.00	ea	70,000.00	/ea	140,000
001	B1, Masonry Panel System Seatwall, Self-Capping	80.00	lf	1,200.00	/lf	96,000
001	B2/B3, Granite Monolithic Benches	185.00	lf	1,350.00	/lf	249,750
001	C1, Vehicular Bollards, Stainless Steel w LED Light	29.00	ea	1,000.00	/ea	29,000
001	C2, Vehicular Bollards, Stainless Steel nonlit	29.00	ea	1,000.00	/ea	29,000
001	H3 - Tree Grates	3.00	ea	5,000.00	/ea	15,000
001	Playground Equipment - Pre-K	1.00	allow	300,000.00	/allow	300,000
001	Playground Equipment - K -> 2nd	1.00	allow	350,000.00	/allow	350,000
001	Playground Equipment - 3 -> 5	1.00	allow	420,000.00	/allow	420,000
001	Playground Underdrainage Coordination	1.00	ls	50,000.00	/ls	50,000
001	Existing Playground to be Reinstalled & Salvaged - removed per recon					
20	C3, Decorative Metal Fence, 4' height	810.00	lf	225.00	/lf	182,250
20	C4, Decorative Metal Double Gate - 12' wide	3.00	ea	10,000.00	/ea	30,000
20	C5, Decorative Metal Double Gate, 7' width	1.00	ea	6,500.00	/ea	6,500

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
:0	C6, Decorative Metal Single Gate, 4' width - Panic Bar Hardware	2.00	ea	5,000.00	/ea	10,000
20	C7, Decorative Metal Single Gate, 4' width - Self Closing	3.00	ea	3,500.00	/ea	10,500
20	C8, Self-Latching Magnetic Childproof Gate Latch	8.00	ea	1,200.00	/ea	9,600
20	C9, Chain Link Sports Field - 8' high	277.00	lf	185.00	/lf	51,245
20	C10, Chain Link Sport Field Single Gate, 4' width, 8' high	1.00	ea	3,000.00	/ea	3,000
20	C11, Chain Link Sport Field Single Gate, 4' width, 8' high, 12' Swing	1.00	ea	5,000.00	/ea	5,000
20	C12, Chain Link Sport Court Fence, 10' high	673.00	lf	250.00	/lf	168,250
20	C13, Chain Link Sport Court Gate, 6' wide, 10' high	2.00	ea	5,000.00	/ea	10,000
20	C14, Chain Link Sport Court Gate, 4' wide, 10' high	2.00	ea	3,500.00	/ea	7,000
20	C15, Chain Link Sport Court Gate, 4' wide, 10' high - Mesh Front	1.00	ea	3,800.00	/ea	3,800
20	C16, Vehicular Barrier Double Swing Gate, 40' width	1.00	ea	4,725.00	/ea	4,725
20	C17, Vehicular Barrier Double Swing Gate, 26' width	1.00	ea	435.00	/ea	435
20	C18, Vehicular Barrier Double Swing Gate, 28' width	1.00	ea	15,000.00	/ea	15,000
20	C19, Steel Barrier Double Swing Gate, 24' width	1.00	ea	15,000.00	/ea	15,000
20	C20, Wood Privacy Fencing, 6' height	897.00	lf	135.00	/lf	121,095
20	C21, Utility Screen Fencing, 6' height	185.00	lf	150.00	/lf	27,750
2	Soccer Field Irrigation	14,700.00	sf	2.50	/sf	36,750
2	Schematic Irrigation Controller Power Conduit from Building - w Electrical	647.700	lf			
2	Schematic Irrigation Water Supply Pipe from Building - w Civil	630.39	lf			
2	Two-Wire, Internet Based Irrigation Controller	1.00	ea	15,000.00	/ea	15,000
2	Quick Coupling Valve	4.00	ea	2,250.00	/ea	9,000
2	2" Isolation Valve	3.00	ea	2,000.00	/ea	6,000
2	2" Master Valve	1.00	ea	2,000.00	/ea	2,000
2	Irrigation Mainline 2" PVC class 200	453.66	lf	45.00	/lf	20,415
2	1.5" Flow Sensor	1.00	ea	1,500.00	/ea	1,500
2	2" Irrigation Point of Connection in Landscape	1.00	ls	2,500.00	/ls	2,500
2	6" Pop-Up Gear-Driven Rotor w 3/4" Inlet (Stainless Steel Riser)	24.00	ea	225.00	/ea	5,400
25	Mulching	450.00	cy	75.00	/cy	33,750
25	Stone Drip Edge and Metal Edge	522.00	lf	75.00	/lf	39,150
10	Import and Place Topsoil - Lawn Areas, 6"	3,700.00	cy	65.00	/cy	240,500
10	Planting Soils - 12"	230.00	cy	95.00	/cy	21,850
10	Soil Cells	4.00	cy	4,000.00	/cy	16,000
10	Soil Cells and Drainage Coordination	1.00	ls	5,000.00	/ls	5,000
5	Non-Irrigated General Lawn Seed Mix	92,400.00	sf	0.65	/sf	60,060
5	Non-Irrigated Multi-Use Athletic Field Seed Mix	35,300.00	sf	0.85	/sf	30,005
5	Irrigated Multi-Use Ahtletic Field Sod Mix - adjusted per recon	14,700.00	sf	2.50	/sf	36,750
5	Non-Irrigated Shade Lawn Seed Mix	5,200.00	sf	0.65	/sf	3,380
5	Low-Growing Wildflower and Grass Mix	14,600.00	sf	0.75	/sf	10,950
5	Shade Right-Of-Way Native Woods RyeGrass Mix	12,400.00	sf	0.75	/sf	9,300
5	Fine Rake And Seed	174,600.00	sf	0.50	/sf	87,300
5	Lawn and Planting Maintenance	1.00	ls	100,000.000	/ls	100,000
120	Deciduous Street and Lawn Trees					
120	Acer Freeman "Freeman Maple" 2"-2.5" cal. 30' oc	13.00	ea	2,100.00	/ea	27,300
120	Acer Rubrum "Red Sunset" 3"-3.5" cal. 30' oc	22.00	ea	2,400.00	/ea	52,800
120	Acer Saccharum "Green Mountaint" 2.5"-3" cal. 30' oc	4.00	ea	2,200.00	/ea	8,800

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
20	Gleditsia Tria. Inermis "Halka" 3"-3.5" cal. 30' oc	11.00	ea	2,400.00 /ea	26,400
120	Liquidambar Styraciflua 2.5"-3" cal. 30' oc	8.00	ea	2,200.00 /ea	17,600
120	Liriodendron Tulipifera 3"-3.5" cal. 30' oc	3.00	ea	2,400.00 /ea	7,200
120	Malus "Spring Snow" 2"-2.5" cal. 20' oc	2.00	ea	2,100.00 /ea	4,200
120	Nyssa Sylvatica 2"-2.5" cal. 30' oc	15.00	ea	2,100.00 /ea	31,500
120	Platanus x Acerifolia "Exclamation" 2"-2.5" cal. 30' oc	7.00	ea	2,100.00 /ea	14,700
120	Prunus Subhirtela "Autumnalis" 2.5"-3" cal. 20' oc	3.00	ea	2,200.00 /ea	6,600
120	Quercus Bicolor 2.5"-3" cal. 30' oc	6.00	ea	2,200.00 /ea	13,200
120	Deciduous Screening Trees				
120	Amelanchier Canadensis 6'-7' ht 15' oc	13.00	ea	2,600.00 /ea	33,800
120	Betula Nigra "Heritage" 14'-16' ht 20' oc	18.00	ea	3,500.00 /ea	63,000
120	Carpinus Caroliniana 2.5"-3" cal. 20' oc	7.00	ea	2,200.00 /ea	15,400
120	Magnolia Virginiana 8'-10' ht 12' oc	12.00	ea	3,100.00 /ea	37,200
120	Evergreen Screening Trees				
120	Abies Balsamea 12'-14' ht 15' oc	12.00	ea	1,800.00 /ea	21,600
120	Abies Concolor 8'-10' ht 15' oc	3.00	ea	1,200.00 /ea	3,600
120	Larix Larcina 10'-12' ht 15' oc	13.00	ea	1,400.00 /ea	18,200
120	Picea Glauca 8'-10' ht 15' oc	7.00	ea	1,200.00 /ea	8,400
120	Thuja Occidentalis "Nigra" 10'-12' ht 10' oc	39.00	ea	1,400.00 /ea	54,600
120	Thuja Plicata "Green Giant" 10'-12' ht 15' oc	21.00	ea	1,400.00 /ea	29,400
120	Deciduous Screening Shrubs				
120	Calycanthus Floridus 36"-48" ht 6' oc	43.00	ea	400.00 /ea	17,200
120	Clethra Alnifolia "Hummingbird" 24"-30" ht 6' oc	30.00	ea	80.00 /ea	2,400
120	Cornus Swida Serice Sericea "Arctic Fire" 18"-24" ht 5' oc	60.00	ea	50.00 /ea	3,000
120	Hamamelis Virginiana 4'-5' ht 8' oc	24.00	ea	500.00 /ea	12,000
120	Viburnum Dentatum "Christom" 24"-30" ht 5' oc	38.00	ea	80.00 /ea	3,040
120	Evergreen Screening Shrubs				
120	Ilex Verticillata "Maryland Beauty" 18"-24" ht 5' oc	50.00	ea	100.00 /ea	5,000
120	Ilex Verticillata "Jim Dandy" 24"-30" ht 5' oc	3.00	ea	100.00 /ea	300
120	Deciduous Shrubs				
120	Fothergilla Gardenii 18"-24" ht 3' oc	41.00	ea	50.00 /ea	2,050
120	Ithea Virginica "Henry's Garnet" 24"-30" cont. 3' oc	36.00	ea	80.00 /ea	2,880
120	Spiraea Japonica "Little Princess" 18"-24" ht 3' oc	13.00	ea	50.00 /ea	650
120	Syringa Patula "Miss Kim" 30"-36" ht 4' oc	11.00	ea	325.00 /ea	3,575
120	Rhus Aromatica "Gro-Low" 18"-24" ht 4' oc	4.00	ea	100.00 /ea	400
120	Evergreen Shrubs				
120	Ilex Glabra "Compacta" 24"-30" ht 4' oc	20.00	ea	325.00 /ea	6,500
120	Juniperus Horizontalis "Bar Harbor" 15"-18" sp. 3' oc	180.00	ea	50.00 /ea	9,000
120	Pinus Mugo "Pumilio" 18"-24" ht 3' oc	13.00	ea	50.00 /ea	650
120	Rhododendron Yakushimanum 24"-30" ht 4' oc	15.00	ea	325.00 /ea	4,875
120	Perennials				
120	Allium "Globemaster" #1 gal. 18" oc	33.00	ea	20.00 /ea	660
120	Aster Novae-Angliae "Purple Dome" #1 gal. 18" oc	31.00	ea	20.00 /ea	620
120	Rudbeckia "American Gold RusH" Blackeyed Susan	42.00	ea	20.00 /ea	840
120	Athyrium Filix-Femina 2 qt. cont. 18" oc	38.00	ea	15.00 /ea	570
120	Chrysanthemum Weyrichii "White Bomb" #1 gal. 24" oc	37.00	ea	20.00 /ea	740
120	Hemerocallis x "Joan Senior" #1 gal. 24" oc	84.00	ea	20.00 /ea	1,680
120	Liriope Spicata #1 qt 12" oc	441.00	ea	15.00 /ea	6,615
120	Salvia Nemorosa "Carodonna" 1 gal. 12" oc	18.00	ea	20.00 /ea	360
120	Sedum Rupestre "Silver" #1 qt 12" oc	90.00	ea	15.00 /ea	1,350
120	Thymus Praecox "Elfin" 2 qt. cont. 18" cont.	32.00	ea	18.00 /ea	576
120	Grasses				
120	Festuca Glauca "Elijah Blue" 10"-18" ht. 18" oc	72.00	ea	20.00 /ea	1,440
120	Panicum Virgatum Switch Grass	27.00	ea	25.00 /ea	675
120	Penninsetum Alop. "Hamlen" #2 gal. 36" oc	21.00	ea	25.00 /ea	525

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	EXTERIOR IMPROVEMENTS			***45.221/sf***	***7,463,049***
	165,035.00 sf				
33-0000.000	***UTILITIES***				
)01	Electrical Site Distribution				
001	Primary service riser pole (2) 4" GRC	1.00	ea	2,800.00 /ea	2,800
001	Primary duct bank 2x 4" PVC	300.00	lf	60.00 /lf	18,000
001	Primary service duct bank 4x 4" PVC	560.00	lf	90.00 /lf	50,400
001	Service pad grounding	2.00	ea	1,722.00 /ea	3,444
001	Secondary service #1 (6) 4" PVC	235.00	lf	744.64 /lf	174,990
001	Secondary service #2 (6) 4" PVC	220.00	lf	744.64 /lf	163,821
001	Electric utility manhole grounding & racks	2.00	ea	4,772.38 /ea	9,545
001					
001	Generator pad grounding	1.00	ea	3,675.00 /ea	3,675
001	Generator feeder (4) 4" PVC 1200A	210.00	lf	459.92 /lf	96,583
001	Generator feeder (2) 1 1/2" PVC 100A	100.00	lf	45.21 /lf	4,521
001	Generator -quick connect feeder (2) 1 1/2" PVC 100A	160.00	lf	40.17 /lf	6,427
001					
001	Irrigation controller circuit1 1/4" PVC 2#4-1#8	580.00	lf	12.435 /lf	7,212
001	Irrigation house heater 1" PVC 2#8 -1#8	580.00	lf	8.274 /lf	4,799
001	Irrigation circuit ingrate pull boxes	2.00	ea	975.40 /ea	1,951
001					
001	EV Provision In-grade pull box	10.00	ea	1,405.00 /ea	14,050
001	EV Feeder 100A 3w PVC copper	3,600.00	ea	20.820 /ea	74,952
001					
001	Site sign connection	2.00	lf	347.86 /lf	696
001	Site sign circuits 1" PVC 4#6	1,305.00	lf	13.050 /lf	17,030
001	Electrical Site Lighting				
001	Site Lighting fixture budget	1.00	ls	175,000.00 /ls	175,000
001	Lighting unit prices include installations & supports				
001	Type SL1 LED single head on 12.5 pole	18.00	ea	598.963 /ea	10,781
001	Type SL2 LED quad head on 12.5 pole	3.00	ea	598.963 /ea	1,797
001	Type SL3 LED Single head on 12.5 pole	8.00	ea	598.964 /ea	4,792
001	Type SL5 LED bollard	16.00	ea	332.758 /ea	5,324
001	Type SL6 LED In grade flood	6.00	ea	900.00 /ea	5,400
001	24" Precast concrete pole base	29.00	ea	1,091.007 /ea	31,639
001	Bollard precast support base	16.00	ea	889.693 /ea	14,235
001	Site lighting branch 1" PVC 4 #8	4,800.00	lf	11.565 /lf	55,511
001	Site lighting branch 1 1/4" PVC - 4 # 4	1,651.00	lf	16.959 /lf	27,998
001	Quazite in grade pull box	34.00	ea	1,405.025 /ea	47,771
001	Site Communications				
001	Telecomm service pole riser (2) 4" GRC	1.00	ls	3,394.81 /ls	3,395
001	Telcom duct bank 10x 4" PVC 2-w/3 inner ducts	850.00	lf	175.00 /lf	148,750
001	4'x 4'x 6' Telcom manhole grounding & racks	2.00	lf	1,920.00 /lf	3,840

Item	Description	Takeoff Qty	Total Unit Cost	Total Amount
	UTILITIES		***7.217/sf***	***1,191,129***
	165,035.00 sf			

Estimate Totals

Description	Amount	Totals	Rate	Cost per Unit
Direct Cost	**99,930,047**	**99,930,047**		**605.508 /sf**
Design Contingency	999,300		1.000 %	6.055 /sf
Escalation	1,498,951		1.500 %	9.083 /sf
Construction Contingency	2,498,251		2.500 %	15.138 /sf
Subtotal	**4,996,502**	**104,926,549**		**635.784 /sf**
Sub Default Insurance	740,000			4.484 /sf
Early Release Package #1 - Sitework	13,552,110			82.117 /sf
General Requirements	5,737,083			34.763 /sf
General Conditions	5,733,391			34.740 /sf
Preconstruction Services				
Subtotal	**25,762,584**	**130,689,133**		**791.887 /sf**
General Liability Insurance	1,491,115		1.095 %	9.035 /sf
Performance Bond	946,415		0.695 %	5.735 /sf
Builder's Risk Insurance	262,817		0.193 %	1.592 /sf
Pollution Insurance	65,364		0.048 %	0.396 /sf
General Building Permit - Waived				
Subtotal	**2,765,711**	**133,454,844**		**808.646 /sf**
CM Fee (OH&P)	2,720,000			16.481 /sf
Subtotal	**2,720,000**	**136,174,844**		**825.127 /sf**
Project Total GSF 165035				
Total		**136,174,844**		**825.127 /sf**



Fontaine Bros. UNI Summary - Combined

Division		Cost/SF		Total Amount
A10 FOUNDATIONS				
A1010 Standard Foundations	165,035 sf	13.08 /sf	$	2,158,158
A1020 Special Foundations	165,035 sf	0.00 /sf	$	-
A1030 Slab on Grade	165,035 sf	7.73 /sf	$	1,275,738
B10 SUPERSTRUCTURE				
B1010 Floor Construction	165,035 sf	47.65 /sf	$	7,863,914
B1020 Roof Construction	165,035 sf	22.38 /sf	$	3,693,580
B20 EXTERIOR VERTICAL ENCLOSURES				
B2010 Exterior Walls	165,035 sf	81.73 /sf	$	13,487,624
B2020 Exterior Windows	165,035 sf	14.08 /sf	$	2,323,995
B2030 Exterior Doors	165,035 sf	1.23 /sf	$	203,300
B30 EXTERIOR HORIZONTAL ENCLOSURES				
B3010 Roof Coverings	165,035 sf	20.07 /sf	$	3,312,551
B3020 Roof Openings	165,035 sf	0.04 /sf	$	7,000
C10 INTERIOR CONSTRUCTION				
C1010 Interior Partitions	165,035 sf	42.97 /sf	$	7,091,596
C1020 Interior Doors	165,035 sf	8.40 /sf	$	1,386,970
C1030 Fittings	165,035 sf	15.06 /sf	$	2,486,250
C20 STAIRS				
C2010 Stair Construction	165,035 sf	4.33 /sf	$	715,175
C2020 Stair Finishes	165,035 sf	1.95 /sf	$	322,583
C30 INTERIOR FINISHES				
C3010 Wall Finishes	165,035 sf	13.27 /sf	$	2,189,543
C3020 Floor Finishes	165,035 sf	17.83 /sf	$	2,942,347
C3030 Ceiling Finishes	165,035 sf	12.69 /sf	$	2,093,738
D10 CONVEYING				
D1010 Vertical Conveying Systems	165,035 sf	1.94 /sf	$	320,350
D20 PLUMBING				
D20 PLUMBING	165,035 sf	21.67 /sf	$	3,575,580
D30 HVAC				
D30 HVAC	165,035 sf	83.77 /sf	$	13,825,376
D40 FIRE PROTECTION				
D40 FIRE PROTECTION	165,035 sf	8.12 /sf	$	1,340,368
D50 ELECTRICAL				
D50 ELECTRICAL	165,035 sf	65.24 /sf	$	10,767,192
E10 EQUIPMENT				
E1010 Commercial Equipment	165,035 sf	5.31 /sf	$	876,120
E1060 Residential Equipment	165,035 sf	0.20 /sf	$	32,195
E1090 Other Equipment	165,035 sf	2.25 /sf	$	371,960
E20 FURNISHINGS				
E2010 Fixed Furnishings	165,035 sf	24.48 /sf	$	4,040,511
F20 DEMOLITION				
F20 Demolition & Abatement	165,035 sf	13.49 /sf	$	2,226,600
G10 SITE WORK				
G10 Site Preparation	165,035 sf	1.82 /sf	$	300,000
G20 Site Improvements	165,035 sf	45.50 /sf	$	7,508,605
G30 Site Utilities	165,035 sf	0.00 /sf	$	-
G40 Site Electrical	165,035 sf	6.27 /sf	$	1,035,145
G50 Site Communications	165,035 sf	0.95 /sf	$	155,985
		Total Direct Cost	**$**	**99,930,047**
		Design Contingency	$	999,300
		Escalation	$	1,498,951
		Construction Contingency	$	2,498,251
		Sub Default Insurance	$	740,000
		Early Release Package #1 - Sitework	$	13,552,110
		General Requirements	$	5,737,083
		General Conditions	$	5,733,391
		Preconstruction Services	$	-
		General Liability Insurance	$	1,491,115
		Performance Bonds	$	946,415
		Builder's Risk Insurance	$	262,817
		Pollution Insurance	$	65,364
		Building Permit	$	-
		CM Fee (OH&P)	$	2,720,000
		Project Total	**$**	**136,174,844**

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Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
A						
A10	**FOUNDATIONS**					
A1010	*Standard Foundations*					
03-0000.000	*CONCRETE*					
25	Concrete Form & Place - Footings	3,424.00	sfca	20.00	/sfca	68,480
125	Concrete Form & Place - Spread Footings	13,112.00	sfca	20.00	/sfca	262,240
125	Concrete Form & Place - Frost Walls	15,086.00	sfca	20.00	/sfca	301,720
125	Concrete Form & Place - Masonry Stub Walls	3,122.00	sfca	20.00	/sfca	62,440
125	Concrete Form & Place - Piers	4,317.00	sfca	20.00	/sfca	86,340
125	Concrete Form & Place - Brick Shelf	1,886.00	lf	30.00	/lf	56,580
125	Concrete Form & Place - Elevator Pit	1.00	ls	25,000.00	/ls	25,000
125	Concrete 90%-100 CD Bridging Allowance	1.00	ls	100,000.000	/ls	100,000
125	General Concrete - Weather Conditions	1.00	ls	300,000.00	/ls	300,000
125	Concrete Premium Time Allowance	1.00	ls	50,000.00	/ls	50,000
20	2" Rigid Foundation Insulation - Vertical	6,245.00	sf	3.00	/sf	18,735
14	Re-Bar, Footings, Piers, Walls	112.70	tons	2,500.00	/tons	281,750
20	Concrete - Footings, Includes Mat / Spread Footings	1,263.00	cy	180.00	/cy	227,340
20	Concrete - Walls, Frost	414.70	cy	180.00	/cy	74,646
20	Concrete - Walls, Masonry Stub	63.80	cy	180.00	/cy	11,484
20	Concrete - Brick Shelf, 6" Tall x 8" Width					
500	Set Anchor Bolts & Column Base Plates	175.00	ea	300.00	/ea	52,500
500	Grout Column Base Plates	175.00	ea	500.00	/ea	87,500
	CONCRETE			*12.523/sf*		*2,066,755*
	165,035.00 sf					
07-0000.000	*THERMAL & MOIST PROTECT*					
	Elevator Pit Crystalline Waterproofing					
2	Elevator Pit waterproofing membrane & 2" Rigid insulation	1.00	ls	20,000.00	/ls	20,000
2	Foundation Sheet Waterproofing					
2	Damproofing at Foundation Wall/Brick Shelf	6,228.00	sf	5.00	/sf	31,140
2	Damproofing at Interior Bearing Walls					
2	Foundation Bituminous Dampproofing - Fluid / Liquid					
2	Exterior Mockup per AG0.05 - Foundation Damproofing					
2	Foundation Bituminous Dampproofing - Fluid / Liquid	145.00	sf	2.50	/sf	363
2	2" Rigid insulation at Exterior Foundation Walls (3'6" Height)	6,650.00	sf	6.00	/sf	39,900

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		THERMAL & MOIST PROTECT			*0.554/sf*		*91,403*
		165,035.00 sf					
		A1010 Standard Foundations			*13.077/sf*		*2,158,158*
		165,035.00 sf					
A1030		*Slab on Grade*					
03-0000.000		*CONCRETE*					
	05	Stage Ramp - adjusted per recon	1.00	ls	10,000.00	/ls	10,000
	12	15 mil Vapor Barrier under SOG	76,300.00	sf	1.50	/sf	114,450
	120	2" Rigid Insulation Under Slab, Full Coverage - adjusted to include 4' perimeter per recon & ADD01	15,000.00	sf	3.50	/sf	52,500
	14	Re-Bar, SOG	10.00	tons	2,500.00	/tons	25,000
	20	Concrete - SOG 5" (Includes Thickened & Haunched)	1,351.25	cy	180.00	/cy	243,225
	20	MVRA Premium	1,351.25	cy	50.00	/cy	67,563
	10	Place & Finish SOG - 5"	76,300.00	sf	10.00	/sf	763,000
		CONCRETE			*7.730/sf*		*1,275,738*
		165,035.00 sf					
		A1030 Slab on Grade			*7.730/sf*		*1,275,738*
		165,035.00 sf					
		A10 FOUNDATIONS			**20.807/sf**		**3,433,895**
		165,035.00 sf					
		A SUBSTRUCTURE			***20.807/sf***		***3,433,895***
		165,035.00 sf					

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
B						
B10	**SUPERSTRUCTURE**					
B1010	*Floor Construction*					
03-0000.000	*CONCRETE*					
00	Place & Finish - SOD, 5-1/4" Light Weight	88,000.00	sf	8.00	/sf	704,000
100	Place & Finish - SOD, 3" Light Weight, Acoustic Topping Slab	9,011.00	sf	10.00	/sf	90,110
100	Place & Finish - SODs - House Keeping Pads, Allow	250.00	sf	30.00	/sf	7,500
12	Acoustic Matt - Pliteq GenMatt FF50 below 3" Topping Slab	9,011.00	sf	13.00	/sf	117,143
14	Re-Bar, SOD	22.00	tons	2,500.00	/tons	55,000
20	Concrete - SOD, Light Weight	1,443.20	cy	190.00	/cy	274,208
	CONCRETE			*7.562/sf*		*1,247,961*
	165,035.00 sf					
05-0000.000	*METALS*					
01	Floor Framing, HSS Shapes, Columns	299.43	tn	5,000.00	/tn	1,497,150
a 01	Floor Framing, HSS Shapes, Bracing	50.17	tn	5,000.00	/tn	250,850
a 01	Floor Framing, W Shapes, Beams	516.99	tn	5,000.00	/tn	2,584,950
a 01	Floor Framing, Connections Allowance - 5%	43.33	tn	5,000.00	/tn	216,650
a 01	Mechanical Couplers per 3/S0.05 (1,350 LF)	1.00	ls	10,000.00	/ls	10,000
a 01	Welded Couplers per 7/S0.05, 1,5/S0.06 (2,170 LF)	1.00	ls	10,000.00	/ls	10,000
a 01	Structural Steel - Coordination Allowance, Floors	1.00	ls	100,000.000	/ls	100,000
a 01	Structural Steel - 90%-100% CD Bridging Allowance	1.00	ls	150,000.00	/ls	150,000
a 01	Exterior Mockup per AG0.05 - Structural Steel					
a 01	Floor Framing, HSS Bracing	1.00	ls	25,000.00	/ls	25,000
a 01	Structural Steel - Premium Time Allowance	1.00	ls	30,000.00	/ls	30,000
618	Metal Floor Deck - 3"	12,852.70	sf	7.00	/sf	89,969
618	Metal Floor Deck - 3" - Lightweight	8,912.34	sf	7.00	/sf	62,386
618	Metal Floor Deck - 5-1/4"	97,526.78	sf	7.00	/sf	682,687
618	Acoustic Metal Floor Deck - Gym					
618	Exterior Mockup per AG0.05 - Structural Steel Decking					
618	Metal Floor Deck - 3" Assumed	152.00	sf	7.00	/sf	1,064
	METALS			*34.603/sf*		*5,710,707*
	165,035.00 sf					

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		METALS			*34.603/sf*	*5,710,707*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
	?	RIM Insulated Slab System scope, including neoprene gaskets, insulation, and plywood - w/ Concrete	9,062.00	sf		
	2	General Rough Carpentry Blocking	165,035.00	sf	1.50 /sf	247,553
		ROUGH CARPENTRY			*1.50 /sf*	*247,553*
		165,035.00 sf				
07-8000.000		*FIRE & SMOKE PROTECTION*				
	?	Fireproofing - Columns, Beams, Floor Decking, Roofing Decking, Braced Framing - 1 Hr.	165,035.00	sf	2.30 /sf	379,581
	2	Fireproofing, Low -> Medium Density - Premium	165,035.00	sf	0.80 /sf	132,028
	2	Building Wrap and Weather Protection, for Fireproofing Work	1.00	ls	75,000.00 /ls	75,000
	2	1-Hour Fireproofing - Structural Steel in hatched areas only per A0.11 - A0.32 - 2 Hr.	40.00	sf	3.00 /sf	120
	2	2-Hour Fireproofing - Structural Steel in hatched areas only per A0.11 - A0.32 - 2 Hr.	1,630.00	sf	5.50 /sf	8,965
	2	Patch Days	10.00	cds	3,200.00 /cds	32,000
	2	Fireproofing Premium Time	1.00	ls	30,000.00 /ls	30,000
		FIRE & SMOKE PROTECTION			*3.985/sf*	*657,694*
		165,035.00 sf				
		B1010 Floor Construction			*47.650/sf*	*7,863,914*
		165,035.00 sf				
B1020		*Roof Construction*				
03-0000.000		*CONCRETE*				
	00	Place & Finish - SOD, RTU Pads, 7" Normal Weight - adjusted unit cost per Recon	3,165.00	sf	13.00 /sf	41,145
	100	Place & Finish - SOD, 5-1/4" Light Weight @ Roof	12,816.00	sf	10.00 /sf	128,160
	14	Re-Bar, SOD, RTU Pads	6.00	tons	2,500.00 /tons	15,000
----		6" Roof MEP Pad				
	20	Concrete - SOD Roof Top Units	59.40	cy	180.00 /cy	10,692

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		CONCRETE			*1.182/sf*	*194,997*
		165,035.00 sf				
05-0000.000		*METALS*				
ı 01		Gym Framing, HSS Shapes, Trusses	5.14	tn	5,000.00 /tn	25,700
a 01		Gym Framing, HSS Shapes, Beams	90.22	tn	5,000.00 /tn	451,100
a 01		Gym Framing, L Shapes, Bracing	3.87	tn	5,000.00 /tn	19,350
a 01		Gym Framing, Connections Allowance - 5%	10.28	tn	5,000.00 /tn	51,400
a 01		Roof Framing, HSS Shapes, Beams	164.69	tn	5,000.00 /tn	823,450
a 01		Roof/ Screen Framing, HSS Shapes, Columns	85.70	tn	5,000.00 /tn	428,500
a 01		Roof Screen Framing, HSS Shapes, Kickers - Incl Above				
a 01		Roof Screen Framing, Unsized X Bracing per 7/S0.07 - Allowance	1.00	ls	30,000.00 /ls	30,000
a 01		Roof Framing, Connections Allowance - 5%	12.52	tn	5,000.00 /tn	62,600
a 01		Structural Steel - Coordination Allowance, Roof	1.00	ls	50,000.00 /ls	50,000
	320	Metal Roof Decking -3" - 20 Gage	40,670.94	sf	6.50 /sf	264,361
	320	Metal Roof Decking -3" - Lightweight	4,701.770	sf	7.00 /sf	32,912
	320	Metal Roof Decking -5-1/4" - Gage	7,659.24	sf	7.00 /sf	53,615
	320	Metal Roof Decking -7" - Gage	2,322.62	sf	7.00 /sf	16,258
	320	Metal Roof Decking - Acoustic - NIC				
	140	Misc Metals - Roof	165,035.00	sf	0.75 /sf	123,776
		METALS			*14.742/sf*	*2,433,023*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
!x04 RL		Heavy Timber Construction				
2x04 RL		Glulam Timber Beams	900.00	lf	245.00 /lf	220,500
2x04 RL		Glu-Lam 16" x 16" x 28" - Columns	240.00	lf	315.00 /lf	75,600
2x04 RL		Dowel-Laminated Timber Paneling w 3/4" APA-Rated Sturd-I-Floor Tongue & Groove Sheathing	6,620.00	sf	45.00 /sf	297,900
2x04 RL		Glu-Lam Installation	6,620.00	sf	38.00 /sf	251,560
2x04 RL		Glu-Lam Connections - Allowance	1.00	ls	50,000.00 /ls	50,000
2x04 RL		Glu-Lam Temporary Protection	1.00	ls	30,000.00 /ls	30,000
2x04 RL		Glu-Lam Premium Time	1.00	ls	15,000.00 /ls	15,000
		ROUGH CARPENTRY			*5.699/sf*	*940,560*
		165,035.00 sf				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		ROUGH CARPENTRY			*5.699/sf*	*940,560*
		165,035.00 sf				
07-8000.000		*FIRE & SMOKE PROTECTION*				
	2	Gymnasium, Intumescent Paint - Allowance - adjusted per recon	1.00	ls	125,000.00 /ls	125,000
		FIRE & SMOKE PROTECTION			*0.757/sf*	*125,000*
		165,035.00 sf				
		B1020 Roof Construction			*22.381/sf*	*3,693,580*
		165,035.00 sf				
		B10 SUPERSTRUCTURE			**70.031/sf**	**11,557,494**
		165,035.00 sf				
B20		**EXTERIOR VERTICAL ENCLOSURES**				
B2010		*Exterior Walls*				
04-0000.000		*MASONRY*				
	2	Cast Stone Lintels	1,065.00	lf	135.00 /lf	143,775
	2	Cast Stone Panels	15,245.00	sf	160.00 /sf	2,439,200
	2	Cast Stone Veneer & Banding				
	2	Cast Stone Canopy Soffits	880.00	sf	160.00 /sf	140,800
	2	Exterior Mockup per AG0.05 - Masonry				
	2	Cast Stone Lintels	90.00	lf	135.00 /lf	12,150
	2	Cast Stone Panels	175.00	sf	160.00 /sf	28,000
	110	Brick Veneer Types 1 & 2 - Belden Brick, Smoky Gray Velour & Belcrest 550	44,120.00	sf	50.00 /sf	2,206,000
	110	Brick Veneer Type 3 - Glen Gery, Bermuda Blue Glazed	3,020.00	sf	60.00 /sf	181,200
	110	Exterior Mockup per AG0.05 - Masonry				
	110	Brick Veneer Type 1 & 2 - Belden Brick, Smokey Gray Velour & Belcrest 550	150.00	sf	50.00 /sf	7,500
	110	Brick Veneer Type 3 - Glen Gery, Bermuda Blue Glazed	80.00	sf	60.00 /sf	4,800
	102	Exterior CMU Backup Walls				
	102	12" CMU -- adjusted per recon from 6" to 12"	665.00	sf	42.00 /sf	27,930
	102	8" CMU - added per recon, includes bulk of Kitchen/Servery and Stairwells	5,500.00	sf	40.00 /sf	220,000
	102	Includes Columns				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	02	Exterior CUVM Veneer - Custom Cast Stone, Light Buff	7,330.00	sf	70.00 /sf	513,100
	102	Exterior Mockup per AG0.05 - Masonry				
	102	Exterior CUVM Veneer - Custom Cast Stone, Light Buff	170.00	sf	70.00 /sf	11,900
	5	Masonry Staging - Exterior	70,595.00	sf	6.25 /sf	441,219
	5	Weather Conditions - Masonry	1.00	ls	100,000.000 /ls	100,000
		MASONRY			*39.250/sf*	*6,477,574*
		165,035.00 sf				
05-0000.000		*METALS*				
	40	Misc Metals - Exterior Walls	165,035.00	sf	0.50 /sf	82,518
	140	Loose Lintels - Masonry	990.00	lf	35.00 /lf	34,650
	140	Exterior Louvers - Allowance - removed per recon				
		METALS			*0.710/sf*	*117,168*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
	2	Framing at Roof Edge & Canopies - added per recon	22,385.00	sf	24.00 /sf	537,240
		ROUGH CARPENTRY			*3.255/sf*	*537,240*
		165,035.00 sf				
07-0000.000		*THERMAL & MOIST PROTECT*				
	?	4" Rigid insulation at MCM Panel Roof Edge	15,377.00	sf	6.00 /sf	92,262
	2	4" Rigid Cavity Wall Insulation (Brick Veneer)	69,715.00	sf	6.00 /sf	418,290
	2	Exterior Mockup per AG0.05 - Insulation				
	2	4" Rigid Cavity Wall Insulation (Brick Veneer)	250.00	sf	6.00 /sf	1,500
	2	4" Rigid insulation at MCM Panel Roof edge	90.00	sf	6.00 /sf	540
	10	Air Vapor Barrier - Exterior Walls	69,715.00	sf	8.50 /sf	592,578
	10	Air Vapor Barrier @ Roof - w Roofing Assembly	86,976.00	sf		
	10	Air Vapor Barrier at canopy columns and soffits	9,520.00	sf	8.50 /sf	80,920
	10	Air Vapor Barrier / Flashing at windows	5,763.00	lf	16.00 /lf	92,208
	10	Air Vapor Barrier - At roof edge / Overhang	13,765.00	sf	8.50 /sf	117,003
	10	Exterior Mockup per AG0.05 - Air Vapor Barrier				
	10	Air Vapor Barrier - Exterior Walls	560.00	sf	8.50 /sf	4,760
	10	Air Vapor Barrier - At roof edge / Overhang	86.00	sf	8.50 /sf	731
	10	Air Vapor Barrier / Flashing at windows	52.00	lf	16.00 /lf	832

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	?	MCM Composite Panels - Allucabond - None Shown					
	2	MCM Composite Panels @ Roof Edges & Flats	18,650.00	sf	80.00	/sf	1,492,000
	2	MLT Springlock/ Counter Flashing	1,300.00	sf	25.00	/sf	32,500
	2	Roof Screen w/Acoustic Metal Panel - 12' Height - adjusted per recon	11,800.00	sf	85.00	/sf	1,003,000
	2	Linear Metal Ceilings at Canopies	3,735.00	sf	65.00	/sf	242,775
	2	PFN Metal Siding on 4" CFMF Duct Enclosures	491.00	sf	100.00	/sf	49,100
	2	Corrugated Metal Panels @ Roof Screen - confirmed to be included per recon	2,256.00	sf	75.00	/sf	169,200
	2	Exterior Mockup per AG0.05 - Composite Panels					
	2	MCM Composite Panels @ Roof Edges & Flats	125.00	sf	100.00	/sf	12,500
		THERMAL & MOIST PROTECT			*26.677/sf*		*4,402,698*
		165,035.00 sf					
07-8000.000		*FIRE & SMOKE PROTECTION*					
	?	Misc. Exterior Joint/Control & Caulking	165,035.00	sf	1.00	/sf	165,035
		FIRE & SMOKE PROTECTION			*1.00 /sf*		*165,035*
		165,035.00 sf					
09-0000.000		*FINISHES*					
	00	Exterior Walls					
	100	EXT WALL Back Up, 8" or 6" LGMF, GWB interior Face, Batt Insul	61,910.00	sf	22.00	/sf	1,362,020
	100	Exterior Wall - Densglass Sheathing	61,910.00	sf	6.00	/sf	371,460
	100	Exterior Mockup per AG0.05 - Drywall					
	100	1/2" GWB BD5 & 5/8" GWB Backup Walls	320.00	sf	24.00	/sf	7,680
	100	Exterior Wall Premium Time	1.00	ls	30,000.00	/ls	30,000
	40	Exterior Mockup per AG0.05 - Painting					
	40	Paint Exterior Walls	320.00	sf	2.75	/sf	880
		FINISHES			*10.737/sf*		*1,772,040*
		165,035.00 sf					
10-0000.000		*SPECIALTIES*					
	10	Exterior Signage					
	110	Time Capsule Plaque	1.00	ea	800.00	/ea	800
	110	6" Aluminum Lettering	54.00	letter	70.00	/letter	3,780

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	10	18" Aluminum Lettering, Face Lit - 'WILMINGTON ELEMENTARY SCHOOL' & 'WILMINGTON ELEMENTARY'	46.00	letter	240.00 /letter	11,040
	20	Fire Department Knox Box	2.00	ea	125.00 /ea	250
		SPECIALTIES			*0.096/sf*	*15,870*
		165,035.00 sf				
		B2010 Exterior Walls			*81.726/sf*	*13,487,624*
		165,035.00 sf				
B2020		*Exterior Windows*				
05-0000.000		*METALS*				
	40	Curtainwall Support Angle	1.00	ls	50,000.00 /ls	50,000
		METALS			*0.303/sf*	*50,000*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
	!	Window Blocking	5,763.00	lf	15.00 /lf	86,445
	2	Exterior Mockup per AG0.05 - Rough Carpentry				
	2	Window/Curtainwall Blocking	52.00	lf	15.00 /lf	780
		ROUGH CARPENTRY			*0.529/sf*	*87,225*
		165,035.00 sf				
07-0000.000		*THERMAL & MOIST PROTECT*				
	2	Backer Rod & Double Sealants - added per recon	5,763.00	lf	15.00 /lf	86,445
		THERMAL & MOIST PROTECT			*0.524/sf*	*86,445*
		165,035.00 sf				

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		THERMAL & MOIST PROTECT			*0.524/sf*		*86,445*
		165,035.00 sf					
08-0000.000		*DOORS & WINDOWS*					
	)05	Level 1 School Guard Glazing Premium - adjusted to include entire assembly	2,935.00	sf	75.00	/sf	220,125
	005	Exterior Curtainwall Assembly	4,970.00	sf	185.00	/sf	919,450
	005	Exterior Mockup per AG0.05 - Curtainwall					
	005	Exterior Curtainwall Assembly	70.00	sf	185.00	/sf	12,950
	10	Exterior Aluminum Windows					
	10	W1, W1a, W2, W3, W4 Windows - adjusted per recon	5,880.00	sf	160.00	/sf	940,800
	10	Includes additional Ballistic Glazing for designated openings - removed per recon					
	10	CW-10 - removed per recon	1.00	ea			
	10	CW-11 - removed per recon	1.00	ea			
	10	CW-12 - removed per recon	1.00	ea			
	10	Exterior Mockup per AG0.05 - Windows					
	10	W2 Window	40.00	sf	175.00	/sf	7,000
		DOORS & WINDOWS			*12.727/sf*		*2,100,325*
		165,035.00 sf					
10-7000.000		*SUN CONTROL DEVICES*					
	001	Custom Exterior Horizontal Sunshade Outriggers - (502 LF) South Elevations only - removed per recon					
	001	Exterior Sunshade Connection - Allowance - removed per recon					
		SUN CONTROL DEVICES					*0*
		165,035.00 sf					
		B2020 Exterior Windows			*14.082/sf*		*2,323,995*
		165,035.00 sf					
B2030		*Exterior Doors*					
08-0000.000		*DOORS & WINDOWS*					
	:20	Exterior Doors					
	220	Type - 1 Wood, 3'0" x 7'0" - Single	1.00	lvs	750.00	/lvs	750
	220	Type - 1A Wood, 6'0" x 7'0" - Double	3.00	pair	850.00	/pair	2,550
	220	Type - 1A Wood, 6'0" x 7'0" - Double - 60 MIN	1.00	pair	850.00	/pair	850

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	220	Type - 3B Wood, 3'0" x 7'0" - Single	2.00	lvs	850.00	/lvs	1,700
	220	Install Exterior Door and HW	11.00	lvs	1,800.00	/lvs	19,800
	220	Exterior Door Frames					
	220	Exterior Door Frame Installation - w Drywall	7.00	ea			
	220	Type 1 - HM 3'0" x 7'0" - Single	1.00	ea	1,500.00	/ea	1,500
	220	Type 1A - HM 6'0" x 7'0" - Double	3.00	ea	2,000.00	/ea	6,000
	220	Type 1A - HM 6'0" x 7'0" - Double - 60 MIN	1.00	ea	2,000.00	/ea	2,000
	220	Type 3B - HM 3'0" x 7'0" - Single	2.00	ea	1,500.00	/ea	3,000
	30	OH-D1 - Overhead Section Door 10' x 10' - Receiving/General Supply 153-2	1.00	ea	19,000.00	/ea	19,000
	005	Exterior Aluminum Doors					
	005	Aluminum, Single Doors	1.00	lvs	12,500.00	/lvs	12,500
	005	Aluminum, Double Doors	10.00	lvs	12,500.00	/lvs	125,000
	005	Aluminum, Double Doors - Ballistic premium removed per recon					
	10	HW 03, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Access Control	3.00	ea	1,200.00	/ea	3,600
	10	HW 05, Single – Storeroom Lock + Closer + Full Gasketing/Sweep/Threshold – Roof Egress	1.00	ea	1,200.00	/ea	1,200
		DOORS & WINDOWS			*1.209/sf*		*199,450*
		165,035.00 sf					
09-0000.000		*FINISHES*					
	0	Paint Exterior HM Doors and Frames	11.00	lvs	350.00	/lvs	3,850
		FINISHES			*0.023/sf*		*3,850*
		165,035.00 sf					
		B2030 Exterior Doors			*1.232/sf*		*203,300*
		165,035.00 sf					
		B20 EXTERIOR VERTICAL ENCLOSURES			**97.040/sf**		**16,014,919**
		165,035.00 sf					
B30		**EXTERIOR HORIZONTAL ENCLOSURES**					
B3010		*Roof Coverings*					
06-0000.000		*ROUGH CARPENTRY*					
		General Roof Blocking	86,976.00	sf	1.00	/sf	86,976

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	1	Roof Blocking Perimeter	2,940.00	lf	18.00 /lf	52,920
	2	Canopy Roof Blocking Perimeter	245.00	lf	18.00 /lf	4,410
		ROUGH CARPENTRY			*0.874/sf*	*144,306*
		165,035.00 sf				
07-5000.000		*MEMBRANE ROOFING*				
	2	R1.1a TPO Roofing, 14" Rigid Insulation (5 Layers), Deck Sheathing - adjusted per recon	1,353.00	sf	32.00 /sf	43,296
	2	R1.1b TPO Roofing, 9" Rigid Insulation, Deck Sheathing (Includes Vertical Faces with 9" Ins) - adjusted per recon	67,393.00	sf	30.00 /sf	2,021,790
	2	R1.2 TPO Roofing, 9" Rigid Insulation, Deck Sheathing - adjusted per recon	9,939.00	sf	30.00 /sf	298,170
	2	R1.4 TPO Roofing, 9" Rigid Insulation (3 Layers), Deck Sheathing - adjusted per recon	8,291.00	sf	30.00 /sf	248,730
	2	Premium for FR deck sheathing 1/2" at R1.1a, R1.1b, & R1.4	77,037.00	sf	2.25 /sf	173,333
	2	Miscellaneous flashings and sealants - adjusted per recon	86,976.00	sf	0.50 /sf	43,488
	2	Exterior Mockup per AG0.05 - MCM Panel				
	2	Exterior Mockup per AG0.05 - MCM Panel Roof Edge	86.00	sf	28.00 /sf	2,408
		MEMBRANE ROOFING			*17.155/sf*	*2,831,215*
		165,035.00 sf				
07-7000.000		*ROOF & WALL ACCESSORIES*				
	10	Elevator Vents - None Shown				
	10	Roof Walkway Pads (24" width)	2,901.00	sf	30.00 /sf	87,030
	20	Roof Protection/Railing System - Allowance (3,038 LF)	1.00	ls	250,000.00 /ls	250,000
		ROOF & WALL ACCESSORIES			*2.042/sf*	*337,030*
		165,035.00 sf				
		B3010 Roof Coverings			*20.072/sf*	*3,312,551*
		165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	B3010 Roof Coverings			*20.072/sf*	*3,312,551*
	165,035.00 sf				
B3020	*Roof Openings*				
07-7000.000	*ROOF & WALL ACCESSORIES*				
20	Roof Hatch	2.00	ea	3,500.00 /ea	7,000
	ROOF & WALL ACCESSORIES			*0.042/sf*	*7,000*
	165,035.00 sf				
	B3020 Roof Openings			*0.042/sf*	*7,000*
	165,035.00 sf				
	B30 EXTERIOR HORIZONTAL ENCLOSURES			**20.114/sf**	**3,319,551**
	165,035.00 sf				
	B SHELL			***187.184/sf***	***30,891,964***
	165,035.00 sf				

C

C10	**INTERIOR CONSTRUCTION**				
C1010	*Interior Partitions*				
04-0000.000	*MASONRY*				
102	Interior CMU Walls				
102	4" CMU - added per recon	1,800.00	sf	32.00 /sf	57,600
102	6" CMU	1,620.00	sf	34.00 /sf	55,080
102	8" CMU	2,190.00	sf	38.00 /sf	83,220
102	8" CMU, 1HR - adjusted per recon	12,100.00	sf	38.00 /sf	459,800
102	12" CMU	14,510.00	sf	42.00 /sf	609,420
5	Masonry Staging - Interior	32,220.00	sf	4.50 /sf	144,990

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		MASONRY			*8.544/sf*	*1,410,110*
		165,035.00 sf				
05-0000.000		*METALS*				
	40	Misc. Folding Door Support	6.00	ea	3,500.00 /ea	21,000
	140	Misc. Masonry Support Steel	165,035.00	sf	0.75 /sf	123,776
		METALS			*0.877/sf*	*144,776*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
	?	Interior Borrowed Light Blocking	90.75	lf	15.00 /lf	1,361
	2	In-Wall Blocking	165,035.00	sf	0.85 /sf	140,280
	2	Temporary Safety and Railings - w GRs				
		ROUGH CARPENTRY			*0.858/sf*	*141,641*
		165,035.00 sf				
07-8000.000		*FIRE & SMOKE PROTECTION*				
	)02	Misc. Fire Stopping w/ Trades				
	40	Misc. Interior Joint/Control & Caulking	165,035.00	sf	0.50 /sf	82,518
		FIRE & SMOKE PROTECTION			*0.50 /sf*	*82,518*
		165,035.00 sf				
08-0000.000		*DOORS & WINDOWS*				
	:20	Borrowed Lite Frames	867.00	lf	45.00 /lf	39,015
	10	Interior Storefront Assemblies	985.00	sf	150.00 /sf	147,750
	10	1 HR Fire Rated Interior Storefront Premium	450.00	sf	300.00 /sf	135,000
	100	Borrowed Lites BL1	400.00	sf	85.00 /sf	34,000
	100	Borrowed Lites BL2 - None Shown				
	100	Borrowed Lites BL3 - None Shown				
	100	Borrowed Lites BL-4, Safety Glass	480.00	sf	85.00 /sf	40,800
	100	Borrowed Lites BL-5, Bullet Resistant Transaction Window	1.00	ea	7,500.00 /ea	7,500

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		DOORS & WINDOWS			*2.448/sf*	*404,065*
		165,035.00 sf				
09-0000.000		*FINISHES*				
	00	Interior Walls				
	100	A, 1 Layer GWB ea Face, Acoustical Insul, 6" Studs	17,205.00	sf	18.00 /sf	309,690
	100	A1, 1 Layer GWB ea Face, Acoustical Insul, 6" Studs - 1 HR	1,592.00	sf	20.50 /sf	32,636
	100	A1A, 1 Layer GWB ea Face 1 Additional Layer on Either side, Acoustical Insul, 6" Studs	885.00	sf	20.00 /sf	17,700
	100	A2, 2 Layer GWB ea Face, Acoustical Insul, 6" Studs - 2 HR	3,513.00	sf	20.50 /sf	72,017
	100	A2A, 2 Layer GWB ea Face, Acoustical Insul, 6" Studs - Non-Rated Acoustic Barrier	91,375.00	sf	25.00 /sf	2,284,375
	100	B, 1 Layer GWB ea Face, Acoustical Insul, 3-5/8" Studs	305.00	sf	22.00 /sf	6,710
	100	B1, 1 Layer GWB ea Face, Acoustical Insul, 3-5/8" Studs - 1 HR - None Shown				
	100	BR, 1 Layer GWB ea Face, 1 Side Bullet Resistant Fiberglass, Acoustical Insul, 6" Studs	470.00	sf	75.00 /sf	35,250
	100	C, 1 Layer GWB ea Face, Acoustical Insul, 8" Studs - None Shown				
	100	C1, 1 Layer GWB ea Face, Acoustical Insul, 8" Studs - 1 HR - None Shown				
	100	D, 4" CMU - None Shown				
	100	F, 1 Side GWB, Acoustical Insul, 2-1/2" Studs	586.00	sf	12.00 /sf	7,032
	100	F2, 1 Side 2 Layers GWB, Acoustical Insul, 2-1/2" Studs - None Shown				
	100	F4, 1 Side GWB, Acoustical Insul, 3-5/8" Studs	35,311.00	sf	12.50 /sf	441,388
	100	F4A, 1 Side GWB, Acoustical Insul, 3-5/8" Studs - Non-Rated Acoustic Barrier - None Shown				
	100	F5, 1 Side 2 Layers GWB, Acoustical Insul, 3-5/8" Studs	10,578.00	sf	15.00 /sf	158,670
	100	F5A, 1 Side 2 Layers GWB, Acoustical Insul, 3-5/8" Studs	151.00	sf	13.00 /sf	1,963
	100	F6, 1 Side 1 Layer GWB, Acoustical Insul, 6" Studs	13,672.00	sf	22.00 /sf	300,784
	100	F6A - Not Shown on AGO.02F6A, 1 Side 1 Layer GWB, Acoustical Insul, 6" Studs - Non-Rated Acoustic Barrier - None Shown				
	100	F7, 1 Side 2 Layer GWB, Acoustical Insul, 6" Studs	28,853.00	sf	11.00 /sf	317,383
	100	F8, 1 Side 1 Layer GWB, 7/8" Hat Channel	873.00	sf	35.00 /sf	30,555
	100	HA, 6" CMU, Acoustic Barrier - None Shown				
	100	HF8, 6" CMU, 1 Layer GWB, 7/8" Hat Channel - None Shown				
	100	S1, 1 Side 1 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 2-1/2" Studs - 1 HR - None Shown				
	100	S2, 1 Side 2 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 2-1/2" Studs - 2 HR - None Shown				

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	00	S6, 1 Side 2 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 6" Studs - 2 HR	79.00	sf	22.00	/sf	1,738
	100	S7, 1 Side 1 Layer GWB, 1 Side 1 Layer GYP Coreboard, Acoustical Insul, 6" Studs - 1 HR	3,433.00	sf	22.00	/sf	75,526
	100	S10, 2 Layers GYP Coreboard, 2" Channel Framing Brace - 2 HR - None Shown					
	100	Drywall General Conditions					
	100	General Carp / Labor	165,035.00	sf	2.00	/sf	330,070
	100	Lifts & Staging	1.00	ls	45,000.00	/ls	45,000
	100	Miscellaneous					
	100	Wall and Soffit Coordination	1.00	ls	50,000.00	/ls	50,000
	100	Misc. Touchup and Patching Allowance	1.00	ls	50,000.00	/ls	50,000
	100	Misc. Engineering & Associated Work	1.00	ls	25,000.00	/ls	25,000
	100	Interior Framing Premium Time	1.00	ls	50,000.00	/ls	50,000
		FINISHES			*28.136/sf*		*4,643,486*
		165,035.00 sf					
10-0000.000		*SPECIALTIES*					
	?	Operable Partition - 35' x 10' @ Library	1.00	ea	70,000.00	/ea	70,000
	2	Operable Partition - 23' x 8' @ Teacher Collab	3.00	ea	45,000.00	/ea	135,000
	2	Operable Partition - 12' x 8' @ Quiet Cafe	1.00	ea	20,000.00	/ea	20,000
	2	Operable Partition - 29'-4" x 13'-4" @ Platform	1.00	ea	40,000.00	/ea	40,000
		SPECIALTIES			*1.606/sf*		*265,000*
		165,035.00 sf					
		C1010 Interior Partitions			*42.970/sf*		*7,091,596*
		165,035.00 sf					
C1020		*Interior Doors*					
05-0000.000		*METALS*					
	40	Overhead Door supports	3.00	ea	5,000.00	/ea	15,000
		METALS			*0.091/sf*		*15,000*
		165,035.00 sf					
08-0000.000		*DOORS & WINDOWS*					

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
220	Interior Doors					
220	HM Doors					
220	Type - 1 HM, 3'0" x 7'0" Single	2.00	lvs	650.00	/lvs	1,300
220	Type - 1B HM, 4'0" x 7'0" Single (S4-4)	1.00	lvs	650.00	/lvs	650
220	Type - 3A HM, 3'0" x 7'0" Single	5.00	lvs	650.00	/lvs	3,250
220	Wood Doors					
220	Type - 1 Wood, 3'0" x 7'0" Single - Width Ranges from 3' to 4'	99.00	lvs	650.00	/lvs	64,350
220	Type - 1 Wood, 3'0" x 7'0" Single Ranges from 3' to 4' Width - 45 MIN	3.00	lvs	800.00	/lvs	2,400
220	Type - 1 Wood, 3'0" x 7'0" Single Ranges from 3' to 4' Width - 90MIN	3.00	lvs	1,000.00	/lvs	3,000
220	Type - 1 Wood, 6'0" x 7'0" Double	14.00	pair	750.00	/pair	10,500
220	Type - 1 Wood, 6'0" x 7'0" Double - 45 MIN	1.00	pair	825.00	/pair	825
220	Type - 1 Wood, 6'0" x 7'0" Double - 90 MIN	2.00	pair	900.00	/pair	1,800
220	Type - 1A Wood, 6'0" x 7'0" Double	6.00	pair	1,000.00	/pair	6,000
220	Type - 1A Wood, 6'0" x 7'0" Double - 60 MIN	8.00	pair	1,200.00	/pair	9,600
220	Type - 1B Wood, 3'0" x 7'0" Single - Width Ranges from 3' to 4'	1.00	lvs	650.00	/lvs	650
220	Type - 1C Wood, 3'0" x 7'0" Single	10.00	lvs	650.00	/lvs	6,500
220	Type - 3 Wood, 3'0" x 7'0" Single	1.00	lvs	650.00	/lvs	650
220	Type - 3A Wood, 3'0" x 7'0" Single	103.00	lvs	650.00	/lvs	66,950
220	Type - 3B Wood, 3'0" x 7'0" Single (G100A)	1.00	lvs	650.00	/lvs	650
220	Type - Unknown Wood, 3'0" x 7'0" Single Width Ranges from 3' to 4' (156-4, 252G)	2.00	lvs	650.00	/lvs	1,300
220	Unknown Type Doors	0.00	ITEM			
220	Type - 1 Unknown, 3'0" x 7'0" Double	6.00	lvs	1,000.00	/lvs	6,000
220	Type - 1A Unknown, 6'0" x 7'0" Double - 60 MIN	1.00	pair	1,200.00	/pair	1,200
220	Type - 1C Unknown, 3'0" x 7'0" Single	1.00	lvs	1,000.00	/lvs	1,000
220	Type - 3A Unknown, 3'0" x 7'0" Double	4.00	lvs	1,000.00	/lvs	4,000
220	Premium for Interior STC 53 HM Doors	3.00	lvs	12,000.00	/lvs	36,000
220	Install Interior Door and HW - adjusted per recon	306.00	lvs	500.00	/lvs	153,000
220	Interior Door Frames					
220	Interior Door Frame Installation - w Drywall	274.00	ea			
220	Type 1 - HM 3'0" x 7'0" - Single - Width Ranges from 3' to 4'	106.00	ea	600.00	/ea	63,600
220	Type 1 - HM 3'0" x 7'0" - Single - 45 MIN	3.00	ea	600.00	/ea	1,800
220	Type 1 - HM 3'0" x 7'0" - Single - Width Ranges from 3' to 4' - 90 MIN	5.00	ea	600.00	/ea	3,000
220	Type 1 - HM 6'0" x 7'0" - Double	14.00	ea	800.00	/ea	11,200
220	Type 1 - HM 6'0" x 7'0" - Double - 45 MIN	1.00	ea	800.00	/ea	800
220	Type 1 - HM 6'0" x 7'0" - Double - 90 MIN	2.00	ea	600.00	/ea	1,200
220	Type 1A - HM 6'0" x 7'0" Double	6.00	ea	600.00	/ea	3,600
220	Type 1A - HM 6'0" x 7'0" Double - 60 MIN	8.00	ea	600.00	/ea	4,800
220	Type 1B - HM 3'0" x 7'0" - Single Ranges from 3' to 4' Width	2.00	ea	800.00	/ea	1,600
220	Type 1C - HM 3'0" x 7'0" Single	10.00	ea	600.00	/ea	6,000
220	Type 3 - HM 3'0" x 7'0" Single	2.00	ea	600.00	/ea	1,200
220	Type 3B - HM 3'0" x 7'0" Single	1.00	ea	600.00	/ea	600
220	Type 3A - HM 3'0" x 7'0" Single	112.00	ea	600.00	/ea	67,200
220	Type Unknown - HM 3'0" x 7'0" Single (156-4, 252G)	2.00	ea	600.00	/ea	1,200
220	Access Doors and Misc Allowances					
220	Premium for Ballistic Doors (4 Leaves)	4.00	lvs	12,000.00	/lvs	48,000
220	Premium for Ballistic Doors (28 Lvs per Alts G throuhg J)					
30	OH-G - Overhead Coiling Grille 20'-4" x 11'-5" - Kitchen 156-1	1.00	ea	25,000.00	/ea	25,000
30	OH-G - Overhead Coiling Grille 20'-4" x 11'-5" - Kitchen 156-2	1.00	ea	25,000.00	/ea	25,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
30	OH - Overhead Coiling Door 4' x 4' - Kitchen 156-4	1.00	ea	10,000.00 /ea	10,000
001	Storefront Entrances-Single	1.00	ea	7,500.00 /ea	7,500
300	Storefront Entrances-Pair	4.00	ea	12,000.00 /ea	48,000
005	Interior Aluminum Doors				
005	Aluminum, Single Doors - removed per Recon (duplicate)				
005	Aluminum, Double Doors - removed per Recon (duplicate)				
005	Interior Curtainwall Assembly	165.00	sf	150.00 /sf	24,750
005	Interior Curtainwall Double Doors	4.00	lvs	8,000.00 /lvs	32,000
10	HW 01, Single - Electrified Panic Hardware + Automatic Operator + Access Control	1.00	ea	1,200.00 /ea	1,200
10	HW 02, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Access Control	5.00	ea	1,200.00 /ea	6,000
10	HW 04, Single – Storeroom Lock + Closer + Full Gasketing/Sweep/Threshold + Security Contact	3.00	ea	1,200.00 /ea	3,600
10	HW 06, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Full Gasketing	4.00	ea	1,200.00 /ea	4,800
10	HW 07, Pair – Electrified Panic Hardware + Keyed Mullion + Automatic Operators + Full Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 08, Single – Passage Set Only + Silencers	15.00	ea	1,200.00 /ea	18,000
10	HW 08A, Single – Passage Set Only + Reduced Hinge/Silencer Quantity				
10	HW 09, Single – Privacy Lock + Silencers	13.00	ea	1,200.00 /ea	15,600
10	HW 10, Single – Entrance Lock + FSIC Core + Silencers	14.00	ea	1,200.00 /ea	16,800
10	HW 11, Single – Classroom Lock + FSIC Core + Silencers	7.00	ea	1,200.00 /ea	8,400
10	HW 12, Single – Classroom Lock + Gasketing + Door Bottom + Threshold	3.00	ea	1,200.00 /ea	3,600
10	HW 13, Single – Entrance Lock with Inside Indicator + Seals	33.00	ea	1,200.00 /ea	39,600
10	HW 14, Single – Entrance Lock with Inside Indicator + Overhead Stop + Seals	1.00	ea	1,200.00 /ea	1,200
10	HW 15, Single – Entrance Lock + Gasketing + Door Bottom + Threshold	111.00	ea	1,200.00 /ea	133,200
10	HW 16, Single – STC Door + STC Manufacturer Seals + Door Bottom + Threshold	2.00	ea	1,200.00 /ea	2,400
10	HW 17, Single – Privacy Lock + Surface Closer + Kick Plate + Silencers	13.00	ea	1,200.00 /ea	15,600
10	HW 18, Single – Entrance Lock + Surface Closer + Kick Plate + Silencers	2.00	ea	1,200.00 /ea	2,400
10	HW 19, Single - Single – Entrance Lock + Surface Closer + Kick Plate + Gasketing	2.00	ea	1,200.00 /ea	2,400
10	HW 20, Single – Classroom Lock + Surface Closer + Kick Plate + Gasketing	1.00	ea	1,200.00 /ea	1,200
10	HW 21, Single – Entrance Lock with Inside Indicator + Closer + Gasketing	2.00	ea	1,200.00 /ea	2,400
10	HW 22, Single – Storeroom Lock + Closer + Kick Plate + Silencers	2.00	ea	1,200.00 /ea	2,400
10	HW 23, Single – Storeroom Lock + Closer + Kick Plate + Gasketing	12.00	ea	1,200.00 /ea	14,400
10	HW 24, Single – Storeroom Lock (8RO) + Closer + Kick Plate + Gasketing	9.00	ea	1,200.00 /ea	10,800
10	HW 25, Single – Electrified Mortise Lock + Automatic Operator + Access Control	2.00	ea	1,200.00 /ea	2,400

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	10	HW 26, Single – Storeroom Lock + Closer + Kick Plate + Gasketing	1.00	ea	1,200.00	/ea	1,200
	10	HW 27, Single – Fire Exit Hardware + Closer + Gasketing	1.00	ea	1,200.00	/ea	1,200
	10	HW 28, Pair – Classroom Lock + Manual Flush Bolt + Silencers	6.00	ea	1,200.00	/ea	7,200
	10	HW 29, Pair – Storeroom Lock + Manual Flush Bolt + Silencers	1.00	ea	1,200.00	/ea	1,200
	10	HW 30, Pair – Storeroom Lock + Manual Flush Bolt + Closers + Kick Plates	2.00	ea	1,200.00	/ea	2,400
	10	HW 31, Pair – Storeroom Lock + Flush Bolts + Coordinator + Dual Closers + Astragal/Gasketing	5.00	ea	1,200.00	/ea	6,000
	10	HW 32, Pair – Panic Hardware + Multiple Cylinders/Cores + Dual Closers					
	10	HW 33, Pair – Fire Exit Hardware + Dual Closers + Mullion Seal + Gasketing	1.00	ea	1,200.00	/ea	1,200
	10	HW 34, Pair – Electrified Fire Exit Hardware + Access Control + Dual Closers + Astragal	4.00	ea	1,200.00	/ea	4,800
	10	HW 35, Pair – Fire Exit Hardware + Magnetic Hold-Open Devices + Astragal/Gasketing	4.00	ea	1,200.00	/ea	4,800
	10	HW 36, Pair – Fire Exit Hardware + Magnetic Hold-Open Devices + Astragal/Gasketing	12.00	ea	1,200.00	/ea	14,400
	10	HW 37, Revolving Unit – Mortise Cylinder; Balance of Hardware by Door Manufacturer	3.00	ea	1,200.00	/ea	3,600
	10	HW 38, FLD Door – No Hardware Required	4.00	ea	1,200.00	/ea	4,800
	10	HW 39, Cased Opening – No Hardware Required					
	10	HW G1, Gate – Gate Hinges + Panic Hardware + Cylinder + Gate Closer					
	10	Unload & Organize Door Hardware	1.00	ls	20,000.00	/ls	20,000
	100	Type N - Door Lite Glazing - Not Shown or Specified					
	100	Type G - Door Lite Glazing (60 EA)	300.00	sf	85.00	/sf	25,500
	100	Type FG - Door Lite Glazing (21 EA)	168.00	sf	85.00	/sf	14,280
	100	Door Transom & Sidelight Glazing					
	100	Transom & Sidelight Glazing S-2 Safety Glass Type 3 (2 EA)	34.00	sf	85.00	/sf	2,890
	100	Transom & Sidelight Glazing S-2 Safety Glass Type 3A (122 EA)	854.00	sf	85.00	/sf	72,590
	100	Transom & Sidelight Glazing S-2 Safety Glass Type 3B (3 EA)	21.00	sf	85.00	/sf	1,785
	100	School Guard Glazing allowance at ALL Interior Sidelight (SG4 & SG5) - w Alternates					
	100	Ballistic Glazing at all Classroom Door Side Lites - Not Shown or Specified					
		DOORS & WINDOWS			*7.690/sf*		*1,269,070*
		165,035.00 sf					
09-0000.000		*FINISHES*					
	10	Paint Interior Doors and Frames	294.00	lvs	350.00	/lvs	102,900

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		FINISHES			*0.624/sf*	*102,900*
		165,035.00 sf				
		C1020 Interior Doors			*8.404/sf*	*1,386,970*
		165,035.00 sf				
C1030		*Fittings*				
05-0000.000		*METALS*				
	0	Stair 5 - Feature Railing above Cafeteria	55.00	lf	650.00 /lf	35,750
	10	Misc. Metals Allowance	165,035.00	sf	2.00 /sf	330,070
	10	Misc. Metals Coordination	1.00	ls	125,000.00 /ls	125,000
	10	Stair 5 Tree Column Support Steel per A10.81 - Allowance	1.00	ls	50,000.00 /ls	50,000
	140	Misc Metals - Floor Construction	165,035.00	sf	0.75 /sf	123,776
	140	Patient Lift Support - Assume Nurses office / PT - removed per Recon				
	140	Unistrut Ceiling Systems - None Shown				
		METALS			*4.027/sf*	*664,596*
		165,035.00 sf				
06-0000.000		*ROUGH CARPENTRY*				
	?	Misc. Blocking	1.00	ls	50,000.00 /ls	50,000
		ROUGH CARPENTRY			*0.303/sf*	*50,000*
		165,035.00 sf				
06-2000.000		*FINISH CARPENTRY*				
	?	Interior Finish Carpentry				
	2	Library Circulation Desk per A5/A10.80	1.00	ls	40,000.00 /ls	40,000
	2	Solid Surface Counters				
	2	Brackets				
	2	Die-wall				
	2	Main Entry Bench per Q21/A10.80	13.14	lf	625.00 /lf	8,213
	2	Stair 5 Built-in Seating per A10.80	13.89	lf	650.00 /lf	9,029
	2	Gym Corridor Wood Benches per Q21/A10.80	50.54	lf	250.00 /lf	12,635
	2	Custodial Benches per D13/A10.80	10.37	lf	250.00 /lf	2,593
	2	Extended Learning Built-in Benches w Storage per Q26/A10.80	64.80	lf	325.00 /lf	21,060
	2	Library Built-in Stepped Seating per A27/A10.80	68.88	lf	625.00 /lf	43,050

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	2	Custom Trash/Recycling Stations	49.50	lf	650.00	/lf	32,175
	2	Display Cases	48.50	lf	375.00	/lf	18,188
	2	Wood Trim - LEGO Walls @ Corridors	31.25	lf	65.00	/lf	2,031
	2	3/4" Millwork Grade Plywood Backing - LEGO Walls @ Corridors	101.45	sf	55.00	/sf	5,580
	2	Mailbox Cubbies - w Manufactured Casework	1.00	ls			
	2	Stair 5 Tree Column Arms per A10.81 - Allowance	1.00	ls	75,000.00	/ls	75,000
	2	Attachment to Structure - w Misc Metals					
	2	Includes LED Strip Lighting - w Electrical	150.00	lf			
	2	Wood Slat Wall Panels w Acoustic Felt Backing - w Acoustical Panels	1,735.00	sf			
	2	Solid Surface Window Sills & Aprons	1,070.00	lf	120.00	/lf	128,400
	2	Restroom Entrance Solid Surface Wall Panels	185.00	sf	95.00	/sf	17,575
	2	Laser-cut Lettering Premium	1.00	ls	15,000.00	/ls	15,000
	2	Restroom Signage Attachment Method - Allowance	12.00	loc	300.00	/loc	3,600
	2	Prep and Coordination Screws					
	2	Wood Veneer @ Library Bookcases - adjusted per recon	393.00	lf	250.00	/lf	98,250
	2	Market Adjustment to Allow VBE Opportunities	1.00	ls	100,000.000	/ls	100,000
	2	Millwork Not Yet Designed	165,035.00	sf	0.90	/sf	148,532
	2	Millwork and FF&E Protection	1.00	ls	40,000.00	/ls	40,000
		FINISH CARPENTRY			*4.974/sf*		*820,909*
		165,035.00 sf					
08-0000.000		*DOORS & WINDOWS*					
	00	PT Mirrors - Allowance	1.00	ls	5,000.00	/ls	5,000
		DOORS & WINDOWS			*0.030/sf*		*5,000*
		165,035.00 sf					
09-0000.000		*FINISHES*					
	2	Corner Guard Installation	184.00	ea	125.00	/ea	23,000
		FINISHES			*0.139/sf*		*23,000*
		165,035.00 sf					
10-0000.000		*SPECIALTIES*					
	2	Visual Display Units					
	2	Magnetic White Boards 4' x 5'	1.00	ea	360.00	/ea	360

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
?	Magnetic White Boards 5' x 5'	11.00	ea	450.00	/ea	4,950
2	Magnetic White Boards 6' x 5'	160.00	ea	540.00	/ea	86,400
2	Tackboards 3' x 3'	7.00	ea	225.00	/ea	1,575
2	Tackboards 4' x 3'	18.00	ea	300.00	/ea	5,400
2	Tackboards 4' x 4'	147.00	ea	400.00	/ea	58,800
2	Tackboards 4' x 5'	3.00	ea	500.00	/ea	1,500
2	Tackboards 5' x 3'	10.00	ea	375.00	/ea	3,750
2	Tackboards 6' x 1'-6"	168.00	ea	225.00	/ea	37,800
2	Tackboards 6' x 4'	10.00	ea	600.00	/ea	6,000
2	Tackboards 6' x 5'	29.00	ea	750.00	/ea	21,750
2	Tackboards 6' x 6'-6"	10.00	ea	975.00	/ea	9,750
2	Tackboards 8' x 2'	34.00	ea	400.00	/ea	13,600
2	Tackboards 12' x 1'-6"	1.00	ea	450.00	/ea	450
2	Wall Hung TV - by others					
110	Interior Signage					
110	Signage, TYPE-A (Typical Room)	112.00	ea	60.00	/ea	6,720
110	Signage, TYPE-B (Classroom/Office)	77.00	ea	100.00	/ea	7,700
110	Signage, TYPE-C (Entrance to Suite of Rooms)	5.00	ea	60.00	/ea	300
110	Signage, TYPE-D.1 (Male Toilet)	7.00	ea	55.00	/ea	385
110	Signage, TYPE-D.2 (Female Toilet)	7.00	ea	55.00	/ea	385
110	Signage, TYPE-E (Unisex Toilet)	36.00	ea	60.00	/ea	2,160
110	Signage, TYPE-F (Electric, Emergency Electric, IDF/MDF, & Elevator Machine Rooms)	17.00	ea	60.00	/ea	1,020
110	Signage, TYPE-G (Use at Elevators)	3.00	ea	70.00	/ea	210
110	Signage, TYPE-H (Use at Stair Landing)	12.00	ea	150.00	/ea	1,800
110	Signage, TYPE-J (Use at all Corridor Side of All Stair Doors)	12.00	ea	55.00	/ea	660
110	Signage, TYPE-K (Use at all communicating doors)	4.00	ea	60.00	/ea	240
110	Signage, TYPE-T (Use at all Elevator Machine Rooms)	1.00	ea	100.00	/ea	100
110	Signage, TYPE-L	10.00	ea	45.00	/ea	450
110	Signage, TYPE-M	15.00	ea	55.00	/ea	825
110	Signage, TYPE-N	10.00	ea	65.00	/ea	650
110	Signage, TYPE-O	5.00	ea	70.00	/ea	350
110	Signage, TYPE-S	2.00	ea	140.00	/ea	280
110	LEED Plaques	3.00	ea	850.00	/ea	2,550
110	36x42 Dedication Plaque	3.00	ea	8,000.00	/ea	24,000
110	Misc. Signage	1.00	ls	15,000.00	/ls	15,000
110	Design & PE Fee	1.00	ls	15,000.00	/ls	15,000
110	Installation	341.00	ea	100.00	/ea	34,100
110	Signage Attachment Method Unknown per S21, S26/A9.50 at Gang Restroom Entrances - w Finish Carpentry					
110	Signage Not Yet Designed - Allowance	1.00	ls	15,000.00	/ls	15,000
2	Toilet Partitions					
2	Plastic Toilet Partitions - Standard Height, 55"	34.00	ea	1,200.00	/ea	40,800
2	Plastic Toilet Partitions - ADA	14.00	ea	1,800.00	/ea	25,200
2	Urinal Screen	1.00	ea	500.00	/ea	500
2	Toilet Partition Installation	1.00	ls	30,000.00	/ls	30,000
2	Curtains & Track	3.00	ea	3,000.00	/ea	9,000
001	Corner Guards, Metal - Kitchen/Servery/Dishwashing - Allowance	184.00	ea	75.00	/ea	13,800
001	Corner Guards, Installation - By GWB					
2	Toilet Accessories (Including Standard, Child, and Pre-K sizes)					
2	42" Grab Bars	100.00	ea	125.00	/ea	12,500
2	Toilet Paper Dispensers	83.00	ea	75.00	/ea	6,225
2	Paper Towel Dispensers	204.00	ea	100.00	/ea	20,400
2	Mirror, framed 18' x 30'	76.00	ea	375.00	/ea	28,500

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	2	Janitor Mop Racks	8.00	ea	275.00 /ea	2,200
	2	Changing Table - Pre-K / K Toilets	13.00	ea	850.00 /ea	11,050
	2	Sanitary Napkin Disposal, Single Bathrooms	13.00	ea	100.00 /ea	1,300
	2	Waste Receptacles	63.00	ea	100.00 /ea	6,300
	2	Soap Dispensers	201.00	ea	100.00 /ea	20,100
	2	Sharps Container	1.00	ea	250.00 /ea	250
	2	Hand Sanitizer Stations - None Shown				
	2	Janitor's Closet Mop/Broom Holders	8.00	ea	175.00 /ea	1,400
	2	Toilet Accessories - Installation	1.00	ls	42,000.00 /ls	42,000
	30	Fire Extinguisher and Cabinets				
	30	Semi-Recessed Fire Extinguisher Cabinets - Allowance	40.00	ea	615.00 /ea	24,600
	30	AED and Cabinets - Allowance	12.00	ea	2,500.00 /ea	30,000
	10	Metal Lockers				
	10	Lockers, 18" x 15" x 72" - LK-T1	9.00	ea	625.00 /ea	5,625
	10	Lockers, 18" x 15" x 72" - LK-T1-ADA	1.00	ea	625.00 /ea	625
	10	Lockers, 12" x 12" x 60" - LK-T2	3.00	ea	525.00 /ea	1,575
	10	Lockers, 12" x 12" x 60" - L-T2B	5.00	ea	525.00 /ea	2,625
	10	Lockers, 12" x 12" x 60" - LK-T5	8.00	ea	525.00 /ea	4,200
	50	Metal Storage Shelving				
		SPECIALTIES			*4.379/sf*	*722,745*
		165,035.00 sf				
12-0000.000		*FIXED FURNISHINGS*				
	001	Market Adjustment to Allow VBE Opportunities	1.00	ls	200,000.000 /ls	200,000
		FIXED FURNISHINGS			*1.212/sf*	*200,000*
		165,035.00 sf				
		C1030 Fittings			*15.065/sf*	*2,486,250*
		165,035.00 sf				
		C10 INTERIOR CONSTRUCTION			**66.439/sf**	**10,964,816**
		165,035.00 sf				
C20		**STAIRS**				
C2010		*Stair Construction*				
03-0000.000		*CONCRETE*				
	105	Stairs and Intermediate Landings, Stair 1	2.00	Flt	4,500.00 /Flt	9,000
	105	Stairs and Landings, Stair 2 - removed per recon				

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	05	Stairs and Intermediate Landings, Stair 3	2.00	Flt	4,500.00	/Flt	9,000
	105	Stairs and Landings, Stair 4 - removed per recon					
	105	Stairs and Landings, Cafeteria, Stair 5 - removed per recon					
	105	Stairs and Intermediate Landings, Stage, Corridor & Stair 6	1.25	Flt	4,500.00	/Flt	5,625
	105	Intermediate Landings, Stairs 2, 4 & 5 - added per recon	3.00	loc	2,500.00	/loc	7,500
		CONCRETE			*0.189/sf*		*31,125*
		165,035.00 sf					
05-0000.000		*METALS*					
	0	Stair 1 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
	10	Stair 2 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
	10	Stair 3 - Stair and Railings	2.00	Flt	50,000.00	/Flt	100,000
	10	Stair 4 - Stair and Railings	3.00	Flt	75,000.00	/Flt	225,000
	10	Stair 4 - Roof Landing and Stair	1.00	ls	10,000.00	/ls	10,000
	10	Stair 4 - Wire Mesh Panels	122.00	sf	250.00	/sf	30,500
	10	Stair 5 - Feature Stair and Railings, Cafeteria	1.00	Flt	65,000.00	/Flt	65,000
	10	Stair 6 - Stage Stair and Ramp Rails	1.00	Flt	12,500.00	/Flt	12,500
	10	Roof Access Stair and Platform at Mechanical Pump Room	1.00	ls	20,000.00	/ls	20,000
	10	Roof Ladder	1.00	ea	10,000.00	/ea	10,000
		METALS			*4.078/sf*		*673,000*
		165,035.00 sf					
06-0000.000		*ROUGH CARPENTRY*					
	2	Sleeper System at Platform Stairs	170.00	lf	65.00	/lf	11,050
		ROUGH CARPENTRY			*0.067/sf*		*11,050*
		165,035.00 sf					
		C2010 Stair Construction			*4.333/sf*		*715,175*
		165,035.00 sf					
C2020		*Stair Finishes*					
06-2000.000		*FINISH CARPENTRY*					

Item		Description	Takeoff Qty		Unit Cost	Total Amount
	2	Wood Stage Risers	170.00	lf	50.00 /lf	8,500
		FINISH CARPENTRY			*0.052/sf*	*8,500*
		165,035.00 sf				
09-0000.000		*FINISHES*				
	2	Terrazzo Treads - Stair 2	50.00	ea	850.00 /ea	42,500
	2	Terrazzo Treads - Stair 4	82.00	ea	850.00 /ea	69,700
	2	Terrazzo Treads - Stair 5	24.00	ea	850.00 /ea	20,400
	2	Terrazzo Landings	1,500.00	sf	50.00 /sf	75,000
	2	Stair Floor Protection	3,055.00	sf	1.50 /sf	4,583
	145	Stair 6/Platform Treads - Stage	320.00	sf	45.00 /sf	14,400
	2	Resilient Sheet Landings & Treads	4.00	flts	6,250.00 /flts	25,000
	40	Paint Pan Stairs & Rails	12.50	Flt	5,000.00 /Flt	62,500
		FINISHES			*1.903/sf*	*314,083*
		165,035.00 sf				
		C2020 Stair Finishes			*1.955/sf*	*322,583*
		165,035.00 sf				
		C20 STAIRS			**6.288/sf**	**1,037,758**
		165,035.00 sf				
C30		**INTERIOR FINISHES**				
C3010		*Wall Finishes*				
06-2000.000		*FINISH CARPENTRY*				
	2	Wood Wainscot	1,221.50	sf	85.00 /sf	103,828
	2	Wood Trim at Tile	4,000.00	lf	30.00 /lf	120,000
		FINISH CARPENTRY			*1.356/sf*	*223,828*
		165,035.00 sf				
09-0000.000		*FINISHES*				

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
00	FRP - Allowance	1.00	ls	5,000.00	/ls	5,000
50	Ceramic Wall Tile					
50	Wall Tile - Restrooms	26,467.00	sf	32.00	/sf	846,944
50	Wall Tile - Corridors	9,725.00	sf	32.00	/sf	311,200
50	Wall Tile - Cafeteria/Stage	230.00	sf	32.00	/sf	7,360
50	Wall Tile - Backsplash	135.00	sf	32.00	/sf	4,320
2	Digitally Printed Wallcoverings (3,380 SF)	1.00	ls	40,000.00	/ls	40,000
2	DPW-1 - Extended Learning 105D					
2	DPW-2 - Extended Learning 105E					
2	DPW-3 - Extended Learning 131E					
2	DPW-4 - Extended Learning 131C					
2	DPW-5 - Office 182					
2	DPW-6 - Corridor 102					
2	DPW-7 - Extended Learning 205C					
2	DPW-8 - Extended Learning 230C					
2	DPW-9 - Extended Learning 205E					
2	DPW-10 - Extended Learning 230F					
2	DPW-11 - Extended Learning 230E					
2	DPW-12 - Cafeteria 168 - w Acoustical Panels					
2	DPW-13 - Extended Learning 301A					
2	DPW-14 - Extended Learning 301B					
2	DPW-15 - Extended Learning 350A					
2	DPW-16 - Extended Learning 333E					
2	DPW-17 - Extended Learning 333F					
2	DPW-18 - Extended Learning 333C					
2	DPW-19 - Extended Learning 302C					
2	DPW-20 - Lobby adjacent to Vestibule 172					
2	DPW-21 - Library Tiered Seating					
2	Stainless Steel Wall Panels - STE Classroom	60.00	sf	15.00	/sf	900
2	Acoustical Wall Panels					
2	AWP1, Acoustical Wall Panels @ Gym	2,900.00	sf	35.00	/sf	101,500
2	AWP1, Acoustical Wall Panels @ Flex Classroom	8.00	sf	35.00	/sf	280
2	AWP2, Acoustical Wall Panels @ Music/Chorus & Flex Classroom	240.00	sf	80.00	/sf	19,200
2	Tectum Panels w/Custom Images @ Cafeteria/Auditorium	315.00	sf	82.00	/sf	25,830
2	Wood Slat Wall Panels w Acoustic Felt Backing	1,735.00	sf	85.00	/sf	147,475
10	Painting					
10	Paint Walls - Interior Only	411,270.00	sf	0.95	/sf	390,707
10	Paint Touch up Allowance	1.00	ls	25,000.00	/ls	25,000
40	Painting Sequencing Allowance	1.00	ls	20,000.00	/ls	20,000
40	Painting MEP Allowance	1.00	ls	20,000.00	/ls	20,000
	FINISHES			*11.911/sf*		*1,965,716*
	165,035.00 sf					
	C3010 Wall Finishes			*13.267/sf*		*2,189,543*
	165,035.00 sf					

C3020 *Floor Finishes*

09-0000.000 *FINISHES*

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
	2	Terrazzo Flooring					
	2	Terrazzo Flooring	16,578.00	sf	40.00	/sf	663,120
	2	Terrazzo Pattern Installation Premium	3,316.00	sf	10.00	/sf	33,160
	2	Terrazzo inlays - Allowance	1.00	ls	12,000.00	/ls	12,000
	2	Floor Protection	19,894.00	sf	1.50	/sf	29,841
	2	QZT-1 Quartz Tile	1,226.00	sf	7.00	/sf	8,582
	2	Wax and Seal Quartz Tile	1,226.00	sf	1.50	/sf	1,839
	2	Floor Protection	1,226.00	sf	0.75	/sf	920
	2	Floors Moisture Mitigation Testing - NIC per Recon, but adding in value per Pam & John	10.00	loc	400.00	/loc	4,000
	2	Floors Moisture Mitigation - Epoxy & Gym					
	2	Common Work Results for Flooring - adjusted per recon	165,035.00	sf	1.50	/sf	247,553
	145	2-1/2" Wood Athletic Flooring System - Gymnasium	12,000.00	sf	30.00	/sf	360,000
	145	Future Owner Logos - Allowance	12,000.00	sf	1.00	/sf	12,000
	145	Floor Protection	12,320.00	sf	1.50	/sf	18,480
	2	Resilient Flooring					
	2	LIN - Linoleum Flooring, BOD = Forbo - adjusted unit cost per Recon	81,860.00	sf	7.50	/sf	613,950
	2	ESD Static Control Tile (SDT-1)	175.00	sf	15.00	/sf	2,625
	2	RAF-1 - Rubber Athletic Flooring, 6mm Thick	2,313.00	sf	26.00	/sf	60,138
	2	RSF-1 Resilient Sheet Flooring, BOD = Nora Systems Norament	6,317.00	sf	8.00	/sf	50,536
	2	Resilient Flooring Pattern Installation Premium - adjusted unit cost per Recon	90,665.00	sf	1.00	/sf	90,665
	2	Floor Protection	90,665.00	sf	0.75	/sf	67,999
	2	Resilient Base	19,180.00	lf	4.00	/lf	76,720
	2	Vented Base	455.00	lf	3.50	/lf	1,593
	002	Seal Concrete	6,045.00	sf	2.75	/sf	16,624
	002	Floor Protection	6,045.00	sf	0.75	/sf	4,534
	002	Sealed Concrete Prep - Allowance	6,045.00	sf	1.50	/sf	9,068
	10	Epoxy Flooring - Dur-A-Flex	9,245.00	sf	28.00	/sf	258,860
	10	Flakes @ Restrooms					
	10	Floor Protection	9,245.00	sf	1.50	/sf	13,868
f 10		Carpet Tile	946.00	sy	60.00	/sy	56,760
f 10		Carpet Pattern Installation Premium	3,903.00	sf	10.00	/sf	39,030
f 10		Floor Protection	8,513.00	sf	0.75	/sf	6,385
	2	Metal Grating Frames, Vestibule	925.00	sf	170.00	/sf	157,250
	2	Walk Off Mats	950.00	sf	15.00	/sf	14,250
	2	1/4" Floor Prep	1.00	ls	10,000.00	/ls	10,000
		FINISHES			*17.829/sf*		*2,942,347*
		165,035.00 sf					
		C3020 Floor Finishes			*17.829/sf*		*2,942,347*
		165,035.00 sf					

C3030 *Ceiling Finishes*

09-0000.000 *FINISHES*

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	Drywall Ceilings				
2	GWB Ceilings (GYP BD6)	6,730.00	sf	15.00 /sf	100,950
2	GWB Ceilings, 2 HR	5.00	sf	15.00 /sf	75
2	GWB Ceilings - Mold and Abuse Resistant (GYP BD3) - None Shown				
2	GWB Soffiting Allowance	165,035.00	sf	1.00 /sf	165,035
2	GWB Ceilings (GYP BD6) - Stairs	2,930.00	sf	15.00 /sf	43,950
2	GWB Ceiling Clouds				
2	GWB Ceilings, Exterior Soffits (GYP BD5)	1,050.00	sf	20.00 /sf	21,000
2	Acoustical Ceilings				
2	ACP-1a, Ultima High NRC by Armstrong, Color White	104,805.00	sf	7.00 /sf	733,635
2	ACP-1a, Ultima High NRC by Armstrong, Color White @ Stairs	1,370.00	sf	7.00 /sf	9,590
2	ACP-1b, Calla by Armstrong, Color Black @ Stage Ceiling only	750.00	sf	7.50 /sf	5,625
2	ACP-2, Ultima High NRC by Armstrong - None Shown				
2	ACP-4, Mineral fiber with scrubbable finish, Kitchen Zone by Armstrong - None Shown				
2	ACP-5, Ceramaguard Fine Fissured by Armstrong - None Shown				
2	ACP-6, Glass fiber panels, Soundscapes Shapes by Armstrong - None Shown				
2	ACP-7, Geometrix 3-Dimensional Metal Panels; Preformed aluminum by USG	1,235.00	sf	35.00 /sf	43,225
2	ACP-8, PT Sound Isolation Ceiling @ Mechanical Room	1,745.00	sf	35.00 /sf	61,075
2	WD-1, 108" x 6" planks, 3/4" thick, BOD: Armstrong Metalworks or equal	6,670.00	sf	55.00 /sf	366,850
2	WD-2, Acoustic Wood Panels, BOD: Woodworks Tegular panels by Armstong or equal - adjusted per Recon	1,720.00	sf	60.00 /sf	103,200
2	2" Tectum Ceiling Panels @ Gym - team confirming which BP this will belong to (ACT or AWP)	11,995.00	sf	30.00 /sf	359,850
20	Paint Exposed Ceilings	13,100.00	sf	3.50 /sf	45,850
30	Paint GWB Ceilings	6,735.00	sf	3.50 /sf	23,573
30	Paint GWB Ceilings - Stairs	2,930.00	sf	3.50 /sf	10,255
	FINISHES			*12.687/sf*	*2,093,738*
	165,035.00 sf				
	C3030 Ceiling Finishes			*12.687/sf*	*2,093,738*
	165,035.00 sf				
	C30 INTERIOR FINISHES			**43.782/sf**	**7,225,627**
	165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	C INTERIORS			***116.510/sf***	***19,228,200***
	165,035.00 sf				
D					
D10	**CONVEYING**				
D1010	*Vertical Conveying Systems*				
03-0000.000	*CONCRETE*				
500	Grout Elevator Sill Angles	3.00	ea	500.00 /ea	1,500
	CONCRETE			*0.009/sf*	*1,500*
	165,035.00 sf				
05-0000.000	*METALS*				
22	Sill Angles	3.00	ea	1,750.00 /ea	5,250
22	Sump Pit Frame Grate	1.00	ea	1,200.00 /ea	1,200
22	Hoist Beam & Lifeline Beam	2.00	ea	1,800.00 /ea	3,600
22	Pit Ladders	1.00	ea	2,800.00 /ea	2,800
	METALS			*0.078/sf*	*12,850*
	165,035.00 sf				
14-0000.000	*CONVEYING SYSTEMS*				
2	Elevator Usage - Operator Time for Adjacent Trades	15.00	day	2,200.00 /day	33,000
2	Elevator Usage - Operator Time for FF&E	15.00	day	2,200.00 /day	33,000
2	Elevator, Holeless Hydraulic, 4,000lbs	3.00	stop	80,000.00 /stop	240,000
2	Elevator, Cab Flooring - See Div 09 65 00, Resilient Flooring				
2	Elevator, Cab Walls - MFG Full Line of PLAM on plywood				
	CONVEYING SYSTEMS			*1.854/sf*	*306,000*
	165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	CONVEYING SYSTEMS			*1.854/sf*	*306,000*
	165,035.00 sf				
	D1010 Vertical Conveying Systems			*1.941/sf*	*320,350*
	165,035.00 sf				
	D10 CONVEYING			**1.941/sf**	**320,350**
	165,035.00 sf				
D20	**PLUMBING**				
D2010	*Plumbing Fixtures*				
22-0000.000	*PLUMBING*				
	Plumbing Fixtures				
1	P-1 - Water Closet (Wall Hung)	34.00	ea	1,325.00 /ea	45,050
1	P-1A - ADA Water Closet (Wall Hung)	40.00	ea	1,400.00 /ea	56,000
1	P-1B - ADA Water Closet (Wall Hung)	12.00	ea	1,400.00 /ea	16,800
1	P-2 - Urinal	1.00	ea	1,380.00 /ea	1,380
1	P-2A - Urinal	7.00	ea	1,550.00 /ea	10,850
1	P-3A - ADA Lavatory (Wall Hung)	64.00	ea	1,620.00 /ea	103,680
1	P-3B - ADA Lavatory (Wall Hung)	12.00	ea	1,620.00 /ea	19,440
1	P-5 - Sink w/ Integral Bubbler / Faucet (Recessed)	52.00	ea	2,100.00 /ea	109,200
1	P-5A - ADA Sink w/ Integral Bubbler / Faucet (Recessed)	80.00	ea	1,100.00 /ea	88,000
1	P-6 - Water Cooler / Bottle Fill	7.00	ea	2,280.00 /ea	15,960
1	P-7 - Mop Sink	7.00	ea	1,550.00 /ea	10,850
1	P-8A - Art Room SinkFaucet / Drain (Sink By Others) Solid InterceptorArt Room Sink	2.00	ea	1,900.00 /ea	3,800
1	Emergency Shower / Eyewash Station (Kitchen)	2.00	ea	3,650.00 /ea	7,300
1	Wall Carrier	170.00	ea	565.00 /ea	96,050
	PLUMBING			*3.541/sf*	*584,360*
	165,035.00 sf				
	D2010 Plumbing Fixtures			*3.541/sf*	*584,360*
	165,035.00 sf				
D2020	*Domestic Water Distribution*				
22-0000.000	*PLUMBING*				
	Domestic Water Distribution				
1	6" Domestic Water Pipe - Mains	45.00	lf	92.20 /lf	4,149

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		4" Domestic Water Pipe - Mains	220.00	lf	78.80	/lf	17,336
	1	3" Domestic Water Pipe - Mains	190.00	lf	68.45	/lf	13,006
	1	2-1/2" Domestic Water Pipe - Mains	180.00	lf	52.20	/lf	9,396
	1	2" Domestic Water Pipe - Mains	1,880.00	lf	46.40	/lf	87,232
	1	1-1/2" Domestic Water Pipe - Mains	890.00	lf	39.85	/lf	35,467
	1	1-1/4" Domestic Water Pipe - Mains	290.00	lf	35.25	/lf	10,223
	1	1" Domestic Water Pipe - Mains	1,260.00	lf	33.30	/lf	41,958
	1	3/4" Domestic Water Pipe - Branch	2,220.00	lf	31.20	/lf	69,264
	1	1/2" Domestic Water Pipe - Branch (Type "L" Cu.)	9,980.00	lf	29.60	/lf	295,408
	1	Misc. Valves,Tags & Fittings	1.00	ls	144,822.13	/ls	144,822
	1	Pipe Insulation - (1/2" - 1-1/4")	13,750.00	lf	9.90	/lf	136,125
	1	Pipe Insulation - (1-1/2" - 4")	3,360.00	lf	23.50	/lf	78,960
	1	Domestic Water Equipment					
	1	BFP-1 - 4" Backflow Preventer	1.00	ea	7,250.00	/ea	7,250
	1	1-1/2" RPBP - Reverse Backflow Preventer	1.00	ea	1,400.00	/ea	1,400
	1	TM-1 - Thermostatic Mixing Valve	1.00	ea	12,000.00	/ea	12,000
	1	TM-2 - Thermostatic Mixing Valve	1.00	ea	12,000.00	/ea	12,000
	1	RP-1 - In-Line Recirc Pump (16 GPM / 1/4 HP)	1.00	ea	1,650.00	/ea	1,650
	1	RP-2 - In-Line Recirc Pump (5 GPM / 1/8 HP)	1.00	ea	1,650.00	/ea	1,650
	1	HB - Hose Bib	18.00	ea	390.00	/ea	7,020
	1	FPHB - Frostproof Hose Bib	22.00	ea	480.00	/ea	10,560
	1	EWH-1 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00	/ea	32,650
	1	EWH-2 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00	/ea	32,650
	1	EWH-3 - Electric Water Heater (120 Gal /90 KW)	1.00	ea	32,650.00	/ea	32,650
	1	ETP-1 - Expansion Tank	1.00	ea	4,800.00	/ea	4,800
	1	ETP-2 - Expansion Tank	1.00	ea	4,800.00	/ea	4,800
	1	ETP-3 - Expansion Tank	1.00	ea	4,800.00	/ea	4,800
	1	Elevator Sump Pump / Oil Separator	1.00	ea	4,800.00	/ea	4,800
	1	SM-1 - 4" Domestic Water Meter	1.00	ea	4,800.00	/ea	4,800
	1	SM-2,3 - 2-1/2" Domestic Water Meter	2.00	ea	2,850.00	/ea	5,700
	1	SM-4 - 1-1/2" Irrigation Water Meter	1.00	ea	2,400.00	/ea	2,400
	1	4" Water Meter	1.00	ea	9,625.00	/ea	9,625
		PLUMBING			*6.887/sf*		*1,136,550*
		165,035.00 sf					
		D2020 Domestic Water Distribution			*6.887/sf*		*1,136,550*
		165,035.00 sf					
D2030		*Sanitary Waste*					
22-0000.000		*PLUMBING*					
		Sanitary Waste & Vent Piping (Under Ground)					
	1	6" Sanitary Waste & Vent Pipe (U)	260.00	lf	66.60	/lf	17,316
	1	4" Sanitary Waste & Vent Pipe (U)	1,690.00	lf	58.85	/lf	99,457
	1	4" Kitchen Waste & Vent Pipe (U)	300.00	lf	58.85	/lf	17,655
	1	3" Sanitary Waste & Vent Pipe (U)	330.00	lf	49.75	/lf	16,418
	1	2" Kitchen Waste & Vent Pipe (U)	160.00	lf	36.60	/lf	5,856
	1	Cleanout	29.00	ea	395.00	/ea	11,455
	1	Sanitary Waste & Vent Piping (Above Ground)					
	1	4" Sanitary Waste & Vent Pipe (A)	1,840.00	lf	58.85	/lf	108,284
	1	3" Sanitary Waste & Vent Pipe (A)	820.00	lf	49.75	/lf	40,795

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		2" Sanitary Waste & Vent Pipe (A)	5,640.00	lf	36.60	/lf	206,424
	1	1-1/2" Sanitary Waste & Vent Pipe (A)	3,930.00	lf	28.80	/lf	113,184
	1	4" Kitchen Waste & Vent Pipe (A)	420.00	lf	46.80	/lf	19,656
	1	2" Kitchen Waste & Vent Pipe (A)	810.00	lf	29.60	/lf	23,976
	1	1-1/2" Kitchen Waste & Vent Pipe (A)	480.00	lf	28.80	/lf	13,824
	1	Floor / Wall Cleanout	16.00	ea	425.00	/ea	6,800
	1	Sanitary and Vent Equipment					
	1	GI-1 - Grease Interceptor - Exterior					
	1	Recessed Grease Interceptor 150 Lbs. / 75 Gallon)	2.00	ls	5,110.00	/ls	10,220
	1	FS-1 - Floor Sink	16.00	ea	1,290.00	/ea	20,640
	1	FD1- 2" Floor Drain	20.00	ea	440.00	/ea	8,800
	1	FD2- 3" Floor Drain	15.00	ea	545.00	/ea	8,175
	1	Trap Primer	52.00	ea	885.00	/ea	46,020
		PLUMBING			*4.817/sf*		*794,954*
		165,035.00 sf					
		D2030 Sanitary Waste			*4.817/sf*		*794,954*
		165,035.00 sf					
D2040		*Rain Water Drainage*					
22-0000.000		*PLUMBING*					
		Storm Drainage Piping					
	1	RD-1 - 15" Round Roof Drain / 6" Hub	45.00	ea	1,385.00	/ea	62,325
	1	OD-1 - 15" Round Roof Overflow Drain / 6" Hub	45.00	ea	1,385.00	/ea	62,325
	1	DN-1 - Downspout Outlet	16.00	ea	950.00	/ea	15,200
	1	12" Storm Pipe (U)	245.00	lf	92.45	/lf	22,650
	1	10" Storm Pipe (U)	420.00	lf	86.25	/lf	36,225
	1	8" Storm Pipe (U)	440.00	lf	73.55	/lf	32,362
	1	8" Storm Pipe (A)	120.00	lf	82.40	/lf	9,888
	1	6" Storm Pipe (U)	480.00	lf	64.10	/lf	30,768
	1	6" Storm Pipe (A)	1,990.00	lf	72.15	/lf	143,579
	1	4" Storm Pipe (U)	210.00	lf	50.50	/lf	10,605
	1	4" Storm Pipe (A)	480.00	lf	58.85	/lf	28,248
	1	Drain Pipe Insulation	1,800.00	lf	21.75	/lf	39,150
		PLUMBING			*2.989/sf*		*493,325*
		165,035.00 sf					
		D2040 Rain Water Drainage			*2.989/sf*		*493,325*
		165,035.00 sf					
D2090		*Other Plumbing Systems*					

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
22-0000.000	*PLUMBING*					
	Gas Piping					
1	Gas Piping, Devices and Equipment - Excluded					
1	Kitchen Plumbing Connections					
1	3-Compartment Sink - C&HW & Indirect Waste Connection Only	1.00	ea	1,210.00	/ea	1,210
1	Hose Reel CW/HW Connections Only	2.00	ea	880.00	/ea	1,760
1	Convection Steamer CW Connection	1.00	ea	650.00	/ea	650
1	Forty-Gallon Tilting Braining Pan	1.00	ea	420.00	/ea	420
1	Double Oven	1.00	ea	1,200.00	/ea	1,200
1	Cooks Table w/ Sink - Connection Only	1.00	ea	880.00	/ea	880
1	Walk-in Cooler Indirect Waste Connection	1.00	ea	450.00	/ea	450
1	Disposer - CW & Waste Connection Only	1.00	ea	880.00	/ea	880
1	Fill Faucet - HW Connection Only	2.00	ea	585.00	/ea	1,170
1	Freezer Indirect Waste Connection	1.00	ea	250.00	/ea	250
1	Hand Sink - Connection Only	4.00	ea	625.00	/ea	2,500
1	Hand Sprayer - C&HW Connection Only	2.00	ea	950.00	/ea	1,900
1	Hot Food Well - H&CW & Indirect Waste Connection	10.00	ea	600.00	/ea	6,000
1	Cold Food Well - H&CW & Indirect Waste Connection	4.00	ea	600.00	/ea	2,400
1	Prep Table w/ Double Sink - Connection Only	1.00	ea	650.00	/ea	650
1	Steamer Unit, CW & Indirect Waste Connection	1.00	ea	950.00	/ea	950
1	Washing Machine Valve Box and Connection	1.00	ea	880.00	/ea	880
1	Water Filter Assembly (FBO) 3/4" CW Connection	2.00	ea	245.00	/ea	490
1	Water Softener System - added per recon	1.00	ea	15,000.00	/ea	15,000
1	Radon Mitigation System					
1	Radon In-Line Exhaust Fan	14.00	ea	850.00	/ea	11,900
1	4" PVC (Sched 40) - Perforated Pipe	3,830.00	lf	38.80	/lf	148,604
1	4" PVC (Sched 40) - Risers	660.00	lf	38.80	/lf	25,608
1	Crushed Stone					
1	Labeling	1.00	ls	800.00	/ls	800
1	Fireproof Roof Seal / Boot	16.00	ea	240.00	/ea	3,840
1	Plumbing General Conditions					
1	Testing & Disinfection	1.00	ls	18,000.00	/ls	18,000
1	Coordination & Management	1.00	ls	80,000.00	/ls	80,000
1	Commissioning	1.00	ls	45,000.00	/ls	45,000
1	Plumbing Premium Time	1.00	ls	35,000.00	/ls	35,000
1	Permits and fees ($10/$1,000) - Waived					
1	Coordination Drawings / BIM	1.00	ls	75,000.00	/ls	75,000
1	Seismic Restraints / Bracing	1.00	ls	18,000.00	/ls	18,000
1	Coring & Patching / Firestopping	1.00	ls	15,000.00	/ls	15,000
1	Hoisting & Rigging / Floor Loading	1.00	ls	15,000.00	/ls	15,000
1	Equipment start up and inspection	1.00	ls	25,000.00	/ls	25,000
1	Access Panels - Furnish Only	1.00	ls	10,000.00	/ls	10,000
	PLUMBING			*3.432/sf*		*566,392*
	165,035.00 sf					
	D2090 Other Plumbing Systems			*3.432/sf*		*566,392*
	165,035.00 sf					

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	D20 PLUMBING			**21.666/sf**	**3,575,580**
	165,035.00 sf				
D30	**HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)**				
D3020	*Heating And Cooling Systems*				
23-0000.000	*HVAC*				
	Heating Generating Equipment				
1	EB-1 - Electric Hot Water Boiler (1,633 MBH)	1.00	ea	65,000.00 /ea	65,000
1	HX-1 - Plate & Frame Heat Exchanger	1.00	ea	24,550.00 /ea	24,550
1	AS-1 - Air Separator	1.00	ea	6,500.00 /ea	6,500
1	AS-3 - Air Separator	1.00	ea	6,500.00 /ea	6,500
1	BT-1 - Heating Hot Water Buffer Tank (700 Gallon)	1.00	ea	14,000.00 /ea	14,000
1	BT-2 - Heating Hot Water Buffer Tank (700 Gallon)	1.00	ea	14,000.00 /ea	14,000
1	CSF-1 - Chemical Shot Feeder	1.00	ea	3,200.00 /ea	3,200
1	ET-1 - Heating Hot Water Expansion Tank	1.00	ea	6,800.00 /ea	6,800
1	ET-2 - Heating Hot Water Expansion Tank	1.00	ea	6,800.00 /ea	6,800
1	GF-1 - Glycol Make -Up Unit	1.00	ea	7,900.00 /ea	7,900
1	GF-3 - Glycol Make -Up Unit	1.00	ea	7,900.00 /ea	7,900
1	25% Glycol System Fill (Heating)	1.00	ls	15,000.00 /ls	15,000
	HVAC			*1.079/sf*	*178,150*
	165,035.00 sf				
	D3020 Heating And Cooling Systems			*1.079/sf*	*178,150*
	165,035.00 sf				
D3030	*Cooling Generating Systems*				
23-0000.000	*HVAC*				
	Chilled Water Systems				
1	ASHP-1 - Air Source Heat Pump Chiller (223 Tons)	1.00	ls	758,200.00 /ls	758,200
1	ASHP-2 - Air Source Heat Pump Chiller (223 Tons)	1.00	ls	758,200.00 /ls	758,200
1	HX-2 - Plate & Frame Heat Exchanger	1.00	ea	24,550.00 /ea	24,550
1	AS-2 - Air Separator	1.00	ea	9,500.00 /ea	9,500
1	AS-4 - Air Separator	1.00	ea	9,500.00 /ea	9,500
1	BT-3 - Chilled Water Buffer Tank (1040Gallon)	1.00	ea	20,000.00 /ea	20,000
1	BT-4 - Chilled Water Buffer Tank (1040Gallon)	1.00	ea	20,000.00 /ea	20,000
1	CSF-2 - Chemical Shot Feeder	1.00	ea	3,200.00 /ea	3,200
1	CSF-4 - Chemical Shot Feeder	1.00	ea	3,200.00 /ea	3,200
1	ET-3 - Chilled Water Expansion Tank	1.00	ea	6,800.00 /ea	6,800
1	ET-4 - Chilled Water Expansion Tank	1.00	ea	6,800.00 /ea	6,800

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		GF-2 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900
	1	GF-4 - Glycol Make -Up Unit	1.00	ea	7,900.00	/ea	7,900
	1	25% Glycol System Fill (Cooling)	1.00	ea	15,000.00	/ea	15,000
		HVAC			*10.002/sf*		*1,650,750*
		165,035.00 sf					
		D3030 Cooling Generating Systems			*10.002/sf*		*1,650,750*
		165,035.00 sf					
D3040		*Distribution Systems*					
23-0000.000		*HVAC*					
		HVAC Air Distribution					
	1	Ductwork Galvanized	162,343.00	lbs	18.50	/lbs	3,003,346
	1	Phenolic Ductwork - Roof Mounted	6,200.00	lbs	28.50	/lbs	176,700
	1	Kitchen Grease Duct	1.00	ls	131,225.00	/ls	131,225
	1	Kitchen Dishwasher Aluminum Duct	1.00	ls	18,000.00	/ls	18,000
	1	Displacement Diffuser	182.00	ea	465.00	/ea	84,630
	1	RGD's - adjusted per Recon	356.00	sf	215.00	/sf	76,540
	1	Constant Volume Damper	8.00	ea	650.00	/ea	5,200
	1	Misc. Ductwork Accessories - Volume Dampers, Fire Dampers, Volume Dampers etc.	165,000.00	sf	0.45	/sf	74,250
	1	Refrigerant Piping (Includes Hangers & Supports)					
	1	Refrigerant Piping -	1,965.00	lf	42.65	/lf	83,807
	1	Misc. Valves, Tags & Fittings	1.00	ls	8,380.73	/ls	8,381
	1	Condensate Piping					
	1	Condensate Drain Pipe (Type "L" Cu.)	580.00	lf	28.50	/lf	16,530
	1	Hydronic Piping & Pumps (Includes Hangers & Supports)					
	1	Hydronic CW/HW Piping - Mains (Blk Stl. Welded)	11,300.00	lf	71.65	/lf	809,645
	1	Hydronic CW/HW Piping - Branch (Type "L" Cu.)	17,500.00	lf	38.85	/lf	679,875
	1	6-Way Hydronic Control Valve	156.00	ea	490.00	/ea	76,440
	1	BP-1 - ECOCIRC Pump (165 GPM)	1.00	ea	12,500.00	/ea	12,500
	1	CP-1 - Condensate Pump (5 GPH)	13.00	ea	625.00	/ea	8,125
	1	P-1 - Heat Pump Heating Hot Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
	1	P-2 - Heat Pump Heating Hot Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
	1	P-3 - Heat Pump Chilled Water Pump (325 GPM / 7.5 HP)	1.00	ea	12,225.00	/ea	12,225
	1	P-4 - Heat Pump Chilled Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
	1	P-5 - Building Hot Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
	1	P-6 - Building Hot Water Pump (565 GPM / 10 HP)	1.00	ea	14,850.00	/ea	14,850
	1	P-7 - Building Chilled Water Pump (600 GPM / 20 HP)	1.00	ea	16,150.00	/ea	16,150
	1	P-8 - Building Chilled Water Pump (600 GPM / 20 HP)	1.00	ea	16,150.00	/ea	16,150
	1	P-9 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00	/ea	14,850

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	P-10 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00 /ea	14,850
1	P-11 - CCHW Water Pump (530 GPM / 20 HP)	1.00	ea	14,850.00 /ea	14,850
1	P-12 - CCHW Water Pump (340 GPM / 10 HP)	1.00	ea	13,365.00 /ea	13,365
1	P-13 - CCHW Water Pump (340 GPM / 10 HP)	1.00	ea	13,365.00 /ea	13,365
1	VFD-1 thru 13 - Variable Frequency Drive	13.00	ea	2,400.00 /ea	31,200
1	Pump Housekeeping Pads	13.00	ea	1,100.00 /ea	14,300
1	Insulation				
1	Duct wrap insulation	121,757.00	sf	5.75 /sf	700,103
1	Duct Liner	1.00	ls	25,000.00 /ls	25,000
1	Grease Duct Fire Wrap	3,000.00	sf	14.85 /sf	44,550
1	Hydronic Pipe Insulation - Mains	11,300.00	lf	16.00 /lf	180,800
1	Hydronic Pipe Insulation - Branch	17,500.00	lf	10.20 /lf	178,500
1	Condensate Pipe Insulation	580.00	lf	9.45 /lf	5,481
1	Refrigerant Pipe Insulation	1,965.00	lf	8.25 /lf	16,211
1	Exhaust Fans				
1	EF-1 - Receiving Exhaust Fan (600 Cfm)	1.00	ea	1,650.00 /ea	1,650
1	EF-2 - Toilet Exhaust Fan - Roof Mounted (2,040 Cfm)	1.00	ea	6,050.00 /ea	6,050
1	EF-3 - Toilet Exhaust Fan - Roof Mounted (2,220 Cfm)	1.00	ea	6,050.00 /ea	6,050
1	EF-4 - Art Room Exhaust Fan - Roof Mounted (450 Cfm)	1.00	ea	1,462.50 /ea	1,463
1	BF-5 / BF-6 - Kitchen / Laundry Exhaust	2.00	ea	10,250.00 /ea	20,500
1	KEF-1 - Kitchen Exhaust (6,800 Cfm)	1.00	ea	12,250.00 /ea	12,250
1	PEV-1 - Penthouse Elevator Vent	1.00	ea	1,800.00 /ea	1,800
1	Central Air Handling Equipment				
1	RTU-1 - Custom Air Handler Unit (CW/HW Coils - 16,200 Cfm)	1.00	ea	396,900.00 /ea	396,900
1	RTU-2 - Custom Air Handler Unit (CW/HW Coils -15,300 Cfm)	1.00	ea	374,850.00 /ea	374,850
1	RTU-3 - Custom Air Handler Unit (CW/HW Coils - 10,300 Cfm)	1.00	ea	252,350.00 /ea	252,350
1	RTU-4 - Custom Air Handler Unit (CW/HW Coils - 12,000 Cfm)	1.00	ea	294,000.00 /ea	294,000
1	RTU-5 - Custom Air Handler Unit (CW/HW Coils - 7,150 Cfm)	1.00	ea	175,175.00 /ea	175,175
1	RTU-6 - Custom Air Handler Unit (CW/HW Coils - 2,250 Cfm)	1.00	ea	55,125.00 /ea	55,125
1	RTU-7 - Custom Air Handler Unit (CW/HW Coils - 1,100 Cfm)	1.00	ea	26,950.00 /ea	26,950
1	RTU-8 - Custom Air Handler Unit (CW/HW Coils - 1,900 Cfm)	1.00	ea	46,550.00 /ea	46,550
1	RTU-9 - Custom Air Handler Unit (CW/HW Coils - 3,300 Cfm)	1.00	ea	80,850.00 /ea	80,850
1	MAU-1 - Make-up Air Unit (CW/HW Coils - 4,400 Cfm)	1.00	ls	96,800.00 /ls	96,800
1	Roof Curbs and Dunnage	10.00	ea	5,500.00 /ea	55,000
1	Sound Attenuation	19.00	ea	5,250.00 /ea	99,750
	HVAC			*52.414/sf*	*8,650,206*
	165,035.00 sf				
	D3040 Distribution Systems			*52.414/sf*	*8,650,206*
	165,035.00 sf				

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		D3040 Distribution Systems			*52.414/sf*		*8,650,206*
		165,035.00 sf					
D3050		*Terminal And Package Units*					
23-0000.000		*HVAC*					
		Heating & Cooling Terminal Equipment					
	1	CUH-01 - thru CUH-14 - HW Cabinet Unit Heater	14.00	ea	2,850.00	/ea	39,900
	1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [18 MBH]	3.00	ea	3,625.00	/ea	10,875
	1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [54 MBH]	2.00	ea	9,720.00	/ea	19,440
	1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [9 MBH]	6.00	ea	1,620.00	/ea	9,720
	1	DCUe - Ductless Cooling Unit (Indoor Fan Coil Unit) [36 MBH]	2.00	ea	6,480.00	/ea	12,960
	1	DCUe - Ductless Cooling Unit (Condenser Unit) [18 MBH]	3.00	ea	2,340.00	/ea	7,020
	1	DCUe - Ductless Cooling Unit (Condenser Unit) [54 MBH]	2.00	ea	7,020.00	/ea	14,040
	1	DCUe - Ductless Cooling Unit (Condenser Unit) [9 MBH]	6.00	ea	1,170.00	/ea	7,020
	1	DCUe - Ductless Cooling Unit (Condenser Unit) [36 MBH]	2.00	ea	4,680.00	/ea	9,360
	1	FCU-1-1 - thru FCU-1-6 - Fan Coil	6.00	ea	3,200.00	/ea	19,200
	1	RP-1 - HW Radiant Ceiling Panel - 24" - adjusted per recon	4,815.00	lf	165.00	/lf	794,475
	1	UH-01 - thru UH-05 - Unit Heater	5.00	ea	2,150.00	/ea	10,750
	1	CUH-01 - thru CUH-14 - Unit Heater	14.00	ea	2,885.00	/ea	40,390
	1	VAV - Variable Air Volume Box	168.00	ea	1,685.00	/ea	283,080
	1	WRU-1 - Wall Radiation Unit (Runtal)	16.00	ea	3,185.00	/ea	50,960
		HVAC			*8.054/sf*		*1,329,190*
		165,035.00 sf					
		D3050 Terminal And Package Units			*8.054/sf*		*1,329,190*
		165,035.00 sf					
D3060		*Controls And Instrumentation*					
23-0000.000		*HVAC*					
	:0	Building Management System					
	20	Building Management System	165,000.00	sf	8.15	/sf	1,344,750

Item	Description	Takeoff Qty		Unit Cost	Total Amount
	HVAC			*8.148/sf*	*1,344,750*
	165,035.00 sf				
	D3060 Controls And Instrumentation			*8.148/sf*	*1,344,750*
	165,035.00 sf				
D3070	*Systems Testing And Balancing*				
23-0000.000	*HVAC*				
	Testing & Balancing				
1	Testing & balancing	165,000.00	sf	0.75 /sf	123,750
	HVAC			*0.750/sf*	*123,750*
	165,035.00 sf				
	D3070 Systems Testing And Balancing			*0.750/sf*	*123,750*
	165,035.00 sf				
D3090	*Other HVAC Systems And Equipment*				
23-0000.000	*HVAC*				
	HVAC General Requirements				
1	Commissioning Support	1.00	ls	45,000.00 /ls	45,000
1	Coordination & Management	1.00	ls	200,580.00 /ls	200,580
1	HVAC Premium Time	1.00	ls	35,000.00 /ls	35,000
1	Permits and fees ($10/$1,000) - Waived				
1	Coordination / BIM	1.00	ls	80,000.00 /ls	80,000
1	Seismic restraints / bracing	1.00	ls	38,000.00 /ls	38,000
1	Coring & patching / firestopping	1.00	ls	20,000.00 /ls	20,000
1	Hoisting & rigging / floor loading	1.00	ls	100,000.000 /ls	100,000
1	Equipment start up and inspection	1.00	ls	25,000.00 /ls	25,000
1	Access panels - furnish only	1.00	ls	5,000.00 /ls	5,000
	HVAC			*3.324/sf*	*548,580*
	165,035.00 sf				
	D3090 Other HVAC Systems And Equipment			*3.324/sf*	*548,580*
	165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	D30 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)			**83.772/sf**	**13,825,376**
	165,035.00 sf				
D40	**FIRE PROTECTION**				
D4020	*Fire Suppression Water Supply And Equipment*				
21-0000.000	*FIRE SUPRESSION*				
	Fire Suppression Water Supply and Equipment				
1	8" Fire Sprinkler Pipe - Incoming Service Main	30.00	lf	106.60 /lf	3,198
1	8" Backflow Preventer	1.00	ea	14,225.00 /ea	14,225
	FIRE SUPRESSION			*0.106/sf*	*17,423*
	165,035.00 sf				
	D4020 Fire Suppression Water Supply And Equipment			*0.106/sf*	*17,423*
	165,035.00 sf				
D4030	*Standpipe Systems*				
21-0000.000	*FIRE SUPRESSION*				
	Fire Protection Standpipe				
1	2-1/2" Dry Alarm Check Valve w/ Compressor	1.00	ea	6,300.00 /ea	6,300
1	6" Fire Sprinkler Pipe w/ Fittings & Hangers	810.00	lf	73.25 /lf	59,333
1	6" Fire Standpipe Riser	280.00	lf	75.85 /lf	21,238
1	6" Alarm Riser Check Valve Assembly	1.00	ea	7,200.00 /ea	7,200
1	4" Sprinkler Horizontal Standpipe w/ Fittings & Hangers	320.00	lf	56.60 /lf	18,112
1	2-1/2" Sprinkler Drain Pipe w/ Fittings & Hangers	440.00	lf	37.25 /lf	16,390
1	FDC-1 - Fire Department Connection Valve	1.00	ea	3,200.00 /ea	3,200
1	4" Zone Control Valve Assembly - adjusted per recon	4.00	ea	3,650.00 /ea	14,600
1	2-1/2" FDV in Recessed Cabinet	14.00	ea	1,120.00 /ea	15,680
1	Fire Hose Cabinet (Stage Area) - removed per recon				
1	Combination Test Connection and Drain Valve	4.00	ea	525.00 /ea	2,100
1	6" Butterfly Valve w/ Tamper Switch	5.00	ea	1,250.00 /ea	6,250
1	4" Butterfly Valve w/ Tamper Switch	4.00	ea	1,050.00 /ea	4,200
1	6" Water alarm check valve - removed per recon				
1	6" OS&Y Gate Valve - removed per recon				
1	4" OS&Y Gate Valve - removed per recon				
1	4" Check Valve	4.00	ea	1,250.00 /ea	5,000
1	4" Storz Connection	1.00	ea	560.00 /ea	560
1	4" PRV Valve - removed per recon				
1	EB-1 - Electric Bell - adjusted per recon	2.00	ea	525.00 /ea	1,050

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		Tamper Switch	12.00	ea	485.00	/ea	5,820
	1	Flow Switch	6.00	ea	380.00	/ea	2,280
		FIRE SUPRESSION			*1.147/sf*		*189,313*
		165,035.00 sf					
		D4030 Standpipe Systems			*1.147/sf*		*189,313*
		165,035.00 sf					
D4040		*Sprinklers*					
21-0000.000		*FIRE SUPRESSION*					
		Fire Protection Sprinkler System					
	1	Sprinkler Head - Custom Color Head Allowance	1.00	ls	8,000.00	/ls	8,000
	1	Sprinkler Head - Protection (Wire Guards)	1.00	ls	5,000.00	/ls	5,000
	1	Sprinkler Head - Upright Pendent	7.00	ea	105.00	/ea	735
	1	Sprinkler Head - Up & Down Concealed Pendent	460.00	ea	100.00	/ea	46,000
	1	Sprinkler Head - Concealed Pendent	1,285.00	ea	110.00	/ea	141,350
	1	Dry Sprinkler Head - Concealed Pendent - adjusted per recon for 2.5" line	30.00	ea	115.00	/ea	3,450
	1	Sprinkler Head - Sidewall	12.00	ea	115.00	/ea	1,380
	1	6" Wet Sprinkler Main Piping w/ Fittings & Hangers	685.00	lf	62.35	/lf	42,710
	1	4" Wet Sprinkler Main Piping w/ Fittings & Hangers	4,730.00	lf	56.60	/lf	267,718
	1	3" Wet Sprinkler Main Piping w/ Fittings & Hangers	280.00	lf	50.40	/lf	14,112
	1	2-1/2" Wet Sprinkler Pipe	510.00	lf	38.56	/lf	19,666
	1	2" Wet Sprinkler Pipe	360.00	lf	27.17	/lf	9,781
	1	1-1/2" Wet Sprinkler Pipe	5,640.00	lf	23.18	/lf	130,735
	1	1-1/4" Wet Sprinkler Pipe	10,960.00	ls	19.25	/ls	210,980
	1	2-1/2" Dry Sprinkler Pipe	220.00	lf	58.85	/lf	12,947
	1	2" Dry Sprinkler Pipe	190.00	lf	48.45	/lf	9,206
	1	1-1/2" Dry Sprinkler Pipe	120.00	lf	42.10	/lf	5,052
	1	1-1/4" Dry Sprinkler Pipe	310.00	lf	37.65	/lf	11,672
	1	Misc. Valves, Tags & Fittings	1.00	ls	42,415.00	/ls	42,415
		FIRE SUPRESSION			*5.956/sf*		*982,908*
		165,035.00 sf					
		D4040 Sprinklers			*5.956/sf*		*982,908*
		165,035.00 sf					
D4090		*Other Fire Protection Systems*					

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
21-0000.000		*FIRE SUPRESSION*					
		Fire Protection General Conditions					
	1	Hydraulic Calculations	1.00	ls	2,600.00	/ls	2,600
	1	Testing & Inspection	1.00	ls	2,200.00	/ls	2,200
	1	Drain & Fill System	1.00	ls	2,800.00	/ls	2,800
	1	Coordination and Management	1.00	ls	68,625.00	/ls	68,625
	1	Commissioning Assistance	1.00	ls	8,000.00	/ls	8,000
	1	Permits and fees ($10/$1,000)					
	1	Coordination Drawings / BIM	1.00	ls	25,000.00	/ls	25,000
	1	Seismic Restraints / Bracing - includes design	1.00	ls	12,000.00	/ls	12,000
	1	Coring & Patching / Firestopping	1.00	ls	4,500.00	/ls	4,500
	1	Hoisting & Rigging / Floor Loading	1.00	ls	25,000.00	/ls	25,000
		FIRE SUPRESSION			*0.913/sf*		*150,725*
		165,035.00 sf					
		D4090 Other Fire Protection Systems			*0.913/sf*		*150,725*
		165,035.00 sf					
		D40 FIRE PROTECTION			**8.122/sf**		**1,340,368**
		165,035.00 sf					
D50		**ELECTRICAL**					
D5005		*Electrical Demolition*					
26-0000.000		*ELECTRICAL*					
		Electrical Demolition					
	2	Disconnect , cut & make safe electric service in footprint of new building	1.00	ls	20,000.00	/ls	20,000
		ELECTRICAL			*0.121/sf*		*20,000*
		165,035.00 sf					
		D5005 Electrical Demolition			*0.121/sf*		*20,000*
		165,035.00 sf					
D5010		*Electrical Service And Distribution*					
26-0000.000		*ELECTRICAL*					

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	Normal Power and Distribution				
2	Switchboard MSB 2500/2500A MCB 277/480v 3-section	1.00	ea	180,000.00 /ea	180,000
2	Switchboard MSB2 2500/2500A MCB 277/480v 3-section	1.00	ea	180,000.00 /ea	180,000
2	Check metering modules	1.00	ea	20,000.00 /ea	20,000
2	-Panel EV 600A MLO 120/208v 60p	1.00	ea	14,400.00 /ea	14,400
2	-Panel KHP 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	-Panel KPP 250A MLO 120/208v 60p	1.00	ea	4,601.50 /ea	4,602
2	-Panel LP1A 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	-Panel LP1B 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	-Panel LP2A 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	-Panel LP2B 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	-Panel LP2B2 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	Panel LP3A 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	Panel LP3B 100A MLO 277/480v 30p	1.00	ea	3,525.16 /ea	3,525
2	Panel MHP2B 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	-Panel MHP2B2 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	Panel MHP3A 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	Panel MHP3B 400A MLO 277/480v 42p	1.00	ea	5,289.57 /ea	5,290
2	-Panel MP1A 250A MLO 120/208v 60p REVISED	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP1B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP2A2 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP2B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel MP2B2 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP2A3 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	Panel MP3B 250A MLO 120/208v 60p	1.00	ea	4,767.08 /ea	4,767
2	-Panel OLP 100A MLO 277/480v 30p	1.00	ea	3,323.56 /ea	3,324
2	-Panel PP1A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,442.95 /ea	4,443
2	-Panel PP1B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP3B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel PP2A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2A2 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel PP2B2 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2A3 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP2B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	Panel PP3A 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,868.88 /ea	4,869
2	-Panel TEP1B 250A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	4,442.95 /ea	4,443
2	-Panel TEP2B 100A MLO 120/208v 60p 200% Neutral REVISED	1.00	ea	2,913.29 /ea	2,913
2	-Panel TEPA2 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,339.32 /ea	3,339
2	T-5 45KVA K-13 Transformer 480-120/208v	9.00	ea	11,122.76 /ea	100,105
2	T-6 75KVA K-13 Transformer 480-120/208v	7.00	ea	14,402.76 /ea	100,819
2	T-9 225KVA K-13 Transformer 480-120/208v	1.00	ea	26,212.16 /ea	26,212
2	100A Disc 600v 3p Fused	2.00	ea	863.93 /ea	1,728
2	30KVA UPS MDF Room	1.00	ea	39,463.72 /ea	39,464
2					
2	100A 3w Feeder EMT copper	2,000.00	lf	48.275 /lf	96,550

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
2	100A 4w Feeder EMT copper	2,300.00	lf	54.65 /lf	125,695
2	125A 3w Feeder EMT copper	1,500.00	lf	37.353 /lf	56,029
2	150A 3w Feeder EMT copper	1,100.00	lf	31.852 /lf	35,037
2	150A 4w Feeder EMT copper	60.00	lf	47.104 /lf	2,826
2	225A 4w Feeder EMT copper	400.00	lf	82.534 /lf	33,013
2	250A 4w Feeder EMT copper	100.00	lf	98.323 /lf	9,832
2	400A 3w Feeder EMT copper	61.00	lf	145.326 /lf	8,865
2	400A 4w Feeder EMT copper	1,700.00	ea	149.41 /ea	253,997
2	Feeder Pri/sec 45KVA 3PH Transformer	9.00	ea	1,331.84 /ea	11,987
2	Feeder Pri/sec 75KVA 3PH Transformer	7.00	ea	1,860.08 /ea	13,021
2	Feeder Pri/sec 225KVA 3PH Transformer	1.00	ea	8,610.60 /ea	8,611
2	4" & 2" Empty raceways for future PV system	200.00	lf	75.00 /lf	15,000
2	PV Systems Based on 500kw - Future Design				
2	Machine and Equipment Power				
2	ASHP-1 Air source heat pump 600a 480v connection	1.00	ea	4,473.96 /ea	4,474
2	ASHP-2 Air source heat pump 600A 480v connection	1.00	ea	4,473.96 /ea	4,474
2	BP-1 Boiler circ pump 20A 208v connection	1.00	ea	1,568.19 /ea	1,568
2	CUH-1**14 Hot water cabinet unit heaters 20A 120v connection	14.00	ea	730.606 /ea	10,228
2	DCUc-1 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-10 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-11 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-12 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-13 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-2 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-3A Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-3B Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-4 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-5 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-6 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-7 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-8 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUc-9 Split unit 20A 208v 2p connection	1.00	ea	1,280.160 /ea	1,280
2	DCUe/-4 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe/-6 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-1 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-10 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-11 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-12 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-13 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-2 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-3A Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-3B Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-5 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-7 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-8 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	DCUe-9 Split unit 20A 208v 2p connection	1.00	ea	1,004.27 /ea	1,004
2	EB-1 Electric boiler 800A 480v connection	1.00	ea	5,564.55 /ea	5,565
2	EB-2 Electric boiler 800A 480v connection	1.00	ea	5,564.55 /ea	5,565
2	EF-1 Exhaust fan 20A 480v connection	1.00	ea	957.00 /ea	957
2	EF-2 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EF-3 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EF-4 Exhaust fan 20A 120v connection	1.00	ea	596.27 /ea	596
2	EWH-1 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	EWH-2 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	EWH-3 Electric water heater 30A 480v connection	1.00	ea	475.00 /ea	475
2	FCU-1**6 Fan coil units 20A 208v 2p connection	6.00	ea	780.47 /ea	4,683
2	KEF-1 Kitchen hood fan 30A 480v connection	1.00	ea	1,389.94 /ea	1,390

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
?	MAU-1 Make up air 20A 480v connection	1.00	ea	1,180.71 /ea	1,181
2	MV-1 Mixing valve 20A 10v connection	1.00	ea	325.00 /ea	325
2	MV-2 Mixing valve 20A 10v connection	1.00	ea	325.00 /ea	325
2	OMP-1 Oil monitoring panel 20A 120v connection	1.00	ea	425.00 /ea	425
2	P-1 HP-HHW Heating hot water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-10 -CCHW Condenser water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-12 Water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-13 Water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-2 HP-HHW Heating hot water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-3 HP-CHW Chilled water 7.5HP 480v connection	1.00	ea	1,570.27 /ea	1,570
2	P-4 HP-CHW Chilled water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-5 BLDG HHW-Heating hot water 10HP 480v connection	1.00	ea	1,581.33 /ea	1,581
2	P-7 BLDG-CHW Chilled water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-8 BLDG-CHW Chilled water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	P-9 -CCHW Condenser water 20HP 480v connection	1.00	ea	2,168.66 /ea	2,169
2	RP-1 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RP-2 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RP-3 Radiant heating panel 20A 120v connection	1.00	ea	325.00 /ea	325
2	RTU-1 Roof top unit 100A 480v connection	1.00	ea	3,052.74 /ea	3,053
2	RTU-2 Roof top unit 100A 480v connection	1.00	ea	3,052.74 /ea	3,053
2	RTU-3 Roof top unit 60A 480v connection	1.00	ea	2,126.77 /ea	2,127
2	RTU-4 Roof top unit 80A 480v connection	1.00	ea	2,647.71 /ea	2,648
2	RTU-5 Roof top unit 40A480v connection	1.00	ea	1,995.09 /ea	1,995
2	RTU-6 Roof top unit 20A 480v connection	1.00	ea	1,478.49 /ea	1,478
2	RTU-7 Roof top unit 20A 480v connection	1.00	ea	1,345.38 /ea	1,345
2	RTU-8 Roof top unit 20A 480v connection	1.00	ea	1,345.38 /ea	1,345
2	RTU-9 Roof top unit 20A 480v connection	1.00	ea	1,343.31 /ea	1,343
2	SM-1**4 Water sub metering 20A 120v connection	4.00	ea	325.00 /ea	1,300
2	SP-1 Elevator sump pump 20A 208v 2p connection	1.00	ea	375.00 /ea	375
2	SPCP-1 Elevator sump pump control panel 20A 120v connection	1.00	ea	425.00 /ea	425
2	UH-1**5 Hot water unit heaters 20A 120v connection	5.00	ea	564.450 /ea	2,822
2	VAV-** Variable air volume 20A 120v connection (96)	160.00	ea	429.60 /ea	68,736
2	Radon venting j-box & circuit	24.00	ea	1,040.00 /ea	24,960
2	3/4" - EMT 3#12	2,400.00	lf	11.42 /lf	27,408
2	3/4" - EMT 4#12	1,775.00	lf	11.736 /lf	20,831
2	3/4" - EMT 5#12	1,000.00	lf	13.429 /lf	13,429
2	3/4" - EMT 3#10	2,200.00	lf	12.42 /lf	27,324
2	3/4" - EMT 4#10	1,000.00	lf	13.888 /lf	13,888
2	3/4" - EMT 5#10	500.00	lf	14.623 /lf	7,311
2	1" EMT - 4 # 8	550.00	lf	17.587 /lf	9,673
2	60A Feeder EMT copper EMT	155.00	ea	27.578 /ea	4,275
2	100A Feeder EMT copper	465.00	lf	53.562 /lf	24,906
2	600A 4w Feeder EMT copper	240.00	lf	284.573 /lf	68,297
2	800A Feeder EMT copper	240.00	lf	449.157 /lf	107,798
2	#12/3C MC Cable	5,500.00	lf	5.056 /lf	27,808
2	Emergency Power and Distribution				
2	600KW Diesel genset , weather proof enclosure w/200KW load bank	1.00	ea	650,000.00 /ea	650,000

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
2	100A 4p 480v Generator quick connect switch					
2	100A 4p 480v Generator quick connect switch					
2	ATS-LS 200A 4' ISO bypass transfer switch 277/480v					
2	ATS-OS 1000A 4p 277/480v transfer switch	1.00	ea	3,321.85	/ea	3,322
2	-Dist. Panel NEDP 1000A MLO 277/480v	1.00	ea	26,440.46	/ea	26,440
2	Panel EHP3B 400A MLO 277/480v 42p	1.00	ea	5,075.53	/ea	5,076
2	-Panel ELP1A 100A MLO 277/480v 42p	1.00	ea	3,809.34	/ea	3,809
2	-Panel ELP2A 100A MLO 277/480v 42p	1.00	ea	3,809.34	/ea	3,809
2	-Panel ELP2B 100A MLO 277/480v 42p	1.00	ea	3,809.34	/ea	3,809
2	-Panel ELP2B2 100A MLO 277/480v 42p	1.00	ea	3,809.34	/ea	3,809
2	Panel EL3B 100A MLO 277/480v 42p	1.00	ea	3,809.34	/ea	3,809
2	-Panel EP1A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,333.52	/ea	3,334
2	-Panel EP1B 100A MLO 120/208v 72p 200% Neutral	1.00	ea	3,333.52	/ea	3,334
2	-Panel EP2A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68	/ea	3,335
2	-Panel EP2B 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68	/ea	3,335
2	-Panel EP2B2 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68	/ea	3,335
2	-Panel EP3A 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,333.52	/ea	3,334
2	-Panel EP3B 100A MLO 120/208v 60p 200% Neutral	1.00	ea	3,334.68	/ea	3,335
2	T-6 75KVA K-13 Transformer 480-120/208v	2.00	ea	14,402.68	/ea	28,805
2	# 3 MI cable feeder	1,350.00	ea	85.00	/ea	114,750
2	100A 4w Feeder EMT copper	1,000.00	ea	56.45	/ea	56,450
2	125A 3w Feeder EMT copper	400.00	ea	54.15	/ea	21,660
2	225A 4w Feeder EMT copper	325.00	lf	91.90	/lf	29,868
2	400A 4w Feeder EMT copper	183.00	lf	204.57	/lf	37,436
2	Feeder Pri/sec 75KVA 3PH Transformer	2.00	ea	1,860.08	/ea	3,720
2	Lighting and Branch Lighting					
2	Lighting fixture budget	1.00	ls	935,000.00	/ls	935,000
2	Lighting unit prices include installations & supports					
2	Type LC1 LED 30' Flexibel tape ceiling cove	1.00	ea	1,850.00	/ea	1,850
2	Type LC1 LED 50' Flexible tape under stair tread	1.00	ea	2,362.50	/ea	2,363
2	Type LC1 LED 60' Flexible tape under stair tread	1.00	ea	2,835.00	/ea	2,835
2	Type LDC LED Flexible tape in 8' corner mounted channel	36.00	ea	378.00	/ea	13,608
2	Type LK22 LED 2x2 recessed food prep grade	40.00	ea	132.56	/ea	5,302
2	Type LP2 LED 4' pendant dir/ind	2.00	ea	195.75	/ea	392
2	Type LP4 LED 4' pendant dir/ind	43.00	ea	195.75	/ea	8,417
2	Type LP6 LED 6' pendant dir/ind	8.00	ea	222.75	/ea	1,782
2	Type LP8 LED 8' pendant dir/ind	315.00	ea	222.75	/ea	70,166
2	Type LPA LED 12' pendant dir/ind	1.00	ea	249.75	/ea	250
2	Type LPB LED 2' pendant dir/ind	2.00	ea	155.25	/ea	311
2	Type LPB LED 4' pendant dir/ind	1.00	ea	195.75	/ea	196
2	Type LPB LED 6' pendant dir/ind	2.00	ea	222.75	/ea	446
2	Type LPB LED 8' pendant dir/ind	1.00	ea	222.75	/ea	223
2	Type LPB LED 10' pendant dir/ind	1.00	ea	249.75	/ea	250
2	Type LPB LED 12' pendant dir/ind	3.00	ea	276.75	/ea	830
2	Type LPB LED 16' pendant dir/ind	2.00	ea	330.75	/ea	662
2	Type LPB LED 18' pendant dir/ind	1.00	ea	384.75	/ea	385
2	Type LPB LED 20' pendant dir/ind	1.00	ea	384.75	/ea	385
2	Type LPB LED 22' pendant dir/ind	1.00	ea	438.75	/ea	439
2	Type LPB LED 26' pendant dir/ind	3.00	ea	519.75	/ea	1,559
2	Type LPB LED 28' pendant dir/ind	8.00	ea	519.75	/ea	4,158
2	Type LPB LED 30 pendant dir/ind	3.00	ea	560.25	/ea	1,681

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
?	Type LPB LED 32' pendant dir/ind	3.00	ea	560.25 /ea	1,681
2	Type LPB LED 34' pendant dir/ind	1.00	ea	614.25 /ea	614
2	Type LPG LED Gym high bay	30.00	ea	222.75 /ea	6,683
2	Type LR2 LED 2"x2' recessed linear	80.00	ea	108.00 /ea	8,640
2	Type LR22 LED 2x2 recessed	12.00	ea	81.00 /ea	972
2	Type LR4 LED 2"x4' recessed linear	279.00	ea	108.00 /ea	30,132
2	Type LR6 LED 2"x6 recessed linear	67.00	ea	135.00 /ea	9,045
2	Type LR6T LED 2"x6 recessed linear	6.00	ea	135.00 /ea	810
2	Type LR8 LED 2"x8 recessed linear	83.00	ea	162.00 /ea	13,446
2	Type LR8T LED 2"x8 recessed linear	2.00	ea	162.00 /ea	324
2	Type LRB LED 2"x6' recessed linear wet location	46.00	ea	182.25 /ea	8,384
2	Type LRB LED 2"x10' recessed linear wet location	15.00	ea	195.75 /ea	2,936
2	Type LRA LED 2"x 12' recessed linear wet location	8.00	ea	222.75 /ea	1,782
2	Type LS2 LED 2' x 2" Utility strip	5.00	ea	87.75 /ea	439
2	Type LS4 LED 4' x 2" Utility strip	19.00	ea	121.50 /ea	2,309
2	Type LS6 LED 6' x 2" Utility strip	15.00	ea	121.50 /ea	1,823
2	Type LS8 LED 2' x 8" Utility strip	43.00	ea	148.50 /ea	6,386
2	Type LT1 LED 4' pendant dir/ind	2.00	ea	195.75 /ea	392
2	Type LT1 LED 6' pendant dir/ind	1.00	ea	222.75 /ea	223
2	Type LT1 LED 8' pendant dir/ind	15.00	ea	222.75 /ea	3,341
2	Type LT1 LED 10' pendant dir/ind	2.00	ea	249.75 /ea	500
2	Type LT1 LED 14' pendant dir/ind	1.00	ea	330.75 /ea	331
2	Type LT1 LED 16' pendant dir/ind	4.00	ea	330.75 /ea	1,323
2	Type LT1 LED 18' pendant dir/ind	1.00	ea	384.75 /ea	385
2	Type LT1 LED 20' pendant dir/ind	3.00	ea	384.75 /ea	1,154
2	Type LT1 LED 22' pendant dir/ind	2.00	ea	425.25 /ea	851
2	Type LT1 LED 24' pendant dir/ind	1.00	ea	425.25 /ea	425
2	Type LT1 LED 26' pendant dir/ind	5.00	ea	479.25 /ea	2,396
2	Type LT1 LED 28' pendant dir/ind	15.00	ea	479.25 /ea	7,189
2	Type LT1 LED 30' pendant dir/ind	8.00	ea	533.25 /ea	4,266
2	Type LT1 LED 32' pendant dir/ind	5.00	ea	533.25 /ea	2,666
2	Type LT1 LED 34' pendant dir/ind	1.00	ea	560.25 /ea	560
2	Type LTC LED pendant dir/ind multi drop clustrers	6.00	ea	650.00 /ea	3,900
2	Type PC1 LED architectural pendant	54.00	ea	303.75 /ea	16,403
2	Type PC2 LED architectural pendant	43.00	ea	303.75 /ea	13,061
2	Type RC1 LED 4" recessed down light	245.00	ea	135.00 /ea	33,075
2	Type RC2 LED 4" recessed down light	88.00	ea	135.00 /ea	11,880
2	Type RC3 LED 2" recessed down light	20.00	ea	121.50 /ea	2,430
2	Type RC4 LED 6" recessed down light - None Shown				
2	Type SL4 LED Single head on 12.5' pole	21.00	ea	810.00 /ea	17,010
2	Type SL7 LED Wall mount exterior flood	11.00	ea	337.50 /ea	3,713
2	Type SL8 LED 4" recessed down light exterior canopy	37.00	ea	168.75 /ea	6,244
2	Type TH1 LED theatrical spot	16.00	ea	540.00 /ea	8,640
2	Type TR1 LED 30' theatrical track /track mount adapter	2.00	ea	540.00 /ea	1,080
2	Type UC LEC 30" undercabinet	93.00	ea	135.00 /ea	12,555
2	Type X1 LED Exit edge lit single face	27.00	ea	135.00 /ea	3,645
2	Type X1W LED Exit edge lit single face wall mount	24.00	ea	135.00 /ea	3,240
2					
2	(L) Slv Wall lighting control	301.00	ea	146.886 /ea	44,213
2	(OS] Ceiling occupancy senser	459.00	ea	182.286 /ea	83,669
2	[LTS] Wall scene controller	7.00	ea	306.329 /ea	2,144
2	[OS-HB] Hi-bay Ceiling occupancy senser	22.00	ea	182.286 /ea	4,010
2	[PS] Lighting photo control	60.00	ea	195.596 /ea	11,736

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
?	[PS] Partition senser lighting control	2.00	ea	413.71 /ea	827
2	[R] Emergency lighting relay	22.00	ea	512.353 /ea	11,272
2	[RC] Room controller	68.00	ea	767.706 /ea	52,204
2	20A 120-277V S/P Switch , box & plate	17.00	ea	94.924 /ea	1,614
2	25' CAT 6 Lighting control cable	872.00	ea	58.509 /ea	51,020
2	Lighting control wall box	314.00	ea	69.550 /ea	21,839
2	3/4" - EMT 5#12	150.00	lf	13.387 /lf	2,008
2	3/4" - EMT 7#12	2,000.00	lf	14.698 /lf	29,397
2	3/4" - EMT 5#10	675.00	lf	14.70 /lf	9,923
2	3/4" - EMT 5#12-2#16 10vdc	2,000.00	lf	29.197 /lf	58,394
2	Luminary cable MC 12/2 & 14/2 1-10VDC	32,550.00	lf	7.548 /lf	245,674
2	Lighting controls programming	160,731.00	sf	0.15 /sf	24,110
	ELECTRICAL			*30.499/sf*	*5,033,425*
	165,035.00 sf				
	D5010 Electrical Service And Distribution			*30.499/sf*	*5,033,425*
	165,035.00 sf				
D5020	*Lighting & Branch Wiring*				
11-0000.000	*EQUIPMENT*				
)10	Theatrical Lighting Package - Barbizon Budget	1.00	ls	110,000.00 /ls	110,000
	EQUIPMENT			*0.667/sf*	*110,000*
	165,035.00 sf				
26-0000.000	*ELECTRICAL*				
?	Theater Lighting				
2	Theater lighting & dimming equipment , included in equipment section	1.00	ls		
2	Theater lighting system circuits & installation	1.00	allw	25,000.00 /allw	25,000
2					
	ELECTRICAL			*0.151/sf*	*25,000*
	165,035.00 sf				
	D5020 Lighting & Branch Wiring			*0.818/sf*	*135,000*
	165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	D5020 Lighting & Branch Wiring			*0.818/sf*	*135,000*
	165,035.00 sf				
D5023	*General Power*				
26-0000.000	*ELECTRICAL*				
	Device Branch				
2	20A 125V 3W Single receptacle, box & plate	128.00	ea	111.695 /ea	14,297
2	20A 125V Duplex receptacle, box & plate	280.00	ea	99.053 /ea	27,735
2	20A 125V Duplex GFCI receptacle, box & plate	149.00	ea	116.766 /ea	17,398
2	20A 125V Duplex GFCI receptacle, box & WP plate	10.00	ea	123.65 /ea	1,237
2	20A 125V Controlled duplex receptacle, box & plate	587.00	ea	99.053 /ea	58,144
2	(2) 20A 125V Duplex controlled receptacle, box & plate	242.00	ea	144.995 /ea	35,089
2	(2) 20A 125V Duplex receptacle, box & plate	38.00	ea	145.006 /ea	5,510
2	15-50R 250V 4W Kiln receptacle, box & plate	2.00	ea	240.105 /ea	480
2	PT** Poke thru w/ branch circuits & raceways 1	8.00	ea	3,012.69 /ea	24,102
2	[FB1] 8 Gang floor box w/ branch & Telcom raceways	6.00	ea	1,842.11 /ea	11,053
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate	24.00	ea	149.552 /ea	3,589
2	[ADO] Automatic door operator & connection	12.00	ea	591.647 /ea	7,100
2	[PP] Door push plate & circuit	24.00	ea	427.758 /ea	10,266
2	20A Cord reel w/ 25' cable	6.00	ea	1,390.693 /ea	8,344
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate IDF closet	24.00	ea	149.552 /ea	3,589
2	L5-30R 30A 125V 3Wire TL receptacle, box & plate MDF racks	24.00	ea	149.552 /ea	3,589
2	30A 250/600V DSN SW NON-FUS - NEMA 1	2.00	ea	408.80 /ea	818
2	Auto flush/faucet valve connection	110.00	ea	213.559 /ea	23,492
2	Basketball backstop receptacle & connection	6.00	ea	1,162.413 /ea	6,974
2	Bleacher driver motor connection	2.00	ea	413.71 /ea	827
2	Shot clock & scoreboard connection	2.00	ea	1,530.74 /ea	3,061
2	Emergency pull switch & light	3.00	ea	947.857 /ea	2,844
2	Hand Dryer connection	43.00	ea	198.924 /ea	8,554
2	Motorized shade connection	18.00	ls	229.154 /ls	4,125
2	Motorized shade control connection	7.00	ea	325.210 /ea	2,276
2	Movable partition motor 30A 208v onnection	3.00	ea	1,100.00 /ea	3,300
2	Overhead coiling door operator connection	3.00	ea	709.413 /ea	2,128
2	3/4" - EMT 3#12	1,600.00	lf	16.034 /lf	25,654
2	3/4" - EMT 5#12	700.00	lf	14.02 /lf	9,814
2	3/4" - EMT 7#12	4,600.00	lf	15.126 /lf	69,581
2	3/4" - EMT 3#10	500.00	lf	16.014 /lf	8,007
2	3/4" - EMT 7#10	5,250.00	lf	16.93 /lf	88,883
2	#10/3C MC Cable	2,400.00	lf	5.399 /lf	12,957
2	#12/2C MC Cable	18,720.00	lf	4.084 /lf	76,447
2	#12/3C MC Cable	32,000.00	lf	5.202 /lf	166,467
2	60A 4w Feeder EMT copper	75.00	lf	27.808 /lf	2,086
2	Gymnasium circuit 3/4" - EMT 4#12	586.00	lf	12.612 /lf	7,391
2	Backstop circuits 3/4" - EMT 5#12	803.00	lf	13.615 /lf	10,933
2	3/4" - EMT 5#12 IDF closet circuits	250.00	lf	17.812 /lf	4,453
2	3/4" - EMT 5#12 MDF Rack circuits	283.00	lf	17.073 /lf	4,832
2	Kitchen equipment connections 20A 3w allowance	1.00	ls	25,000.00 /ls	25,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	ELECTRICAL			*4.862/sf*	*802,425*
	165,035.00 sf				
	D5023 General Power			*4.862/sf*	*802,425*
	165,035.00 sf				
D5040	*Lightning and Power Specialties*				
26-0000.000	*ELECTRICAL*				
!	Lightning and Power Specialties				
2	Building & service grounding	1.00	ls	30,000.00 /ls	30,000
2	Lighting protection	1.00	ls	125,000.00 /ls	125,000
	ELECTRICAL			*0.939/sf*	*155,000*
	165,035.00 sf				
	D5040 Lightning and Power Specialties			*0.939/sf*	*155,000*
	165,035.00 sf				
D5080	*Miscellaneous Electrical Systems*				
27-0000.000	*COMMUNICATIONS*				
)01	Miscellaneous Systems				
001	Temporary power and lights	1.00	ls	225,000.00 /ls	225,000
001	Subcontractor general conditions	1.00	ls	350,000.00 /ls	350,000
001	BIM Coordination	1.00	ls	45,000.00 /ls	45,000
001	Electrical Premium Time	1.00	ls	50,000.00 /ls	50,000
	COMMUNICATIONS			*4.060/sf*	*670,000*
	165,035.00 sf				
	D5080 Miscellaneous Electrical Systems			*4.060/sf*	*670,000*
	165,035.00 sf				
D5095	*Testing & Commissioning*				
27-0000.000	*COMMUNICATIONS*				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	Testing and Commissioning				
001	Testing and Commissioning	1.00	ls	50,000.00 /ls	50,000
	COMMUNICATIONS			*0.303/sf*	*50,000*
	165,035.00 sf				
	D5095 Testing & Commissioning			*0.303/sf*	*50,000*
	165,035.00 sf				
	D50 ELECTRICAL			**41.602/sf**	**6,865,849**
	165,035.00 sf				
D60	**COMMUNICATIONS**				
D6010	*Data Communications*				
27-0000.000	*COMMUNICATIONS*				
)01	Telephone and Communications Systems				
001	Telecomm wall sleeve 1" - EMT	335.00	lf	125.00 /lf	41,875
001	Telcom backbone (2) 4" EMT w/hangers	500.00	lf	118.054 /lf	59,027
001	Telcom closet ground 1/0 THHN 1" EMT	320.00	lf	18.791 /lf	6,013
001	1/4"x 4"x 3' Copper ground bar	4.00	ea	491.82 /ea	1,967
001	Telcom wall & floor sleeves 4" x 12"	33.00	ea	235.817 /ea	7,782
001	12" Wx 3" Dx 9" Spacing Alum cable tray	130.00	ea	68.912 /ea	8,959
001	12x 12x 6" BOX HNGD CVR - NEMA 3R	9.00	ea	378.387 /ea	3,405
001	MDF Closet 4-post rack,	3.00	ea	1,800.00 /ea	5,400
001	IDF racks horizontal wire management	6.00	ea	763.928 /ea	4,584
001	IDF Closet 2-post rack, 45u	3.00	ea	601.557 /ea	1,805
001	48 Port 1-RMU FO Patch panel	2.00	ea	380.43 /ea	761
001	48 Port CAT6 UTP Patch panel	32.00	ea	339.129 /ea	10,852
001	(CAM) 1-CAT 6A Devices , termination & testing	121.00	ea	84.58 /ea	10,234
001	(W) 1-CAT 6A Devices , termination & testing	130.00	ea	84.58 /ea	10,995
001	1-CAT 6A Devices , termination & testing	3.00	ea	84.58 /ea	254
001	2-CAT 6A Devices , termination & testing	70.00	ea	148.72 /ea	10,410
001	2-CAT 6A Devices , termination & testing FP location	81.00	ea	148.72 /ea	12,046
001	3-CAT 6A Devices , termination & testing	93.00	ea	216.57 /ea	20,141
001	4-CAT 6A Devices , termination & testing	3.00	ea	280.44 /ea	841
001	(WAP) 2-CAT 6A Devices , termination & testing	158.00	ea	86.638 /ea	13,689
001	CORD - 10' 1F PATCH ST>SC MM	1,150.00	ea	46.586 /ea	53,573
001	CORD - 10' PATCH CMR CAT6A BLU	100.00	ea	36.792 /ea	3,679
001	CBL - CMP CAT6A UTP BLU	225,000.00	lf	1.65 /lf	371,250
001	FO Cable 24F MM OM4 Armored	350.00	lf	7.20 /lf	2,520
001	FO Cable 24F SM OS2 Armored	350.00	lf	4.65 /lf	1,628
001	FO Terminations	288.00	ea	68.654 /ea	19,772
001	Electronic technology equipment budget	1.00	ls	585,000.00 /ls	585,000

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	COMMUNICATIONS			*7.686/sf*	*1,268,463*
	165,035.00 sf				
	D6010 Data Communications			*7.686/sf*	*1,268,463*
	165,035.00 sf				
D6020	*Voice Communications*				
27-0000.000	*COMMUNICATIONS*				
)01	Public Address Systems				
001	(TB) Classroom talk back 8" Ceiling speaker	62.00	ea	315.00 /ea	19,530
001	[CB] classroom call station	64.00	ea	619.172 /ea	39,627
001	Paging 8" ceiling speaker	225.00	ea	260.00 /ea	58,500
001	PA speaker w/volume control	133.00	ea	185.730 /ea	24,702
001	One way wall mounted Speaker	30.00	ea	215.13 /ea	6,454
001	One way exterior wall mounted Speaker	8.00	ea	325.00 /ea	2,600
001	Exterior wall mount speaker	1.00	ea	405.00 /ea	405
001	Gymnasium sound system raceways	660.00	lf	13.485 /lf	8,900
001	Gymnasium One way ceiling mounted box Speaker	12.00	ea	450.00 /ea	5,400
001	#18- 2P Twisted pr cable	30,000.00	lf	1.27 /lf	38,100
001	Gymnasium sound system	1.00	ls	25,000.00 /ls	25,000
001	Public address Systems equipment & installation	1.00	ls	25,000.00 /ls	25,000
001	Program Clock System				
001	Equipment & programming allowance	1.00	ls	20,000.00 /ls	20,000
001	12" Surface wireless clock	160.00	ea	410.00 /ea	65,600
001	16" Surface wireless clock w/wire guard	2.00	ea	600.00 /ea	1,200
	COMMUNICATIONS			*2.066/sf*	*341,018*
	165,035.00 sf				
	D6020 Voice Communications			*2.066/sf*	*341,018*
	165,035.00 sf				
D6030	*Audio-Video Communication*				
27-0000.000	*COMMUNICATIONS*				
)01	AV System				
001	AV Equipment & installation	1.00	budget	350,000.00 /budget	350,000
001	AV wall sleeve (1) 1" & (1) 1-1/4" - EMT & box	208.00	ea	325.00 /ea	67,600
001	[L1] ALS Antennae backbox & wall sleeve	3.00	ea	209.277 /ea	628

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	)01	[S1] Gymnasium speaker backbox & wall sleeve	11.00	ea	260.222 /ea	2,862
	001	AV Ceiling projector location box & 1" sleeve	152.00	ea	209.715 /ea	31,877
	001	Cafeteria AV 1-1/4" wall sleeve	21.00	ea	341.392 /ea	7,169
	001	AV raceway rough in for classrooms	63.00	ea	500.00 /ea	31,500
	001	16" Wx 4" D Wire mesh cable tray	90.00	lf	45.00 /lf	4,050
	001	[SR] Classroom sound reinforcement speaker	66.00	ea	3,200.00 /ea	211,200
	001	Digital signs	1.00	ls	25,000.00 /ls	25,000
		COMMUNICATIONS			*4.435/sf*	*731,886*
		165,035.00 sf				
		D6030 Audio-Video Communication			*4.435/sf*	*731,886*
		165,035.00 sf				
D6060		*Distributed Communications and Monitoring*				
27-0000.000		*COMMUNICATIONS*				
	)01	DAS Radio Repeater System				
	001	Distributed access Amplifier system	1.00	allw	250,000.00 /allw	250,000
	001	Radio repeater system allowance	1.00	ls	125,000.00 /ls	125,000
		COMMUNICATIONS			*2.272/sf*	*375,000*
		165,035.00 sf				
		D6060 Distributed Communications and Monitoring			*2.272/sf*	*375,000*
		165,035.00 sf				
		D60 COMMUNICATIONS			**16.459/sf**	**2,716,367**
		165,035.00 sf				
D70		**ELECTRONIC SAFETY AND SECURITY**				
D7020		*Safety and Security*				
27-0000.000		*COMMUNICATIONS*				
	)01	Security Access Control &CCTV				
	001	[CR] Car reader raceway, device	59.00	ea	720.130 /ea	42,488
	001	Security door rough-in raceways & boxes	59.00	ea	439.905 /ea	25,954
	001	[DC] Door contact	102.00	ea	124.849 /ea	12,735

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	[REX] Request to exit	58.00	ea	185.00 /ea	10,730
001	[DJ] 8x8x4 Door security junction box	58.00	ea	110.893 /ea	6,432
001	[EL] Electric door lock	58.00	ea	115.00 /ea	6,670
001	[DH] Door transfer hinge	58.00	ea	75.00 /ea	4,350
001	[KP] Digital key pad , raceway	2.00	ea	673.42 /ea	1,347
001	[LD] Local down em button	11.00	ea	388.419 /ea	4,273
001	[MO] Ceiling motion sensor & cable	60.00	ea	142.618 /ea	8,557
001	[MS] Master call station	1.00	ea	676.23 /ea	676
001	[IC] Voice intercom station	45.00	ea	489.236 /ea	22,016
001	[P] Panic call button, & raceway sleeve	16.00	ea	220.00 /ea	3,520
001	[CCTV] Ceiling mount dome camera	49.00	ea	460.00 /ea	22,540
001	[CCTV] Wall mount fixed camera	35.00	ea	460.00 /ea	16,100
001	[CCTV] Exterior wall mount camera	8.00	ea	2,480.00 /ea	19,840
001	[CCTV] Exterior wall mount 360d camera	18.00	ea	3,780.00 /ea	68,040
001	[CCTV] Exterior 270d pole mounted	1.00	ea	3,780.00 /ea	3,780
001	[CCTV] Exterior 360d pole mounted	10.00	ea	3,780.00 /ea	37,800
001	Fiber Optics to power converter w/FO termination	11.00	ea	1,015.00 /ea	11,165
001	#18- 1P Communication cable	4,000.00	lf	1.331 /lf	5,326
001	#18- 2P Communication cable	1,000.00	lf	1.708 /lf	1,708
001	#18/6C Shielded communication cable	15,000.00	lf	3.764 /lf	56,453
001	#22- 2P Communication cable	1,000.00	lf	1.601 /lf	1,601
001	#22/2C Communication cable	2,000.00	lf	1.343 /lf	2,687
001	#22/4C Communication cable	3,000.00	lf	1.471 /lf	4,412
001	Access control & CCTV head end equipment , programming & commissioning	1.00	ea	175,000.00 /ea	175,000
	COMMUNICATIONS			*3.491/sf*	*576,198*
	165,035.00 sf				
	D7020 Safety and Security			*3.491/sf*	*576,198*
	165,035.00 sf				
D7050	*Fire Alarm System*				
27-0000.000	*COMMUNICATIONS*				
)01	Fire Alarm System				
001	Equipment ,devices and programming	1.00	ls	135,000.00 /ls	135,000
001	F/A Addressable control panels per section	1.00	ea	4,621.72 /ea	4,622
001	F/A Radio master box	1.00	ea	866.57 /ea	867
001	F/A Remote annunciator	3.00	ea	577.713 /ea	1,733
001	F/A Mass notification local control panel	8.00	ea	577.715 /ea	4,622
001	F/A Graphic display	1.00	ea	433.28 /ea	433
001	F/A Knox box	1.00	ea	554.35 /ea	554
001	F/A Terminal cabinet	5.00	ea	577.714 /ea	2,889
001	Mass notification message board	4.00	ea	577.715 /ea	2,311
001	F/A Exterior rotating beacon	1.00	ea	774.07 /ea	774
001	F/A Pull station installed w/back box	18.00	ea	279.017 /ea	5,022
001	F/A CO detector installed w/.back box	12.00	ea	206.739 /ea	2,481
001	F/A Smoke detector installed w/back box	163.00	ea	475.823 /ea	77,559
001	F/A Smoke detector installed w/elevator relay base & back box	2.00	ea	475.825 /ea	952

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
)01	F/A Mass notification strobe ceiling mount installed w/back box	222.00	ea	239.907 /ea	53,259
001	F/A Mass notification strobe wall mount installed w/back box	36.00	ea	266.269 /ea	9,586
001	F/A Combo Mass Notification Speaker/strobe wall mount installed w/back box	55.00	ea	223.628 /ea	12,300
001	F/A Speaker/strobe ceiling mount installed w/back box	229.00	ea	326.047 /ea	74,665
001	F/A Strobe wall mount installed w/back box	34.00	ea	179.859 /ea	6,115
001	F/A Tamper switch & monitor module	16.00	ea	454.794 /ea	7,277
001	F/A Door holder installed w/back box	33.00	ea	546.872 /ea	18,047
001	F/A Flow switch & monitor module	5.00	ea	452.936 /ea	2,265
001	F/A Control/ monitor module relay	10.00	ea	353.696 /ea	3,537
001	F/A SLC/NAC 3/4" EMT & loop circuits	4,400.00	lf	11.386 /lf	50,098
001	F/A SLC/NAC RISER 1" EMT & loop circuits	1,500.00	lf	13.655 /lf	20,483
001	F/A 14/4 FPLP/MC cable	14,200.00	lf	4.165 /lf	59,136
001	F/A 16/2 FPLP/MC cable	6,500.00	lf	3.081 /lf	20,028
001					
001	Area of refuge	1.00	ea	25,000.00 /ea	25,000
001	F/A 16/2 FPLP/MC cable	2,200.00	lf	3.257 /lf	7,166
	COMMUNICATIONS			*3.689/sf*	*608,778*
	165,035.00 sf				
	D7050 Fire Alarm System			*3.689/sf*	*608,778*
	165,035.00 sf				
	D70 ELECTRONIC SAFETY AND SECURITY			**7.180/sf**	**1,184,976**
	165,035.00 sf				
	D SERVICES			***180.743/sf***	***29,828,867***
	165,035.00 sf				

E

E10 EQUIPMENT

E1010 Commercial Equipment

11-0000.000 EQUIPMENT

:	Food Service Equipment - Allowance	1.00	ls	876,120.00 /ls	876,120
2	Vending Machines, Including Freight & Setting in Place - removed per recon				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	EQUIPMENT			*5.309/sf*	*876,120*
	165,035.00 sf				
	E1010 Commercial Equipment			*5.309/sf*	*876,120*
	165,035.00 sf				
E1060	*Residential Equipment*				
11-0000.000	*EQUIPMENT*				
;0	Residential Appliances				
50	Refrigerators	10.00	ea	1,800.00 /ea	18,000
50	Microwaves	9.00	ea	355.00 /ea	3,195
50	Front Load Washer - None Shown				
50	Front Load Dryer - None Shown				
50	Freight	1.00	ls	1,500.00 /ls	1,500
50	Unload, Unwrap, and Drop Appliances in Place	19.00	ea	500.00 /ea	9,500
	EQUIPMENT			*0.195/sf*	*32,195*
	165,035.00 sf				
	E1060 Residential Equipment			*0.195/sf*	*32,195*
	165,035.00 sf				
E1090	*Other Equipment*				
11-0000.000	*EQUIPMENT*				
)01	Smart Board & Short Throw Projectors				
001	Smart Board & Throw Projectors - PreK/ K Classrooms				
001	Smart Board & Throw Projectors - Classrooms				
001	Smart Board & Throw Projectors - Art Classrooms				
001	Smart Board & Throw Projectors - Music Classrooms				
001	Smart Board & Throw Projectors - Staff				
001	Smart Board & Throw Projectors - Media / Library				
010	Auditorium Stage Rigging and Curtains				
010	Rigging and Curtain System	1.00	ls	75,000.00 /ls	75,000
010	Projection Screens	2.00	ea	15,000.00 /ea	30,000
10	Interior Gymnasium Equipment				
10	Motorized Basketball Hoops, Winch, Connectors	6.00	ea	13,000.00 /ea	78,000
10	Motorized Divider Curtain in Gym	1.00	ea	23,000.00 /ea	23,000
10	Volley Ball Equipment - Allowance - removed per recon				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
0	Pickle Ball Equipment - Allowance				
38	Wall Pads - 6' tall x 2' wide, Fire Rated - Gym	1,565.00	sf	42.00 /sf	65,730
38	Interior Scoreboard w/Shot Clock				
38	Traverse Wall, Climbing Wall - 8' Height	200.00	sf	100.00 /sf	20,000
38	Climbing Ropes				
38	Adaptive Swings & Hooks - Gym				
38	Calming Room Wall Padding - 6' Height	1,315.00	sf	42.00 /sf	55,230
38	Pull up bar - None Shown				
38	PT Platform Swing - None Shown	1.00	ea	6,500.00 /ea	6,500
001	Kiln	2.00	ea	9,000.00 /ea	18,000
001	Owner Training - Kiln Vendor	1.00	ls	500.00 /ls	500
	EQUIPMENT			*2.254/sf*	*371,960*
	165,035.00 sf				
	E1090 Other Equipment			*2.254/sf*	*371,960*
	165,035.00 sf				
	E10 EQUIPMENT			**7.758/sf**	**1,280,275**
	165,035.00 sf				
E20	**FURNISHINGS**				
E2010	*Fixed Furnishings*				
06-2000.000	*FINISH CARPENTRY*				
!	3-Tier Open Wall Shelving	90.00	lf	105.00 /lf	9,450
2	5-Tier Open Wall Shelving	120.00	lf	175.00 /lf	21,000
	FINISH CARPENTRY			*0.130/sf*	*30,450*
	234,125.00 sf				
12-0000.000	*FIXED FURNISHINGS*				
!	Window Treatments				
2	Type WS1a, manual (1,570 SF)	170.00	ea	225.00 /ea	38,250
2	Type WS3, motorized (4,710 SF)	15.00	ea	575.00 /ea	8,625
2	Type WS5, manual (5,900 SF)	183.00	ea	400.00 /ea	73,200
2	Exterior Mockup per AG0.05 - Window Treatments				
2	Type WS1, manual (10 SF)	1.00	ea	400.00 /ea	400
2	Type WS2, motorized (17 SF)	1.00	ea	550.00 /ea	550
001	Manufactured Casework				
001	Standard Door Base Cabinets w Plam Tops	1,080.25	lf	545.800 /lf	589,601

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	)01	Standard Door Base Cabinets w Plam Tops, Island	7.25	lf	764.121 /lf	5,540
	001	Open Base Cabinets w Plam Tops	400.00	lf	502.136 /lf	200,854
	001	Open Base Cabinets w Plam Tops, Slim	116.00	lf	360.228 /lf	41,786
	001	Plam Tops w Brackets	771.00	lf	65.496 /lf	50,497
	001	Standard Door Base Cabinets w Solid Surface Tops	644.50	lf	605.838 /lf	390,463
	001	Multi-Drawer Base Cabinets w Solid Surface Tops (Art Classroom)	22.00	lf	731.372 /lf	16,090
	001	Solid Surface Tops w Brackets	63.00	lf	92.786 /lf	5,846
	001	Solid Surface Transaction Counter - None Shown				
	001	Typical Tall Cabinetry (381 ea)	1,000.00	lf	911.486 /lf	911,486
	001	Tall Microwave Cabinetry (2 ea)	6.00	lf	818.70 /lf	4,912
	001	STE Tall Cabinetry (10 ea)	22.00	lf	999.901 /lf	21,998
	001	Tall Storage Cubbies (260 ea)	808.50	lf	911.486 /lf	736,937
	001	EPI Pen & Inhaler Storage	1.00	ea	791.42 /ea	791
	001	Mail Cubbies (Assumed to be standardized)	16.00	lf	152.824 /lf	2,445
	001	Standard Door Wall Cabinets	1,131.50	lf	350.00 /lf	396,025
	001	Open Wall Cabinets	45.50	lf	325.00 /lf	14,788
	001	Open Wall Shelving @ Library	11.75	lf	195.00 /lf	2,291
	001	Narcotics Cabinet	1.00	ea	280.00 /ea	280
	001	Student Tables on Casters @ STE Classrooms - NIC	24.00	ea		
	001	Metal Bookcases w Wood Veneer	393.00	lf	585.00 /lf	229,905
	001	Short Bookcases (25 ea)	65.25	lf		
	001	Tall Bookcases (35 ea)	87.75	lf		
	001	Freestanding Bookcases on Casters (62 ea)	186.00	lf		
	001	Freestanding Endpiece Bookcases (24 ea)	54.00	lf		
	001	Wood Veneer @ Metal Bookcases - w/ Millwork	393.00	lf		
	001	Instrument & Music Library Storage System - Allowance	1.00	ls	36,500.00 /ls	36,500
	001	MS-23	1.00	ea		
	001	MS-72	3.00	ea		
	001	MS-73	1.00	ea		
	001	MS-75	6.00	ea		
	001	MS-OG	2.00	ea		
	001	MS-PO	1.00	ea		
	001	MS-SI	2.00	ea		
	10	Telescopic Bleachers - Gym, 84' Length, 600 Seat	1.00	ls	230,000.00 /ls	230,000
		FIXED FURNISHINGS			*24.298/sf*	*4,010,061*
		165,035.00 sf				
		E2010 Fixed Furnishings			*24.483/sf*	*4,040,511*
		165,035.00 sf				
		E20 FURNISHINGS			**24.483/sf**	**4,040,511**
		165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	E EQUIPMENT AND FURNISHINGS			***32.240/sf***	***5,320,786***
	165,035.00 sf				
F					
F20	**SELECTIVE BUILDING DEMOLITION**				
F2010	*Building Demolition*				
02-0000.000	*EXISTING CONDITIONS & DEMO*				
110	Demolition	1.00	ls	600,000.00 /ls	600,000
110	Premium Time	1.00	ls	150,000.00 /ls	150,000
	EXISTING CONDITIONS & DEMO			*4.544/sf*	*750,000*
	165,035.00 sf				
	F2010 Building Demolition			*4.544/sf*	*750,000*
	165,035.00 sf				
F2020	*Hazardous Components Abatement*				
02-0000.000	*EXISTING CONDITIONS & DEMO*				
30	Hazardous Material Abatement - Includes 2,500 tons of Bulk Load	1.00	ls	1,476,600.00 /ls	1,476,600
30	Hazardous Material Abatement - Roofing Assumption				
	EXISTING CONDITIONS & DEMO			*8.947/sf*	*1,476,600*
	165,035.00 sf				
	F2020 Hazardous Components Abatement			*8.947/sf*	*1,476,600*
	165,035.00 sf				
	F20 SELECTIVE BUILDING DEMOLITION			**13.492/sf**	**2,226,600**
	165,035.00 sf				

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	F SPECIAL CONSTRUCTION AND DEMOLITION			***13.492/sf***	***2,226,600***
	165,035.00 sf				
G					
G10	**SITE PREPARATION**				
G1010	*Site Preparation*				
31-0000.000	*EARTHWORK*				
0	Early Release Pacakge #1 Sitework - See Totals Page				
10	Mass DEP Appeal Drainage Design Bridging Allowance	1.00	ls	300,000.00 /ls	300,000
	EARTHWORK			*1.818/sf*	*300,000*
	165,035.00 sf				
	G1010 Site Preparation			*1.818/sf*	*300,000*
	165,035.00 sf				
	G10 SITE PREPARATION			**1.818/sf**	**300,000**
	165,035.00 sf				
G20	**SITE IMPROVEMENTS**				
G2020	*Parking Lots & Roadways*				
32-0000.000	*EXTERIOR IMPROVEMENTS*				
25	A5/A6, Concrete Unit Pavers - Pedestrian w pattern	10,400.00	sf	28.00 /sf	291,200
2	Precast Concrete Curbing	2,650.00	lf	50.00 /lf	132,500
2	Precast Concrete Curbing - Turf Edger - removed per recon				
2	CIP Concrete Curbing - Fence Strip	670.00	lf	65.00 /lf	43,550
2	Granite Curbing - w ERP#1 - Sitework	1,000.00	lf		
6	Painted Courts	2.00	ea	30,000.00 /ea	60,000
6	Painted 4-Square	3.00	ea	3,000.00 /ea	9,000
6	Parent Round About Play Graphics	1.00	ea	12,500.00 /ea	12,500

Item		Description	Takeoff Qty		Total Unit Cost		Total Amount
		EXTERIOR IMPROVEMENTS			*3.325/sf*		*548,750*
		165,035.00 sf					
		G2020 Parking Lots & Roadways			*3.325/sf*		*548,750*
		165,035.00 sf					
G2040		*Site Developement*					
05-0000.000		*METALS*					
	10	Bollards - w Landscaping	58.00	ea			
		METALS					*0*
		165,035.00 sf					
32-0000.000		*EXTERIOR IMPROVEMENTS*					
	5	Site Concrete, Foundations	3,250.00	sf	40.00	/sf	130,000
	6	Site Concrete - Flatwork					
	6	Site Concrete, Flatwork, P&F - Sidewalks, 6" Thickness	47,030.00	sf	14.00	/sf	658,420
	6	Site Concrete, Flatwork, P&F - Paver Base, 4" Thickness	10,700.00	sf	10.00	/sf	107,000
	6	Site Concrete, Flatwork Materials	964.00	cy	155.00	/cy	149,420
	6	Site Concrete					
	6	Granite Slab Bench Footings, 1' thick x 2'6 width, F&P	190.00	lf	100.00	/lf	19,000
	6	Granite Slab Bench Footings, Material	13.00	cy	155.00	/cy	2,015
	6	Bench Footings	10.00	ea	1,500.00	/ea	15,000
	6	Trash / Recycling Footings	9.00	ea	250.00	/ea	2,250
	6	Table Footings	3.00	ea	2,500.00	/ea	7,500
	6	Circular Bench Footings	2.00	ea	2,500.00	/ea	5,000
	6	Free Form Bench Footings	4.00	ea	2,500.00	/ea	10,000
	6	Shed Footing Mat Slab 1' Thick, 10'x20'	200.00	sf	11.00	/sf	2,200
	6	Shed Footing Mat Slab , Material	8.00	cy	171.00	/cy	1,368
	6	Raised Garden Bed 6" Thick, 4'x4'	6.00	ea	500.00	/ea	3,000
	6	Main Entry Sign (AG0.04) - Form And Place, Footings & Wall	191.00	sfca	20.00	/sfca	3,820
	6	Main Entry Sign (AG0.04) - Material	5.50	cy	171.00	/cy	941
	6	Main Entry Sign (AG0.04) - Rigid Insulation, 3"	78.00	sf	3.00	/sf	234
	6	CIP Low Retaining Walls 1'-0" wide	450.00	lf	485.00	/lf	218,250
	6	CIP Low Retaining Walls 1'-6" wide	240.00	lf	485.00	/lf	116,400
	6	Site Concrete 90%-100% Bridging Allowance	1.00	ls	150,000.00	/ls	150,000
	001	Basketball Hoops	4.00	ea	10,000.00	/ea	40,000
	001	Soccer Goals	2.00	ea	8,500.00	/ea	17,000
	001	E9, Player Benches	2.00	ea	2,500.00	/ea	5,000
	20	Rubber Play Surfacing @ Playground - unit cost adjusted per Recon to include color/design installation	27,103.00	sf	40.00	/sf	1,084,120

Item	Description	Takeoff Qty		Total Unit Cost		Total Amount
:0	A10, Synthetic Turf, Play Shock Pad	4,805.00	sf	25.00	/sf	120,125
20	A11, Synthetic Turf, Play Shock Pad	480.00	sf	25.00	/sf	12,000
001	D1, 6' Long Benches w Arms	7.00	ea	8,000.00	/ea	56,000
001	D2, 6' Long Backless Benches	3.00	ea	7,500.00	/ea	22,500
001	D3, Table w Integral Seats	2.00	ea	7,725.00	/ea	15,450
001	D4, Table w Integral Seats & ADA Seat	1.00	ea	7,000.00	/ea	7,000
001	D5, Litter Receptacles	9.00	ea	5,000.00	/ea	45,000
001	D6, Bicycle Racks	23.00	ea	977.00	/ea	22,471
001	D7, Aluminum Flagpole, Internal Halyard	2.00	ea	15,000.00	/ea	30,000
001	D8, 10' x 20' Prefabricated Shed	1.00	ea	25,000.00	/ea	25,000
001	D9, Raised Garden Beds, ADA Compliant	6.00	ea	1,835.00	/ea	11,010
001	D10, Free-Form Benches	4.00	ea	7,425.00	/ea	29,700
001	D11, Sculptural Benches	1.00	ea	13,275.00	/ea	13,275
001	D12, Backless Curved Benches	4.00	ea	1,700.00	/ea	6,800
001	D13, Movable Cube Seats, Free-Standing	8.00	ea	175.00	/ea	1,400
001	D14, Circular Benches	2.00	ea	1,500.00	/ea	3,000
001	D15, Buddy Benches - adjusted per recon	5.00	ea	1,500.00	/ea	7,500
001	E18, Shade Structure - adjusted per recon	2.00	ea	70,000.00	/ea	140,000
001	B1, Masonry Panel System Seatwall, Self-Capping	80.00	lf	1,200.00	/lf	96,000
001	B2/B3, Granite Monolithic Benches	185.00	lf	1,350.00	/lf	249,750
001	C1, Vehicular Bollards, Stainless Steel w LED Light	29.00	ea	1,000.00	/ea	29,000
001	C2, Vehicular Bollards, Stainless Steel nonlit	29.00	ea	1,000.00	/ea	29,000
001	H3 - Tree Grates	3.00	ea	5,000.00	/ea	15,000
001	Playground Equipment - Pre-K	1.00	allow	300,000.00	/allow	300,000
001	Playground Equipment - K -> 2nd	1.00	allow	350,000.00	/allow	350,000
001	Playground Equipment - 3 -> 5	1.00	allow	420,000.00	/allow	420,000
001	Playground Underdrainage Coordination	1.00	ls	50,000.00	/ls	50,000
001	Existing Playground to be Reinstalled & Salvaged - removed per recon					
20	C3, Decorative Metal Fence, 4' height	810.00	lf	225.00	/lf	182,250
20	C4, Decorative Metal Double Gate - 12' wide	3.00	ea	10,000.00	/ea	30,000
20	C5, Decorative Metal Double Gate, 7' width	1.00	ea	6,500.00	/ea	6,500
20	C6, Decorative Metal Single Gate, 4' width - Panic Bar Hardware	2.00	ea	5,000.00	/ea	10,000
20	C7, Decorative Metal Single Gate, 4' width - Self Closing	3.00	ea	3,500.00	/ea	10,500
20	C8, Self-Latching Magnetic Childproof Gate Latch	8.00	ea	1,200.00	/ea	9,600
20	C9, Chain Link Sports Field - 8' high	277.00	lf	185.00	/lf	51,245
20	C10, Chain Link Sport Field Single Gate, 4' width, 8' high	1.00	ea	3,000.00	/ea	3,000
20	C11, Chain Link Sport Field Single Gate, 4' width, 8' high, 12' Swing	1.00	ea	5,000.00	/ea	5,000
20	C12, Chain Link Sport Court Fence, 10' high	673.00	lf	250.00	/lf	168,250
20	C13, Chain Link Sport Court Gate, 6' wide, 10' high	2.00	ea	5,000.00	/ea	10,000
20	C14, Chain Link Sport Court Gate, 4' wide, 10' high	2.00	ea	3,500.00	/ea	7,000
20	C15, Chain Link Sport Court Gate, 4' wide, 10' high - Mesh Front	1.00	ea	3,800.00	/ea	3,800
20	C16, Vehicular Barrier Double Swing Gate, 40' width	1.00	ea	4,725.00	/ea	4,725
20	C17, Vehicular Barrier Double Swing Gate, 26' width	1.00	ea	435.00	/ea	435
20	C18, Vehicular Barrier Double Swing Gate, 28' width	1.00	ea	15,000.00	/ea	15,000
20	C19, Steel Barrier Double Swing Gate, 24' width	1.00	ea	15,000.00	/ea	15,000
20	C20, Wood Privacy Fencing, 6' height	897.00	lf	135.00	/lf	121,095
20	C21, Utility Screen Fencing, 6' height	185.00	lf	150.00	/lf	27,750

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
		EXTERIOR IMPROVEMENTS			*33.545/sf*	*5,536,069*
		165,035.00 sf				
		G2040 Site Developement			*33.545/sf*	*5,536,069*
		165,035.00 sf				
G2050		*Landscaping*				
04-0000.000		*MASONRY*				
	?	Cast Stone Cap - 2'4" w x 12'4" l x 5" d - Exterior Monument Signage	12.40	sf	160.00 /sf	1,984
	110	Brick Veneer - Exterior Monument Signage	105.00	sf	46.00 /sf	4,830
	102	Exterior 6" CMU Wall - Exterior Monument Signage	22.00	sf	34.00 /sf	748
	102	Exterior 12" CMU Wall - Exterior Monument Signage	22.00	sf	42.00 /sf	924
	102	Exterior CUVM Veneer - Custom Cast Stone, Light Buff - Exterior Monument Signage	12.00	sf	70.00 /sf	840
	102	Exterior 6" CMU Wall	320.00	sf	34.00 /sf	10,880
	102	Exterior 8" CMU Wall	475.00	sf	38.00 /sf	18,050
		MASONRY			*0.232/sf*	*38,256*
		165,035.00 sf				
10-0000.000		*SPECIALTIES*				
	10	1-Sided Monument Signage	1.00	ls	6,000.00 /ls	6,000
	110	Includes Exterior 5" Fabricated Letter, Aluminum "WILMINGTON ELEMENTARY SCHOOL"	26.00	ea		
	110	Includes Exterior 4" Fabricated Letter, Aluminum "320 SALEM STREET"	14.00	ea		
	110	Includes LED Outdoor Signage - 33" x 66" x 10"	1.00	ea		
	110	Includes aluminum mounting insert	1.00	ea		
	110	38" X 84" MDF Project Signage - Allowance	1.00	ls	1,300.00 /ls	1,300
		SPECIALTIES			*0.044/sf*	*7,300*
		165,035.00 sf				
32-0000.000		*EXTERIOR IMPROVEMENTS*				
	?	Soccer Field Irrigation	14,700.00	sf	2.50 /sf	36,750

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
?	Schematic Irrigation Controller Power Conduit from Building - w Electrical	647.700	lf		
2	Schematic Irrigation Water Supply Pipe from Building - w Civil	630.39	lf		
2	Two-Wire, Internet Based Irrigation Controller	1.00	ea	15,000.00 /ea	15,000
2	Quick Coupling Valve	4.00	ea	2,250.00 /ea	9,000
2	2" Isolation Valve	3.00	ea	2,000.00 /ea	6,000
2	2" Master Valve	1.00	ea	2,000.00 /ea	2,000
2	Irrigation Mainline 2" PVC class 200	453.66	lf	45.00 /lf	20,415
2	1.5" Flow Sensor	1.00	ea	1,500.00 /ea	1,500
2	2" Irrigation Point of Connection in Landscape	1.00	ls	2,500.00 /ls	2,500
2	6" Pop-Up Gear-Driven Rotor w 3/4" Inlet (Stainless Steel Riser)	24.00	ea	225.00 /ea	5,400
25	Mulching	450.00	cy	75.00 /cy	33,750
25	Stone Drip Edge and Metal Edge	522.00	lf	75.00 /lf	39,150
10	Import and Place Topsoil - Lawn Areas, 6"	3,700.00	cy	65.00 /cy	240,500
10	Planting Soils - 12"	230.00	cy	95.00 /cy	21,850
10	Soil Cells	4.00	cy	4,000.00 /cy	16,000
10	Soil Cells and Drainage Coordination	1.00	ls	5,000.00 /ls	5,000
5	Non-Irrigated General Lawn Seed Mix	92,400.00	sf	0.65 /sf	60,060
5	Non-Irrigated Multi-Use Athletic Field Seed Mix	35,300.00	sf	0.85 /sf	30,005
5	Irrigated Multi-Use Ahtletic Field Sod Mix - adjusted per recon	14,700.00	sf	2.50 /sf	36,750
5	Non-Irrigated Shade Lawn Seed Mix	5,200.00	sf	0.65 /sf	3,380
5	Low-Growing Wildflower and Grass Mix	14,600.00	sf	0.75 /sf	10,950
5	Shade Right-Of-Way Native Woods RyeGrass Mix	12,400.00	sf	0.75 /sf	9,300
5	Fine Rake And Seed	174,600.00	sf	0.50 /sf	87,300
5	Lawn and Planting Maintenance	1.00	ls	100,000.000 /ls	100,000
120	Deciduous Street and Lawn Trees				
120	Acer Freeman "Freeman Maple" 2"-2.5" cal. 30' oc	13.00	ea	2,100.00 /ea	27,300
120	Acer Rubrum "Red Sunset" 3"-3.5" cal. 30' oc	22.00	ea	2,400.00 /ea	52,800
120	Acer Saccharum "Green Mountaint" 2.5"-3" cal. 30' oc	4.00	ea	2,200.00 /ea	8,800
120	Gleditsia Tria. Inermis "Halka" 3"-3.5" cal. 30' oc	11.00	ea	2,400.00 /ea	26,400
120	Liquidambar Styraciflua 2.5"-3" cal. 30' oc	8.00	ea	2,200.00 /ea	17,600
120	Liriodendron Tulipifera 3"-3.5" cal. 30' oc	3.00	ea	2,400.00 /ea	7,200
120	Malus "Spring Snow" 2"-2.5" cal. 20' oc	2.00	ea	2,100.00 /ea	4,200
120	Nyssa Sylvatica 2"-2.5" cal. 30' oc	15.00	ea	2,100.00 /ea	31,500
120	Platanus x Acerifolia "Exclamation" 2"-2.5" cal. 30' oc	7.00	ea	2,100.00 /ea	14,700
120	Prunus Subhirtela "Autumnalis" 2.5"-3" cal. 20' oc	3.00	ea	2,200.00 /ea	6,600
120	Quercus Bicolor 2.5"-3" cal. 30' oc	6.00	ea	2,200.00 /ea	13,200
120	Deciduous Screening Trees				
120	Amelanchier Canadensis 6'-7' ht 15' oc	13.00	ea	2,600.00 /ea	33,800
120	Betula Nigra "Heritage" 14'-16' ht 20' oc	18.00	ea	3,500.00 /ea	63,000
120	Carpinus Caroliniana 2.5"-3" cal. 20' oc	7.00	ea	2,200.00 /ea	15,400
120	Magnolia Virginiana 8'-10' ht 12' oc	12.00	ea	3,100.00 /ea	37,200
120	Evergreen Screening Trees				
120	Abies Balsamea 12'-14' ht 15' oc	12.00	ea	1,800.00 /ea	21,600
120	Abies Concolor 8'-10' ht 15' oc	3.00	ea	1,200.00 /ea	3,600
120	Larix Larcina 10'-12' ht 15' oc	13.00	ea	1,400.00 /ea	18,200
120	Picea Glauca 8'-10' ht 15' oc	7.00	ea	1,200.00 /ea	8,400
120	Thuja Occidentalis "Nigra" 10'-12' ht 10' oc	39.00	ea	1,400.00 /ea	54,600
120	Thuja Plicata "Green Giant" 10'-12' ht 15' oc	21.00	ea	1,400.00 /ea	29,400
120	Deciduous Screening Shrubs				
120	Calycanthus Floridus 36"-48" ht 6' oc	43.00	ea	400.00 /ea	17,200
120	Clethra Alnifolia "Hummingbird" 24"-30" ht 6' oc	30.00	ea	80.00 /ea	2,400
120	Cornus Swida Serice Sericea "Arctic Fire" 18"-24" ht 5' oc	60.00	ea	50.00 /ea	3,000
120	Hamamelis Virginiana 4'-5' ht 8' oc	24.00	ea	500.00 /ea	12,000

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	20	Viburnum Dentatum "Christom" 24"-30" ht 5' oc	38.00	ea	80.00 /ea	3,040
	120	Evergreen Screening Shrubs				
	120	Ilex Verticillata "Maryland Beauty" 18"-24" ht 5' oc	50.00	ea	100.00 /ea	5,000
	120	Ilex Verticillata "Jim Dandy" 24"-30" ht 5' oc	3.00	ea	100.00 /ea	300
	120	Deciduous Shrubs				
	120	Fothergilla Gardenii 18"-24" ht 3' oc	41.00	ea	50.00 /ea	2,050
	120	Ithea Virginica "Henry's Garnet" 24"-30" cont. 3' oc	36.00	ea	80.00 /ea	2,880
	120	Spiraea Japonica "Little Princess" 18"-24" ht 3' oc	13.00	ea	50.00 /ea	650
	120	Syringa Patula "Miss Kim" 30"-36" ht 4' oc	11.00	ea	325.00 /ea	3,575
	120	Rhus Aromatica "Gro-Low" 18"-24" ht 4' oc	4.00	ea	100.00 /ea	400
	120	Evergreen Shrubs				
	120	Ilex Glabra "Compacta" 24"-30" ht 4' oc	20.00	ea	325.00 /ea	6,500
	120	Juniperus Horizontalis "Bar Harbor" 15"-18" sp. 3' oc	180.00	ea	50.00 /ea	9,000
	120	Pinus Mugo "Pumilio" 18"-24" ht 3' oc	13.00	ea	50.00 /ea	650
	120	Rhododendron Yakushimanum 24"-30" ht 4' oc	15.00	ea	325.00 /ea	4,875
	120	Perennials				
	120	Allium "Globemaster" #1 gal. 18" oc	33.00	ea	20.00 /ea	660
	120	Aster Novae-Angliae "Purple Dome" #1 gal. 18" oc	31.00	ea	20.00 /ea	620
	120	Rudbeckia "American Gold RusH" Blackeyed Susan	42.00	ea	20.00 /ea	840
	120	Athyrium Filix-Femina 2 qt. cont. 18" oc	38.00	ea	15.00 /ea	570
	120	Chrysanthemum Weyrichii "White Bomb" #1 gal. 24" oc	37.00	ea	20.00 /ea	740
	120	Hemerocallis x "Joan Senior" #1 gal. 24" oc	84.00	ea	20.00 /ea	1,680
	120	Liriope Spicata #1 qt 12" oc	441.00	ea	15.00 /ea	6,615
	120	Salvia Nemorosa "Carodonna" 1 gal. 12" oc	18.00	ea	20.00 /ea	360
	120	Sedum Rupestre "Silver" #1 qt 12" oc	90.00	ea	15.00 /ea	1,350
	120	Thymus Praecox "Elfin" 2 qt. cont. 18" cont.	32.00	ea	18.00 /ea	576
	120	Grasses				
	120	Festuca Glauca "Elijah Blue" 10"-18" ht. 18" oc	72.00	ea	20.00 /ea	1,440
	120	Panicum Virgatum Switch Grass	27.00	ea	25.00 /ea	675
	120	Penninsetum Alop. "Hamlen" #2 gal. 36" oc	21.00	ea	25.00 /ea	525
		EXTERIOR IMPROVEMENTS			*8.351/sf*	*1,378,231*
		165,035.00 sf				
		G2050 Landscaping			*8.627/sf*	*1,423,787*
		165,035.00 sf				
		G20 SITE IMPROVEMENTS			**45.497/sf**	**7,508,605**
		165,035.00 sf				
G40		**SITE ELECTRICAL UTILITIES**				
G4010		*Site Electrical Utilities*				
33-0000.000		*UTILITIES*				
	001	Electrical Site Distribution				

Item		Description	Takeoff Qty		Total Unit Cost	Total Amount
	)01	Primary service riser pole (2) 4" GRC	1.00	ea	2,800.00 /ea	2,800
	001	Primary duct bank 2x 4" PVC	300.00	lf	60.00 /lf	18,000
	001	Primary service duct bank 4x 4" PVC	560.00	lf	90.00 /lf	50,400
	001	Service pad grounding	2.00	ea	1,722.00 /ea	3,444
	001	Secondary service #1 (6) 4" PVC	235.00	lf	744.64 /lf	174,990
	001	Secondary service #2 (6) 4" PVC	220.00	lf	744.64 /lf	163,821
	001	Electric utility manhole grounding & racks	2.00	ea	4,772.38 /ea	9,545
	001					
	001	Generator pad grounding	1.00	ea	3,675.00 /ea	3,675
	001	Generator feeder (4) 4" PVC 1200A	210.00	lf	459.92 /lf	96,583
	001	Generator feeder (2) 1 1/2" PVC 100A	100.00	lf	45.21 /lf	4,521
	001	Generator -quick connect feeder (2) 1 1/2" PVC 100A	160.00	lf	40.17 /lf	6,427
	001					
	001	Irrigation controller circuit1 1/4" PVC 2#4-1#8	580.00	lf	12.435 /lf	7,212
	001	Irrigation house heater 1" PVC 2#8 -1#8	580.00	lf	8.274 /lf	4,799
	001	Irrigation circuit ingrate pull boxes	2.00	ea	975.40 /ea	1,951
	001					
	001	EV Provision In-grade pull box	10.00	ea	1,405.00 /ea	14,050
	001	EV Feeder 100A 3w PVC copper	3,600.00	ea	20.820 /ea	74,952
	001					
	001	Site sign connection	2.00	lf	347.86 /lf	696
	001	Site sign circuits 1" PVC 4#6	1,305.00	lf	13.050 /lf	17,030
		UTILITIES			*3.968/sf*	*654,896*
		165,035.00 sf				
		G4010 Site Electrical Utilities			*3.968/sf*	*654,896*
		165,035.00 sf				
G4050		*Electrical Site Lighting*				
33-0000.000		*UTILITIES*				
	)01	Electrical Site Lighting				
	001	Site Lighting fixture budget	1.00	ls	175,000.00 /ls	175,000
	001	Lighting unit prices include installations & supports				
	001	Type SL1 LED single head on 12.5 pole	18.00	ea	598.963 /ea	10,781
	001	Type SL2 LED quad head on 12.5 pole	3.00	ea	598.963 /ea	1,797
	001	Type SL3 LED Single head on 12.5 pole	8.00	ea	598.964 /ea	4,792
	001	Type SL5 LED bollard	16.00	ea	332.758 /ea	5,324
	001	Type SL6 LED In grade flood	6.00	ea	900.00 /ea	5,400
	001	24" Precast concrete pole base	29.00	ea	1,091.007 /ea	31,639
	001	Bollard precast support base	16.00	ea	889.693 /ea	14,235
	001	Site lighting branch 1" PVC 4 #8	4,800.00	lf	11.565 /lf	55,511
	001	Site lighting branch 1 1/4" PVC - 4 # 4	1,651.00	lf	16.959 /lf	27,998
	001	Quazite in grade pull box	34.00	ea	1,405.025 /ea	47,771

Item	Description	Takeoff Qty		Total Unit Cost	Total Amount
	UTILITIES			*2.304/sf*	*380,249*
	165,035.00 sf				
	G4050 Electrical Site Lighting			*2.304/sf*	*380,249*
	165,035.00 sf				
	G40 SITE ELECTRICAL UTILITIES			**6.272/sf**	**1,035,144**
	165,035.00 sf				
G50	**SITE COMMUNICATIONS**				
G5010	*Site Communications*				
33-0000.000	*UTILITIES*				
)01	Site Communications				
001	Telecomm service pole riser (2) 4" GRC	1.00	ls	3,394.81 /ls	3,395
001	Telcom duct bank 10x 4" PVC 2-w/3 inner ducts	850.00	lf	175.00 /lf	148,750
001	4'x 4'x 6' Telcom manhole grounding & racks	2.00	lf	1,920.00 /lf	3,840
	UTILITIES			*0.945/sf*	*155,985*
	165,035.00 sf				
	G5010 Site Communications			*0.945/sf*	*155,985*
	165,035.00 sf				
	G50 SITE COMMUNICATIONS			**0.945/sf**	**155,985**
	165,035.00 sf				
	G SITEWORK			***54.532/sf***	***8,999,735***
	165,035.00 sf				

Estimate Totals

Description	Amount	Totals	Rate	Cost per Unit
Direct Cost	**99,930,047**	**99,930,047**		**605.508 /sf**
Design Contingency	999,300		1.000 %	6.055 /sf
Escalation	1,498,951		1.500 %	9.083 /sf
Construction Contingency	2,498,251		2.500 %	15.138 /sf
Subtotal	**4,996,502**	**104,926,549**		**635.784 /sf**
Sub Default Insurance	740,000			4.484 /sf
Early Release Package #1 - Sitework	13,552,110			82.117 /sf
General Requirements	5,737,083			34.763 /sf
General Conditions	5,733,391			34.740 /sf
Preconstruction Services				
Subtotal	**25,762,584**	**130,689,133**		**791.887 /sf**
General Liability Insurance	1,491,115		1.095 %	9.035 /sf
Performance Bond	946,415		0.695 %	5.735 /sf
Builder's Risk Insurance	262,817		0.193 %	1.592 /sf
Pollution Insurance	65,364		0.048 %	0.396 /sf
General Building Permit - Waived				
Subtotal	**2,765,711**	**133,454,844**		**808.646 /sf**
CM Fee (OH&P)	2,720,000			16.481 /sf
Subtotal	**2,720,000**	**136,174,844**		**825.127 /sf**
Project Total GSF 165035				
Total		**136,174,844**		**825.127 /sf**

RECONCILED CONSTRUCTION COST ESTIMATE TEMPLATE

District: Town of Wilmington
Project: Wilmington Elementary School
OPM: LeftField, LLC
Designer: Dore + Whittier
CM (if applicable): Fontaine Brothers, Inc
Project Type: New Construction
Submittal (DD/60/90): 90% CD
Proposed Gross SqFt: 165,035

Reconciliation Notes

Shaded cells represent entries [columns/rows] added to this MSBA standard document

		VE NOT INCLUDED				VE INCLUDED
		PM&C CSI Estimate dated 9/9/2026	Fontaine CSI Estimate dated 9/9/2026	% Delta	$ Delta	Fontaine CSI Estimate dated 9/9/2026
CSI DIVISION	DESCRIPTION	DESIGNER COST ESTIMATE	CM COST ESTIMATE			OPM Reconciled Amount
n/a	GMP Fee, GC's, Insurances & Bonds	$11,944,821	$12,146,212	2%	$201,391	$12,146,212
n/a	GMP Insurance (included above)	$0	$0		$0	$0
n/a	GMP Contingency	$3,240,010	$2,498,251	-23%	-$741,759	$2,498,251
n/a	Design & Estimating Contingency	$988,034	$999,300	1%	$11,266	$999,300
n/a	Escalation	$1,482,051	$1,498,951	1%	$16,900	$1,498,951
1000	General Requirements	$5,737,083	$5,737,083	0%	$0	$5,737,083
2000	Existing Conditions	$2,293,092	$2,226,600	-3%	-$66,492	$2,226,600
3000	Concrete	$6,988,174	$4,818,076	-31%	-$2,170,098	$4,818,076
4000	Masonry	$7,874,995	$7,925,940	1%	$50,945	$7,925,940
5000	Metals	$10,074,985	$9,821,120	-3%	-$253,865	$9,821,120
6000	Woods, Plastics, Composites	$2,186,673	$3,243,261	48%	$1,056,588	$3,243,261
7000	Thermal and Moisture Protection	$7,219,189	$8,786,037	22%	$1,566,848	$8,786,037
8000	Openings	$3,845,625	$3,977,910	3%	$132,285	$3,977,910
9000	Finishes	$14,336,575	$13,861,158	-3%	-$475,417	$13,861,158
10000	Specialties	$1,955,359	$1,010,915	-48%	-$944,444	$1,010,915
11000	Equipment	$1,301,720	$1,390,275	7%	$88,555	$1,390,275
12000	Furnishings	$4,130,932	$4,210,061	2%	$79,129	$4,210,061
13000	Special Construction	$0	$0	0%	$0	$0
14000	Conveying Equipment	$336,000	$306,000	-9%	-$30,000	$306,000
21000	Fire Suppression	$1,326,749	$1,340,368	1%	$13,619	$1,340,368
22000	Plumbing	$3,570,995	$3,575,580	0%	$4,585	$3,575,580
23000	Heating Ventilating and Air Conditioning	$13,749,185	$13,825,376	1%	$76,191	$13,825,376
26000	Electrical	$11,080,440	$10,657,192	-4%	-$423,248	$10,657,192
27000	Communications	Included in Electrical	Included in Electrical			Included in Electrical
28000	Electronic Safety and Security	Included in Electrical	Included in Electrical			Included in Electrical
31000	Earthwork	$7,100,000	$7,100,000	0%	$0	$7,100,000
32000	Exterior Improvements	$8,511,769	$9,763,049	15%	$1,251,280	$9,763,049
33000	Utilities	$4,285,944	$5,456,129	27%	$1,170,185	$5,456,129
	Subtotal Base Contract Amount	$135,560,400	$136,174,844	0.45%	$614,444	$136,174,844
	Bid Alternates (If applicable)	$1,073,544	$1,073,544	0.00%	$0	$1,073,544
	TOTAL AMOUNT	**$136,633,944**	**$137,248,388**	**0.45%**	**$614,444**	**$137,248,388**
	TOTAL $/SF	**828**	**832**	**0.45%**	**$4**	**832**
	NOTES	This value represented the most expensive security options under consideration by the District.	Ditto. These values are from the designer's cost estimator.			

COST ESTIMATE COMPARISON SPREADSHEET (UNIFORMAT)

Wilmington Elementary School - New Construction

Estimated Construction Start Date:			June-26			June-26			June-26			June-26			June-26			XXXX		
Division #		Description	Project Scope & Budget			Project Funding Agreement			Design Development			60% CD			90% CD			100% CD		
			GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost
A		Substructure	165,035	$5,818,594	$35.26	165,035	$5,818,594	$35.26	165,035	$5,727,053	$34.70	165,035	$5,651,972	$34.25	165,035	$5,533,896	$33.53			#DIV/0!
B		Shell	165,035	$28,185,853	$170.79	165,035	$28,185,853	$170.79	165,035	$30,786,252	$186.54	165,035	$31,548,144	$191.16	165,035	$30,891,964	$187.18	0	0	#DIV/0!
	B10	Superstructure	165,035	$11,031,003	$66.84	165,035	$11,031,003	$66.84	165,035	$11,844,056	$71.77	165,035	$12,137,711	$73.55	165,035	$11,557,494	$70.03	0		#DIV/0!
	B20	Exterior Enclosure	165,035	$14,494,280	$87.83	165,035	$14,494,280	$87.83	165,035	$15,855,014	$96.07	165,035	$16,177,950	$98.03	165,035	$16,014,919	$97.04	0	0	#DIV/0!
		B2010 Exterior Walls	165,035	$12,000,405	$72.71	165,035	$12,000,405	$72.71	165,035	$12,791,739	$77.51	165,035	$13,295,927	$80.56	165,035	$13,487,624	$81.73	0		#DIV/0!
		B2020 Exterior Windows	165,035	$2,325,955	$14.09	165,035	$2,325,955	$14.09	165,035	$2,836,075	$17.18	165,035	$2,588,045	$15.68	165,035	$2,323,995	$14.08	0		#DIV/0!
		B2030 Exterior Doors	165,035	$167,920	$1.02	165,035	$167,920	$1.02	165,035	$227,200	$1.38	165,035	$293,978	$1.78	165,035	$203,300	$1.23	0		#DIV/0!
	B30	Roofing	165,035	$2,660,570	$16.12	165,035	$2,660,570	$16.12	165,035	$3,087,182	$18.71	165,035	$3,232,483	$19.59	165,035	$3,319,551	$20.11	0		#DIV/0!
C		Interiors	165,035	$17,253,514	$104.54	165,035	$17,253,514	$104.54	165,035	$17,643,088	$106.91	165,035	$18,011,866	$109.14	165,035	$19,228,202	$116.51	0		#DIV/0!
D		Services	165,035	$28,827,960	$174.68	165,035	$28,827,960	$174.68	165,035	$30,731,268	$186.21	165,035	$29,803,910	$180.59	165,035	$29,828,866	$180.74	0	0	#DIV/0!
	D10	Conveying	165,035	$259,620	$1.57	165,035	$259,620	$1.57	165,035	$273,100	$1.65	165,035	$303,100	$1.84	165,035	$320,350	$1.94	0		#DIV/0!
	D20	Plumbing	165,035	$3,504,350	$21.23	165,035	$3,504,350	$21.23	165,035	$3,628,243	$21.98	165,035	$3,586,893	$21.73	165,035	$3,575,580	$21.67	0		#DIV/0!
	D30	HVAC	165,035	$13,913,586	$84.31	165,035	$13,913,586	$84.31	165,035	$14,176,380	$85.90	165,035	$13,920,952	$84.35	165,035	$13,825,376	$83.77	0		#DIV/0!
	D40	Fire Protection	165,035	$1,317,979	$7.99	165,035	$1,317,979	$7.99	165,035	$1,206,770	$7.31	165,035	$1,357,202	$8.22	165,035	$1,340,368	$8.12	0		#DIV/0!
	D50	Electrical	165,035	$9,832,425	$59.58	165,035	$9,832,425	$59.58	165,035	$11,446,775	$69.36	165,035	$10,635,763	$64.45	165,035	$10,767,192	$65.24	0		#DIV/0!
E		Furnishings & Fixed Equipment	165,035	$4,095,892	$24.82	165,035	$4,095,892	$24.82	165,035	$4,532,875	$27.47	165,035	$4,823,389	$29.23	165,035	$5,320,786	$32.24	0		#DIV/0!
		Building Subtotal	**165,035**	**$84,181,813**	**$510**	**165,035**	**$84,181,813**	**$510**	**165,035**	**$89,420,536**	**$541.83**	**165,035**	**$89,839,281**	**$544.37**	**165,035**	**$90,803,714**	**$550.21**	**0**	**0**	**#DIV/0!**
F		Special Construction & Demo	165,035	$2,032,010	$12.31	165,035	$2,032,010	$12.31	165,035	$2,000,000	$12.12	165,035	$2,250,000	$13.63	165,035	$2,226,600	$13.49	0		#DIV/0!
G		Other Site Construction	165,035	$15,594,947	$94.49	165,035	$15,594,947	$94.49	165,035	$15,804,363	$95.76	165,035	$19,369,462	$117.37	165,035	$20,264,735	$122.79	0	0	#DIV/0!
	G10	Site Preparation	165,035	$4,013,109	$24.32	165,035	$4,013,109	$24.32	165,035	$4,004,000	$24.26	165,035	$4,478,452	$27.14	165,035	$5,000,000	$30.30	0		#DIV/0!
	G20	Site Improvements	165,035	$8,197,222	$49.67	165,035	$8,197,222	$49.67	165,035	$7,983,035	$48.37	165,035	$9,410,821	$57.02	165,035	$9,808,605	$59.43	0		#DIV/0!
	G30	Mechanical Utilities	165,035	$2,418,926	$14.66	165,035	$2,418,926	$14.66	165,035	$2,383,538	$14.44	165,035	$3,874,223	$23.48	165,035	$3,900,000	$23.63	0		#DIV/0!
	G40	Electrical Utilities	165,035	$965,690	$5.85	165,035	$965,690	$5.85	165,035	$1,433,790	$8.69	165,035	$1,605,966	$9.73	165,035	$1,556,130	$9.43	0		#DIV/0!
		Subtotal	**165,035**	**$101,808,770**	**$617**	**165,035**	**$101,808,770**	**$617**	**165,035**	**$107,224,899**	**$649.71**	**165,035**	**$111,458,743**	**$675.36**	**165,035**	**$113,295,049**	**$686.49**	**0**	**0**	**#DIV/0!**
Z		Mark-Ups	165,035	$28,299,238	27.8%	165,035	$28,299,238	27.8%	165,035	$25,740,000	24.0%	165,035	$23,212,471	20.8%	165,035	$21,380,846	18.9%	0	#REF!	#REF!
Z		Insurance	165,035	$0	0.0%	165,035	$0	0.0%	165,035	$2,606,536	2.4%	165,035	$2,686,435	2.4%	165,035	$2,765,711	2.4%	0	#REF!	#REF!
Z		Subcontractor Bonds	165,035	$768,665	0.8%	165,035	$768,665	0.8%	165,035	$956,523	0.9%	165,035	$955,331	0.9%	165,035	$927,110	0.8%	0	#REF!	#REF!
Z		GC Bonds	165,035	$0	0.0%	165,035	$0	0.0%	165,035	$0	0.0%	165,035	$0	0.0%	165,035	$0	0.0%	0	#REF!	#REF!
Z		Design & Pricing Contingency	165,035	$10,180,877	10.0%	165,035	$10,180,877	10.0%	165,035	$5,361,245	5.0%	165,035	$2,593,762	2.3%	165,035	$999,300	0.9%	0	#REF!	#REF!
Z		General Conditions	165,035	$14,687,983	14.4%	165,035	$14,687,983	14.4%	165,035	$14,095,696	13.1%	165,035	$14,256,943	12.8%	165,035	$13,968,725	12.3%	0	#REF!	#REF!
Z		Overhead & Profit	165,035	$2,661,713	2.6%	165,035	$2,661,713	2.6%	165,035	$2,720,000	2.5%	165,035	$2,720,000	2.4%	165,035	$2,720,000	2.4%	0	#REF!	#REF!
		Construction Subtotal	**165,035**	**$130,108,008**	**$788**	**165,035**	**$130,108,008**	**$788**	**165,035**	**$132,964,899**	**$805.68**	**165,035**	**$134,671,214**	**$816.02**	**165,035**	**$134,675,895**	**$816.04**	**0**	**#REF!**	**#REF!**
Z		Escalation to Construction Mid-Point	165,035	$7,635,658	7.5%	165,035	$7,635,658	7.5%	165,035	$4,664,283	4.3%	165,035	$2,786,469	2.5%	165,035	$1,498,251	1.3%	0	#REF!	#REF!
		Total Addition Cost	**165,035**	**$137,743,666**		**165,035**	**$137,743,666**		**165,035**	**$137,629,182**		**165,035**	**$137,457,683**		**165,035**	**$136,174,146**		**0**	**#REF!**	
		$/GSF		**$835**			**$835**			**$834**			**$833**			**$825**			**#REF!**	

		Alternates																		
		60CD - 1	**Temporary Playground**										**$150,000**							
		60CD - 2	**Level 1 Interior Entrance Ballistic Glazing**										**$472,882**							
		60CD - 3	**Classroom Door Sidelight School Guard Glazing at All Levels**										**$78,448**							
		60CD - 4	**Classroom Door Sidelight Ballistic Glazing at All Levels**										**$313,791**							
		90CD - 1	**SG5 ILO SG4 at L1 Exterior Glazing**													**$48,623**				
		90CD - 2	**Improved security L3 Glass ILO SG4 at L1 Windows, SG5 at Curtain Wall**													**$311,038**				
		90CD - 3	**SG4 at interior sidelights**													**$130,655**				
		90CD - 4	**SG5 at interior sidelights**													**$150,254**				
		90CD - 5	**SG4 at classroom borrowed lights**													**$108,456**				

		90CD - 6	**SG5 at borrowed lights**												**$124,724**				
		90CD - 7	**Improved security Assembly at interior vestibule doors**												**$77,532**				
		90CD - 8	**Improved security Assembly at Cafeteria**												**$127,231**				
		90CD - 9	**Improved security door assemblies at exterior vestibule locations**												**$138,497**				
		90CD -10	**Improved security door assemblies at exterior stair locations**												**$95,645**				

(Enter School Name) (Renovation)

Estimated Construction Start Date:			**XXXX**			**XXXX**			**XXX-2010**			**XXXX**			**XXXX**			**XXXX**		
Division #		**Description**	**Project Scope & Budget**			**Project Funding Agreement**			**Design Development**			**60% Design**			**60% Design**			**100% Design**		
			GSF	**Total Cost**	**Unit Cost**	**GSF**	**Total Cost**	**Unit Cost**	**GSF**	**Total Cost**	**Unit Cost**	**GSF**	**Total Cost**	**Unit Cost**	**GSF**	**Total Cost**	**Unit Cost**	**GSF**	**Total Cost**	**Unit Cost**
A		Substructure			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
B		Shell	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!
	B10	Superstructure	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	B20	Exterior Enclosure	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!
		B2010 Exterior Walls	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
		B2020 Exterior Windows	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
		B2030 Exterior Doors	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	B30	Roofing	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
C		Interiors	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
D		Services	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!	0	$0	#DIV/0!
	D10	Conveying	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	D20	Plumbing	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	D30	HVAC	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	D40	Fire Protection	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
	D50	Electrical Utilities	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
E		Furnishings & Fixed Equipment	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
		Building Subtotal	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**
F		Special Construction & Demo	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!	0		#DIV/0!
		Subtotal	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**	**0**	**$0**	**#DIV/0!**
Z		Mark-Ups	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		Insurance	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		Subcontractor Bonds	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		GC Bonds	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		Design & Pricing Contingency	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		General Conditions	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
Z		Overhead & Profit	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
		Construction Subtotal	**0**	**#REF!**	**#REF!**	**0**	**#REF!**	**#REF!**	**0**	**#REF!**	**#REF!**	**0**	**#REF!**	**#REF!**	**0**	**#REF!**	**#REF!**	**0**	**#REF!**	**#REF!**
Z		Escalation to Construction Mid-Point	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!	0	#REF!	#REF!
		Total Renovation Cost	**0**	**#REF!**		**0**	**#REF!**		**0**	**#REF!**		**0**	**#REF!**		**0**	**#REF!**		**0**	**#REF!**	
		$/GSF		**#REF!**			**#REF!**			**#REF!**			**#REF!**			**#REF!**			**#REF!**	
Total Addition & Renovation Cost			**165,035**	**#REF!**		**165,035**	**#REF!**		**165,035**	**#REF!**			**#REF!**			**#REF!**			**#REF!**	
		$/GSF		**#REF!**			**#REF!**			**#REF!**			**#REF!**			**#REF!**			**#REF!**	

NOTES:
1 Project Scope & Budget costs are based on , 2010 dollars.
2 Design Development costs are based on , 2010 dollars.
3 60% Construction Document costs are based on , 2010 dollars.
4 100% Construction Document costs are based on , 2010 dollars.

Town of Wilmington
Wildwood Elementary School

90 CD Submission

Total Project Budget: All costs associated with the project are subject to 963 CMR 2.16(5)	Estimated Budget	Scope Items Excluded from the Estimated Basis of Maximum Facilities Grant or Otherwise Ineligible	Estimated Basis of Maximum Total Facilities Grant[1]	Estimated Maximum Total Facilities Grant[1]
Feasibility Study Agreement				
OPM Feasibility Study	$150,000	$0	$150,000	
A&E Feasibility Study	$853,920	$0	$853,920	
Environmental & Site	$145,076	$0	$145,076	
Other	$66,004	$0	$66,004	
Feasibility Study Agreement Subtotal	**$1,215,000**	**$0**	**$1,215,000**	**$665,577**
Administration				
Legal Fees	$100,000	$100,000	$0	**$0**
Owner's Project Manager				
Design Development	$400,000	$0	$400,000	
Construction Contract Documents	$600,000	$265,415	$334,585	
Bidding	$250,000	$0	$250,000	
Construction Contract Administration	$3,250,000	$1,427,661	$1,822,339	
Closeout	$220,000	$0	$220,000	
Extra Services	$0	$0	$0	
Reimbursable & Other Services	$60,000	$0	$60,000	
Cost Estimates	$0	$0	$0	
Advertising	$20,000	$0	$20,000	
Permitting	$120,000	$0	$120,000	
Owner's Insurance	$300,000	$0	$300,000	
Other Administrative Costs	$200,000	$0	$200,000	
Administration Subtotal	**$5,520,000**	**$1,793,076**	**$3,726,924**	**$2,041,609**
Architecture and Engineering				
Basic Services				
Design Development	$3,409,156	$698,359	$2,710,797	
Construction Contract Documents	$4,772,818	$789,735	$3,983,083	
Bidding	$681,831		$681,831	
Construction Contract Administration	$4,090,986	$3,925,523	$165,463	
Closeout	$681,831	$0	$681,831	
Other Basic Services	$0	$0	$0	
Basic Services Subtotal	**$13,636,622**	**$5,413,617**	**$8,223,005**	
Reimbursable Services				
Construction Testing	$0	$0	$0	
Printing (over minimum)	$0	$0	$0	
Other Reimbursable Costs	$712,976	$0	$712,976	
Hazardous Materials	$183,700	$0	$183,700	
Geotechnical & Geo-Environmental	$316,624	$0	$316,624	
Site Survey	$0	$0	$0	
Wetlands	$0	$0	$0	
Traffic Studies	$51,700	$0	$51,700	
Architectural/Engineering Subtotal	**$14,901,622**	**$5,413,617**	**$9,488,005**	**$5,197,529**
CM at Risk Pre-Construction Services				
Pre-Construction Services	$320,000	$0	**$320,000**	**$175,296**
Site Acquisition				
Land / Building Purchase	$0	$0	$0	
Appraisal Fees	$0	$0	$0	
Recording fees	$0	$0	$0	
Site Acquisition Subtotal	**$0**	**$0**	**$0**	**$0**
Construction Costs				
SUBSTRUCTURE				
Foundations	$2,158,158			
Basement Construction	$1,275,738			
SHELL				
Super Structure	$11,557,494			
Exterior Closure	$0			
Exterior Walls	$13,487,624			
Exterior Windows	$2,323,995			
Exterior Doors	$203,300			
Roofing	$3,319,551			
INTERIORS				
Interior Construction	$10,964,816			
Staircases	$1,037,758			
Interior Finishes	$7,225,628			
SERVICES				
Conveying Systems	$320,350			
Plumbing	$3,575,580			
HVAC	$13,825,376			
Fire Protection	$1,340,368			
Electrical	$10,767,192			
EQUIPMENT & FURNISHINGS				
Equipment	$1,280,275			
Furnishings	$4,040,511			

SPECIAL CONSTRUCTION & DEMOLITION				
Special Construction	$0	$0		
Existing Building Demolition	$750,000	$0		
In-Building Hazardous Material Abatement	$1,316,600	$0		
Asbestos Containing Floor Material / Ceiling Tile Abatement	$160,000	$160,000		
Other Hazardous Material Abatement	$0	$0		
BUILDING SITE WORK				
Site Preparation	$13,852,110	$0		
Site Improvements	$7,508,605	$0		
Site Civil / Mechanical Utilities	$0	$0		
Site Electrical Utilities	$1,191,130	$0		
Scope Excluded Site Work	$0	$0		
Construction Trades Subtotal	$113,482,159	$160,000		
Contingencies (Design and Pricing)	$999,300	$1,409		
Sub-Contractor Bonds	$740,000	$1,043		
D/B/B Insurance	$0	$0		
General Conditions	$11,470,474	$16,172		
D/B/B Overhead & Profit	$0	$0		
GMP Insurance	$2,765,711	$3,899		
GMP Fee	$2,720,000	$3,835		
GMP Contingency	$2,498,251	$3,522		
Escalation to Mid-Point of Construction	$1,498,951	$2,113		
Construction Cost over Funding Cap		$39,679,364		
Construction Budget	**$136,174,846**	**$39,871,359**	**$96,303,487**	**$52,755,050**
Alternates				
Ineligible Work Included in the Base Project	$0	$0	$0	
Alternates Included in the Total Project Budget	$0	$0	$0	
Alternates Excluded from the Total Project Budget	$0		$0	
Subtotal to be Included in Total Project Budget	**$0**	**$0**	**$0**	**$0**
Miscellaneous Project Costs				
Utility Company Fees	$200,000	$0	$200,000	
Testing Services	$500,000	$0	$500,000	
Swing Space / Modulars	$0	$0	$0	
Other Project Costs (Mailing & Moving)	$350,000	$350,000	$0	
Miscellaneous Project Costs Subtotal	**$1,050,000**	**$350,000**	**$700,000**	**$383,460**
Furnishings and Equipment				
Furniture, Fixtures & Equipment	$1,661,000	$755,000	$906,000	
Technology	$1,661,000	$755,000	$906,000	
FF&E Subtotal	**$3,322,000**	**$1,510,000**	**$1,812,000**	**$992,614**
Soft Costs that exceed 20% of Construction Cost		$0	$0	
Project Budget	**$162,503,468**	**$48,938,052**	**$113,565,416**	**$62,211,135**

David Saindon:
$2.00 rounding descrepancy in total. Adjusted transfer of savings in construction and rounding of $2.00 to Owners Contingency to match total project budget.

Board Authorization	
Design Enrollment	755
Total Building Gross Floor Area (GSF)	165,035
Total Project Budget (excluding Contingencies)	$162,503,468
Scope Items Excluded or Otherwise Ineligible	- $48,938,052
Third Party Funding (Ineligible)	- $0
Estimated Basis of Maximum Total Facilities Grant [1]	$113,565,416
Reimbursement Rate [3]	54.78%
Est. Max. Total Facilities Grant (before recovery) [1]	$62,211,135
Cx Costs associated with Ineligible Building Area [4]	- $18,985
Cost Recovery associated with Prior Projects [4]	- $209,597
Estimated Maximum Total Facilities Grant [1]	$61,982,553

Construction Contingency [2]	$8,456,003
Ineligible Construction Contingency [2]	$7,094,255
"Potentially Eligible" Construction Contingency [2]	$1,361,748
Owner's Contingency [2]	$2,306,155
Ineligible Owner's Contingency [2]	$1,625,281
"Potentially Eligible" Owner's Contingency [2]	$680,874
Total Potentially Eligible Contingency [2]	$2,042,622
Reimbursement Rate [3]	54.78%
Potential Additional Contingency Grant Funds [2]	$1,118,948
Maximum Total Facilities Grant	$63,101,501
Total Project Budget	$173,265,626

49.11	Reimbursement Rate Before Incentive Points
5.67	Total Incentive Points [3]
54.78%	MSBA Reimbursement Rate

NOTES
This document was prepared by the MSBA based on a preliminary review of information and estimates provided by the Town of Wilmington for the Wildwood Elementary School project. Based on this preliminary review, certain budget, cost and scope items have been determined to be ineligible for reimbursement, however, this document does not contain a final, exhaustive list of all budget, cost and scope items which may be ineligible for reimbursement by the MSBA. Nor is it intended to be a final determination of which budget, cost and scope items may be eligible for reimbursement by the MSBA. All project budget, cost and scope items shall be subject to review and audit by the Authority, and the Authority shall determine, in its sole discretion whether any such budget, cost and scope items are eligible for reimbursement. The MSBA may determine that certain additional budget, cost and scope items are ineligible for reimbursement.

1 - The Estimated Basis of Total Facilities Grant and Estimated Maximum Facilities Grant amounts do not include any potentially eligible contingency funds and are subject to review and audit by the MSBA.

2 - Pursuant to Section 3.21 of the Project Funding Agreement and the applicable policies and guidelines of the Authority, any project costs associated with the reallocation or transfer of funds from either the Owner's contingency or the Construction contingency to other budget line items shall be subject to review by the Authority to determine whether any such costs are eligible for reimbursement by the Authority. All costs are subject to review and audit by the MSBA.

3 - The MSBA has provisionally included three (3) incentive points for energy efficiency, and one (1) incentive point for indoor air quality, subject to the District meeting certain sustainability requirements for the project. If the District does not meet the requirements of the Green Schools Program, the District will not qualify for some or all of these incentive points, and the MSBA will adjust the reimbursement rate accordingly.

4 - Costs associated with the commissioning of ineligible building area will result in the recovery of a portion of the overall commissioning cost. The MSBA has calculated this recovery of funds to be $18,985 and this amount has been deducted from the Estimated Total Facilities Grant and the Maximum Total Facilities Grant. The proposed demolition of the North Intermediate School will result in the MSBA recovering a portion of state funds previously paid to the District for the 201203420060 Accelerated Repair Windows/Doors project at the existing North Intermediate School completed in September 15, 2014. The MSBA has calculated this recovery of funds to be $209,597 and this amount has been deducted from the Estimated Maximum Total Facilities Grant and the Maximum Total Facilities Grant.

Owner's Project Requirements

Prepared For:

Project Name: Wildwood Elementary School

MSBA Project Number: 202003420015
Location: Wilmington, MA
Date: March 27, 2026
Revision #: 0

Prepared By:

Town of Wilmington
Wilmington Public Schools
LeftField, LLC
Dore + Whittier
GGD Consulting Engineers
AKAL Engineering, Inc.

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1. Introduction

The Owner's Project Requirements (OPR) document is a written document completed by the Owner or Owner's Representative. This document will be used as the outline for the more detailed and technical Basis of Design (BOD) document. Both the OPR and BOD inform, direct, and guide the design and construction process. These documents must be reviewed by the Commissioning Authority for clarity and completeness.

The Owner's Project Requirements document should be completed prior to the start of design and provided to the design team. The design team should assist the Owner in the development of this document within the initial project workshop or visioning session. Updates and revisions to the Owner's Project Requirements document throughout the course of project delivery should be completed by the Owner or Owner's Representative based on decisions and agreements coordinated with the project team.

The intent of the Owner's Project Requirements document is to provide a record of the building's owner and end-users objectives and criteria for the building system. The Owner's Project Requirements will be used commissioning process to evaluate the success.

This template has been provided as an example Owner's Project Requirements document. If used for the project, it should be edited to meet the project needs. The use of this document is not required for the Owner's Project Requirements, but it is outlined based on the LEED Reference Guide for Green Building Design and Construction Owner's Project Requirement criteria.

2. Revision Log

This Owner's Project Requirements document identifies the Owner's expectations for the project and is subject to change. The following is a summary of changes made to the OPR document throughout the Pre-Design, Design, Construction, and Occupancy and Operations. The information is critical to keeping all members of the project team aligned on shared assumptions of basic project requirements and overarching goals and where those assumptions or goals have changes.

Date	Revised by	Section Updates	Description of Changes
3/27/2026	District, OPM, Designer	All	Original version

3. Project Overview

Project Details:

Location	320 Salem Street, Wilmington, MA
Size (SF)	165,035
Building Type	Public elementary school (PreK, K-5)
Number of Occupants	Design Enrollment = 755 K-5 students + 100 PreK; Max capacity 855 + 140 staff = 995
Construction Budget	$137,743,666 / Total Project Budget $173,265,626

The project team consists of the following team members:

Role	Team Member	Start of Engagement
Owner	Town of Wilmington	-
Owner's Facilities Staff	Dennis Kelley, Superintendent of Public Buildings	-
Owner's Project Manager	LeftField, LLC	Jun 2025
Architect	Dore + Whittier Architects (D+W)	Apr 2023
HVAC & Electrical Engineers	GGD Consulting Engineers Inc.	Apr 2023
Plumbing & FP Engineers	AKAL Engineering Inc.	Apr 2023
Technology Engineer/Consultant	Edvance Technology Design Inc.	Apr 2023
Sustainability Consultant	The Green Engineer Inc.	Apr 2023
Construction Manager	Fontaine Bros. Inc.	Mar 2025
Commissioning Provider	ICO Energy and Engineering, Inc.	Oct 2025
Enclosure Commissioning Provider	ICO Energy and Engineering, Inc.	Oct 2025

Project Schedule:

Milestones	Date
Schematic Design	MSBA submission 5/1/25
100% Design Development	MSBA submission 3/20/26
60% Construction Documents	MSBA submission 6/25/26
90% Construction Documents	MSBA submission 9/28/26
100% Construction Documents	Issue Date 10/30/26
Construction Start	6/23/26
Substantial Completion	Substantial Completion for Building: 6/26/28, EUI tracking period begins
Commissioning	Precon starting Q1 2026, Construction phase starting +/- Q1 2027
O&M Training	+/- Q2 2028
Final Acceptance	Cx certificate of completion to the MSBA June 2029
Occupancy	9/5/28
10-Month Warranty Walkthrough	+/- 4/4/29, Independent third party produces BAS warranty items report
End of 1-Year Warranty Period (Building)	6/26/29, EUI Verification Report

4. Construction Requirements

What type of construction process be used? *(e.g. design build, general contract, construction management)*

CM-at-Risk project delivery method per c.149A

Is there a requirement for the use of a construction management tools? What documents should be controlled through the construction management tool? Should WIFI be provided onsite for use of this too? *(e.g., Procore, BIM360, etc.; drawings, submittals, RFIs, punchlists, etc.)*

Yes, the CM will distribute and track all construction related files using a web-based service, such as Procore.

Yes, the CM will provide Wi-Fi to the Owner's trailer.

Will training need to be recorded? Are there any videography requirements? *(e.g., same videographer for consistency, audio, etc.)*

No - in the Town's experience, video recordings of the training are unlikely to be useful. The quality of the recording and the quality of instruction are typically insufficient for the recording to be useful in the future. The town would rather the trade contractors put the effort into providing O&Ms with screen captures to demonstrate how to interface with the equipment and systems, especially the BAS. In-person training will still be required for all pieces of equipment.

COMMUNICATIONS FOR COMMISSIONING DOCUMENTATION

Regular email communication and coordination are requested to be sent to the below project team representatives:
1. David Saindon, david.saindon@leftfieldpm.com
2. Craig DiCarlo, craig.dicarlo@leftfieldpm.com
3. Jay Faxon, jay.faxon@leftfieldpm.com
4. Lee Dore, lpdore@DoreandWhittier.com
5. Rani Philip, rphilip@DoreandWhittier.com
6. Pam Galeota, pgaleota@fontainebros.com
7. Chad L'Ecuyer, clecuyer@fontainebros.com

Major communications, such as milestone submissions, are requested to also be sent to the below Owner representatives:
1. R. Eric Slagle, eslagle@wilmingtonma.gov
2. Judy O'Connell, joconnell@wilmingtonma.gov
3. Dennis Kelley, dkelley@wilmingtonma.gov
4. Dr. David Thomson, david.thomson@wpsk12.com

For more information on project communication, refer to the Communication and Document Control Protocol document in the pending Design Development Submission.

Limit communication to key decision makers in the Town.

5. Owner and User Requirements

What is the primary purpose, program, and use of this project; what areas are required for a functional facility? *(e.g., office spaces, conference rooms, data center, maintenance storage, restrooms, etc.)*

New construction, elementary school with a design enrollment of 755 K-5 students and 100 PreK students, and associated sitework. Refer to the attached Space Summary for the full list of spaces.

The district-wide CARES program (Children's Art, Recreation and Enrichment Services) will be operated in the Wildwood School Building before and after school hours.

PROJECT HISTORY

Wilmington is a suburban community of 17.14 square miles in area located roughly 17 miles from Boston with four (4) exits off Interstate 93 and easy access to Routes 128/Interstate 95 and Route 495. Wilmington's location in the metropolitan Boston area, its access to the regional highway network and two (2) MBTA commuter rail stops makes the community attractive for both businesses and residents. The U.S. Census population for 2020 establishes Wilmington's population at 23,349.

On May 6, 2020, the Owner submitted a Statement of Interest (Attachment A) to the MSBA for the Wildwood Early Childhood Center. At the April 14, 2021, Board of Directors meeting, the MSBA voted to issue an invitation to the Owner to conduct a feasibility study.

The feasibility study reviewed the problems identified in the Statement of Interest at the Wildwood Early Childhood Center. The school, constructed in 1955, is the oldest of the Town's eight (8) schools. The site is bounded to the north by a wooded area and residential property, to the east by a wooded area of Town property and the Maple Meadow Brook, to the south by residential property and to the west by Wildwood Street and residential property on the opposite side of the street. The Wildwood Early Childhood Center is a one-story 29,160 square foot building located on 7.5 acres of Town property.

The Preliminary Design Program (PDP) was submitted to the MSBA on April 18, 2024. The Preferred Schematic Report (PSR) was submitted to the MSBA on October 24, 2024.

On December 13, 2024, the Massachusetts School Board Authority (MSBA) voted and approved the Town of Wilmington to proceed into Schematic Design based on the Town's preferred option. This approval was based on the preferred option for a new school with a Design Enrollment of 755 students in grades K-5, plus 100 Pre-K students. The preferred solution presented in the PSR located the new school on the existing playfield northwest of the existing North Intermediate School and proposed the demolition of the existing school and creation of new parking and drives to improve site circulation, increase on-site parking, and establish new outdoor areas for student gathering and play.

Schematic Design was completed and submitted to the MSBA for consideration on May 1, 2025. The Project received approval from the MSBA Board of Directors to execute a project scope and budget agreement at their meeting held on June 18, 2025. The project funding agreement was executed on November 6, 2025.

For a more detailed review of the history, refer to the Schematic Design submission:

https://www.wpsk12.com/common/pages/GetFile.ashx?key=xx%2bIBrDm

This Owner's Project Requirements document is based on the Schematic Design Binder and all other relevant documents, meetings, and conversations with Owner regarding the project goals and operational requirements.

Design Development was completed and submitted to the MSBA on March 20, 2026,

SPECIAL CONSTRUCTION PROCESSES

Are there any special construction processes? *(e.g., phasing, access, occupancy, adjacencies)*

Construction will occur on an occupied site; the existing North Intermediate School is in close proximity to the location of the new school and will remain in operation until the new school is complete and open for classes.

A process for CORI/SORI checking has been established for all workers and professionals on site.

Construction will be procured and executed in phases.

The school property is surrounded by residential properties and are sensitive to disruption.

The property includes a bordered vegetative wetland and an isolated wetland area that are being submitted to the Conservation Commission as if they are jurisdictional wetland areas, though that determination has not been definitively made.

LEED REQUIRMENTS

What are the LEED Requirements and or any other special requirements? *(e.g., phasing, access, occupancy, adjacencies)*

As a requirement of the MSBA grant, the project shall achieve a minimum of LEED-Silver; the building and site being designed with LEED Gold as a reach goal. The project will utilize LEED v4.0 BD+C for Schools.

The project team will be required to meet the BPDO Materials Ingredients credits (2 points) and the IAQ Low VOC Credits (3 Points) in order to obtain additional 1% reimbursement from the MSBA.

The commissioning portion of the project shall adhere to MSBA guidelines and as such will be responsible for enhanced commissioning and Monitoring Based commissioning to earn six (6) LEED points for the project.

GOALS AND PROJECT REQUESTS

Describe any broad goals relative to project needs. *(e.g., future expansions, flexibility, quality of materials, and construction, maintenance, and operational costs)*

The Wilmington Wildwood School Building Committee (SBC) is pursuing an all-electric HVAC system.

The project will attempt to earn additional 4% reimbursement through the MSBA's Green Schools Program by 1) meeting the MA Specialized Opt-in Energy Code for an additional 3% reimbursement and 2) earning a minimum total of five points (from seven points available) in the LEED indoor air quality categories (MR Building Product Disclosure and Optimization – Material Ingredients, IEQ – Low Emitting Materials, and IEQ – Indoor Air Quality Assessment) to for an additional 1% reimbursement

An emergency generator is included in the project and is sized to prevent damage to the building during loss of power. The Generator will be diesel-fueled. The BAS shall track the operation of the generator but NOT control it. The project team shall provide a list of the systems, circuits, and outlets on emergency power.

The project is NOT intended to be an emergency shelter or a warming/cooling center.

PREVIOUS ISSUES AND LESSONS LEARNED

See attached list from the Town.

What must be accomplished for a successful project? *(e.g., schedule, budget, sustainability goals, meet state and local codes, etc.)*

The district is intent on delivering the project on budget.

Sustainability goals must be met as a requirement of MSBA funding.

Conformance with all applicable building codes is required.

Successful turnover to the Town includes full commissioning of building systems and assurance the building systems are running properly and efficiently.

6. Environmental Sustainability Goals

How do we measure the sustainability of the project? *(e.g., Owner's priorities among possible LEED points;* ***ATTACH LEED SCORE CARD FOR REFERENCE.****)*

See attached LEED scorecard, dated 2/19/26.

7. Energy Efficiency Goals

Overall Energy Efficiency Goals	Description		
Energy Usage	W/ft^2	BTU/ft2/yr	$/ft^2/yr
Local Codes	780 CMR- Massachusetts State Building Code 10th Edition, amended 2021 IBC 527 CMR 1.00 - Massachusetts Comprehensive Fire Safety Code, amended the 2021 Edition of NFPA 1, Uniform Fire Code 521 CMR – Massachusetts Architectural Access Board (MAAB) Rules and Regulations 2010 ADA Standards for Accessible Design 527 CMR 12.00 - Massachusetts Electrical Code, which is an amended version of the 2023 Edition of NFPA 70, National Electrical Code 2021 International Mechanical Code (IMC) as amended by 780 CMR 28.00 248 CMR 10.00 – Uniform State Plumbing Code, Updated 12/08/2023 225 CMR 23.00, Massachusetts Commercial Stretch Energy Code 225 CMR 23.00 Appendix CC, Municipal Opt-In Specialized Energy Code 524 CMR – Massachusetts Board of Elevator Regulations, which is an amended version of the 2013 ANSI A17.1, Safety Code for Elevators and Escalators		
Equipment & Appliances			
Measurement & Verification	Building Energy Management System and should be completed by an independent third party using operational data (utility meter, BAS, submeters).		
Building Controllability	DDC/ATC		
Ventilation	Code required exhaust provided by localized energy recovery ventilation systems		

Overall Energy Efficiency Goals	Description
HVAC Systems/ Efficiencies	Fossil-free mechanical system: An air-source heat pump plant with displacement system with passive radiant cooling/heating panels and high efficiency air-source to hydronic heat pump chiller/heating plant for chilled/heating hot water
Domestic Water System	Instantaneous electric domestic hot water system
Lighting Systems	Lighting will be provided as energy efficient LED type fixtures throughout the building. Lighting will be a combination of linear pendants, recessed fixtures, downlighting, and basic strip light fixtures for back of house areas.
Lighting Controls	Interior lighting will be controlled via relays which is achieved through programming and network controls. The control of the relays will be by automatic means, such as occupancy sensor in each classroom. Where there are spaces with daylight zones the lighting will be controlled via photosensors for continuous dimming. Spaces will also be controlled via multi-level switching. Exterior lighting will be controlled via photocell "ON" and scheduled for "OFF" operation. The parking area lighting will be controlled by "zones" with dimmable capability. Emergency and Exit lighting will be run through life safety panels and will be "ON" during normal power conditions, as well as power outage conditions. The emergency lighting system will have time control so that lights are "ON" only with the building is occupied. Lighting controls system data shall be exportable to a third party.
On Site Energy Generation	None
Energy Metering	To provide a system that enables monitoring of energy performance, an interface between the main electric meter and the BAS must be completed by substantial completion. Additionally, electricity usage will be sub-metered and should be designed by the electrical engineer in such a way to roll up end-usage data to specific meters. Sub-metering data must be summarized by end-use, including whole-building energy, and integrated with the BAS.

Envelope Performance Goals	Description
Orientation	
Façade	Goal for the building has high R-value insulation in walls and roof and clad with weather- and climate-appropriate durable and low maintenance materials.

Envelope Performance Goals	Description
Window / Wall Ratio	Window-to-wall ratio for the building will be balanced to meet TEDI energy modeling requirements.
Fenestrations	Technical requirements of glazing will be balanced to comply with both heating and cooling TEDI model requirements.
Quality Insulation	
Roof Features	

Water Efficiency Goals	Description
Outdoor Water Use	No permanent irrigation is planned for site landscaping but is included for the sports field.
Indoor Water Use	
Equipment & Appliances	
Local Codes	
Water Metering	
Submetering	

8. Environmental Quality and Performance Criteria

What is the operational cost budget for this building? *($/ft2 – Annual budget)*

None identified.

What are the acoustical performance criteria?

Code requirements per the 10th Edition of the MA Building Code, LEED Prerequisite, and best practices.

Sound attenuation of rooftop equipment is required for neighbors.

What are the thermal comfort and air quality requirements? *(e.g. after hour use of facility- occupancy overrides/schedule protocol, building pressure, desired user ability to adjust controls, operable windows, filters) Will this building be used on nights and weekends by the public or public groups?*

The school will be used after hours and duriung weekends. The Town requests redundancy in the cooling provided to the MDF room.

Area (Breakout further as needed)	**Summer Comfort Ranges**					
	Occupied			Unoccupied		
	Heating	Cooling	Humidity	Heating	Cooling	Humidity
Common Areas	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH

Area (Breakout further as needed)	Summer Comfort Ranges					
	Occupied			Unoccupied		
	Heating	Cooling	Humidity	Heating	Cooling	Humidity
Administration, Media Center, Library, Cafeteria, Classrooms, Gym, Art/Music	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Tel/Data, IDF, Electric Rooms	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Storage Rooms	N/A °F	N/A °F	N/A %RH	55 °F	85 °F	55(max) %RH
Mechanical Rooms, Stairs, Vestibules	60 °F	N/A °F	55(max) %RH	55 °F	85 °F	55(max) %RH

Area (Breakout further as needed)	Winter Comfort Ranges					
	Occupied			Unoccupied		
	Heating	Cooling	Humidity	Heating	Cooling	Humidity
Common Areas	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Administration, Media Center, Library, Cafeteria, Classrooms, Gym, Art/Music	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Tel/Data, IDF, Electric Rooms	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Storage Rooms	70 °F	75 °F	55(max) %RH	55 °F	85 °F	55(max) %RH
Mechanical Rooms, Stairs, Vestibules	60 °F	N/A °F	55(max) %RH	55 °F	85 °F	55(max) %RH

Occupancy Schedule		
Area (Breakout further as needed)	**Day**	**Occupied**
Common Areas	Monday – Friday	**6:30am-6:00pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
Administration & CARES offices	Monday – Friday	**6:30am-5:30pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
Classrooms – 1st floor including Art and Music	Monday – Friday	**6:30am-6:00pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
	Summer	**6:30am-6:00pm**
Classrooms – Upper levels	Monday – Friday	**6:30am-5:30pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied

Occupancy Schedule		
Offices	Monday – Friday	**6:30am-5:30pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
	Summer	**6:30am-5:30pm**
Gym	Monday – Friday	**6:30am-9:00pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
	Summer	**6:30am-5:30pm**
Cafetorium	Monday – Friday	**6:30am-6:00pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
Cafetorium	Summer	**6:30am-6:00pm**
Media Center	Monday – Friday	**6:30am-6:00pm**
	Saturday - Sunday	Unoccupied
	Holiday	Unoccupied
Telecommunication Room	Monday – Friday	**24/7**
	Saturday - Sunday	**24/7**
	Holiday	**24/7**
Mechanical/Electrical Rooms	Monday – Friday	Non- regularly occupied space
	Saturday - Sunday	Non- regularly occupied space
	Holiday	Non- regularly occupied space

What are the lighting requirements? *(e.g., types of lighting, illumination levels, lighting control – dimmers, daylight sensors, motion sensors, time clocks)*

LED lamps throughout.

Area (Breakout further as needed)	Light Level Settings	Plug Load Control (indicated @ each outlet)	Vacancy Time Delay (min)
Classrooms	30 FC	YES	15 mins
Offices, Conference Rooms, Library	30 FC	YES	15 mins

Area (Breakout further as needed)	Light Level Settings	Plug Load Control (indicated @ each outlet)	Vacancy Time Delay (min)
Kitchen	50 FC	NO	15 mins
Gymnasium	50 FC	NO	15 mins
Cafeteria	30 FC	NO	15 mins
Corridors	20 FC	NO	15 mins
Utility and Storage Rooms	20 FC	NO	15 mins

How will exterior lighting be controlled? *(e.g., astrological time clock, photocell) – single photo cell*

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

What activities generate pollutants in/near this building which impact health, hygiene and indoor environments? *(e.g., Trash Rooms, Copy Rooms, chemicals or paints stored on site, smoking, garage)*

Trash room, Copy Areas, STEM (possible acid neutralization).
Kitchen: humidity is the biggest issue, exhaust will be interlocked with exhaust, cooking areas hooded, negative pressure to limit odor.
The design team recommends separating trash room and receiving area with a partition to reduce the need for high ventilation for LEED, however the Town does not want any extra partitions because they would limit flexibility, access with palette jacks, etc.

Telecommunication Rooms? (dedicated ac units)

Redundant AC unit for the MDF.
The town does not require split AC units for electric rooms because they do not have not enough heat generation and the town does not want to spend the money. The design team shall provide splits for rooms with large electric transformers but not small electric rooms.

What are the indoor environmental quality goals? (*see examples below*)

Goals	Description
Ventilation	Variable ventilation is provided to each zone and based on zone CO2 readings. Classrooms with CO2 sensors trigger an alarm, but don't react. The Town would like CO2 sensors to control the system. The Town would like the BAS programmed to include an override for high outdoor air exchange for situations like COVID or flu. Classrooms, Gym, and Cafeteria to be designed to have max outside air.
Monitoring	CO2 levels are monitored at each zone as a proxy measurement for IAQ. T-stats in toilet rooms will be a plain sensor with no digital readouts and no temp control in the room. T-stats in the classrooms, to be read-only, all temperature will be controlled by the BAS, not the t-stats.
Pollutant Source Control	Ventilation is the pollutant control. Displacement ventilation facilitates more effective contaminant removal vs mixed air
Carbon Dioxide Monitoring	CO2 levels maintained below 800 ppm. When sensors see CO2 rising, the BAS will respond by bringing in more fresh air to bring below 800ppm. Will not include CO2 monitors for rooms without a VAV box that cannot be controlled.
Acoustics	Project will meet MSBA and code required maximum noise criteria levels. The Town is concerned about noise levels in cafeteria and surrounding rooms. Concerned about rooftop mechanical equipment noise impacts on the neighboring homes. The design team recommends the acoustical consultant, Acentech to review a particular unit with compressors. Consider concrete below some RTUs.
Air Filtration	All air handling units will be provided with high effectiveness MERV 14 filtration in the rooftop units.
Building Flush out	Project will comply with LEED required building flushout
Air Testing	Annual Air Quality Testing performed by school's vendor. Radon mitigation system included in the design.

9. Equipment and System Expectations

What are the equipment and system expectations? *(e.g., quality, reliability, type, automation, flexibility, and maintenance requirements and accessibility for each system)*

Energy recovery wheels - prefer vertical wheels to prevent filters from sagging and scoring the wheel.
VAV and Equipment that need maintenance and service, all sides need to be accessible – nothing hidden behind walls, ducts, pipes, etc.

The Town wants systems to ensure cellular signal throughout the new building.

The Town wants a lightning protection system for the new building.

The Town wants robust sound attenuation for building equipment.

The Town wants dry fire protection sprinklers with pre-action system in rooms with sensitive equipment.

Will the facility be connected to a building management or automation system (BMS, BAS, etc.)? If any, what are the interface requirements? *(e.g., monitoring points, control points, scheduling)*

Yes, connected to a BMS system for monitoring and scheduling. There will be a local workstation provided at a location preferred by the building owner to access the BMS front-end display.

Requires remote capability.

Require graphics showing points / graphic user interface.

Are there any system integration requirements particularly across trades? *(e.g., occupancy sensors controlling lighting and HVAC, monitoring of electrical or plumbing equipment at the BMS)*

Yes, HVAC, plumbing equipment, water submeters, electrical submeters, lighting, and emergency generator will all integrate into the BMS.

The emergency generator will be diesel-fueled, it shall report the fuel level to BAS.

Provide proprietary equipment for building system, if any. Proprietary items must be documented, and explanations must be made and submitted to MSBA for approval.

Goals	Description
BMS/BAS *	The new Town Hall and the new Senior Center are **Johnson Controls Facility Explorer** (HOWSE Corp installed it). This is preferred for Wildwood.
Fire Panels *	Prefer **Silent Night** and **Firelight.** Do not want Simplex products or Encore. Do not want Siemens (owned by Simplex or vice versa).
Fire Department connections *	30-degree angle on a siamese connection or straight connection
Gate Valves *	TBD by DPW
Lighting Controls *	The lighting control system is **Current NX Site Manager** (installed in new Town Hall, so far so good). WHS (Wilmington High School) has Green Gate, do not want them again.
Plumbing Fixtures*	Do not want Kohler for faucets etc. WHS has Chicago fixtures. Flushometer - specify mfrs that have the ability to be retrofitted with higher flush volume as needed (American Standard is one example).

Goals	Description
Access Control/Security *	TBD with School Department IT.
Security Alarm System *	TBD with School Department IT.
Security Cameras *	TBD with School Department IT. Exacq Vision used at Yentile Park, new Senior Center, new Town Hall. Some buildings use Galaxy cameras
Door Keys/Cores/Hardware *	All schools use **Primus Schlage System** at least on the exterior doors (with Great Grandmaster key for universal access). WHS has Primus on all interior and exterior doors (but gets expensive).

*** At the time of writing, proprietary systems are in discussion; none have been finalized or approved by the Town.**

Provide specific targets, desired technologies, or preferred manufacturers for building system, if any.

Goals	Description
Electrical Systems	See above
HVAC Systems	"
Plumbing Systems	"
Renewable Energy System	"
Building Automation System	"
Technology Systems	"
Utility Monitoring	"

10. Occupant and Operation & Maintenance (O&M) Personnel Training Requirements

How will the facility be operated; HVAC and lighting control systems? Who will operate the facility?

To operate the facility as designed, the facility staff must be well versed in design intent.

Who will conduct periodic HVAC and lighting control system maintenance?

Facilities has an in-house HVAC tech, electrician; also hire outside vendors.

What is the desired level of training and orientation for building **occupants** to understand and use the building? How much time and what training atmospheres are required?

Kitchen staff should be made aware of how to operate specialty kitchen equipment. Instructions on when and how to turn equipment on/off should be provided. If possible, staggered start of kitchen equipment should be considered to reduce peak loads.

Staff and faculty all need a basic understanding of all regular-use systems, especially lighting controls.
Staff needs training on gymnasium and Cafetorium Audio Visual systems.
Select staff needs training on access control and intrusion alarm systems.

What is the desired level of training and orientation for O&M **staff** to understand and maintain the building? How much time and what training atmospheres are required?

Advanced training for the Facilities Director, trade staff, and custodial staff, including comprehensive training in proper BAS controls, programming, and operations.
Trade staff will benefit from walking the building with the CM during the construction phase to understand the installations.

11. Maintenance Management

Will the facility use a Computerized Maintenance Management Systems (CMMS) or Asset Management System? Will any information be required to be provided and in what format? (e.g. excel spreadsheet)

Yes, School Dude used for scheduling and maintenance orders.

What documentation is required to properly operate and maintain facilities? *(e.g., valve tags, as-built documents, one-line diagrams, hard copy and electronic copy O&M manuals)*

Valve tags, as-built drawings, one-line diagrams, hard copy and electronic copy of the O&M manuals, signage to indicate location of critical equipment such as BDA. Color coded indicators for above-ceiling components.

What are your expectations for extra stock? *(e.g., filters, belts, etc.)*

Limited storage availability / Limited quantities.
Lighting – spare drivers for LEDs, spare switches, spare plugs,
Flooring – attic stock for Carpet tiles. None for sheet goods.
Ceilings – Attic stock for track and tiles that are not commonly available.
HVAC filters – full set for one change
Water filter – full set for on change
Door hardware – none
Paint - No attic stock for paint, just provide the paint formulas.
Mechanical – 3 of each: spare t-stats, CO2 sensor, VAV actuators (if common to all VAVs)

Describe any special system warranty expectations.

Roof membrane – extended warranty
Plantings – 2 year warranty (if required by ConCom)

12. Testing Requirements

What equipment/systems are to be included in the commissioning scope of work?

Refer to MSBA standard commissioning contract.

Are there any additional commissioning testing requirement beyond a typical scope or in addition to equipment/systems identified in the proposal? *(e.g., sampling rate; witness other third-party testing)*

No.

What is the building envelope testing requirements? *(e.g., thermal scans; window leak testing; building pressure)*

Refer to MSBA standard building envelope commissioning contract.

13. Early Turnover Spaces

What area or systems need to be turned over prior to the rest of the project (e.g. telecom rooms, site security, conditioned spaces, temporary/permanent electrical)

Telecom spaces (MDF, IDF rooms) – must be secure and dust-free at the time of turnover.
Offices and classrooms priority turn over to make way for furnishing and move-in.

What turnover packages or personnel are required for successful turnover? (civil, telecom, security, steel, etc.)

Commissioning before occupancy.
Training and O&M packages before occupancy.

14. Additional Requirements

Indicate any special consideration and project requirements not already identified.

During construction, and especially during training, Town wants roof to remain free of debris, fasteners, and items that can damage the roof membrane.

Glulam beams – contractor to control and protect stockpiled beams to prevent footprints, water damage, etc.

Temporary protection for finishes:
- Flooring
- Countertops
- Window sills

Do not install Terrazzo too early in the construction phase and put it at risk of being damaged by other construction activities.

Project information									PFA or PSBA data					
MSBA ID	Calendar Year of sub bid date	District	School	OPM	Designer	CM/GC	Procurement Type (DBB/CMR)	PS&B Authorised Date (Board Meeting)	PS&B/PFA Construction Budget W\ Pre-Con & Alts	Design & Pricing Contingency	Design & Pricing Contingency (% of Construction Budget)	Escalation to mid point of construction ($)	Escalation to mid point of construction (%)	Total Project Budget
											#DIV/0!		#DIV/0!	
202003420015	2026	Wilmington	Wilmington Elmentary School	LeftField, LLC	Dore + Whittier	Fontaine Bros.	CMR	6/18/2025	**$137,743,666**	$10,180,877	7.39%	$7,635,658	5.54%	$173,265,626

DD														
Designer Current Cost Estimate	OPM's Current Cost Estimate	OPM Reconciled DD Estimate after VE	Design & Pricing Contingency	Design & Pricing Contingency (% of DD Construction Budget)	Escalation to mid point of construction	Escalation to mid point of construction (%)	Approved VE at DD since PFA	% OF approved VE since PFA	DD Total Project Budget	DD Date	Comments	Designer Current Cost Estimate	OPM's Current Cost Estimate	OPM Reconciled CD60 Estimate after VE
				#DIV/0!		#DIV/0!		#DIV/0!						
$135,415,779	$137,629,182	$137,629,182	$5,361,245	3.90%	$4,664,283	3.39%	$0	0.00%	$173,265,626	3/20/2026	Reconciled cost estimate is under budget, no VE needed	$135,711,493	$137,457,680	$137,457,680

CD60															
Design & Pricing Contingency	Design & Pricing Contingency (% of CD60 Construction Budget)	Escalation to mid point of construction	Escalation to mid point of construction (%)	Approved VE at CD60	% OF CD60 VE to PFA	Approved VE since PFA	% of approved VE since PFA	CD60 Total Project Budget	CD60 Date	Comments	Designer Current Cost Estimate	OPM's Current Cost Estimate	OPM Reconciled CD90 Estimate after VE	Design & Pricing Contingency	Design & Pricing Contingency (% of CD90 Construction Budget)
	#DIV/0!		#DIV/0!		#DIV/0!	$0	#DIV/0!								#DIV/0!
$3,343,762	2.43%	$2,786,469	2.03%	$0	0.00%	$0	0.00%	$173,265,626	6/25/2026	Reconciled cost estimate is within budget, no VE needed	$135,560,400	$136,174,844	$136,174,844	$999,300	0.73%

CD90									Final Cost						
Escalation to mid point of construction	Escalation to mid point of construction (%)	Approved VE at CD90	% OF CD90 VE to PFA	Approved VE since PFA	% of approved VE since PFA	CD90 Total Project Budget	CD90 Date	Comments	Sub Bid Date	Bid/GMP Date	Combined Approved VE	Combined Approved VE since PFA (%)	Total Bid/GMP Amount	Total Over(+) /Under(-) PFA Construction Budget	Bid/GMP Variance to PFA (%)
	#DIV/0!		#DIV/0!	$0	#DIV/0!						$0	#DIV/0!		$0	#DIV/0!
$1,498,951	1.10%	$0	0.00%	$0	0.00%	$173,265,626	9/28/2026	Reconciled cost estimate is within budget, no VE needed			$0	0.00%		($137,743,666)	-100.00%

Office of the Town Manager

Town of Wilmington
146 Middlesex Avenue
Wilmington, MA 01887-2733

PHONE: (978) 658-3311
FAX: (978) 658-3334
TTY: (978) 694-1417

WWW.WILMINGTONMA.GOV

September 28, 2026

Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

RE: Wilmington Elementary School Project
320 Salem Street, Wilmington, Massachusetts
MSBA 90% Construction Documents Submission
State Reviews and Approvals / PFA Section 4.12 Confirmation

Dear MSBA Staff:

On behalf of the Town of Wilmington, this letter is provided in connection with the 90% Construction Documents submission for the Wilmington Elementary School Project, located at 320 Salem Street in Wilmington, Massachusetts.

In accordance with Section 4.12 of the Project Funding Agreement, the Town confirms that the Project has undergone review by the applicable departments and agencies required to review the Project at this stage. The Town and Project Team will continue to coordinate with all applicable local, state, and federal agencies as the Project advances and will obtain and maintain all required approvals prior to the solicitation of filed-trade construction bids, as referenced in the Project Funding Agreement.

The Town further provides the following update regarding environmental and wetlands-related review items.

Following the Project's submission of the Notice of Intent ("NOI") to the Wilmington Conservation Commission, and prior to the close of the public hearing and issuance of the Order of Conditions, private parties identifying themselves as neighborhood residents and/or abutters submitted correspondence to MassDEP raising environmental allegations regarding the Project site, including assertions related to arsenic in soil. In response, the Project's environmental consultant submitted a response package to MassDEP on April 6, 2026, which included environmental documentation, soil investigation information,

regulatory context, and supporting analysis. The information provided to MassDEP indicated that the arsenic concentrations identified at the site are consistent with naturally occurring conditions in the region and that the condition does not require reporting under the Massachusetts Contingency Plan.

Following MassDEP's review of the documentation provided by the Project's environmental consultant, Town Counsel spoke with MassDEP counsel regarding the matter. Based on that discussion, MassDEP counsel indicated that MassDEP had reviewed the submitted documentation and determined that the arsenic levels found at the site are consistent with naturally occurring conditions. MassDEP counsel further indicated that no further action was required by MassDEP with respect to the private-party correspondence submitted to DEP, and that the Town should continue to address the site through the standard Licensed Site Professional ("LSP") process. The Town will continue to comply with applicable requirements for soil management, soil disposition, and construction-phase environmental controls.

The Wilmington Conservation Commission subsequently issued an Order of Conditions for the Project under MassDEP File No. 344-1588 for the work proposed at 320 Salem Street. The public hearing was closed on June 3, 2026, and the Order of Conditions was issued on June 4, 2026.

Following issuance of the Order of Conditions, the Town received notice of a neighborhood/abutter appeal of the Conservation Commission's Order of Conditions on or about June 15, 2026. On June 24, 2026, the Town received a letter from MassDEP acknowledging receipt of the appeal and requesting a site walk at the property on July 13, 2026. Town and Project Team representatives participated in this site walk along with representatives of the appealing parties.

On August 17, 2026, the Town received a letter from MassDEP requesting additional information related to the stormwater design. As of the issuance of the 90% construction document report to the MSBA, the Town is preparing a response to MassDEP. The Town will provide MassDEP with any required documentation and will continue to coordinate with MassDEP, the Conservation Commission, and the Project Team as necessary.

Fontaine Bros., Inc., the Project's Construction Manager, mobilized to the site in late June 2026, as planned. Initial construction fencing has been installed, and the limits of work have been established outside the Bordering Vegetated Wetland buffer zone regulated under the issued Order of Conditions. No work will commence within the buffer zone until MassDEP issues its determination on the appeal.

The Town understands that the appeal must be addressed in accordance with applicable MassDEP procedures and law and will continue to track this item as part of the Project's permitting schedule.

At this time, the Town is not aware of any additional required state reviews or approvals that have not been obtained or otherwise identified and incorporated into the Project permitting schedule, other than the pending MassDEP appeal associated with the Conservation Commission's Order of Conditions, as noted above.

Sincerely,

Judith L. O'Connell
Assistant Town Manager
Town of Wilmington

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

RECEIVED
JUN 16 2025
MASS. HIST. COMM
RC. 76918

PROJECT NOTIFICATION FORM

After review of MHC files and the materials you submitted, it has been determined that this project is unlikely to affect significant historic or archaeological resources.

RC. 76918

7/9/25

Joshua Dorin
Preservation Planner
Massachusetts Historical Commission

Date

Project Name: Wilmington Wildwood Elementary School

Location / Address: 320 Salem Street

City / Town: Wilmington, MA 01887

Project Proponent

Name: Dore + Whittier Architects

Address: 260 Merrimac St. Bldg. 7, Floor 2

City/Town/Zip/Telephone: Newburyport MA 01950

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or funding (specify)
Massachusetts School Building Authority (MSBA)	Facility Construction Grant

Project Description (narrative):

The project will seek to develop a new Prekindergarten - Grade 5 Elementary School to address the school needs in the District.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

A new building project will include complete demolition of the existing building.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

No the project will not include rehabilitation of the existing building.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

The proposed project will include all new construction. Refer to the attached plans.

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

No known to exist within the project's area of potential impact.

What is the total acreage of the project area?

Woodland	0.738 acres	Productive Resources:	
Wetland	0.024 acres	Agriculture	acres
Floodplain	0 acres	Forestry	acres
Open space	4.147 acres	Mining/Extraction	acres
Developed	7.236 acres	Total Project Acreage	12.145 acres

What is the acreage of the proposed new construction? Varies, see attached acres

What is the present land use of the project area?

The current site includes one (1) elementary school serving grades 4-5. The site also includes parking, access drives, and athletic fields.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

See attached.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: Lee Dore Digitally signed by Lee Dore DN: C=US, E=ldore@doreandwhitler.com, OU="Dore + Whitler", CN=Lee Dore Date: 2025.06.10 14:28:35-04'00' Date:

Name: Lee P. Dore

Address: 260 Merrimac Street, Floor 2

City/Town/Zip: Newburyport MA 01950

Telephone: (978)499 2999

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

OFFICE OF THE INSPECTOR GENERAL
MASSACHUSETTS

JEFFREY S. SHAPIRO
Inspector General

January 13, 2025

Via Electronic Mail

R. Eric Slagle, Town Manager
Town of Wilmington
121 Glen Road, Room 111
Wilmington, MA 01887
eslagle@wilmingtonma.gov

Re: Application to Use the Construction Management At-Risk Alternative Delivery Method for the Wilmington Wildwood Elementary School Project

Dear Mr. Slagle:

Good day.

On December 3, 2024, pursuant to Chapter 149A of the Massachusetts General Laws and 945 CMR 2.00, the town of Wilmington (Wilmington) submitted to the Office of the Inspector General (OIG) an application to use the construction management at-risk (CM at-risk) alternative delivery method for the Wildwood Elementary School consolidation project.

Based on all the information provided, Wilmington has met the statutory requirements for using the CM at-risk delivery method for the project. Accordingly, the OIG is issuing this notice to proceed to use the CM at-risk delivery method as specified in M.G.L. c. 149A, §§ 1-13. However, please note that the initial application was missing required responses and exhibited a flawed understanding of the CM at-risk delivery method. It is incumbent upon Wilmington and the project team to fully comprehend the statutory requirements in order to execute the project in accordance with the law.

The OIG reminds Wilmington that it must properly dispose of any surplus equipment and supplies from the current schools using Chapter 30B of the Massachusetts General Laws. Please review a recent OIG letter detailing a school district's failure to follow Chapter 30B during a renovation project.

This approval is conditioned on Wilmington using a CM at-risk firm that the Division of Capital Asset Management and Maintenance (DCAMM) has certified, as well as DCAMM-certified trade contractors. Therefore, Wilmington must require each CM at-risk firm to supply both a certificate of eligibility and an update statement during both the prequalification phase and the technical proposal phase of the selection process. In addition, Wilmington must require each trade contractor to supply a certificate of eligibility and an update statement during the prequalification phase and again at the bidding phase of the selection process. Wilmington must reject as invalid all contractors' statements of qualifications, proposals and bids that do not provide such certificates of eligibility or update statements.

If, during the course of the project, Wilmington changes its Owner's Project Manager (OPM) or Designer, please submit information about the new OPM or Designer to the OIG. Also, if Wilmington decides not to proceed with the CM at-risk delivery method for any reason, please notify the OIG within 30 days of that decision.

As a condition of the approval, Wilmington is required to submit the following project milestone information to the OIG.

1. Selected CM at-risk firm,
2. Date the initial cost-plus CM at-risk contract was signed,
3. Date physical on-site work started,
4. Date the guaranteed maximum price (GMP) was set,
5. Percent of design document completion when the GMP was set,
6. Date of substantial completion, and
7. Final total cost of the project.

At each milestone, Wilmington must use this Form to submit the information.

Wilmington must also provide the OIG with a final report within 70 days of project completion. The final report must discuss Wilmington's experience using CM at-risk, the final project schedule, budget and final actual costs. Wilmington must use this Form to submit the final project report.

The project milestone report and final project report forms are available on the OIG's website.

All correspondence regarding this project may be sent to igo.municipal@mass.gov.

Please feel free to contact Kerri-Anne Hollingshead, Senior Policy Analyst at Kerri-Anne.Hollingshead@mass.gov or 617-722-8871 or me at Jeffrey.S.Shapiro@mass.gov or 617-722-8806 if you have any questions or concerns regarding this building process approval.

Sincerely,

Jeffrey S. Shapiro, Esq., CIG
Inspector General

cc (by email):

Glenn Brand, Ed.D., Superintendent of Schools, Town of Wilmington
Gregory B. Bendel, Select Board Chair, Town of Wilmington
David A. Ragsdale, School Committee, Town of Wilmington
Nicholas Golden, School Committee, Town of Wilmington
Stephen Turner, School Committee, Town of Wilmington

Julie Leduc, Director of OPM Services, Symmes, Maini and McKee Associates
Sarah Traniello, Assistant Project Manager, Symmes, Maini and McKee Associates
Joshua Giles, Director, Government Outreach and Public Policy, OIG
Kerri-Anne Hollinghead, Senior Policy Analyst, Government Outreach and Public Policy, OIG
Nataliya Urciuoli, Senior Executive Assistant, OIG

GGD Consulting Engineers, Inc.
375 Faunce Corner Road, Suite D
Dartmouth, MA 02747

L#98579
J#894 135 00.00

June 10, 2026, *Revised September 25, 2026*

Dore + Whittier
260 Merrimac Street, Building #7
Newburyport, MA 01950

Attn: Bryce Taft

Re: Wilmington Elementary School
Wilmington, MA

Dear Mr. Taft:

Please find below a list of Utility Officials contacted by our design team regarding the Wilmington Elementary School.

Utility Company	**Date Contacted**	**Remarks**
Reading Municipal Light Department	December 26, 2025	Initiated contact with Reading Municipal Light Department to coordinate the electric service.
	February 11, 2026	Coordination with RMLD regarding transformers.
	May 11, 2026	Updated Load data sheet was sent.
	September 9, 2026	Coordination with Vaughn from RMLD about incoming service requirements.

If you have any questions or comments regarding the above, please contact our office at your earliest convenience.

Very truly yours,

GGD Consulting Engineers, Inc.

David M. Pereira, P.E.

DMP:jfm

DM Berg Consultants, PC
475 Hillside Ave, Suite 5
Needham, MA 02494
p 781.444.5156
f 781.444.5157
www.dmberg.com

DM BERG CONSULTANTS, P.C.
SERVING THE INDUSTRY SINCE 1963

MEMORANDUM

TO: Engineers Design Group, Inc.

FROM: Ali Borojerdi

DATE: July 20, 2026

RE: **WILMINGTON ELEMENTARY SCHOOL**
WILMINGTON, MASSACHUSETTS

SUBJECT: **Peer Review Comments – 60% Set**

Drawing S0.01

1. Note G3 indicates the design is in accordance with the ninth edition of the code. Is this correct?

Drawing S0.07

1. In Detail 1, the section on the right, replace HORIZ REBAR with VERT REBAR.

Drawing S1.22

1. Please review W12x14 beams on Lines B.20, B.24, and B.28 between Lines 1.30 and 1.32. Also, W12x14 on Line B.28 between 2.08 and 2.12.
2. Framing Notes 11 and 12 refer to multiple details on sheet S0.07. Please review and adjust references.
3. Shearwalls are shown on plan and elevations are shown in S4.02 and S4.03. There should be a reference in FRAMING NOTES to define SW-XX and to Detail 1/S0.07 for the connection to the framing around them.
4. What is the connection detail for the shearwalls that pass by the floor beam (Lines B.28, 1.32, and 2.08)?
5. Please review W12x14 along B.28 between 1.62 and 1.76. What supports the CMU starting above this W12?
6. It appears that short W12x14 beams below and parallel to grid EDG B.xx need to be continuous from cantilever to cantilever.

Drawing S1.32

1. How are the glulam beams at the bottom of the sheet supported on steel beams and columns? No details or sections are available.
2. Slab designation in the shaded area is marked as 3” LW/5 ¼” LW. Sections 7 and 8 on S3.01 indicate topping slab over isolation system over concrete on deck. 3” LW has not been defined in Framing Notes.
3. Section 11 cut close to B.20-2.26 appears to be Section 10. And section 12 in the middle of the sheet appears to be Section 11.

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MEMORANDUM

Drawing S1.41

1. Screen posts are called as C8 on this drawing and on S1.42. Per S1.12, C8 is HSS8x6x3/8. Detail 8 on S0.08 calls the post to be HSS6x6x1/2. Please coordinate.

Drawing S1.42

1. Are the beams at B.24-2.08 moment connected to the column, or one beam cantilevering over the column?

Drawing S4.01

1. Brace design forces are mentioned in the notes but they have not been shown below the members yet.

p:\proj26\001-099\26066\clerical\26066 wilmington elem school 60% peer review comments memo.doc

EDG RESPONSES TO PEER REVIEWER COMMENTS

DRAWING S0.01

1. ALL NOTES REFERENCING THE *NINTH* EDITION OF THE MASSACHUSETTS STATE BUILDING CODE WILL BE UPDATED TO 'TENTH'.

DRAWING S0.07

1. *DETAIL 1 ON S0.07 DOES NOT HAVE ANY REBAR SHOWN. PEER REVIEWER TO CONFIRM COMMENT IS REGARDING DETAIL 1 ON S0.06 - **TYPICAL STEEL TO REINFORCED MASONRY SHEAR WALL ANCHORAGE DETAILS**.*

IF SO; NOTE ON SECTION AT STEEL BEAM, THAT LEADS TO STEEL PLATE AT VERTICAL REBAR BUT SAYS 'HORIZ REBAR' - WILL BE CORRECTED.

DRAWING S1.22

1. TRANSFER BEAMS SIZES AT REFERENCED GRIDS, SUPPORTING CORRIDOR GIRDERS ALONG THE GYMNASIUM WALLS HAVE BEEN INCREASED FROM W12s.

2. 'FRAMING NOTES' ON PLANS AND APPLICABLE REFERENCES TO TYPICAL DETAILS HAVE BEEN UPDATED.

3. 'FRAMING NOTES' ON PLANS HAVE BEEN UPDATED TO INCLUDE NOTE REGARDING SHEAR WALLS.

4. DETAIL 6 ON S0.04 - **TYPICAL STEEL TO MASONRY CONNECTION DETAIL**, APPLICABLE AT THESE LOCATIONS - HAS BEEN ADDED.

5. W12x14 AT THIS LOCATION HAS BEEN UPDATED. CONCRETE-MASONRY WALL INTENDED TO BEAR ON THIS BEAM.

6. CONFIRMED; W12s AT THIS LOCATION WILL BE UPDATED AS SUGGESTED.

DRAWING S1.32

1. GLULAM BEAM - TO - STEEL BEAM CONNECTIONS HAVE BEEN ADDED TO THE DRAWINGS. REFER TO DETAIL 9 ON S0.07. ADDITIONAL SECTIONS APPLICABLE AT THE CAFETERIA ROOF WILL BE ADDED. INTENT IS TO PROVIDE SHOP-INSTALLED STEEL PLATE CONNECTION ASSEMBLY; GLULAM BEAM WILL BE BOLTED TO SHOP-INSTALLED STEEL CONNECTION.

2. 'FRAMING NOTES' HAVE BEEN UPDATED TO ACCURATELY DESCRIBE THIS CONDITION.

3. SECTION TAGS SHOWN ON PLANS WILL BE UPDATED TO REFERENCE CORRECT SECTIONS.

DRAWING S4.1

1. DETAIL 8 ON S0.08, [NOW MOVED TO DRAWING S0.07], IS A TYPICAL CONDITION THAT WOULD BE APPLICABLE AT ANY COLUMN SIZE INDICATED ON PLANS. DETAIL WILL BE REVIEWED TO ACCOMODATE ACTUAL COLUMN SIZES AS REQUIRED.

DRAWING S1.42

1. BEAMS SPANNING (PLAN) EAST/WEST, BETWEEN GRIDS (B.20) - (B.24) ARE CANTILEVERED VIA MOMENT CONNECTIONS TO THE GIRDER ALONG GRID (2.08). ADDITIONAL MOMENT CONNECTION SYMBOL WILL BE ADDED TO THE BEAM ALONG GRID (B.24) FOR THE CANTILEVER PAST THE COLUMN AT GRID (2.08, B.24).

DRAWING S4.01

1. AXIAL DESIGN FORCES AT BRACE MEMBERS HAVE BEEN ADDED TO ALL BRACE FRAME ELEVATIONS.

ALEX AUDITORE, 08/04/2026

The Green Engineer
Sustainable Design Consulting

www.greenengineer.com

WILMINGTON ELEMENTARY SCHOOL

WILMINGTON, MA

CONSTRUCTION DOCUMENTS
TEDI ASSESSMENT



Figure 1: Wilmington Elementary School
Source: Dore + Whittier

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Report Date:
September 18, 2026

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DISCLAIMER: The results and findings presented in this report are based, in whole or in part, on information contained in design documents and communications with the designers of record. While The Green Engineer, Inc. has made reasonable efforts to verify the information, we do not guarantee the completeness or accuracy of information provided by others. The Green Engineer, Inc. assumes no responsibility for any errors, omissions, or misrepresentations in the information provided by others and disclaims any liability for discrepancies between reported information and actual constructed conditions and/or actual energy performance. No warranty, expressed or implied, is made regarding the accuracy or completeness of the information presented.

Executive Summary

This report contains the results of the Thermal Energy Demand Intensity (TEDI) Assessment for the Wilmington Elementary School project, a new three-story building consisting of classrooms, administration offices, gymnasium, cafeteria/auditorium, and kitchen spaces. The project is in the Construction Documents phase of design and intends to meet the Massachusetts Stretch Energy Code effective July 1, 2025, by pursuing **Section C401.2.1(2) Targeted Performance Compliance Pathway**. This report evaluates the performance of the design with respect to Section C407.1.1 and assesses TEDI standards in the design process.

The Green Engineer (TGE) performed a building performance analysis in accordance with the MA Department of Energy Resources (DOER) recommended Simulation Guidelines that accompany Section C407.1, to document compliance with the Targeted Performance Pathway. The final TEDI assessment was conducted utilizing the 60% Construction Documents drawings set and supplemental information from design team members. Based on this information, the updated Basis of Design's (BOD) Heating and Cooling TEDI values are **1.09** and **8.87** kBtu/sf-yr, respectively. This demonstrates that the project **complies** with both the heating (2.2 kBtu/sf-yr) and cooling (12 kBtu/sf-yr) requirements under the MA State Stretch Energy Code Section C407.1 Targeted Performance Pathway. These results are depicted graphically in Figures 2 & 3.

Figure 2: *Heating TEDI*

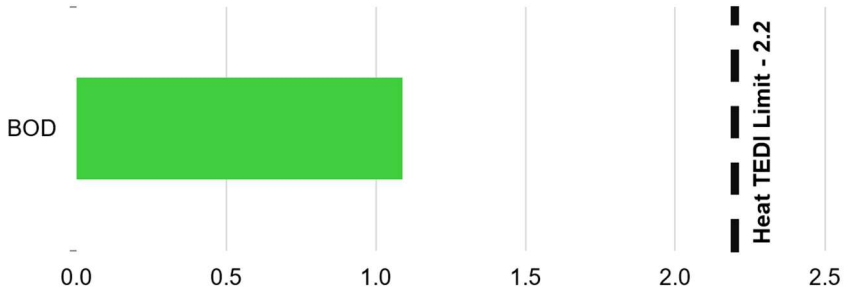
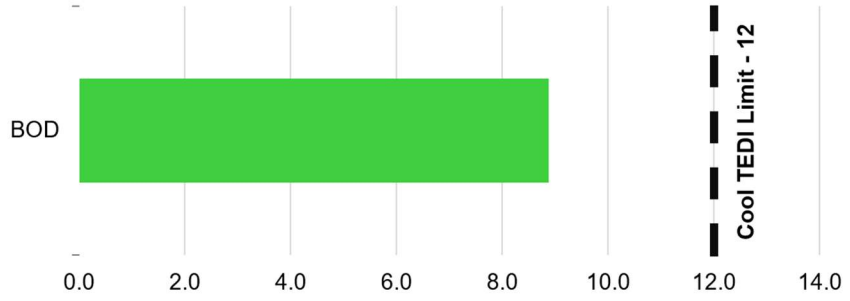


Figure 3: *Cooling TEDI*



1. Project Overview

The Wilmington Elementary School project includes the design and construction of a new three-story building on the site of the North Intermediate School in Wilmington, MA. The building has an approximate area of 165,000 Gross Square Feet (GSF), and includes classrooms, administration offices, gymnasium, cafeteria/auditorium, and kitchen spaces. The project team includes Dore + Whittier as the project architects, SMMA consulting as the owners' project manager, Garcia Galuska & Desousa as the MEP/FP engineers, and The Green Engineer as sustainability consultants.

The results of the TEDI analysis detailed in this report indicate **that the Basis of Design evaluated for the team complies with the Stretch code TEDI requirements**.

Detailed results are provided in Section 2. A summary table of model inputs is provided in Appendix B.

The model inputs are based on the 60% Construction Documents drawing set, narratives, and supplemental information provided by the design team.

- The Basis of Design (BOD) incorporates a derated U-value of 0.068 for the walls.
- The roof assembly comprises 9" rigid insulation, resulting in an assembly U-value of 0.018 (R-55)
- A window-to-wall ratio of 19% has been specified by the architects in tandem with an overall assembly U-value for the fenestration of 0.28.
- An infiltration rate of 0.175 cfm/sf at 75Pa is assumed for the BOD.
- The Dedicated Outdoor Air Systems (DOAS) includes energy recovery ventilation that ranges in winter effectiveness from 59-87% and summer effectiveness from 56-78%, averaging 83% winter and 76% summer.

The analysis also assesses additional design alternates to characterize the scale of their impact on annual heating & cooling loads.

The following design alternatives have also been assessed:

- **Alternative 1:** Decreased roof insulation (R-55 to R-40)
- **Alternative 2:** Bullet resistant windows and entry doors on Level 1 (U-value: 0.338)

Please refer to Appendix B for model inputs.

2. Discussion of Results

The building performance analysis was conducted based on the 60% Construction Documents drawing set demonstrating that the project meets the designated Heating and Cooling TEDI limits. Overall, the design team's commitment to energy efficiency has helped the BOD building meet the specified requirements in the Massachusetts Stretch Energy Code, Section C401.2.1(2).

In summation, the aggregate of these inputs resulted in a **heating TEDI of 1.09** and a **cooling TEDI of 8.87**. One design alternative has been assessed for the design team to consider.

- At 83% effectiveness the energy recovery unit preheats incoming outdoor air with recovered exhaust heat, leaving only a small portion of the ventilation load to be met by the heating system and offsetting the wall and fenestration transmission losses.
- The envelope inputs govern both TEDI metrics: lower wall, roof, and fenestration U-values reduce conductive heat loss and therefore heating TEDI, while in the cooling season the same assemblies limit conductive and solar-driven heat gain, reducing cooling TEDI.
- Reduced roof insulation (Alt 1) is observed to increase conductive roof losses raising heating TEDI.
- Bullet resistant glazing on the first floor vision glazing and entry doors result in a higher overall fenestration u-value leading to an increased heating TEDI.
- Infiltration contributes heating load in direct proportion to envelope leakage; a tighter envelope therefore corresponds to reduced heat loss and lower heating TEDI. Confirmation of the modeled value by whole-building air leakage testing is required; a tested result below 0.175 cfm/sf at 75 Pa would provide additional margin against the limit.

Table 1. The various design specifications changed to measure their effect against the TEDI Values.

	BOD Specification	Reduced Roof Insulation (Alt 1)	Bullet Resistent Glazing (Alt 2)	All Alts	Limits
BOD Specification	N/A	U-0.018	U-0.282	All	
Alternates	N/A	U-0.025	U-0.338		
Heating TEDI [kBtu/sf-yr]	1.09	1.16	1.20	1.29	***2.20***
Cooling TEDI [kBtu/sf-yr]	8.87	8.61	8.49	8.26	***12.00***

Figures 4 and 5 display how each design alternative impacts the projects hearing and cooling TEDI values. Each Graph is organized according to the alternative option.

Figure 4: *Design Alternatives Impact on Heating TEDI*

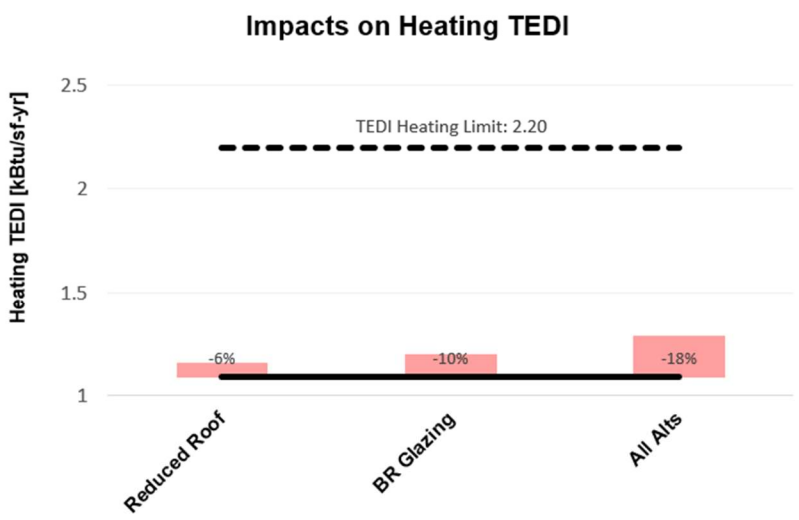
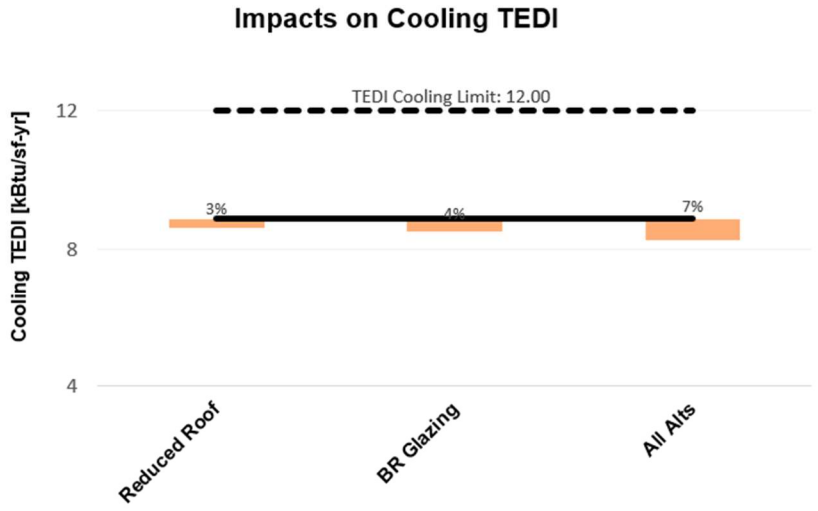


Figure 5: *Design Alternatives Impact on Cooling TEDI*



3. Recommendations

Key Performance Advantages:

- Improved building envelope, including foundation, walls, roof, and fenestration assemblies
- High-efficiency Energy Recovery Ventilators (ERV) to reduce heating and cooling loads
- Reduced air infiltration helps reduce excess heating and cooling losses
- Low window-to-wall ratio (WWR) helps reduce heating and cooling loads through fenestration

Further Recommendations:

- Maintain the targeted design strategies to ensure compliance and avoid value engineering of critical design components for TEDI compliance
- Include window assembly performance criteria into project specifications such as U-Value and SHGC.
- Include insulation thermal performance criteria into project specifications such as R-Value/Inch.
- Incorporate responsible parties into the air leakage verification effort and coordinate review of design envelope details, mockups, and construction phase testing protocols.

Appendix A: Analysis Methodology and Input Summary

This analysis follows the DOER Simulation Guidelines and the “default” thermal block and HVAC system options.

The energy analysis was conducted using DesignBuilder v2025. DesignBuilder uses the EnergyPlus simulation engine to estimate annual energy consumption by simulating a year of building operations based on a typical weather year and user inputs.

The assessment of the building is based on the Construction Documents pricing set issued 5/15/2026 and supplemental information provided by the design team. The windows positions are simplified based on a percentage glazing in each zone and exposure.

The TEDI guidelines dictate most MEP system details, while the infiltration value, energy recovery effectiveness, and inputs for window and wall assemblies are derived from the design. This approach aims to enhance uniformity in compliance outcomes across various projects while emphasizing alignment with the building's energy requirements.

The TEDI guidelines also establish standardized ventilation requirements for the building. Ventilation rates are determined based on the OA CFM/ft² values specified in Tables 1-6 of the Schedules and Loads Guidelines Supplement, according to the building’s use type. If the actual design’s ventilation rate exceeds the minimum requirements of applicable codes and standards by more than 135% **and** surpasses the OA CFM/ft² values from Tables 1-6 for the building’s use type, then the design’s ventilation rates must be modeled. For additional details, refer to Table 3.

Based on this information, and the floor plan included in the CD pricing set, the DOER stipulated TEDI ventilation is 70,500 CFM.

Since the TEDI ventilation rates are higher than the current design ventilation rates, the TEDI rates must be used in the model. As a result, the exception under Section 13.4.1 of the TEDI Simulation Guidelines does not strictly apply. However, it is still helpful to track this comparison so that as the design develops, the project remains within compliance.

Table 3: Standardized Assumptions for School Buildings > 75,000-sf

Thermal Block Type	Ventilation Rate (CFM/ft²)
Cafeteria/kitchen	1.19*
Gymnasium	0.5
Auditorium	1.26
School	0.38

*Applies to cafeterias/kitchens less than or equal to 9,040 sf. For cafeterias/kitchens greater than 9,040 sf model use the following equations, where cafeteria,kitchen sf = the square footage of the cafeteria/kitchen area:
Ventilation Rate CFM/sf = [10,761 + ((cafeteria,kitchen sf - 9,040) * 0.45)]/(cafeteria,kitchen sf)

The energy analysis was conducted using DesignBuilder v2025, which serves as a graphical user interface for Energy Plus v2023, a simulation engine developed and supported continuously by the US Department of Energy. DesignBuilder estimates annual energy consumption by simulating a year of building operations based on a typical weather year and user-defined design specifications. This phase of analysis reflects design input provided by the project team in the form of design documents, specifications, conference call discussions, and email correspondence. The geometry of the building is based on the architectural floor plans, except that window configurations are simplified based on a percentage of glazing in each zone and exposure.

Appendix B: Energy Model Input Tables

Information marked in blue is based on design.

TEDI MODEL INPUTS		
Parameter Description	**TEDI Design**	**Design Alternate**
General Information		
Energy Modeling Software	DesignBuilder v2025, EnergyPlus simulation program	
Climate Zone	ASHRAE Climate Zone 5A	
TEDI Building Type	K-12 School >= 125,000-sf	
Gross Building Area (SF)	165,621 sf	
Hours of Operation	Schedules according to DOER recommended TEDI Guidelines	
Building Envelope		
Roof Assembly U-value	U-Value: 0.018 (R-55 c.i.) 9" polyisocyanurate over steel decking	**Alt-1**: U-Value: 0.025 Reduced roof insulation (R-40)
Above-Grade Wall Assembly U-value	Derated U-Value: 0.068	
Ground floor slab (F-factor)	R-10 48” vertical perimeter, 48” horizontal underslab F-0.48	
Fenestration U-value	Weighted Avg U-value: 0.282 SHGC: 0.30	**Alt-2**: BR Glazing, weighted avg U-value: 0.338
Window-to-Wall Ratio (%)	19%	
filtration (CFM/SF @75 Pa)	0.175	

Parameter Description	TEDI Design
Internal Loads	
Interior Lighting Power Calc Method	As per DOER recommended TEDI Guidelines
Interior Lighting Power Density (W/SF)	School: 0.63 Auditorium: 0.61 Gymnasium: 0.85 Cafeteria/Kitchen: 0.52
Daylight Dimming Controls	Included as per TEDI guidelines
Receptacle/Misc Loads (W/SF)	School: 0.89 Auditorium: 0.46 Gymnasium: 0.46 Cafeteria/Kitchen: 15.5
HVAC (Air-Side)	
HVAC Types	**System 2 FCU (4-pipe fan coil units with CHW and HW)** Cooling Type: Chilled water Heating Type: Hot-water electric boiler Fan control: Constant volume
T-Stat Setpoints (F)	Space temperature and humidity design setpoints: Summer: 75F DB, 55% RH maximum Winter: 70F DB Outdoor ambient design conditions: Summer: 87F DB; 71F WB Winter: 7F DB
Hours of Operation	Schedules according to DOER recommended TEDI Guidelines
HVAC Air-side Economizer Cycle	Not modeled as per TEDI guidelines
Design Airflow Rates	Supply airflow rates are auto-sized and based on a supply-air-to-room temperature set-point difference of 20°F, or the minimum outdoor airflow rate, whichever is greater.

Parameter Description	TEDI Design

HVAC (Air-Side)

Ventilation (CFM)	TEDI prescribed [1] School: 45,800 (0.38 CFM/SF) Auditorium: 13,500 (1.26 CFM/SF) Gymnasium: 5,300 (0.5 CFM/SF) Cafeteria/Kitchen: 8,300 (1.19 CFM/SF) Overall building ventilation: 72,900 (0.50 CFM/SF) **School space includes office/locker room areas for ventilation.*
Fan Power (kW/CFM)	DOAS (School zones): 0.00063 Heating and cooling equipment (School FCU): 0.00024 Heating and cooling equipment (Single zones): 0.00050
Exhaust Air Energy Recovery	Energy recovery effectiveness: 83% heating, 76% cooling
Demand Control Ventilation	Demand control ventilation has not been modeled as per TEDI guidelines.

HVAC (Water-Side)

Chiller Efficiency	**COP: 6.6** Cooling coil capacities are auto-sized based on sizing runs and oversized by 15%
CHW Loop Temperature	44F supply and 56F return temperature
CHW Pump Power and Pump Flow	Primary pump: Secondary Pump: Constant flow Variable flow 9.0W/gpm 13.0W/gpm
Heating Capacity and Efficiency	**100% efficient electric boilers** Heating coil capacities are auto-sized based on sizing runs and oversized by 25%
HW Loop Temperature	180F supply and 130F return temperature
HW Pump Power and Pump Flow	Primary pump: Variable flow 19.0W/gpm

Note: 1: The total building-level ventilation as per the proposed design is around 70,500 CFM. Since the total building ventilation as prescribed by the TEDI standards is greater than the proposed design, the TEDI values will be used

- END OF REPORT -