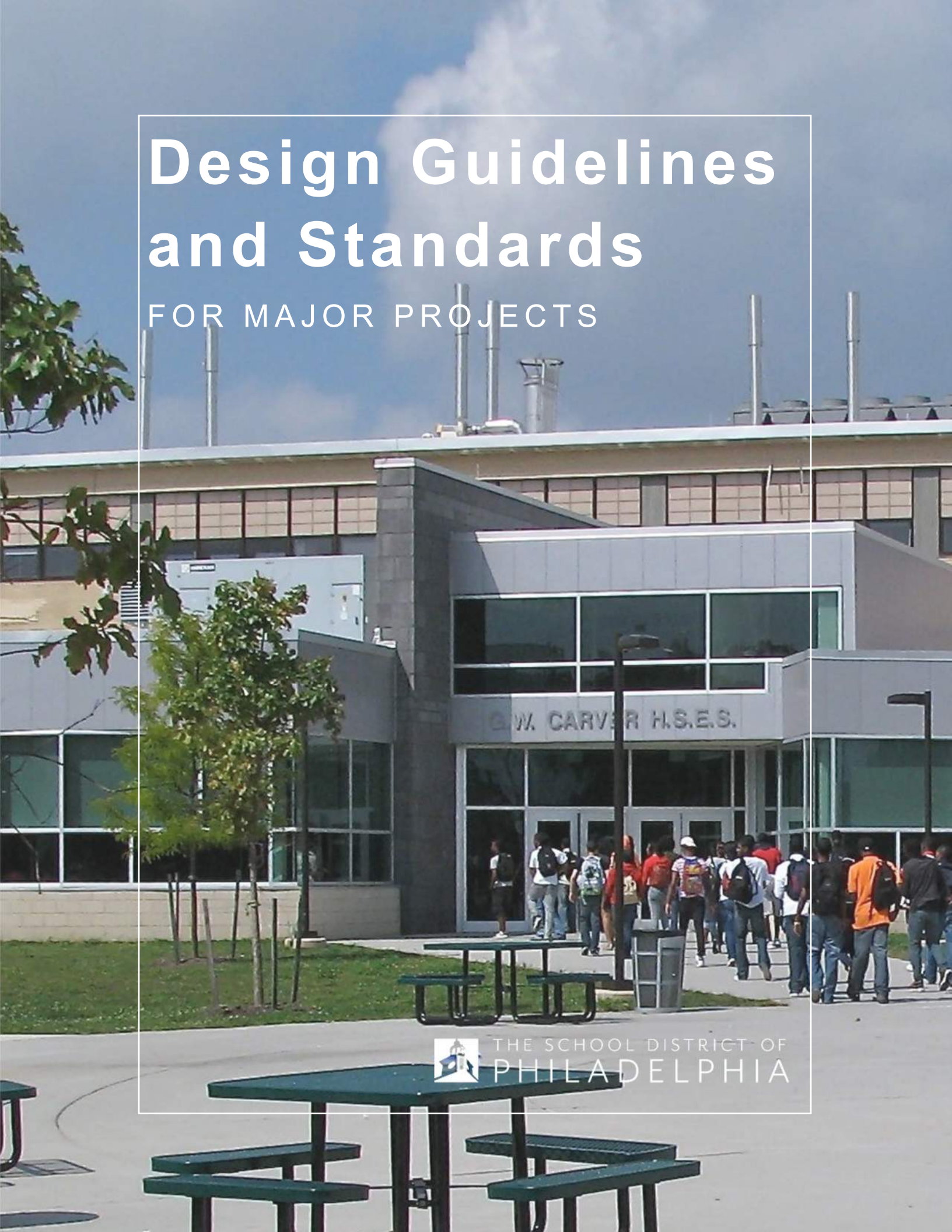


Design Guidelines and Standards

FOR MAJOR PROJECTS



THE SCHOOL DISTRICT OF
PHILADELPHIA

DESIGN GUIDELINES AND STANDARDS

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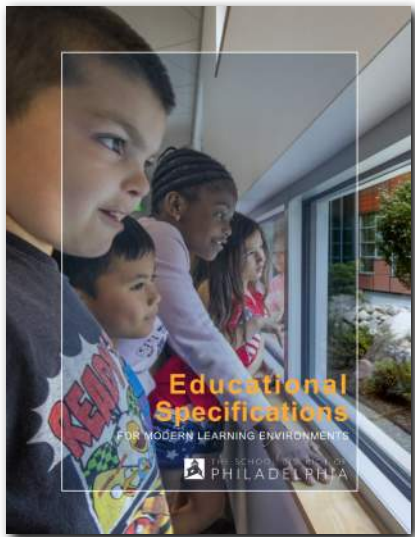
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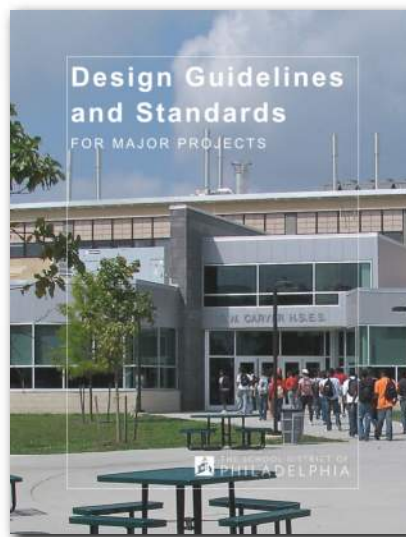
FOREWORD

School District of Philadelphia Educational Specifications and Design Guidelines and Standards

Over several months in 2019 and 2020, the School District of Philadelphia commissioned and completed the development of Educational Specifications and Design Guidelines, separate documents that together form a Project Development Manual. These are two key documents that form the foundation for sound K-12 capital improvement planning and implementation.



Educational Specifications



Design Guidelines and Standards

Part 1: Educational Specifications (“Ed Specs”) are a document describing the spatial, quantitative and relational characteristics of school facilities. There are several purposes for ed specs, including the following:

- To facilitate consensus within the School District around expectations and requirements for planned school facilities.
- To efficiently communicate between the school district and consulting architects and engineers, to help guide architectural programming and building design for renovations, additions, and new schools.

- To communicate planning principles and goals with educators and community members in order to encourage understanding and collaboration during the development of major capital improvements and new schools.
- To serve as a framework to ensure equity and application of best practices across the district, with an articulated balance of consistency and customization as appropriate to best serve the needs of the students.

The new ed specs are forward-looking and innovative, and take into account assessments of previous standards, conditions, and projected constraints. The Ed Specs and Design Guidelines have been developed in collaboration with the following School District Offices:

- Arts and Creative Learning
- Athletics
- Capital Programs
- Career and Technical Education
- Curriculum, Instruction, and Assessment
- Early Childhood Education
- Educational Technology
- Facilities and Maintenance
- Food Services
- GreenFutures
- Health, Safety, and Physical Education
- Information Systems and Information Technology
- School Safety
- Transportation

The document details the goals, planned activities, curriculum, and functions that will occur in SDP school facilities. See **Educational Specifications Part 1 Overview** for more background on the development and contents of the Ed Specs.

Part 2: Design Guidelines and Standards (“Guidelines”) are a companion volume, developed simultaneously with the Educational Specifications. The Guidelines provide direction and qualitative instructions about how to approach design for the School District of Philadelphia. They serve as a “how to” guide for major projects, highlighting important standards and delineating technical recommendations for project development, while explaining the project development and review processes. The Guidelines do not include full technical specifications, but rather focus on key District requirements.

Contents include:

- Chapter 1: Professional Services Requirements**
- Chapter 2: Energy and Sustainability**
- Chapter 3: Safety and Security**
- Chapter 4: Facility Design Standards**
- Chapter 5: Site Design Standards**
- Appendices**

The Design Guidelines are the result of multiple workshops with specialized offices within the SDP and external experts. SDP staff have provided many hours of review comments to ensure that the standards are responsive to SDP priorities, are aligned with SDP policies, and reflect operational, procedural, and budgetary norms.

Application of the Educational Specification and Design Guidelines and Standards:

The Educational Specifications and Design Guidelines have been developed to support facilities with a life expectancy of 40 or more years. They reflect the need for high quality and durability as well as flexibility and adaptability over time. SDP will update specific guidance from time to time. Although the standards have been developed with new schools in mind, they have application to projects that focus on renovations, additions, and major system replacements.

Any variation from these standards must be reviewed and approved by the Philadelphia School District's Office of Capital Programs. Any such deviations must be submitted in writing for formal written approval. The request will indicate how the proposed variance differs from the requirements of these Design Standards, including rationale and impact on the project cost and schedule. A variance review committee comprised of SDP staff will review the request and make its final recommendation and decision regarding its approval or disapproval.

An exception to the variation approval process applies to variations in size of spaces when compared to the standard educational specifications. A deviation of +/- 5% of the assigned net area is acceptable without formal approval, provided the space still functions appropriately.

Because these standards are based on SDP best practices, it is desirable that capital investments at existing schools, whether additions, renovations, or systems replacements, meet or approach these requirements. Where this is not feasible due to scope or budget limitations, this must be clearly documented for the project record. Rather than a series of separate exception requests, the scope for the project will include a summary of expected exceptions to be vetted in the first phase of design. The agreed-upon outcome will be documented as part of the Schematic Design Phase.

Amendment of these standards will occur from time to time, at the discretion of the office of Capital Programs. An ad-hoc committee, representing various interested departments, will meet as needed to receive feedback and to expand and revise the standards.

Your comments and suggestions on how to improve these standards are welcomed. Please submit comments to: capitalprograms@philasd.org and include the phrase "SDP Educational Specifications & Design Guidelines" in the subject line.

Dated: February 8, 2021

PROFESSIONAL SERVICES



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CHAPTER 1 – PROFESSIONAL SERVICES

Introduction

Professional Services General Requirements

Before executing any agreement with the School District of Philadelphia (SDP), consultants and subconsultants (the “design team”) shall become familiar with the provisions of all sections of the Design Guidelines and Educational Standards and shall incorporate those provisions into proposals for services. The design team shall identify any proposed deviations from these standards and issue to SDP for consideration prior to the execution of a contract. The SDP expects that all provisions within the standards, subject to approved exceptions, are carried through to completion.

After the execution of a contract, should the design team take issue with any requirement or discover a regulatory conflict with this document, the design team shall notify the SDP by documenting the conflict and proposed alternate solution. The design team shall include a short explanation on how the alternate solution provides an improved result for the SDP. If the SDP agrees with the proposed deviations from the Standards, the exchange of electronic correspondence is considered an addendum to the Standards for the specific project referenced. A digital log of approved variances shall be kept by the Design Consultant along with back-up documentation of written approvals.

Before or after execution of a contract, if the design team discovers any standard in this document that could potentially limit modernization of facilities, the design team should notify the SDP, document the issue, and propose a solution for consideration. If SDP agrees to deviations from the Standards, the exchange of electronic correspondence is considered an addendum to the Standards for the specific project referenced. A digital log of approved variances shall be kept by the Design Consultant along with back-up documentation of written approvals.

Design Team (A/E) Roles and Responsibilities

Design Team Services

In general, the design team provides architectural, engineering, and other services necessary to develop designs that are consistent with SDP's programmatic, budgetary and schedule requirements. Typically, the services provided by the design team includes the following services:

- Architecture
- Interior Design
- Educational Planning
- Landscape Architecture
- Civil Engineering
- Mechanical Engineering
- Plumbing Engineering
- Electrical Engineering
- Structural Engineering
- Fire Detection and Fire Protection Engineering
- Specifications
- Cost Estimating
- Food Service Design
- Vertical Transportation/Elevator Design
- Lighting Design (IESNA)
- Acoustics
- Traffic Engineering (Regulatory Review)
- Environmental Graphics
- Sustainable Project Services
- Energy Services
- Communications / Data Design
- Security Systems Design
- Theatrical Lighting, Sound, and Acoustic Design
- Historical Resources

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The following services are provided by the design team unless indicated otherwise by SDP:

- Site Surveys
- Subsurface Explorations
- Geotechnical Engineering
- Basic Commissioning
- Electrical Contractor Support – *when required*
- Plumbing Contractor Support – *when required*
- HVAC Contractor Support – *when required*

The following services are typically provided by SDP:

- Environmental Services (Hazmat, Environmental Reports)
- Furniture Specification
- Zoning Entitlements (Legal Services)
- Construction Management

Special Inspections:

For cases that a given project shall include Special Inspections, as defined in IBC Chapter 17, the lead design professional shall perform the role of "Design Professional in Responsible Charge of Special Inspections" (DPRC-SI).

Design teams shall refer to the project-specific Contract for Professional Design Services for further description of governing roles and responsibilities.

Design Phase Submissions and Review

Project Resource Documents

Design Teams are advised that these Standards form part of the information resources applicable for projects. Additionally, other applicable documents provide guidance and are as follows:

1. SDP Educational Specifications – Provides programming standards and planning concepts.
2. Archive record drawings (Hardcopies and PDF format).
3. Existing geotechnical testing and site surveys (for info only, SDP does not guarantee the accuracy of these documents).
4. Hazardous materials reports.
5. Consult with SDP for additional information available to the design team.

Design Phase Deliverable Requirements

Deliverables required for each Design Phase shall follow responsibilities listed in the professional services agreement and as outlined in this Section.

Design Phases

Typical design phases for new SDP projects will consist of the following:

1. Pre-Design / Programming Phase
2. Schematic Design Phase
3. Design Development Phase
4. Construction Document Phase
5. Bid Document Phase

Professional services during Bidding and Construction will typically include responsibilities as outlined in the professional services agreement and SDP's standard specifications. Phases include:

1. Bidding and Descope
2. Construction
3. Post-Construction

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Project Specifications

Design teams shall develop project specifications for all applicable divisions and include Division 00 and 01 sections provided by SDP. List acceptable manufacturers' products in all sections. Prepare specification section numbering in accordance with the current edition of MasterFormat by the Construction Specifications Institute.

Drawings and Drawing Format

Provide all drawings in AutoCAD version 2014 or higher at each phase. Package files in "DWG" format and include all external drawing references, linked documents, fonts, and plot styles. Design work completed in REVIT or other software is required to have compatibility with AutoCAD without any loss of data or performance.

All drawings shall conform to the current American Institute of Architect's CAD layer guidelines. Prepare a Microsoft Excel spreadsheet for the Owner that lists the drawing files and the following information:

1. Owner facility name
2. Owner project number
3. File name
4. Sheet number
5. Drawing name and description
6. Date of sheet

Pre-Design and Planning Phases

Deliverable Requirements

The design team shall review the following items and report any discrepancies, incomplete data, or any regulatory conflict with these documents to the Owner prior to commencing the Schematic Design Phase. Reference Appendix B for phase submission requirements.

1. Provide an evaluation of the project **Program of Requirements** (POR) to include the following items:
 - A. Space program square footages, interrelationships, and functions of all components.
 - B. Project-specific requirements

- C. Review space program and functional needs with SDP and project stakeholders, including school community and representatives of the community at large.
 - D. Recommended POR variance requests for SDP consideration and approval.
 - E. Project schedule
 - i. Include analysis and recommendation for project phasing, construction limits for the project, and analysis of impacts to the functions of the school, testing schedules, daily learner activities, etc.
 - F. Final POR for Approval.
2. Provide a preliminary Code Analysis.
 - A. Identify conditions that will require Zoning Entitlement review process or other regulatory exceptions.
 3. Identify programming and design elements that will require variance from SDP based on Educational Specifications and Design Guideline requirements.
 4. For major modernization additions, evaluate and recommend proposed locations for facility additions and coordinate with any existing facilities.
 - A. Provide an evaluation of existing major systems.
 5. Review space program and functional needs with SDP and project stakeholders, including school community and representatives of the community at large.
 - A. During this phase, identify key stakeholders to be engaged during the design process. Stakeholders include but are not limited to, the school community and the community at large. Focus groups are included in design charrettes and monthly update meetings.
 6. Provide analysis of site utilities and infrastructure.
 7. Work with SDP to establish sustainability goals and objectives. See Chapter 02, Energy and Sustainability
 8. Provide evaluation of Construction Budget.
 9. Obtain written approval from SDP prior to proceeding to Schematic Design.

Schematic Phase

Deliverable Requirements

The schematic design phase is the development of a conceptual design document and associated narrative descriptions of the building systems with recommendations to SDP. Reference Appendix B for phase submission requirements.

1. Minimum drawing requirements:
 - A. Preliminary Life Safety Plans
 - i. Composite floor plans at minimum 1/16" scale
 - B. Site plan
 - C. Landscape plan
 - D. Composite demolition plans (if applicable)
 - E. Floor Plans at minimum 1/8" scale.
 - F. Enlarged Plans at minimum 1/4" scale:
 - i. Typical Classroom
 - ii. Kitchen
 - G. Preliminary roof plan
 - H. Building elevations
 - I. Building sections
 - J. Typical schematic wall sections
 - K. Structural conceptual plans
 - L. Mechanical, Plumbing, and Fire Protection plans with primary space requirements for equipment and distribution systems
 - M. Optional - One-line system schematics
 - N. Electrical plans with primary space requirements for equipment and distribution systems.
2. Provide supporting design information and narratives as outlined below. Minimum requirements include:
 - A. Space program with a comparison to Educational Specifications

- B. Preliminary code analysis
 - C. Discipline narratives as described below that outline basis-of-design for building materials and systems. Other minimum requirements include design criteria, relevant codes and standards, primary systems, alternate options, and computations (if applicable). For existing building modernizations, include a full analysis of existing equipment, especially for mechanical and electrical.
 - i. Civil narrative
 - a. Include existing utility capacities and new demands
 - ii. Landscape narrative
 - iii. Architectural narrative
 - iv. Interior narrative with diagrams communicating operability and transparency of walls and materials
 - v. Structural narrative
 - vi. Mechanical narrative
 - vii. Electrical narrative
 - viii. Technology narrative
 - ix. Security narrative
 - x. Plumbing narrative
 - xi. Fire Protection narrative
 - xii. Sustainability narrative with updated SDP Scorecard documentation.
 - xiii. Basis of Design document. Refer to Chapter 02, Energy and Sustainability for document format.
 - D. Outline Specifications (Divisions 00 – 50).
 - E. Written statement of probable construction cost. Refer to **Appendix C** for Sample Cost Estimate Requirements.
 - F. Updated Design Schedule
3. Additional Required Deliverables:

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- A. Any architectural models, renderings, perspectives, etc. to describe the three- dimensional concepts of the buildings. Renderings shall be photorealistic at this stage.
 - B. Request and obtain water flow test.
4. Provide record of meetings with Regulatory Agencies
 5. Schedule Schematic Design presentation with SDP and school.
 6. Obtain written approval from SDP prior to proceeding to Design Development.

Design Development Phase

Deliverable Requirements

The Design Development deliverables shall illustrate and describe the development of the approved Schematic Design documents and consist of drawings and other documents including plans, sections, elevations, typical construction details, and diagrammatic layouts of building systems to fix and describe the size and character of the project as to architectural, structural, mechanical systems, electrical systems, and other appropriate elements. The Design Development Documents shall also include full specifications that identify major materials and systems and establish, in general, their quality levels. Reference Appendix B for phase submission requirements.

1. Minimum drawing requirements:
 - A. Life safety plans and analysis
 - B. Accessibility standards, clearances, and mounting heights
 - C. Exterior and interior wall types, UL and STC assemblies, etc.
 - D. Civil
 - i. During this phase, design teams shall schedule a preliminary review with Philadelphia Water Department (PWD).
 - ii. Site survey
 - iii. Existing site conditions and demolition plans
 - iv. Site Plans
 - v. Paving and striping plans
 - vi. Erosion and sedimentation control plans and details

- vii. Drainage area plans
- viii. Grading plans
- ix. Utilities plans
- x. Water quality plans
- xi. Water quality details and calculations
- xii. Details

E. Landscape

Landscape plans

- i. Typical details

F. Structural

- i. Foundation plans
- ii. Typical foundation details
- iii. Floor framing plans
- iv. Roof framing plans
- v. Typical details
- vi. Plans for the lateral load carrying system
- vii. Typical sections and details for connections and reinforcing
- viii. Typical edge of slab details for attachment of building systems
- ix. Schedules
- x. Calculations

G. Architectural

- i. Demolition plans (if applicable)
- ii. Architectural site plan
- iii. Comprehensive floor plans for all levels
- iv. Floor plans at minimum 1/8" = 1'-0"

- v. Enlarged floor plans
- vi. Typical plan details
- vii. Reflected ceiling plans
- viii. Typical ceiling details
- ix. Roof plans
- x. Typical roof details
- xi. Building elevations
- xii. Building sections
- xiii. Wall sections and details
- xiv. Stair plans, sections, and details
- xv. Elevator plans and sections
- xvi. Door and frame schedules
- xvii. Frame details
- xviii. Window details
- xix. Storefront and curtainwall elevations and details
- xx. General building details
- xxi. Interior elevations at minimum 1/4" = 1'-0"
- xxii. Special graphics concept elevations or images
- xxiii. Millwork and casework elevations
- xxiv. Finish plans and schedules
- xxv. Signage plans and details

H. Furniture

- i. Design teams to coordinate with SDP.

I. Mechanical

- i. HVAC plans
- ii. Piping plans
- iii. Enlarged equipment room plans and sections with dimensions showing horizontal and vertical clearances.
- iv. Typical details

- v. Schedules
- vi. System diagrams
- vii. Controls Sequence
- viii. Controls Points List
- ix. Controls Schematics

J. Plumbing

- i. Plumbing plans
- ii. Enlarged plans
- iii. Typical details
- iv. Waste and vent riser diagrams
- v. Water riser diagrams
- vi. Schedules

K. Fire Protection

- i. Fire protection plans
- ii. Typical details

L. Electrical

- i. Lighting plans
- ii. Power plans
- iii. Special systems plans
- iv. Enlarged plans
- v. One-line diagrams
- vi. Schedules
- vii. Typical details
- viii. Lightning protection plan
- ix. Fire alarm plans
- x. Security plans
- xi. System diagrams

M. Food service

- i. Food service plans
 - ii. Food service plumbing, electrical, and special conditions plans
 - iii. Enlarged plans
 - iv. Equipment elevations
 - v. Equipment schedules
 - vi. Hood Requirements
2. Provide supporting design information as outlined below. Minimum requirements include:
 - A. Geotechnical - Soils investigation general recommendations, based on proposed buildings or improvements.
 - B. Color palette of principal materials components.
 - C. HVAC Load Calculations
 - D. Written statement of probable construction cost. Refer to Appendix C for Sample Cost Estimate Requirements.
 - E. Site Narrative (See Chapter 02, Energy and Sustainability, Voluntary Measures)
 - F. Updated SDP Sustainability scorecards.
3. Basis of Design document. Refer to Chapter 02, Energy and Sustainability for document format.
4. Project Specifications:
 - A. Draft technical specifications for Divisions 00 through 50.
5. Additional Required Deliverables:
 - A. Any architectural models, renderings, perspectives, etc. to describe the three- dimensional concepts of the buildings for review by SDP.
 - B. Review design and functional needs with SDP department leadership.
 - C. Updated design schedule.
6. Commence plan submissions to permitting authorities for preliminary review.

7. Obtain written approval from SDP prior to proceeding to Construction Documents.

Construction Documents Phase

Deliverable Requirements

The Construction Documents shall illustrate and describe the development of the approved Design Development Documents and consist of drawings and specifications setting forth in detail the quality levels and performance criteria of materials and systems and other requirements for the construction of the work. Reference **Appendix B** for phase submission requirements.

1. Minimum drawing requirements:
 - A. Life safety plans and analysis
 - B. Accessibility standards, clearances, and mounting heights
 - C. Exterior and interior wall types, UL and STC assemblies, etc.
 - D. Fire rated systems and details
 - E. Civil
 - i. Site survey
 - ii. Existing site conditions and demolition plans
 - iii. Site Plans
 - iv. Paving and striping plans
 - v. Erosion and sedimentation control plans
 - vi. Erosion and sedimentation control details
 - vii. Drainage area plans
 - viii. Grading plans
 - ix. Utilities plans
 - x. Water quality plans
 - xi. Water quality details and calculations
 - xii. Details
 - F. Landscape
 - i. Landscape plans
 - ii. Enlarged plans

- iii. Typical details
- iv. Project specific details
- v. Planting schedules

G. Structural

- i. Special inspection requirements
- ii. Foundation plans
- iii. Typical foundation details
- iv. Project specific foundation details
- v. Floor framing plans
- vi. Roof framing plans
- vii. Typical details
- viii. Project specific details
- ix. Plans and details for the lateral load carrying system
- x. Typical sections and details for connections and reinforcing
- xi. Typical edge of slab details for attachment of building systems
- xii. Schedules
- xiii. Calculations

H. Architectural

- i. Demolition plans (if applicable)
- ii. Architectural site plan
- iii. Architectural site details
- iv. Comprehensive floor plans for all levels
- v. Floor plans at minimum 1/8" = 1'-0"
- vi. Enlarged floor plans
- vii. Typical plan details
- viii. Project specific plan details
- ix. Reflected ceiling plans
- x. Enlarged reflected ceiling plans
- xi. Typical ceiling details
- xii. Project specific ceiling details

- xiii. Roof plans
- xiv. Typical roof details
- xv. Project specific roof details
- xvi. Building elevations
- xvii. Building sections - Sections should document every change in plane, elevation, intersection of planes, all wall types, etc. Building sections shall be specifically provided for stairs, floor openings, intersecting volumes, and at major equipment locations, including main ductwork.
- xviii. Wall sections and details
- xix. Project specific details
- xx. Stair plans, sections, and details
- xxi. Elevator plans, sections, and details
- xxii. Door and frame schedules
- xxiii. Frame details
- xxiv. Window details
- xxv. Storefront and curtainwall elevations and details
- xxvi. General building details
- xxvii. Interior elevations at minimum 1/4" = 1'-0"
- xxviii. Special graphics concept elevations or images
- xxix. Special graphics details
- xxx. Millwork and casework elevations
- xxxi. Millwork and casework details
- xxxii. Finish plans and schedules
- xxxiii. Finish details
- xxxiv. Signage plans
- xxxv. Typical signage details
- xxxvi. Project specific signage details

I. Furniture

- i. Design teams to coordinate with SDP and review Smartboard locations, marker and tack boards, casework, IT outlets, power receptacles, sinks, plumbing accessories and other fixed elements

J. Mechanical

- i. HVAC plans
- ii. Piping plans
- iii. Enlarged equipment room plans and sections
- iv. Typical details
- v. Project specific details
- vi. Schedules
- vii. System diagrams
- viii. Controls Sequence
- ix. Controls Points List
- x. Controls Schematics

K. Plumbing

- i. Plumbing plans
- ii. Enlarged plans
- iii. Typical details
- iv. Project specific details
- v. Waste and vent riser diagrams
- vi. Water riser diagrams
- vii. Schedules

L. Fire Protection

- i. Fire protection plans
- ii. Typical details

M. Electrical

- i. Lighting plans
- ii. Lighting controls and details
- iii. Power plans
- iv. Special systems plans
- v. Special systems details
- vi. Enlarged plans

- vii. One-line diagrams
- viii. Schedules
- ix. Typical details
- x. Lightning protection plan
- xi. Fire alarm plans
- xii. Security plans
- xiii. Security details
- xiv. Security schedules
- xv. System diagrams

N. Food service

- i. Food service plans
- ii. Food service plumbing, electrical, and special conditions plans
- iii. Enlarged plans
- iv. Equipment elevations
- v. Equipment schedules
- vi. Equipment details
- vii. Serving counter details

2. Project Manual including:

- A. Technical specifications for Divisions 00 through 50.
- B. Coordinate Front End specifications with SDP.

3. Provide supporting design information as outlined below. Minimum requirements include:

- A. Written statement of probable construction cost. Refer to **Appendix C** for Sample Cost Estimate Requirements.
- B. Updated Design schedule and status of permit applications and regulatory reviews.
- C. Basis of Design document. Refer to Chapter 02, Energy and Sustainability for document format.

4. Additional Required Deliverables:
 - A. Any architectural models, renderings, perspectives, etc. to describe the three-dimensional concepts of the buildings for review by SDP.

5. Obtain written approval from SDP prior to proceeding with Bid Documents or bidding procedures for construction services.
 - A. Review design and functional needs with SDP department leadership.

8. Prepare and apply for Zoning and Building approvals as outlined in the Contract. Confirm and coordinate with Zoning submission and review timeline prior to commencing with CD phase.

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Bidding and Negotiation Phases

Perform responsibilities for bidding procedures and procurement as outlined in the professional services agreement and SDP's standard specifications.

Construction and Post-Construction Phase Services

Services During Construction

Perform construction administration responsibilities as outlined in the Contract and SDP's standard specifications.

Post-Construction Services

Perform project closeout responsibilities as outlined in SDP's standard specifications. The design team is required to provide electronic record documents. Verify all electronic record documents with the red-lined record drawing set provided by the construction team, prior to final project completion acceptance by SDP. Prepare all documents in accordance with the drawing format requirements, so the record documents are reproducible as a complete set of documents. Provide final updated CAD files.

Coordinate with SDP for a warranty walkthrough on the project site 11 months after substantial completion. Document warranty items for all disciplines associated with the design work and issue a compiled report to SDP and contractor.

Design Phase Reviews and Regulatory Approvals

SDP Design Phase Reviews

Upon completion of each Design Phase, the design team shall submit required documents to SDP’s Office of Capital Programs for review. Through the design phases, design teams shall reference the Phases of Service and Deliverables Schedule provided in **Appendix B**. This document will be utilized by SDP during deliverable reviews for compliance with project requirements.

PHASE SUBMISSION REVIEW FOR NEW CONSTRUCTION AND MAJOR MODERNIZATIONS / ADDITIONS		THE SCHOOL DISTRICT OF PHILADELPHIA		
PROJECT NAME		Design Consultant:		
SDP Site Review by		Date of Submittal:		
SDP Architectural Review by		Date of Review:		
SDP Structural Review by		Status following Review:		
SDP Interiors Review by				
SDP HVAC Review by				
SDP Plumbing Review by				
SDP Electrical Review by				
SDP Fire Suppression Review by				
SDP Kitchen Equipment Review by				
SDP Technology Review by				
Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Schematic Design Phase				
1.00 Schematic Site Plan (including):				
1.01 Location of building(s)				
1.02 Site development concepts including paving, walks, parking, ramps, stairs and landscape elements				
1.03 Identification of accessible routes in compliance with ADA				
1.04 Concept of traffic patterns				
1.05 Preliminary grading concepts				
1.06 Concept for addressing storm water				
1.07 Site utilities				
1.08 Site demolition				
1.09 Zoning Requirements				
2.00 Schematic Floor Plan(s):				

Phases of Service and Deliverables Schedule

Design teams shall confirm project schedule requirements with SDP and anticipate the following review timelines upon submission of each Design Phase deliverable:

- Small Project – 2 Weeks
- Large Project – 4 Weeks

Regulatory Approval Agencies

Design teams shall be responsible for all research, documentation, and filings for approvals required of regulatory agencies for the project. Approval requirements may vary by project and will typically include the following agencies:

- City of Philadelphia Water Department
- City of Philadelphia Streets Department
- City of Philadelphia Art Commission
- City of Philadelphia Historic Commission
- City of Philadelphia Planning Commission
- City of Philadelphia Zoning Commission
- City of Philadelphia Health Department
- City of Philadelphia Department of Licenses and Inspection
- City of Philadelphia Fire Department
- Philadelphia Parks and Recreation
- NPDES through the Pennsylvania Department of Environmental Protection
- Utility Companies such as PECO and Philadelphia Gas Works (PGW)

Stakeholder Engagement:

- Design Committee Meetings
- Community Engagement
- Registered Community Organizations (RCO's)

Drawing Format Standards

Sheet Naming Standards

1. Drawing Naming Format: X-123.4

- A. **X** = Discipline designator:
 - i. A-Architectural
 - ii. B-Geotechnical
 - iii. C-Civil
 - iv. CS-Cover Sheet
 - v. E- Electrical
 - vi. F-Fire Protection
 - vii. GN-General Notes
 - viii. H-HVAC
 - ix. L-Landscape
 - x. M-Mechanical
 - xi. P-Plumbing
 - xii. S-Structural
 - xiii. T-Telecommunication
 - xiv. D suffix indicates demolition for the respective discipline
- B. **1** = Sheet type:
 - i. 1-Plan
 - ii. 2-Elevation
 - iii. 3-Building Sections
 - iv. 4-Large Scale Drawings (NOT Details)
 - v. 5-Details
 - vi. 6-Schedules and Diagrams
 - vii. 7,8,9 User Defined
- C. **23** = Sheet sequence number (01, 02, etc)
- D. **.4** = Additional sheet same floor (.1, .2, etc)
- E. Example – Architectural 1st Floor shown divided between two sheets = A-101.1 and A-101.2.

2. Cover sheet requirements

- A. Project Title
- B. School Name
- C. School Address (tax address)
- D. Owner – Board of Education

- E. Set title – Schematic Design, Design Development, etc.
- F. Date
- G. Code Data
- H. Zoning Data
- I. Drawing list
- J. GIS site map

3. All sheet requirements

- A. Key plan
- B. North arrow
- C. Scale
- D. Set title – Schematic Design, Design Development, etc. and Date

4. Sheet rules

- A. Consultant name, logos are not to appear outside of the title block
- B. Sheet type and sequence number are to use the same format for each trade (Ex. A-101.1, M-101.1, P-101.1)
- C. Orientation of plans shall be the same direction throughout drawing set

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Standard Drawing Set Cover Sheet

Issued: 02/08/21

PDF PLACEHOLDER

Issued: 02/08/21

Standard Titleblock – Side Layout

SDP will provide the Title Block at the beginning of the project in CAD format.

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PDF PLACEHOLDER

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Standard Titleblock – Bottom Layout

SDP will provide the Title Block at the beginning of the project in CAD format.

Issued: 02/08/21

PDF PLACEHOLDER



ENERGY AND SUSTAINABILITY

2

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CHAPTER 2 – ENERGY AND SUSTAINABILITY

The School District of Philadelphia (SDP) is committed to the conservation of energy and water resources, healthy indoor environmental quality, and the implementation of sustainable construction practices. The contractual obligations with respect to this effort are described under the Contracts/Agreements between the District and Design & Construction professionals.

The various methodologies and tools used to define, track and document the sustainability achievements for each project are outlined in this Chapter:

Introduction

Sustainability Guidelines

All School District of Philadelphia projects shall document and track sustainability achievements using the following guidelines:

- A. **SDP Sustainability Scorecard**: The Scorecard focuses on documenting “common sense” sustainability objectives that almost any project can achieve, with minimal of documentation and reporting requirements. The scorecard is managed with support from SDP’s core project team.

ASHRAE Advanced Energy Design Guidelines (AEDG): Intended for new schools and major additions (greater than 10,000 square feet), the AEDG can be utilized as a guideline to inform an early integrated design process. Projects should reference the 50% AEDG.

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Sustainability Values Prioritization

In order to establish sustainability priorities a multi-hour sustainability workshop was held with the School District of Philadelphia design standards working team: VALUES - Viewing Architecture through the Lens of Users Experience in Sustainability¹. This process was developed as a methodology to obtain feedback on sustainability topics, without the use of a formal green building rating system framework, like LEED. This allows team priorities to be identified organically. The process included the following steps:

1. Background Introduction: Process and Context Highlights, Indoor Environmental Quality, and Resource Conservation.
2. Topic Review: 37 initial topics were selected for consideration. Teams were asked to prioritize topics using 100 individual priority chips. Some teams may choose not to place points on topics or heavily weigh points on a handful of topics. Experience indicates that any topic assigned 3 or more chips is a core priority.
3. Discussion: the results from the teams were organized to allow review of the top and bottom priorities, as well as topics where there was a significant difference in priorities.

The topics generally fall into four broad categories: Community (13 topics), Resource Conservation (4 topics), Health and Wellness (12 topics), and Building Life Cycle Impacts (8 topics). In summary, the following core priorities which inform the 2020 School District Design Standards were identified:

1. **Resource Conservation**
 - A. Energy and Carbon
 - B. Waste
 - C. Water
2. **Indoor Environmental Quality**
 - A. Thermal Comfort
 - B. Air Quality
 - C. Water Quality
3. **Life Cycle**

¹ The VALUES framework was developed by DLR Group and is protected under US and International Copyright laws.

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- A. Durable Materials
- B. Maintenance Programs
- C. DIY (Flexible) Space and Placemaking

4. **Community**

- A. Security

GreenFutures

In 2016, The School District of Philadelphia released the first version of a comprehensive sustainability program, known as GreenFutures. This program addresses 65 individual topics in 5 categories:

- Education for Sustainability
- Consumption and Waste
- Energy and Efficiencies
- School Greenscapes
- Health Schools, Healthy Living

The program goes significantly beyond physical space alone. This design standard includes highlighted actions in GreenFutures that relate to the District's design and construction program. Design teams are encouraged to become familiar with the guiding principles of GreenFutures and explore opportunities and synergies with these principles for alignment with project sustainability objectives.

For more information visit GreenFutures online:

<https://www.philasd.org/greenfutures/>

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Sustainability Scorecards

The following scorecards shall be utilized to identify and track sustainability objectives for School District of Philadelphia projects.

Sustainability Scorecard – Requirements: This scorecard lists sustainability requirements to be implemented on all SDP projects.

Sustainability Scorecard – Voluntary Measures: This scorecard lists additional sustainability requirements that may be pursued in addition to meeting the items under the Requirements Scorecard. Design teams shall evaluate and consider project budget and feasibility when reviewing items for implementation. Additional measures may be proposed by Design Teams for review with SDP.

Design Teams shall meet with SDP during Pre-Design / Planning Phases to review these Scorecards and outline sustainability goals for the project. Scorecards shall be updated and issued under each design phase deliverable.

Sustainability Scorecard - Requirements

Y	NA	Requirement	
		GEN - 1	Basis of Design Document: AE to prepare narrative at SD and update
		GEN - 2	Design Review Process: Sustainability Review at PD, SD, DD, CD
		GEN - 3	Construction Waste Management: Divert 75% from landfill
		IEQ - 1	Low Emitting Materials – Adhesives, Sealants, Paints + Coatings: Low VOC
		IEQ - 2	Low Emitting Materials – Composite wood and agrifiber: No added formaldehyde
		IEQ - 3	Low Emitting Materials – Flooring: Green Label Plus, FloorScore
		IEQ - 4	Low Emitting Materials – Insulation (batt): No added formaldehyde
		IEQ - 5	Low Emitting Materials – Wall and Ceiling Systems: Must be SCS Indoor Advantage Gold or Greenguard Gold Certified
		IEQ - 6	IAQ During Construction: Provide IAQ plan
		MEC - 1	Energy Efficiency – Mechanical Renovation: Meet or exceed ASHRAE 90.1 - 2016
		MEC - 2	Commissioning – Mechanical: Reference standard spec
		ELE - 1	Energy Efficiency – Lighting: Meet or exceed ASHRAE 90.1- 2016 using Building Area Method
		ELE - 2	Commissioning – Electrical: Reference Standard Spec
		PLU - 1	Indoor Water Use Reduction: Use 5% less water than local code
		PLU - 2	Commissioning – Plumbing
		ARCH -1	Storage & Collection of Recyclables & Composites
		ARCH -2	Energy Efficiency – Envelope: Meet or exceed ASHRAE 90.1- 2016 prescriptive envelope requirements
		ARCH - 3	Acoustical Performance – 1: ASHRAE handbook Chapter 48
		ARCH - 4	Acoustical Performance – 2: Ceiling Tiles w/ NRC of 0.70 or better

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		ARCH - 5	Acoustical Performance – 3: Isolate learning spaces in compliance with ANSI S12-2019
		SITE - 1	Native and Non-Invasive Adapted Species
		SITE - 2	Outdoor Water Use Reduction – 30%: Document 30% reduction
		SITE - 3	Integrated Pest Management: Refer to standard spec.

Refer to the Green Building Resources section of this Chapter for detailed summaries of listed items.

Sustainability Scorecard – Voluntary Measures

Y	N	NA	Voluntary Measures	
			GEN – 1V	Optimize Energy Performance: 6% improvement over baseline
			GEN – 2V	Construction Waste Management: 95% diversion from landfill
			GEN – 3V	Sustainability Sourced Materials and Products: 10% of construction cost to be regionally sourced, contain recycled content, FSC certified wood
			GEN – 4V	School As a Teaching Tool: Educate building occupants w/ signage, case study published on district website, digital presentations.
			IEQ – 1V	Controllability of Systems - Thermal Comfort: Occupant controls
			IEQ – 2V	Indoor Chemical and Pollutant Control: Walk-off mats, separate ventilation, MERV13 filters
			MEC – 1V	Enhanced Refrigerant Management: No refrigerants
			ELE – 1V	Renewable Energy: Offset 1 to 10% of building energy cost.
			ELE – 2V	Controllability of Lighting Systems: Occupant controls
			ELE – 3V	Daylight Controls: Sensors
			PLU – 1V	Indoor Water Use Reduction: Use 10% less water than local code
			PLU – 2V	Process Water Reduction: Comply w/ SDP process water tracking matrix
			ARCH – 1V	Envelope Commissioning - Additions & Major Renovations: Cx of envelope to comply with NIBS 3-2012
			ARCH – 2V	Views to Outside: Provide 75% of occupied spaces with views
			ARCH – 3V	Daylighting: Provide 70% of occupied spaces with daylighting
			ARCH – 4V	Low Emitting Materials - Furniture and Furnishings: Meet CA 01350 as verified by GREENGUARD Gold Standard or SCS Indoor Advantage Gold
			ARCH – 5V	Low Emitting Materials - Insulation (non-batt): no added formaldehyde
			ARCH – 6V	Construction IAQ Mgmt Before Occupancy, Air Testing: Conduct IAQ testing according to IAQ Testing Standards and Methods Table.
			ARCH – 7V	Construction IAQ Mgmt Before Occupancy, Flush Out: Install new filters and supply 14,000 cu.ft of outdoor air per SF

Y	N	NA	Voluntary Measures (Continued)	
			SITE – 1V	Protect and Restore Habitat: Restore 30% or more
			SITE – 2V	Maximize the Open Space: Provide open space equal to 30% of site
			SITE – 3V	Stormwater Design Quality: Manage a volume of stormwater equal to 50% of water quality volume (WQV) by infiltration on site.
			SITE – 4V	Site Assessment: Design narrative
			SITE – 5V	Outdoor Water Use reduction: No potable water
			SITE – 6V	Parking Capacity: Reduce parking by min. of 20% above code
			SITE – 7V	Carpools, vanpools, LEV & FEV: Provide 5% preferred parking for car/van pools and low emitting/ fuel efficient vehicles.
			SITE – 8V	Reduce Heat Island Effect: Green roof for 25% or shading 50% hardscape or 50% hardscape with SRI >29
			SITE – 9V	Light Pollution Reduction: Meet requirements for uplighting and light trespass
			SITE – 10V	Learning Environment: Outdoor classroom

Refer to the Green Building Resources section of this Chapter for detailed summaries of listed items.

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SDP Energy Standard

Energy Standard for New School and Major Modernizations

The 2018 International Energy Conservation Code with City of Philadelphia Amendments is currently the official City of Philadelphia Energy Code.

All new schools, additions, and renovation projects will comply with the current City of Philadelphia Energy Code, with the following additional requirements and clarifications:

1. City of Philadelphia Compliance Documentation
 - A. A/E Design Team is responsible for preparing all documentation required by City of Philadelphia Officials to document compliance with the City of Philadelphia Energy Code. This applies to new schools, additions, and all aspects of renovation projects that are addressed by the Energy Code.
 - B. Compliance documentation shall also be prepared for projects that fall outside the jurisdiction of the City of Philadelphia.
 - C. Completed Comcheck forms shall be included with the Permit Documents and shall be sealed and signed by the Architect or Engineer of Record. This applies to Envelope, Lighting and Mechanical components.
 - D. Where Energy Code Compliance cannot be demonstrated via Comcheck, the Performance Rating Method (computer simulation) outlined in Appendix G of ASHRAE 90.1 – 2016 shall be used as means of compliance.

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SDP Sustainability Submittal Sheets

The following Sustainability Submittal Sheets shall be utilized by the Contractor during construction for tracking of Sustainability Requirements and Voluntary Measures.

SDP SUSTAINABILITY SUBMITTAL SHEET

Low-Emitting Materials (LEED v4 EQc Low-Emitting Materials) PAGE 1

PRODUCT INFORMATION

See page 2 for additional information on credit category definitions, required data, reference standards and product requirements. Required data must be provided and standards / requirements must be met for each applicable category.

Submittal #	<input type="text"/>	Product Name / Model Number	<input type="text"/>
CSI # - Division Name	<input type="text"/>	Website URL for Supporting Documentation	<input type="text"/>
Manufacturer	<input type="text"/>	Manufacturer Contact Information	<input type="text"/>

INTERIOR PAINTS + COATINGS

VOC Content (g/L)	<input type="text"/>	Supporting documentation attached?	<input checked="" type="checkbox"/>
Volume Used (Liters)	<input type="text"/>	CDPH Standard Method v1.1-2010	<input type="checkbox"/>
TVOC Content (mg/m3)	<input type="text"/>	SCAQMD Rule #1113 or CARB 2007 SCM	<input type="checkbox"/>
		Green Seal GS-11 VOC limits	<input type="checkbox"/>
		No methylene chloride / perchloroethylene	<input type="checkbox"/>

INTERIOR ADHESIVES + SEALANTS

VOC Content (g/L)	<input type="text"/>	Supporting documentation attached?	<input checked="" type="checkbox"/>
Volume Used (Liters)	<input type="text"/>	CDPH Standard Method v1.1-2010	<input type="checkbox"/>
TVOC Content (mg/m3)	<input type="text"/>	SCAQMD Rule #1168	<input type="checkbox"/>
		No methylene chloride / perchloroethylene	<input type="checkbox"/>

FLOORING

Provide flooring-related adhesives & coatings above.	Supporting documentation attached?	<input checked="" type="checkbox"/>
	CDPH Standard Method v1.1-2010	<input type="checkbox"/>
	Carpet: CRI Green Label Plus / Certified	<input type="checkbox"/>
	Floor Finishes: SCAQMD Rule #1113	<input type="checkbox"/>

COMPOSITE WOOD

No added formaldehyde resins or ultra-low emitting formaldehyde (ULEF)	Supporting documentation attached?	<input checked="" type="checkbox"/>
	No added formaldehyde resins / ULEF	<input type="checkbox"/>

CEILINGS, WALLS, THERMAL + ACOUSTIC INSULATION

VOC Content (g/L)	<input type="text"/>	Supporting documentation attached?	<input checked="" type="checkbox"/>
Volume Used (Liters)	<input type="text"/>	CDPH Standard Method v1.1-2010	<input type="checkbox"/>
TVOC Content (mg/m3)	<input type="text"/>	Batt Insulation: No added formaldehyde	<input type="checkbox"/>

FURNITURE

Furniture Cost	<input type="text"/>	Supporting documentation attached?	<input checked="" type="checkbox"/>
Furniture Evaluation Type	<input type="text"/>	ANSI/BIFMA Standard Method M7.1-2011	<input type="checkbox"/>
		ANSI/BIFMA e3-2011 (non-classroom)	<input type="checkbox"/>
		CDPH Standard Method v1.1 (classroom)	<input type="checkbox"/>
		Salvaged/reused?	<input type="checkbox"/>

EXTERIOR APPLIED PRODUCTS

VOC Content (g/L)	<input type="text"/>	Supporting documentation attached?	<input checked="" type="checkbox"/>
Volume Used (Liters)	<input type="text"/>	CARB 2007 SCM	<input type="checkbox"/>
		Green Seal GS-11 VOC limits	<input type="checkbox"/>
		SCAQMD Rule #1168	<input type="checkbox"/>
		No hot-mopped asphalt & coal tar sealants	<input type="checkbox"/>

SDP SUSTAINABILITY SUBMITTAL SHEET

Low-Emitting Materials (LEED v4 EQc Low-Emitting Materials) PAGE 2

ADDITIONAL INFORMATION + REFERENCE STANDARDS

Complete separate Sustainability Submittal Sheet for EACH distinct product and include all applicable information. Requirements apply to Interior Paints + Coatings, Interior Adhesives + Sealants, Flooring, Composite Wood, Ceilings/Walls/Thermal + Acoustic Insulation, Furniture, & Exterior Applied Products.

Inherently non-emitting sources (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished/untreated solid wood flooring) are considered fully compliant if they do not include organic-based coatings/binders/sealants.

All information must be verified by manufacturer or supplier. Acceptable forms of verification include: SDS, Product Data Sheets, Letter from Manufacturer/Supplier, Online Information on Manufacturer/Supplier Website, and Approved 3rd Party Certifications, as applicable.

Credit Categories	Definitions
Interior Paints + Coatings	Defined as applied on-site and inside the weatherproofing system. VOC content & TVOC value must be provided.
Interior Adhesives + Sealants	Defined as applied on-site and inside the weatherproofing system. VOC content & TVOC value must be provided.
Flooring	Defined as interior-installed carpet & resilient (hard surface) flooring, carpet cushion. Flooring-related adhesives & coatings such as sealer, stain & finish for concrete, wood, bamboo, cork, etc: VOC & TVOC must be provided.
Composite Wood	Defined as interior-installed composite wood & agrifiber products (particleboard, MDF, plywood, wheat/strawboard, panel substrates & door cores).
Ceiling, Walls, Thermal + Acoustic Insulation	Defined as ceilings, walls, thermal + acoustic insulation applied on-site and inside the weatherproofing system. VOC content & TVOC value must be provided.
Furniture	Defined as all stand-alone furniture and furnishing items purchased for project.
Exterior Applied Products	Defined as adhesives, sealants, coatings, roofing and waterproofing materials applied on-site outside and inclusive of the primary and secondary weatherproofing system, such as membranes + barrier materials.

Data / Standards / Requirements	Additional Information
VOC Content (g/L)	Disclosure of VOC (volatile organic compound) content must be made by the manufacturer
Volume Used (Liters)	Provide liters of product installed
CDPH Standard Method v1.1-2010	General emissions criteria. Provide Total VOCs (TVOC) after 14 days. See Reference Standards, below
TVOC Content (mg/m3)	Per CDPH Standard Method v1.1-2010 testing criteria, provide TVOC range: < 0.5; 0.5 - 5.0; > 5.0
SCAQMD Rule #1113	Current SCAQMD Rule #1113. See Reference Standards, below
CARB 2007 SCM	CARB 2007 Suggested Control Measures for Architectural Coatings. See Reference Standards, below
SCAQMD Rule #1168	Current SCAQMD Rule #1168. See Reference Standards, below
Green Seal GS-11, Edition 3.1, 2013	Limits (g/L): Non-flat topcoat ≤100; Flat topcoat ≤50; Primer/Undercoat ≤100; Anti-corrosive coating ≤250
No methylene chloride / perchloroethylene	No intentionally added methylene chloride or perchloroethylene
Carpet: CRI Green Label Plus / Certified	Carpet + Rug Institute Green Label Plus (carpet); Green Label Certified (cushions)
Floor Finishes: SCAQMD Rule #1113	Sealer, stain and finish for concrete, wood, bamboo, cork and other flooring: shall not exceed VOC limits in SCAQMD Rule 1113, Architectural Coatings. Provide volume used
Composite wood/agrifiber products	No added formaldehyde resins OR meet CARB ATCM formaldehyde emissions for ultra-low emitting formaldehyde/ULEF
Batt Insulation: No added formaldehyde	No added formaldehyde resins, including urea, phenol, & urea-extended phenol formaldehyde
Furniture Evaluation Type	Indicate ANSI/BIFMA section 7.6.1 or 7.6.2, CDPH testing for classroom furniture, or salvaged/reused
ANSI/BIFMA Standard Method M7.1-2011	New furniture and furnishings must comply with testing protocol. See Reference Standards, below
ANSI/BIFMA e3-2011	Section 7.6.1 (1/2 credit) or 7.6.2 (full credit). Alt: CDPH for classroom furniture. See Reference Standards, below
CDPH Standard Method v1.1 (classroom)	Classroom furniture must use the standard school model in CDPH Standard Method v1.1-2010
No hot-mopped asphalt & coal tar sealants	Hot-mopped asphalt & coal tar sealants are prohibited

REFERENCE STANDARDS

California Department of Public Health (CDPH) Standard Method v1.1-2010: Claims of compliance must state (applicable) exposure scenario. For wet-applied products: state amount applied in mass per surface area & range of Total VOCs after 14 days.

South Coast Air Quality Management District (SCAQMD) Rule #1113: All paints and coatings wet-applied on site must meet this requirement (alt: CARB 2007 SCM for Architectural Coatings). Effective June 3, 2011 (LEED) and current regulations (AEGB).

California Air Resources Board (CARB) 2007, Suggested Control Measures (SCM) for Architectural Coatings: All paints and coatings wet-applied on site must meet this requirement (alt: SCAQMD Rule #1113).

Green Seal Environmental Standard GS-11 Edition 3.1 2013 Section 3.4: All paints, primers, anti-corrosive coatings applied on-site must not exceed the VOC limits.

South Coast Air Quality Management District (SCAQMD) Rule #1168: All adhesive and sealants wet-applied on site must meet this requirement. Effective July 1, 2005 (LEED) and current regulations (AEGB).

ANSI/BIFMA Standard Method M7.1-2011: new furniture and furnishings must comply with testing protocol.

ANSI/BIFMA e3-2011 Furniture Sustainability Standard Section 7.6.1 & 7.6.2, using concentration modeling or emissions factor approach.

SDP SUSTAINABILITY SUBMITTAL SHEET

EPDs | Sourcing of Raw Materials | Material Ingredients (LEED v4.1 MRc Building Product Disclosure + Optimization - BPDO)

PRODUCT INFORMATION

Include permanently installed products in Divisions 03-10, incl. built-in casework & millwork items, Sections 31.60.00 Foundations, 32.10.00 Paving, 32.30.00 Site Improvements, 32.90.00 Planting. Only include furniture, furnishings, MEP components/appliances/equip. & specialty items (elevators) if used throughout all BPDO calculations. See below for additional information and reference standards.

Submittal #	
CSI # / Division Name	
Manufacturer	
Product Name	
Product Website	
Material Cost	

BPDOc ENVIRONMENTAL PRODUCT DECLARATIONS - OPTION 1

Declaration Type	✓	Name of 3rd-party Program
Product-specific declaration	<input type="checkbox"/>	
Industry-wide (generic) 3rd party certified EPD	<input type="checkbox"/>	
Product-specific Type III 3rd party certified EPD	<input type="checkbox"/>	

Product-specific declaration or EPD attached?

BPDOc SOURCING OF RAW MATERIALS - OPTION 2

Leadership Extraction Practice	%	Name / Certificate #
Extended Producer/Take Back Program	<input type="checkbox"/>	
Bio-Based Material	<input type="checkbox"/>	
Certified Wood Products (FSC chain of custody)	<input type="checkbox"/>	
Materials Reuse	<input type="checkbox"/>	
Recycled Content Post-Consumer	<input type="checkbox"/>	
Recycled Content Pre-Consumer (Post-Industrial)	<input type="checkbox"/>	

Cut sheet/signed letter verifying the following information attached?

Material Origin	%	Furthest Distance from Project Site (miles + location)
% of material extracted, manufactured and purchased within 100 miles of site	<input type="checkbox"/>	

Map and/or signed letter from manufacturer confirming material origin (extraction, manufacture + purchase) attached?

BPDOc MATERIAL INGREDIENTS - OPTION 1

Reporting Program	✓	Reporting Program	✓
Manufacturer Inventory GreenScreen	<input type="checkbox"/>	ANSI / BIFMA e3 Furniture Sustainability Standard	<input type="checkbox"/>
Manufacturer Inventory GHS	<input type="checkbox"/>	Cradle to Cradle Material Health Certificate	<input type="checkbox"/>
Health Product Declaration (HPD)	<input type="checkbox"/>	UL Product Lens Certification	<input type="checkbox"/>
Cradle to Cradle V2 (Basic), V3 (Bronze)	<input type="checkbox"/>	FACTS: NSF/ANSI 336	<input type="checkbox"/>
Declare	<input type="checkbox"/>		

Reporting program docs attached?

ADDITIONAL INFORMATION + REFERENCE STANDARDS

BPDOc ENVIRONMENTAL PRODUCT DECLARATIONS Option 1. Product-specific declarations with publicly-available life-cycle assessment conforming to ISO 14044 or EPDs conforming to ISO 14025 and EN15804 or ISO 21930. Either option must have at least a cradle to gate scope.

BPDOc SOURCING OF RAW MATERIALS Option 2. All percentages are by weight and cannot exceed 100%.

Products extracted, manufactured AND purchased within 100 miles of project site are valued at 200%. Provide material origin info.

BPDOc MATERIAL INGREDIENTS Option 1. If pursuing Material Ingredients credit, identify which reporting program is being used to demonstrate compliance. Chemicals must be inventoried to at least 0.1% (1,000 ppm)

SDP SUSTAINABILITY SUBMITTAL SHEET

Appliances + Equipment (LEED v4 WEc Water Reduction + EAp/c Refrigerant Management)

PRODUCT INFORMATION

Include all information applicable to EACH type of appliance and equipment. Accompany w/ verifying documentation from manufacturer or supplier. Acceptable documentation includes: SDS, Product Data Sheets, Letter from Manufacturer/Supplier, Information from Manufacturer/Supplier Website, Approved 3rd Party Certifications.

Submittal #		Product Name	
CSI # - Division Name		Model Number	
Manufacturer		Product Website	

WATER USE

For water-using equipment, fill in actual water use; do not exceed maximum water use indicated.

Equipment Type	Water Use Standard / Maximum Allowable Water Use per Unit	Actual Water Use Per Unit	Number of Units
Ice Machine	ENERGY STAR or equiv.		
Dishwasher (Residential)	ENERGY STAR or equiv.		
Dshwasher (Commercial)			
Undercounter	1.6 gal/rack		
Stationary, single tank, door	1.4 gal/rack		
Single tank, conveyor	1.0 gal/rack		
Multiple tank, conveyor	0.9 gal/rack		
Flight machine	180 gal/rack		
Pre-rinse spray valve	1.3 gal/minute		
Combination Oven	1.5 gal/hr/pan including condensate cooling water		
Food steamer (batch - no drain connection)	2 gal/hr/pan including condensate cooling water		
Food steamer (cook-to-order w/ drain connection)	5 gal/hr/pan including condensate cooling water		
Clothes washer (residential)	ENERGY STAR or equiv.		
Clothes washer (commercial)	CEE Tier 3A		
Water Feature (such as fountain)	Use at least 50% non-potable water supply		
Other equipment not listed here	Performance baseline based on industry standards		

Documentation verifying water use per unit and/or ENERGY STAR (manufacturer's info, cutsheets) attached?

REFRIGERANT USE

For refrigerant-using equipment, fill in refrigerant type if equipment contains ≥ 0.5 lbs. CFCs are prohibited in HVAC+R systems.

Equipment Type	Refrigerant type	Unit (tons)	Ozone Depletion Potential (ODP)	Global Warming Potential (GWP)
HVAC Unit 1				
HVAC Unit 2				
HVAC Unit 3				
HVAC Unit 4				
HVAC Unit 5				
Refrigerator				
Freezer				
Ice Machine				
Other Equipment				

Documentation verifying refrigerant (manufacturer's info, cutsheets) attached?

SDP SUSTAINABILITY SUBMITTAL SHEET

Exterior Lighting + Internally Illuminated Exterior Signage (LEED v4 SSc Light Pollution Reduction)

PRODUCT INFORMATION

Include information applicable to EACH type of exterior fixture. Accompany w/ verifying documentation from manufacturer or supplier.

Submittal #	
CSI # - Division Name	
Lighting Rep / Contact	

BACKLIGHT / UPLIGHT / GLARE (BUG) RATING

Provide fixture type / ID per lighting plan, and catalog number and BUG rating per manufacturer data. Additional information (mounting height, distance from LEED boundary, lighting zone) will be needed to verify compliance.

Fixture Type	Quantity	Manufacturer	Catalog Number	Landscape or Façade? (Y/N)	BUG RATING		
					B	U	G

Documentation verifying BUG rating (photometric data/ies files, cut sheet) attached?

INTERNALLY ILLUMINATED EXTERIOR SIGNAGE

Provide maximum luminance data for any exterior signage that is internally illuminated.
Do not exceed a luminance of **200 cd/m2 (nits) during nighttime** hours and **2,000 cd/m2 (nits) during daytime**.

Sign Type	Quantity	Manufacturer	Description	LUMINANCE	
				Nighttime	Daytime

Documentation verifying maximum luminance data attached?

Basis of Design Guidelines

Design Teams shall utilize the following to develop and maintain the project Basis of Design Guidelines.

Project Name:

Project Location:

Date:

Firm Developing Basis of Design:

Firm Details:

1. Introduction

A. Project Description

Brief summary of the project including overview of space size and type, and scope of work.

B. Environmental Ratings

Identification of environmental and/or sustainable goals/certification to be achieved, i.e. LEED Silver Certification, Green Globes.

C. Occupancy

Estimated occupancy for the project

D. Hours of Operation

Estimated hours of operation for the project. Separate by space use type as needed.

2. Heating, Ventilation, and Air-Conditioning Systems

A. Applicable Standards

Provide list of standards and codes applicable to the design of the HVAC systems for the project, i.e. ASHRAE, ASME, SMACNA, AMCA, ANSI, ASTM, any local building and energy codes with jurisdiction.

B. Scope of Work

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Provide the scope of work for the project, listing all HVAC systems and equipment factored into the design.

C. Cooling System - Comfort

Provide narrative or listed description of the comfort cooling system to be installed for the project. Include details such as which energy codes the system shall meet or exceed, system capacity, efficiency rating, refrigerant used, control type, alarms monitoring, insulation requirements, etc.

D. Cooling System - Critical

Provide narrative or listed description of the critical cooling system to be installed for the project. Include details such as which energy codes the system shall meet or exceed, system capacity, efficiency rating, refrigerant used, control type, alarms monitoring, insulation requirements, etc.

E. Ventilation Air System

Provide narrative or listed description of the outdoor air ventilation system serving the project. Include details such as adherence to ASHRAE 62.1 requirements, control type, outdoor air monitoring capabilities, etc.

F. Air Distribution System

Provide narrative or listed description of the air distribution system for the project. Include details such as design static pressure setpoints, insulation requirements, acoustical lining requirements, adherence to standards and codes, etc.

G. Monitoring and Metering

Provide narrative or listed description of the monitoring and metering goals of the project. Include details such as which points the existing base building management system currently monitors, electrical sub-metering requirements for new systems and equipment, BTU metering for new systems and equipment, list of points to monitor i.e. fan status, reversing valve status, supply air temperatures, space temperatures, leak detector status, etc.

H. HVAC Design Criteria

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Provide design criteria observed for the project, including indoor/outdoor temperature/humidity design conditions, ventilation requirements per person or by area.

Provide any additional considerations for the design of the project. This could include acoustical criteria, filtration requirements, etc.

3. Electrical Systems

A. Applicable Standards

Provide list of standards and codes applicable to the design of the HVAC systems for the project, i.e. ASHRAE, ASME, SMACNA, AMCA, ANSI, ASTM, any local building and energy codes with jurisdiction.

B. Scope of Work

Provide the scope of work for the project, listing all electrical systems and equipment factored into the design, such as electrical service and distribution, lighting controls, power, etc.

C. Design Criteria

Provide design criteria observed for the project, including maximum electrical load densities for lighting systems, equipment, and receptacles by area served, as well as design foot-candle thresholds by space.

D. System Description

Provide narrative or listed description of the electrical service, power distribution, lighting systems, lighting control systems, fire alarm systems, and metering systems for the project.

4. Plumbing Systems

A. Domestic Cold-Water System

Provide description of the domestic cold-water system to serve the building/space

B. Domestic Hot Water System

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Provide narrative or listed description of the domestic hot water systems serving the project.

C. Plumbing Fixtures

Provide description of the plumbing fixtures to be installed in the building/space. Include details such as low-consumption specifications, sustainability rating system flush/flow requirements, architectural requirements (specific type, mounting), etc.

5. Building Envelope Systems

A. Building Enclosure Description

Provide description of the roof, exterior walls, floors, windows, skylights, atria, thermal mass, etc.

B. Exterior Wall Design Criteria

Provide narrative or listed description of the performance requirements for the exterior walls such as thermal performance, air leakage, water leakage, structural criteria, durability, and acoustical performance.

C. Exterior Windows, Curtainwall, and Storefront Systems

Provide narrative or listed description of the performance requirements for the exterior windows such as window to wall ratio, u-values, solar heat gain coefficients, glare control, security, and visible transmittances.

D. Roofing

Provide narrative or listed description of the performance requirements for the roofing such as insulation, fire rating, u-value, and reflectivity.

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Green Building Resources

(For projects pursuing SDP Sustainability Scorecard)

Sustainability Scorecard – Detailed Summaries

Requirement	Explanation
GEN - 1	Prepare narrative during early SD outlining scope and describing how it will be addressed. Utilize format outlined in this Chapter.
GEN - 2	Provide updated scorecards and other supporting documents for sustainability review at PD, SD, DD. Respond to review comments.
GEN - 3	Specify requirement for Contractors to divert a minimum of 75% of construction waste from landfill calculated by either weight or volume. To be coordinated with City of Philadelphia Construction and Demolition Waste Management requirements.
IEQ - 1	Utilize low-emitting materials for applicable interior adhesives, sealants, paints and coatings in accordance with requirements outlined in Chapter 04.
IEQ - 2	Composite wood + agrifiber must contain no added formaldehyde OR meet emissions requirements for ultra-low emitting formaldehyde (ULEF).
IEQ - 3	Carpet and carpet pads must have Green Label Plus certification; hard surface flooring must have FloorScore certification and/or compliance with California 01350.
IEQ - 4	Must contain no added formaldehyde.
IEQ - 5	Materials for wall and ceiling systems must be either SCS Indoor Advantage Gold or GREENGUARD Gold certified.
IEQ - 6	Specify requirement for an Indoor Air Quality Plan during construction, in accordance with Chapter 04, Energy Efficiency.
MEC - 1	Meet or exceed ASHRAE 90.1 – 2016 minimum efficiency requirements.
MEC - 2	Commissioning of mechanical and control systems. Refer to Chapter 04, Commissioning.
ELE - 1	Lighting in new and/or renovated spaces must meet or exceed ASHRAE 90.1-2016 using Building Area Method
ELE - 2	Commissioning of electrical, lighting and control systems. Refer to Chapter 04, Commissioning.
PLU - 1	New fixtures to use 5% less water in aggregate than local maximum as established using the SDP Building Water Use Reduction Calculator included under the Chapter 02, Green Building Resources section.
PLU - 2	Commissioning of plumbing systems in accordance with standard specifications. Refer to Chapter 04, Commissioning.
ARCH -1	Include area for collection of recyclable and compostable materials (if applicable).
ARCH -2	Building envelope must meet or exceed ASHRAE 90.1- 2016 prescriptive envelope requirements
ARCH - 3	Learning spaces shall be acoustically separated from noise generating spaces such as gymnasiums, cafeteriums, playgrounds AND HVAC systems designed using guidance from 2015 ASHRAE Handbook Chapter 48, Noise and Vibration Control; background noise level from HVAC systems in classrooms and other core learning spaces shall be 40 dBA or less. Refer to Chapter 04 Acoustics section.
ARCH - 4	In spaces with minimum acoustical requirements, provide ceiling tiles with a Noise Reduction Coefficient (NRC) of 0.70 or better. Refer to Chapter 04 Acoustics section.

ARCH - 5	Provide acoustical isolation of learning spaces in compliance with ANSI S12-2019.
SITE - 1	Provide native and non-invasive adapted species for plantings. Refer to Chapter 04, Division 32 narratives and Chapter 05, Plantings.
SITE - 2	Document 30% reduction in outdoor water use by means of the Outdoor Water Use Calculator provided under the Green Building Resources section.
SITE - 3	Implement a sustainable pest management program in accordance with SDP standards, refer to Chapter 04, Division 31 narrative.
Voluntary Measures	Explanation
GEN – 1V	Demonstrate a minimum 6% improvement in the energy performance of the proposed building compared to the baseline building, based on ASHRAE 90.1 – 2016.
GEN – 2V	Divert a minimum of 95% of construction waste from landfill, in accordance with requirements outlined in Chapter 04.
GEN – 3V	Provide sustainably sourced materials and/or products with 10% or greater sustainably sourced content calculated by the material/s cost.
GEN – 4V	Provide method to educate building occupants on sustainability aspects of the facility. Methods may include digital presentations, signage on building, case study published on District's website, etc.
IEQ – 1V	Install and commission systems that provide for individual controllability of one or more of the following: air temperature, radiant temperature, air speed, and humidity, for all individual occupants and shared multi-occupant spaces, including classrooms.
IEQ – 2V	Provide walk off mats at regularly used entrances to the building for a minimum length of 10 feet. Design and implement ventilation and partitions to separately exhaust and provide negative pressure to areas where hazardous gases or chemicals may be used and/or stored. Provide MERV13 or better filtration media immediately prior to occupancy.
MEC – 1V	The use of no refrigerants or acceptable levels of ODP and GWP.
ELE – 1V	Provide renewable energy sources such as solar panels, etc. Must provide documentation that confirms it will offset 1 to 10 percent of building energy cost.
ELE – 2V	Provide multi-mode lighting controls to allow occupants to adjust lighting to meet the needs and preferences of building occupants.
ELE – 3V	Design and implement daylighting strategies for dimming and/or switching off lights in areas that receive sufficient ambient light.
PLU – 1V	New fixtures to use 10% less water than City of Philadelphia Code maximum as established using the Building Water Use Reduction calculator provided in the Green Building Resources section. Lavatories excluded.
PLU – 2V	New fixtures and equipment to comply with the SDP Process Water Tracking Matrix provided in this Chapter under Green Building Resources.
ARCH – 1V	Commissioning of envelope in accordance with NIBS 3-2012.
ARCH – 2V	Provide views to outside for 75% of classrooms and regularly occupied spaces.

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ARCH – 3V	Design and implement daylighting strategies for 75% of classrooms and regularly occupied spaces.
ARCH – 4V	New furniture in all classrooms and other spaces such as libraries, computer, music and art rooms must meet or exceed the indoor air quality requirements of CA 01350 as verified by GREENGUARD Gold Standard or Scientific Certification Systems (SCS) Indoor Advantage Gold Environmental Certification Program.

ARCH – 5V	Insulation (non-batt) must contain no added formaldehyde.
ARCH – 6V	Prior to occupancy, conduct IAQ testing according to the IAQ Testing Standards outlined in Chapter 04, Indoor Air Quality section.
ARCH – 7V	Prior to occupancy, install new filters and perform building flush out supplying 14,000 cu. ft. of outdoor air per sq. ft. of gross floor area while maintaining internal temp between 60°F and 80°F & rel. humidity of 60%.
SITE – 1V	Restore 30% or more of the site with native and non-invasive adapted plant species.
SITE – 2V	Provide open space equal to 30% of project's site area.
SITE – 3V	Manage a volume of stormwater equal to 50% of water quality volume (WQV) by infiltration on site.
SITE – 4V	Provide a narrative outlining the site analysis conducted to demonstrate how it influenced design, siting, and orientation.
SITE – 5V	No Potable Water for Irrigation.
SITE – 6V	Reduce parking by minimum 20% above land development code minimums and provide solutions for off-site parking when events are held at the facility.
SITE – 7V	Provide 5% of parking for carpools, vanpools, and fuel-efficient, low-emitting vehicles.
SITE – 8V	Reduce heat island effect by any one or any combination of the following: greenroofs for at least 25% of roof area; OR any combination of accepted strategies for 50% of site hardscape.
SITE – 9V	Design and installation of indoor and outdoor lighting systems that reduce light pollution. Refer to the Light Pollution Reduction Reference Standard under the Chapter 02, Green Building Resources section.
SITE – 10V	Provide infrastructure for either a school garden or outdoor classroom. Refer to Chapter 05, Outdoor Learning.

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Building Water Use Reduction Calculator - Sample

PLU – 1 and PLU – 1V Indoor Water Use Reduction

Requirements

Employ strategies that, when aggregated, use 5% less potable water than local code water use baseline calculated for the building (not including irrigation) after meeting the current local code fixture performance requirements.

Instructions

The calculator consists of two tables, each divided into a section for flush fixtures and a section for flow fixtures. The Baseline Case Table establishes baseline water use assuming fixtures that meet code requirements. The Design Case Table calculates the estimated water use of the proposed design. These two results are then subtracted from each other and a percent water savings is calculated at the bottom. Typically, inputs must be made in the green fields.

The first table is the Baseline Case Table. In most cases, the only inputs needed will be the number of occupants. Fixture types and flow rates have been set to minimum requirements.

The second table is the Design Case Table. The user must choose the type of fixtures from the pull down menus as well as enter the corresponding inputs for each fixture type.

Flush Fixture - These can be entered using the pulldown menus. Common fixture types are listed in the pulldown menu. To add fixtures to the pulldown menus, provide project-specific fixtures and flow rates in the yellow highlighted columns at the bottom of the calculator. When a fixture is chosen from the menu, the corresponding gallons per flush (GPF) are automatically entered in the **Flowrate** column.

Flow Fixture - These can also be entered using the pulldown menus. Common fixture types are listed in the pulldown menu. To add fixtures to the pulldown menus, provide project-specific fixtures and flow rates in the yellow highlighted columns at the bottom of the calculator. When a fixture is chosen from the menu, the corresponding gallons per minute (GPM) are automatically entered in the **Flowrate** column.

Daily Uses - Daily Use is the number of times an occupant typically uses a fixture in one business day. Daily uses are per the Daily Use Chart below.

Duration - Duration is the length of time a fixture is used by an occupant during one

Daily Use. Durations are per the Duration Chart below.

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Occupants - Occupants refer to the number of people that will use a fixture in a typical business day. The total number of occupants are usually assumed to be half male and half female except for specialty businesses.

Annual Work Days - Number of days per year the facility is open for business and fully staffed.

Annual Graywater or Rainwater Reuse [gal] - Annual gallons of rainwater or graywater substituted potable water for indoor building use, such as toilet flushing.

BUILDING WATER USE REDUCTION CALCULATOR - SAMPLE

Baseline Case Table

Flush Fixture		Daily Uses	Flowrate [GPF]	Duration [flush]	Occupants	Water Use [gal]
1	Conventional Toilet					
	Staff FTE (Male)		1.28	1		0
	Staff FTE (Female)		1.28	1		0
2	Conventional Toilet					
	Students FTE (Male)		1.28	1		0
	Students FTE (Female)	0	1.28	0	0	0
3	Conventional Urinal					
	Visitors (Male)		0.5			0
	Visitors (Female)		0.5			0
4	Other					
	Male		0.0			0
	Female		0.0			0
Flow Fixture		Daily Uses	Flowrate [GPM]	Duration [sec]	Occupants	Water Use [gal]
1	Conventional Lavatory		0.5	15		0
2	Conventional Lavatory		0.5	15		0
3	Conventional Kitchen Sink		1.8			0
4	Other		0.0			0
5	Other		0.0			0
6	Other		0.0			0
7	Other		0.0			0
8	Other		0.0			0
Total Daily Volume [gal]						0
Annual Work Days						
TOTAL ANNUAL VOLUME [gal]						0

BUILDING WATER USE REDUCTION CALCULATOR - SAMPLE

Design Case Table

Flush Fixture		Daily Uses	Flowrate [GPF]	Duration [flush]	Occupants	Water Use [gal]
1	Toilet 2: ▼					
	Staff FTE (Male)		1.1	1		0
	Staff FTE (Female)		1.1	1		0
2	Conventional Urinal ▼					
	Students FTE (Male)		0.125	1		0
	Students FTE (Female)		0.125	1		0
3	Other ▼					
	Visitors (Male)		0.0	1		0
	Visitors (Female)		0.0	1		0
4	Other ▼					
	Male		0.0	1		0
	Female		0.0	1		0
Flow Fixture		Daily Uses	Flowrate [GPM]	Duration [sec]	Occupants	Water Use [gal]
1	Conventional Lavatory ▼		05			0
2	Conventional Kitchen Sink ▼		1.5			0
3	Other ▼		0.0			0
4	Other ▼		0.0			0
5	Other ▼		0.0			0
6	Other ▼		0.0			0
7	Other ▼		0.0			0
8	Other ▼		0.0			0
Total Daily Volume [gal]						0
Annual Work Days						
Annual Volume [gal]						0
Annual Graywater or Rainwater Reuse [gal]						
TOTAL ANNUAL VOLUME [gal]						0

BUILDING WATER USE REDUCTION CALCULATOR - SAMPLE

Water Use Reduction

Flush Fixture Chart

Flush Fixture Type	Water Use [GPF]
1 Conventional Toilet	1.1
2 Toilet 2:	
3 Toilet 3:	
4 Urinal 1:	
5 Conventional Urinal	0.125
6 Other	

Flow Fixture Chart

Flow Fixture Type	Water Use [GPM]
1 Conventional Lavatory	0.5
2 Lav 2:	
3 Conventional Kitchen Sink	1.5
4 Kitchen Sink 2:	
5 Conventional Shower:	
6 Shower 2:	
7 Other	

Default Fixture Uses, by Occupancy Type			
Fixture	FTE	Student	Transient (visitors)
Water Closet			
1 Male (if urinals available)	1	1	0.1
2 Female	3	3	
Urinal			
4 Male	2	2	0.4

BUILDING WATER USE REDUCTION CALCULATOR - SAMPLE

5	Female	0	0	0
6	Lavatory Faucet, duration 15 sec; 12 sec with autocontrol	3	3	0.5
	Shower	0.1	0	0
	Kitchen Sink, nonresidential, duration 15 sec	1	0	0

Duration Chart

	Fixture Type	Seconds
1	Lavatory Sink	15
2	Lavatory Sink with Electronic Controls	12
3	Kitchen Sink	15
4	Kitchen Sink with Electronic Controls	12
5	Shower	300

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Full-Time Employee Worksheet

FULL TIME EMPLOYEE (FTE) WORKSHEET

Directions: Complete fields highlighted in yellow for spaces within the project scope of work. FTE calculation for Part Time Staff should auto-fill. Refer to default fixture uses when completing the project indoor water use calculator

Occupancy Type	Number of Occupants	Daily Shift Length (# of hours in attendance for students)	FTE calculation
Full Time Staff		8	0
Part Time Staff			0
Staff FTE Total			0
Students			0
Visitors - Peak Daily Total		n/a	n/a

Default Fixture Uses, by Occupancy Type			
Fixture	FTE	Student	Transient (visitors)
Water Closet			
Male (if urinals available)	1	1	0.1
Female	3	3	0.5
Urinal			
Male	2	2	0.4
Female	0	0	0
Lavatory Faucet, duration 15 sec; 12 sec with autocontrol	3	3	0.5
Shower	0.1	0	0
Kitchen Sink, nonresidential, duration 15 sec	1	0	0

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Process Water Matrix and Standards

PROCESS WATER MATRIX AND STANDARD

Equipment	Standard	Model Installed	Performance Standard Met
Clothes Washers (residential and commercial)	ENERGY STAR or performance equivalent.		
Dishwashers			
Undercounter	ENERGY STAR		
Stationary, Single Tank, Door	ENERGY STAR		
Single Tank, Conveyor	ENERGY STAR		
Multiple Tank, Conveyor	ENERGY STAR		
Flight Machine	≤150 gph and ≤ 1 gal/900 dishes		
Food Steamers			
Batch	≤ 2 gal/hour/pan including condensate water		
Cook-to-order (with drain connection)	≤ 5 gal/hour/pan including condensate water		
Combination Ovens			
Countertop or Stand	≤ 1.5 gal/hour/pan including condensate cooling water		
Roll-in	≤ 1.5 gal/hour/pan including condensate cooling water		

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Light Pollution Reduction Reference Standards

SDP LIGHT POLLUTION REDUCTION REFERENCE STANDARDS

Lighting Zone	Zone Requirements - Footcandles/Uplight Percentage, Calculated with Sports Lighting Turned Off
LZ1: Dark (developed areas within national parks, state parks, forest land and rural areas)	Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles (0.1 horizontal and vertical lux) at the LEED project boundary and beyond. Document that 0% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).
LZ2: Low (primarily residential zones, neighborhood business districts, light industrial areas with limited nighttime use and residential mixed-use areas)	Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical footcandles (1.0 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal lux) 10 feet (3 meters) beyond the LEED project boundary. Document that no more than 2% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).
LZ3: Medium (all other areas not included in LZ1, LZ2 or LZ4, such as commercial/ industrial, and high-density residential)	Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles (2.0 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal lux) 15 feet (4.5 meters) beyond the site. Document that no more than 5% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).
LZ4: High (high-activity commercial districts in major metropolitan areas)	Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.60 horizontal and vertical footcandles (6.5 horizontal and vertical lux) at the LEED project boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal lux) 15 feet (4.5 meters) beyond the site. Document that no more than 10% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).
LZ2, LZ3 and LZ4	For LEED project boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the LEED project boundary.
FOR ALL ZONES	Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site is allowed to use the centerline of the public roadway as the LEED project boundary for a length of 2 times the driveway width centered at the centerline of the driveway.
SPORTS FIELD LIGHTING (PHYSICAL EDUCATION SPACES)	Physical education spaces (playing fields) do not need to comply with the lighting power density requirements of this credit, as per ANSI/ASHRAE/IESNA Standard 90.1-2007 section 9.4.5, exception E.

Lighting Zone	TRESPASS CALCULATIONS - Calculated with Sports Lighting Turned On
LZ1	0.10 fc (1.0 lux) at the LEED project boundary, dropping to 0.01 fc (0.1 lux) within 10 feet (3 meters) of the boundary
LZ2	0.30 fc (3.0 lux) at the LEED project boundary, dropping to 0.01 fc (0.1 lux) within 10 feet (3 meters) of the boundary
LZ3	0.80 fc (8.0 lux) at the LEED project boundary, dropping to 0.01 fc (0.1 lux) within 15 feet (4.5 meters) of the boundary
LZ4	1.50 fc (16.0 lux) at the LEED project boundary, dropping to 0.01 fc (0.1 lux) within 15 feet (4.5 meters) of the boundary

BUG Rating Method

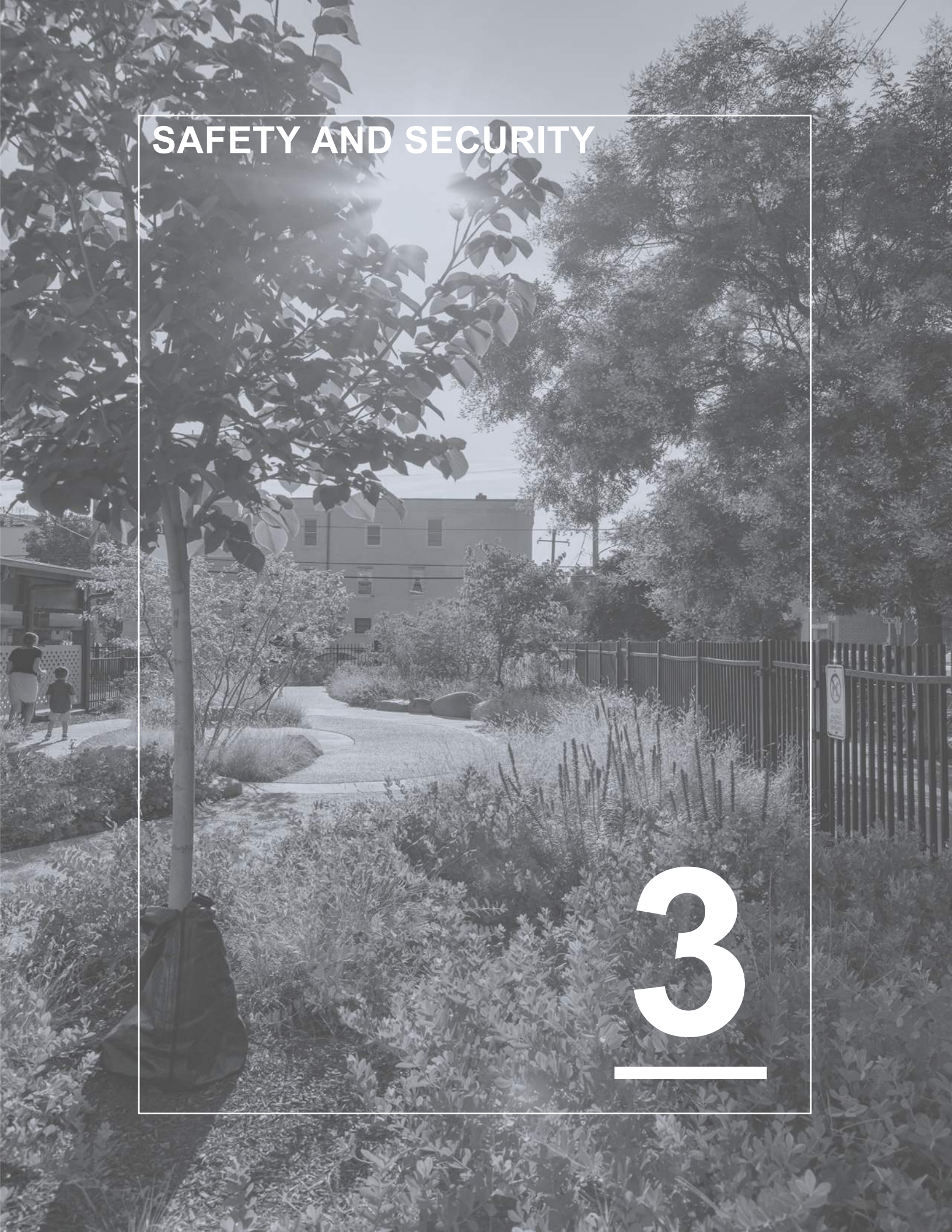
Uplight Ratings: Do not exceed the following luminaire uplight ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.

MLO Lighting Zone	Luminaire Uplight Rating
LZ0	U0
LZ1	U1
LZ2	U2
LZ3	U3
LZ4	U4

Backlight and Glare Ratings					
Luminaire Mounting	MLO Lighting Zones -				
	LZ0	LZ1	LZ2	LZ3	LZ4
Allowed Backlight Ratings					
> 2 mounting heights from lighting boundary	B1	B3	B4	B5	B5
1 to 2 mounting heights from lighting boundary and properly oriented	B1	B2	B3	B4	B4
0.5 to 1 mounting height to lighting boundary and properly oriented	B0	B1	B2	B3	B3
< 0.5 mounting height to lighting boundary and properly oriented	B0	B0	B0	B1	B2
Allowed Glare Ratings					
Building Mounted > 2 mounting heights from any lighting boundary	G0	G1	G2	G3	G4
Building Mounted 1 to 2 mounting heights from any lighting boundary	G0	G0	G1	G1	G2
Building Mounted 0.5 to 1 mounting height to any lighting boundary	G0	G0	G0	G1	G1
Building Mounted < 0.5 mounting height to any lighting boundary	G0	G0	G0	G0	G1
All other Luminaires	G0	G1	G2	G3	G4

SAFETY AND SECURITY

3



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CHAPTER 3 – SCHOOL SAFETY AND SECURITY

“We believe all students can reach their full potential in a safe, productive environment. We aim to create that environment through effective school/ community partnerships with principals, teachers, students, parents and community members. We are stronger and safer when we work together.”

-SDP Office of School Safety

Introduction

SDP believes that safe and secure schools are essential to successful educational outcomes. We address safety and security from several interrelated vantage points to ensure our students are able to focus on learning, without fear, distraction, or incidents.

Topics related to safety are addressed throughout the Educational Specifications and Design Guidelines. See “Related Sections” at the end of this chapter for further guidance.

School climate, safety and security within SDP are the focus of two independent but related offices:

SDP Office of School Safety: <https://www.philasd.org/schoolsafety/>, and
SDP Office of Climate and Culture: <https://www.philasd.org/schoolclimate/>

In this holistic sense, safety and security can be effectively fostered through three related commitments:

- Fostering positive human connections
- Enhancing environmental safety by applying researched best practices in school design

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- Using technology to extend our ability to detect, avoid, and deter unsafe activities.

Positive Human Connections are essential to students' safety and educational success and can be fostered through appropriate school design.

SDP's Office of Climate and Safety clearly makes this link through their "commitment to the educational and safety aims that make school a healthy and effective space for learning. Using a multi-tiered model of behavioral intervention suited to each individual's needs and abilities, SDP, is dedicated to creating and maintaining safe and supportive learning environments, promoting positive life skills, and reducing negative behaviors so that all children can succeed in school."



Enhanced Environmental Safety can be achieved by creating school spaces that send positive cues to students and community, that apply best practices, such as those developed by Crime Prevention Through Environmental Design (CPTED), and that successfully link schools to their communities in ways that promote the community stake in the school and schoolyard.

For more information regarding CPTED, visit the following link:
http://cptedsecurity.com/cpted_design_guidelines.htm

Technology has become an important supporting enhancement for school safety and security programs through screening, monitoring, and responding. While technology alone does not make a safe school, it greatly enhances school management by providing real-time tools to reduce risks and address concerns.

Patterns for enhanced school climate, safety, and security:

In order to facilitate the translation of best educational and operational practice into design guidelines, we have developed the following patterns for application in the design of SDP school facilities:

Patterns that support positive human connections are found throughout the Educational Specifications and Design Guidelines. Here are some design elements that focus particularly on creating a sense of welcome and well-being in a school:



Positive Human Connections

- Create a nurturing environment by **managing the scale of the school** through learning clusters (by grade, focus area, or other commonalities) so that students have a sense of belonging to a learning community, where they are known by a group of trusted adults as well as other students. The groupings may range from 100 to 400 students depending on the age grouping and program structure.
- Create a welcoming environment with clearly defined and visible main entrances, ample fenestration and daylighting, and clear cues around the building for public and student approaches.
- Adults serving administrative and support functions may be distributed throughout the facility to provide more positive interaction points for and passive supervision of students, contingent on appropriateness of adjacencies. For schools with multiple assistant principals, offices should be distributed to various student cohorts within the school. This can be based on academies, grade level groupings, or other organizational patterns as appropriate
- Enhance the school climate through careful attention to child-centered scale. Fostering a sense of belonging helps students to be vested in learning, and to do their best work.



- Openness between classrooms and circulation areas should include a reasonable amount of glazed area, so that a sense of openness pervades the learning areas. The amount of glazing must be balanced for cost, safety, the need for tackable surface and other performance requirements. Classroom glazing will have convenient shades to meet “shelter-in-place” protocols.
- While maintaining a durable facility, reduce the institutional character of key areas (dining, classrooms, etc.) by developing biophilic elements, use of engaging graphics, and other means.
- All offices require a vision panel at minimum.

Enhanced Environmental Safety and Security

- Safe arrival to and departure from school are a first area to evaluate. In designing a school site, care should be taken to understand modes of transit (walk, school bus, parent drop-off, public transit) both before and after school. Study student routes at the perimeter of the site and onto the grounds and minimize risks from having to cross vehicle paths. Separate cars and buses. Minimize the number of curb cuts, as each one represents a potential conflict between pedestrians and vehicles. Ensure that sidewalks are wide enough for the expected use. See Chapter 05, Site Design, for more information.
- Recognize and develop zones of security at a school.
- Locate the main office so that there is good passive and active supervision of the main entrance.
- The welcome center inside the school should have ample glazing to see out to the building approach.
- Security staffing varies by school size and type. Elementary and Middle Schools may have a full- or part-time School Safety Officer (SSO), or no assigned School Safety Personnel. Those schools that do not have an SSO assigned are checked on periodically by SDP patrol units. There is an office in the administrative area for security where surveillance monitoring equipment is housed. The SSO is not expected to be in this space continually, but may be at the main desk or circulating through the school and school site.
- For high schools, all schools have magnetometers and x-ray machines. Each location is expected to conduct weapons detection screening daily. It is decided on a case-by-case basis. This must be determined no later than Schematic Design, as it will increase the size and complexity of the entry sequence. Magnetometers and x-ray machines are evaluated for elementary, middle, and K-8 schools on an as-needed requirement.

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- At each school, there is only one entrance open to the public during the day. This is the main entrance to the school. There is a camera/intercom at that entrance. Upon release of the exterior doors (electronically, by an attendant in the main office or at a front desk in the lobby), there is a vestibule that allows access only to the welcome center, where further check-in and assistance to visitors will take place. This sequence should be reviewed with the school administrator for each new school design and Major renovations affecting the administration area or main entrance.



Figure 1 Main Entrance with controls requires screening at Main Office

- For large schools, student arrivals may be handled at more than one entrance for logistical reasons. A secondary entrance near the dining area may serve students who arrive early for breakfast, or for protection during inclement weather. All secondary doors remain locked once the main student arrival is

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- completed and the school day has started. Secondary entrance design should be reviewed no later than SD phase and specific approval granted.
- Sightlines around the school's interior and exterior should be carefully studied during design. Hidden corners, whether inside or outside, should be avoided. Avoid designs that have "back stairs" or other difficult to supervise areas.
 - For elementary, middle, and K-8 schools, play areas should be readily superviseable by no more than one or two staff members. The perimeter of the play areas should be fenced (minimum 42" high). Fencing along facades that face nearby neighbors should be ornamental and functional (heavy duty vandal resistant).
 - Per SDP emergency guidelines, each classroom should be designed so that it can serve as a "shelter in place" location during a crisis event. This requires several features:
 - Door hardware between the classroom and the hallway that can be locked from the inside. See Chapter 04, Division 08 door hardware narrative.
 - Glazing between classroom and hallway, and classroom and exterior, that can be obscured with shades.
 - Communication system in accordance with SDP standards.
 - If classroom lighting is controlled by sensors, provide an override mechanism for use in case of shelter-in-place.
 - Consider creation of building lockdown zones within a school, using a switch at reception that releases magnetic door holders. Zones would provide another layer of security, allowing clusters of classrooms to be zoned off in the event of an active shooter situation.
 - Building wayfinding should be clear and well-marked, to aid in an emergency. This can be done in a positive way that helps to create a sense of place.
 - Generally, apply CPTED principles as industry best practices.

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Technology

SDP has standards for locking system and hardware, video surveillance, access control, and exterior security lighting. Design teams shall meet with the Office of Information Technology to confirm security requirements during the design phases. See Chapter 04, Division 28 technical narratives for general security technology guidelines.

FACILITY DESIGN STANDARDS

4



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CHAPTER 4 – FACILITY DESIGN STANDARDS

Introduction

How to Use This Chapter

The Facility Design Standards outline the design requirements by programmatic space for all new or modernized elementary, middle, and high schools in the School District of Philadelphia. This chapter includes the following:

- General Requirements and Space Requirements
- Performance Requirements
- Technical Standards

It is the responsibility of the Design Team to review and incorporate the requirements provided in this chapter. The space types provided are meant to be flexible in order to accommodate various programs. Define unique additional spaces or requirements with SDP.

Chapter Format

1. **General Requirements** – Lists general requirements for specific building systems for all new school construction and modernizations.

GENERAL REQUIREMENTS

Openings

1. Exterior Windows:
 - A. Provide natural light and views to the outdoors from all learning spaces.
 - B. Operable window units shall be interior-hinged hopper type to facilitate maintenance.
 - C. For typical window units, avoid large panels of glass that would require special or additional equipment to replace.
 - D. Within 12 ft. above exterior grade surface or accessible elevated deck surface, and where directed by SDP, provide security treatment at windows. This may include the specification of one or combination of the following strategies:
 - i. Impact resistant glazing
 - ii. Aluminum window security screen.Design Teams shall consider both budget and exterior aesthetics when evaluating window security treatment.
2. Exterior Window Treatment:
 - A. Provide roller window shades at all exterior window locations. Roller window shades are the recommended standard.
3. Interior Window Treatment:
 - A. Provide only where needed for privacy or security purposes.
4. Door Access/Door Hardware:
 - A. Door locations that serve as points of ingress into the facility shall be limited to the extent feasible. Egress doors and associated egress door hardware shall be specified as required by Code.
 - B. Fiberglass Reinforced Polyester (FRP) flush doors with aluminum frames and continuous hinge is preferred at all Exterior Doors. Storefront Aluminum Doors and Frames may be used at Main Entrances.
 - C. SDP maintains specific requirements for all Door Hardware sets.
Refer to *Section 087100 – Door Hardware*

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SAMPLE

2. Master Tables – Lists requirements for each space type.

Legend				
Closed Requirement	●	Combined Linear Footage	#	Open to Design
Open Requirement	○	Quantity	#	

Closed Requirement – A non-negotiable requirement.

Open Requirement – A choice between two or more non-negotiable requirements.

Combined Linear Footage. – The required linear feet.

Quantity – The required quantity.

Open to Design (no symbol) – No requirement is specified.

Sample Master Chart

	Openings																	
	Miscellaneous							Specialty										
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	FUTURE PLACEHOLDER	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	FUTURE PLACEHOLDER	FUTURE PLACEHOLDER	FUTURE PLACEHOLDER
Instructional Spaces																		
Pre-K and Kindergarten Classrooms	○	○																
Pre-K and Kindergarten Toilet Rooms			●															
Pre-K and Kindergarten Storage			●															
Elementary Classrooms	○	○																
Special Shared Classrooms																		
Tech Ed Classroom/ Workroom/ Storage	○	○																
Science Classroom	○	○																
Science Classroom Storage			●															
Vocal Music Classroom	○	○																
Art Classroom	○	○																
Small Group Instruction Classroom (ESL)	○	○																
Special Education Spaces																		
Special Education Classroom	○	○																
Special Education Toilet Room			●															
Speech Room	○	○																
OT/PT Room	○	○																
Special Ed Compliance Office	○	○																
Special Education Pull-Out Services	○	○																
Emotional Support Room	○	○																
Student Assembly																		
Cafetorium																		
Teacher Dining Room	○	○																
Table & Chair Storage			●															
Stage/Platform																		
Stage/Storage			●	○	○													
Gymnasium	○	○																
PE-Storage			●	○	○													
PE-Student Locker Rooms			●															
PE-Student Showers/Toilets																		
PE-Instructors Office	○	○																

Space Requirements

Openings

Requirements for all schools:

1. Exterior Windows:

- A. Provide natural light and views to the outdoors from all learning spaces.
 - i. Each continuously occupied and core academic space shall receive a minimum of 120 sf of exterior glazing.
 - ii. Design Teams may pursue enhanced daylight and views strategies as voluntary measures. Refer to Chapter 02 Sustainability Scorecards.
- B. Operable window units shall be interior-hinged hopper type to facilitate maintenance.
- C. For typical window units, avoid large panels of glass that would require special or additional equipment to replace.
- D. Within 12 ft. above exterior grade surface or accessible elevated deck surface, and where directed by SDP, provide security treatment at windows. This may include the specification of one or combination of the following strategies:
 - i. Impact resistant glazing
 - ii. Aluminum window screen integrated with window units per Section 108200.
 - iii. Frame-mounted perforated metal panels.

Design Teams shall consider both budget and exterior aesthetics when evaluating window security treatment.

2. Exterior Window Treatment:

- A. Provide manually operated roller window shades at all exterior window locations. Roller window shades are the recommended standard.

3. Interior Window Treatment:

- A. Provide only where needed for privacy or security purposes. Opaque roller window shades are the SDP standard.

4. Door Access/Door Hardware:
 - A. Door locations that serve as points of ingress into the facility shall be limited to the extent feasible. Egress doors and associated egress door hardware shall be specified as required by Code.
 - B. Fiberglass Reinforced Polyester (FRP) flush doors with aluminum frames and continuous hinge is preferred at all Exterior Doors. Storefront Aluminum Doors and Frames may be used at Main Entrances.
 - C. SDP maintains specific requirements for all Door Hardware sets. Confirm compliance with applicable Codes. Refer to *Section 087100 – Door Hardware*

5. Automatic Door Operators:
 - A. Automatic door operators may be considered at the Main Entrances or where specifically requested by SDP.
 - B. Automatic door operator selections shall be reviewed and accepted by SDP Office of School Safety.

6. Sound Control Doors:
 - A. Provide sound control doors within required acoustically rated wall assemblies.

7. Restrooms:
 - A. Prevent views of toilet stalls from public areas.
 - B. Provide separate Teacher/ Staff toilet rooms in addition to Public/ Student use group restrooms.
 - C. Teacher/ Staff toilet rooms shall receive Privacy locks with Occupancy Indicators.
 - D. Lockable doors at group restrooms are not allowed.
 - E. Lavatories should be separate from toilet rooms and located in a visible location from hallway.

8. Kitchen/Serving:
 - A. Provide overhead coiling grilles to limit access to open kitchen and serving areas when not serving.

Finishes

Requirements for all schools:

1. Flooring
 - A. All flooring selections are limited to what is indicated in the Master Charts for each program space. All other decorative finishes should be specified based upon function, durability, acoustics, and maintenance and subject to SDP review and acceptance.
 - B. Carpet and carpet tile flooring is not allowed. In spaces that require additional acoustical treatment, Design Teams shall consider flooring products that provide resilient flooring properties while meeting acoustical requirements.

2. Interior Walls:
 - A. Typical interior walls shall be painted or pre-finished concrete masonry unit assemblies (CMU). Other wall types are allowed where indicated in the following program space charts.
 - B. Framed partitions with durable finishes such as laminates may be considered with written authorization from SDP.
 - C. Main corridor widths: corridor minimum width shall not be less than 10 Ft clear. Corridors with lockers shall not be less than 12 Ft.

3. Wall Base:
 - A. Provide 4-inch high resilient wall base at all gypsum wall board and concrete masonry unit walls.
 - B. Provide 4-inch high integral cove base at all restrooms and kitchen areas.

4. Walk-off Mats:
 - A. Rollout mats for use at vestibules and entrances are not allowed. Provide recessed entry systems.

5. Corner Guards & Wall Protection:
 - A. Provide a minimum of 48-inch high corner guards and wall protection at gypsum wall board walls in areas with high traffic or abuse such as circulation areas.
 - B. Material: Pre-finished metal is SDP standard.

6. Ceiling Heights:
 - A. Instructional spaces and common areas shall maintain a minimum 10 ft clear ceiling height.
 - B. Design teams shall evaluate each program space to determine necessary minimum ceiling heights.

7. Stairs & Ramps:
 - A. Provide protective nosings at all stairs to prevent sharp edges and slip hazards.
 - B. Provide non-slip flooring at all interior ramps.

8. Kitchen/Serving:
 - A. Provide integral cove wall base.
 - B. Provide cleanable ceiling tiles.

9. Hydration Stations (Water Coolers):
 - A. Provide porcelain/ceramic tile at all walls behind hydration stations.
 - B. No carpet or wood flooring beneath hydration stations are allowed.

10. Acoustic Panels:
 - A. Provide acoustic panels where necessary to achieve acoustic requirements. See Performance Requirements, Acoustics for criteria.

Casework and Display

Requirements for all schools:

1. Casework:
 - A. Casework requirements are outlined for each space in the following space charts.
 - B. Casework can include wall cabinets, base cabinets, and full height cabinets within the combined linear footage indicated in the following charts.
 - C. Accommodate any casework-nested equipment/plumbing within the combined linear footage of casework.
 - D. Provide transparency into wall cabinets within Health Services.

2. Countertops:
 - A. Provide minimum of 2 feet of splash guard at countertops with sinks within visual arts room.
 - B. Provide a 4" integral backsplash in all other classrooms.

3. Writable Surface:
 - A. Mounting heights:
 - i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
 - ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
 - B. Linear footage of writable surface is allowed as a combination of fixed and mobile writable surfaces.
 - C. Linear footage of writable surface does not include clear glass.

4. Tackboard/Tackwall/Tackstrip:
 - A. Mounting heights:
 - i. Elementary School – 2 feet above finish floor maximum to 6 feet above finish floor minimum.
 - ii. Middle & High School – 2 feet 6 inches above finish floor maximum to 6 feet above finish floor minimum.
 - B. Provide tackable surfaces in corridors / circulation space to meet school needs. Confirm linear footage and locations with SDP and school.

5. Display Case:
 - A. Located within primary circulation space.
 - B. Provide lockable display cases with lighting and tackwall. Tackwall is not required at dual sided display cases.
 - C. Determine depth and functional needs with SDP.

Equipment

Requirements for all schools:

1. Equipment included in this section:
 - A. Equipment that has significant size/clearance requirements
 - B. Equipment that requires dedicated:
 - i. Floor or wall space
 - ii. Casework or countertop space
 - iii. Power or data
 - iv. Plumbing or mechanical
2. Fire Extinguishers:
 - A. Provide ceiling or wall-mounted signage at each mounting location.
3. AED:
 - A. Determine locations with SDP.
 - B. Provide ceiling or wall-mounted signage.
4. Paper Towel and Soap Dispensers:
 - A. Locate at all non-restroom sinks.

Plumbing

Requirements for all schools:

1. All Toilet Rooms and Restrooms shall receive the following and as required by Code:
 - A. Wall-Mounted Water Closets
 - B. Wall-Mounted Urinals (Waterless Not Allowed)
 - C. Undermount Lavatories
 - D. Wall Hydrants
 - E. Floor Drains
2. Toilet seats shall be white.
3. Provide floor drains at all toilet rooms, restrooms, Pre-K and K classrooms.
4. Lavatories should be separate from toilet rooms and located in a visible location from hallway.
5. Provide 2 ft clear wide minimum chase at group restrooms, 3 ft preferred.
6. See Performance Requirements Section Division 22.

Mechanical

Requirements for all schools:

1. Kitchen / Serving:
Refer to food services equipment for additional HVAC requirements in this area.
2. Maker Spaces:
For fully enclosed maker spaces, design HVAC system to control a negative static pressure and provide an exhaust fan.
3. Kiln Rooms:
Specialty exhaust systems for kiln room are typically furnished with the kiln and are directly connected to the equipment.
4. Science Classrooms:
Refer to specific program requirement to determine if specialty exhaust in combination with a fume hood is necessary.
5. Music Instrument Storage:
Include provisions for HVAC humidity control, including humidification, as required to maintain the humidity levels with the recommended range for the equipment stored in this area.
6. Literacy Library, Book Storage, and IMC:
Include provisions for HVAC dehumidification to maintain the humidity levels with the recommended range for stored materials in this area.

Electrical / Data

Requirements for all schools:

1. Technology:
 - A. Meet with SDP to determine all current technology and technology requirements.
 - (i) Design teams to review the SDP Technology Design Standards.

2. General Power:
 - A. Provide a minimum of two receptacles in walls designated to receive power in addition to equipment needs unless noted otherwise.
 - B. Provide duplex receptacles unless noted otherwise.
 - C. Where walls are constructed of glass or movable partitions, relocate power as additional power to an adjacent wall.

3. Room Specific Power:
 - A. Classrooms –
 - (ii) Provide receptacles spaced at approximately 12 feet on center around the perimeter of each room.
 - (iii) Provide 4-Quad receptacles at teaching wall and 3-Quad receptacles at opposite wall.
 - (iv) Provide Quad receptacle at Teacher's station.
 - B. Offices – Provide a minimum of one receptacle on each wall.
 - C. Restrooms – Provide one convenience receptacle minimum. Circuit receptacle with the adjacent corridor.
 - D. Storage rooms – Provide one convenience receptacle for every 100 square feet, one receptacle minimum. Circuit receptacle(s) with the adjacent corridor.
 - E. Copiers – Provide a dedicated 120v, 20amp circuit for each copier minimum. Refer to Space Requirements for locations of copiers.

- F. MDF and IDF Rooms – Provide one convenience receptacle near the door designated as ‘dirty’ power. Circuit this receptacle with receptacles in the adjacent corridor but do not circuit receptacle with other receptacles within the MDF or IDF. Provide a minimum of one receptacle on each wall. Provide additional receptacles as directed by SDP to support equipment. Confirm requirements of UPSs and other equipment with SDP.
- 4. Wireless Access Points:
 - A. MDF Provide additional data for wireless access points for 100% wireless coverage of the building based on building configuration and input from SDP.
- 5. Public Address:
 - A. Provide volume control in auditorium control booths to silence paging in the auditorium house and stage areas.
 - B. Speakers shall not be daisy chained. Speakers shall be wired with home runs.
 - C. Provide volume control in additional areas as directed by SDP.
- 6. Vending Machines:
 - A. Confirm location of vending machines with SDP and provide the appropriate power.
- 7. Timekeeping System:
 - A. Refer to the SDP Technology Design Standards for Kronos system requirements.

Space Charts – Elementary Schools

	Openings													Finishes																											
	Miscellaneous							Specialty						Floor						Wall				Ceiling																	
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Terrazzo	Polished Concrete	Sealed Concrete	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]					
Administration																																									
Secure Vestibule	•																	•										•													
Separate Entrance for Pre-K	•																	•										•													
Security Office	o	o																•									o	o													
Principal's Office	o	o																•									o	o													
Principal's Toilet Room			•																•								o	o	•						•						
Lobby/ Welcome Center	o	o																•				o	o					•													
Admin. Vice Principal Office	o	o																•									•														
Counselor's Office	o	o																•									•														
School Based Teacher Leader Office	o	o																•									•														
Workroom	o	o																•									•														
Records Room			•															•									•														
Student Services	o	o																•									•														
Student Services Conference Room	o	o																•									•														
Staff Lounge	o	o																•									o	o													
Wellness/ Lactation Room			•															•									•														
General Admin. Storage Room			o	o														•									•														
Math and Literacy Lead Office	o	o																•									o	o													
Bilingual Counselor's Office	o	o																•									o	o													
BCA Conference	o	o																•									•														
BCA Storage			•	o														•									o	o										•			
Student Services Storage			•	o														•									o	o										•			
Family and Volunteer Center	o	o																•									o	o								•					
Family and Volunteer Center Storage			•	o														•									o	o									•				
Conference	o	o																•									o	o													
Admin Toilet Rooms			•															•									o	o	•												

Space Charts – Elementary Schools

	Casework & Display								Equipment								Plumbing																																		
	Combined Linear Footage								Appliances				Miscellaneous				Plumbing Fixtures & Equipment																																		
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	[FUTURE PLACEHOLDER]	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinal	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]							
Administration																																																			
Secure Vestibule																																																			
Separate Entrance for Pre-K																																																			
Security Office			2	4	4																																														
Principal's Office			2	4	4																																														
Principal's Toilet Room																																																			
Lobby/ Welcome Center					4																																														
Admin. Vice Principal Office			2	4	4																																														
Counselor's Office			2	4	4																																														
School Based Teacher Leader Office			2	4	4																																														
Workroom	12			4	4																																														
Records Room				4	4	4																																													
Student Services	6		2	4	4																																														
Student Services Conference Room				8	8																																														
Staff Lounge	8	3			4					•		•				•																																			
Wellness/ Lactation Room	6	3									•																																								
General Admin. Storage Room						19																																													
Math and Literacy Lead Office			2	4	4																																														
Bilingual Counselor's Office			2	4	4																																														
BCA Conference	6			8	8																																														
BCA Storage						20																																													
Student Services Storage						12																																													
Family and Volunteer Center	6			8	8																																														
Family and Volunteer Center Storage						12																																													
Conference				8	8																																														
Admin Toilet Rooms																																																			

Space Charts – Elementary Schools

	Mechanical													Electrical																							
	HVAC Systems													Power				Data				Miscellaneous															
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]				
Administration																																					
Secure Vestibule	•															•																					
Separate Entrance for Pre-K		•														•																					
Security Office		•														•	•				•			•													
Principal's Office		•														•	•				•			•													
Principal's Toilet Room						•										•																					
Lobby/ Welcome Center		•															•				•			•													
Admin. Vice Principal Office		•															•				•			•													
Counselor's Office		•															•				•			•													
School Based Teacher Leader Office		•															•				•			•													
Workroom		•															•				•			•													
Records Room						•										•																					
Student Services		•															•				•			•													
Student Services Conference Room		•															•				•			•													
Staff Lounge		•															•				•			•													
Wellness/ Lactation Room		•														•					•			•													
General Admin. Storage Room						•										•																					
Math and Literacy Lead Office		•															•				•			•													
Bilingual Counselor's Office		•															•				•			•													
BCA Conference		•															•				•			•													
BCA Storage						•										•																					
Student Services Storage						•										•																					
Family and Volunteer Center		•															•				•			•													
Family and Volunteer Center Storage						•										•																					
Conference		•															•				•			•													
Admin Toilet Rooms						•										•																					

Space Charts – Elementary Schools

	Openings												Finishes																										
	Miscellaneous						Specialty						Floor				Wall				Ceiling																		
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42" Door Opening Width	72" Door Opening Width	84" Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Terrazzo	Polished Concrete	Sealed Concrete	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]			
Health Suite																																							
Health Office	o	o																•										•						•					
Treatment			•															•										•						•					
Cots			•															•										•						•					
Toilet Room			•															•									o	o	•						•				
Waiting Area	o	o																•										•						•					
Health Storage			o	o														•										•						•					
Core Academic																																							
Professional Learning Center	•	o																•										•						•					
Pre-K and Kindergarten Classrooms	•	o																•									o	o					o		o				
Pre-K and Kindergarten Toilet Rooms			•															•									o	o	•						•				
Pre-K and Kindergarten Storage			•															•									o	o							•				
PK Itinerant Staff Office	o	o																•									o	o							•				
Pre-K Kitchen / Food Prep			•															•									•								•				
PK Large Motor Activity / Indoor Recess Area																		•									•					o		o	o				
General Storage			o	o														•									•								•				
Small Group Instruction	•	o																•									o	o							•				
ESOL Instruction	•	o																•									o	o							•				
Discovery Commons																		•									•					o		o	o				
Elementary Classrooms (Grades 1-5)	•	o																•									o	o						o		o			
Itinerant Staff Office	o	o																•									o	o							•				
Special Education Classroom	•	o																•									o	o							•				
Special Education Storage			o	o														•									•								•				
Special Education Toilet Room			•															•									o	o	•					•					
Speech Room	o	o																•									o	o							•				
OT/PT Room	o	o																•									o	o							•				
Speech/ OT/ PT Storage			o	o														•									•								•				
Special Education Compliance Office	o	o																•									o	o							•				
Small / Medium Group Break-Out	o	o																•									o	o							•				
Sensory Room	o	o																•									o	o							•				
Science Classroom	•	o																•									o	o						o		o			
Science Storage			•															•									o	o							•				
Science Classroom Lab (6-8)	•	o																•									o	o						o		o			
Science Prep Room (6-8)	o	o																•									o	o							•				

Space Charts – Elementary Schools

	Casework & Display							Equipment										Plumbing																										
	Combined Linear Footage							Appliances					Miscellaneous					Plumbing Fixtures & Equipment																										
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	[FUTURE PLACEHOLDER]	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinal	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]			
Health Suite																																												
Health Office	6		2	4	4													•																										
Treatment	4	4			4				•									•				o				•																		
Cots					4													•																										
Toilet Room																		•							•																			
Waiting Area																		•																										
Health Storage						8																																						
Core Academic																																												
Professional Learning Center	12			4	4													•	•																									
Pre-K and Kindergarten Classrooms	16	3	3	16	20			•										•							•																			
Pre-K and Kindergarten Toilet Rooms																									•		•																	
Pre-K and Kindergarten Storage																																												
PK Itinerant Staff Office			2	4	4													•																										
Pre-K Kitchen / Food Prep																		•							•																			
PK Large Motor Activity / Indoor Recess Area				8	8													•																										
General Storage						20																																						
Small Group Instruction				4	4													•																										
ESOL Instruction	12		3	16	16													•																										
Discovery Commons	12			8	8													•																										
Elementary Classrooms (Grades 1-5)	16	3	3	16	20			•										•							•																			
Itinerant Staff Office			2	4	4													•																										
Special Education Classroom	9	3	3	16	20			•										•							•																			
Special Education Storage						19																																						
Special Education Toilet Room	6																								•		•																	
Speech Room																																												
OT/PT Room																		•																										
Speech/ OT/ PT Storage						19												•																										
Special Education Compliance Office			2	4														•																										
Small / Medium Group Break-Out																		•																										
Sensory Room																		•																										
Science Classroom	30		3	16	20													•			•	o				•																		
Science Storage						19																																						
Science Classroom Lab (6-8)	30		3	16	20													•			•	o				•																		
Science Prep Room (6-8)	12	3			8				•									•							•																			

Space Charts – Elementary Schools

	Mechanical														Electrical																
	HVAC Systems														Power				Data			Miscellaneous									
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]	Public Address Speaker	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]	[FUTURE-PLACEHOLDER]
Health Suite																															
Health Office		•														•							•								
Treatment		•														•							•								
Cots		•														•															
Toilet Room						•										•															
Waiting Area		•														•							•								
Health Storage						•										•															
Core Academic																															
Professional Learning Center		•														•							•			•					
Pre-K and Kindergarten Classrooms		•									•					•							•			•					
Pre-K and Kindergarten Toilet Rooms						•										•															
Pre-K and Kindergarten Storage		•														•															
PK Itinerant Staff Office		•														•							•								
Pre-K Kitchen / Food Prep		•						•								•							•			•					
PK Large Motor Activity / Indoor Recess Area		•														•							•			•					
General Storage						•										•															
Small Group Instruction		•														•							•			•					
ESOL Instruction		•									•					•							•			•					
Discovery Commons		•														•							•			•					
Elementary Classrooms (Grades 1-5)		•									•					•							•			•					
Itinerant Staff Office		•														•							•			•					
Special Education Classroom		•									•					•							•			•					
Special Education Storage						•										•															
Special Education Toilet Room						•										•															
Speech Room		•														•							•			•					
OT/PT Room		•														•							•			•					
Speech/ OT/ PT Storage						•										•															
Special Education Compliance Office		•														•							•			•					
Small / Medium Group Break-Out		•														•							•			•					
Sensory Room		•														•							•			•					
Science Classroom		•				•					•					•							•			•					
Science Storage		•														•															
Science Classroom Lab (6-8)		•				•					•					•							•			•					
Science Prep Room (6-8)		•						•								•							•			•					

Space Charts – Elementary Schools

	Openings														Finishes																								
	Miscellaneous							Specialty							Floor						Wall			Ceiling															
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Terrazzo	Polished Concrete	Sealed Concrete	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]			
Library and Media																																							
Main Library Zone																																							
Library / Media Office	•	○																	•									○	○						•				
Small Group Study Room	•	○																	•									○	○						•				
Maker Space	•	○																	•									○	○						○				
Maker Space Storage Rooms			○	○															•									○	○						○				
Technology Storage			○	○															•									○	○						○				
Innovation Center / Computer Lab	•	○																	•									○	○						○				
Art and Creative Learning																																							
General Music Room	•	○																	•									○	○						•				
Keyboard Lab / Instrumental	•	○																		•								•							•				
Instrumental Music Room (6-8)	•	○		○	○															•								•							•				
Vocal Music Room (6-8)	•	○																		•								•							•				
General Music Room Storage			○	○															•									•							•				
Art Labs	•	○																	•									○	○						○				
Art Lab Storage			○	○															•									•							•				
Kiln Room			•	○															•					•				○	○							•			
Small Group Instrumental	•	○																	•									○	○						•				
Physical Education																																							
Stage/Platform																			•																				
Gymnasium	○	○																										•									•		
Gym / PE Storage			•	○	○																			•				•								•			
Health Classroom	•	○																	•									○	○						○				
Changing Room			•																•									•							○	○			
PE Office	○	○																	•									•							•				

Space Charts – Elementary Schools

	Casework & Display								Equipment								Plumbing																																			
	Combined Linear Footage								Appliances				Miscellaneous				Plumbing Fixtures & Equipment																																			
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	[FUTURE PLACEHOLDER]	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinal	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]								
Library and Media																																																				
Main Library Zone				12	16														•			•																														
Library / Media Office	6	3	2	4	4														•																																	
Small Group Study Room				4	4														•																																	
Maker Space	20-40	3		8	8														•			•																														
Maker Space Storage Rooms						16																																														
Technology Storage						16														•																																
Innovation Center / Computer Lab	12			16	16															•		•																														
Art and Creative Learning																																																				
General Music Room	5	3	3	16	16															•																																
Keyboard Lab / Instrumental	6		3	16	16															•																																
Instrumental Music Room (6-8)	23	3		16	16	9														•																																
Vocal Music Room (6-8)	6		3	16	16															•																																
General Music Room Storage						18-30																																														
Art Labs	16	6	3	16	20															•																																
Art Lab Storage						18-30																																														
Kiln Room	6																					•																														
Small Group Instrumental				4	4															•																																
Physical Education																																																				
Stage/Platform																																																				
Gymnatorium																				•			o																													
Gym / PE Storage						18-30																																														
Health Classroom	12	3	3	16	16															•		•																														
Changing Room																				•																																
PE Office			2	4	4															•																																

Space Charts – Elementary Schools

	Mechanical													Electrical																									
	HVAC Systems													Power				Data				Miscellaneous																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]						
Library and Media																																							
Main Library Zone		•															•																						
Library / Media Office		•															•																						
Small Group Study Room		•															•																						
Maker Space		•															•																						
Maker Space Storage Rooms																																							
Technology Storage				•													•																						
Innovation Center / Computer Lab		•															•																						
Art and Creative Learning																																							
General Music Room		•															•																						
Keyboard Lab / Instrumental		•															•																						
Instrumental Music Room (6-8)		•															•																						
Vocal Music Room (6-8)		•															•																						
General Music Room Storage																	•																						
Art Labs		•															•																						
Art Lab Storage																	•																						
Kiln Room		•																																					
Small Group Instrumental		•															•																						
Physical Education																																							
Stage/Platform		•																																					
Gymnasium		•																																					
Gym / PE Storage																	•																						
Health Classroom		•																																					
Changing Room		•																																					
PE Office		•																																					

Space Charts – Elementary Schools

	Openings													Finishes																										
	Miscellaneous							Specialty						Floor						Wall				Ceiling																
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Terrazzo	Polished Concrete	Sealed Concrete	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]				
Food Service																																								
Student Dining Commons																		o	o																					
Chair / Table Storage			•															•																						
Serving Area																																								
Kitchen (Full Service)			•											•																										
Kitchen (Warming)			•																																					
Adult Toilet / Lockers			•															•																						
Food Service Office	•	o																•																						
Dry Food Storage																																								
Building Support Space																																								
Building Corridors/Stairs/Elevators																		o																						
Main Custodial Storage			o	o	o	o																																		
Building Loading and Receiving			•	o	o	o																																		
Recycling Room			o	o	o	o																																		
Trash Room			o	o	o	o																																		
Custodial Office	o	o																•																						
Technology Closets			•						•																															
Custodial Closets			•																																					
Electrical Substation Room			o	o	o	o																																		
Electrical Closets			o	o																																				
Electrical Generator Room			o	o	o	o																																		
HVAC Equipment Spaces			o	o	o	o																																		
Public/Student Toilet Facilities			•																•																					
Teaching/Staff Toilet Facilities (Single Use)			•																•																					

Space Charts – Elementary Schools

	Casework & Display									Equipment									Plumbing																																																	
	Combined Linear Footage									Appliances					Miscellaneous				Plumbing Fixtures & Equipment																																																	
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	[FUTURE PLACEHOLDER]	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinal	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]																								
Food Service																																																																				
Student Dining Commons																				•																									•																							
Chair / Table Storage																																																																				
Serving Area																																																																				
Kitchen (Full Service)																																																																				
Kitchen (Warming)																																																																				
Adult Toilet / Lockers																						•																																														
Food Service Office	6			4	4																																																															
Dry Food Storage																																																																				
Building Support Space																																																																				
Building Corridors/Stairs/Elevators																																																																				
Main Custodial Storage						24																																																														
Building Loading and Receiving																																																																				
Recycling Room																																																																				
Trash Room																																																																				
Custodial Office				4	4																																																															
Technology Closets																																																																				
Custodial Closets																																																																				
Electrical Substation Room																																																																				
Electrical Closets																																																																				
Electrical Generator Room																																																																				
HVAC Equipment Spaces																																																																				
Public/Student Toilet Facilities																																																																				
Teaching/Staff Toilet Facilities (Single Use)																																																																				

Space Charts – Elementary Schools

	Mechanical													Electrical																								
	HVAC Systems													Power				Data					Miscellaneous															
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp/Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]				
Food Service																																						
Student Dining Commons		•																																				
Chair / Table Storage						•																																
Serving Area		•																																				
Kitchen (Full Service)		•																																				
Kitchen (Warming)		•																																				
Adult Toilet / Lockers		•																																				
Food Service Office		•																																				
Dry Food Storage																																						
Building Support Space																																						
Building Corridors/Stairs/Elevators		•																																				
Main Custodial Storage																																						
Building Loading and Receiving																																						
Recycling Room																																						
Trash Room																																						
Custodial Office		•																																				
Technology Closets																																						
Custodial Closets																																						
Electrical Substation Room																																						
Electrical Closets																																						
Electrical Generator Room																																						
HVAC Equipment Spaces																																						
Public/Student Toilet Facilities		•																																				
Teaching/Staff Toilet Facilities (Single Use)		•																																				

Space Charts – Middle / High Schools

	Openings															Finishes																							
	Miscellaneous							Specialty								Floor					Wall					Ceiling													
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Wood Flooring	Polished Concrete	Sealed Concrete	Quarry Tile	Terrazzo	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]			
Administrative Spaces																																							
Secure Vestibule	•																	•								•													
Lobby/ Welcome Center	o	o																•				o			o		•						•						
Principal's Office	o	o																•									•						•						
Principal's Restroom			•																•							o	o	•					•						
School Based Teacher Leader Office	o	o																•									•						•						
Math and Literacy Lead Office	o	o																•									•						•						
Admin Toilet Rooms			•																•							o	o	•					•						
Administrative / Vice Principal Office	o	o																•									•						•						
Bilingual Counselor's Office	o	o																•									•						•						
BCA Conference	o	o																•									•						•						
BCA Storage			•	o														•								o	o								•				
Student Services	o	o																•									•						•						
Student Services Conference	o	o																•									•						•						
Student Services Storage			•	o														•								o	o							•					
Family and Volunteer Center	o	o																•									•						•						
Family and Volunteer Center Storage			•	o														•								o	o							•					
General Admin Storage			o	o														•									•							•					
Workroom	o	o																•									•						•						
Records Room			•															•								•							•						
Conference Room	o	o																•									•						•						
College and Career Center	•	o																•								o	o				o		o						
Dean of Students Office	o	o																•									•						•						
Security Office			•															•									•						•						
Counselor's Office	o	o																•									•						•						
Wellness/ Lactation Room			•															•									•						•						
Staff Lounge	o	o																•								o	o					•							

Space Charts – Middle / High Schools

	Casework & Display						Equipment								Plumbing																																							
	Combined Linear Footage						Appliances				Miscellaneous				Plumbing Fixtures & Equipment																																							
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinals	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]											
Administrative Spaces																																																						
Secure Vestibule																																																						
Lobby/ Welcome Center					4																																																	
Principal's Office			2	4	4																																																	
Principal's Restroom																																																						
School Based Teacher Leader Office			2	4	4																																																	
Math and Literacy Lead Office			2	4	4																																																	
Admin Toilet Rooms																																																						
Administrative / Vice Principal Office			2	4	4																																																	
Bilingual Counselor's Office			2	4	4																																																	
BCA Conference	6			8	8																																																	
BCA Storage																																																						
Student Services	6		2	4	4																																																	
Student Services Conference				8	8																																																	
Student Services Storage																																																						
Family and Volunteer Center	6			8	8																																																	
Family and Volunteer Center Storage																																																						
General Admin Storage																																																						
Workroom	12																																																					
Records Room						4																																																
Conference Room	6			8	8																																																	
College and Career Center	12		3	16	16																																																	
Dean of Students Office			2	4	4																																																	
Security Office	9		2	4	4																																																	
Counselor's Office			2	4	4																																																	
Wellness/ Lactation Room	6	3																																																				
Staff Lounge	8				4																																																	

Space Charts – Middle / High Schools

	Mechanical														Electrical																					
	HVAC Systems														Power				Data				Miscellaneous													
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]			
Administrative Spaces																																				
Secure Vestibule	•																			•																
Lobby/ Welcome Center		•																			•															
Principal's Office		•																			•															
Principal's Restroom		•				•															•															
School Based Teacher Leader Office		•																			•															
Math and Literacy Lead Office		•																			•															
Admin Toilet Rooms		•				•															•															
Administrative / Vice Principal Office		•																			•															
Bilingual Counselor's Office		•																			•															
BCA Conference		•																			•															
BCA Storage						•															•															
Student Services		•																			•															
Student Services Conference		•																			•															
Student Services Storage						•															•															
Family and Volunteer Center		•																			•															
Family and Volunteer Center Storage						•															•															
General Admin Storage						•															•															
Workroom		•																			•															
Records Room						•															•															
Conference Room		•																			•															
College and Career Center		•									•										•															
Dean of Students Office		•																			•															
Security Office		•																			•															
Counselor's Office		•																			•															
Wellness/ Lactation Room		•																			•															
Staff Lounge		•																			•															

Space Charts – Middle / High Schools

	Openings														Finishes																								
	Miscellaneous							Specialty							Floor					Wall			Ceiling																
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Wood Flooring	Polished Concrete	Sealed Concrete	Quarry Tile	Terrazzo	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]			
Health Suite																																							
Treatment			•															•										•											
Cots			•															•										•											
Toilet			•															•									○	○	•										
Health Office	○	○																•									○	○	•										
Waiting Area	○	○																•									○	○	•										
Storage			•	○														•									○	○									•		
Core Academic																																							
Professional Learning Center	•	○																•									○	○	•										
General Classrooms	•	○																•									○	○						○		○			
General Classrooms (10-12)	•	○																•									○	○						○		○			
Small / Medium Group Break-Out	•	○																•									○	○						•					
General Storage			○	○														•									○	○	•										
Special Education Classroom	•	○																•									○	○						○		○			
Special Education – Toilet Room			•															•									○	○	•										
Special Education Storage			•	○														•									○	○									○		
Special Ed Compliance Office	○	○																•									○	○											
ESOL Instruction	•	○																•									○	○											
Life Skills Support	•	○										•						•									○	○							○		○		
Speech Room	•	○																•									○	○											
OT/PT Room	•	○																•									○	○											
Speech / OT / PT Storage			•	○														•									○	○											
Sensory Room	•	○																•									○	○											
Itinerant Staff Office	○	○																•									○	○											
Discovery Commons																		•									○	○						○		○	○		
Science Classroom	•	○																•									○	○											
Science Prep Room	○	○																•									○	○											
Chemical Storage Closet			•	○														•									○	○									○		
Science Storage			•	○														•									○	○									○		

Space Charts – Middle / High Schools

	Casework & Display							Equipment										Plumbing																												
	Combined Linear Footage							Appliances					Miscellaneous					Plumbing Fixtures & Equipment																												
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Specialty Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinals	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]				
Health Suite																																														
Treatment	6	3		4				•										•									•																			
Cots				4														•																												
Toilet																										•		•																		
Health Office	4	3	4	4														•								•																				
Waiting Area																		•																												
Storage					12																																									
Core Academic																																														
Professional Learning Center	12		4	4														•	•																											
General Classrooms	16	3	3	16	16													•			•						•																			
General Classrooms (10-12)	16		3	16	16													•			•																									
Small / Medium Group Break-Out			4	4														•																												
General Storage					20																																									
Special Education Classroom	16	3	3	16	16													•			•						•																			
Special Education – Toilet Room																										•		•																		
Special Education Storage					12																																									
Special Ed Compliance Office			2															•																												
ESOL Instruction	12		3	16	16													•																												
Life Skills Support	12	3	3	16	16			•		•				•				•									•																			
Speech Room																																														
OT/PT Room																																														
Speech / OT / PT Storage					12																																									
Sensory Room																		•																												
Itinerant Staff Office			2	4	4													•																												
Discovery Commons	12			8	8													•																												
Science Classroom	56		3	8	12													•			•					•																				
Science Prep Room	12	3		8				•										•								•																				
Chemical Storage Closet					12																																									
Science Storage					12																																									

Space Charts – Middle / High Schools

	Mechanical													Electrical																									
	HVAC Systems													Power				Data				Miscellaneous																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]						
Health Suite																																							
Treatment		•															•					•		•						•									
Cots		•															•					•								•									
Toilet		•				•											•					•								•									
Health Office		•															•					•							•										
Waiting Area		•															•					•							•										
Storage						•											•																						
Core Academic																																							
Professional Learning Center		•															•					•		•					•										
General Classrooms		•									•						•					•		•					•										
General Classrooms (10-12)		•									•						•					•		•					•										
Small / Medium Group Break-Out		•															•					•		•					•										
General Storage						•											•																						
Special Education Classroom		•															•					•		•					•										
Special Education – Toilet Room						•											•												•										
Special Education Storage						•											•																						
Special Ed Compliance Office		•															•					•		•					•										
ESOL Instruction		•															•					•		•					•										
Life Skills Support		•															•					•		•					•										
Speech Room		•															•					•		•					•										
OT/PT Room		•															•					•		•					•										
Speech / OT / PT Storage						•											•																						
Sensory Room		•															•					•		•					•										
Itinerant Staff Office		•															•					•		•					•										
Discovery Commons		•															•					•		•					•										
Science Classroom		•															•					•		•					•										
Science Prep Room		•						•									•					•		•					•										
Chemical Storage Closet						•											•																						
Science Storage						•											•																						

Space Charts – Middle / High Schools

	Openings															Finishes																						
	Miscellaneous							Specialty								Floor					Wall					Ceiling												
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Wood Flooring	Polished Concrete	Sealed Concrete	Quarry Tile	Terrazzo	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]		
Library and Media																																						
Main Library Zone									•											•								o	o					o		o		
Library / Media Office	o	o																		•								o	o					•				
Small Group Study Room	•	o																	•									o	o					•				
Maker Space	•	o																	•									o	o					o		o		
Maker Space Storage Rooms			o	o															•									o	o					o		o		
Technology Storage			o	o															•									o	o					o		o		
Innovation Center / Computer Lab	o	o																	•									o	o					o		o		
Arts and Creative Learning																																						
Art Labs	•	o																	•									o	o					o		o		
Art Lab 3D	•	o																	•									o	o					o		o		
Art Storage			•	o															•									o	o							•		
Kiln Room			•	o																				•				o	o							•		
Instrumental Music Room	•	o		o	o														•									•						•				
Music Storage			•	o	o														•									•								•		
Music Library			•																•									•							•			
Vocal Music Classroom	•	o																	•									•							•			
Vocal Music Storage			•																•									•								•		
Small / Medium Group Instrumental	•	o																	•									o	o						•			
Keyboard / Music Tech Lab	•	o																	•									•							•			
Live Room	•	o																	•									o	o						•			
Vocal Booth	•	o																	•									o	o						•			
Auditorium	o	o																	o	o								•						o		o		
Auditorium Lobby																			o			o						•						o		o		
Black Box Theater	o	o																	o	o								•						o		o		
Auditorium Stage														•					o	o								•							•			
Control Room	o	o																	•									•							•			
Set Construction Classroom & Storage	•	o		o	o														•									•							•			

Space Charts – Middle / High Schools

	Casework & Display						Equipment										Plumbing																															
	Combined Linear Footage						Appliances					Miscellaneous					Plumbing Fixtures & Equipment																															
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Specialty Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinals	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]						
Library and Media																																																
Main Library Zone				12	16													•			•																											
Library / Media Office	6	3	2	4	4													•									•																					
Small Group Study Room				4	4													•																														
Maker Space	20-40	3		8	8													•				•					•																					
Maker Space Storage Rooms						16																																										
Technology Storage				4	4	16												•																														
Innovation Center / Computer Lab	12			16	16													•	•		•																											
Arts and Creative Learning																																																
Art Labs	4	3	3	16	16													•									•		•																			
Art Lab 3D	16	3	3	16	16													•				•					•		•																			
Art Storage																																																
Kiln Room	6																																															
Instrumental Music Room	23	3		16	16	9												•									•																					
Music Storage						12																																										
Music Library						12																																										
Vocal Music Classroom	6		3	16	16													•																														
Vocal Music Storage						12																																										
Small / Medium Group Instrumental				4	4													•																														
Keyboard / Music Tech Lab	6		3	16	16													•																														
Live Room				4	4													•																														
Vocal Booth				4	4													•																														
Auditorium																		•																														
Auditorium Lobby																		•																														
Black Box Theater																		•																														
Auditorium Stage																																																
Control Room					8													•																														
Set Construction Classroom & Storage	23	3		16	16	9												•										•																				

Space Charts – Middle / High Schools

	Mechanical													Electrical																									
	HVAC Systems													Power				Data				Miscellaneous																	
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]					
Library and Media																																							
Main Library Zone		•														•							•		•							•							
Library / Media Office		•														•							•		•							•							
Small Group Study Room		•														•							•		•							•							
Maker Space		•														•			•				•		•							•							
Maker Space Storage Rooms																																							
Technology Storage				•																			•		•														
Innovation Center / Computer Lab		•														•							•		•														
Arts and Creative Learning																																							
Art Labs		•														•							•		•														
Art Lab 3D		•														•							•		•														
Art Storage							•									•																							
Kiln Room		•						•															•																
Instrumental Music Room		•														•							•		•														
Music Storage							•									•																							
Music Library		•																					•		•														
Vocal Music Classroom		•														•							•		•														
Vocal Music Storage							•									•																							
Small / Medium Group Instrumental		•																					•		•														
Keyboard / Music Tech Lab		•														•							•		•														
Live Room		•																					•		•														
Vocal Booth		•																					•		•														
Auditorium		•																					•		•														
Auditorium Lobby		•																					•		•														
Black Box Theater		•																					•		•														
Auditorium Stage		•																					•		•														
Control Room		•																					•		•														
Set Construction Classroom & Storage		•														•							•		•														

Space Charts – Middle / High Schools

	Openings														Finishes																							
	Miscellaneous							Specialty							Floor					Wall				Ceiling														
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Wood Flooring	Polished Concrete	Sealed Concrete	Quarry Tile	Terrazzo	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]		
Physical Education																																						
Gymnatorium	o	o																			•						•											
Locker Rooms			•																•									•					o	o				
Ticket Booth	o	o																	•									•										
Gymnasium	o	o																			•							•										
Auxiliary Gym	o	o																			•							•										
Team Room			•																•									o	o									
Wrestling / Dance Room	o	o																	•									•										
Athletic Trainer Room	o	o																	•									•										
PE Lobby	o	o																	•									•										
Gymnasium Storage			•	o	o														o					•				•										
Changing Room			•																•									o	o									
Fitness Room	o	o																	•									•										
Health Classroom	•	o																	•								o	o										
P.E. Office	o	o																	•									•										
Food Service																																						
Student Dining Commons																		o	o		o						•					o		o	o			
Serving Area																												•										
Kitchen (Full Service)			•																						•			•										
Kitchen (Warming)			•																						•			•										
Adult Toilet / Lockers			•																•								o	o	•						•			
Food Service Office	o	o																	•								•											
Dry Food Storage																												o	o									
Chair / Table Storage			•																•									o	o									

Space Charts – Middle / High Schools

	Casework & Display						Equipment										Plumbing																																				
	Combined Linear Footage						Appliances					Miscellaneous					Plumbing Fixtures & Equipment																																				
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinals	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]											
Physical Education																																																					
Gymnasium				8	8													•				○														•																	
Locker Rooms				8	8													•		•																		•															
Ticket Booth	4			4	4													•																																			
Gymnasium																		•					○																•														
Auxiliary Gym																		•					○																	•													
Team Room				8	8													•		•																			•														
Wrestling / Dance Room																		•					○																	•													
Athletic Trainer Room	9	3	2	4	4													•					○																														
PE Lobby							30											•																																			
Gymnasium Storage						32 to 48												•																																			
Changing Room																		•																																			
Fitness Room																		•					○																		•												
Health Classroom	16	3	3	16	16													•																																			
P.E. Office			2	4	4													•																																			
Food Service																																																					
Student Dining Commons																		•																																			
Serving Area																		•																																			
Kitchen (Full Service)																		•																																			
Kitchen (Warming)																		•																																			
Adult Toilet / Lockers																			•										•																								
Food Service Office				4	4													•																																			
Dry Food Storage																																																					
Chair / Table Storage																																																					

Space Charts – Middle / High Schools

	Mechanical														Electrical																										
	HVAC Systems														Power				Data				Miscellaneous																		
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]								
Physical Education																																									
Gymnasium																																									
Locker Rooms		•																																							
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Gymnasium		•																																							
Auxiliary Gym		•																																							
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Athletic Trainer Room		•																																							
PE Lobby		•																																							
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Changing Room		•																																							
Fitness Room		•																																							
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P.E. Office		•																																							
Food Service																																									
Student Dining Commons		•																																							
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Kitchen (Full Service)		•																																							
Kitchen (Warming)		•																																							
Adult Toilet / Lockers		•																																							
Food Service Office		•																																							
Dry Food Storage																																									
Chair / Table Storage																																									

Space Charts – Middle / High Schools

	Openings														Finishes																									
	Miscellaneous							Specialty							Floor					Wall			Ceiling																	
	Door Vision Panel	Door Sidelite	No Vision Panel / Sidelite	42"Door Opening Width	72"Door Opening Width	84"Door Opening Width	Secondary Door to Corridor	Room Darkening Treatment	Keyed Separately	[FUTURE PLACEHOLDER]	Sliding Door	Sectional Door	Folding Partition	Coiling Counter Door	Overhead Coiling Door	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Resilient Flooring/ Base	Porcelain Tile/ Base	Resilient Faux-Carpet Tile	Wood Flooring	Polished Concrete	Sealed Concrete	Quarry Tile	Terrazzo	Concrete Masonry Unit	Gypsum Wall Board	Porcelain/Ceramic Tile	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Acoustical Panel Ceiling	Gypsum Board Ceiling	Exposed Structure	Specialty Ceiling	[FUTURE PLACEHOLDER]				
Building Support																																								
Building Corridors/Stairs/Elevators																		o				o																		
Main Custodial Storage			o	o	o	o																	o														o		o	
Building Loading and Receiving			o	o	o	o																	o															o		
Recycling Room			o	o	o	o																	o															o		
Trash Room			o	o	o	o																	o															o		
Custodial Office	o	o																					o																o	
Technology Closets			•																				o															o		
Custodial Closets			•																				o														o			
Electrical Substation Room			o	o	o	o																	o															o		
Electrical Closets			o	o																			o															o		
Electrical Generator Room			o	o	o	o																	o															o		
HVAC Equipment Spaces			o	o	o	o																	o															o		
Public/Student Toilet Facilities			•																																			•		
Teaching/Staff Toilet Facilities (Single Use)			•																																			•		

Space Charts – Middle / High Schools

	Casework & Display						Equipment									Plumbing																																	
	Combined Linear Footage						Appliances					Miscellaneous				Plumbing Fixtures & Equipment																																	
	Base / Wall Cabinets	Sink Cabinet	Tall Wardrobe w/ File Drawers	Writable Surface (total)	Tackboard/ Tackwall (total)	Adjustable Shelving	Display Case	Open Casework (Cubbies)	Refrigerator	Under-counter Refrigerator	Microwave	Oven/ Range/ Exhaust Hood	Washer/ Dryer	Commercial Washer / Dryer	Dish Washer	Vending Machine	[FUTURE PLACEHOLDER]	Clock	Floor Printer / Copier	Metal Lockers	Presentation Equipment	Speciality Equipment	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Lavatory	Sink	Water Closet / Urinals	Solid Separator	Acid Neutralization	Mop Sink	Floor Sink	Floor Drain	Shower	Water Cooler and Bottle Filler	Utility Sink	Emergency Eye Wash	Emergency Eye Wash/Shower	Hose Bib	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]							
Building Support																																																	
Building Corridors/Stairs/Elevators																		•																		•													
Main Custodial Storage						24																																											
Building Loading and Receiving																						o																											
Recycling Room																						o																											
Trash Room																						o																											
Custodial Office				4	4													•																															
Technology Closets																																																	
Custodial Closets																																																	
Electrical Substation Room																																																	
Electrical Closets																																																	
Electrical Generator Room																																																	
HVAC Equipment Spaces																																																	
Public/Student Toilet Facilities																																																	
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Space Charts – Middle / High Schools

	Mechanical													Electrical																								
	HVAC Systems													Power				Data				Miscellaneous																
	Heated Only	Fully Conditioned	Ventilated Only	Dedicated HVAC Equipment	Redundant HVAC Equipment	Temp\Humidity Sensor	Exhaust System	Specialty Exhaust System	Positive Static Pressure	Negative Static Pressure	Carbon Dioxide Sensor	Bldg Engineer Limited Range Temp Control	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	One-Wall	Perimeter	Floor	Ceiling	One-Wall	Perimeter	Floor	Wireless Access Point	Wall-Mounted VoIP Phone	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	Public Address Speaker	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]	[FUTURE PLACEHOLDER]					
Building Support																																						
Building Corridors/Stairs/Elevators		•																																				
Main Custodial Storage						•										•	•																					
Building Loading and Receiving						•										•	•																					
Recycling Room						•										•	•																					
Trash Room						•										•	•																					
Custodial Office		•															•					•							•									
Technology Closets						•											•																					
Custodial Closets						•											•																					
Electrical Substation Room																																						
Electrical Closets						•											•																					
Electrical Generator Room																																						
HVAC Equipment Spaces																																						
Public/Student Toilet Facilities		•				•											•												•									
Teaching/Staff Toilet Facilities (Single Use)		•				•											•												•									

Performance Requirements

Building Envelope

General Requirements

1. Building envelope commissioning is required on all new SDP construction projects. Design and construction team shall coordinate with the SDP's Commissioning Authority throughout all phases of the project.
2. Reduce thermal bridges, air, and water leakage at the entire building envelope, including parapets and foundations.

Building Envelope Testing

1. Air and Water Testing: Perform air leakage testing (ASTM E 783) along with water testing (ASTM E 1105 and AAMA 501.2) early in construction at each typical window installation, then test a minimum of 10% of the glazing at completion of construction to verify consistent installation, using the same test methods.
2. Design new construction projects to achieve the following building envelope testing requirements.
 - A. Testing entity must have five (5) continuous years of experience performing the testing required. Submit the qualifications and experience of the testing entity for approval by design team and SDP.
 - B. Demonstrate performance of the continuous air barrier for the building envelope by the following tests:
 - C. Test the building and demonstrate that the air leakage rate of the building envelope does not exceed 0.40 cfm/sf at a pressure differential of 0.3 in. wag (75 Pa) in accordance with ASTM E-779 or E-1827-96. Air leakage testing can be performed in stages as progress of the building construction allows. Accomplish tests using BOTH pressurization and depressurization. Divide the average measured air leakage flow rate in both directions in cfm @ 0.3 in. wc (L/s @ 75 Pa) by the surface area of the envelope enclosed by the continuous air barrier of the building, including roof or ceiling, walls, and floor to produce the air leakage rate in cfm/sf @ 0.3 in. wc (L/s.m2 @ 75 Pa). Do not conceal air barrier surfaces with cladding until observed by the Owner's envelope commissioning agent, and any required repairs are completed and documented.

Exterior Wall Performance

1. Provide a dew point analysis in accordance with the latest version of the ASHRAE Handbook of Fundamentals during the construction documents phase of the project to verify the performance of all unique exterior wall sections.

Acoustics

The acoustic environment has a critical impact on the ability to teach and learn. Design teams shall design facilities to meet the acoustical requirements, criteria and guidelines in the following categories:

1. Sound Transmission
2. Impact Noise
3. Background Noise
4. Reverberation Time
5. Sound Reinforcement
6. Construction Methods to Achieve Sound Isolation Criteria
7. Reference Standards

The English language involves a speech frequency range of approximately 200 to 6,000 Hz with most of this falling within 500 to 3,000 Hz. Normally vowels are long duration, higher energy and lower frequency sounds. The opposite is generally true for consonants as short duration, lower energy and higher frequency sounds. Consonants have a greater impact than vowels regarding the ability to understand speech. Under ideal conditions, direct processing of the signal will normally result in comprehension, but ideal conditions rarely exist. A certain amount of reverberation is normally necessary to carry speech throughout a room, but too much reverberation will cause sounds to become muddled and confused by superimposed signals. The optimum reverberation time for speech is below 1.0 seconds, while the optimum reverberation time for music is 2.0 seconds or higher.

In designing the acoustic environment for schools, each type of space will require evaluation based on differing requirements. That which is perceived as ideal conditions for listening to speech is usually considered too dead for music. Private conversations require different criteria than are required for group conversations.

The design professional shall evaluate the acoustic environment for each habitable space during the design of facilities for the School District of Philadelphia. This analysis shall include evaluation of background noise (dBA or NC), the sound transmission rating (STC) for the

envelope of each space, HVAC and other mechanical system noises, and impact noise. It shall also include evaluation of reverberation time at each of 500, 1,000, and 2,000 Hz.

The following shall be considered as design guidelines. Because variations in background noise, reverberation time, intensity of noise sources and physical volume of each space can have an impact on the acoustic environment, proper analysis and design may result in differences to these guidelines.

Sound Transmission

Minimum STC ratings shall be required in accordance with the following Table (Ref: ANSI S12.60):

Table 1 - Adjacent Space			
Other enclosed or open plan core learning space, speech clinic, health care room and outdoors ^{c)}	Common use and public use toilet room and bathing room	Corridor, ^{a)} staircase, office or conference room ^{a, b)}	Music room, mechanical equipment room, ^{d)} cafeteria, gymnasium, and indoor swimming pool
50	53	45	60
<p>a) For corridor, office, or conference room walls containing doors, the basic wall, exclusive of the door, shall have an STC rating as shown in the appropriate column in this table. The entrance door shall conform to the requirements of 4.5.5.</p> <p>b) When the need for acoustical privacy is critical, the minimum STC rating of the partitions around an office or conference room shall be increased to 50.</p> <p>c) An STC rating of 50 is the minimum for the exterior walls and roofs of a core learning space. However, this rating does not ensure conformance to the background noise limits in Table 1 for noise from major outdoor noise sources.</p> <p>d) When the adjacent space is a mechanical equipment room containing fans circulating 140 m³/min(5000 ft³ /min.) or more, the minimum STC rating shall be 60. When the fan circulation is less than this rate, the STC rating may be as low as 45 providing the maximum A-weighted steady background noise level in the adjacent core learning space does not exceed 35 dB. The minimum STC rating shall include the effect of entry door(s) into the mechanical equipment room.</p>			

The design of partitions of each habitable space shall be based on the sound level of the noise that penetrates them. It also depends on masking that will be provided by background noises on both sides of the envelope. When considering masking noises, these masking noises shall not include intermittent sources that will not be constant during all times of expected occupancy. General guidelines are as follows:

1. Isolation of very loud sounds such as loud music and power tools. With NC of 25, minimum STC of 60, and with NC of 35, minimum STC of 55 (note that NC applies to space exterior to envelope of space where noise is generated). This level of noise would be expected to be generated in Auditoriums, Cafeterias, Vocal and Instrumental Music Rooms, Building Receiving Areas, Gymnatoriums, and places equipped with power tools. Dependant on type of equipment, noise of this level may generate in mechanical equipment spaces. Ideal condition for Auditoriums and Radio and Television Broadcast spaces would require lower NC levels and higher STC ratings depending on the activities taking place within these spaces.
2. Isolation of all conversations that require confidential security. With NC of 25, minimum STC of 50, and with NC of 35, minimum STC of 45 (note that NC applies to space exterior to envelope of space where noise is generated). Types of spaces requiring this isolation include administrative, guidance and nurse's office, conference rooms and teacher dining spaces. Also isolate mechanical spaces not included above.
3. Isolation of all but loud speech which would be only faintly heard. With NC of 25, STC of 45 to 50, and with NC of 35, STC of 40 to 45 (note that NC applies to space exterior to envelope of space where noise is generated). Types of spaces requiring this isolation include Instructional Spaces (classrooms and laboratories) and Instructional Media Centers.
4. Isolation of normal speech:
 - A. NC of 25, STC of 40 to 45
 - B. NC of 35, STC of 35 to 40 (note that NC applies to space exterior to envelope of space where noise is generated).Types of spaces requiring this isolation include general offices.
5. Minimal isolation of speech will allow loud speech to be understood:
 - A. NC of 25, STC of 35 to 40
 - B. NC of 35, STC of 30 to 35 (note that NC applies to space exterior to envelope of space where noise is generated).

This is the minimal sound transmission that would be acceptable in the facility.

Impact Noise

Impact noise needs to be considered when selecting materials of construction. The materials need to be evaluated to minimize impact sounds in spaces adjacent to where the impact occurs. These include:

1. Impact from traffic and other activities (such as sliding of furniture) on floors above a habitable space.
2. Heavy rains or hail on roofs above habitable spaces.
3. Slamming of locker doors in corridors that would transmit to habitable spaces.
4. Aggressive writing on chalk boards attached to common wall of a habitable space.
5. Bouncing of balls on gymnasium floors or walls common to other habitable spaces.

Design the floor-ceiling assemblies of normally occupied rooms located above learning spaces for a laboratory test rating of:

1. At least IIC 45 if they are located above core learning spaces
2. IIC 40 if they are located above ancillary learning spaces.

These IIC ratings shall apply without carpeting on the floor in the room above the learning space.

Background Noise

Maximum levels of background noise shall be in accordance with ANSI S12.60 as follows:

Maximum A-weighted steady background noise levels and maximum reverberation times in unoccupied, furnished learning spaces

Learning space a)	Maximum one-hour-average A-weighted steady background noise level b, c) dB	Maximum reverberation time for sound pressure levels in octave bands with mid-band frequencies of 500, 1000 and 2000 Hz _s
Core learning space with enclosed volume < 283 m ³ (< 10 000 ft ³)	35	0.6

Core learning space with enclosed volume > 283 m ³ and □ 566 m ³ (> 10 000 ft ³ and □ 20 000 ft ³)	35	0.7
Core learning spaces with enclosed volumes > 566 m ³ (20 000 ft ³) and all ancillary learning spaces	40 d)	e)

- a) See 3.1.1.1 and 3.1.1.2 for definitions of core and ancillary learning spaces.
- b) See 4.3.1 for limits on unsteady (time varying) background noise levels.
- c) See 4.3.2 for other limits on background noise from building services and utilities including C-weighted steady background noise levels.
- d) When corridors are used solely for conveyance of occupants within the school building and structured learning activities do not occur, the A-weighted steady background noise level limit for such corridors may be increased to 45 dB. The use of corridors for formal learning purposes should be avoided.

Along with sound transmission and impact noise, HVAC delivery noises combine to establish the background noise in each space. The ideal background noise would be within a range of NC 25 to NC 35 for instructional spaces. This range provides an acoustic environment that is considered quiet and allows for a normal conversation within a range of 30 feet. A lower NC would be very quiet without enough background sound to provide beneficial masking of noises from adjacent areas, and this would require increasing the STC of the space's envelope. Higher NC represents additional acoustic challenges.

Generally the background criteria for different types of spaces in the school building are as follows:

1. NC 15-25: Auditoriums, broadcast studios.

2. NC 25-35: Classrooms, laboratories, music rooms, assembly spaces without amplification (cafeteria and non-spectator seating gymnasium), offices and instructional media centers.
3. NC 40-45: Heavy circulation areas and assembly areas with amplification (spectator seating gymnasiums).

Reverberation Time

The reverberation time of a room must be designed based on the sound reinforcement required to create a proper acoustic environment for each space. This must consider the type of sound source (speech, speech and music, or music).

In general, the following reverberation times shall be achieved for 500, 1,000 and 2,000 Hz for the types of listed spaces.

1. Between 0.6-0.7 second reverberation time: Classrooms, instructional laboratories, instructional media centers, offices, conference rooms, and cafeterias.
2. 1.0 to 2.0 seconds reverberation time: Auditoriums, gymnasiums and music rooms. In general, the acoustic requirements for speech and chamber music, is good below 1.2 seconds and only fair above 1.5 seconds. The reverse is true for orchestral, choral and non-amplified music with a fair condition below 1.5 seconds and good when greater.
3. 1.5 to 2.0 seconds reverberation time: Spectator gymnasium with sound reinforcement. Allowing these gymnasiums to be acoustically lively helps to reinforce school spirit during competitions.

Sound Reinforcement

Electronic sound reinforcement required for the building needs to be coordinated with the acoustic environment that is designed for the facility.

1. The building public address system needs to be adjusted for volume and location of speakers that provides clear understanding of the message at all locations in the building.

2. Public address systems in auditoriums, gymnasiums and cafeteriums also require adjustment of volume and location of speakers that provides clear understanding of the message at all locations in the space.
3. Classroom voice enhancement systems need to be fine tuned to the instructional area used in.
4. Building bell system and weather and fire alarm systems need to have sound devices located so that every part of the building is provided the sonic signal at the required db level.

Construction Methods to Achieve Sound Isolation Criteria

General Guidelines

1. Develop architectural and structural details to avoid sound leakage and flanking at the connections of partitions at the building perimeter. Dog-leg partitions to abut mullions, so the partitions do not terminate against glazing.
2. Where enclosed spaces are surrounded by partitions which extend slab to slab, provide a sound isolating return air boot or sound trap to meet the documented NIC value above the entry door to the space.
3. Provide a continuous seal at all slab-to-slab acoustical partitions at the partition base and structure above. All penetrations, such as for duct, pipe and conduit, should have a 1/8" gap minimum between the penetrating service line and the partition with a resilient acoustical sealant.
4. All gypsum board sheets should run vertically. No joints allowed except at studs. Stagger joints of gypsum board where multiple layers occur and do not glue multiple layers of gypsum board together.
5. Locate equipment as far from student locations as possible.
6. Design additional sound attenuation features in learning spaces where numerous pieces of equipment may be collectively noisy.
7. Basis-of-design for fiberglass batts is Owens-Corning Fiberglass Noise Barrier Batts, OCF Friction Fit Building Insulation or approved equal. Fiberglass thickness to equal stud depth. Mineral wool is an acceptable alternate.

The following are guidelines related to HVAC design and acoustic performance:

1. Specify equipment, grilles and diffusers to meet noise criteria (NC) established by acoustic design requirements for each room.
2. Design airflow velocities in trunk ducts not to exceed 800 ft/min. with branch ductwork sizes matching the air device duct connection size.
3. Specify duct silencers inside the air handling unit or in the main supply and return ducts.
4. Design ductwork to achieve a low static pressure loss in accordance with *SMACNA for HVAC Duct Design, [B2]*. Plenum depth should be equivalent to at least three to four diameters of the duct going to the diffuser.
5. Locate all rotating equipment with static pressure control dampers at least 10 feet from classrooms.
6. Locate HVAC fan equipment serving more than one classroom farther from the classrooms than equipment serving only one classroom.
7. Specify airfoil-shaped blades for centrifugal fans.
8. Do not specify fans with forward curved blades.
9. Lined ductwork shall not be allowed for any SDP project.
10. Do not locate variable air volume (VAV) boxes over learning space, unless measures are taken to meet required acoustic standards for the spaces.

The following are guidelines related to Electrical design and acoustic performance:

1. Locate outlet and junction boxes on opposite sides of a stud wall so that they are separated by at least 24", not within the same stud space.
2. Detail construction at boxes located back-to-back in double stud walls so that they are fully enclosed in gypsum board that does not contact the framing of the other row of studs with all joints sealed. Alternatively, use vapor-barrier type boxes that are caulked and sealed.

The following are guidelines related to Plumbing design and acoustic performance:

1. Locate piping above corridor ceilings rather than habitable spaces.
2. Specify cast iron for waste line piping.
3. Specify that any plastic piping shall be wrapped with a lagging material.
4. Specify that any plastic or copper waste piping shall be wrapped with a lagging

material and enclosed with gypsum board construction.

5. Specify that all piping be isolated from building walls and structure by using compressible wrapping or resilient clamps and hangers.
6. Where a plumbing wall must be located next to a learning space, design the wall with a 1" gap between double rows of studs plus two layers of gypsum board on the classroom side plus sound-absorbing insulation batts in both stud cavities, or use solid masonry construction.
7. Specify supply water pressure that is reduced as much as possible.
8. Specify water hammer arrestors for supply pipes serving flush or solenoid valve fixtures.
9. Specify water siphon jet fixtures.
10. Do not specify blowout fixtures.
11. Specify inspection of all plumbing for conformance to noise control features before closing the walls.

Reference Standards

LEED v4 Reference Guide for Building Design and Construction;
Indoor Environmental Quality Prerequisite: Minimum Acoustic Performance Indoor
Environmental Quality Credit: Acoustic Performance

ANSI/ASA S12.60-2010/Part 1 American National Standard Acoustical Performance
Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools

AHRI Standard 885–2008, Procedure for Estimating Occupied Space Sound Levels in the
Application of Air Terminals and Air Outlets: ahrinet.org

2011 HVAC Applications, ASHRAE Handbook, Chapter 48, Noise and Vibration Control:
ashrae.org

NRC-CNRC Construction Technology Update No. 51, Acoustic Design of Rooms for
Speech, 2002: nrc-cnrc.gc.ca

ASTM E 336 "Standard Test Method for Measurement of Airborne Sound Attenuation
between
Rooms in Buildings

ASTM E 413 "Classification for Rating Sound Insulation"

Issued 02/08/21

ASTM E989-06, Standard Classification for Determination of Impact Insulation Class (IIC)

ANSI/ASA S12.9-1992/Part 2 (R2008), American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term Wide- Area Sound

Energy Efficiency

HVAC system design will meet or exceed the requirements of the applicable version of the International Energy Conservation Code (IECC) and International Mechanical Code, as adopted by the City of Philadelphia's Department of Licenses and Inspections (L&I).

Plumbing system design will meet or exceed the requirements of the applicable version of the International Energy Conservation Code (IECC) and International Plumbing Code, as adopted by the City of Philadelphia's Department of Licenses and Inspections (L&I).

Electrical system design will meet or exceed the requirements of the applicable version of the International Energy Conservation Code (IECC), National Electric Code, and NFPA, as adopted by the City of Philadelphia's Department of Licenses and Inspections (L&I).

Minimum Energy Performance Requirement

1. Energy Performance Approach:

- A. At the completion of the schematic design, provide a COMcheck report that shows the building design at this point in the project complies with the applicable version of the International Energy Conservation Code (IECC) / ASHRAE 90.1, as adopted by the City of Philadelphia's Department of Licenses and Inspections (L&I).
- B. At the completion of the design development phase, provide a computer simulation of the total building performance that shows the project's proposed site and source energy use intensity.
- C. At completion of the construction document phase, provide an updated computer simulation of the total building performance that shows the project's proposed site and source energy use intensity. Generate an ENERGY STAR target finder rating and final COMcheck report.
- D. Design teams shall review energy modeling tools with the District at the beginning of the design process. Trane Trace 700 is currently preferred.

Energy Performance Criteria

The following criteria shall be used as assumptions in performance simulations used to verify the Energy Performance Standard:

1. Occupancy
 - A. Consult with the Owner for the design building occupancy including learners, instructional, and other staff.
2. Indoor Design Conditions
 - A. Consult with OCP's Design Unit for the approved design setback and setpoint temperature and humidity conditions.
3. Outdoor Design Conditions
 - A. Refer to *Chapter 4, Division 23 - Mechanical*.
4. Hours of Operation
 - A. Significant variations in space use can occur from one school to another. To allow for comparison between projects, utilize standard schedules from the Department of Energy's Commercial Building prototype models. These schedules include provisions for lighting, equipment, occupancy, ventilation, and service water heating.
 - i. Elementary Schools:
 - a. Refer to elementary (primary school) prototype schedules.
 - ii. Middle Schools and High Schools:
 - a. Distribute these occupancy levels over known school calendar recesses, holidays, and weekends.
 - iii. High Schools:
 - a. Refer to middle/high school (secondary school) prototype schedules.
 - iv. For the following spaces, utilize the following customizations:
 - a. Libraries: Same as administration areas
 - b. MDF and IDF Rooms: 24/7/365
 - c. Administration: Monday thru Friday, 7 am to 5 pm, all year long
 - d. Gyms, athletics: Same as administration in addition to off-hour use

- e. Studios: Monday thru Friday, 7 am to 5 pm, school year (9 months/year)
- f. Dining areas: Same as studios
- g. Projects submitted for LEED certification are bound by the computer simulation requirements prescribed by the USGBC.

Domestic Water Consumption Efficiency

Plumbing system design will meet or exceed the requirements for water efficiency issued by the Philadelphia Water Department.

1. Provide a preliminary water budget analysis with the schematic design deliverable.
2. Plumbing fixtures:
 - A. For new buildings or additions, design fixture flow rates to allow the school to achieve a minimum of 20% lower water consumption than a code-compliant installation. Touchless fixtures are expected for all public uses.
 - B. For renovations, where low-flow faucets or fixtures are not practical, request a special directive from the Owner.

Indoor Air Quality

Indoor air quality standards shall comply with ASHRAE 62.1-2013 or the requirements of the Authority Having Jurisdiction, whichever is more stringent. Design teams should have an indoor air quality workshop during schematic design to review this topic and determine whether any enhanced measures beyond the baseline established in this standard are required.

Sustainability

Design and construction teams shall coordinate with the Owner's Project Manager to define, implement, and document the sustainability objectives of the project, which may include compliance with one or more of the following rating systems:

1. SDP Sustainability Scorecard (Refer to *Chapter 2 – Energy & Sustainability*)
2. At each phase of design, the design team shall provide a detailed basis-of-design document to include:
 - A. A narrative description of proposed systems
 - B. Description of the sustainable features of the design

Commissioning

Envelope

Design and construction teams shall coordinate with the Owner's Commissioning Authority, where identified in the team's scope of work, to define, implement, and document a water spray test for all exterior windows per ASTM E779.

Design and construction teams shall coordinate with the Owner's Commissioning Authority, where identified in the team's scope of work, for verification and integrity of air, water, and vapor control layers.

Plumbing

Design and construction teams shall coordinate with the Owner's Commissioning Authority, where identified in the team's scope of work, to define, implement, and document the commissioning of plumbing systems in accordance with the Owner's standard commissioning specifications, the requirements of the City of Philadelphia and the energy code, and one or more of the following rating systems:

1. SDP Sustainability Scorecard (Refer to Chapter 2 – Energy & Sustainability)
2. At each phase of design, the design team shall provide written responses to review comments issued by the Owner and Commissioning Authority.
3. Design team shall include the Owner's standard commissioning specifications for Divisions 01, 22, 23, and 26 in the project manual.
4. During submittal phase, the design team shall review comments issued by the Commissioning Authority and include in formal comments to contractor.
5. During construction commissioning, the design team shall respond to observation reports issued by the Commissioning Authority and provide directives for resolution of issues.

HVAC

The School District of Philadelphia operates one of the largest K-12 portfolios of buildings in the United States, with a high average building property age. SDP facilities staff have prioritized system reliability and is seeking to focus new construction and major modernization work to achieve a balance between reliability, efficiency, and first cost, without compromising on indoor environmental quality metrics. Given the recent update of Philadelphia's energy code to the

2018 International Energy Conservation Code or ASHRAE 90.1-2016, design teams should expect a significant increase in the need for early exploration of energy conservation measures. The stringency of the energy code includes additional requirements for energy recovery, direct digital controls with advanced sequences, and lighting controls. The design team may elect to reference ASHRAE 90.1-2019, as well as the ASHRAE Advanced Energy Guide for K-12 schools to complement energy use optimization using energy simulation.

The District has established a baseline class of systems. While this section focuses on characteristics of HVAC systems primarily, efficient and right sized operation requires attention to holistic design, with efficient programming, an optimized building enclosure, and a consistent maintenance framework.

Component	Baseline
Energy Performance	Comply with ASHRAE 90.1-2016 / IECC 2018
Acoustics	Meet LEED for Schools Pre-Requisite
Ventilation	Comply with ASHRAE 62.1-2016
Thermal Comfort	Comply with ASHRAE 55.1-2017 (T/RH)
HVAC System - Plant	SDP Standard – 90.1-2016 Compliant
HVAC System – Education Space	SDP Standard – Fan Coil Unit with DOAS
Thermal Zoning	1 per classroom 1 per two offices
Lighting – Power	SDP Standard – 90.1-2016 Compliant
Lighting – Quality	CCT <4100 K CRI > 80
Renewable Energy	Evaluate solar potential on site

Design and construction teams shall coordinate with the Owner’s Commissioning Authority to define, implement, and document the commissioning of mechanical systems in accordance with the Owner’s standard commissioning specifications, the requirements of the City of Philadelphia and the energy code, and one or more of the following rating systems:

1. SDP Sustainability Scorecard (Refer to *Chapter 2 – Energy & Sustainability*)

2. At each phase of design, the design team shall provide written responses to review comments issued by the Owner, Sustainability Manager, and Commissioning Authority.
3. Design teams shall include the Owner's standard commissioning specifications for Divisions 01, 22, 23, and 26 in the project manual.
4. For submittals during construction, the design team shall review comments issued by Commissioning Authority and include in formal comments to contractor.
5. During construction commissioning, the design team shall respond to observation reports issued by the Commissioning Authority and provide directives for resolution of issues.

Electrical Systems

1. Lighting Control
 - A. Provide testing, programming, and training by a manufacturer-trained technician. Technician must be available on-site within a 24-hour response time.
 - B. Provide a minimum of 2-hours of training for Owner's maintenance staff on adjusting settings and programming schedules.
 - C. Provide initial programming as directed by the Owner.

Technical Standards

Introduction

This section outlines requirements for SDP facilities and is organized by MasterSpec divisions. Performance requirements outlined are minimums. The general requirements listed apply to all subsequent specification sections for that division and outline some materials or systems not allowed. If there are materials used in the design of SDP facilities, and no performance requirements are listed, review these materials and systems with SDP at the appropriate milestones for approval and inclusion in the project.

Division 02 – Existing Conditions

Section 024119 Selective Demolition (Major Modernization Projects)

1. Check locations where existing mechanical and electrical work pass through proposed demolition areas.
2. Check perimeter walls to remain at demolition areas for existence and location of any mechanical and electrical work on either side.
3. Do not retain partitions in demolition areas for the sake of retaining existing HVAC, plumbing, or electrical work unless absolutely necessary for continuity of service.
4. Double check for load bearing walls or concealed columns.
5. Assist school Principal or other SDP personnel in identifying items to be demolished and salvaged as SDP property:
6. Before design work begins, identify any equipment, materials, or components suitable for reuse in the Project, including, but not limited to:
 - A. Existing old and new doors and hardware
 - B. Toilet partitions
 - C. Plumbing Fixtures
 - D. Lighting Fixtures
 - E. Doors
 - F. Frames
 - G. Hardware
 - H. Ceiling Tiles and Suspension System
 - I. Ceramic Tiles that may be needed for patching existing work to remain.
 - J. Ductwork

- K. Grilles
- L. Diffusers
- M. Dampers

7. Identify items to be retained in the Contract Documents and items to be Contractor's salvage or SDP salvage.

When considering the scope of demolition in a project, the effect on adjacent areas should be kept in mind. This includes the occupied areas of the floors above and below, as well as occupancies as remote as other buildings. The disturbances of demolition are not as significant for Architectural components as they are for Mechanical and Electrical components where services, such as sanitary lines, risers and vents, electrical conduit, etc., passing through the demolition area must remain operational. Of particular concern are some items which may not be readily observable in the demolition area, such as over-ceiling plenums for HVAC return air, or the use of fire rated ceilings or wall systems.

The question of whether or not to save an existing partition or ceiling that contains mechanical or electrical components must be carefully evaluated for overall economic advantage in the entire scope of work, as well as consideration about disturbing adjacent occupancies.

Selective demolition decisions must always be made after a complete analysis and understanding of the building structural system, including the location of concealed columns, piers, and the extent of bearing walls.

Mechanical and electrical codes should be searched when evaluating existing systems and components within proposed demolition areas. What might appear to be adequate and serviceable components may in fact not meet current code standards and therefore not be worth saving. Also, the schematic adequacy of existing utility lines to serve proposed new uses and layout must be evaluated for feasibility.

Reuse of existing materials that are scheduled for demolition must be evaluated carefully by methods of true value engineering. Other than suitability of appearance or functional adequacy, one must approximate the age and remaining useful life of materials and components which otherwise become Contractor's salvage.

A mandatory site and building review is required of the design professional before commencing design work. Existing design drawings are made available to the design professional by SDP but their accuracy with regard to actual existing conditions is not assured. Similarly, the Instructions to Bidders require them to perform a mandatory site visit to verify existing conditions.

Where work intends to utilize existing mechanical systems, the Design Team's mechanical engineer shall evaluate the existing mechanical system prior to commencement of Schematic Design phase. Evaluation must be provided to SDP prior to final decision.

Where work intends to utilize existing plumbing systems, the Design Team must retain a drain investigation contractor to evaluate existing drain lines (sanitary and domestic) prior to commencement of Schematic Design phase. Corrective work to existing plumbing system, when required, shall be added to the scope of work.

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Where work intends to utilize existing electrical systems, the Design Team must retain an electrical contractor to evaluate existing electric panels and circuitry prior to commencement of Schematic Design phase. Corrective work to existing electric system, when required, shall be added to the scope of work.

Division 03 – Concrete

Section 032000 Concrete Reinforcing

1. Design steel reinforcement to have straight rather than bent bars as permitted and as considered practical. There will be applications that bent bars will be necessary.
2. Design and detail column caps planned for future vertical expansion with a steel plate that future re-bars can be welded to.
3. Specify ASTM A615, grade 60 deformed bars.
4. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
5. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
6. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1, plain steel.
7. Welding of rebar shall not be permitted without consent of the EOR and SDP.
8. Provide Recycled steel, if possible.

Section 033000 Structural Concrete

1. Consider flat slab construction only where relatively close column spacing is acceptable.
2. Specify concrete hardener for all unfinished horizontal concrete surfaces exposed to traffic.

Section 034000 Precast Concrete

1. Design totally pre-cast structural systems only after careful consideration of local market conditions and analysis of price competitiveness with other systems.
2. Predetermine and document all slab openings in pre-cast concrete components. Field cutting and coring may not be structurally feasible.
3. Specify consultation with Structural Engineer before cutting any pre-cast concrete.
4. Specify PCI Certified plant.

Section 035000 Insulating Concrete Decks

1. Design and specify insulation board on concrete slab in lieu of less thermally efficient insulating concrete.
2. Specify concrete topping to be installed before installation of moveable partitions.
3. Specify substrate preparation to be in accordance with concrete topping manufacturer's recommendations.
4. Specify product that is self-leveling and can be spread to a feather edge.
5. Basis of Design Product: Topping Manufacturer: Dayton Superior Corp or Equal.

Section 035400 Cast Underlayment

1. At locations of movable partitions, specify installation of concrete topping before partitions are installed.
2. Specified substrate preparation shall be in accordance with concrete topping manufacturer's recommendations.
3. Specify product that is self-leveling and can be spread to a feather edge.

Division 04 – Masonry

Section 042000 Concrete Unit Masonry

1. Design corridor partitions as CMU.
2. Design fire rated partitions as CMU.
3. Consider use of Acoustical CMU in cafeterias and other high decibel areas.
4. Design and specify glazed CMU as base for CMU walls.
5. Specify CMU back-up to brick masonry as either 6" standard weight or 8" lightweight, depending on cost advantage.
6. Specify horizontal masonry ties at every two courses between brick and CMU. Horizontal ties shall be provided on a 16" H and 16" V grid.
7. Specify horizontal reinforcing in exterior walls to be every two courses of CMU. For CMU walls backing up brick or other veneer masonry, the veneer ties shall be compatible and integral with the CMU backup horizontal joint reinforcement.
8. Carefully consider both Horizontal and vertical coursing of CMU to minimize field cutting.
9. Specify curing period for CMU to be 28 days, minimum.
10. Provide solid or grouted units at the course above and below any change in unit widths, number of wythes and/or corbels.
11. Cells of all units below grade or retaining earth shall be grouted solid where this occurs; however, earth-retaining construction shall typically be CIP construction.

Section 042113 Brick Masonry

1. For modernizations and additions, confirm if matching existing brick will be required. Design teams to evaluate availability and sourcing.
2. Brick for new building construction:
 - A. Typical brick bond pattern / coursing shall be running bond.
 - B. Use of other brick patterns/coursing to enhance building elements as well as the overall building aesthetic is subject to approval by SDP.
 - C. SDP shall approve size, color and texture of brick.
 - D. Use standard shapes, sizes, and colors.
 - E. Limit cutting of bricks.

3. Minimize design of pilasters, soldier courses, and other such labor intensive features.
4. Limit brick patterns, created by use of different colored bricks, to three colors.
5. Consider multiple floor vertical spans of masonry to minimize supporting steel.
6. Preclude necessity of cut bricks over lintels.
7. Do not use cored bricks over lintels or for sills.
8. Specified mortar strength shall be 1800 psi, minimum.
9. Do not specify additives. Control color of mortar by specifying color of sand. Do not specify cold weather additives or plasticizers.
10. Specify temperature ranges for installation.
11. Specify that masonry work be performed during non-freezing days.
12. Brick to extend 8" into grade.
13. Give preference to products manufactured within 500 miles of project.
14. Avoid use of vandal-resistant (graffiti) coatings.

Section 047200 Cast Stone Masonry

NOTE: This is permitted only where existing building construction is being matched. New construction shall not utilize cast stone, marble, limestone or other stone.

1. Consider use of cast stone in lieu of marble, limestone, or other cut stones used as decorative features in exterior walls.
2. Give preference to products manufactured within 500 miles of project.
3. Cast stone may be made with post-consumer or post-industrial recycled content.

Division 05 – Metals

Section 051200 Structural Steel

Structural steel elements shall comply with the following and as required by Code.

1. W-Shapes: ASTM A 992/A 992M.
2. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M.
3. Plate and Bar: ASTM A 36/A 36M, unless noted as ASTM A 572/A 572M, Grade 50 (345).
4. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
5. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M,
6. structural tubing.
7. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 - A. Finish: Black except where indicated to be galvanized.
8. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
9. Steel Forgings: ASTM A 668/A 668M.
10. Design building forms to be framed in simple ways with as few pieces as possible.

Section 053100 Steel Decking

1. Design in conformance with Steel Deck Institute (SDI) Manuals “Floor Deck Design Manual” and “Roof Deck Design Manual”.
2. Specify galvanizing of floor decks and consider specifying a contractor's option for paint or phosphatized treatment.
3. Specify gauge of deck to be heavy enough to carry wet concrete, precluding necessity of centering.
4. Check roof deck flute dimension to be certain that insulation board will span the width.

Section 055113 Metal Pan Stairs

1. Specify stairs to meet building code structural loading and serviceability requirements.

2. Design interior stairs as concrete filled metal pan type unless price competition indicates cost advantage with poured-in-place concrete.
3. Continue design dimensions and profiles of stair stringer in design of base at walls of landings.
4. Design metal deck stairs, without concrete fill or rubber treads, only as minimum quality in non-student areas.
5. Do not design open riser stairs.
6. Provide an area of refuge at each floor of all Stair Towers. Each area of refuge shall be provided with a two-way communication system between the area of refuge and a central control point as approved by the fire department. Each door providing access to an area of refuge from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE, including the International Symbol of Accessibility. Area of Refuge shall be designed in accordance with the requirements of the ICC International Building Code, Chapter 10 – Means of Egress and shall comply with ICC/ANSI A117.1.
7. Do not specify abrasive nosing on metal stairs; only on poured concrete stairs.
8. Give preference to products made with recycled (post consumer, post industrial) materials.
9. Acceptable Manufacturers
 - A. Alfab, Inc.
 - B. American Stairs, Inc.
 - C. Sharon Companies Ltd.

Section 055200 Metal Railings

1. Specify railings to meet building code structural loading and serviceability requirements.
2. Design all stairwell handrails as welded pipe construction.
3. Design entranceway handrails as manufactured metal systems.
4. Specify SDP approved color for painted railings.
5. Specify galvanized steel for interior and exterior handrails not scheduled for painting.
6. Guards may be constructed of steel pipe, bars, rods or finished mesh inserts.
7. Give preference to products made with recycled (post consumer, post industrial) materials.

Division 06 – Wood, Plastics, and Composites

Section 064100 Architectural Woodwork

1. Teacher and Student Wardrobe (Cubbies)
 - A. Do not design poured concrete bases for wardrobes.
 - B. Specify wardrobe dimensions to be as follows:
 - i. Single Student Wardrobe – 12”w x 60”h x 17”d
 - a. Wardrobes shall be open front, fixed upper shelf, with one ceiling mounted double coat hook
 - b. Provide raised bottom shelf from floor for boot storage.
 - ii. Double Student Wardrobe – 16”w x 60”h x 17”d
 - a. Wardrobes shall be open front, fixed upper shelf, with one ceiling mounted double coat hook with two sides mounted single hooks.
 - b. Provide raised bottom shelf from floor for boot storage.
 - iii. Teacher Wardrobe – 36”w x 60”h x 17”d
 - a. Wardrobes shall be closed front (lockable doors), fixed upper shelf, with one ceiling mounted double coat hook with two sides mounted single hooks.
2. Cabinets and Countertops
 - A. Casework:
 - i. Design and specify all custom casework to meet AWI "custom" Standard.
 - ii. Provide all lockable casework.
 - iii. Solid wood construction is preferred by SDP however design teams shall evaluate and track potential cost impacts.
 - iv. Cabinet doors to receive sound dampening bumpers.
 - v. Provide self-close hinges for cabinet doors.
 - B. Countertops:
 - i. Solid Surface – Recommended as typical.
 - ii. Acid Resistant – As required
 - iii. Stainless Steel – As required at locations specified by SDP. Not allowed at food

serving, provide solid surface.

iv. Backsplash –

- a. Provide integral backsplash; 4" typical, unless noted otherwise.
- b. Provide splash guards at sinks.
- c. Design outside corners of island countertops to have 3" minimum radius.
- d. Do not design post-formed countertop and backsplash or rolled countertop edge.
- e. Specify that all cut-outs in countertops be sealed.
- f. Specify that countertops and backsplashes be scribed to wall with sealant at joint.
- g. Specify scribe strips for adjusting plumbness of casework.

Division 07 – Thermal and Moisture Protection

General Requirements

In general, when specifying building envelope assemblies, design team shall consider the following primary considerations:

- Durability
- Aesthetics
- Long Term Maintenance

General requirements for building envelope components are as follows:

1. Walls:

- A. Incorporate a fluid-applied membrane air barrier, or similar system, into the building envelope, as part of a system compliant with NFPA 285 (Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components). Air barriers must form a continuous barrier for the building envelope in conjunction with roofing and waterproofing systems. Provide details to ensure continuity at intersections.
- B. EIFS (Exterior Insulation and Finish System) and other similar systems are not allowed.
- C. Formed metal wall panels, insulated metal wall panels, and similar systems are restricted to accents for the building envelope systems and shall be a minimum 12 ft above grade. Design applications for metal panels, where proposed, shall be subject to SDP review and approval.
- D. Blind fastening of cladding systems (metal wall panels and similar) through the air barrier is prohibited. Subframing used to secure cladding must be installed and sealed at the air barrier layer prior to installation of insulation.
- E. As a general rule, the design of basements should be avoided due to cost vs above-grade construction. Partial sub-grade walls are to be expected where site topography results in grade elevations above interior floor. In these cases, walls shall be designed accordingly for these conditions.
- F. Where murals are desired or planned, keep murals 1 foot below the top and above the bottom of the wall to allow for moisture to dissipate

1. Waterproofing:

- A. Detail and specify fluid applied waterproofing at the rear portion of exposed masonry parapets and at exterior face of all sub-grade walls. Prior to backfill of sub grade walls, protect the waterproofing with a layer of foundation insulation board.

- B. Specify that waterproofing or re-pointing of existing masonry walls shall be executed prior to performing roofing work.

2. Roof Access:

- G. Do not design stairways to go to roof unless SDP program requires it.
- H. Design roof access by way of hatch and ladder located in a secured space.
- I. Metal stairs may be used for roof access if space allows.

3. Roofing:

- A. Closed and/ or proprietary roof system specifications are prohibited.
- B. SDP standard for roofing is low-slope 2-ply SBS Modified Bitumen Roofing System.
- C. Sloped Roof Systems may be considered as follows:
 - i. Standing Seam Metal Roof
 - ii. Thermafiber Shingles
- D. Design low roof slopes to be a minimum of $\frac{1}{4}$ " per foot.
- E. New Construction
 - i. For new construction, roof sloping shall be achieved with sloped structural roof deck.
 - ii. Detail and specify tapered insulation only at small roof areas or where sloped roof framing is not practical.
 - iii. To the maximum extent feasible, roof slopes shall be directed to perimeter roof drainage. Drains within the interior of roof areas are to be avoided.
- F. Roof Replacements
 - i. Specify and indicate tapered insulation to achieve as much pitch as possible in re-roofing projects. Consider visibility and appearance with regard to heights of parapet walls.
- G. Detail all roof systems in accordance with the referenced specifications above, as well as current National Roofing Contractors Association and SMACNA Architectural Sheet Metal Manual guidelines.

- i. Ensure that all roof edges and parapets in details match assemblies tested in accordance with ANSI/SPRI ES-1 to pressures that meet or exceed design wind uplift loads.
- ii. Provide isometric details indicating how roof edges and parapet assemblies will tie in at intersections with walls to maintain a continuous air barrier.

Section 075216 SBS Modified Bituminous Membrane Roofing

1. Roofing system shall be specified with 25 Year Warranty.
2. Basis-of-Design Manufacturers:
 - A. Tremco Roofing
 - B. Siplast
 - C. Garland

Section 076200 Flashing and Sheet Metal

Like the roofing membrane, flashing is a major source of building water leaks. They require special attention. Metals such as copper or stainless steel provide the greatest longevity of service. Stainless steel is preferred contingent on compatibility with other flashing materials.

Aluminum may be used for flashing and counter flashing and such applications are also compatible with copings and gravel stops that are usually made of aluminum.

Galvanized and painted sheet metal is prohibited.

Non-metallic flashing materials, such as Sisal craft impregnated felt, are satisfactory for through wall flashing or other totally embedded applications.

Flashing details and specifications should follow the roofing manufacturer's recommendations or follow the National Roofing Contractors' Association (NRCA) recommended standard details. They are the ultimate authority on this subject.

1. Specify stainless steel for flashing and trim applications requiring superior, long term performance.
2. Specifying Sisal craft impregnated felt or other proven non-metallic materials is acceptable in thru-wall applications.

Section 077100 Roof Specialties

1. Specify prefabricated curbs and cants in lieu of custom fabricated.
2. Specify an interior locking device on roof hatches.
3. OSHA compliant access ladders shall be provided where roof heights differ and are greater than 24".

Section 078100 Applied Fireproofing

1. Note on drawings and specify fire rating required and not thickness of sprayed-on fireproofing.
2. Detail and specify sprayed-on fireproofing for columns where sprayed-on fireproofing is used elsewhere.
3. Do not detail or specify concrete encasement of columns for fireproofing.

Section 079200 Joint Sealants

1. Specify high quality, long lasting, paintable sealant materials. Consult with manufacturers and sub-contractors about materials appropriate to all specific uses.
2. Schedule all sealants and key to drawings.
3. Provide backer rods at all locations.
4. Elastometric joint sealers are to be in compliance with ASTM C920 for classification and class.
5. Acrylic-latex or siliconized acrylic-latex sealants shall comply with ASTM C834.
6. Sealant backings are to be in compliance with ASTM C1330.

Section 079513 Expansion Joint Cover Assemblies

1. Provide aluminum expansion joint cover assemblies where required.

Division 08 – Openings

Section 081300 Steel Doors

1. Design and schedule hollow metal doors and frames at the following locations:
 - A. Exterior Doors Sheltered from Rain
 - B. Stairway Doors
 - C. Mechanical Equipment Room Doors
2. Design frames with sub-frames 1/8" bent plate hot-dip galvanized, G-140, steel sub-frames for all fire-rated and non-fire-rated door frames, to replace existing frames, unless directed otherwise.
3. Design welded masonry frame where new masonry walls are constructed.
4. Design welded dry wall frame where new drywall partitions are constructed.
5. Design vision lights in cross corridor doors to be 3" X 33" with bottom of opening located at 42" above finished floor. Confirm with ADA requirements.
6. Do not Design side lights in partitions rated 1 hour or greater, unless at stairwells. Design side lights at door/panel assemblies at stairwells with fire rated glass (FireLite NT where required, or equivalent).
7. Design side lights to a single standard size, to as great an extent as possible.
8. Specify 1 3/4 inch thick Steel Stiffened Doors with sheets made of commercial quality, 14 gauge hot dipped zinc coated steel that complies with ASTM A924 A60.
9. Specify door Vertical edges that join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground, filled and dress smooth to make them invisible and Design a smooth flush surface.
10. Specify reinforced tops and bottoms of all doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel shall have a steel closure channel welded in place so the web of the channel is flush with the top of the face sheets of the door. Plastic fillers are not acceptable.
11. Specify exterior doors to have 14 gauge vertical steel stiffeners spanning the full thickness of the interior space between door faces. Stiffeners are spaced not more than 6" apart, and attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners are to be filled with fiberglass insulation (min. density 0.8#/cubic ft.)
12. Specify Door Louvers and Vision Lights Design louvers (Anemostat FLDL-UL-SGZ) according to SDI 111 C for interior doors where indicated, with blades or baffles formed of 0.0236-inch-thick cold-rolled steel set into minimum 0.0359-inch-thick steel frame. Frame Material: 0.0516 inch-thick cold-rolled steel, hot-dip galvanized, G-90. Grille Material: 1" centers, on both sides of glazing material.

13. Specify mounting holes for lights and louvers with 1/4" diameter holes around perimeter of opening. Mount frame with #8X32 Phillips head steel thru bolts, with blank head on exterior side.
14. Specify Steel Frames for lights and louvers to be 14 gage, hot dipped zinc coated steel that complies with ASTM designations A924 A60
15. Specify all frames for lights and louvers shall be designed with die cut miters and face welded seams. All frames are to be assembled so that the face miter joint and top miter return angle is closed, flush and ground smooth. Weld and dress the face seam of the frame and the op corner smooth. Grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.
16. Specify frames with sub-frames 1/8" bent plate hot-dip galvanized, G-140, steel sub-frames, to replace existing frames, at all fire-rated and non-fire-rated door frames, unless noted otherwise.
17. Specify hardware reinforcements to be in accordance with the minimum standard gauges as listed in SDI-100. Specify Hinge reinforcements to be 7-gauge steel.
18. Specify frames to be mortised, reinforced, drilled and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template Designed by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only; others shall do all drilling and tapping.
19. Specify the certification by manufacturer and approval by SDP of galvanic coating before prime coat of paint.
20. Specify doors and frames to comply with National Fire Protection Association (NFPA) Standard Number 80.

Section 081400 Wood Doors

1. Design all wood doors to be Pre-fitted, Pre-machined and Pre-finished. All standard and fire rated type wood doors shall have flush faces except where lites or louvers are indicated, and Dutch-type doors shall be used only where required by space standards. All single leaves shall be 3'0" x 7'0" x 1 3/4" and all leaves within a paired opening shall be each 3'0" x 7'0" x 1 3/4" (6'0" opening).
2. Design new and existing wood doors to match (wherever possible) in color and texture. Hardwood veneer finish is to be furnished for wood doors in public areas, and wood suitable for paint finish, elsewhere. All non-labeled wood doors shall be furnished with a solid core of high-density particleboard with wood face veneer.
3. Design all louvers to be inverted "Y" type. All louvers and light kits shall be metal and all shall be fully painted. Cut outs to be sealed. At all existing operating transom lights, these shall be fixed shut or as otherwise specified.
4. Specify Door Construction: Non-Fire Rated Doors: Thickness: 1-3/4 inches, interior flush

wood, bonded, solid core conforming to WDMA I.S. 1-A and the following; Core: bonded particle core (PC) conforming to WDMA I.S. 1-A. Door construction shall conform to WDMA I.S. 1-A Premium Grade requirements.

5. Specify Stiles: Hardwood to match face veneer over structural composite lumber (SCL), glued to core. Rails: Mill option hardwood or SCL. Top and bottom: 2 inches, and Facing shall be Wood veneer as specified.
6. Specify Fire Rated Doors: Thickness: 1-3/4 inches, interior flush wood, bonded, solid core conforming to WDMA I.S. 1-A and the following; Core: bonded mineral core (FD) conforming to WDMA I.S. 1-A. Door construction shall conform to WDMA I.S. 1-A Premium Grade requirements.
7. Specify Stiles of Hardwood to match face veneer over mineral composite, glued to core. Rails: Mineral composite as required by fire door authorities. Top and bottom: as required by manufacturer's fire door authorities. Facing: Wood veneer as specified.
8. Specify Wood Veneer Door face veneers to meet HPVA "A" grade quality standards conforming to WDMA I.S. 1-A for transparent or semi-transparent finish. Minimum face veneer thickness shall be 1/50" at 12% moisture content after finish sanding.
9. Specify face to core adhesives to be Type I or Type II as appropriate for location in building. Adhesives must be classified Type I or Type II per WDMA TM-6 "Adhesive Bond Test Method."
10. Type I adhesives shall be used for doors in exterior applications; Type II adhesives shall be used for doors in interior applications.
11. Consider eliminating resins containing added urea-formaldehyde and limiting VOC content of adhesives and sealants
12. Specify Transparent Finish: Match finish indicated in WDMA Section G-17: WDMA System #6.
13. Limit VOC emissions from paint and coatings as referenced in Green Seal Standards GS 11.
14. Specify wood doors in accordance with requirements of WDMA I.S. 1-A Quality Standards. Fabricate fire rated doors in accordance with requirements of ITS – Warnock Hersey or Underwriters' Laboratories, with metal label on each door including UL-10C. Wood door blocking for reinforcement (and enhanced screw attachment) shall be furnished on all doors. Sex nuts and bolts shall not be allowable in lieu of wood blocking and no hardware shall be installed with the use of sex nuts or grommet nuts.
15. Specify doors with WDMA Quality Standards hardware blocking options as follows:
 - A. Provide HB-1 – head and HB-2 – sill rails and HB-4 – lock-block on all doors.
 - B. Provide HB-6 only when exit devices are specified for door.
 - C. Provide HB-8 for pivots or when floor bolts are specified under Section 087100 – Finish Hardware.

16. Provide doors with minimum ¼ inch thick edge strips, of wood species to match face veneers except as required for fire rating.
17. Specify manufacturer's guarantee for all wood doors. Guarantee period: Lifetime of original installation. Doors exhibiting defects in materials or workmanship including warp and delamination within guarantee period shall be replaced (including hanging and finishing) with new doors. These terms shall be part of the manufacturer's standard warranty.
18. Fire Rated Pair of Doors; greater than 20 minute: Supply overlapping astragals or metal edge sets only as required by NFPA 80 or by door manufacturer's fire door authorities. If an astragal is required, to comply with fire rated labeling requirements for pairs of fire rated doors, provide door manufacturer's standard tested astragal.
19. Specify that existing operating transom lights to remain shall be fixed shut or otherwise eliminated.
20. Specify that tops and bottoms of doors are to be sealed.
21. Give preference to products that use certified wood for veneers
22. Equal products by manufacturers not listed here will be considered only if those products are in strict compliance and exceed the demands of the performance specification. The manufacturer's name, address, phone number and any modifications needed to a standard product must be noted on the request for approval. Specify submittal of manufacturer's technical data for each type of door, panel or miscellaneous accessory. Include door (or component part's) sections, elevations, and details. Specify submittal of two samples of each door type or series that shows rails, stiles, core, joint construction, and edge trim.

PREFERRED PRODUCTS

- A. Graham
- B. Marshfield
- C. Eggers

Section 081613 Fiberglass Doors

1. Fiberglass-Reinforced Plastic (FRP) flush doors with aluminum frames is the SDP standard for all Exterior Doors, non-fire Rated Stairway Doors and Main Entrance doors where there is Heavy Traffic Usage and a need for High tolerance to abuse. Industrial grade Storefront Aluminum Doors and Frames may be used at main entrances in lieu of FRP flush doors if the designer so chooses. (Refer to Aluminum Storefronts)
2. Specify 1-3/4" extra heavy duty fiberglass wide stile FRP doors. doors with aluminum alloy stiles and rails. Doors have an aluminum main frame constructed from extruded aluminum 6063 -T6 alloy. Main frame tube is to be a single extruded unit measuring 1 1/2" x 5 1/2" (O.D.) on both side stiles, and 6" (O.D.) Top and Bottom rails. Spliced extrusions that are joined together to measure 6" will not be accepted.

3. Specify all Rails and Stiles to have a minimum of 1/8" thick face walls and a 3/16" hinge edge wall.
4. Specify the assembly for the meeting joints of the Rails and Stiles on the main frame are to be MORTISE & TENON on all four joints. Secured with: 2 Tie Rods in Head Rail, 1 Tie Rod in Bottom Rail, welded joints will not be accepted.
5. Specify face sheets that will be fiberglass reinforced polyester, .120" thick, and have a pebble-like embossed finish. FRP face sheets are MR85 high impact frp material that has been tested by ASTM D5420 Gardner Impact Test with "Mean Failure Energy" rating no lower than 411.84 in-lb. (or equal). Both faces of the door must have a 26 Ga. liner bonded to the face sheet and core.
6. Specify a core material with a 25 psi density polystyrene with a flame spread rating of no more than 25.
7. Specify an inter-loc edge trim - All aluminum trim is completely removable. All parts of the door are replaceable and repairable in the field. No fastening devices are exposed on the Stile Edge Trims. Snap-on or screw-on stile trim will not be accepted.
8. Specify weatherstrip that is integral with the doors and frames.
9. Specify closer reinforcing to be 3/16" steel inserted into the head rail. Other surface applied hardware is reinforced with the standard mainframe tube wall thickness of 1/8". Reinforcing for mortise and concealed hardware is to be done per template requirements. Sex or thru bolts will not be accepted.
10. Specify standard closed back frames of extruded aluminum 6063-T5 alloy and a wall thickness of .125". All vertical frame jambs and mullions will be full height of opening. Tube sections will be 2" x 8" with joints connected by use of reinforcing clips and machine screws. All exposed screws must be stainless steel with spanner heads.
11. Specify fiberglass (FRP) panels and aluminum edged fiberglass (FRP) panels constructed of two sheets of .120 fiberglass sheets bonded to 3/4" core material. Panel thickness will be 1". An aluminum frame surrounds the perimeter of the panel, and measures 1" x 1" x 1" with 1/8" wall thickness. Wood edged panels will not be accepted.
12. Specify vision lite trim moldings to be aluminum extrusion - 6063-T5 alloy and removable from the inside only. All exposed screws must be stainless steel with spanner heads.
13. Specify all lights shall be glazed with wire glass pattern that is square, not diagonal, and as REQUIRED by code, impact resistance glass shall be furnished and installed where safety type glass is REQUIRED in lieu of wire glass.
14. Specify recessed pull handle, 6" x 8 1/2" x 1-9-16", manufactured from all extruded aluminum 6063-T6 alloy. Unit is welded together. Pull will be finished to match door edge trim or as specified. All exposed screws must be stainless steel with spanner heads products. Pull is to be supplied and installed at factory by door manufacturer.
15. Specify a Wide Stile FRP door and frame system that will carry a 25 year limited warranty on doors structural integrity, main frame, and the lamination between face sheets and core. the entire system (excluding hardware) will be guaranteed for 10 years.

16. Specify FRP Entrance systems that comply with requirements for system performance characteristics as determined by the testing methods that follow. Complete system units that include door, frame and hardware are to meet the following criteria:
 - A. R-value expressed in hr-ft (2)-F/Btu - ASTM 1503-98 - 1.43
 - B. Air Infiltration:
 - i. ASTM E283 @ 1.56 psf (25 mph) - 0.31 cfm/ft (2)
 - ii. ASTM E283 @ 6.24 psf (50 mph) - 0.97 cfm/ft (2)
 - C. Water Penetration:
 - i. ASTM E331 - 15 Min Cycle - NO ENTRY
 - D. Uniform Load - ASTM E330 - (+) - 82.5 psf
 - E. Exit Bar Pull Off Test - 2400 lbs. minimum load resistance before exit bar disengages from door.
 - F. Door Closer Pull Off - 1638 lbs. minimum load resistance before closer disengages from door.
 - G. WINDBORNE DEBRIS RESISTANCE TESTS:
 - i. Missile Impact Test: - PA 201 - 94 - PASSED
 - ii. Cyclic Wind Pressure Test - PA 203 - 94 - 60PSF
 - iii. Forced Entry Test - SFBC 3603.2 - 300 lbs. - PASSED

Section 083100 Access Doors and Panels

1. All access panels shall be sized properly to accommodate the equipment specified. All access panels shall be factory finished.

Section 084113 Aluminum-Framed Entrances and Storefronts

1. Design wide stile aluminum entrance doors with sidelights and transoms at main entrances.
2. Design frames with superior strength rugged, one-piece aluminum extrusions of aluminum alloy with a minimum 3/16" wall thickness.
3. Design doors with superior strength rugged, one-piece aluminum extrusions of aluminum alloy with a minimum 3/16" wall thickness.
4. Design Wide stile, 6" vertical face dimension, 1 3/4" depth, 3/16" wall thickness door and frame for high traffic and high abuse applications. 6" Top Rails and 10" minimum bottom rails to comply with ADA.

5. Specify 1 3/4" doors with extruded aluminum alloy stiles and rails and integral weather-stripping.
6. Specify doors with 6 inch mid rails, which add to the strength and stability of the door and allow for attachment of high stress hardware.
7. Specify doors that are mechanically joined and welded
8. Specify doors with 1/4" to 1" standard glazing and insulated glass with Low E coating.
9. Specify doors with hardware that is factory installed and specified in the door hardware section.
10. Specify doors with the necessary drop plates, brackets and spacers to allow the correct installation of the finish hardware.
11. Specify doors with surface mounted hardware including continuous hinges at all aluminum entrance doors.
12. Specify frames with one-piece aluminum extrusions mechanically joined. Provide thermally broken frames.
13. Specify frames with integral weather-stripping.
14. Design frames that are 1 3/4 x 4 1/2 or wider to accommodate thermal, wind, weather and structural demands.
15. Design doors and matching aluminum framing with Class 1 anodized aluminum finish.

Section 085113 Aluminum Windows

1. Design hopper vent windows (bottom-hinged, swing-in), with lever handle or pull if mounting height is 6'-0" or less. If more than 6'-0", specify eye for pole operation.
 - A. Casement operation may be provided if required for emergency egress. Provide minimum area
2. Design fixed sash windows with 4" deep frames.
3. Design and specify all window units to permit both sides of glass to be cleaned from the interior.
4. Window type, construction materials, and operation method must be pre-authorized by SDP prior to any such product being incorporated into the design of any new construction or window replacement project.
5. Specify window classification grade to be AAMA Grade HC.
6. Specify that all operating sash, not scheduled to receive exterior wire guards, shall be equipped with limit stops, that limit opening to 10" maximum, except in the following

locations:

- A. Areaways
 - B. 2 windows at basement level of a light well
 - C. Main administrative office
 - D. Other administrative offices
 - E. Principal's office
7. See Division 10 for Insect Screen requirements.
 8. Specify a thermal break in aluminum windows.
 9. Specify fixed (non-glass) window panels shall be porcelain enamel on 24 gauge steel with extruded polystyrene insulation.

Section 087100 Door Hardware

Door Hardware Review

SDP maintains specific requirements for door hardware as outlined in this section. Prior to development of the door hardware schedule, design teams are to review door and door hardware selections with SDP and SDP Locksmith Office.

Technical Standards

1. Specify hardware sets. Require qualified supplier to develop hardware schedule.
2. Specify commercial grade 1 hardware.
3. Specify that manufacturer's nameplate shall be omitted from products.
4. Coordinate specification of new hardware with existing.
5. Specify matching finishes of new and existing hardware.

Hinges

1. Specify heavy duty inset continuous hinges on all exterior aluminum and FRP doors similar to McKinney MCK14HD. For Interior applications, provide at all custodial closets. Hinges to match the color of the door.
2. Specify heavy weight bearing half-surface hinges on all high use doors including classroom, bathroom, corridor, and stair tower. Hinges to match the color of the balance of the hardware.
3. Specify standard weight bearing half-surface hinges on infrequently used doors including mechanical rooms, offices, closets and administration areas. Hinges to match the color of the balance of the hardware.

4. Specify NRP non rising pins for all interior steel outswing doors. Provide SSF security stud feature for all exterior steel outswing doors
5. Specify hinges and pins to be stainless steel at exterior locations, boiler rooms, kitchens, swimming pools, and other wet atmosphere areas.

Locks and Latches

1. Specify extra heavy duty BHMA grade 1 cylindrical locks
2. Specify a single lock chassis to accommodate 1 ¾ to 2 ¼ inch door thickness.
3. Specify locksets to have solid cast levers without plastic inserts.
4. Specify that when the outside lever is locked, it shall rotate freely and return to its horizontal position to assure vandal resistance (lever release or free wheeling).
5. Specify a single lockset shall be able to accommodate a six pin conventional cylinder.
6. Specify locksets shall carry a minimum 7-year limited warranty
7. Specify a double cylinder intruder classroom function lock at all classroom and office entrances. The interior levers of these locks shall be marked with a key turn indicator to help assure remote locking of the outside lever from the inside.
 - A. If project budget allows, provide exit device set with keyed dogging in lieu of lever set. This approach results in less maintenance and replacements compared to standard locksets.
8. Do not specify lever trim at exterior side of exterior doors. Only recessed pull are accepted.

Cylinders and Keys

1. Specify cylinders that employ a utility patent pending mechanism that requires the use of a patented key and furnished with a minimum of six pins.
2. Specify cylinders that have a locking pin mechanism, which engages a blocking plate and prevents the plug from turning.
3. Specify keys that have a control pin that depresses the locking mechanism and allows the plug to turn.
4. Specify patented key system that has a patent life until 2018
5. Specify a key system that does not require the need for special keying or key cutting equipment.

6. Specify keys made from nickel silver that are stronger and thicker than conventional keys and have a larger key bow than conventional keys.
7. Specify 6 of each master key and 3 keys per cylinder at each school.
8. Specify removable SFIC (Best) cylinders on the exterior of the building and traditional cylinders on the interior.
9. Specify a Key system that is independent and not have the ability to be keyed into a conventional key system or cross keyed.
10. Specify Keys and cylinders that are covered by a five year warranty.
11. Provide a BHMA grade 1 wall mounted key control cabinet with hinged panel door, including a two tag system with key holding hooks, self locking key holders, labels, envelopes, key tags, markers and a capacity able to hold 150% of the number of locks.
12. Specify a "Best" SFIC cylinder be provided at openings designated as "Best Door Opening" on hardware schedule.

Exit Devices and Mullions

1. Specify BHMA grade 1 exit devices on all doors requiring an exit device.
2. Specify rim exit devices on all exterior single doors.
3. Specify rim exit devices with key removable mullions on all exterior pairs of doors.
4. Specify devices with cylinder dogging at all main entrances and devices less dogging at all other exterior openings.
5. Specify one exterior cylinder for a single or per pair on each main entrance.
6. Supply pulls only at doors with cylinders. Specify only one door pull on a pair of doors.
7. Specify surface vertical rod exit devices, less bottom rod, on interior pairs of doors that are less than 64 inches in width. Supply rod guards to protect the top rods.
8. Specify exit devices with chassis made from heavy duty cold forged electroplated steel. Cast chassis will not be accepted.
9. Specify an exit device that uses ¼ inch attaching screws to mount the device to the door, and tamper proof screws attaching the chassis and end covers.
10. Specify an exit device that uses true architectural brass, bronze, chrome or stainless steel finishes. Stainless steel shall be specified unless the finish is otherwise noted.
11. Specify an exit device that incorporates a ¾ inch deadbolt style latchbolt with positive deadlocking by the auxiliary bolt. Pullman type latchbolts and devices without deadlatching will not be acceptable.

12. Specify that end caps on exit devices be metal, (preferably stainless steel.) and attach with a minimum of 3 screws.
13. Specify rim exit devices with key removable mullions on all interior pairs of doors with rim exit devices.
14. Specify heavy duty lever trim at any interior opening with an exit device. Trim shall have free wheeling levers for vandal resistance, beveled sides and a flush cylinder for attack resistance and heavy duty threaded posts with ¼ inch attaching screws.
15. Provide exit devices and trim by the same manufacturer and have a written five year warranty.
16. Use of tec type self drilling screws, unless provided by the manufacturer, with the hardware is prohibited.

Door Closers

1. Specify BHMA grade 1 door closers for interior and exterior doors that are surface mounted, have corrosion resistant cast aluminum bodies with a 2 1/8 inch projection and have a powder coated finish to match the surrounding hardware.
2. Specify door closers that have a rack and pinion design with two teeth engagement and a 1 ½ inch diameter piston.
3. Specify door closers that have standard, separate and independent non critical adjustment valves for latch speed, sweep speed, backcheck and backcheck intensity.
4. Specify door closers that are capable of adjusting the spring size 1 thru 6 and contains all season fluid that increases lubricity and minimizes seasonal adjustments, standard.
5. Avoid use of overhead stops, SDP has experienced durability issues. Spring Cush type arms are not acceptable.
6. Specify parallel rigid arms at all applications requiring parallel arms.
7. Specify all door closers with a metal cover.
8. Use of tec type self drilling screws, unless provided by the manufacturer with the hardware, is prohibited.
9. Specify door closers that have a life of the building warranty for the closer body and a 10 year warranty for all arms.

Stops and Holders

1. Specify cast wall and floor stops for each door. All doors shall be furnished with an auxiliary stop. An overhead, wall or floor stop, shall be furnished whether scheduled or not, and as is found typically scheduled in the balance of the hardware sets. If no door stop is scheduled (or if no specialized auxiliary door closer arm is listed), supplier shall provide an auxiliary stop, overhead, wall (or floor) stop for every door, which opens and impacts or opens into any fixed structure.

2. Specify Wall stops that have a metal encased rubber design with an anti vandal feature that incorporates an imbedded steel washer in the rubber portion to prevent the bumper from being removed from the wall.
3. Specify Universal Dome floor Stop that is capable of stopping a door in both a low rise and a high rise condition. Floor stops shall have the lip of a low rise bumper and the dome of a high rise bumper.
4. Specify magnetic holders that are capable of holding a door in a floor or wall application has a triple voltage coil that has the capability of working with 12, 24 or 120 vac/dc and has an assortment of extensions that may be used to accommodate various applications.

Door Bolts and Coordinators

1. Specify BHMA grade 1 flush bolts, surface bolts, automatic and self latching flush bolts as required for non labeled openings and to comply with labeled fire door requirements.
2. Specify a 12 inch rod for doors up to 84 inches and longer rods as necessary for taller doors.
3. Specify door coordinators with carry bars where automatic and self latching bolts are used.

Door Trim

1. "Z" shaped anti-vandal stainless steel pulls are preferred over lever locksets where pulls are used with Exit devices.
2. Push plates shall be 6" x 16" and beveled on four sides.
3. For push/ pull operation, specify Pulls that are 8 inches in length and mounted with a 4" x 16" push plate.
4. Specify pulls that are ADA compliant.

Protective Trim

1. Specify kick plates as stainless steel, on hollow metal doors and on wood veneer doors. Kickplates to be 8 inches high (minimum) .050 thickness and beveled on four sides.
 - A. Where required, provide ADA compliant kick plates.
2. Specify armor plates on areas that require extra protection from door damage including loading dock areas, kitchen areas or any place doors are subject to damage from carts and hand trucks. Armor plates are to be 36 inches tall or as label requirements dictate .050 thickness and beveled on four edges.

Weatherstrip

1. Specify ¼ inch high, aluminum thresholds with a lip containing a neoprene bulb insert on all exterior openings. Threshold to be 5" in width.
2. Specify ¼ inch high flat thresholds on all interior stair tower doors. Thresholds to be as wide as the frame depth.
3. Specify rigid jamb aluminum weatherstrip, with a neoprene bulb, at all exterior openings. Weatherstrip shall have the ability to be adjusted and cover gaps up to 1/8th of an inch.
4. Specify stick-on weather-strip on all mullion faces where they come in contact with the door.
5. Specify nylon brush sweeps with ability to cover gaps up to ½ of an inch.
6. Specify 2 inch projecting aluminum rain drips on exterior doors that are not under cover.
7. Specify the finish of the weather-strip to match the door and frame color.

Additional Notes

1. Indicate modification of exterior door sill substrates, if necessary to accommodate proper installation of threshold.
2. Specify that the hardware installers be certified installers and attend an installation seminar provided by the manufacturer's representative.
3. Specify that Contractor provide instruction of SDP personnel about adjustment and maintenance of hardware.
4. Specify submission of manufacturer representative's address and telephone number for each type of hardware installed, to SDP field inspector, as part of close-out submittals package.
5. Specify the following hardware sets and indicate on door schedule.
6. Use hardware set numbers for each project only as listed in this master. If any particular hardware set is not used, show that set number in the schedule and indicate as "NOT USED".

Acceptable Manufacturers

Acceptable manufacturers listed are subject to compliance with the requirements of this document and must meet the criteria of the standards as listed herein. Manufacturers offering products that may be incorporated in this work shall reflect the standard of the School District of Philadelphia and are limited to the following.

Butt Hinges McKinney, Bommer
Continuous Hinges McKinney, Pemko
Cylindrical Locks Corbin Russwin CL3300
Security locks Corbin Russwin ML2000 x Vandal Resistant Trim
Exit Devices Corbin Russwin Secure Bolt ED5200S
Cylinders Corbin Russwin Pyramid 7 pin Patented Security
Door Closers LCN 40 Series Heavy Duty EDA
Wall Stops Trimco, Burns
Magnetic holders Rixson, Sargent
Electric Strikes HES
Electronic Accessories Folger Adam
Pull Trim Trimco, Burns
Protection plates Trimco, Burns
Weatherstrip Pemko, Reese

FINISH HARDWARE SETS

Hardware Set 1

Exterior HM–Pair Doors - Rim x Mullion – Ingress/Egress (Best Door Opening)

Each Pair to Receive:

2 ea Cont Hinges MCK-25HD 628 Mc Kinney
1 ea Exit Device ED5200S x M52 x K157 RHR Dr. 630 Corbin-Russwin
1 ea Exit Device ED5200S M52 LHR Dr. 630 Corbin-Russwin
1 ea Mullion 707A KM x M57 USP Corbin-Russwin
1 ea Cylinder 1E72 RHR Dr. 626 Best Type
2 ea Cylinder 1E74 Mullion, Dogging 626 Best Type
2 ea Door Closers 40 Series Heavy Duty EDA Alum LCN
1 ea Pulls 1097HA SP 630 Trimco
2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Threshold 2005AN Alum Pemko
2 ea Sweeps 18061_NB Pemko
1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
1 set Weatherstrip PK33D Mullion Silicone Pemko
1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 2

Exterior HM–Pair Doors - Rim x Mullion –Egress Only

Each Pair to Receive:

2 ea Cont Hinges MCK-25HD 628 Mc Kinney
2 ea Exit Device ED5200S 630 Corbin-Russwin

- 1 ea Mullion 707A KM x M57 USP Corbin-Russwin
- 1 ea Cylinder 1030.118 Mullion 626 Corbin-Russwin
- 2 ea Door Closers 40 Series Heavy Duty EDA Alum LCN
- 2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 2 ea Sweeps 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 set Weatherstrip PK33D Mullion Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 3

Exterior Alum/FRP–Pair Doors - Rim x Mullion – Ingress/Egress

Each Pair to Receive:

- 2 ea Cont Hinges MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200S x M52 x K157 RHR Dr. 630 Corbin-Russwin
- 1 ea Exit Device ED5200S x M52 LHR Dr. 630 Corbin-Russwin
- 1 ea Mullion 707A KM x M57 USP Corbin-Russwin
- 1 ea Cylinder 3030.RHR Dr. 626 Corbin-Russwin
- 3 ea Cylinder 1030.118 Mullion & Dogging 626 Corbin-Russwin
- 2 ea Door Closers 40 Series Heavy Duty EDA Alum LCN
- 2 ea Pulls 7191 x 10" RHR Door 630 Trimco (Aluminum Doors)
- 2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 2 ea Sweeps 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 set Weatherstrip PK33D Mullion Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Hardware Set 4

Exterior Alum/FRP–Pair Doors - Rim x Mullion –Egress Only

Each Pair to Receive:

- 2 ea Cont Hinges MCK-25HD 628 Mc Kinney
- 2 ea Exit Device ED5200S x M51 630 Corbin-Russwin
- 1 ea Mullion 707A KM x M55 USP Corbin-Russwin
- 1 ea Cylinder 1030.118 Mullion 626 Corbin-Russwin
- 2 ea Door Closers 40 Series Heavy Duty EDA Alum LCN
- 2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 2 ea Sweeps 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko

- 1 set Weatherstrip PK33D Mullion Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 5

Exterior – HM Single Door –Rim Exit Device – Egress Only

Each Door to Receive:

- 1 ea Cont Hinge MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200S x M51 630 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 6

Exterior – HM Single Door –Rim Exit Device – Ingress/Egress (Best Door Opening)

Each Door to Receive:

- 1 ea Cont Hinge MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200S x M52 630 Corbin-Russwin
- 1 ea Cylinder 1E72 626 Best Type
- 1 ea Cylinder 1E74 Dogging 626 Best Type
- 1 ea Pulls 1097HA SP 630 Trimco
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 7

Exterior – HM UL Single Door –Rim Exit Device – Exit Only

Each Door to Receive:

- 1 ea Cont Hinge MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200SA 630 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko

- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 8

Exterior Alum/FRP–Single Door - Rim– Ingress/Egress

Each Pair to Receive:

- 1 ea Cont Hinges MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200S x K157 RHR Dr. 630 Corbin-Russwin
- 1 ea Cylinder 3030 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Pulls 7191 x 10" RHR Door 630 Trimco (Aluminum Doors)
- 1 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 set Weatherstrip PK33D Mullion Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Note: For Main Entry, review remote access control and intercom requirements with SDP Office of School Safety.

Hardware Set 9

Exterior Alum/FRP–Single Door - Rim–Egress Only

Each Pair to Receive:

- 1 ea Cont Hinges MCK-25HD 628 Mc Kinney
- 1 ea Exit Device ED5200S x M51 630 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 set Weatherstrip PK33D Mullion Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Note: On FRP doors flush pull provided by FRP door manufacturer.

Note: For Main Entry, review remote access control and intercom requirements with SDP Office of School Safety..

Hardware Set 10

Interior HM/WD UL Pair Rim x Mullion - Ingress/Egress

Each Pair to Receive:

- 6 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
- 2 ea Exit Device ED5200SA x PR955 630 Corbin-Russwin
- 1 ea Mullion 707A KM x M55 USP Corbin-Russwin
- 2 ea Cylinder 3030.RHR Dr. 626 Corbin-Russwin
- 1 ea Cylinder 1030.RHR Dr. 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 2 ea Stops 1270CVSV 630 Trimco
- 2 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 11

Interior HM/WD UL Pair Doors SVR Exit Device LBR– Ingress/Egress (Mag Hold where required for Life Safety)

Each Pair to Receive:

- 6 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
- 2 ea Exit Devices ED5470B X x M55 x PR955 630 Corbin-Russwin
- 2 ea Rod Guards Protect Top Rods and Latch 630 Trimco
- 2 ea Cylinder 3030.RHR Dr. 626 Corbin-Russwin
- 2 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 2 ea Kick Plates 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 2 ea Stops 1270CVSV 630 Trimco
- 2 ea Magnetic Holders 997 689
- 1 set Seals PK33BL full Perimeter Silicon Pemko

Note: Supply correct magnetic holder for each wall condition.

Hardware Set 12

NOT USED

Hardware Set 13

Interior WD/HM UL Single Door Rim - Ingress/Egress

Each Door to Receive:

- 3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate

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- 1 ea Exit Device ED5200SA x PR955 630 Corbin-Russwin
- 1 ea Cylinder 3030.RHR Dr. 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Stop 1270CVSV 630 Trimco
- 1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 14

Interior WD UL Single Door Rim - Ingress/Egress – (Mag Hold where required for Life Safety)

Each Door to Receive:

- 3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
- w/ McKinney 10P/N 63240 26D back plate
- 1 ea Exit Device ED5200SA x PR955 x M54 630 Corbin-Russwin
- 1 ea Cylinder 3030.RHR Dr. 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Stop 1270CVSV 630 Trimco
- 1 ea Mag Hold 998 628 Rixson
- 1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Supply correct magnetic holder for each wall condition.

Hardware Set 15

Roof Access HM UL Single Door Rim – Ingress/Egress

Each Door to Receive:

- 1 ea Cont Hinges MCK-25HD 628 Mc Kinney
- 1 ea Lockset CL3357NZZ M08 630 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Threshold 2005AN Alum Pemko
- 1 ea Sweep 18061_NB Pemko
- 1 set Weatherstrip 303DS Head and Jambs Silicone Pemko
- 1 ea Rain Drip 346D full width of frame Alum Pemko

Hardware Set 16

Interior WD/HM UL Single Door – Storeroom Lock

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Storeroom Lock CL3357 PZD PS 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Custodial Closets to Receive Continuous Hinge (see exterior doors)

Hardware Set 17

Interior HM UL Single Door – Lock – (Best Door Opening)

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Storeroom Lock CL3357 PZD M08 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Provide Best SFIC cylinders for the following:

- Boiler Rooms

Hardware Set 18

Interior WD/HM UL Single Door – Lock

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Office Lock CL3352 PZD x PS 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 19

Interior WD UL Pair Doors – Lock - Outswing

Each Pair to Receive:

6 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney

w/ McKinney 10P/N 63240 26D back plate
2 ea Flush Bolts 3915 12" LHR Dr. 626 Trimco
1 ea DP Strike 3910 LHR Dr. 626 Trimco
1 ea Storeroom Lock CL3357 PZD PS RHR Dr. 626 Corbin-Russwin
1 ea Lock Protector 1082-6 630 Trimco
2 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
2 ea Kick Plates 8" x 1" LDW .050 Push Side Mount 630 Trimco
2 ea Stops 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 20

Interior HM Rolling Doors

Each Door to Receive:

1 ea Slide Locks

Hardware Set 21

Interior WD Single Door Lock Outswing – Intruder Function

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney

w/ McKinney 10P/N 63240 26D back plate

1 ea Classroom Lock CL3352 PZD PS 626 Corbin-Russwin

1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN

1 ea Stop 1270CVSV 630 Trimco

Note: If project budget allows, provide exit device set with keyed dogging in lieu of lever set. This approach results in less maintenance and replacements compared to standard locksets.

Hardware Set 22

Interior WD Single Door Lock Inswing – Intruder Function

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney

w/ McKinney 10P/N 63240 26D back plate

1 ea Classroom Lock CL3352 PZD PS 626 Corbin-Russwin

1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN

1 ea Stop 1270CVSV 630 Trimco

Hardware Set 23

Interior WD Single Door Lock

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Office Lock CL3351 PZD PS 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 24

Interior WD Single Door Lock – (Best Door Opening)

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Office Lock CL3351 PZD M08 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Provide Best SFIC cylinders for the following:

- Building Engineer's Office

Hardware Set 25

Interior WD Single Door – Privacy

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Privacy Lock CL3320 PZD 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Mop Plate 4" x 1" LDW x .050 Pull Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Privacy operation requiring emergency release.

Hardware Set 26

Interior WD Single Door – Push/Pull

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Push Plate 57 8" x 16" 630 Trimco
1 ea Pull Plate 54x26B 4" x 16" 10" ctc 1" dia 630 Trimco
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Dead Lock DL3117 PS 626 Corbin-Russwin
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Mop Plate 4" x 1" LDW x .050 Pull Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 27

Interior WD UL Single Door – Privacy

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Privacy Lock CL3340 626 Corbin-Russwin
1 ea Cylinder 1030.RHR Dr. 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Mop Plate 4" x 1" LDW x .050 Pull Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Use for Principal Toilet Room

Hardware Set 28

Interior WD UL Single Door – Privacy

Each Door to Receive:

3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
1 ea Keyed Lock CL3357 PSV PS 630 Corbin-Russwin
1 ea Cylinder 1030.RHR Dr. 626 Corbin-Russwin
1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
1 ea Mop Plate 4" x 1" LDW x .050 Pull Side Mount 630 Trimco
1 ea Stop 1270CVSV 630 Trimco
1 set Seal PK33BL full Perimeter Silicon Pemko

Note: Keyed use for Staff Toilet Rooms

Hardware Set 29

Interior WD UL Single Door – Computer Room

Each Door to Receive:

- 3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
- 1 ea Classroom Lock CL3357 PSV PS 630 Corbin-Russwin
- 1 ea Cylinder 1030.RHR Dr. 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 ea Stop 1270CVSV 630 Trimco
- 1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 30

Interior WD Single Door – Passage

Each Door to Receive:

- 3 ea Hinges T4A3382 4 ½ x 4 ½ NRP 626 Mc Kinney
w/ McKinney 10P/N 63240 26D back plate
- 1 ea Passage Lock CL3310 PZD 626 Corbin-Russwin
- 1 ea Door Closer 40 Series Heavy Duty EDA Alum LCN
- 1 ea Kick Plate 8" x 2" LDW x .050 Push Side Mount 630 Trimco
- 1 set Seal PK33BL full Perimeter Silicon Pemko

Hardware Set 31

Misc. Hardware

Furnish to Owner:

- 1 ea Key Cabinet Provide Wall Cabinet - Project plus 50% Expansion with cross reference filing system. Provide SFIC (Best) cabinet lock.
- 1 ea Bitting List Provide Original Keying Bitting List (with expansion) to owner's rep
- 50 ea Key Blanks Provide to SDP Locksmith Shop

Section 088000 Glazing

1. Design adequate natural ventilation for existing glazing that is blocked off by interior alterations.
2. Impact Resistance Glass shall meet the requirements as defined in currently adopted IBC and pass the test requirements of CPSC 16CFR 1201.
3. Impact resistant glazing is to be considered at main entrances, administration areas, and exterior windows as an alternate to security screens (see Section 085656).
4. Specify 1" dual glazing 1/4" tempered glass (interior & exterior) insulating units.
5. Specify outdoor lite to be coated on interior face.
6. Schedule and specify tempered glass at locations identified by Building Code, as hazardous.
7. Schedule and specify obscure glass at all windows in toilet rooms, locker rooms, basements and other rooms where visual privacy is desirable.
8. Exterior glazing performance shall comply with currently adopted IECC (Energy Code).

Section 089119 Fixed Louvers

1. Specify exterior louvers and vents shall be fabricated in aluminum.

Section 089119 Wall Louvers

Exterior Louvers

1. Specify exterior louvers and vents shall be fabricated in aluminum.
 - A. Provide heavy-duty construction. Frame and blade wall thickness .125" (3.2) minimum.
 - B. Provide drainable blades at exterior locations.
2. Provide a statement of VOC content for adhesives and sealants.

Interior Louvers

1. Specify interior louvers and vents shall be fabricated in galvanized steel.
 - A. Provide heavy-duty construction. Frame and blade wall thickness 16 gage minimum.
2. Provide Statement of VOC content for adhesives and sealants

Division 09 – Finishes

Section 092116 Gypsum Board Assemblies

1. Gypsum wall board used shall be minimum 5/8 inch thick and as follows:
 - A. Any spaces normally accessible to students shall be Abuse/Impact resistant gypsum wall board meeting ASTM C36 and C1278 with long edges tapered.
 - B. All board that is placed on an exterior wall application shall be foil backed.
 - C. All gypsum board assemblies shall have control joints installed at a maximum of 30-foot intervals.
 - D. All joints and fastener locations shall be taped and finished. (Simply fire taping above ceilings is not acceptable.)
 - E. Non-load-bearing steel framing shall comply with ASTM C754 and ASTM C840.
 - F. Specify non-toxic glue/adhesive.

Section 092200 Furring and Lathing

1. Design, detail, and specify galvanized control joints located at 10' to 12' maximum spacing, vertically and horizontally. Locate joints with consideration of unified appearance and design.
2. Specify metal lath to have 1" overlaps at edges.

Section 092400 Stucco (Cement Plaster)

1. Use of stucco for exterior walls is limited to masonry wall construction and subject to review and acceptance by SDP. Refer to Divisions 04 and 07 for primary exterior finish materials.
2. Application of Stucco shall comply with ASTM C 926
3. Detail exterior stucco as a minimum of 3/4" Portland Cement Plaster applied to galvanized metal lath attached framing or structural elements.
4. Specify that color of stucco shall be achieved through color selection of sand and aggregates.
5. Give preference to products manufactured within 500 miles of project.

6. EIFS is not approved for use on SDP projects.

Section 093013 Ceramic Tiling

1. Design ceramic tile as full height finish in the following spaces:
 - A. Student Toilet Rooms and Restrooms
2. Food Preparation Areas – Quarry Tile Flooring
 - A. Design with and specify quarry tile sizes as 9" x 9" or 12" x 12".
3. Design and specify that existing ceramic tile in rooms scheduled for major modernizations be demolished to accommodate all new material.
4. Confirm ceramic tile types and colors have not been discontinued by manufacturer.
5. Design ceramic tile wall surfaces to extend behind toilets, urinals, and lavatories.
6. Design ceramic tile wall surfaces in all service closets, to extend behind sinks and mop receptors.
7. Design with and specify ceramic floor tiles as 2"x2" and ceramic wall tiles as 4-1/4" x 4-1/4". Deviations shall be subject to SDP review and approval.
8. Within a two-foot square area around floor drains, the size of tile may be decreased as may be required.
9. Specify glazed ceramic tile for wall tiles.
10. Detail and specify thin-set material as setting method for ceramic tile, as recommended by manufacturer.
11. Do not detail or specify stone saddle at transition of ceramic tile floor to other finishes. Detail ceramic tile with bull nose edge.

Section 095100 Acoustical Ceilings

1. Design and schedule all ceilings as suspended acoustical tile systems, except as otherwise required for specific areas. Refer to Chapter 04 Space Requirements charts.
2. Design facias as gypsum board. Do not design or detail acoustical tile facias.
3. Design and detail soffits less than 2'-0" as gypsum board, and greater than 2'-0" as ceiling tile.
4. Design and specify acoustical tile size as 2' x 2'. Other proposed sizes are to be reviewed by SDP.

5. Specify water resistant & washable ceiling tiles in the following areas:
 - A. Food Preparation Areas
 - B. Other Wet Areas as indicated on Chapter 04 Space Requirements charts.
6. Refer to Chapter 04 Acoustics narrative for acoustical performance requirements.

Section 096466 Wood Athletic Flooring

1. Wood athletic flooring is typically specified for High School gymnasiums.
2. Design hardwood maple flooring for athletic uses only.
3. Design synthetic resilient flooring for spaces that will have activities in addition to athletic uses. Refer to Chapter 04 Space Requirements charts.
4. Design athletic spaces that are to have wood floors at locations above grade, wherever possible.
5. Design “salvageable” installation systems minimizing use of adhesive such as floating or nail down systems.
6. Coordinate HVAC design with the following year-round criteria for spaces with athletic wood floors:
 - A. Indoor temperature: 55 deg. F. to 75 deg. F.
7. Specify that technical standards follow recommendations of the Maple Flooring Manufacturers Association, (MFMA).
8. Do not specify staining or bleaching of maple floors.
9. Specify nailing, stapling, and fastening of sub-floor components at 12” O.C. maximum.
10. Evaluate substrate, Code requirements, and manufacturer installation guidelines for specification of vapor barrier.
11. Specify that use of wood fillers is not permitted.
12. Specify that sub-floor concrete slabs be flat to a tolerance of 1/8” in a 10’ radius.
13. Specify that placing any material between the below-slab vapor barrier and the concrete slab, including sand, is not permitted.
14. Specify that floor system manufacturer be consulted with regard to bleacher blocking requirements.
15. Specify that American Concrete Institute, (ACI), Ff/FI standards for concrete slab flatness and levelness not be applied to concrete slabs beneath athletic wood floors. Refer to MFMA standards and definitions.

16. Specify certified rebound performance of athletic floors is to be in accordance with the international D.I.N. #18032, Part 2 standards.
17. Specify that athletic wood flooring shall not be installed over new concrete slabs within 60 days of pour or as indicated by manufacturer, whichever is longer.
18. Specify that measurement of moisture in newly-poured concrete slabs shall not be performed by using electronic moisture meters.
19. Specify that moisture be identified in newly-poured concrete slabs as the quantity of moisture passing through the slab, at a rate of 4.5 lbs. or less of vapor emissions per 1000 sq. ft. in 24 hours.
20. Specify that if ACI Ff/FI standards are applied to concrete slabs beneath athletic wood floors, the following conditions must be met:
 - A. The F-Number measurement must be taken no less than two (2) weeks prior to installation of the wood floor.
 - B. The measurement process must include all construction joints over the entire concrete slab.
 - C. The MFMA flooring installer must be present during the entire measurement process.
21. Specify expansion spacing (“washer rows”) using either 1/16” or 1/8” washers, at the discretion of the flooring installer, and depending on current and anticipated climatic conditions.
22. Specify that 1 ½” – 2” expansion voids shall be provided at the floor perimeter and at anchors for fixtures, equipment or bleachers in floating floor systems and that they are to be maintained free of debris or other obstructions until enclosed.
23. Specify 4” minimum spacing between end joints of adjacent floor boards.
24. Specify that face-nailing of floor boards shall be countersunk and filled with a mixture of maple dust and floor finish.
25. Specify that water-based floor finishes shall be used with great caution, in order to avoid side-bonding and “penalization”.
26. Specify that painting of solid areas shall be performed during coldest/driest weather, whenever possible.
27. Specify topical application of water repellent/preserver. Do not specify pressure treatment with Wolman salts.

Section 096813 Carpeting

1. Sheet and tile carpeting is not allowed unless accepted in writing by SDP.

2. For spaces requiring acoustical flooring treatment, the preferred material is a resilient faux-carpet tile system.
 - A. Basis of Design Product: Flotex by Forbo or Equal
 - B. Refer to Chapter 04 performance requirements for Acoustics criteria.

Section 098116 Acoustic Blanket Insulation

1. Detail and schedule sound attenuation blankets in gypsum board assembly partitions as needed to meet to meet performance requirements as outlined in Chapter 04, Acoustics.
2. The following rooms shall receive sound attenuation blankets where gypsum board assemblies are specified:
 - A. Mechanical equipment rooms
 - B. Principal's office
 - C. Administrative offices
 - D. Conference rooms
 - E. Health/ Medical rooms
 - F. Sound / Recording Studios
3. Specify acoustical boots at ceiling plenum air return grilles in rooms with sound rated partitions.

Section 099123 Interior Painting

1. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
2. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
3. Paints:
 - A. Acceptable Base Manufacturers:
 - i. Behr Process Corporation
 - ii. PPG Paints: www.ppgpaints.com/#sle.

- iii. Sherwin-Williams Company
 - iv. Other Approved Equal
- B. Primer Sealers: Same manufacturer as top coats.
4. Paints and Coating shall be Low VOC in compliance with SDP Sustainability Requirements (refer to Chapter 02).

Color Materials in Schools

Although color can be one of the most influential elements in the design of an educational facility, it is often not given appropriate attention in the design process, but rather develops as a result of product availability, color trends, ease of maintenance, or personal subjective preferences of those involved in selecting colors, instead of more scientific principles. The appropriate use of color is important in protecting eyesight and preventing eyestrain, thereby creating surroundings that provide a balance of stimulation and a sense of security.

While developing standard palettes of colors for all schools would not be practical or beneficial, there are guidelines that can be used for the use of color and light in K-12 environments.

The reaction to, and influence of, color differs according to age groups. Children will, to some extent, view color differently than adults. Their eye and brain development is at a different stage than adults, and at younger ages, they have not been as influenced by marketing trends. Different age groups in K-12 schools will vary in response to color as well. Considerations should also include how children with special needs respond to color in their environment.

Considerations

1. Use of neutral colors (achromatic hues) such as white, black, grey, dark brown, off-white, etc. may be considered for permanent surfaces such as acoustic panels, laminates, etc. Paintable surfaces shall be considered for accent color(s).
2. Consider integrating school colors into the color palette to promote school community identity.
3. Avoid overuse of deeply saturated bright hues.
4. Consider use of color in “wayfinding.”
5. Avoid use of one color throughout all surfaces of a space.
6. Specify tile grout to be a tinted shade, (never white, light gray, or cream).
7. Specify stage walls shall be painted black or dark gray, unless the space is multi-use.
8. Specify stage floors shall be a dull, dark stain, or black painted wood to avoid the reflection of stage lighting.

Section 099723 Concrete and Masonry Coatings

1. Specify block filler prime coat on all CMU.
2. Do not specify painting of concrete floors.
3. For floors receiving sealed concrete, specify products that are easily cleanable and that can withstand heavy duty traffic.
4. Due to durability issues, avoid epoxy coating flooring.
5. Specify products with low or no VOC.

Section 096519 Vinyl Composition Tile Flooring

1. Do not design VCT to be on substrates of lightweight aggregate concrete having a density less than 90 pounds per cubic foot or cellular concrete having a density less than 100 pound per cubic foot.
2. Specify that curing agents, sealers, or hardeners on new or existing concrete substrates be removed prior to installation of VCT.
3. Specify slip resistant tiles in the following areas:
 - Art Rooms
 - Science Rooms (shall also be chemical resistant)
 - Ramps
 - Stairways And Landings
 - Classroom Kitchens
 - Elevators
 - Shop Areas
 - Beneath Water Coolers and Water Fountains
 - Adjacent to Exterior Doors
4. Specify VCT size to be 12" X 12".

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5. Specify maintenance stock to be a minimum of 10% of each type and color used for projects up to 100K SF and 5% of each type and color used for projects over 100K SF.
6. Specify transition strips to be vinyl.
7. Coordinate specification of setting materials with low VOC requirements. Comply with Chapter 02 Sustainability requirements.
8. Specify VCT base height to be 4", or higher if a higher existing base has been removed.

Division 10 – Specialties

Section 101100 Visual Display Surfaces

1. Markerboards
 - A. Face Sheet: .021 inch thick liquid chalk writing surface, with low gloss finish.
 - B. Core: 3/8 inch thick particleboard.
 - C. Backing: .005 inch thick aluminum foil.
 - D. Trim: 1 ½” minimum wide (2” maximum). Anodized extruded aluminum with tray and 1 inch map rail with natural cork insert.
 - E. Trim: Factory applied anodized extruded aluminum.
 - F. Provide marker tray.
 - G. Map Rail: 1 inch display rail with cork insert and a map hook and clips for every 48 inches of map rail and fraction thereof.
 - H. Refer to Chapter 04 Space Requirements Charts for mounting heights.

2. Tackboards
 - A. Material, vinyl fabric faced industrial fiberboard.
 - B. Trim: 1 ½” minimum wide (2” maximum). Factory applied anodized extruded aluminum.
 - C. Refer to Chapter 04 Space Requirements Charts for mounting heights.

Section 101200 Display Cases

1. Recessed display cases are preferred to eliminate protrusions into circulations spaces or learning environments. Review all parameters, finishes, locations, etc. with SDP for approval.
2. Factory-fabricated with finished interior, operable or hinged panel access, and trim to cover edge of recessed openings.

- A. Face Frame: Aluminum or Wood.
- 3. Rear access panels preferred over front sliding or hinged glazed doors.
- 4. Provide 6-mm tempered glass shelves on adjustable shelf standards and supports.
- 5. Provide tackable surface back panels.
- 6. Provide illumination system.
- 7. Display cases shall be lockable.

Section 101416 Dedication Plaques

- 1. Position near the main entrance and administration area.
- 2. Material: 24-inch by 36-inch cast bronze.
- 3. Identify information content of bronze dedication plaque in consultation with SDP.

Section 101419 Dimensional Letter Signage

- 1. Exterior building mounted signage.
- 2. Design and specify the name of the school as pin-mounted cast aluminum letters.
- 3. Signage to comply with Philadelphia Zoning Code. In most cases a ZBA variance will be needed for new school signs. Confirm with Code limits..

Section 101423 Panel Signage

- 1. All interior signage shall be in compliance with the ADA.
- 2. Identify each room and / or space and provide a room number.
- 3. Provide interior room-identification panel signage with the following performance criteria:
 - A. Signage with permanent room numbers, coordinated and approved by SDP.
 - i. Inserts shall be provided for room name and a minimum of one (1) for teacher/staff name.
 - ii. Building service rooms such as Electrical, Mechanical, Data, etc. to include the room name.

- iii. Restroom signage shall include room name and pictograms in compliance with ADA.
- B. No tape mounting allowed.
- C. Typeface requirements:
 - iv. Character Font: Helvetica, Arial, or other sans serif font. All uppercase.
 - v. Contrasts with background
 - vi. Retro-reflective for low light or smoky conditions
- D. Colors to be reviewed and approved by SDP.

Building, Room, and Door Designations

Room Numbering

- A. Provide the following room numbering system:

101

- 1 - Floor level designation
- 01 - Sequential room number

- B. Designate the main entry to the building with the number 100.

- i. Example: 100

- C. Number the rooms in a clockwise fashion from the main entry using sequential numbers.

- i. Example: 101, 102, etc.,

- D. Stack similar room numbers by floor where possible.

- i. Example: 201 is above 101.

- E. Suites: Where rooms open off of a common room, number those rooms by adding a letter to the end of the common room number. Number the rooms in a clockwise direction.

- i. Example: 101A, 101B, and 101C all open off of a common reception room 101.

- F. Stairs: Provide the following stair numbering system:

STAIR 1

STAIR Stair designation

1 Sequential stair number

Provide stair pictogram

G. Elevators: Provide the following elevator numbering system:

EL1

EL - Elevator designation

1 - Sequential elevator number

H. Service Yards: Provide the following service yard numbering system:

SY1

SY - Service yard designation

1 - Sequential service yard number

I. Roof hatches: Provide the following roof hatch numbering system:

RH1

RH - Roof hatch designation

1 - Door number

J. Crawl space access doors: Provide the following crawl space numbering system:

CH1

CH - Crawl space hatch designation

1 - Door number

Section 101426 Signage

1. Applications

A. Directional and wayfinding signage for vehicular and pedestrian circulation.

B. Monumental signage for school identification.

C. Interpretive and educational signage for site history, outdoor curriculum, habitat areas and stormwater management features.

2. Guidelines

- A. Coordinate with SDP and school staff regarding exterior signage requirements.
- B. Signage shall use SDP standard fonts, sizes, colors, and style.
- C. Signage shall inform and educate students, staff, and community members.

Section 102113 Toilet Compartments

1. Design toilet compartment sizes to be the following minimum sizes:
 - A. Compartments for Girls: 2'-6" X 5'-0"
 - B. Compartments for Boys: 2'-6" X 5'-0"
 - C. Compartments for ADA per ADA.
2. Design the bottom of toilet partitions to be at 14" AFF.
3. Design the top of toilet partitions to be 5'-10" AFF.
4. Provide floor mounted, overhead-braced systems.
5. Provide appropriate accessible toilet compartments with special attention to door swings.
6. Private:
 - A. HDPE Toilet Compartment Partitions (1" thick) and Doors with heavy duty stainless steel surface continuous hinges and hardware, provide stainless steel coat hanger/stop.
 - B. Use one way screws, contractor to de-burr all fasteners, trim and brackets.
 - C. Basis-of-Design – Hiny Hiders by Scranton Products
 - i. Standard Color – Black Paisley
7. Public:
 - A. HDPE Toilet Compartment Partitions (1" thick) and Doors with heavy duty stainless steel surface continuous hinges and hardware.
 - i. DO NOT provide coat hanger/stop.
 - B. Use one way screws, contractor to de-burr all fasteners, trim and brackets.
 - C. Basis-of-Design – Hiny Hiders by Scranton Products
 - i. Standard Color – Black Paisley

Section 102813 Toilet Accessories

1. Schedule and specify toilet accessories as follows (all products listed are Basis-of-Design):

Student & Public Toilet Rooms

Mirrors:

ASI Model #8026 Frameless Stainless Steel Mirror 18"x30" above lavatory.

Soap Dispenser:

Automatic operation is Basis-of-Design: Bobrick B2012 or Equivalent

Toilet Paper Dispenser:

Renown Model RENO5151 - IB

Sanitary Napkin Dispensers:

Do not specify Sanitary Napkin Dispenser/receptacles.

Paper Towel Dispenser:

Automatic operation is Basis-of-Design: Bobrick B-29744 or Equivalent
Hand Dryers

Sensor Operated Basis-of-Design: Excel ThinAir with wall guard.

Grab Bars:

ASI Model #3200 1-1/2" diameter Grab Bars at accessible toilets, in accordance with ADA regulations (use one way screws, contractor to de-burr all fasteners, trim, and brackets.

Faculty and Staff Private Toilet Rooms

Mirrors:

Provide one ASI model #0600 Stainless Steel Angle Frame Mirror 24"x60" per toilet room.

Soap Dispenser:

Kimberly-Clark Professional 1000 ml skin care dispenser code no. 92145

Toilet Paper Dispenser:

ASI Model #0263-1 single roll Toilet Paper Dispenser, surface mounted on toilet stall partition.

Paper Towel Dispenser:

ASI Model #8522 roll type, surface mounted Paper Towel Dispenser. Provide one in each room.

Sanitary Napkin Dispensers:

Do not specify Sanitary Napkin Dispenser/receptacles.

Clothes Hook:

Clothes hook at inside of each toilet compartment door.

Shower Rooms and Stalls:

Shower head adjustable spray, no swivel.

Grab bars in accordance with ADA regulations.

Specify ceramic soap dishes.

Athletic Locker Rooms:

Metal framed, full-length mirror.

Janitor's Closet:

Clip type Mop Holder, 4 mops.

One tier of non-rusting Metal shelving to as great an extent as possible.

Kimberly-Clark Professional 1000 ml skin care dispenser code no. 92145

ASI Model #8522 roll-types, surface mounted Paper Towel Dispenser provided each sink & Mop holders.

Section 104413 Fire Extinguisher and Hose Cabinets

1. Detail and specify fire extinguisher & hose cabinets that are fully recessed. Confirm partition or wall thickness can accommodate required cabinet depth.
2. Specify cabinet windows as plastic pull-out type.
3. Specify all hose cabinets shall also contain a fire extinguisher.
4. Specify cabinet window maintenance stock at 10% of the quantity for each size installed.
5. Specify submission of cabinet manufacturer's name, address, and cabinet model number as part of close-out submission package.
6. Acceptable Manufacturers:
 - A. Larsen's Manufacturing Company
 - B. J.L. Industries, Inc.
 - C. Fire-End & Croker Corp.

Section 104416 Fire Extinguishers

1. Specify all fire extinguishers according to NFPA-10 utilizing type 'B' or 'C' extinguishers.
2. Acceptable Manufacturers:
 - A. Anerex Corp.
 - B. Kidde
 - C. Larsen's Manufacturing Company

D. J.L. Industries, Inc.

E. Fire-End & Croker Corp.

Section 105113 Metal Lockers

General

1. Provide fully-welded construction, minimum 16-gauge steel with continuous hinges.
 - A. Locking System - Padlocks
2. Include shelves, coat hooks, & number plates.
 - A. Specify that single tier lockers to have a hat shelf.
3. Provide 4" locker base from framed assembly.
 - A. Do not design poured concrete bases for lockers.
 - B. Provide wall base as specified for room.
4. Schedule and specify sloped tops for lockers at locations where tops are exposed.
5. Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.
6. Provide required number of lockers to meet ADA accessibility requirements.

Changing Room Lockers

1. Specify locker dimensions as 12"w X 18"d X 6'h.
 - A. Specify single and five tier lockers
 - B. Specify that configuration to be alternating single and five tier lockers.
2. Specify that lockers are to be ventilated.

Hall Lockers

1. Specify locker dimensions as 12"w X 18"d X 6'h.

Personnel Lockers

Issued 02/08/21

1. Specify locker dimensions as 12"w X 18"d X 6'h.
2. Specify that lockers are to be ventilated.

Section 107516 Ground-Set Flagpoles

Provide the following performance criteria:

1. Natural aluminum finish
2. 6-inch round, tapered pole
3. Height: 30-feet
4. Manual operation
5. One rope for two flags measuring 5-feet by 8-feet
6. Stainless steel flag clips
7. Internal lanyard or external lock box at the cleat
8. Illumination shall be solar powered and may be a pole top luminaire (preferred) or an in-ground mounted spot light.

Section 108200 Grilles and Screens

1. Insect Screens

Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.

- A. Hardware: Spring loaded steel pins; four per screen unit.
- B. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh. Do not specify aluminum wire fabric insect screens.
- C. Frame Finish: Same as frame and sash.
- D. Do not locate insect screens at HVAC air intake openings.
- E. Indicate bird screens only near HVAC air intake openings.

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- F. Specify wire fabric insect screen inserts at operating window units in the following locations:
 - i. Cafeterias and Food Preparation Areas
 - ii. Lounges
 - iii. Medical Rooms
- 2. Bird Screens
 - A. Design and specify galvanized steel bird screens at all HVAC air intake grilles.
 - B. Specify that screening device shall limit penetration of a ½” probe.

Division 11 – Equipment

Section 111300 Loading Dock Equipment

1. Design loading dock height to be 36".
2. Consider curb-side loading if excavation is required to achieve standard dock height.
3. Consider using an oil trap to keep oil from leaching into ground.
4. Do not specify or detail dock levelers.
5. Specify dock bumpers as laminated rubber strips bolted to face of dock.
6. Specify products with recycled rubber.

Section 114000 Food Service Equipment

Applicable Standards

All food service equipment shall be manufactured in strict compliance with standards as set forth by the National Sanitation Foundation (NSF) including fabrication of custom-built equipment and shall be listed with same and shall bear their seal. Indicate that any item of food service equipment lacking the NSF seal will be rejected.

All electrically operated food service equipment shall be constructed in strict compliance with standards as set forth by the Underwriters Laboratories (UL) and shall utilize approved components and assemblies and shall bear the label thereof.

Custom fabricated food service equipment shall be constructed to the standards as set forth by the National Association of Food Equipment Manufacturers (NAFEM).

All refrigeration equipment and all pressurized vessels shall be constructed, approved, inspected, registered and stamped and installed in strict compliance with the American Society of Mechanical Engineers (ASME), state and local codes for Unfired Pressure Vessels and all other agencies having jurisdiction thereof.

All gas operated food service equipment shall be fabricated in strict compliance with standards as set forth by the Underwriter Laboratory (UL) and shall be listed with same and shall bear their seal.

Steam operated equipment shall be fabricated and installed in accordance with Pennsylvania Department of Labor and Industry standards.

Design Criteria

1. Design of kitchen layout will be reviewed by SDP Food Services Department. Design kitchen in consultation with a specialized kitchen consultant experienced in projects for the type and size of school being designed, and who is knowledgeable of all current applicable codes.
2. Carefully coordinate HVAC, plumbing, and electrical requirements of kitchen equipment with mechanical and electrical engineers.
3. Specify energy efficient/energy star appliances.
4. Specify that hood fire suppression system manufacturer has ability to train and certify SDP staff for maintenance of system.
5. Specify hot water to be 140 degrees F. to all kitchen and hand washing sinks, boosted to 180 degrees F. at three-compartment sinks.
6. Do not design a separate 180 degree F. line that originates in the project's main mechanical equipment room.
7. Do not provide a steam line to locations.
8. Provide the following equipment as a Basis-of-Design or equivalent:
 - A. Warming Kitchen:
 - Roll in double oven, Southbend, model SLGS/22SC
 - Milk Cooler, large 16 crate capacity, Beverage Aire
 - Walk-in Refrigerator, Norlake, custom sized per school
 - Shelving for walk in Refrigerator, 4 tier w/ STCA5SBR casters
 - Stainless steel Prep Tables - Advance, model SS-307
 - Warmer, Metro, sized per school
 - Three compartment sink - Advance, model 94-83-60-24RL
 - Hand washing sink - Advance, model 7-PS-40
 - B. Full Service Kitchen:
 - Walk in Refrigerator – Norlake, custom sized per school

- Walk in Freezer – Norlake, custom sized per school
- Dunnage Racks – Metro, model HP2248PD
- Shelving for Walk ins and Store Room – 4 tier w/ STCA5SBR casters
- Prep Sink – Advance, model VKS-3012/TA-11D2
- Food Slicer w/stand – Globe, model GC-12 w/ Advance, model KSS-304 stand
- Mobile mixer w/stand – Globe, model SP-20 w/ Advance MT-SS-302 stand
- Ice Machine w/ bin – Ice-O-Matic, 529 lbs/ day
- Hand Sink – Advance, model 7-PS-40
- Three Compartment Sink – Advance, model 94-83-60-24RL
- Waste Disposal – Salvajor, model 300-CA-18-ARSS
- Single Door Refrigerator, Victory, model VSR-1
- Two Door Refrigerator – Victory, model VSR-2
- Milk Coolers – Beverage-Air, model SM34NS
- Warmer Pass Thru – sized per school
- Range – sized per school
- Double Deck Oven – sized per school
- Steamer – sized per school
- Microwave Oven – Amana .95 Cu Ft capacity, 1000w
- Serving Counter – Delfield, custom sized per school
- Steam Table (four or five well) – Delfield, custom sized per school
- Cold Table (flat top) – Delfield, custom sized per school
- Cashiers Table – Delfield, custom sized per school
- Roll down Shutter
- Data drop at Cashier table
- Exhaust Hood (NO Auto Cleaning) – Captive-Aire, custom sized per school
- Condiment Counter – Delfield custom sized per school,

- Stainless Steel Prep Tables – Advance, model SS-307
- C. Serving Line:
- Provide stanchions for queue and crowd control.
 - Provide plexiglass guards along food display.

Section 114100 Food Storage Equipment

1. Design floor construction of walk-in refrigerator cases as 4" concrete slab over 4" minimum rigid insulation, finished to match floor height of kitchen.
2. Design compressors for refrigeration cases to be remotely located. Do not locate compressors in kitchen space.
3. Specify energy efficient/energy star appliances.
4. Specify walk-in refrigerator cases in the Contract.

Section 115115 Kilns

1. At kiln rooms, include the following:
 - A. Provide a minimum of 18-inches clear between the kiln and adjacent walls and clear access to the kiln controls.
 - B. Provide aluminum or stainless steel exhaust ducts and operate in negative pressure unless required otherwise by the manufacturer.
 - C. Reference mechanical performance requirements for separate room exhaust and requirements to provide room temperature continuously during operation of the kiln.
 - D. Basis-of-Design: L&L Kiln, LE28T-3208-1SFK
 - i. Provide furniture kit: (8) 25.5" [64.7cm] half round shelves, six each 1/2", 1", 2", 4", 6" & 8" square posts.
 - E. Kilns shall have downdraft systems with bottom vents to allow the room air to mix with air in the kiln.
 - i. L&L Vent-Sure System

Section 116143 Stage Curtains

1. Design stage curtains to include but not limited to the following:

- A. Bi-parting proscenium curtain
 - i. 25-ounce velour
 - ii. Flame resistance: passes NFPA 701
 - B. Opaque lining
 - C. Side tormentors
 - D. Top teaser
 - E. Back cyclorama
 - F. Other wing curtains and teasers as requested by SDP.
2. Consult with SDP regarding stage curtain color(s).
 3. Consult with SDP regarding manual or power operation of stage curtain.
 4. Specify factory applied Scotch Guard treatment of curtain fabric.

Section 116623 Gymnasium Equipment

Basketball Backstops

1. Provide retractable backstops for main backstops. Side backstops may be retractable if space allows.
 - A. Suspended Forward Fold Offset Mast Basketball Backstops: Similar to Porter Model No. 950. Consult with SDP Athletics Dept. to confirm requirements for each project.

Divider Curtain

1. Electrically operated, folding, and as follows:
 - A. Upper Curtain, Mesh: Woven fabric of 100 percent polyester yarn coated with PVC weighing not less than 6.5 oz./sq. yd. a. Mesh Color: White.
 - B. Lower Curtain, Solid: Woven polyester coated with PVC, minimum 18 oz./sq. yd, embossed, 8-foot height above floor. a. Fabric Color: As selected by Architect from manufacturer's full range.
 - C. Top Hem: Reinforce with double thickness mesh for grommets and continuous pipe batten

Floor Sleeves

1. Floor Sleeves with Chrome Covers: Similar to Porter Model No. 870; an adaptor must be available for floor sleeve, allowing it to be utilized for 2-3/8 inch diameter and 3-1/2 inch diameter pole stands.
2. Cover plate consists of molded plastic recessed mounting flange, cork gasket and a 5-inch diameter chrome plated cover.
3. Cover shall be equipped with a swivel type retainer pin to prevent theft.

Scoreboards

1. Scoreboard requirements will depend on school (ES, MS, HS) and size of gymnasium. Consult with SDP Athletics Dept. to confirm requirements for each project.
 - A. Acceptable Manufacturers: Daktronics, Nevco

Safety Wall Padding

1. Pad Coverings: Provide safety pad fabric covering fabricated from puncture- and tear-resistant, not less than 14-oz./sq. yd PVC-coated polyester or nylon-reinforced PVC fabric treated with fungicide for mildew resistance; with surface-burning characteristics indicated.
2. Wall Safety Pads: Padded wall wainscot panels designed to be attached in a continuous row; each panel section consisting of fill laminated to backer board with visible surfaces fully covered by seamless fabric covering, free of sag and wrinkles and firmly attached to back of backer board.
 - A. Backer Board: Not less than 3/8-inch- thick plywood.
 - B. Fill: Multiple-impact-resistant foam not less than 2-inch- thick polyurethane; minimum 3.5-lb/cu. ft. density.
 - C. Size: Each panel section, 24 inches wide by not less than 72 inches long.
 - D. Number of Panel Sections: As indicated modular panel sections.
 - E. Installation Method:
 - i. Walls: Concealed mounting Z-clips.
 - ii. Bleachers: Velcro wall storage strips.
3. Fabric Covering Color: As selected by Architect from manufacturer's full range for one color.

Section 116800 Play Equipment and Structures

1. Applications
 - A. Schoolyard active play areas.
2. Guidelines
 - A. Play equipment must be IPEMA certified, ADA-compliant, and universally accessible.
 - B. Traditional swings are not permitted. Basket swings and other group-style swings are permitted with written approval from SDP.
 - C. Steel slides are preferred over plastic. Slides shall face north to prevent direct exposure to afternoon sun.
 - D. Play equipment shall be installed a minimum of 10'-0" from any walls or fencing, in accordance with manufacturer's recommendations.

Section 116803 – Athletic Equipment

1. Baseball Field
 - A. Baseball Bases – Preferred Product: Rogers Break Away System.
 - B. Equivalent Safety Release bases that have been clinically proven to dramatically reduce injuries in both the baseball and softball arenas.
2. Recycled Content and Materials
 - A. Recycled content and materials are preferred for outdoor equipment such as the use of recycled plastic lumber in lieu of aluminum construction (aluminum is a vandalism risk).

Division 12 – Furnishings

Section 122413 Roller Window Shades

1. Design window shades to fill openings with not more than 1/4-inch clearance at jambs and 3/8-inch clearance at sill. Install shades level and plumb, mounted not less than 1-inch from face of exterior glass.
2. Shades shall be provided at all exterior window locations and at interior locations where specified by SDP. Refer to Chapter 04 Space Requirements Charts.
3. Shades shall consist of non-PVC shade cloth, reclaimable and recyclable, durable, antimicrobial and flame retardant, off-white color, maximum width to be 72 inches. Shades shall be manually operated with cord pulls located at the center of the shade.
4. Provide attic stock of ten (10) shades of the largest window size.

Section 126100 Fixed Auditorium Seating

1. Design auditorium seating to include the following:
 - A. Fire Rating: Class 1 Fabric
 - i. Fabric double rubs: Minimum 250,000
 - B. Tablet arms at every second seat in front rows, max. 100
 - C. Low back style
 - D. Specify face to be Maple veneer.
 - E. Specify that seat backs and tablet arms are to be finished in dark colors. Review colors with SDP for approval.
 - F. Specify that back wings to be formed from 14 ga. Steel.
 - G. Specify hinge assembly for tablet arm formed from 12 ga. Steel with 5/8" pivot rod.
 - H. Specify stop mechanism to be solid steel with neoprene cushions.
 - I. Specify armrest to be solid hardwood.
 - J. Provide seating layouts and configuration in compliance with ADA.

Division 14 – Conveying Equipment

Section 14200 Elevators

1. Provide at least one elevator for any project that is more than one story high, including basement.
2. Where more than one elevator is required, provide one service elevator that will also be used by passengers.
 - A. Specify pad hooks in service elevators.
3. Design pits to be largest requirements of competing manufacturers.
4. Design a depression in pit, 18" X 18" X 18", to accommodate sump pump.
5. Hard piped drain or sump pump tied into building sanitary as required by codes.
6. Design all cab sizes to be ADA compliant and in compliance with Code.
7. Specify controls and other features to be accessible in accordance with ADA.
8. Design cab finish as plastic laminate.
9. Design and specify electric traction elevators, operating at 250 fpm, in buildings over three stories.
10. Design operating and emergency features in accordance with code requirements and consultation with manufacturer. Consult with SDP about any special operating requirements.
11. Design positive smoke evacuation for all shafts and equipment rooms.
12. Specify door and frame finish as painted steel.
13. Specify doors as bi-parting.

Division 21 - Fire Suppression

General Requirements:

1. Utility Service

A. Water service

- i. Comply with applicable requirements codes and standards that meet the standard of care of the Authority Having Jurisdiction.
- ii. A/Es and project managers should consult with SDP facilities maintenance personnel during the design phase of utilities to confirm that the plans take advantage of ways to lower cost and align with SDP performance requirements.
 - a. Water service is delivered and metered by the Philadelphia Water Department at the point of delivery of each campus.
 - b. All new buildings and major modernizations at existing schools will connect to the existing fire water underground distribution loop.
 - c. Prior to embarking on any design, provide a flow-pressure test to determine the adequacy of existing system to support proposed construction project.
 - d. All provisions shall be made for anticipated/potential future additions to the buildings when sizing the plumbing systems. Review with the SDP.

B. Site water supply

- i. At each site, provide a separate point of entry for domestic water and fire sprinkler service.
- ii. Provide backflow preventer(s) and pressure reducing valve(s) as required. Consult with Authority having Jurisdiction regarding the need for building entrance or use-specific backflow preventers within each building.
- iii. For Modernizations, check to see if a new system can be connected into an existing system to avoid metering and utility account costs.

Section 210500 – Common Work Results for Fire Suppression

1. General installation requirements
 - A. Piping penetrating exterior walls below grade shall be installed to prevent breakage due to any building movement.
 - B. Provide sealed sleeves for penetrations of wall, floors, ceilings and roofs.
 - C. Penetrations through floors, walls and roofs shall be watertight and shall be rated to match the fire or smoke rating of the assembly. Provide fire sealant and link- seal (or equivalent).
 - D. Fire suppression shall be concealed to the greatest extent possible. Piping shall be run as directly as possible and parallel to and at right angles to walls, partitions, etc., and shall be neatly grouped in parallel lines.
 - E. No fire sprinkler piping shall be installed in transformer vaults, switchboard rooms, telephone rooms, and IDF and MDF rooms. Consult with SDP requiring the use of gaseous, pre-action, or similar fire suppression systems for areas with high concentrations of electrical or technology equipment.
 - i. Dry-pipe system shall be utilized in Technology (IT) Rooms.
 - F. Fire water service entrance, zone control valves, and other fire suppression equipment shall be installed in a dedicated room. Room size, clearance, access, and identification shall be consistent with the requirements of the Authority having Jurisdiction.
 - G. Size, style and location of the fire department connection shall be approved by the Authority having Jurisdiction.
 - H. Provide wire guards for sprinkler heads located in areas where they can be disturbed such as gymnasiums, shops, etc.
 - I. The color of conceal covers on fully recessed sprinklers shall match the color of the adjacent architectural surface.
2. Submittals
 - A. Product data and sprinkler shop drawings shall be submitted to SDP for review prior to submission to the Authority having Jurisdiction.
 - B. Include the following supplemental requirements for Division-21 submittals:
 - i. Product data for each specific system provided, including model number, dimensions, weight, and other characteristics as applicable.
 - ii. Performance data for each specific system/equipment provided including all operating parameters, efficiency, setpoints, etc.

- iii. Installation, start-up, operation and maintenance requirements.
 - iv. Scaled installation Shop Drawings for all pieces of equipment showing all field connections to power, water, gas.
 - v. Detailed Plumbing Shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built condition.
 - vi. Overlay Coordination Drawings showing Plumbing, Mechanical, Fire Suppression Piping, and Electrical/Data Conduits, at 1/4-inch scale. Coordinate with Division-22, Division-23, and Division-26. Update these daily during installation to reflect as-built condition.
3. Warranty requirements
 - A. Equipment warranties shall be clearly stated at the time of submittals and again in the close-out documentation. Warranties tied to shipping or start-up date are NOT ACCEPTABLE
 - B. Consult with SDP to determine if additional warranty durations should be included as an alternate to the project.
 - C. General: Minimum, one (1) year from substantial completion for parts and labor for all fire suppression equipment.

Section 211313 – Automatic Sprinkler Systems

1. Scope
 - A. An automatic sprinkler system shall be designed, installed, tested and approved for the entire building. in accordance with NFPA standards, state codes, local jurisdiction's requirements and contract documents.
 - B. In all major modernization and addition projects retaining existing systems, the contractor shall provide temporary protection for all branch mains and bulk mains run through corridors where the ceiling has been removed. The contractor shall provide upright sprinklers (within 12" of the deck above) along the path of all water charged sprinkler branch mains and bulk mains in the corridor. When the ceilings are replaced the upright sprinklers shall be removed and the outlets they were connected to shall be capped.
2. Quality Assurance

- A. The automatic sprinkler system shall be tested in accordance with NFPA No. 13, FM 1637, UL 2443 and be approved by the local jurisdiction.
- B. For major modernizations retaining existing fire suppression systems, the new and altered system will require full recertification.
- C. The sprinkler contractor shall be licensed by the local jurisdiction to install the sprinkler system as required.
- D. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
 - i. All castings used for coupling housings, fittings, and valve bodies shall be date stamped for quality assurance and traceability.

3. Design

- A. The entire building shall receive a sprinkler system, hydraulically designed and zoned. Zones shall not exceed fifty thousand square feet (50,000 sq. ft.). The sprinkler design shall be a wet- pipe system for the interior of the building. Attic spaces, crawlspaces, technology rooms, and areas subject to freezing shall receive dry system. Loading docks, Walk-in freezer and unheated outdoor storage shall have dry heads. Design Teams shall obtain current hydrant flow test information from the local water authority prior to starting any design work.

4. Sprinkler Heads

- A. Sprinkler heads, where there are ceilings, shall be recessed mounted with a polished chrome finish and escutcheon and shall be quick response type.
 - i. Exceptions: Sprinkler heads in locker rooms and shower rooms shall have a corrosion resistant coating.
- B. Sprinkler heads, upright or pendent, exposed, shall be factory brass and shall be quick response.

- C. Sprinkler heads, dry sidewall, shall be glass bulb, quick response with white epoxy coating and Escutcheon.
- D. Sprinkler heads, sidewall, shall be wall mounted with polished chrome finish and escutcheon and shall be extended coverage quick response.
- E. Sprinkler heads, dry pendant, shall be extended type glass bulb, quick response with corrosion resistant coating and escutcheon. Provide and install dry sprinkler boot to eliminate the air gap at the wall or ceiling.
- F. Sprinkler heads in unoccupied spaces may be rough brass.
- G. Sprinkler heads, concealed, shall have factory finished white painted cover plate and shall be quick
- H. Response. For ceilings painted black, custom black painted cover plate shall be provided.
- I. Provide sprinkler guards on all heads in the physical education rooms, gymnasiums, gym storage, walk-in coolers, loading docks, all storage rooms, gang toilets, locker rooms, boiler rooms and in mechanical rooms. Guards in occupied spaces shall be chrome plated.
- J. Escutcheons and guards shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
- K. Sprinkler heads shall be of the same manufacturer for each type used.
- L. Escutcheon finishes shall match that of the sprinkler head they serve.
- M. Chrome plating is not an acceptable corrosion resistant coating.

5. Valves

- A. Backflow prevention valve shall be a U.L., listed double check valve assembly including ball type test cocks to protect the potable water supply against backflow from the automatic sprinkler system. Shutoff valves shall be U.L./FM listed with epoxy coated OS&Y valves, 2 1/2" and larger. 2"-1 1/4" Watts 009. 1" and smaller 009SS, with tamper switches. The assembly shall comply with ASSE 1015 or AWWA C510. The double check valve assembly shall be manufactured by WATTS (Series 757) or listed equivalent alternates by Ames or Zurn.

6. Piping

- A. All Main and Branch piping shall be Schedule 40 steel pipe.

7. Fire Department Connection

- A. Two-way projecting Siamese with cast brass, straight Y pattern, double inlet body, furnished with plugs and chains, and brass escutcheon plate lettered 'AUTO. SPKR.' Finish - polished brass chrome plated and shall be manufactured by Potter Roemer, No. 5750 with automatic ball drip. Provide low point drain for service. Siamese connections fully equal to the item specified, manufactured by ELKHART, GUARDIAN FIRE EQUIPMENT< FIRE END< CROKER CORPORATION or POWHATTAN shall be acceptable. Siamese connections with a rough brass finish are not allowed. Provide a minimum 24" x 24" keyed lockable, access door to service check valve, ball drip and low point drain. Provide one key for each location and store in sprinkler cabinet.
- B. At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for system drainage to prevent freezing.

Division 22 - Plumbing

General Requirements

1. Utility service

A. Water service

- i. Consult with SDP during the design phase of utilities to confirm that the plans take advantage of ways to lower cost and align with SDP performance requirements.
- ii. Prior to embarking on any design, provide a flow-pressure test to determine the adequacy of existing system to support proposed additions and renovations. If flow tests determine that a fire pressure booster pump is required it shall be selected per code and coordinated with emergency generator selection for power.
- iii. Make provisions for future additions to the buildings when sizing the plumbing systems. Review with SDP.
- iv. Obtain water hardness information for the domestic water service supplied to the facility during schematic design. Data must be no older than 18- months from the start of design.
- v. At each site, provide a point of entry for domestic water and fire sprinkler service, if applicable. Specify that contractor must provide water meter pit outside the building where utility requires.
- vi. Provide an isolation valve immediately upon entering the site, in a valve box outside the building(s).
- vii. Check to see if a new system can connect into an existing system to avoid metering and utility account costs.

B. Backflow Preventers

- i. Specify stainless steel and lead-free construction from the following acceptable manufacturers:
 - a. Watts (Model 957 for domestic water – Basis-of-Design)
 - b. Ames
 - c. Zurn
- ii. Stainless steel strainers required.
- iii. Provide epoxy coated OS&Y valves, 2 1/2" and larger. 2"-1 1/4" Watts
009. 1" and smaller 009SS.

- iv. Ceiling mount is not acceptable. Install 3-5 feet above finish floor.

C. Natural gas service

- i. Provide a dedicated gas meter and regulator for kitchen natural gas service only. Provide a separate meter for other gas loads in the building.
- ii. Prior to embarking on any design, consult with the gas utility to determine availability of gas at the site and easement requirements.
- iii. For existing facilities, assess need for service upgrade to accommodate increased or decreased gas load.

Section 220500 – Common Work Results for Plumbing

1. General installation requirements

- A. Provide cut-offs on main water line serving each building in a keyed case valve outside the building.
- B. Design piping penetrating exterior walls below grade to prevent breakage due to any building movement.
- C. Provide sealed sleeves for penetrations of wall, floors, ceilings, and roofs.
- D. Design penetrations through floors walls and roofs to be watertight and rated to match the fire or smoke rating of the assembly. Provide fire sealant and link-seal or equivalent.
- E. Design piping to run as directly as possible, parallel to and at right angles to walls, partitions, etc., and grouped in parallel lines.
- F. Plumbing piping are NOT allowed in transformer vaults, switchboard rooms, telephone rooms, and IDF and MDF rooms. Comply with Code requirements.
- G. Design domestic water systems to be zoned with shut-off valves so individual areas to be turned off without affecting the entire building.
- H. Each toilet room or other space serving multiple fixtures requires accessible shut- off valves to isolate the domestic water supply to the room.
- I. Label all plumbing equipment with identification tags. For equipment with special warranty requirements, the identification tag shall include start and end date of the warranty.
- J. Access to all valves, working parts of plumbing devices, and items requiring periodic maintenance shall have access provided by door, panel or lift-out

ceiling.

- K. Water heaters mounted on the floor are not permitted in custodial rooms. Any water heater in these areas must be wall or ceiling mounted at an elevation high enough to not restrict access to plumbing or other custodial equipment.
2. Special installation requirements
- A. Provide keyed hose bibs for all interior applications. Refer to Chapter 04 – Space requirement charts for required locations.
 - B. Provide exterior, lockable, freeze-proof wall hydrants for all exterior applications. Refer to Chapter 05 – Site Design.
 - C. Provide drain down, freeze-proof, hydrants for rooftop and on-grade applications when a wall mounted device exceeds maximum distance.
 - D. Provide floor drains with trap primers in each of the following areas:
 - i. Toilet / Restroom areas
 - ii. Pre K and K Classrooms
 - iii. Custodial closets
 - iv. Trash collection area
 - v. Receiving / Loading areas
 - vi. Emergency showers/ wash areas
 - vii. Food service
 - viii. Mechanical room housing HVAC machinery
 - ix. Boiler Rooms
 - x. Areas where large volumes of water are stored.
 - E. Consult with Authority having Jurisdiction for use of trap-guards in areas that are not near a source of water for connection of trap primers.
 - F. Outside hydration stations are not allowed.
 - G. Provide eyewash and emergency showers as required. Refer to Chapter 04 – Space requirement charts for required locations.
 - H. Consult with Authority having Jurisdiction to request exemption from tempering requirements.
 - I. Where possible, route mechanical equipment condensate and overflow drains to dedicated floor drains with funnel or floor sinks in mechanical rooms. Refer to Authority having Jurisdiction’s requirements for condensate reuse. Avoid use of custodial mop sinks for condensate disposal.

- J. Provide floor sinks with strainers in lieu of floor drains in food service preparation areas where drain pipes that require air gaps are used. Size floor sink for water volume of fixture.
3. Submittals
- A. Include the following supplemental requirements for Division 22 submittals:
 - i. Product data for each specific system provided, including model number, dimensions, weight, and other characteristics as applicable.
 - ii. Performance data for each specific system and equipment provided including all operating parameters, efficiency, setpoints, etc.
 - iii. Installation, start-up, operation and maintenance requirements.
 - iv. Scaled installation shop drawings for all pieces of equipment showing all field connections to power, water, gas.
 - v. Detailed plumbing shop drawings at a minimum 1/4-inch scale. Update these daily during installation to reflect as-built condition.
 - vi. Overlay coordination drawings showing plumbing, mechanical, fire suppression piping, and electrical/data conduits, at a minimum 1/4-inch scale. Coordinate with Divisions 22, 23 and 26. Update these daily during installation to reflect as-built condition.
4. Warranty requirements
- A. Equipment warranties durations are required with submittals and again in the close-out documentation. Equipment warranties begin upon acceptance of functional testing by SDP's third-party commissioning authority. Warranties tied to shipping or start-up date are NOT ACCEPTABLE.
 - B. Consult with SDP to determine if additional warranty durations should be included as an alternate to the project.
 - C. General: Minimum, 1 year from substantial completion for parts and labor for all plumbing equipment
 - D. Water heaters:
 - i. Heat exchanger: Minimum, 5 years from substantial completion for parts and labor.
 - ii. Control components: Minimum, 5 years from substantial completion for parts and labor.
 - iii. Integral storage tanks: Minimum, 10 years from substantial completion for parts and labor.

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- E. Storage tanks: Minimum, 10 years from substantial completion for parts and labor.
- F. Pumps: Minimum, 5 years from substantial completion for parts and labor.
- G. Thermostatic mixing valves: Minimum, 5 years from substantial completion for parts and labor.

Section 221116 / 221119 – Domestic Water Piping and Specialties

1. Water piping

- A. Lead-free piping, fittings, and material for joining are required.
- B. Design exterior underground piping below driveways and traffic areas with ductile iron with boltless restrained joints rated for 250 psi operating pressure, or type K copper, if under 2 inches.
- C. Design exterior underground piping below areas not exposed to traffic with Schedule C-900 PVC for 2.5-inch and above. Provide shock resistor C-900 PVC connection to steel.
- D. Do not route pressure piping under concrete slabs that are on grade or fill.
- E. Design condensate piping to flow by gravity to the sanitary sewer system or by other means appropriate for reuse. The City of Philadelphia requires condensate reuse system for structure with more than 200-tons of cooling capacity. Refer to *City Ordinates* for more information. Design interior condensate piping with type L copper with lead-free, solder fittings and joints.
- F. All connections between dissimilar materials in the piping system require dielectric unions, couplings or flanges.
- G. Mechanical pressed (Pro-Press and similar) fittings are acceptable for interior copper water line 2-inches and smaller. [to be confirmed]
- H. Insulate all domestic water piping. Specify as allowed by Code to meet Smoke/ Flame-Spread limits.
- I. Provide insulated, jacketed and heat-traced outdoor domestic water piping.
- J. Piping made in the USA is required.

2. Valves

- A. Provide full-port ball valves for all types of plumbing equipment or piping assemblies 2-1/2 inch and smaller. Provide high-performance butterfly valves for all types of plumbing equipment or piping assemblies 3 inch and larger.

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- B. Science laboratories: Route water, gas, and air piping through a lockable utility control box that enables the educator to turn on or shut off all utilities to the learner stations. Use manual ball valves in a locked box for gas, water and compressed air, if provided.
- C. Provide pressure reducing valves for domestic water service lines wherever static pressure exceeds 60 psi.

Section 221125 – Natural Gas Systems

1. Design team shall evaluate capacity and availability at service entry and evaluate distribution piping capacity prior to any work involving additional gas use.
2. Locate the building pressure regulator and main shut off valve as close to the building as possible. Two, dedicated, systems are required for schools with kitchens; one gas service for kitchen and one gas service for the remaining portion of the building.
3. Gas-rated polyethylene (PE) pipe is required for underground applications.
4. Provide black steel rated for service, pressure, and painted yellow for above ground gas piping.
5. Support gas piping routed on the roof of the building a minimum of 12 inches above the finished roof surface on approved roof piping supports.
6. All gas burning appliances require a full line size shut-off valve located at the equipment. Provide AGA approved bronze plug or ball valves for sizes up through 1-1/2 inch and iron body lubricated plug cocks for sizes 2 inch and larger.

Section 221316 – Sanitary Waste and Vent Piping

1. PVC piping is allowed for sanitary piping underneath the slab.
2. In food service preparation areas, provide cast iron piping for all drains near the exhaust hoods, discharge from dishwashers, and discharge from 3-compartment sinks. Cast iron piping shall be used, from the receptacle for a minimum on 15-feet or

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until the branch pipe connects with main pipeline, whichever is longest. Route all sanitary drainage piping to grease trap, as required by City of Philadelphia for 3-compartment sinks and floor drains.

3. No-hub cast iron piping is acceptable for sanitary piping within the building.
4. PVC piping is acceptable for sanitary vents unless restricted due to fire/smoke ratings or other Code requirements.
5. Provide copper piping material for exposed sanitary drainage lines receiving condensate. All above grade sanitary drainage lines receiving condensate require insulation in their entirety.
6. Floor cleanouts are not allowed. Extend piping to the nearest partition for wall cleanouts as needed.
7. Provide sanitary piping and hangers located in crawl spaces from materials specifically selected to withstand the expected humid environment.
8. Piping made in the USA is a requirement.

Section 221413 / 221423 – Storm Drainage Piping and Specialties

1. All plazas, paved areas, and unpaved areas require drainage by gravity to a public storm sewer or shall terminate with proper headwalls at approved outfall locations.
2. Provide schedule 40 PVC piping for all above grade interior building. Any pipe routed through a return air plenum requires insulation (fire-wrap) to meet fire and smoke requirements. Provide underground piping of the same type as sanitary pipe.
3. No-hub cast iron piping is allowable for use inside the building.
4. Insulate storm drainage piping for the first 30-feet of horizontal length within the building.
5. Connect downspouts and auxiliary drains to storm system.
6. Provide storm piping and hangers located in crawl spaces from materials specifically selected to withstand the expected humid environment.
7. Piping made in the USA is a requirement.

Section 221323 – Sanitary Waste Interceptors

1. Acid waste:

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- A. All fixtures and equipment where acids are used require neutralization before discharging to the sanitary drainage system as required by Authority having Jurisdiction.
 - B. All laboratory piping serving laboratory sinks, cup drains, floor drains, or other devices that may conduct acid wastes, extend to acid neutralizing sumps, and all vent piping serving these fixtures or system, require approved acid-resistant materials, such as acid resistant polypropylene.
 - C. Glass piping is not allowed except at the direction of the Owner or the Authority having Jurisdiction.
2. Grease interceptors:
- A. A grease interceptor is required wherever any liquid waste containing large amounts of grease, fats or oils are discharged into the sanitary system and as required by Authority having Jurisdiction.
 - B. Locate grease interceptors as close to the source of the grease as possible and on the exterior of the building with convenient truck access. Locate away from doors, windows, and air intake, etc. to minimize fume infiltration into building.
 - C. Provide manholes where required. Provide reinforced concrete pads around manhole covers. Provide surface drainage away from the grease interceptor.
 - D. Provide a sample well as required, where the sanitary waste ties into City service. Sample port to be covered with lockable fiberglass flip-top enclosure per City of Philadelphia requirement. Coordinate final location of sample port and lock box with SDP and City of Philadelphia. [to be confirmed]
 - E. Provide insulation and electric heat trace for exposed grease piping. Controllers must have built-in ground fault protection.

Section 221513 – Compressed Air Systems

1. Provide a compressed air system for technology areas as required. Provide with filter, driers, and pressure regulators as required for use.
2. Provide schedule 40 galvanized steel or type L copper piping with 150 psi fittings.
3. Provide piping with 1/8-inch per foot slope, sloped back to the compressed air

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source to aid in the removal of moisture in the piping.

4. Provide line size full port ball valves to flush moisture and particulate at each air outlet.
5. Branch piping shall connect to the top of the main header pipeline to limit moisture transfer.

Section 223100 – Water Softening

1. Consult with the food service consultant regarding water hardness limitation for equipment specified in this area.
2. Provide water conditioning equipment for hot and cold water if water hardness is greater than 20 grains.
3. Provide water conditioning equipment for hot water if water hardness is greater than 10 grains.

Section 223300 / 223400 – Domestic Hot Water

1. Design hot water systems to the same general criteria as cold-water systems.
2. Configure hot water piping system for recirculation, with a temperature-controlled recirculation pump to ensure hot water is available at any fixture as required by the Philadelphia Plumbing Code, the International Energy Conservation Code (IECC) and local amendments, or as required by Authority having Jurisdiction. Heat trace is not allowed as a replacement for hot water recirculation systems.
3. Hot water distribution piping, hot water tailpieces, roof drain fixtures, laterals, risers in non-accessible chases require insulation. Make provisions to prevent freezing of any pipe exposed to outside temperatures. Provide an electric heat tracing system with built-in ground fault protection where necessary.
4. Hot water storage temperature to be 110°F minimum [confirm], and 130°F maximum supplying fixtures for hand and mop sinks.
5. Provide food service preparation facilities with a separate 140°F hot water system. Hot water storage may be higher to ensure that 140 deg F min water at fixture outlet when water is running.
6. Provide showers for learner with limited-access blending valves to control water

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temperature between 105°F and 110°F. Provide a master control temperature valve to shut off water to the learner showers in the coach's office.

7. Water Heaters:
 - A. Provide high efficiency condensing type local storage type gas fired water heaters to serve unisex and grouped learner bathrooms.
 - B. Provide high-efficiency, storage type, non-condensing gas fired water for gymnasium showers and food preparation areas.
 - C. Provide point-of-use, water heaters to serve isolated, single lavatory and sink located remote from storage-type water heaters. Commercial warranty required. Specify product training at Closeout.
 - D. Water to water, heat pump type water heaters are preferred in facilities with heat pump hydronic systems.

Section 224000 – Plumbing Fixtures

1. General
 - A. Plumbing fixtures shall meet EPA's WaterSense criteria.
 - B. Provide plumbing fixtures of commercial grade and constructed of vitreous china, cast iron or stainless steel of the latest design and type for their intended use.
 - C. Each sink, lavatory or piece of kitchen equipment with water connections shall have a stop on each supply. All stops and hose bibs in learner or public toilets shall have removable keys.
 - D. Support wall-hung fixtures with concealed carriers.
2. Water Closets
 - A. Description: 1.28 gpf , white vitreous china, elongated bowl, wall mounted, siphon jet.
 - i. Acceptable manufacturers: American Standard, Kohler, Zurn
 - B. Installation: All fixtures to be installed on floor mounted carrier.
 - i. CMU wall preferred for mounting.
 - C. Accessories:

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- i. Seat color black, open front, manufacturers Olsonite or Church
 - ii. Carrier – provide stainless steel studs and fasteners
 - D. Include steel uprights with feet for fixture carrier with hanger and bearing plates. “Baby Devoro” type toilet fixtures are not permitted.
 - E. Flushometer – Concealed sensor hardwired with true mechanical override.
 - i. Acceptable manufacturers: Sloan Royal 152 ESS, Zurn, or equal
- 3. Urinals
 - A. Description: 1.0 gpf, white vitreous china, elongated bowl, wall mounted, extended sides.
 - i. Acceptable manufacturers: American Standard, Kohler, Zurn
 - B. Installation: All fixtures to be installed on floor mounted carrier.
 - C. Accessories:
 - i. Stainless Steel Strainer 047068-0070A (removable bee-hive type strainer threaded to fixed base flange)
 - D. Flushometer – Concealed sensor hardwired with true mechanical override.
 - i. Acceptable manufacturers: Sloan Royal 195 ESS, Zurn, or equal
 - E. Waterless urinals are prohibited.
- 4. Lavatories
 - A. Provide undermount cast iron basin lavatories at restroom and toilet room counters.
 - i. Installation: install per requirements of the Accessibility Guidelines.
 - B. Provide mixing type faucets with self-closing, lever, wrist-blade, vandal-resistant handles.
 - i. Alternate Sensor Operated Faucet – Sloan Optima EAF-200 or equal.
- 5. Showers
 - A. WaterSense Label 2.0 gpm ADA compliant with vandal-resistant showerhead.
 - B. Shower Base: One-piece precast Terrazzo ADA compliant shower base.
 - i. Acceptable manufacturers: Fiat ADAW-3636 or pre-approved equal.
 - C. Installation: install per requirements of the Accessibility Guidelines.

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6. Classroom Sinks

- A. Description: 18 gage 304 stainless-steel stainless-steel drop-in sink with 4" centers for faucets. Dimensions 19" x 18" x 5.5".
 - i. Acceptable manufacturers: Elkay Lustertone LRAD191855-5, Eljer, Just
- B. Faucet: 8" gooseneck, 4" wrist blade handles.
 - i. Acceptable manufacturers: Zurn Z831C4-XL-1CT or equal.

7. Art Sink

- A. Provide an easily accessible solids interceptor for the large plaster and clay sink in the art room. Provide impervious wainscoting to act as a splashguard.
- B. Provide stainless steel wash station with faucets.
- C. Basis-of-Design – Grainger 56WSL, Elkay, Just or equal

8. Water Cooler

- A. Provide ADA electric water cooler with bottle filler (hydration station).
- B. Acceptable manufacturers: Elkay LVRCGRN8WS, Bottle Filler LZWSR or Equal

9. Mop Receptor

- A. Description: Single piece molded stone mop service basin. Walls shall be 10" high and not less than 1" thick. Drain shall be stainless steel with dome strainer and lint basket sized for 3" inch drain connection.
- B. Installation: Select largest model listed to accommodate installation.
- C. Accessories:
 - i. Service faucet Delta 20189
 - ii. Hose
 - iii. Hose Bracket
 - iv. Wall mounted mop hanger Fiat 889-CC
- D. Acceptable manufacturers: Fiat MSB 2424, or MSB 3624, or equal.

10. Emergency Wash Stations

- A. Emergency Eye Wash
 - i. Guardian Recessed Model G1813.
- B. Emergency Shower
 - i. Guardian Model GBF1672, furnish with AP28D-230 electric light and alarm horn
- C. Emergency Shower/Eye Wash
 - i. Guardian Model GBF2150 furnish with AP28D-230 electric light and alarm horn
- D. Installation: Provide accessible isolation valve at ceiling for each installation. Install equipment in accordance with manufacturers requirements and to compliance with ADA guidelines.
- E. Refer to Chapter 04 Space requirement charts for locations.
- F. Acceptable manufacturers: Guardian, Speakman, Bradley

11. Wall Hydrants (Exterior)

- A. Description: cast bronze box type non-freeze wall Hydrant with hex key operated hinged latching cover and 3/4" H.P.T. outlet with key operator, integral vacuum breaker-backflow preventer, pressure relief valve, bronze casing, bronze operating parts convertible into service tool, 3/4" female and 1" male N.P.T. inlet connections.
- B. Installation: Provide at dumpster and receiving area for wash-down. Review additional exterior locations with SDP. Limited number of exterior wall hydrants preferred.
- C. Provide cylinder vandal-proof lock.
- D. Accessories: Wall clamp
- E. Acceptable manufacturers: Josam 71000, Watts, Wade

12. Wall Hydrants (Interior)

- A. Description: Cast bronze box type mild climate wall Hydrant with hex key operated hinged latching cover and 3/4" H.P.T. outlet with key operator, integral vacuum breaker-backflow preventer, pressure relief valve, bronze casing, bronze

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operating parts convertible into service tool, 3/4" female and 1" male N.P.T. inlet connections.

- B. Installation: As indicated in Chapter 04 Space requirement charts.
- C. Provide cylinder vandal-proof lock.
- D. Accessories: Wall clamp
- E. Acceptable manufacturers: Josam 71300, Watts, Wade

Division 23 - Mechanical

General Requirements

1. HVAC design conditions

A. Design temperature conditions (ASHRAE 90.1-2017):

- i. Outdoor cooling: 93.6°F db / 74.9°F wb
- ii. Outdoor dehumidification: 75.3°F dewpoint, 82.5°F dry bulb
- iii. Evaporation: 78.1°F wb
- iv. Outdoor heating: 10°F (lower than ASHRAE 99.6% heating condition)

B. Indoor design conditions:

- i. Gymnasiums/Kitchens/Shops: Winter - 68°F, Summer – 75°F
- ii. Toilet Rooms: Winter - 70°F, Summer – 75-78°F
- iii. Shower Rooms: Winter - 70F, Summer – 75-78°F
- iv. Auditoriums/Cafeterias/Classrooms/Offices: Winter - 70°F, Summer – 75°F / 60% RH
- v. Mechanical Rooms: Winter – 68°F, Summer - 78°F
- vi. Remaining Areas: Winter - 70°F, Summer – 75°F / 60% RH
- vii. Reference ASHRAE 55-2017: Thermal Environmental Conditions for Human Occupancy.
- viii. Occupant Heat Loads:

School Type	Sensible (Btu/h)	Latent (Btu/h)
Primary / Intermediate	245	105
Secondary	245	155
Administrative Areas	250	200

C. Ventilation:

- i. Design per ASHRAE Standard 62.1-2013, the Mechanical Code, and requirements identified by the District’s COVID-19 overlay standards.
- ii. Demand control ventilation for all spaces with variable high-density occupancy (studios, libraries, conference rooms, assembly areas) is required.
- iii. For laboratories and shop areas use industry-accepted standards specific to the application, such as Industrial Ventilation: A Manual of Recommended Practice by ACGIH.
- iv. Heat recovery devices for pretreatment of outside air are not allowed without specific authorization from the Owner and as mandated by code.
- v. Particle ionization and other similar air cleaning devices are

acceptable as permitted by the applicable building and ventilation design standards. The maximum indoor CO₂ concentrations are not allowed to exceed 800 ppm. Design teams may use the ASHRAE 62.1 IAQ Procedure method, as an alternate to the Ventilation Rate Procedure method (e.g. flow rates defined per person and area based on space type).

2. Primary cooling systems and equipment:
 - A. Provide primary cooling from a central plant with two or more chillers. Size each chiller to meet no less than 60% of the design cooling capacity of the facility. A single chiller is enough if a minimum of two independent refrigerant circuits is provided. Sizing should be based on May and September design conditions, when there is minimum occupancy during the Summer.
3. Primary heating systems and equipment:
 - A. Provide building heat by hot water from a central boiler plant with two or more natural gas-fired condensing type boilers with direct venting of combustion air. Size each boiler to meet no less than 100% of the design heating capacity of the facility. Design teams should confirm whether dual-fuel (natural gas and no. 2 fuel oil) systems are required at the beginning of schematic design.
 - B. Electric resistance heat is not permitted.
4. HVAC system capacity, zoning, and system selection
 - A. HVAC system capacity:
 - i. Calculate thermal loads using an ASHRAE approved methodology, and design conditions stated elsewhere in these guidelines;
 - ii. Select air handler systems to meet the heating and cooling loads resulting from the sum of peak space loads, with no oversizing factors;
 - iii. Select hydronic pumps to meet the sum of hydronic coil flow with no oversizing factors. Provide a standby pump sized to 100%. Both pumps should have a dedicated VFD or be equipped with a electronically commutated motor for speed control.
 - B. HVAC system zoning:
 - i. Design air handler systems to serve zones with similar thermal loads in order to minimize the possibility of simultaneous heating and cooling. This currently applies to cafeterias, gymnasium, and auditorium space types.
 - ii. Condition each thermal zone with an individual terminal unit or fan-coil unit or VAV box, with dedicated temperature sensing, humidity sensing, carbon dioxide sensing and ventilation control.

- iii. Interior and perimeter zones as defined by ASHRAE shall not be combined.

C. HVAC system selection:

- i. Determine HVAC system selection using life cycle cost analysis. Analysis shall use parameters provided in the Energy Performance Criteria, maintenance cost factors provided by ASHRAE, equipment replacement costs, applicable utility tariffs, and financial parameters provided by the Owner.
- ii. For renovation applications, the age and capacity of existing equipment planned for reuse should be verified.

D. System matrix: the system matrix is intended to be used as a starting point for design teams. Team’s should identify the best combination of system component with favorable life-cycle cost using an integrated

System Matrix

System Component	New Construction Project Size				Modernization Project Size			
	100k+ sf	50-100k sf	10-50k sf	<10k sf	100k+ sf	50-100k sf	10-50k sf	<10k sf
Central Station AHUs	Assembly space type	Assembly space type	Assembly space type	Assembly space type	Assembly space type	Assembly space type	Assembly space type	Assembly space type
Fan Coil Unit	Y	Y	Y	Y	Y	Y	Y	Y
Unit Ventilators	N	N	N	N	N	N	M	M
Water-Source Heat Pump	N	Y	Y	Y	N	Y	Y	Y
Packaged Rooftop Unit	Assembly space type	Assembly space type	Y	Y	Assembly space type	Y	Y	Y
Variable Refrigerant Flow	N	N	N	Y, non-classroom	N	N	Yes, non-classroom	Yes, non-classroom
Split-System	Telecom only	Telecom only	Telecom only	Telecom only	Telecom only	Telecom only	Telecom only	Telecom only
Dedicated Outdoor Air System	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase	Y, confirm during SD Phase
Air-Cooled Chiller Plant	Y	Y	Y	Y	Y	Y	Y	Y
Water-Cooled Chiller Plant	Y	Y	N	N	Y	Y	N	N
Modular Condensing Boiler Plant	Y	Y	Y	Y	Y	Y	Y	Y

design process.

E. HVAC system selection for new construction is required with one, or a combination of the following:

- i. Hydronic air handling unit systems require the following:
 - a. High-efficiency chillers (water or air-cooled);
 - b. High-efficiency boilers;
 - c. Variable air volume air handlers with chilled water coils;
 - d. Decoupled outside air coils within the air handler;

- e. Large zones with variable occupancy (gymnasiums, dining areas, libraries) will use single-zone, variable volume air handlers with cooling and heating coils;
 - f. Variable speed pumping.
- ii. Hydronic fan-coil unit systems require the following:
- a. High-efficiency chillers (water or air-cooled);
 - b. High-efficiency, non-condensing type boilers;
 - c. Variable speed (ECM) fan-coil units with chilled water and hot water coils;
 - d. Decoupled outside air units ducted directly to the space or the return inlet of fan-coil units;
 - e. Variable speed pumping.
 - f. Self-contained, direct expansion, air-cooled systems require the following:
 - g. For buildings under 10,000 square-feet and more than 300-ft away from hydronic lines, use self-contained, indoor, high-efficiency direct-expansion systems with special provisions for decoupled ventilation, dehumidification and partial load operation.
 - h. This system is allowed on new construction or modernization after consultation with the Owner.
- iii. Packaged roof-top units require the following:
- a. Systems may be used after consultation with the Owner, support the project's energy goals, and are life-cycle cost effective.
- iv. Variable refrigerant volume (VRV) and/or variable refrigerant flow (VRF) are not allowed for educational spaces without prior review with the SDP facilities team.
- v. Telecommunication rooms (MDF/IDF/SuperNodes) require the following:
- a. MDF Rooms: Provide dedicated, redundant cooling source.
 - b. IDF Rooms: Provide dedicated cooling source.
 - c. SuperNodes: Provide dedicated, redundant cooling source.

- d. Single-duct, cooling-only VAV terminal unit for general space cooling is acceptable for AHUs intended to operate 24/7/365.
 - e. Standalone, direct-expansion cooling system for server and equipment cooling is allowed.
 - f. Where no other option exists, request approval from Owner to use mini-split or VRF type cooling units.
- vi. Electrical rooms require the following:
- a. For rooms with heat generating equipment less than 125 kVA, no special ventilating equipment is required.
 - b. For rooms with heat generating equipment between 126 kVA and 400 kVA, use a crossflow exhaust system draws conditioned building air into the room. Use 20°F temperature difference for calculating exhaust fan capacity.
 - c. For rooms with heat generating capacity greater than 400 kVA, use cooling equipment similar to the description for IDF Rooms.

5. Special ventilation requirements

- A. Ventilate all storage spaces in accordance with Code requirements.
- B. Provide special ventilation requirements for normal and purge modes in science laboratories in accordance with ASHRAE and [other]
- C. Provide special ventilation requirements in shop areas.
- D. Provide exhaust duct for clothes dryers consistent with the manufacturer's installation instructions and the applicable building code.
- E. Provide a 3-minute delay (minimum) between off command and disabling fan for exhaust fans serving toilet rooms.
- F. Implement interlocks and controls to prevent introduction of unconditioned outside air and potential condensation in conditioned spaces.
- G. Underfloor (crawl space) ventilation
 - i. Evaluate groundwater conditions, including site and subsurface drainage for the building site, shall be carefully evaluated to determine the most appropriate method of ventilating underfloor spaces. Where

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mechanical ventilation is required, make provisions to ensure proper conditions for installation and maintenance of systems.

6. Special mechanical considerations
 - A. Protection against noise and vibration: See High Performance Design Section for additional information.
 - B. Construction changes or substitutions (motors and connections): The contract documents shall indicate that all motor horsepower ratings and electrical circuit ratings are the minimum acceptable ratings, based on the original design, use of the equipment, and projections for future additions to electrical system loads.
 - ii. Motor size changes: Any changes in motor sizes based on substitution of equipment having peculiar or unique characteristics are the responsibility of the contractor.
 - iii. Electrical system changes: Any changes in system feeder circuits based on substitution of equipment having peculiar or unique characteristics, are the responsibility of the contractor.
 - C. Preferred power voltages for HVAC equipment is in order of preference:
 - i. 480 volts – 3 phase, 208 v – 3 phase.
 - ii. 277 and 120 volts should only be used to power motors of less than ½ horsepower.
 - D. The use of direct drive fans is preferred. Fan performance adjustments can be made using a VFD or other speed control device. Inlet guide vanes are not permitted for modification of fan performance
 - E. All mechanical equipment shall be labeled with identification tags. For equipment with special warranty requirements, the identification tag shall include start and end date of the warranty.
 - F. Tag piping and control valves. Furnish valve schedule.
 - G. All tags shall follow label specifications.

Section 230500 – Common Work Results for HVAC

1. Include the following supplemental requirements for Division-23 submittals:

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- A. Product data for each specific system provided, including brand and model number (basis of design and two confirmed alternates), dimensions, weight, thermal values (input, output conditions, BTU and flow values, electrical if applicable, selected options and other characteristics as applicable. Show on equipment schedule for each type of equipment listing drawing designation and information as described.
 - B. Performance data for each specific system and equipment provided, including all operating parameters, efficiency, setpoints, etc.
 - C. Installation, start-up, training, operation, and maintenance requirements.
 - D. Scaled installation shop drawings for all pieces of equipment showing all field connections to power, water, gas.
 - E. Detailed duct shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built conditions.
 - F. Detailed hydronic piping shop drawings at 1/4-inch scale. Update these daily during installation to reflect as-built conditions.
 - G. Overlay coordination drawings showing ductwork, hydronic piping, fire suppression piping, electrical conduits and data pathways, at 1/4-inch scale. Coordinate with Division 22 and Division 26. Update these daily during installation to reflect as-built conditions.
 - H. Product data for each refrigerant type.
 - I. Control sequences with actual equipment specific programming details naming specific input and output devices and using the Owner's "Point List" as a minimum. Submittals that simply repeat the sequences stated in bid documents are not acceptable.
 - J. Testing, adjusting and balancing design review report by a certified NEBB or AABC Balancing contractor only, identifying any modifications to the design that are necessary to properly balance the air and hydronic systems. If no deficiencies are noted, the TAB Contractor is acknowledging that all the components are required to achieve proper balance are addressed in the documents.
2. Equipment locations
 - A. Locate equipment on the floor in dedicated mechanical rooms near the spaces served.
 - B. Mechanical rooms shall comply with the following:

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- iii. Provide mechanical equipment rooms large enough to allow easy access and have a means to remove and replace all equipment for maintenance without removing or relocating other equipment or systems. If space restrictions exist, design team shall note on preliminary design documents for the Owner's consideration. Outline area to pull coils and other access areas on the drawings. Where applicable, access doors should be fire rated and be a minimum of 36" wide.
 - iv. Provide concrete housekeeping pads and/or inertia pads for equipment within mechanical rooms.
 - v. Ventilate equipment rooms housing heat-generating equipment such as boilers, compressors, etc.
 - vi. Combination mechanical equipment rooms and custodian's closet, or machine room/storage spaces are NOT acceptable.
 - vii. Provide access to machine and mechanical equipment room spaces without going through assigned areas, such as a custodian's closet, studios, laboratories, telecommunications areas, etc.
 - viii. The minimum clearance around any piece of mechanical equipment is 3'-0".
 - ix. Provide hose bibs in mechanical rooms containing equipment with hydronic coils. Provide floor drains for capture of condensate.
- C. Avoid installation of equipment above ceilings (except for terminal units) and obtain approval from the Owner. Locate above ceiling equipment with electrical motors, belts, bearings, or filters in areas easily accessible for servicing without the use of lifts or scaffolding. No AHU systems above 5 tons are allowed above ceilings. Outline area to pull coils and other access areas on drawings.
- D. Roof-mounted equipment can be considered but should be reviewed with the Owner during the schematic design phase. Where roof-mounted HVAC equipment is required, the installation shall include:
- x. A roof hatch and ladder with security provisions to allow only authorized user access.
 - xi. Provide a 120 volt AC, ground fault protected electrical outlet within a 25-foot radius from all equipment.

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- xii. Provide weatherproof mounting curbs, flashed into roofing, at a minimum of 14-inches above the roof surface.
 - xiii. Remoted mounted, NEMA 3R, disconnect.
 - xiv. Provide bracing for appropriate wind loads and seismic loads as required by code.
 - xv. Route piping external to roof curbs and equipment enclosures through separate roof penetrations and not through a pipe chase or cabinet provided by the equipment manufacturer. Provide weather-resistant valves and actuators.
 - xvi. Furnish freeze protection pumps and controls for roof mounted hydronic equipment.
- E. Exterior ground-mounted equipment
- i. Surround ground mounted HVAC equipment with a secure, lockable enclosure.
 - ii. Provide equipment clearances not less than those recommended by the manufacturer for service, ventilation, and removal.
 - iii. Provide an electrical outlet with ground-fault circuit breaker protection within 25-feet, in line of sight.
 - iv. Provide a freeze-proof hose bib or hydrant within 50-feet of ground-mounted equipment with cooling coils.
 - v. Remoted-mounted, NEMA 3R, disconnect.
3. Work in existing buildings –additional requirements
- A. Prior to the start of any work in existing facilities, schedule all activities and working hours with Owner. This includes any shutdown of existing utilities, fixtures, or equipment.
 - B. Protect all existing structures and finishes against damage from all construction work.
 - C. Notify Owner prior to any drilling or cutting of concrete floors to protect the safety of occupants. Confirm with Owner that no x-ray of slabs, for electrical conduit or post tension cables, is required. This will assure equipment operator safety and maintain the structural integrity of the building.
 - D. If systems are replaced or removed contact Owner to discuss options for storage or disposal.

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- E. When units containing refrigerants are removed as part of the scope, the contractor is required to recover the refrigerant into Owner-furnished canisters.
 - F. Assess items removed from service for any hazardous materials. If identified, proceed with appropriate disposition of hazardous materials per local, state, and federal laws.
 - G. Do not leave piping, fixtures or equipment taken out of service. Remove all branch piping taken out of service to the nearest pipe remaining in service. For all water and gas applications, install a valve, for future use, and a permanent cap. For all other applications, install a permanent cap.
 - H. Protect all existing structures and finishes from all demolition work.
 - I. Coordinate with Owner for equipment to be salvaged and delivered to Owner at a specified location.
 - J. Service outages
 - i. Do not schedule service outages during normal school operating hours. Require a written request for all required service outages a minimum of two weeks prior to anticipated shut-down. The contents of the written notification shall include a schedule of the work involved and an estimate of the time required to accomplish the work. Shutdown will not proceed without written authorization from the Owner. Utility outages to MDF rooms and media center longer than 24 hours may require implementation of temporary HVAC, power, life-safety, and security measures.
 - K. Construction dust control measures.
4. Variable frequency drives
- A. UL labeled, pulse width modulated (PWM) inverter for HVAC applications is required.
 - B. VFDs rated for operation without fault for up to plus/minus 10%, and plus/minus 5% frequency are required.
 - C. Provide NEMA 1 enclosures in clean and dry indoor environments and NEMA 3R enclosures in wet indoor environments. Provide NEMA 4 enclosures outdoors.
 - D. Output reactors are required on the drive output side of the VFD drives.
 - E. Total Harmonic Distortion (THD) to meet IEEE 519. Minimum 5% DC bus impedance is required.

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- F. 100,000 RMS short circuit rating is required.
 - G. BACnet communications protocol is required.
 - H. Acceptable manufacturers: Yaskawa or ABB. No exceptions are allowed.
5. Ductwork and Piping
- A. Specific fire, smoke, and combination dampers where required by code when penetrating rated walls.
 - B. Specific control of smoke and combination dampers.
 - C. Specify duct mounted smoke detectors for air handling equipment as required by code.
 - D. Specific who furnishes, installs, and wires control devices.
6. Warranty requirements
- A. Clearly state equipment warranties at the time of submittals and again in the close-out documentation. Equipment warranties begin upon acceptance of functional testing by Owner's third-party commissioning authority. Warranties tied to shipping or start-up date are not acceptable.
 - B. Consult with Owner to determine if additional warranty durations should be included as an alternate to the project are required.
 - C. General: Minimum, 1-year from substantial completion for parts and labor for all mechanical equipment
 - D. Warranties durations:
 - i. Air handling units: Minimum 5-year warranty directly from the manufacturer for parts and labor.
 - ii. Water chillers: Minimum 5-year warranty directly from the manufacturer for parts and labor.
 - iii. Heating water boilers: Minimum 5-year warranty directly from the manufacturer for parts and labor.
 - iv. Hydronic pumps: Minimum 5-year warranty directly from the manufacturer for parts and labor.
 - v. Packaged roof-top units require a 5-year warranty for parts and labor directly from the manufacturer. Gas fired furnaces require a 15-year parts warranty directly from the manufacturer.
 - vi. Split-system air conditioning and heat pump units require a 5-year warranty for parts and labor directly from the manufacturer. Gas fired

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- furnaces require a 15-year parts warranty directly from the manufacturer.
- vii. Self-contained direct expansion air-cooled units require a 5-year warranty for parts and labor directly from the manufacturer.
 - viii. Water sourced heat pumps require a 5-year warranty for parts and labor directly from the manufacturer.
 - ix. Mini-split type HVAC units require a 2-year warranty for parts and labor directly from the manufacturer. Warranty includes control system and refrigerant loss.
 - x. Variable frequency drives require a 3-year warranty for parts and labor directly from the manufacturer.
 - xi. Kiln exhaust fans require a 2-year warranty for parts and labor directly from the manufacturer.
 - xii. Dust collectors require a 2-year warranty for parts and labor directly from the manufacturer.
 - xiii. Refer to the “service” section for manufacturer’s service during warranty period.
7. Manufacturer’s services: All mechanical equipment shall require participation by the manufacturer’s technical representative, as follows:
- A. Pre-installation: Awarded contractor shall schedule a pre-installation meeting with the equipment manufacturer’s representative. The meeting requires attendance by all trades that have installation duties associated with the equipment. Manufacturer’s representative shall review all aspects of the installation including water, gas, electrical, venting, condensing, and controls. Provide a written record of the pre-installation meeting including dates and names of attendees to the Owner’s Commissioning Authority prior to start-up.
 - B. Start-up: Start-up of all mechanical equipment is required by a manufacturer’s technical representative who will provide a written certification that the installation meets the manufacturer’s requirements. Start-up by an installing contractor who is authorized to conduct start-up on behalf of the manufacturer is not acceptable.
 - C. Commissioning: Manufacturer’s technical representative shall set aside time, as agreed upon by the Owner and Engineer, to coordinate field-commissioning tasks with the control’s contractor. Technical representative shall set aside a

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minimum of one day to participate in functional testing with Owner's third-party commissioning agent. Technical representative shall issue a written report stating the systems are operational and controlled in accordance with manufacturer's requirements.

- D. Warranty service: Manufacturer's technical representative shall inspect all systems installed with a frequency of no less than once every 6 months for the duration of the warranty period (see below). Manufacturer's technical representative shall issue a written and signed observation report at the time of each visit, stating any deficiencies that require correction and attention by maintenance personnel, and indicating items requiring connections by the manufacturer under the terms of the warranty.

8. Emergency Systems:

- A. Chiller rooms are to be equipped with a code compliant purge exhaust and the necessary detectors. Minimum of sensors per refrigeration device are required. Provide annunciator both inside and at all points of entry to space and to the BAS.
- B. Boiler rooms are to be provided with carbon monoxide (CO) sensors (one per room and not per boiler). Provide annunciator both inside and at all points of entry to space and to the BAS.
- C. Relief Vents and Rupture disks are to be piped the shortest distance to the exterior of the building and terminate above the roof at least at IMC required minimum distance from ventilation intake or operable windows.
- D. Emergency generators shall be sized to permit operation of the heating plant and air handling devices to support operation of the large assembly areas including the cafeteria, auditorium, gym and multipurpose rooms. Approach to be confirmed with the District by the end of Schematic Design.

9. Space Temperature Control:

- A. All space mounted temperature control devices shall be secured in lockable covers (temperature sensors to be thermistor type with stainless steel plate flush mounted to the wall), integrated into the building automation system, and provided in accordance with the following:
 - i. Gymnasiums/Kitchens/Shops: Single control device space mounted.
 - ii. Toilet Rooms: Enclosed within radiation housing.
 - iii. Shower Rooms/Drying Rooms: Enclosed within radiation housing.

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- iv. Natatoriums: Located in return air inlet.
- v. Auditoriums/Cafeterias/Classrooms/Offices: Wall mounted.
- vi. Mechanical Rooms: Wall mounted.

B. See Section 230926 Building Automation Systems for further details.

10. Restrictions:

- A. The District does not operate cooling and heating plants simultaneously, therefore reheat is unavailable during the cooling season. Economizer provisions should be established to maintain sufficient cooling capability during shoulder seasons when the cooling plant is off-line. Variable air volume systems are not desirable.
- B. Use dual fuels in all facilities (No.2 oil and interruptible gas service), unless otherwise agreed upon with the Owner.
- C. Designers must locate outside air intakes twenty-five feet from all exhausts, vents and stacks or minimum allowed by Code. Intakes below this amount are to be noted.
- D. A maximum heating hot water temperature of 120 to 180°F should be established early in design and should be optimized based on boiler plant design for maximum operating efficiency. All heat transfer equipment, pump flows, and coil selections must be adjusted for the final selected temperature ranges.
- E. Use of ice storage systems is not acceptable, unless approved and shown to provide life-cycle cost effective energy cost benefits.
- F. Grade level installation of equipment air-cooled chillers, cooling towers etc. have been subject to severe vandalism. Installations at grade are acceptable with consideration of local site conditions and provisions for appropriate perimeter screening.
- G. Under no circumstances is duct mounted humidification to be provided.
- H. Globe valves shall only be used where a throttling requirement exists. The District prefers the use of ball valves for line size up to 2.5" and butterfly valves for line size above 2.5" on all non-throttling shut off applications. All strainers 1" and larger shall be provided with blow down valve on strainer discharge. Flow rates below 5 gpm shall use two position valve actuators. High flows may use two position or modulating valve actuators.

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- I. Flexible ductwork is only permitted for lengths up to 5 ft at the final connection to diffusers, registers, and grilles.
 - J. Door louvers are not permitted.
 - K. The use of T-drill, T-drill II, Rigid pipe clamp system or other devices to fasten steel piping is prohibited. (Use of T-drill to form butt-weld Tee fittings for copper tuning and piping is permitted. Such mechanically formed tee fittings shall be brazed in accordance with the Copper Development Association's Cooper Tube Handbook using BcuP series filler metal.) Mechanical coupling type fittings for copper and steel piping is acceptable.
 - L. All discharge piping from F&T traps must pitch towards the condensate feed tank on low-pressure steam applications.
11. Exceptions
- A. Any deviations from the District standards are to be reviewed and approved prior to the incorporation in any design. Changes to the base design concept will require a lifecycle/operating cost analysis. Operating cost analysis shall be based on actually school usage allowing for summer outage and reduced usage.
 - B. Operation of central plant shall compare to the District's operating cycle. Equipment life expectancies are to be based on District standards.

Section 230926 – Building Automation Systems

1. For work in existing buildings with other control systems, the designer will consult with the Owner and the Owner's Commissioning Authority. The preferred BAS system shall be a generic BACnet compliant system, compatible with the following three major manufacturer's: Trane, JCI, and Carrier.
2. Design team shall develop a complete design for the control system, including operational sequences, points lists, control diagrams, and initial setpoints for each system controlled. Submit controls system design for review by Owner and the Owner's Commissioning Authority at the design development phase and at construction documents phase. Points lists should include each individual device, including control valves.

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3. Provide packaged direct-expansion equipment with onboard controls by the equipment manufacturer. Equipment controls shall allow for remote on/off control, setpoint adjustment, and monitoring from the Building Automation System. It is the design team's responsibility to obtain and document all requirements for interface between equipment manufacturer's controls and the Building Automation System.
4. For controls provided by equipment manufacturer, the design team shall document manufacturer's sequence, points that are accessible from the operator interface for monitoring, control and adjusting, hard-wired points from the controls system, and control diagrams.
5. Locate temperature sensing devices away from supply air diffusers. Consider ADA requirements when specifying the installation height of temperature sensing devices.
6. Integrate each water consumption meters into the Building Automation System in the form of a dashboard that will display the following:
 - A. Instantaneous consumption and peak.
 - B. Cumulative daily consumption and daily average.
 - C. Cumulative monthly consumption and monthly average.
 - D. Cumulative annual consumption and average.
7. Integrate each natural gas consumption meters into the Building Automation System in the form of a dashboard that will display the following:
 - A. Instantaneous consumption and peak.
 - B. Cumulative daily consumption and daily average.
 - C. Cumulative monthly consumption and monthly average.
 - D. Cumulative annual consumption and average.
8. Integrate electric consumption meters into the Building Automation System in the form of a dashboard that will display for each category. Refer to *Chapter 5, Division 26 – Electrical* for additional information.
9. Refer to *Chapter 5, Division 22 - Plumbing* and *Chapter 5, Division 23 - Mechanical* for requirements on locations for consumption meters.
10. Building automation systems and components shall be certified to meet ASHRAE-135 BACnet standard. (ie: Native BACnet)
 - i. All communications shall be in BACnet protocol, and wiring standards.
 - ii. All communications wiring shall be in EMT conduit in ceilings, rigid conduit in mechanical rooms.

- iii. BACnet system shall be represented by job specific in schematic form on BAS plans (front end and major equipment controllers and programmable controllers).
- iv. Automation system plans shall have dedicated number section within mechanical plans.
- v. Automation system plans shall include system specific schematic plans showing controller, inputs (temperature, pressure, CO₂, Relative humidity, status and outputs (signal for start/stop, fan and or pump speed, damper position, valve, etc), sequences (on plan or in specifications), point list, etc.
- vi. There shall be a human interface front end for the building engineer.
- vii. Complete interactive graphics for monitoring and control showing floor plans, dedicated controller graphics and graphics created to show programmable controllers specific systems including all inputs and outputs.
- viii. Alarms shall be programmed to show any equipment operating outside parameters and setpoints, or preprogrammed equipment alarms.
- ix. Front end shall have levels of access to allow minimal control adjustment for building engineers, and higher level of access for techs for programming and troubleshooting.
- x. There shall be a hand held interface for our dedicated service techs to access controllers and or the network. The system shall be capable of being connected to a common central system.
- xi. The use of products by Tridium and Niagara are not native BACnet and have multiple security flaws and are not permitted by the district.
- xii. BACnet compatible devices are not native BACnet and are not acceptable by the district.
- xiii. All sensors, control valves dampers shall be specified.
- xiv. Classroom mounted temperature sensors shall be brushed stainless only with temperature sensing element located behind the cover. No field adjustment or display is allowed.
- xv. In renovations all existing control tubing (if pneumatic) or wiring, controls, control panels and air compressors shall be specified to be demolished and removed.

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- xvi. Specify 120 power wiring from breaker, through separate power conduit for control power and junction boxes for remote controllers, panels and actuators requiring dedicated power source shall be by the job electrical contractor.
- xvii. Low voltage wiring and transformers if required shall be by mechanical contractor or subcontractor for automation.

Section 230519 – Meters and Gauges for HVAC

1. Provide direct reading thermometers, gauge cocks, thermometer wells, and test plugs for each piece of HVAC equipment (boiler, chiller, cooling tower, water coil, etc.).
2. Locate devices appropriately in order to monitor leaving and entering water temperature from each water coil, heat exchange vessel, and elsewhere in the line as required to monitor or evaluate performance of systems and components.
3. Provide pressure gages with valves to allow reading of inlet and outlet pressure of chillers, boilers, pumps, and water coils.
4. Provide common pressure gauge with piping and valves so the same gauge is used for suction, discharge, and differential pressure at pumps.
5. Mercury-free temperature reading devices are required.

Section 230593 – Testing, Adjusting, and Balancing for HVAC

1. Provide testing and balancing for HVAC systems by an independent firm not associated with the design engineer or installation contractor of the systems. Membership in the Associated Air Balance Council (AABC), or the National Environmental Balancing Bureau (NEBB) is required.

Section 230713 / 230716 / 230719 - Duct, Equipment, and Piping Insulation

1. Pipeline insulation:

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- A. Insulation is required for chilled water, hot water, condensate drain, and refrigerant suction lines.
 - B. Exterior piping and exposed interior piping below 10-feet requires an aluminum jacket cover.
 - C. Phenolic foam or foamglas insulation for chilled water is required.
 - D. Provide fiberglass insulation for hot water.
 - E. Closed-cell insulation for condensate piping is acceptable in non-return air, plenum areas. Provide phenolic foam or foamglas insulation in return air plenum areas.
 - F. Removable/replaceable insulation covers on valves, test ports, strainers and pumps are required.
 - G. All insulated piping shall receive a primer that is approved by the insulation manufacturer, prior to applying insulation.
 - H. Paint all condenser water piping with an epoxy-based paint.
2. Air duct insulation
 - A. Externally insulate supply, return and outside air intake ductwork with 2-inch foiled faced fibrous insulation.
 - B. Externally insulate the first 20 feet of exhaust duct adjacent to exterior walls or roofs with 2-inch foiled face fibrous insulation.
 - C. Flexible ducts require factory-applied insulation.
 - D. Ductwork constructed of fibrous duct board is not allowed.
 - E. Internal duct lining is not allowed.
 3. All insulation shall meet fire/smoke requirements for the application.
 4. Provide weatherproof exterior insulations.
 5. Provide vapor-sealed interior insulation.

Section 231113 – Fuel Oil Piping

1. Underground Fuel Storage Tanks
 - A. Acceptable manufacturers: Highland Tank or pre-approved equal
 - B. Description: Double wall steel tank with STI-P3® coating. Provide two manholes one fill and one level opening with bolted and gasket lids. Internal ladder with 2"X 1/4" flat bar sides and 3/4" diameter rungs 12" on center. Striker

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plates required under each opening. Polyurethane coating (15 mils DFT head and shell) per STI-P3® spec. The corrosion control system shall be in strict accordance with STI-P3® specifications as applied by a licensee of the STEEL TANK INSTITUTE and shall have the STI-P3® limited 30 year warranty against failure due to exterior corrosion and internal corrosion when used with petroleum products or alcohols. Tank shall bear UL and STI-P3® labels. Manholes will have 42" dia. Cast-iron grade covers with vandal-proof fasteners.

C. Installation: An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100- 94. Before placing the tank in the excavation, all dirt clods and similar foreign matter shall be cleaned from the tank, and areas of coating damage shall be repaired with a compatible coating supplied by the manufacturer. An air test of the tank above ground is required. Pressure should not exceed 5 psi while a bubble solution is applied to welded seams. Refer to instructions on side of tank or per PEI RP100-94. Under no circumstances use chains or slings around the tank shell. Special Note: Hold Down Straps--Special care should be exercised when installing hold down straps to ensure that the straps are separated from the tanks by separating pads made of an inert, insulation dielectric material. The separating pad should be at least 2" wider than the hold down straps width and must be carefully placed anywhere on the tank where hold down straps would come into direct contact with the tank shell. Sizing of concrete pad beneath the tank shall be as recommended by the tank manufacturer.

D. Accessories:

i. Tank and piping leak monitoring detection unit.

ii. Tank level meter with reporting feature to DDC for current level and alarm at field adjustable set point.

E. Additional Notes: Tank shall be sized for fourteen day capacity. Fiberglass and above ground storage tanks are not acceptable. Tank will be sized based on fuel-oil required for operation of boilers to meet the full design load for 80 hours of occupied time plus to meet the 30% of design load for 256 hours of unoccupied time.

F. Design Standard Web product page: <http://www.highlandtank.com/>

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Section 231113 – Fuel Gas Piping

1. Gas Boosters
 - A. Acceptable manufacturers: Eclipse or pre-approved equal
 - B. Description: Gas Booster shall be pre-wired, factory-tested, packaged type, skid mounted, and ready with field connections for gas piping and power supply.
 - C. Installation: Provide 6” housekeeping pads for equipment. Provide isolation valves for servicing.
 - D. Accessories: Furnish with cooler.
 - E. Requirement of cooler will be as recommended by the manufacturer.
 - F. Additional Notes: Review with PGW the existing gas pressure. In the event available gas pressure is questionable specify booster as deduct alternate with line item costs.

Section 232113 / 232116 – Hydronic Piping and Specialties

1. Piping general requirements
 - A. Avoid routing of piping within MDF and IDF communication equipment rooms. Provide shielding to protect equipment from potential water damage.
 - B. Do not route piping through electrical and elevator machine rooms.
 - C. Identify above grade piping systems with pipe markers to indicate the type of material being conveyed.
 - D. Identify valves with stamped brass tags, keyed to a valve list.
 - E. Piping installed on the roof is not permitted, unless specifically serving roof-mounted air handlers.
 - F. Install pipe penetrations into buildings through chases with isolation valves inside building.
 - G. Provide isolation valves at all piping branch-offs of piping.
 - H. Design piping to allow for expansion and contraction without overstressing the pipe. Design growth strategy pipelines, including, anchors, one-dimensional slides, and expansion joints.
 - I. Provide seal sleeves for pipes passing through floors, walls and roofs. Provide watertight and rated sleeves to match the fire and smoke rating of the assembly.

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- J. Seal fire rated wall penetrations per code standard.
 - K. Victaulic pipeline connections are allowed for use in hydronic system installed in dedicated mechanical rooms and exterior to the building.
2. Hot and chilled water piping
- A. Design to a maximum friction loss of 4-feet per 100-feet of pipe for mains and branches, using a minimum velocity of 2 ft/sec.
 - B. Run outs to individual coils are not allowed to exceed 8 ft/sec velocity.
 - C. Avoid joints below floor slabs and route piping in accessible locations.
 - D. Provide a minimum schedule 40 black steel piping with wrought steel fittings, wrought-cast or forged-steel flanges, flange fittings, and welded and flanged joints for sizes 2.5-inches and above. Welded or flanged steel pipe is required.
 - E. Provide hard drawn Type L copper with wrought copper fittings for sizes less than 2-inches. Soldered joints for copper pipe are required.
 - F. Grooved mechanical joints and mechanical pressed joints are only permitted in dedicated mechanical room.
 - G. Provide unions or flanged joints at each piece of equipment, valve, or device in the system to allow future removal.
 - H. Pressure test systems at 200% of the design operating pressure, but not less than 125 psi. Verify that test pressure will not exceed any component pressure rating.
 - I. Underground hot water piping shall pre-insulated Schedule 40 steel pipe with expansion compensation and thrust blocks to prevent excessive pipe movement and stress.
 - J. Provide pre-insulated minimum schedule 40 steel for underground chilled water piping 6-inches or smaller, or AWWA C900 PVC (Blue Brute) for pipe diameter 8-inches or larger. Provide thrust blocking at changes in direction, changes in size, and at dead ends. Provide thrust block and specialized fittings when transitioning from C900 pipe below grade to steel pipe above grade.
 - K. Provide manual air vents at all high points. Provide drains at all low points.
 - L. Protect piping against freezing by either recirculation sequences or electric heat tracing. Provide built-in ground fault protection on heat trace controllers.
 - M. Provide full-size valves and blind flanges at chilled water and hot water supply and return lines to allow for connection of temporary chillers and boilers. Coordinate location of temporary connections for ease of use and no risk of

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freezing. Provide valves to allow bypass of permanent equipment as required for connection of temporary equipment.

- N. Treat non-insulated hydronic pipelines located in crawl spaces with corrosion resistant paint. For insulated hydronic pipelines located in crawl spaces, treat fittings joints, and/or connections with corrosion resistant paint prior to installing the insulation.
 - O. Piping made in USA is required. Steel, copper, and PEX is acceptable, per requirements of the IMC.
3. Valves
- A. Each pump, heating or cooling water coil, chiller, and boiler require valves to balance, drain, isolate, purge air, and measure pressure.
 - B. Pumps require check valves on the pump discharge.
 - C. Provide full-port, ball valves for pipeline sizes 2-inches and less. Provide butterfly valves for pipeline sizes 2.5-inches and larger.
 - D. Ball valves shall have blow-out proof, stainless steel ball and stem.
 - E. Provide gear operators for butterfly valves 4 inches and. Install gear operators facing down.
 - F. Provide stainless steel stems on all exterior isolation valves.
 - G. Provide chain operators for valves over 13-feet above finished floor. Extend chains to 7-feet above finished floor. Chain operators are only intended for mechanical rooms.
 - H. Consider using high performance butterfly valves for critical applications.
4. Air separation and expansion
- A. Each closed pumping system requires an automatic air separator and expansion device piped with an isolation valve to vent drain at high points in the system, an ASME-rated diaphragm type compression tank, and in-line centrifugal type separator with strainer.
 - B. Furnish expansion tank sizing calculations on the plans.
5. Piping specialties
- A. Circuit setter: Provide circuit setter stations for each air handler coil, chiller, boiler and pump.
 - B. Strainers: Provide a cleanable strainer on the suction side of each pump with full size ball valve and piped to a floor drain for blow down

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- C. Flexible connections: Use flexible connectors where piping connects to rotating or vibrating equipment and where below-grade piping is subject to movement due to expansion and contraction of the soil.
- D. Furnish backflow preventer (Reduced pressure zone (RPZ) type for pressure rated equipment connected to domestic water supply.
- E. Furnish PRV for connection to domestic water system.

Section 232123 – Hydronic Pumps

1. Provide centrifugal pumps for heating, cooling, or condenser water systems.
2. Pumps with packing glands are not acceptable.
3. Provide a suction diffuser for each chilled or hot water pump or 10-diameters of straight pipe with an eccentric fitting at the pump suction inlet. Select pumps with suction inlets no less than one pipe size smaller than the suction line serving the pump.
4. Base-mounted, end suction pumps are preferred for most applications. Obtain written request for deviation from the Owner for use of other pump types.
5. Pumps operating at variable speed (VFD) shall use inverter duty motors, couplings, and shaft grounding ring. Each pump shall have a dedicated VFD (not shared).
6. All pumps require TEFC motors.
7. Spring isolated pumps are required for base mount pumps.

Section 232300 - Refrigerant Piping

1. Prior to equipment selection review refrigerant options with Owner to include considerations related to use of refrigerants. Do not specify equipment with refrigerants that are no longer in production or planned phased-out of manufacture within 5 years.
2. In general, the expectation is to deliver all equipment to the site with all refrigerant piping in place from the factory. Any required field piping is required to comply with the current ASHRAE Refrigeration Handbook. Maximum allowable line loss for suction, hot gas and liquid lines is the pressure equivalent of one degree of temperature (Fahrenheit) or not more than 1.0 psi for each line.

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3. ACR, hard drawn Type L copper pipelines with wrought copper fittings is required. Solder piping with silver solder and with dry nitrogen in the lines.
4. Design refrigerant suction lines to transmit oil up vertical risers at minimum load conditions. Use double risers where necessary.
5. Provide valves to isolate compressors and pump down the system.
6. Provide a liquid-moisture indicator, replaceable liquid line filter-drier, hot gas muffler, expansion device (TXV), and pressure relief device in each refrigerant circuit.
7. Test each system for leaks at 200 psi with an electronic leak detector and evacuated to 500 microns prior to charging.
8. Manufacturer's requirements required to fulfill warranty supersede these requirements.

Section 232500 – Water Treatment

1. Chemical water treatment is provided by the Owner's water treatment company, with the installation and first year of service included as part of the project.
2. Flush, clean, and treat closed hydronic systems. Provide bypass pot feeder with replaceable filter and differential pressure gauge for closed hydronic systems.
3. For work involving or connecting to existing systems, clean and flush the entire hydronic system, blow down all the strainers, and provide chemical treatment of entire system.
4. Provide an automatic chemical treatment system for open water systems by the Owner's water treatment company.
5. Acceptable manufacturers: LMI Milton Roy
6. Description: Provide a stand-alone system for each of the following applications:
7. Chilled Water: provide 5-gallon capacity chemical bypass feeder of Neptune-make, piped across the suction and discharge headers of circulating water pumps.
8. Hot Water (except in the case of dual temperature systems): provide 5-gallon capacity chemical bypass feeder of Neptune-make, piped across the suction and discharge headers of circulating water pumps.
9. Condenser Water:
 - A. LMI Chemical Feed Pump Model # P151-91T, for each Chemical Feed Tank
 - B. LMI Chemical Feed Tank Model # 27400. Provide two tanks, one for bio-feed and one for Inhibitor.

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- C. LMI Conductivity Controller with dual biocide Model # DC4500
 - D. 56 gallon 316 Stainless Steel containment tank
 - E. $\frac{3}{4}$ " solenoid valve, isolation ball valve, sensing water-meter for cooling tower make-up water and interconnecting piping
 - F. Installation: Provide 6" housekeeping pads for equipment.
 - G. Accessories: One (1) inhibitor test kit, two (2) liquid biocide test kit
10. Additional Notes: Install equipment only as part of this contract. Thirty days prior to start-up notify project manager to coordinate take-over by water treatment contractor. Water treatment contractor will assume operation of treatment program under a separate general services contract. Separate chilled and hot water loops shall each be provided with treatment equipment for each loop.
11. Design Standard Web product page: <http://www.lmipumps.com/>

Section 233113 - Metal Ducts

1. Construct supply and return air ducts of galvanized metal.
2. Provide flexible duct to connect a main or branch duct to an air device. Limit flexible duct length to 5 feet. Make connections from vertical face of the rectangular duct.
3. Seal all supply and return duct joints and seams with mastic. Pressure test systems with an operating static pressure of more than 1-inch and achieve a leakage rate of less than 5%. Systems with an operating static pressure of less than 1-inch are not required to be pressure tested. Specify all ductwork for Class A seals per SMACNA.
4. Provide seal sleeves for ducts passing through floors, walls and roofs. Water tight and rated sleeves are required to match the fire and smoke rating of the assembly.
5. Seal penetrations through rated wall assemblies per code.
6. Where exposed to view, round spiral duct is preferred over rectangular ductwork.
7. Use code-approved duct materials for special applications such as laboratories, kitchens, and shop areas in accordance with SMACNA standards.
8. Exposed supply ductwork on roofs is not acceptable. Consider stainless steel exhaust duct for special (laboratory) applications.
9. Where plenum return systems are used, provide return boots with sound attenuation.
10. For risers, size ductwork for return air maximum velocity of 1200 FPM and supply air maximum velocity of 2000 FPM.

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Section 233300 – Metal Duct Accessories

1. Dampers

- A. Provide dampers in the mains, branches, returns, exhaust, and outdoor air intakes for balancing of each duct system.
- B. Provide opposed-blade dampers, except that single blade type may be used in branches to individual air devices. Clear denote the open and closed positions and the normal operating position of each damper.
- C. Include provisions for ensuring that dampers are visible, accessible, and easy to operate after installation is complete.
- D. Where balancing dampers are located above hard ceilings, provide cable-operated (Young's regulators) dampers to allow for adjustment without accessing the ceiling space.
- E. Provide fire dampers and fire-smoke dampers at locations required by Authority having Jurisdiction. Provide properly labeled and numbered access panels.

2. Intake and exhaust air

- A. Protect outside air intakes and exhausts with rainproof louvers, hoods, or other approved systems, and bird screens.
- B. Design intakes and exhausts to protect against accidental freeze-up of adjacent interior equipment or piping.
- C. Design intakes and exhausts to protect against short circuiting of air streams or nearby operable windows or doors.
- D. Size intakes to minimize air velocity to eliminate the possibility of water intrusion.
- E. Design outside air intake and exhaust openings as high as practical to prevent introduction of foreign materials into the building.
- F. Provide lightning-protection systems on exterior equipment, flues, and exhaust stacks.

Section 233423 – HVAC Power Ventilators

1. Utility Centrifugal Fans

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- A. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck, Penn Ventilator
- B. Description: direct-drive centrifugal fans with fan speed control consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
- C. Housing: Fabricated of galvanized steel with side sheets fastened with a deep lock seam or welded to scroll sheets
- D. Fan Wheels: Single-width, single inlet; welded to cast-iron or cast-steel hub and spun-steel inlet cone, with hub keyed to shaft.
- E. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
- F. Shaft Bearings: Pre-lubricated and sealed, self-aligning, pillow- block-type ball bearings with ABMA 9, L50 of 200,000 hours.
- G. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.
- H. Service Factor Based on Fan Motor: 1.5
- I. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with motors larger than 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
- J. Belts: Oil resistant, non-sparking, and non-static; matched sets for multiple belt drives.
- K. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
- L. Installation: Provide vibration isolation on hangers and duct connections. Install floor-mounting units on concrete bases. Roof mounted units shall be installed on full curbs. Install units with factory recommended clearances for service and maintenance.
- M. Accessories:
 - i. Scroll Access Doors: Shaped to conform to scroll, with quick- opening latches and gaskets.
 - ii. Companion Flanges: Galvanized steel, for duct connections.
 - iii. Inlet Screens: Removable galvanized steel welded grid screen.
 - iv. Scroll Drain Connection: NPS 1 (DN 25) steel pipe coupling welded to low point of fan scroll.
 - v. Damper: Counterbalanced, parallel-blade, backdraft dampers mounted in fan discharge; factory set to close when fan stops.

- vi. Weather cover and roof curb factory furnished where required.
 - vii. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
- N. Design Standard Web product page: <http://www.lorencook.com/>

2. Roof Centrifugal Fans

- A. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Penn Ventilator, Greenheck
- B. Description: Belt-driven or direct-driven (preferred) centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- C. Housing: Removable, spun-aluminum, dome top and outlet baffle, square, one-piece, aluminum base with venturi inlet cone.
- D. Up blast Units: Provide spun-aluminum discharge baffle to direct discharge air upward.
- E. Fan Wheels: Aluminum hub and wheel with backward- inclined blades.
- F. Belt-Driven Drive Assembly: Resiliently mounted to housing.
- G. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
- H. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
- I. Pulleys: Cast-iron, adjustable-pitch motor pulley.
- J. Fan and motor isolated from exhaust air-stream.
- K. Installation: Provide vibration isolation on duct connections. Roof mounted units shall be installed on factory curbs. Install units with factory recommended clearances for service and maintenance.
- L. Accessories:
 - i. Roof curb galvanized steel; mitered and welded corners; 1-1/2- inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Self-flashing with built-in raised cant and mounting flange. Overall height: 18" with intergral backdraft damper
 - ii. Bird Screens: Removable, 1/2-inch mesh
 - iii. Variable-Speed Controller: Direct drive motors only.

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- iv. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

M. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.

N. Design Standard Web product page: <http://www.lorencook.com/>

3. Cabinet Centrifugal Fans

A. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck

B. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications. Steel housing with lined with acoustical insulation. Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

C. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.

D. Accessories:

- i. Variable-Speed Controller: Direct drive motors only.

- ii. Isolation: Rubber-in-shear vibration isolators.

- iii. Manufacturer's standard roof jack or wall cap, and transition fittings.

- iv. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

E. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.

F. Additional Notes: Exhaust fans shall be mounted Use ceiling grille type specified elsewhere not fan manufacturer's grille.

G. Design Standard Web product page: <http://www.lorencook.com/>

4. In-Line Centrifugal Fans

A. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck

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- B. Description: In-line, belt-driven centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets, and accessories.
 - C. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
 - D. Direct-Driven Units: Motor encased in housing outside of air- stream, factory wired to disconnect switch located on outside of fan housing.
 - E. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
 - F. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
 - G. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.
 - H. Accessories:
 - i. Companion flanges with flex connectors.
 - ii. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
 - iii. Fan Guards: 1/2- by 1-inch mesh of galvanized steel in removable frame for units not connected to ductwork.
 - iv. Access doors for units with fans in air-stream
 - v. Belt guards
 - I. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.
 - J. Design Standard Web product page: <http://www.lorencook.com/>
5. Propeller Axial Fans
- A. Acceptable manufacturers: Loren Cook, JennFan, Carnes, Greenheck
 - B. Description: Belt-driven or direct-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.
 - C. Housing: Galvanized steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.

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- D. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.
 - E. Fan Wheel: Replaceable, cast-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
 - F. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
 - G. Installation: Provide vibration isolation on duct connections. Install units with factory recommended clearances for service and maintenance.
 - H. Accessories:
 - i. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
 - ii. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications
 - iii. Wall Sleeve: Galvanized steel to match fan and accessory size.
 - iv. Variable-Speed Controller: For direct drive motors.
 - I. Electrical: All wiring 120 volt and higher shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box. Provide junction box for electrical connection on housing.
 - J. Design Standard Web product page: <http://www.lorencook.com/>
6. Kiln Exhaust Systems
- A. Provide kiln exhaust systems in spaces as directed by program need. Consult with Owner for application.
 - B. For kilns without bottom draft connection, the exhaust shall have retractable capture hoods that direct air to the building exterior. Provide make up path from an adjacent space into the room where the kiln is located.
 - C. For kilns with bottom draft connection, the exhaust shall be directly attached to connection point and the air flow transferred to the building exterior. Provide make up path from an adjacent space into the room where the kiln is located.
 - D. Provide a dedicated, general space, downdraft room exhaust fan for kiln rooms that transfers air to the building exterior.

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- E. Control exhaust fan with a local control panel. Monitor operation of the kiln. Provide on, off, and automation selector switch. Enable when kiln is on. Provide a delay timer that runs the exhaust system for a minimum of 24 hours after the kiln is off.
- F. Provide carbon monoxide sensors in the room. Basis of design manufacturer is Kilnmaster-Skutt with EnviroVent Model KM-1027-3.

Section 233425 – Dust Extraction Systems

1. Provide dust collection systems in spaces as directed by program need such as wood shops, construction labs, etc. Consult with Owner for application.
2. Locate dust collectors on the exterior of the building, as close as possible for the area of use. Provide dedicated dust collector for each space.
3. Dust collectors shall be once-through type. Recirculating dust collectors can only be used with authorization from the Owner.
4. Provide sound attenuation.
5. Provide local control via wall switch.
6. Coordinate fire alarm and fire sprinkler requirements.
7. Basis-of-design manufacturers is Donaldson Torit Cyclone.

Section 233713 – Diffusers, Registers, and Grilles

1. Acceptable manufacturers:
 - A. Adjustable Bar Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - B. Security Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - C. Fixed Face Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - D. Linear Bar Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - E. Linear Slot Diffuser: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus

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- F. Louver Face Diffuser Square Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
 - G. Perforated Diffuser Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey, Titus
2. Description:
- A. Adjustable Bar Grille or Register:
 - i. Material: Steel or Aluminum.
 - ii. Finish: Baked enamel, color selected by Architect.
 - iii. Face Blade Arrangement: Adjustable horizontal, Adjustable vertical, Concealed tamperproof blade gang operator.
 - iv. Frame: 1-1/4 inches wide.
 - v. Mounting: Countersunk tamperproof fasteners.
 - vi. Damper Type: Adjustable opposed-blade assembly.
 - B. Security Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey
 - i. Material: Steel.
 - ii. Finish: Baked enamel, color selected by Architect.
 - iii. Face Arrangement: 3/16-inch thick front lattice plate with 1- by-1 inch square holes and 1/2-inch frets, 0.135-inch wire mesh, and 1/4-inch thick backer plate.
 - iv. Frame: 1-1/4 inches wide mounting and countersunk tamperproof fasteners.
 - v. Damper Type: Adjustable opposed-blade assembly.
 - C. Fixed Face Grille or Register: METALAIRE, Inc., Price Industries, Tuttle & Bailey.
 - i. Material: Steel or Aluminum.
 - ii. Finish: Baked enamel, color selected by Architect.
 - iii. Face Arrangement: 1/2-by-1/2-by-1/2-inch grid core.
 - iv. Frame: 1-1/4 inches wide.
 - v. Mounting: Countersunk tamperproof fasteners.
 - vi. Damper Type: Adjustable opposed-blade assembly.
 - D. Linear Slot Diffuser: METALAIRE, Inc., Price Industries, Tuttle & Bailey.
 - i. Material: Steel or Aluminum.
 - ii. Finish: Baked enamel, color selected by Architect.

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- iii. Core Spacing Arrangement: 1/8-inch thick blades spaced 1/4 to 1/2 inch apart, 15 degree deflection. One Or Two-Way Deflection Vanes: Extruded construction fixed louvers with removable core.
 - iv. Frame: 1-1/4 inches wide.
 - v. Mounting: Countersunk tamperproof fasteners.
 - vi. Damper Type: Adjustable opposed-blade assembly.
- E. Louver Face Diffuser Square Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey.
- i. Material: Steel or Aluminum.
 - ii. Finish: Baked enamel, color selected by Architect.
 - iii. Face Size: 24 by 24, 12 by 12 inches.
 - iv. Face Blade Arrangement: One, Two, Three or Four way fixed blades.
 - v. Mounting: Surface, T-bar, Snap in, or Spline.
 - vi. Damper Type: Butterfly.
- F. Perforated Diffuser Ceiling Diffusers: METALAIRE, Inc., Price Industries, Tuttle & Bailey.
- i. Material: Steel or Aluminum.
 - ii. Finish: Baked enamel, color selected by Architect.
 - iii. Face Size: 24 by 24, 12 by 12 inches.
 - iv. Pattern Controller: Adjustable with louvered pattern modules at inlet
 - v. Mounting: Surface, T-bar, Snap in, or Spline.
 - vi. Damper Type: Butterfly.
- G. Installation: Indicate flow direction on ceiling diffusers. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.
- H. Additional Notes: Select diffusers registers and grilles to meet ANSI S12.60-2002 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. Devices shall be selected with a catalog Noise Criteria (NC) rating of NC18 or less. All air terminal devices used in public areas are to be steel construction, heavy grade material. Non- public areas shall utilize heavy grade aluminum grilles. All air terminal devices are to be installed a minimum 8'-0" above the finished floor.
- I. Design Standard Web product page: <http://www.metalaire.com/>

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Section 233813 – Commercial Kitchen Hoods

1. Interlock kitchen exhaust fans and associated make-up air fans to run automatically when the kitchen hoods are enabled.
2. Energy code: note requirements for use of energy recovery, demand controlled ventilation, or transfer air.
3. Captiveaire is basis of design.
4. Exhaust ductwork for kitchen hoods for cooking kitchens shall be Type I with heavy gauge welded black iron construction.
5. Furnish dedicated make up air system to work with kitchen exhaust hood. It shall supply 80% of exhaust air.
6. Furnish fire suppression system for hood.
7. Warming kitchen and dishwasher hood and exhaust duct shall be Type II stainless steel construction.
8. Provide common gas shutoff valve. It shall be manual or automatically operated as required by code.

Section 234100 – Air Filters

1. Provide disposable filters during the construction period.
2. Prior to system commissioning, provide and install filter pad holding metal frames and disposable filter media for the metal frames.
3. Provide MERV 8 filters, minimum, using two-inch filter racks on outside air intakes. Provide MERV 8 filters, minimum, using two-inch filter racks on return air sections. A different approach to air filter selection may be necessary for projects submitting for LEED Certification.
4. Select filters based on maximum 400 fpm face velocity or recommended velocity of the manufacturer, whichever is lowest.
5. Provide MERV-8 filters for construction if new equipment is used during construction period, These shall be replaced at turnover for occupancy.

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Section 235116 – Breechings, Chimneys, and Stacks

1. Acceptable manufacturers: Selkirk Metalbestos, Heat-Fab Inc., Van Packer
 - A. The Schebler, Security Chimneys and Metal-Fab, Inc. are also acceptable manufacturers.
2. Manufacturer shall verify and certify venting system sizing calculations.
3. Description: Stack and breeching shall be double wall construction. Interior liner shall be AL29-4C super-feric stainless steel. Outer jacket shall be fabricated of type 430 stainless steel. Sections shall be assembled with mechanical locking bands and built in gaskets not requiring sealant.
4. Boiler breeching shall be round, double wall construction. Inner shell shall be ASTM A-666, type 304 stainless steel (0.035" thick min.). Outer jacket shall be fabricated of aluminized steel (0.025" thick min.) Sections shall be assembled by V-bands at flanged joints. V-bands shall be type 316 stainless steel and filled with silicone during installation for sealing. Boiler breeching shall be rated for 1000 deg. F continuously or 1700 deg. F for 10 minutes, with neutral or negative flue pressure up 2" W.C. and positive pressure up to 60" W.C. at room temperature.
5. Installation: Vertical stack shall rest on 6" housekeeping pads, with cleanout door and drain. Stacks shall NOT be supported via wall bracket. Cleanouts shall be provided at each change in direction. Raincaps shall be provided at stack termination. Stack shall terminate 25'-0" from any outside air intakes.
6. Accessories: Provide adjustable, self-actuating barometric draft damper, type M+MG2 of Field Controls, on the common boiler breeching near the entrance to chimney (if boilers are forced draft type). Provide Safe-Flex fabric type flexible connector of Mid-Atlantic Services for each boiler flue outlet.
7. Additional Notes: Stack components shall be provided with a 15 year warranty. Boiler Breeching shall be provided with a 10 year warranty.
8. Design Standard Web product page: <http://www.selkirkinc.com>

Section 235200 – Hydronic Boilers

1. Provide hydronic boilers with the following performance criteria:
 - A. Low-NOx, less than 30 ppm

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- B. Full-modulation 7:1 turndown (100% - 14%)
- C. Condensing: 96% efficient when low-load/low-temperature operation is anticipated (such as dehumidification loads). Condensing boilers shall have either stainless steel firetubes or cast aluminum heat exchangers. NO Condensing boiler manufacturers or spec shown, the rest below is dedicated to those limited renovation jobs that require replacement of existing steam cast iron boilers. More specifications and detail is needed. Acceptable condensing hydronic boiler brands (dual fuel) include Fulton, Aerco and Cleaver.
- D. Non-condensing: 88% efficient for heating loads. Select vertical copper-finned tube boilers (where floor area is limited), or horizontal cast-iron boilers. Limited to steam replacement applications only.
- E. Integral pumps for primary-secondary variable flow pumping configuration.
- F. Integral controls with remote signal from BAS for enable/disable and temperature reset.

Section 236410 – Chilled Water Systems

- 2. Provide chilled water systems with the following performance criteria:
 - A. If building load is 400 tons or greater: water-cooled chillers
 - B. If load is less than 400 tons: scroll or screw air-cooled chillers
- 3. Provide a life cycle cost analysis as a justification for the chiller technology utilized.
- 4. Design team shall adjust the number and/or capacity of chillers to ensure that:
- 5. Central plant can effectively unload to meet cooling requirements under partial occupancy conditions down to 15% of the capacity of a single chiller.
- 6. Chiller selections and design schedules shall include required performance (capacity and efficiency) at full-load, 75% load, 50% load, and 25% of capacity.
- 7. Factory test centrifugal chillers in accordance to AHRI procedures with zero tolerance for full-load capacity and efficiency.
- 8. Test chillers at 100%, 75%, 50%, 25% of capacity with constant 85°F entering condenser water temperature. Deviations from specified performance shall not exceed standard AHRI values.
- 9. Chillers shall operate in a variable flow pumping configuration, in either a primary-secondary, or primary-only configuration.

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10. For primary-secondary systems, each chiller shall have a dedicated (primary) chilled water pump is controlled by the chiller. With the use of dedicated pumps, no automatic isolation valves at the chillers are necessary.
11. Chiller controls shall include a BACnet interface that will allow for the following remote signals from the building automation system:
 - A. Enable/disable
 - B. Demand limit
 - C. Supply chilled water temperature reset
 - D. Monitoring chiller parameters (refer to controls standards)

Section 236416 – Chillers

1. Centrifugal Chillers
 - A. Acceptable manufacturers: Trane, JCI, Carrier
 - B. Description: Factory-assembled and -tested water chiller complete with compressor, evaporator, condenser, controls, interconnecting unit piping and wiring, indicated accessories, and mounting frame.
 - C. Compressors: Variable displacement with direct- drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.
 - D. Refrigerant: HFC-134a, or HFC-410
 - E. Evaporator: Shell-and-tube design, ASME labeled, Shell Material- Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4- inch OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor- type temperature sensor factory installed in each nozzle.
 - F. Condenser: Shell-and-tube design ASME labeled, Shell Material- Carbon steel, Tube Construction-Externally enhanced and individually replaceable, expanded into tube sheets, Material: Copper, Minimum Size: 3/4-inch OD; 0.028-inch wall thickness, Internal Finish-Enhancedater Box-Standard with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.

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- G. Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch
Factory apply insulation over entire surfaces of water chiller components.
- H. Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - i. Date and time.
 - ii. Operating or alarm status.
 - iii. Operating hours.
 - iv. Outside-air temperature if required for chilled-water reset.
 - v. Temperature and pressure operating set points.
 - vi. Entering and leaving temperatures of chilled water and condenser water.
 - vii. Refrigerant pressures in evaporator and condenser.
 - viii. Saturation temperature in evaporator and condenser.
 - ix. Oil temperature and pressure.
 - x. Percent of maximum motor amperage.
 - xi. Current-limit set point.
 - xii. Number of compressor starts.
- I. Control Functions
 - i. Manual or automatic startup and shutdown time schedule.
 - ii. Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.
- J. Current limit and demand limit.
- K. Condenser-water temperature.
- L. External water chiller emergency stop.
- M. Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:
 - i. Low evaporator temperature; high condenser pressure.
 - ii. Low chilled-water temperature.
 - iii. Low oil differential pressure.
 - iv. High or low oil pressure.

- v. High oil temperature.
 - vi. High compressor-discharge temperature.
 - vii. Loss of chilled- or condenser-water flow.
 - viii. Electrical overload.
 - ix. Sensor- or detection-circuit fault.
 - x. Processor communication loss.
 - xi. Starter fault.
 - xii. Extended compressor surge.
- N. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-water set point and chiller-control displays and alarms.
- O. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide strainer in addition to pump strainer a maximum 10'-0" from chiller piping inlets. Provide necessary isolation valves to service oil filter(s) without evacuation of refrigerant. Provide 6" housekeeping pads equipment. Furnish with diagnostics port for portable operator terminal on control panel. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.
- P. Accessories: Pressure Relief Rupture Disc: Frangible carbon disc. Sound attenuation kit to reduce ambient noise to 68 DB. Attenuation kit shall isolate the compressor only. Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on both condenser and chilled water outlets.
- Q. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label. All wiring 120 volt and higher run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
- R. Additional Notes: Centrifugal chiller use is restricted to tonnages in excess of 500. Comply with Green Seal's GS-31 for Full Load Efficiency 0.56 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.44 Kw/Ton. Operating

temperatures 54F. EWT, 44F. LWT. The following refrigerants are NOT permitted: R-22, and R-123.

2. Water Cooled Scroll Chillers

- A. Acceptable manufacturers: Trane, JCI, Carrier
- B. Description: Factory-assembled and -tested water chiller complete with compressor, evaporator, condenser, controls, interconnecting unit piping and wiring, indicated accessories, and mounting frame.
- C. Compressors: Minimum two compressors, with two separate circuits, scroll, direct-drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.
- D. Refrigerant: HFC-134a, or HFC-410
- E. Evaporator: Shell-and-tube design, ASME labeled, Shell Material-Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4-inch, OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor-type temperature sensor factory installed in each nozzle.
- F. Condenser: Shell-and-tube design ASME labeled, Shell Material-Carbon steel, Tube Construction-Externally enhanced and individually replaceable, expanded into tube sheets, Material-Copper, Minimum Size: 3/4-inch OD; 0.028- inch wall thickness, Internal Finish-Enhanced, Water Box- Standard with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor- type temperature sensor factory installed in each nozzle.
- G. Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch Factory applied insulation over entire surfaces of water chiller components.
- H. Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, NEMA 250, Type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - i. Date and time.
 - ii. Operating or alarm status.
 - iii. Operating hours.

- iv. Outside-air temperature if required for chilled-water reset.
 - v. Temperature and pressure operating set points.
 - vi. Entering and leaving temperatures of chilled water and condenser water.
 - vii. Refrigerant pressures in evaporator and condenser.
 - viii. Saturation temperature in evaporator and condenser.
 - ix. Oil temperature and pressure.
 - x. Percent of maximum motor amperage.
 - xi. Current-limit set point.
 - xii. Number of compressor starts.
- I. Control Functions
- i. Manual or automatic startup and shutdown time schedule.
 - ii. Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.
 - iii. Current limit and demand limit.
 - iv. Condenser-water temperature.
 - v. External water chiller emergency stop.
 - vi. Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:
 - a. Low evaporator temperature; high condenser pressure.
 - b. Low chilled-water temperature.
 - c. Low oil differential pressure.
 - d. High or low oil pressure.
 - e. High oil temperature.
 - f. High compressor-discharge temperature.
 - g. Loss of chilled- or condenser-water flow.
 - h. Electrical overload.
 - i. Sensor- or detection-circuit fault.
 - j. Processor communication loss.
 - k. Starter fault.
 - l. Extended compressor surge.
- J. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-

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water set point and chiller-control displays and alarms. Provide open BACnet system.

- K. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide strainer in addition to pump(s) maximum 10'-0" from chiller piping inlets. Provide necessary isolation valves to service oil filter(s) without evacuation of refrigerant. Provide 6" housekeeping pads equipment. Furnish with diagnostics port for portable operator terminal on control panel. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.
 - L. Accessories: Sound attenuation kit to reduce ambient noise to 68 DB. Attenuation kit shall isolate the compressor only. Frangible carbon rupture disc. Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on both condenser and chilled water outlets.
 - M. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label.
 - N. Additional Notes: Screw chiller use is restricted to loads below 250 tons. Provide multiple chillers for loads up to and including 500 tons. Comply with Green Seal's GS-31 for Full Load Efficiency 0.64 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.49 Kw/Ton. Operating temperatures 54F. EWT, 44F. LWT. The following refrigerants are NOT permitted: R-22, and R-123.
3. Air Cooled Scroll Chillers
- A. Acceptable manufacturers: Trane, JCI, Carrier
 - B. Description: Factory-assembled and -tested water chiller complete with casing, compressor, heat exchanger, condenser coils, fans, and controls integrated with compressor operation.
 - C. Compressors: Minimum two compressors, with two separate circuits, scroll, direct-drive, hermetically sealed or direct-drive, semi-hermetically sealed motor.
 - D. Refrigerant: HFC-134a, or HFC-410

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- E. Evaporator: Shell-and-tube design, ASME labeled, Shell Material- Carbon steel, Tube Construction-Individually replaceable, expanded into tube sheets, Material-copper, Minimum Size-3/4- inch OD; 0.028-inch wall thickness, Internal Finish: enhanced, Water Box: Standard, with design working pressure of 150 psig and having flanged water-nozzle connections with a thermistor- type temperature sensor factory installed in each nozzle.
- F. Condenser: Coil shall be aluminum bonded to copper fins and pressure tested to 450 psig. Refrigerant circuit to include oil separator, high and low side pressure relief devices, discharge and liquid line shutoff valves, filter dryer, moisture indicating sight glass electronic expansion device and refrigerant economizer.
- G. Insulation: Cold Surfaces: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type II, for sheet materials. Thickness: 3/4 inch Factory applied insulation over entire surfaces of water chiller components.
- H. Controls Control Panel: Stand-alone, microprocessor based, Enclosure-Unit-mounted, NEMA 250, Type 1 enclosure, lockable; factory wired with a single-point power connection and a separate control circuit. Status Display: Multiple-character liquid-crystal display or light-emitting diodes and keypad. Display the following conditions:
 - i. Date and time.
 - ii. Operating or alarm status.
 - iii. Operating hours.
 - iv. Temperature and pressure operating set points.
 - v. Entering and leaving temperatures of chilled water
 - vi. Refrigerant pressures in evaporator and condenser.
 - vii. Saturation temperature in evaporator and condenser.
 - viii. Percent of maximum motor amperage.
 - ix. Current-limit set point.
 - x. Number of compressor starts.
- I. Control Functions
 - i. Manual or automatic startup and shutdown time schedule.
 - ii. Entering and leaving chilled-water temperatures, control set points, and motor load limit. Chilled-water temperature shall be reset based on return-water temperature.

- iii. Current limit and demand limit.
- iv. External water chiller emergency stop.
- v. Manually Reset Safety Controls: The following conditions shall shut down water chiller and require manual reset:
 - a. Low evaporator temperature; high condenser pressure.
 - b. Low chilled-water temperature.
 - c. High compressor-discharge temperature.
 - d. Loss of chilled water flow.
 - e. Electrical overload.
 - f. Sensor- or detection-circuit fault.
 - g. Processor communication loss.
 - h. Starter fault.
 - i. Extended compressor surge.
- J. Building Management System Interface: Factory-installed hardware and software to enable building management system to monitor and control chilled-water set point and chiller-control displays and alarms.
- K. Installation: All chillers shall have a minimum operating temperature of 42°F and system ΔT of 12°F. Provide necessary dunnage and vibration isolation. Unit shall be installed level within factory tolerances. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance. Provide strainer in addition to pump strainer maximum 10'-0" from chiller piping inlet.
- L. Accessories: Two (2) hand held controllers. Provide wafer type flow meter ring for use with portable flow meter on chilled water outlet.
- M. Electrical - Unit shall require single electrical connection to the main electrical panel. The electrical panel shall be NEMA 12 rated and mounted on the unit as shown on the General Arrangement drawings. The electric panel shall consist of a non-fused disconnect, fused IEC full voltage starters for each motor, control power transformer, and HOA switch for the unit. Electrical panels shall bear an ETL label.

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N. Additional Notes: Comply with Green Seal's GS-31 for Full Load Efficiency 0.64 Kw/Ton and Integrated Part-Load Value (IPLV) efficiency of 0.49 Kw/Ton. Operating temperatures 54F. EWT, 44F. LWT.

Section 236420 – Cooling Towers

1. Manufacturers: BAC, Evapco, Marley
2. Provide cooling towers unless there is a written request for deviation by design team and approval by Owner.
3. Gears and motors rated for inverter duty are required. Belt drive is not permitted.
4. Locate motors outside the air stream. Provide TEFC or Marine Duty motors when recommended by design team and accepted by Owner. Provide premium efficiency and inverter duty rated shaft ground rings.
5. Provide flow control valves where multiple hot water basins are used. Provide cold-water basins complete with depressed outlet sump having debris screen, overflow connection, equalization connection, electrical basin immersion heater, and automatic electronic controlled make-up water valve.
6. Provide insulated and heat traced make-up water piping with aluminum jacketing. Consider installing the cooling tower makeup water connection on the suction side of the condenser water pump suction to avoid routing domestic water outside of the building.
7. Provide equalization pipeline between tower basins for multiple tower installations. Provide equalization pipeline at least one size larger than the size of the pipeline returning to the condenser water pump.
8. Provide hose bib adjacent to cooling tower.
9. Each cooling tower fan shall have a protective discharge guard of non-corrosive materials. Provide ladder, handrails, and platform around the elevated areas of the cooling tower that require maintenance access.
10. Provide one VFD per fan.
11. Carefully coordinated cooling tower location for consideration of aesthetics, acoustics, performance, and maintenance. If installed above the roof, towers must have elevation for drainage under the unit. Provide drift eliminators and sound attenuation features.

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12. Provide schedule 40 black steel and epoxy coating for cooling tower piping. Polypropylene piping is acceptable with written request by design team and approval by Owner.
13. The tower will include a condenser water bypass. Design team will provide a recommendation if basin heat is necessary.
14. Provide vibration sensor and oil level switch with connection to building automation system.
15. Provide water meters on tower make-up and blow down with connections to building automation system.
16. Tower piping shall have two access points with butterfly valves for tying into temporary cooling tower.
17. Provide catwalk and/or ladder for service.

Section 237213 – Package Outdoor, Central Station, Air-handling Units

1. Design casings specifically for weatherproof operation and provide with weatherproof roof mounting curbs flashed into roof membrane and enclose all ducts and conduit penetrations associated with the unit.
2. Provide casings with two-inch thick minimum, double-wall and insulated to prevent condensation, with thermally-broken structure. Manufacturer shall provide data to demonstrate that no part of the unit will condense when exposed to outdoor ambient conditions.
3. Provide draw-through airflow configuration.
4. Use multiple, variable speed plug or plenum fans where feasible.
5. Provide field installed variable speed drives. For multi-fan configurations, provide no fewer than two variable frequency drives.
6. Provide interior lights and glass inspection ports on the fan section and coil section.
7. Provide hinged doors with lockable handles.
8. Provide TEFC motors with inverter duty shaft ground rings.
9. Provide stainless steel and ASHRAE compliant drain pans.
10. Provide interlaced, cooling coils made of copper tubes and aluminum fins. A maximum face velocity of 400 FPM is required.

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11. Provide modulating compressor technology for single compressor or leading compressor applications.
12. Provide hot gas reheat or similar proven technology to control relative humidity in the occupied space.
13. Gas-fired furnaces are the preferred heating source. Furnace shall have modulating control to 30% of full rated capacity.
14. Electric resistance heat may be specified for specialized circumstances with Owner approval.
15. Outside air intakes requiring sizing and shielding by manufacturer to prevent water intrusion are required.
16. Solid state integral controls compatible with the BAS are required.
17. Interface for remote control from Owner's building automation system are required.

Section 237313 – Modular Indoor, Central Station, Air-handling Units

1. Manufacturers: Trane, JCI, Carrier
2. Air handlers shall be factory assembly and tested for leakage at the factory. Modular, field-assembled air handlers shall be avoided but shall be considered if required by space constraints. Modular field-assembled units 5000 cfm and higher will be field-tested for leakage by manufacturer's representative.
3. Provide draw-through airflow configuration.
4. Use multiple, variable speed plug or plenum fans where feasible.
5. Mount fan motors within the air handler casing on vibration isolators. Provide slide-out blower assembly where feasible and extended lubrication lines to the exterior of the casing.
6. Provide field installed variable speed drives. For multi-fan configurations, provide no fewer than two variable frequency drives.
7. Provide interior lights and glass inspection ports on the fan section and coil section.
8. Provide hinged doors with lockable handles.
9. Provide TEFC motors with inverter duty shaft ground rings.
10. Provide stainless steel and ASHRAE compliant drain pans.

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11. Provide 6-rows cooling coils made of copper tubes, aluminum fins, and stainless-steel frame. A maximum face velocity of 400 FPM is required.
12. Where air handling units are installed exposed to the weatherproof casings specifically designed for exterior installation. Where installed on roofs, Provide a weatherproof roof mounting curb flashed into roof membrane and enclosing all ducts and conduit penetrations associated with the unit.
13. Provide double-wall and insulated air handling unit casing to prevent condensation, with thermally-broken frame. Manufacturer shall provide data to demonstrate that no part of the unit will condense when exposed to outdoor ambient conditions.
14. Provide outside air intakes sized and shielded to prevent water intrusion.
15. Provide all chilled water coils with a condensate overflow sensor that will cause the Building Automation System to close the chilled water valve and shut down the unit upon detection of high condensate level.

Section 237433 – Makeup Air Units

1. Acceptable manufacturers: CaptiveAire, Engineered Aire, Greenheck. (Trane, Temptrol, Aeon, Carrier, and McQuay are also acceptable manufacturers, subject to specification requirement.)
2. Description
 - A. Configuration: Draw-thru coil with hydronic or DX cooling (where required), and hydronic or indirect-fired heating.
 - B. Casing: Exterior walls and interior walls are to be constructed of 16 gauge galvanized steel with pre-painted, baked enamel finish over electro-flash coat galvanizing passing 500-hour salt spray test (ASTM B-117) for pre painted steel and 125-hour marine level 1 cohesion test (ASTM G-85.A5) for pre painted steel. Sections shall be supplied with 16-gauge corrosion resistant G90 galvanized pre-painted steel. Casing panels have no exterior exposed raw edges that could lead to rust formation. All casing corners are radiused or chamfered. All panels seal against a full perimeter automotive style gasket to ensure a tight seal. Unit housing shall be cross broken and pitched to prevent the collection of water on the tops of sections.
 - C. Insulation: All sections shall be insulated with a minimum value of R-13.

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- D. Fan section: Fan shall be draw thru type double width double inlet utilizing forward curved blades or air foil blades (consultant shall selected based on fan HP requirements). Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
 - E. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base assembly shall be isolated from the outer casing on factory installed springs and vibration absorbent fabric on the scroll. Canvas style duct connections are NOT acceptable.
 - F. Motors shall be high efficiency type.
 - G. Bearings shall be provided with extended grease fittings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
 - H. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
 - I. Access doors shall be equipped with two (2) cam lock non- removable handles per door and furnished on the following sections: Coil (access section), fan, filter, filter mixing box, mixing box.
 - J. Filter section shall be equipped for 30% 2" pleated throwaway type filters
 - K. Motorized inlet damper with end switch to prove position before burner will fire.
 - L. Heat Exchanger: All stainless-steel construction (aluminized steel is NOT acceptable) for natural indirect gas-fired burners with the following controls:
 - i. Redundant dual gas valve with manual shutoff.
 - ii. Direct-spark pilot ignition.
 - iii. Electronic flame sensor.
 - iv. Induced-draft blower.
 - v. Flame rollout switch.
 - vi. Purge-Period Timer
3. Installation: Provide dunnage, roof curbs and flashing required for installation. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Furnish with diagnostics port for portable operator terminal on control panel. Install units with factory recommended clearances for service and maintenance.

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4. Accessories: Provide factory installed disconnect switch. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide piping compartment if piped thru curb (exposed piping above roof is not permitted).
5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher and wire size #8 and smaller shall be run in MC Cable. All wire size #6 and larger shall be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
6. Additional Notes: All units shall be equipped with pleated throwaway filter racks. Warranty heat exchangers for 10 years.
7. Design Standard Web product page: <http://www.captiveaire.com/>

Section 237223.23 – Packaged Air-to-Air Recovery Units

1. Acceptable manufacturers: Trane, JCI, Carrier
2. Description
 - A. Configuration: Draw-thru coil with hydronic or DX cooling (where provided), and hydronic or indirect fired heating.
 - B. Casing: Wall and roof panels shall consist of 2" thick dual wall 18 gauge galvanized solid exterior skins and 22 gauge galvanized steel solid interior skins enclosing 2 inch thick 3 pcf mineral wool insulation. The housing shall be supported by a painted structural steel base. The base includes a solid welded floor with 6" thick mineral wool insulation. The bottom face of the insulation shall be protected with a 22 gauge galvanized steel cover. Outdoor air intake and exhaust air discharge openings shall have galvanized steel sheet metal hoods with openings covered with bird screen.
 - C. Fan section: Fans shall be centrifugal plenum type. The wheels shall be non-overloading type. The blades shall be securely welded, die-formed backward curved (16" and smaller) or airfoil (18" and larger) type. Fans shall have AMCA class rating for the capacity indicated. Fan wheels and shafts shall be selected with a maximum rated fan speed 25% below the first critical.
 - D. Mounting: Fan scroll, wheel, shaft, bearings, drives and motor shall be mounted on common base assembly. The base assembly shall be isolated from the outer

- casing on factory installed springs and vibration absorbent fabric on the scroll. Canvas style duct connections are NOT acceptable.
- E. Bearings shall be provided with extended grease fittings. Bearings shall be rated for 200,000 hours. Drive shall be designed for 2.0 service factor.
 - F. Drain pan shall be double wall insulated stainless steel construction. Drain connection shall be 1-1/4" MPT and insulated from the point of connection to the pan to point at which it exits the casing.
 - G. Access doors shall be equipped with two (2) cam lock non-removable handles per door and furnished on the following sections: Coil (access section), fan, filter, and wheel.
 - H. Filter: Pre-filter section shall be 30% 2" pleated throwaway type. Secondary filter shall be mounted in the same filter frames as the pre-filters and be 12" deep, high performance filters. The media shall have an average efficiency of 65 percent. The filter shall be listed as UL class 2.
 - I. Marine lights shall be furnished on any accessible sections 5'-0" or higher. Lights shall be wired to an external waterproof switch.
 - J. Water Coil Sections: Individual, insulated, galvanized-steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to ensure full airflow through coils. Self-draining coil fabricated according to ARI 410. Tubes/Fins: Copper/Aluminum with fin spacing 0.125. Headers: Cast iron with drain and air vent tappings. Frames: Galvanized-steel channel frame, 0.079 inch. Ratings: Design tested and rated according to ASHRAE 33 and ARI 410. Working-Pressure Ratings: 200 psig, 325 deg F.
 - K. Outside Coil Fan: Propeller type, directly driven by motor.
 - L. Refrigerant Coils: Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
 - M. Compressor: Hermetic scroll compressor with integral vibration isolators, internal over-current and over-temperature protection, internal pressure relief, and crankcase heater.
 - N. Heat Exchanger: All stainless-steel construction (aluminized steel is NOT acceptable) for natural gas-fired burners with the following controls:
 - i. Redundant dual gas valve with manual shutoff.
 - ii. Direct-spark pilot ignition.
 - iii. Electronic flame sensor.

- iv. Induced-draft blower.
 - v. Flame rollout switch.
- O. Enthalpy recovery wheel - The rotor media shall be made of aluminum coated to prohibit corrosion. Media surfaces shall be coated with adsorbent prior to being formed. Both faces of the energy recovery wheel shall be covered and sealed with a two part polymer coating for chemical resistance. Desiccant shall utilize a 3A molecular sieve certified by the manufacturer which limits adsorption to materials not larger than the critical diameter of a water molecule (2.8 angstroms). The media shall be cleanable with low pressure steam (less than 5 PSI), hot water or light detergent, without degrading the latent recovery. Dry particles up to 800 microns shall pass freely through the media. The unit shall be provided with a factory set, field adjustable purge sector to limit cross contamination to < .04 percent of exhaust air stream. Rotor shall be supplied with labyrinth seals, which at no time shall make contact with any rotating surface of the exchanger rotor face. These seals shall utilize four labyrinth stages for optimum performance. The rotor media shall be provided in segments to allow for field erection or replacement. The rotor housing shall be a structural framework which limits the deflection due to air pressure loss to less than 1/32".
- P. Installation: Provide dunnage, roof curbs and flashing required for installation. Provide condensate piping to roof drains. Install stand-alone control module providing link between unit controls and (LonWorks based) DDC system. Install units with factory recommended clearances for service and maintenance.
- Q. Accessories: Furnish with diagnostics port for portable operator terminal on control panel. Provide temperature and pressure gauges at each coil. Provide factory installed disconnect switch and convenience outlet. Provide three complete sets of filters for each unit. Provide one additional set of belts. Provide piping compartment if piped thru curb (exposed piping above roof is not permitted). Provide wafer type flow meter ring for use with portable flow meter on chilled and heating water inlet.
- R. Electrical - Unit shall require single electrical connection the main electrical panel. The electrical panel shall be NEMA 12 rated. Electrical panels shall bear an ETL label. All wiring 120 volt and higher shall be run in EMT. Motors

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requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.

- S. Additional Notes: Coil velocities not to exceed 500 fpm for cooling and 600 fpm for heating.
- T. Design Standard Web product page: <http://www.semcoinc.com/>

Section 238119 – Self Contained Air-Conditioners

1. Manufacturers: Trane, JCI, Carrier
2. Provide vertical, self-contained, indoor, direct-expansion air to air heat pumps, with all components in a single double-wall enclosure with all components, ready for installation as a single package.
3. Install units indoors, adjacent to exterior walls in studios, with opening for outside air intake and condenser air.
4. Cabinet casing insulation shall meet requirements for fire resistance (NFPA 90), mold-growth (UL-181), and ASTM standards for resistance to fungal and bacterial growth.
5. Two stages of heating and cooling are required.
6. ECM motors for variable speed control are required.
7. Provide antimicrobial drain pan with solid state overflow protection.
8. Provide solid state integral controls that can interface with Owner's BAS.

Section 238229 – Radiators

1. Acceptable manufacturers: panel-type, manufactured in the United States
2. Description:
 - A. Cabinet: Sloped top security enclosure with patterned 1/8" perforations for inlet and discharge. All exposed panels and accessory sections shall be a minimum of 12 gauge steel. All exposed fasteners shall be tamperproof torx or allen head screws.
 - B. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25. Enclosure shall be finished in a bronze tone. Submit color chart for exact selection.

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- C. Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 500 psig and a maximum entering water temperature of 275 deg F.
- D. Installation: All fittings, valves traps, etc., shall be located inside the enclosure and serviceable through access doors. Provide drain and air vent at the lowest and highest points respectively. Provide isolation valves to service element.
- E. Accessories: Provide factory access doors with allen head keylock. Do NOT provide damper controls on radiation.
- F. Additional Notes: All temperature sensing devices shall be located within the enclosure and shielded from tampering from outside the casing. (The control valve shall be self-contained type, of AMETAL body, with sensor and actuator mounted on valve body with a vandal- proof cover. These valves shall be Regin-make or MNZ-make.) Where a radiator is subject to high traffic, the District's preference is to use panel-type radiators (Runtal).
- G. Design Standard Web product page: <http://www.hydro-air.net/rittling/products/enclosures/security.html>

Section 238239.13 – Cabinet Unit Heater

1. Acceptable manufacturers: Trane, JCI, Carrier
2. Description:
 - A. Configuration: Floor mounted units are to be fully recessed in new construction. Semi-recessed and surface mounting is permitted on in existing construction.
 - B. Cabinet: 14 gauge steel, with removable panels secured with tamperproof fasteners.
 - C. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25.
 - D. Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 300 psig and a maximum entering water temperature of 275 deg F.
 - E. Insulation: No fibrous insulation is permitted in the air stream.

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3. Installation: Provide isolated trapeze hangers on horizontal units. Provide vibration isolation on vertical units. Insure that sufficient clearance is provided for filter and motor servicing and that hanging method does not preclude access.
4. Accessories: Provide security intake grille, tamperproof access door, and leveling legs (floor mounted units). Provide one additional set of belts.
5. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher shall be run in EMT.
6. Additional Notes: Provide chain retainer for ceiling mounted units. Use EC motors when available.
7. Design Standard Web product page: <http://www.hydro-air.net>

Section 238239.16 – Propeller Unit Heater

1. Acceptable manufacturers: Rittling HR type, Engineered Air, Vulcan
2. Description: 20 gauge steel cabinet, factory primed and top coat, copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch (2.5 mm). Coils shall be rated for a minimum working pressure of 200 psig (2068 kPa) and a maximum entering water temperature of 275 deg F (135 deg C).
3. Installation: Provide vibration isolation on hangers and piping.
4. Accessories: Provide with fan guard and discharge louvers.
5. Electrical: Unit shall require single electrical connection.
6. Additional Notes: Install with room thermostat to cycle fan-operation and an aqua-stat to limit fan operation below set-point.
7. Design Standard Web product page: <http://www.hydro-air.net>

Section 238223 – Unit Ventilator

1. Acceptable manufacturers: Trane, JCI, Carrier, Magicaire
2. Description:
 - A. Configuration: Draw-thru coil with face and bypass damper control. Units shall be designed for 100% economizer operation with exhaustor box.

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- B. Cabinet: All exposed panels shall be a minimum of 14 gauge steel. Frame shall be fabricated of minimum 12 gauge steel. No plastic components shall be permitted on the exterior cabinet. All exposed fasteners shall be tamperproof torx or allen head screws. Discharge grille shall be welded steel with pencil-proof blades spaced no further than 0.23" apart. Grille shall be removable. Screens of 0.10 wire on 1/4" centers shall be provided on fan discharges behind bar grille.
- C. Finish: Units shall be provided with a textured polyurethane powder finish applied to a minimum mil thickness of .25. Unit top shall be finished in a dark bronze tone or colors as selected and approved by the Architect. End and front panels shall be tan. Submit color chart for exact selection.
- D. Coil: Dual coil dual circuit piping shall be provided on heating/cooling units. Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and with manual air vent. Coils shall be rated for a minimum working pressure of 500 psig and a maximum entering water temperature of 275 deg F. Maximum air flow rates 500 FPM cooling, 600 FPM heating.
- E. Fans: Motors shall be secured with bayonet mounting bracket. Fan shaft shall have accessible bearings and oil cups at each end. Motors shall be three speed high static units. ECM motors are not acceptable.
- F. Dampers: Outside air dampers shall be galvanized steel with gasketed blades. Face and bypass dampers shall be constructed of aluminum.
- G. Insulation: No fibrous insulation is permitted in the air stream.
- H. Drain Pans: Galvanized steel, with connection for drain. Drain pan shall be fully insulated and furnished with drain connections at both ends. Drain pan shall be provided with level sensor in compliance with IBC 2018 and integrated per BACnet protocol.
- I. Installation: Furnish with diagnostics port for portable operator terminal on control panel. Controls are BACNet compatible, to be factory installed and wired for final connection (note: controls are not to be provided by the unit manufacturer). All onboard temperature sensors shall be secured inside unit cabinet and shielded from tampering from the exterior of the unit. All units are to be piped to provide for isolation of coils. Install units with factory recommended clearances for service and maintenance.

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- J. Accessories: Furnish with storm-proof 6063-T5 aluminum intake louver with protective lattice faced grille. All exposed fasteners shall be tamperproof torx or allen head screws. Provide with three complete sets of filters for each unit. Provide 10% spare blower motors, and 50% spare bearings.
- K. Electrical - Unit shall require single electrical connection. All wiring 120 volt and higher be run in EMT. Motors requiring wire run in EMT shall have a 2' length of sealtight at the motor junction box.
- L. Additional Notes: Units shall be selected for operation at the middle fan speed setting. Provide temperature/pressure gauges ports on connections. Furnish with exhaustor boxes or other relief system incorporated into design. Self contained units are NOT permitted. Unit sound performance on medium speed shall not exceed 36 dba in the 500, 1000, and 2000 frequency bands. Utilize multiple units if required to comply with sound levels criteria. Utilize EC motors when available.

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Division 26 - Electrical

Section 260500 Common Work Results

1. Electrical equipment should be located in accessible, consistent locations between buildings/projects. Locate building management system panel in branch mechanical rooms. Locate fire alarm control panel either in the main administrative office in a controlled location or in the electrical room nearest the main administrative office. Locate the fire alarm graphic annunciator at the main entrance.
2. Maintain code required clearance for all electrical equipment.
3. Equipment shall be appropriate for the space. NEMA 4 enclosures shall be used in Mechanical rooms in areas exposed to water spray. NEMA 3R enclosures shall be used outdoors.
4. Renovation work:
 - A. Prior to commencing work in existing buildings, contractor shall test all existing systems affected by the work. Submit a report of any defects in the system to the Owner. Consider all systems in good working condition at the start of the project if a report is not available.
 - B. Coordinate down times of power and other services with the Owner at least two weeks in advance.

Section 260519 – Low-Voltage Electrical Power Conductors and Cables

1. Provide conductor material as follows:
 - A. Copper feeders and branch circuits.
2. Provide THHN-THWN or XHHW-2 insulation.
 - A. Cables in feeders and branch circuits exposed to sunlight or above rooftops shall have type XHHW-2 insulation.
3. Provide solid conductors for sizes #10 AWG and smaller.
4. Provide stranded conductors for size #8 AWG and larger.
5. Branch circuits and feeders shall be sized to limit voltage drop to not exceed NEC requirements.

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6. Power Cables (AC, MC, etc.) are not permitted excepted as noted below:
 - A. Provide MC cables for runs 72-inches and less in length from junction boxes to light fixtures (i.e. fixture whips) in unfinished spaces or where concealed above an accessible lay-in ceiling.
7. Minimum conductor size for interior work is #12 AWG.
8. Minimum conductor size for exterior underground work is #10 AWG.

Section 260526 – Grounding and Bonding for Electrical Systems

1. Provide grounding in accordance with NEC requirements.
2. Provide isolated grounding system for select audiovisual systems as required by the program.
3. Provide grounding and bonding of telecommunications rooms in compliance with the latest TIA 607 standard.
 - A. Provide telecommunications grounding busbars in each telecommunications room and telecommunications bonding backbone conductors per the TIA 607 standard.
 - B. Provide bonding of racks, trays, etc. with telecommunications rooms per the TIA 607 standard.

Section 260533 – Raceway and Boxes

1. Minimum conduit size shall be $\frac{3}{4}$ ".
2. Conceal raceways within walls or above finished ceilings in finished spaces in all new construction.
 - A. Exceptions:
 - i. Surface raceway products above counters in labs if part of the design.
 - ii. In finished, dry spaces with exposed structure ceilings such as gymnasium, exposed EMT is allowed above the bottom cord of joists within the space. Paint EMT to match adjacent surfaces.
 - iii. Existing masonry walls in renovation projects

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3. Conceal raceways in renovation projects to the greatest extent possible in finished spaces in renovation projects. If exposed raceway is the only option, provide a paintable surface metal raceway such as Wiremold products.
4. Do not route raceways horizontally on roofs or elsewhere exposed to sunlight in lengths greater than five feet.
5. Limit the use of flexible raceways to lengths of 72-inches and less and the following applications:
 - A. Connections to equipment subject to vibration such as motors, transformers, elevators, etc.
 - B. Connections to light fixtures.
6. Floor boxes and poke-thru boxes shall have heavy-duty metallic covers.
7. Install Sleeves where low-voltage conductors pass through walls.
8. Provide manufactured sleeves for low-voltage cabling that pass through rated walls specifically for this application with an intumescent material that allows the sleeve to remain open for cable modifications.
9. Provide plenum-rated insulated bushings on the ends of all conduit stub-ups and sleeves used for low voltage cabling.

Section 260536 – Cable Trays

1. Provide wire-mesh basket cable trays with electroplated zinc finishes for low voltage telecommunications cabling.

Section 260553 – Identification for Electrical Systems

1. Provide underground-line warning tape containing a detectable metallic core directly above all buried electrical and telecommunications lines and 4- to 6-inches below finished grade.
2. Provide a label for each piece of electrical equipment. Labels shall include the following information:
 - A. Equipment name
 - B. Fed from

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- C. Voltage, phase, wire configuration
 - D. Color of each phase, neutral and grounding conductors in the panel.
 - E. Available fault current
 - F. Date
3. Provide labels constructed of phenolic plastic or similar material and engraved with lettering 3/8-inch high minimum. Provide white lettering on a red background for items related to an emergency or stand-by power source. Provide black lettering on a white background for all other items.
 4. Provide arc flash hazard labels per NFPA 72E all equipment containing overcurrent protective devices.
 5. Provide updated typed circuit directories for each panelboard and relay panel affected by work. Trace and verify all existing circuits to remain served by each panelboard affected by the work. Directories shall use the Owner's final room numbers which may not match the room numbers on the construction documents. Every circuit and circuit modification shall be legibly identified as to its clear, evident, and specific purpose or use. The identification shall include an approved degree of detail that allows each circuit to be distinguished from all others. Spare positions shall be described accordingly.
 6. Label junction box covers with panelboard and circuit number information. Label junction boxes exposed in finished spaces on the inside of the junction box cover. Use permanent marker or machine printed labels.
 7. Label conduits at panelboards and where conduits penetrate walls with panelboard and circuit number information. Use permanent marker or machine printed labels.
 8. Provide labels on equipment indicating warranty expiration dates.
 9. Provide machine printed labels on the coverplate of each wiring device identifying panelboard and circuit number.

Section 260573 – Short-Circuit Studies, Arc-Flash Hazard Analysis, Coordination Studies

1. Coordination and arc-flash studies shall be conducted by the equipment manufacturer or approved equal.

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2. Short-Circuit Studies shall be submitted for all new and renovated equipment and provide label as provided by code on equipment cover.
3. Arc-Flash Hazard Analysis shall be submitted, and labels shall be provided for all equipment.
4. Coordination curves shall be submitted showing selective coordination of Emergency and Legally Required Standby systems and power distribution to elevators.

Section 260923 – Lighting Controls

1. Provide lighting controls to meet current emergency codes, sustainability goals, and requirements of this document. Refer to *Chapter 02 – Energy, Water, and Sustainability* Sustainability Scorecard for additional information.
2. Provide local occupancy sensor control for studios and smaller spaces.
 - A. Sensors shall provide for 100% coverage of space served and utilize the appropriate technologies to minimize false off situations.
3. For classrooms, lighting controls should be located in consistent, controlled, readily accessible locations. Ideally, locate controls in electrical rooms. If room controllers are located concealed above accessible ceilings, they should be installed with one controller per room and in a consistent location within each room, preferably near the entrance to the room.
4. Provide relay-based lighting control panels for corridors, and large spaces such as gymnasiums and commons.
 - A. A master relay panel shall contain an astronomical time clock and allow for scheduling of on and off times as well as nightly off sweeps.
 - B. Network all relay panels in a building together.
 - i. Networked relay panels serving an individual studio or pair of studios are not required.
5. Means should be available for turning on all lights in the case of failure in the lighting control system.
6. Provide daylight harvesting as required by code and sustainability goals.
7. Provide dimming down to 10% minimum in all studios, conference rooms and other educational spaces.
8. Provide separate control for a 'Projector Zone' in each space equipped with a projector.

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9. Provide relay controls for all exterior lighting with time of day function.
 - A. Allow for separate control of different zones of exterior lighting to allow for flexible use of the site.
 - B. Provide reduced light levels during unoccupied hours and as required by code.
 - C. Motion sensors on all exterior light fixtures shall allow light levels to raise if motion is detected during unoccupied hours.
 - D. The relay control system controller/computer shall be located in a controlled, readily accessible location accessible to maintenance staff during non-business hours.
10. Refer to *Chapter 03, Safety and Security* for additional lighting requirements.

Section 262000 – Electrical Distribution Equipment

1. Medium voltage service is preferred from the utility company with a unit substation consisting of primary switch, air cooled, dry type transformer and 480 volt switchboard secondary feeding floor mounted distribution panels.
2. The designer shall take the lead in coordinating with the utility provider.

Section 262413 – Electrical Switchboards

1. Switchboards: Copper bus is preferred.
2. Main Circuit Breaker-Individually mounted, LSIG type as required to meet code requirements and coordinate with downstream devices.
3. Feeder Circuit Breakers-Group mounted, LSI type as required to meet code requirements and to coordinate with downstream devices.
4. Provide transient voltage surge suppression, lightning arrestors, and owner metering.

Section 262416 – Electrical Panelboards

1. Panelboards: Copper bussing only
2. Install panels in dedicated electrical rooms only unless otherwise noted.

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- A. Provide recessed panelboards in kitchen.
 - B. Panelboards in mechanical rooms are allowed if the panelboard only serves loads within the mechanical room.
 - C. Provide a panelboard dedicated to MDF (telecom) equipment loads. Locate this panel in the MDF room. Feed the AC system serving the room from this panel.
 - D. Panels shall not be installed in corridors or custodial rooms.
3. Provide a minimum of 30% branch breaker space and 20% spare capacity for all branch circuit panelboards
 4. Provide a maximum of 42-poles per panelboard section.
 5. All panels within a facility shall be keyed the same using a common, industry standard keying system.

Section 262713 – Electrical Metering

1. Provide sub-metering of different load types as required by the project sustainability goals and energy codes. At a minimum for new projects provide separate metering of the following:
 - A. Total Electrical Energy
 - B. HVAC Systems
 - C. Interior Lighting
 - D. Exterior Lighting
 - E. Receptacles
2. Meters shall be monitored by the Building Automation System. Refer to *Section 230926 – Building Automation Systems* for additional information.

Section 262726 – Electrical Wiring Devices

1. Provide NEMA 5-20R receptacles. (Do not provide USB receptacles)
2. Ceiling mounted cord reels shall be considered in laboratories, CTE, and maker spaces. Consider rolling track system mounting for flexibility within spaces.
3. Floor boxes shall not be used.

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4. Provide duplex receptacles mounted vertically in the front of the stage.
5. Outdoor outlets may be required for outdoor learning spaces. These should be lockable and weatherproof. The outlet should be controlled by a relay located in an indoor controlled location to disconnect power to the outlets when not in use.
4. Provide a minimum of two 20-amp receptacle circuits per standard size studio. Do not share circuits between studios and adjacent corridors or other rooms.

Section 262740– Electrical Solar Ready

1. Solar Ready:

On occasion, new construction projects may be required to be Solar Ready. In these instances the following shall apply.

- A. Electrical interconnection: Design shall include provisions for a solar interconnection to the electrical service with minimal cost and distribution. Interconnection must comply with the National Electrical Code and local utility requirements. Calculate the potential size of the array in kilowatts and submit a record of the calculations to the Owner.
 - B. Solar-ready zone: Design shall also include a designated area on the building roof for the solar array. Size the array to approximately half of the open roof area as calculated per the local Solar Ready ordinance.
 - C. Structural capacity: The structural design of the roof areas designated for a future solar array shall account for the load of the solar array.
 - D. The design must meet the requirements for Solar Ready as defined by local ordinance.
- ### 2. Electric Vehicle Charging (EV):
- A. Design may include designated space for future type 2 electric vehicle charging stations for school buses. Coordinate extent of scope with SDP. At a minimum provide conduit with pull string to the designated EV station locations. Include loads for EV stations in building load calculations and size transformers and panelboards to accommodate EV station loads.

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Section 262816 – Enclosed Switches

1. Provide non-fused disconnects for roof-mounted and ground-mounted mechanical equipment remote from the units. Group and gang disconnects within sight of units served and within 50-feet of the units served. Label disconnects with name of unit served.

Section 262726 – Wiring Devices

1. Provide wiring devices rated for 20-amps minimum.
2. Provide type 302 stainless steel faceplates in the kitchen. Provide unbreakable plastic or nylon construction faceplates in other areas.

Section 263200 – Generators

1. Provide battery systems or an on-site generator as the emergency power source for emergency egress lighting and legally required standby loads as determined by the project design team or as directed by the Owner
 - A. For small projects, batteries integral to light fixtures are preferred as emergency source for emergency egress lighting.
 - B. Except as otherwise required by code, buildings less than four stories, a battery lowering system and area of refuge is preferred. Buildings greater than three stories should have generator backup power for elevators with capacity to operate one elevator within each elevator bank at any time on generator power.
2. Generators.
 - A. Diesel generators are preferred over natural gas generators. Diesel generators shall be provided with In-skid tank sized for 48 hours of operation at 100% load.
 - B. Generators located outdoors in weatherproof, sound attenuated enclosures are preferred over generators located indoors.

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3. Generator manufacturers shall have a service center that is able to make an emergency call response within 24 hours and is located within 50 miles of site.
4. Generator remote annunciator should be located in the Engineer's Office.
5. Historically, high schools have been used as long term warming centers. Elementary schools have been used as short term warming centers. If part of the program, provide standby generator power to backup building HVAC systems and lighting in program spaces such as gymnasium, or auditorium and administrative offices. Full kitchen power is not required to be connected to standby power.

Section 264113 – Lightning Protection

1. Provide a lightning protection calculation based on NFPA 780.
2. If a lightning protection system is recommended, provide a Franklin System. Installation of the system should focus on concealing down conductors and protecting the system components from theft.

Section 264313 –Surge Protection for Low-Voltage Electrical Power Circuits

1. Surge suppression devices (SPD): Provide SPD's on switchboards and panelboards and integral to the equipment.

Section 265000 – Lighting

1. Lighting Power Density shall be less than that allowed by the adopted Energy Conservation Code.
2. Design Light Levels shall be compliant with current IESNA standards.
3. All light fixtures shall utilize LED's as the source of illumination.
4. Light fixtures shall contain long-life LED's with L70 rating of 60,000 hours minimum.

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5. Light fixtures shall contain a lens or other shielding means to eliminate direct view of the bare LED's.
6. Light fixtures shall contain protective wire guards and or lenses at in Gymnasiums, mechanical, electrical, janitorial spaces, elevator machine rooms and elevator shafts and in other spaces requiring physical protection.
7. Provide 5-year warranty on all light fixtures.
8. Design light levels per IESNA.
9. Provide recessed 2x4 LED, low-profile, volumetric distribution, center basket design, with curved ribbed diffuser for fixtures as standard luminaire. .Standardize luminaire types to reduce district attic stock requirements. Provide 5% attic stock for light fixtures in critical areas such as elevator lobbies, stairs, corridors, classrooms and site.
10. Pendant lighting should be avoided as it is a maintenance issue, requires additional cleaning and is difficult to maintain.
11. Require that all lighting in mechanical and equipment rooms be field located to coordinate with final installed location of pipes, ductwork and mechanical equipment in the space.
12. Color temperature consistent throughout building: 3500K-4000K for interior lighting; 4000K for exterior lighting
13. Provide color tuning for SPED rooms allowing occupant to vary the color temperature of the fixtures from warm to cool.
14. Provide light fixtures with a minimum color rendering index (CRI) of 80 for all interior lighting.
 - A. Exception: Special use, color effect lighting.
15. Provide light fixtures with a minimum CRI of 70 for all exterior lighting.
16. Provide light poles with the following characteristics:
 - A. Round, tapered
 - B. Steel or aluminum
17. Exterior lighting shall cut-off at property line. Refer to Chapter 02 Sustainability Scorecard for use as sustainability strategy (Light Pollution Reduction).
18. Provide night lights at the following locations:
 - A. Corridor intersections
 - B. Stairs
 - C. End of Corridor
19. For performance spaces provide the following:

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- A. Low level performance “blue lights” backstage and on catwalks.
 - B. Low level aisle performance lighting maintaining minimum light levels during performance.
20. In food service and food prep spaces, provide NSF (National Sanitation Foundation International) rated lights
21. In 3D Art Studios and for General Art Display, provide LED Track lighting, with High CRI and selected color temperature.

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Division 27 – Communications

Section 270000 – Communication General Requirements

1. The data communications network system is comprised of spaces, cable supports, and termination equipment. Technology requirements are stipulated herein and in the **SPD Technology Design Standards** available under the following link:

<https://drive.google.com/file/d/1jAcrr4XbYihgkEyCswBvbRKqL5nacLgx/view>

2. Spaces described here are based on the door(s) swinging out to permit the minimum required usable floor area. If it is necessary to swing the door into the room, the floor area shall be increased in length (or width) by the accessible width of the door.
 - A. Each building shall contain one **EF (Entrance Facility)** as required by the NEC within 50 feet of cable length from the outside cable entry. The EF shall be provided to terminate exterior cables from interior rated cables and the location of cable surge protection devices. The EF shall be a clear space (without columns) area of minimum 8' x 8' (required).
 - B. Each building shall contain one **MDF (Main Distribution Frame)**. The MDF should consist of a fully enclosed room consisting of approximately 240 square feet and a minimum dimension of 12 feet by 20 feet inside. The walls shall be floor to structure, finished and painted. Ceiling clear space shall be 8'-6" AFF; no false ceiling is preferred. Entry door shall be minimum 6'-8" inside height and minimum 36" wide inside, no door sill.
 - B. Each building shall have at least one **IDF per floor (Intermediate Distribution Frame)**. Each IDF should be a fully enclosed room consisting of approximately 100 square feet, with a minimum dimension of 10 feet by 10 feet inside. The walls shall be floor to structure, finished and painted. Ceiling clear space shall be 8'-6" AFF; no false ceiling is preferred. Entry door shall be minimum 6'-8" inside height and minimum 36" wide inside, no door sill. Lighting shall be 50FC and the room should be air conditioned to maintain to maintain between 64-75 degrees based upon the heat load of the equipment. The entry door shall

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be lockable and shall also have controlled access with a card reader (note card reader is an option and will need to be confirmed for each project). IDF's SHALL BE CENTRALLY LOCATED AND SHALL BE STACKED BETWEEN FLOORS

3. Design team to coordinate with fiber provider to determine location of incoming service.
4. Design team to coordinate with additional outside providers as needed where facilities require a secondary feed.

Section 271300 – Communications Cable Plant

1. Provide a complete structured telecommunications cabling system.
2. Obtain current specifications for School District furnished telephone, telecom, and mobile audio-visual systems. Provide cabling to support these systems.
3. Specify Contractor qualifications:
 - A. Shall have completed three projects of similar size and scope within the past five years.
 - B. Certified by manufacturer of cabling products proposed prior to bid date.
 - C. RCDD on staff
 - D. Can provide the equipment and cabling manufacturer's warranty
 - E. Provide the applications warranty from the cable manufacturer for telecommunications cabling.
 - F. Submit warranty documentation and cable test results in the format specified by the School District to the School District.

Section 272100 Data Communications Network System

1. Verify current specifications for network system equipment with the **SPD Technology Design Standards**.
2. Provide power, cabling, HVAC, etc. to support this equipment.

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Section 274116 Audio Video Systems

Responsibilities

1. To clarify the various roles and responsibilities within the design as well as construction processes, the following is a list of expectations of each party involved.
2. Items provided in construction contract:
 - A. Cabling
 - B. Room intercom / paging system
 - C. Smartboard support blocking
 - D. Projector support blocking
3. Items provided by SDP:
 - A. Teacher and student workstations and laptops.
 - B. Mobile A/V systems
 - C. Classroom Smartboards
 - D. Connectivity: School District network.
4. Designer shall review the requirements of A/V Systems for each space with the SDP Educational Technology group.
5. Built-in A/V systems for learning spaces are contractor furnished, contractor installed by a School District approved installer.
 - A. Provide all required cabling, raceways, boxes, etc. for a complete working installation.
 - B. A/V implementations (verify with SDP Educational Technology):
 - i. HDMI
 - ii. Wireless Connectivity
 - C. The following equipment may be furnished by the School District for learning spaces (verify and coordinate with School District):
 - i. Interactive White Board (or projector unit)
 - ii. Flat screen monitors (or projectors)
 - iii. Mounting brackets
 - iv. Speakers and sound amplifiers
6. Include A/V systems for spaces other than learning spaces in the building contract. Provide an A/V system for each of the following spaces:
 - A. Gymnasiums

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- B. Commons
- C. Other spaces as directed by the School District

Section 275313 Clock System

1. Classroom clock system and clocks are provided as part of the construction contract.
2. Renovation projects
 - A. Provide secondary clocks compatible with the existing synchronous clock system. Replace entire system if directed by the School District. Coordinate scope of work with School District.
 - B. Obtain current clock specifications from Appendix – SDP IT Requirements.
3. New construction projects
 - A. Provide a complete synchronized clock system consisting of PoE-IP clocks. Integrate the system with the class/bell schedule. Coordinate scope of work with the School District.

Section 273123 VoIP System

1. Verify current specifications for phone equipment with the **SDP Technology Design Standards**. Provide power, cabling, HVAC, etc. to support this equipment.

Section 275319 Education Intercom and Public Address System

1. Renovation projects
 - A. Coordinate scope of work with the School District and Renovation guidelines as listed in the **SDP Technology Design Standards**.
2. New construction projects
 - A. Provide a complete paging and scheduling system in accordance with **SDP Technology Design Standards**. Verify system wide interconnection requirements with the School District.

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Division 28 Electronic Safety and Security

General – Safety and Security Systems

Responsibilities

1. To clarify the various roles and responsibilities within the design as well as construction processes, the following is a list of expectations of each party involved.
2. Items provided in construction contract:
 - A. Card Readers
 - B. Door Controls
 - C. Cabling
 - D. Surveillance Cameras
 - E. Surveillance Head end
3. Items provided by SDP:
 - A. Access credential enrollment workstation and credentials.
 - B. Connectivity: School District network.

Section 281300 Access Control System

1. Provide an access control system compatible with the district-wide system.
2. The Access Control System shall control power via a line-voltage relay to power assist door and gate operators. System shall allow power to a door operator when the door is unlocked only. System shall allow power to a gate based on a time schedule or access credential reader as directed by the School District.
3. Verify current specifications with the School District.
4. Provide card access (or remote control, if acceptable to the School District) on all exterior doors for Police response use.
5. Refer to *Chapter 03, Safety and Security* for additional information.

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Section 281600 Intrusion Detection

1. Provide intrusion detection at exterior entries and locations directed by the School District.
2. Intrusion detection shall be provided via motion detection.
3. Verify current specifications with SDP Security.
4. Refer to *Chapter 03, Safety and Security* for additional information.

Section 282300 Video Surveillance

1. Provide video surveillance systems at all exterior entries and at locations directed by the School District.
2. Verify current specifications with SDP Security and coordinate system arrangement with **SDP Technology Design Standards**. Confirm compatibility with existing School District surveillance systems.
 - A. ONVIF compatible and must not contain any foreign-made chipsets. Per the 2019 National Defense Authorization Act (NDAA)
3. At the visitor entry the camera coverage shall provide clear identification of visitors and prevent tailgating of entrants.
4. Refer to *Chapter 03, Safety and Security* for additional information.

Section 284621 – Fire Alarm System

1. New buildings should be fully sprinklered. For modernizations of existing buildings that are not fully sprinklered, smoke detectors shall be installed throughout.
2. The central station signal shall be coordinated with the school system for current technology.
3. Provide non-coded, analog addressable fire alarm system.

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4. Design the fire alarm system according to the exceptions provided in the Philadelphia Fire Code and do not provide any manual fire alarm boxes in student areas like corridors, gymnasium, auditorium, cafeteria, etc., Provide manual fire alarm boxes at the following locations only: one in the main office, one in the building engineer office, one or two in boiler room and one in kitchen.
5. Provide fire alarm control panel with a digital alarm communicator transmitter (DACT) for off-premises monitoring of the control panel. Provide two Cat. 5 cables from the fire alarm control panel to the telephone demarcation station (main telephone service box).
6. Provide remote annunciators at main entrance, in main office and in building engineer's office.
7. Provide non-coded single action type addressable manual pull stations.
8. If the exceptions to the manual fire alarm boxes cannot be applied and fire alarm boxes must be provided, then provide plastic covers with battery powered audible sounder over all manual pull stations located in corridors, lobbies, locker rooms and cafeteria. Provide wire guards to all pull stations located in gymnasium.
9. Provide wire guards to all strobes and horn/strobes units located in gymnasium and locker rooms.
10. Provide duct detectors where required by NFPA code. Provide remote test switch with LED alarm indicator for each duct detectors.
11. Connect all fire extinguishing control equipment, sprinkler system valve temper switches and sprinkler water flow switches to the fire alarm system.
12. Connect all elevator control equipment to the fire alarm system for elevator recall function.
13. Provide a sign to each manual pull station. The sign shall be mounted immediately adjacent to the manual pull station. The sign shall read "IN CASE OF FIRE: SOUND ALARM AND CALL THE FIRE DEPARTMENT".

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14. Mounting heights of fire alarm devices shall comply with ADA requirements. The fire alarm pull stations shall be mounted maximum at 48" and minimum at 42" above finished floor. The strobe units and horn/strobe combination units shall be mounted at 80" above finished floor or 6" below the ceiling whichever is lower.
15. The strobe locations shall be as required per NFPA 72, section 6-4.4.2. The strobes in corridors shall be located no more than 15 feet from the end of corridors. The spacing between strobes in corridors shall be less than 100 feet.
16. Provide remote NAC power extender panels as required for horn/strobe circuits. Do not locate these panels in janitor closets, bathrooms or any wet or damp areas.
17. Provide normal/emergency power circuits to the fire alarm control panel and all remote NAC panels (not applicable to buildings which do not have emergency generators).
18. Provide a complete new raceway system for the new fire alarm system and install all fire alarm wiring in metal conduit. Provide galvanized rigid steel conduit for all riser conduits and all conduits in mechanical, electrical and boiler rooms. Paint all junction boxes with red color paint and label as "FIRE ALARM".
19. Whenever existing fire alarm system is to be replaced with a new system, do not remove existing fire alarm system until new system has been installed, tested, approved and under operation.

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Division 31 Earthwork

Section 311000 – Site Clearing

1. Guidelines

- A. Designer shall confirm with SDP the environmental conditions of the soils.
- B. Remove obstructions, objectionable material, rubbish, junk, trees, shrubs, grass, and other vegetation within the limit of disturbance to permit installation of new construction.
- C. Clear the ground of existing organic matter within excavation areas to a depth of eight (8) inches below the existing ground.
- D. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- E. Dispose of all unsuitable or excess topsoil, obstructions, demolished material off of owner's property in accordance with the environmental assessment and all local and state regulations.
- F. Protect existing features to remain including pavement, sidewalks, Stormwater systems etc.

Section 312000 – Earthwork

1. Guidelines

- A. Sawcutting of existing concrete and bituminous pavement to be marked out in the field for approval by the Owner/Authorized Representative prior to proceeding with the paving removal.
 - i. Existing concrete and bituminous paving to be saw-cut with a clean-cut line to a sufficient depth to allow for the removal of paving without disturbing the existing paving that is to remain.
- B. Earthwork to be in accordance with the approved geotechnical report.
- C. In areas to receive fill, excluding areas marked for bioinfiltration, proof roll and compact the exposed ground surface following site clearing to obtain the following density requirements in accordance with ASTM D698:
 - i. Foundations – 98%

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- ii. Floor Slabs – 95%
 - iii. Pavements – 95%
 - iv. Berms (non-structural) – 93%
- D. Dewatering, trenching and backfilling to be completed in accordance with all City of Philadelphia and Pennsylvania state regulations.
- E. All existing material not suitable for fill to be removed from the site in accordance with the PA DEP management if fill policy and regulations.

Division 32 Exterior Improvements

Section 321216 - Asphalt Paving

1. Applications
 - A. School yards, court yards, parking lots, and access roads.
2. Full-Depth Paving Guidelines
 - A. Asphalt Mixes
 - i. Wearing Course: Superpave Asphalt Mix, HMA Wearing Course, and thickness as indication on plans with a minimum thickness of 2" in accordance with PennDOT Publication 408, Section 409.
 - ii. Base course: Superpave Asphalt Mixture Design, HMA Binder Course, thickness as indication on plans with a minimum thickness of 3" to be installed in accordance with PennDOT Publication 408, Section 409.
 - B. Aggregate Base Course shall be in accordance with the latest revision of PennDOT Publication 408, Section 703 for Course aggregate 2A stone, thickness as indicated on plans with a minimum thickness of 6" to be installed in accordance with PennDOT Publication 408, Section 350.3. Provide aggregate from sources listed in PennDOT Construction Bulletin 14.
 - C. Tack Coat Application shall be in accordance with Section 460 of PennDOT Publication 408.
 - D. Provide asphalt paving with a minimum slope of $\frac{1}{4}$ " per foot or 2%.
 - E. Where integral colored asphalt is specified, the wearing surface shall consist of a combination of filler and finish coats of acrylic rounded silica particles.
 - i. Only for use in school yards and court yards
 - F. Porous Asphalt to not be used on School District Property
3. Mill & Overlay of Existing Paving
 - A. Existing paving to be removed by planing or milling with a smooth transitional cross grade to a depth indicated on the plan
 - B. All milled areas shall be cleaned by mechanical sweepers or vacuums immediately before and after completion of milling operation.
 - C. Tack coat to be installed in accordance with PennDOT Publication 408, section 460 as required.

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- D. Provide Superpave HMA Wearing course in accordance with PennDOT Publication 408, section 409, thickness as indicated on plans.
4. Asphalt Resurfacing over Existing Asphalt
- A. Scarify surface and fill and seal all pavement cracks or joints that exceed 1/8" in width in accordance with PennDOT Publication 408, Section 469, use fillers ad sealants conforming to PennDOT Specifications.
 - B. Tack coat to be installed in accordance with PennDOT Publication 408, section 460 as required.
 - C. Provide Superpave HMA wearing course in accordance with PennDOT Publication 408, Section 409, thickness as indicated on plans.

Section 321313 - Concrete Paving

- 1. Applications
 - A. Dumpster Pads, Service Drives, School Yards
- 2. Guidelines
 - A. Pavement to be designed as required for the anticipated use with AASHTO-25 loading where required.
 - B. Class A concrete to be provided in accordance with PennDOT publication 408, section 704 with thickness as indicated on the plans with the following minimum thicknesses:
 - i. 5" minimum depth pedestrian use applications only
 - ii. 8" minimum depth where heavy vehicle loading is expected
 - C. Aggregate base course shall be in accordance with the latest revision of PennDOT Publication 408, Section 703 for Course aggregate 2A stone, thickness as indicated on plans with the following minimum thickness:
 - i. 4" minimum depth pedestrian use applications only
 - ii. 6" minimum depth
 - D. Colored "pigmented" concrete acceptable only in play areas only.
 - E. Wire mesh reinforcing equivalent to #4@12" where applicable
 - i. Reinforcing not to be included in public right-of-way paving

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Section 321400 – Unit Pavers

1. Applications
 - A. For select use in plazas or entry areas. Unit paving shall be used sparingly and as approved in writing by the School District of Philadelphia.
2. Guidelines
 - A. Concrete pavers shall be in compliance with ASTM C936
 - B. Unit Pavers to be provided with a minimum $\frac{3}{4}$ " thick bituminous setting bed with a 4" concrete slab over a 4" compacted aggregate subbase.
 - C. Provide Stabilizing joint sand in conformance with ASTM C144.
 - D. Pavers to meet requirements of the most currently adopted ADA standards for Accessible Design for change in level, slopes, joint sizes.
 - E. Edge Restrain or Concrete curb required to hold pavers together and prevent horizontal movement.
 - F. Geotextile to be provided as required.

Section 321613.13 – Cast-In-Place Concrete Curbs

1. Applications
 - A. Concrete Curbs
2. Guidelines
 - A. Concrete curbs shall be in accordance with the Department of Streets Design standards and Department of Streets Standard Details SC0101 Typical Curb and footway Construction and Roadway Restoration and SC0102 Concrete Curb Construction.
 - B. Class A Concrete in accordance with PennDOT publication 408, section 704.
 - C. Concrete curbs to be provided with a minimum 6" curb reveal.
 - D. Expansion Joint Material in accordance with PennDOT Publication 408 Section 705.1
 - E. Curing in accordance with PennDOT Publication 408 Section 711.2

Section 321623 – Sidewalks

1. Applications
 - A. Pedestrian Concrete Sidewalks
2. Guidelines
 - A. Concrete sidewalks shall be in accordance with the Department of Streets Design standards and Department of Streets Standard Detail SC0101 Typical Curb and footway Construction
 - B. Class A concrete to be provided in accordance with PennDOT publication 408, section 704 with thickness as indicated on the plans with the following minimum thicknesses:
 - i. 4" minimum depth for walkways where normal pedestrian use is expected
 - ii. 5" minimum depth for expansive plazas, main entrances and walkways where heavy pedestrian use is expected
 - C. Aggregate base course shall be in accordance with the latest revision of PennDOT Publication 408, Section 703 for Course aggregate 2A stone, thickness as indicated on plans with the following minimum thickness of
 - i. 4" minimum depth for walkways where normal pedestrian use is expected
 - ii. 6" minimum depth for expansive plazas, main entrances and walkways where heavy pedestrian use is expected
 - D. Expansion Joint Material in accordance with PennDOT Publication 408 Section 705.1.
 - E. Curing in accordance with PennDOT Publication 408 Section 711.2.
 - F. Wire mesh reinforcing equivalent to #4@12" where applicable.
 - i. Reinforcing not to be included in public right-of-way paving.
 - G. Sidewalk width to be in accordance with the design plans with a minimum width of 5 feet except at major entrances where a minimum of 10 feet is required.
 - H. Sidewalk slopes to be designed with a minimum of 1% and maximum of 5%.
 - I. Sidewalk Cross Slopes to be designed with a minimum of 1%.
 - J. Sidewalks to have a light broom finish perpendicular to slope

Section 321633 – Driveways

1. Applications
 - A. Concrete Driveways
2. Guidelines
 - A. Concrete driveways to be in accordance with the Department of Streets Design standards and standard Detail SC0105 Standard Driveways.
 - B. Class A concrete to be provided in accordance with PennDOT publication 408, section 704 with thickness as indicated on the plans with the following minimum thicknesses:
 - i. 6" minimum Depth for light duty driveways
 - ii. 8" minimum depth for heavy duty driveways
 - C. Aggregate provided shall be in accordance with the latest revision of PennDOT Publication 408, Section 703 for Course aggregate 2A stone, thickness as indicated on plans with the following minimum thickness:
 - i. 6" minimum thickness for driveways
 - D. Wire mesh reinforcing equivalent to #4@12" where applicable.
 - i. Reinforcing not to be included in public right-of-way paving.
 - E. Expansion Joint Material in accordance with PennDOT Publication 408 Section 705.1.
 - F. Curing in accordance with PennDOT Publication 408 Section 711.2.

Section 321723 Pavement Markings

1. Applications
 - A. Schoolyard, as part of outdoor curriculum, physical education, or decorative pavement enhancements.
 - B. Athletic courts on pavement.
 - C. Parking lots.

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2. Guidelines

- A. Permanent Pavement Marking Paint shall be used on new asphalt or concrete pavement only.
- B. Temporary Pavement Marking Paint is recommended for existing paved surfaces that may be repaired, demolished or replaced in the near future.
- C. Permanent Pavement Marking Paint material shall be elastomeric, alkyd-resin, solvent-borne, acrylic, latex, or approved equal.
- D. Paint shall be applied with mechanical equipment to produce pavement markings with uniform straight edges and shall be applied at manufacturer's recommended rates.
- E. Colors, patterns, and designs for decorative pavement enhancements shall be approved by SDP.
- F. Athletic court pavement paint color, layout, and line width shall comply with National Federation of State High School (NFHS) Standards.
- G. Parking lot pavement paint color, layout, and line width shall comply with ADA guidelines.
- H. Parking lot pavement paint shall be thermoplastic.

Section 321816.13 Playground Protective Surfacing

1. Applications

- A. Schoolyard active play areas located under and around play equipment.

2. Guidelines

- A. Playground protective surfacing shall be located under and within the safety / use zones of play equipment as required by the play equipment manufacturer's critical fall height for individual pieces of equipment.
- B. Surfacing shall comply with ADA.
- C. Impact attenuation for critical fall heights must be tested according to ASTM F1292.
- D. Surfacing around high-traffic areas (such as spinners) or at base of slides, shall be a minimum depth of 5".

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- E. Approved Playground Protective Surfacing types include Poured-In-Place Rubber Safety Surface, Playground Synthetic Grass with Safety Pad, and Engineered Wood Fiber.
 - i. Poured-In-Place Rubber Safety Surface and Synthetic Grass Surface shall be installed over aggregate subbase to allow for water infiltration where appropriate.
 - ii. Engineered Wood Fiber to be used only upon written approval by SDP.
- F. Rubber tiles are not permitted.

Section 322100 Running Track Trench Drain

- 1. Applications
 - A. Around running tracks, track and field areas that require drainage
- 2. Guidelines
 - A. Trench Drain grate to Heavy Duty Cast iron or ductile iron.
 - B. Trench drain to be sized for appropriate drainage surfaces.

Section 322200 Resilient Track Surfacing

- 1. Applications
 - A. Running track, pole vault and high jump areas with surface drainage
- 2. Guidelines
 - A. All high school athletic surfaces must comply with National Federation of State High School (NFHS) standards.
 - B. To be installed in accordance with manufactures specifications and minimum requirements.
 - C. Provide an asphalt pavement with impervious rubber resilient surface.
 - i. A base mat of recycled rubber granules and an impervious wearing coat of colored rubber granules with polyurethane binder placed on full depth asphalt pavement.

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- ii. Track surfacing systems can use recycled ground rubber from recycled tires or Nike Grind.

Section 322040 Synthetic Turf Base

1. Applications
 - A. Use on High School football, soccer, baseball, softball fields
2. Guidelines
 - A. All high school athletic surfaces must comply with National Federation of State High School (NFHS) standards.
 - B. To be installed in accordance with manufactures specifications and minimum requirements.
 - C. Provide a synthetic turf with 1 ¾" thick resilient infill.
 - i. Synthetic turf with loose, shock absorbing infill placed on new stone base that permits water to "flow thru" the stone base into a drainage collection or retention system.

Section 323113 Chain Link Fences and Gates

Standard finish for all chain link fencing materials, gates and backstop systems is hot dipped zinc galvanized steel with PVC Class 2b coating. Specify "Black" color.

1. Provide design for fence framing with manufacturer's recommended post and rail fittings.
2. Provide top and bottom rails. Provide middle rail if required by height of fence.
3. Use PVC coated Schedule 40 steel pipe with fittings.
4. Provide gates with lockable hasps, self-latching heavy-duty hinges.
5. Provide delegated design by fencing manufacturer for structural live and dead loads.

Section 323119 Ornamental Metal Fences and Gates

1. Provide tubular picket fence system including:

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- A. 12 gauge posts and 14 gauge pickets.
 - B. Provide steel fencing system with light industrial polyester powder coat system;
or
 - C. Provide aluminum fencing system with powder coat system.
 - D. Specify flexible panel system to accommodate site slopes.
 - E. Provide 25-year manufacturer's warranty for materials and labor for replacement.
2. Option: Provide post and frame system with decorative punched metal or mesh infill with manufacturer's powder coat protection coating system.
 3. Provide gates with heavy-duty hinges, and lockable latches.
 4. Specify gate hardware (stainless steel) including the following:
 - A. Self-closing hinges;
 - B. Lockable latches;
 - C. Panic hardware required at courtyards or locations where building has rated egress exit doors per code;
 - D. Cane bolts for double service gates for securing gates in both the open and closed positions.
 - E. Provide design for trash enclosure gates including: cane bolts with stainless steel receivers in the pavement to accept the bolt to secure the gates in both the open and closed positions.
 5. Provide continuous reinforced concrete mow strip – 12" wide below all fences to facilitate mowing maintenance and reduce damage to fencing by maintenance equipment.

Section 323200 Retaining Walls

1. Retaining walls and curbs shall be typically cast-in-place concrete. In addition to the applicable Building Code requirements, the wall thickness determined by design, walls and curbs shall have additional reinforcement at fence posts with the following minimum thickness to reduce number and width of cracks at the posts.
 - A. Walls and curbs supporting chain-link fences shall have a minimum of 5" concrete clear at fence sleeves each side, typically providing a width of 1'-0" for fences 10'-0" high or less and 1'-4" for fences over 10'-0".

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- B. Walls supporting iron fences 6'-0" or less are to have a minimum width of 1'-0".
2. Provide $\frac{3}{4}$ " expansion joints every 40'-0" maximum, with joints within 10 feet of corners. Expansion joint layout shall be shown on the plans. Place expansion joints a minimum of 2'-0" away from the fence posts.
3. Provide drainage mat, stone drainage layer and weep holes (or perforated drainpipe connected to a stone dry well at lot line condition) behind the wall to prevent saturation of the backfill.
4. If retaining wall is a large element of the site, provide special formliners to provide an architectural finish.
5. The use of modular block masonry retaining wall systems, typically comprised of a reinforced earth system and interlocking loose laid decorative blocks, shall be evaluated on a case by case basis during design.

Section 323300 Site Furnishings

1. Applications
 - A. Schoolyard, pick-up / drop-off areas.
2. Guidelines
 - A. Bicycle Racks
 - i. Bicycle racks are required on site in order to support alternative and physically active transportation methods for staff and students.
 - ii. Bicycle racks shall provide two-point contact for secure locking.
 - iii. Preferred bicycle rack material is powder-coated steel.
 - iv. Specify surface-mounted or embedded in pavement.
 - v. Bicycle rack spacing shall follow manufacturer's recommendations to allow for maximum bicycle parking and clear circulation surrounding parked bicycles. Parked bicycles shall not interfere with adjacent pedestrian circulation.
 - vi. Bicycle parking shall accommodate no less than six bicycles within 50 feet of each primary entrance of the school.
 - B. Benches, Fixed Tables, or Other Seating
 - i. Seating shall be provided at pick-up and drop-off areas.

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- ii. Determine seating capacity with SDP to be based on school capacity, available site space, and other outdoor program.
- iii. Provide seating that accommodates a variety of group sizes and ages.
- iv. Specify surface-mounted or embedded benches, tables, or other seating. Movable furniture is not recommended and requires approval by SDP.
- v. Benches with intermediate arm rest are preferred.

C. Trash & Recycling Receptacles

- i. Specify covered openings.
- ii. Co-locate collection containers for recyclables next to all trash receptacles. Recycling receptacle shall be distinct and marked as 'Recycling Only'.
- iii. Locate receptacles near primary building entrances, near seating areas, and as needed throughout schoolyard.

Section 328400 Planting Irrigation

1. Applications

- A. Plant beds: temporary irrigation only.

2. Guidelines

- A. Specify temporary drip irrigation systems during two-year plant establishment period only. Once plants are successfully established, disconnect and remove irrigation system.
- B. Long-term irrigation shall not be specified, unless approved by SDP.

Section 329200 Turf and Grasses

1. Applications

- A. Athletic Fields to be accepted by SDP.
- B. Conditional use only on school grounds.

2. Guidelines

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- A. Specify turf only where areas are easily accessible by mower.
- B. Areas designated to be turf lawn shall be a minimum width of 4'-0".
- C. Areas designated to be turf lawn shall not exceed 20% slopes, except when incorporated into stormwater management features.
- D. Specify sod or seed.
- E. Turf shall be a mix of cool season grass:
 - i. For full sun locations, specify Kentucky Bluegrass (*Poa pratensis*) with a minimum of three cultivars; or approved equal.
 - ii. For partial sun locations, specify a mix of 50% Kentucky Bluegrass (*Poa pratensis*), 30% Chewings Red Fescue (*Festuca rubra*), 10% Perennial Ryegrass (*Lolium perenne*), and 10% Redtop (*Agrostis alba*); or approved equal.
- F. Method: Seed shall be sown with spreader or seeding machine. Hydroseeding is prohibited.

Section 329300 Plants

1. Applications

- A. Schoolyards.
- B. School grounds.
- C. Streetscapes.

2. Guidelines

- A. Specify Canopy trees with minimum caliper of 2"-2.5" upon installation and to comply ANSI Guidelines.
- B. Limb all canopy trees in pedestrian and vehicular areas to 7' clear height upon installation.
- C. Specify Understory trees at minimum height of 5'-6' upon installation and to comply with American National Standards Institute Z60.1 and A300 (ANSI) Guidelines.
- D. Specify Shrubs in minimum #3 Container and to comply with ANSI Guidelines.
- E. Specify Perennials in #1 Container or as deep-rooted Plugs and to comply with ANSI Guidelines.

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- F. Use rootball anchoring (in lieu of tree staking) for trees located in pavement within schoolyard and/or play areas.
- G. Planting shall occur during one of the following periods:
 - i. Spring Planting: March 1 – June 1
 - ii. Fall Planting: September 15 – November 15
 - iii. Planting between June 16 to September 14 is not permitted.
 - iv. Trees shall be planted before bud break or after leaf drop for balled & burlapped trees dug in season of planting.
 - v. Trees that have fall dig hazard shall only be planted in the spring.
 - vi. Planting outside of designated timeframes above may only occur with written approval from Landscape Architect.

Section 331000- Water Utilities

1. Applications

A. Domestic Water and Fire Service Connections

2. Guidelines

- A. All work shall conform to the requirements of Philadelphia Water, Philadelphia Fire Marshall, and any other regulatory authorities having jurisdiction.
- B. All water main work and water service connections shall be governed by, and done in accordance with the most recent revision or amendment to the Standard Specifications and Standard Details of the Philadelphia Water Department.
- C. All work on water service connections shall be done by, or under the direction of, a licensed Master Plumber.
- D. Domestic Water (and Fire Service connections if required) to be installed in accordance with PWD's water service installation detail.
- E. Designer required to evaluate meter pit and meter pit requirements in accordance with the latest PWD regulations.
- F. All domestic water and fire service mains to be Ductile iron pipe and shall conform to the requirements of AWWA C151, class 54, and shall have a cement-mortar lining of standard thickness in accordance with AWWA C104; pipe thickness shall be in accordance with AWWA C150; pipe shall have push-

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on joints in accordance with AWWA C110. Additional fittings shall be mechanical-joint ductile-iron compact fittings in accordance with AWWA C153 or standard size in accordance with AWWA C110.

- G. Buffalo Type Curb box or approved equal
- H. All service piping shall be placed at 4' of cover including the proposed curb stop.
- I. Service Saddle Assembly to comply with AWWA C800
- J. Corporations Valve in compliance with AWWA C800, bronze body, threaded inlet and outlet matching service pipe material
- K. Cleaning, disinfecting and testing water service mains to be required.

Section 333113 - Site Sanitary Sewerage Gravity Piping

1. Applications

- A. Sanitary Sewer Service Connection

2. Guidelines

- A. All sewer work to be done in accordance with the most recent version or amendment to the standard specifications and standard details of the Philadelphia Water Department
- B. Acceptable Pipe Material
 - i. Cast iron soil pipe in accordance with ASTM A 74 standard specifications with compression joints in accordance with ASTM C 564.
 - ii. Vitrified Clay Pipe shall conform to ASTM C700 Standard Specifications for Vitrified Clay pipe and shall be tested in accordance with ASTM C301 Standard Methods of testing Vitrified Clay pipe
- C. All sanitary sewer service connections to have a 4" Fresh Air Inlet in accordance with City of Philadelphia standards and PWD sewer service connection detail.
- D. Lateral pipes shall be placed in open cut trenches with Class D bedding installed in accordance with ASTM C 12.
- E. Backfill to be Select Granular Material (2RC) in accordance with PennDOT Publication 408, Section 703.3
- F. House laterals shall maintain a minimum slope of 2%.

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- G. Sewer Service connection to be installed in accordance with the latest version of PWD's sewer connection and repair manual.

Section 334211 – Stormwater Gravity Piping

1. Applications

- A. Stormwater Piping and Stormwater Service Connections

2. Guidelines

- A. All sewer work to be done in accordance with the most recent version or amendment to the standard specifications and standard details of the Philadelphia Water Department
- B. Acceptable Pipe material:
 - i. Cast iron soil pipe in accordance with ASTM A 74 standard specifications with compression joints in accordance with ASTM C 564.
 - ii. Vitrified Clay Pipe shall conform to ASTM C700 Standard Specifications for Vitrified Clay pipe and shall be tested in accordance with ASTM C301 Standard Methods of testing Vitrified Clay pipe
 - iii. Reinforced Concrete Pipe shall conform to ASTM C 76 Standard Specifications for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe, class III Wall B.
- C. All Stormwater gravity sewer service connections in combined systems to have a 4" Fresh Air Inlet in accordance with City of Philadelphia standards and PWD sewer service connection detail.
- D. Lateral pipes shall be placed in open cut trenches with Class D bedding installed in accordance with ASTM C 12.
- E. Backfill to be Select Granular Material (2RC) in accordance with PennDOT Publication 408, Section 703.3.
- F. Sewer Service connection to be installed in accordance with the latest version of PWD's sewer connection and repair manual.

SITE DESIGN



5



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CHAPTER 5 – SITE DESIGN REQUIREMENTS

The following items require multi-disciplinary coordination and cover several specification sections. Design teams are required to discuss specific design solutions and recommendations on a project-by-project basis with the School District of Philadelphia.

Site Documentation

Documentation

For new school projects and major modernizations, SDP will typically provide the following site-specific information for use by the Design Team:

- Land Ownership / Land Use Documentation
- Environmental Reports (Environmental Site Reports)
- Legal Representation for Zoning Entitlements (Variances/ Approvals). Designers are responsible for initial Zoning analysis and submission.
- School Data (Capacity/ Schedule)
- Sustainability Requirements

The Design Team shall utilize available information and resources to determine key site design considerations. Information and resources include, but are not limited to, the following:

- Local Codes / Regulations
- Right-of-Way Improvement Standards
- Area Traffic Studies
- Philadelphia Streets Department
- Community/ Neighborhood Groups
(Design teams shall assist with presentation material)
- Walk to School Programs
- Philadelphia Art Commission
- Utility Service Providers

- Campus Plan (If Applicable)

Site Surveys

Site Surveys will typically be required as part of the Design Team's Scope of Work. The Survey will be required to obtain the data necessary to prepare a boundary, topographical and utility survey for the entire school district property and adjacent public right of way. The survey datum shall be Pennsylvania South State Plane Coordinate system, North American Datum 1983 (PASPCS NAD83) for horizontal and the City of Philadelphia Datum based on nearby benchmarks that will need to be provided by the local Philadelphia survey district. The Designer of Record should confirm with the City Surveyor the accuracy of the boundaries and ensure all lots in one parcel have been consolidated. The survey shall typically include but not limited to:

1. Contours at 1-foot intervals, edges of pavements and elsewhere when appropriate. Provide spot elevations at critical locations.
2. Locate utilities from the best available information and include field locations of readily visible and accessible utilities within the project boundary and in the adjacent public right of way.
3. Locate and identify all existing surface features such as fences, sidewalks, signs, gates, lights, land cover conditions, buildings, manholes, storm drain catch basins, above and underground utilities, above and underground stormwater features, downspouts and roof leaders, roadways, pathways, power, telephone and cable poles and lines.
4. Obtain top of rim and pipe invert elevations and material (where accessible) of manholes, catch basins and culvert pipes.
5. Locate individual trees and document size and type. Clusters of smaller trees and brush may be identified by the perimeter of the clump with a description inside the area. Note if the trees are part of the Stormwater Fee tree canopy credit.
6. Measure and record deciduous tree size by caliper, evergreen tree size spread, per AAN standards. Measure and show on plan approximate tree canopy (drip line).
7. Provide at least 2 vertical control benchmarks on site. Provide the X, Y and Z coordinates for these points.
8. Provide metes and bounds of property on plan based upon deed information, field survey, City Plan, and other available information. Provide site area in acres and square feet. Where applicable locate easements and confirm with the city surveyor the accuracy of the boundaries to ensure all lots have been consolidated.
9. On new projects and major renovations containing stormwater management systems above ground, retain an arborist, horticulturalist or environmental consultant to identify existing trees, their age, their condition and any invasive

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species present on site. Consult with SDP regarding list of invasive species to identify.

The deliverable shall include:

1. The survey in AutoCAD Civil 3D 2019 or latest electronic format.
2. AutoCAD .dwg file of the property lines, easement lines, utilities and site features.
3. Field control points used to establish the survey in a .CSV (PNEZD) format.
4. Survey Map of the site.

Geotechnical Engineering Requirements

Geotechnical engineering expertise is required from the Design Team to perform field testing, laboratory testing and analysis of subsurface soils and/or rock to evaluate the subsurface conditions and their effect upon the proposed site development. Any disturbance caused by these investigations shall be restored to the original conditions without causing hazardous or unsightly conditions. Geotechnical investigations are typically required to perform the following types of field testing:

1. Auger borings for building foundations
2. Geotechnical testing for stormwater management systems (borings and infiltration tests for SMP's)
3. Soil sampling for Clean Fill (conducted by SDP)
4. Pavement Core Samples

Perform in accordance with Building Code requirements.

Auger Borings for building foundations:

Borings are completed at any proposed building location or addition to evaluate the existing subsurface conditions so their foundations can be designed appropriately, the following recommendations shall be provided as part of the geotechnical report:

1. Foundation support of the structure and slabs, including soil bearing pressures, bearing elevations, foundation design recommendations and anticipated settlement for shallow foundations.
2. Seismic site conditions in accordance with IBC 2018/ASCE 7 guidelines
3. Relative elevations of surface and subsurface features
4. Fill and compaction criteria
5. Pavement and floor slabs
6. Lateral earth pressures for retaining walls
7. General Geotechnical related construction procedures

Geotechnical testing for storm water management systems

The objective of the geotechnical testing at each SMP is to determine the infiltration rates and to evaluate the lithology at depths sufficient to identify any hydraulically limiting layers that would inhibit infiltration. This geotechnical investigation shall consist of drilling a borehole and infiltration testing within the footprint of each proposed GSI system in accordance with the latest version of the Philadelphia Water Departments Green Stormwater Infrastructure Geotechnical Guidelines

Soil Sampling for Clean Fill:

Soil sampling for clean fill is typically conducted by SDP, designer of record shall coordinate with OEMS for location of borings to allow SDP to collect necessary samples. Soil samples shall be taken to determine and evaluate the soil quality on all areas of the site that will be excavated during construction. These samples shall be analyzed in accordance with the Pennsylvania Department of Environmental Protection (PADEP) Clean fill guidance to determine if the material would satisfy the PADEP Clean Fill Concentration Limits.

Pavement Core Samples:

Pavement core samples are required to determine the existing thickness of asphalt, concrete and stone base.

Site Design

Transportation

The SDP Office of Transportation oversees and supports student transportation across the District. Design Teams shall become familiar with transportation options available to students and staff prior to evaluating site access, drop-off, and parking.

Yellow Bus Transportation is typically provided for students in grades 1 through 6 who live 1.5 miles or more from the assigned school and for students who are enrolled in Special Education programs. The Office of Transportation scheduling department will map routes based on eligibility information in the system and is responsible for determining final transportation assignments for Philadelphia resident students. Students in grades 7 through 12 who live 1.5 miles or farther from school are eligible for free mass transit Student TransPasses. Designers shall assist SDP and SEPTA with review and coordinating bus routes and stops for student drop-off and pick-up.

Student Drop-Off / Pick-Up

Design teams shall review and develop vehicular student drop-off and pick-up circulation, including bus loading and unloading.

1. Onsite drop-off zones are desirable where site space allows. Where designated drop-off zones are necessary along the public street, design teams are to consult and coordinate with the Philadelphia Streets Department and SEPTA.
2. Onsite car drop-offs shall meet the following requirements:
 - A. Provide a parent / caregiver car loading and unloading zone to accommodate anticipated number of cars. Confirm with school staff during site planning to determine daily number of student drop-offs.
 - B. Use 22-foot minimum length per car for planning of car stacking in drop-off areas.
 - C. A minimum overall drive width of 24-feet is required for one-way drives to accommodate cars in a stacking lane and allow cars to pass on the inside lane.
 - D. Refer to Chapter 04 technical narratives for pavement requirements.
 - E. Provide separate, paved, two-way bike lane and a pedestrian sidewalk.
 - F. Design site drives to accommodate service vehicles, buses, and fire trucks using “Auto-Turn” CAD program or equal to ensure drives will

- accommodate prescribed vehicle turning radii.
 - G. Confirm with SDP any initiatives related to the *Safe Routes to Schools* being applied to the project.
3. Provide bus loading area and drop-off loop drives, separate from car areas.
- A. Provide a bus loading and unloading zone to accommodate anticipated number and sizes of buses. Confirm with school staff during site planning.
 - B. Designate a one-way traffic flow for bus loading areas with signs and striping and with adequate width for buses to pass another bus in the loading area. A minimum 12 foot width shall be provided for bus maneuverability and increased where necessary to allow for the safe passage of school buses at all times.
 - C. Avoid arrangements where buses would need to back up.
 - D. Design all turning radii so bus can turn in a single maneuver.
 - E. Refer to Chapter 04 technical narratives for pavement requirements.
 - F. Design loading areas for student safety and allow students to directly enter the bus and not pass between other buses or vehicles.
 - G. ADA-compliant loading areas are mandatory. Locate these loading areas near the front door of the building.
 - H. Provide pedestrian lighting for early morning and evening loading area activities.
 - I. Restrict loading areas to bus loading and unloading of students.
 - J. Designate loading areas with signs and markings as a safety zone.
4. Onsite bus staging shall meet the following requirements:
- A. Curbside/ parallel / single-file bus staging is the preferred and safest method. Staging to occur alongside one-way bus drive.
 - B. Design bus parking area with over-striping for after-school, special event parking.
 - i. Car Striping – 4-inch wide white striping
 - ii. Bus Striping – 4-inch wide yellow striping
 - C. Locate bus parking close to main school entrance.
 - D. Design a curbed sidewalk along the drop-off/ pick-up lane protected by illuminated bollards.
 - E. Refer to Chapter 04 technical narratives for pavement requirements.

Parking

Onsite parking shall comply with the following:

1. Staff and Visitor Parking:
 - A. Consult with SDP and school staff to determine the desired number of Staff Parking spaces. Philadelphia Code requirements may govern.
 - B. Provide number of visitor parking spaces at 2% (min.) - 5% (max.) of the student population.
 - C. Locate staff parking near or contiguous with visitor parking or bus parking, where possible, for economy of paving.
 - D. Provide 2-5 parking spaces near building receiving area for Food Service and Custodial Staff. Number of spaces to be confirmed based on school staff.

2. Design Requirements:
 - A. Review Philadelphia Zoning Code to confirm number of parking spaces, dimensions, and other possible requirements. Notify SDP if site restrictions exist that may impact minimum parking requirements (excessive slopes, minimal site area, etc.).
 - B. Design parking spaces to be 9' X 18' minimum.
 - C. Address code requirements for ADA parking, such as number, location and special spacing of ADA parking spaces
 - D. Design double loaded aisles in parking areas, to greatest extent possible.
 - E. Design conventional curbs without integral gutters.
 - F. Design planting areas as paving cut-outs with concrete edging.
 - G. Indicate wheel stops only at locations where necessary to protect planting, buildings, or walkways without curbs.
 - H. Consider use of bollard barriers to prevent vehicular traffic from entering upon non-vehicular pavement areas.
 - I. Car striping to be 4-inch wide white lines
 - J. Bus striping to be 4-inch wide yellow lines.
 - K. Refer to Chapter 02 for parking design considerations to meet project Sustainability goals.
 - L. In addition to parking signage required to meet regulatory requirements, the following reserved parking stalls shall be identified with signage:
 - i. Accessible Stalls (as required by ADA)
 - ii. Principal
 - iii. Staff (location and number of stalls to be reviewed with school)
 - iv. Visitors (location and number of stalls to be reviewed with school)

v. Service and Delivery

Pedestrian Circulation

The following shall apply to onsite pedestrian circulation:

1. Design onsite pedestrian walks from major drop-off drives to major entrances to be a minimum of 8 ft and a maximum of 12 ft wide.
2. Design minor connecting walks to be a minimum of 5 feet wide.
3. Verify that accessibility is addressed at drop-offs and sidewalks.
4. Refer to Chapter 04 Performance Requirements for pavement requirements.
5. For drop-off zones along public street, provide bollard protection between vehicles and sidewalk.
6. Design pedestrian routes to be ADA compliant.
7. Confirm with Streets Dept requirements for signals, stop signs, lay-by-lanes, existing sidewalks repair, and other site elements.

Service Access

Coordinate with SDP and school staff for specific requirements for each school project. Review waste, recycling, and composting pick-up frequency. Review vehicle access requirements with service providers.

The following shall apply to onsite service access:

1. Service areas shall be isolated from other site elements (bus drop-offs, parking, play areas, etc.).
2. Loading Docks are required. Deviation from this requirement will require SDP approval.
3. Design adequate turning radii for service vehicle access to loading dock, trash dumpsters, etc. Consult with SDP and school staff to determine anticipated truck sizes. Historically, schools are serviced by straight body trucks. Need to accommodate container trucks shall be confirmed with school staff.
4. Refer to Philadelphia Code for additional requirements.
5. Refer to Chapter 04 technical narratives for pavement requirements.

Loading Dock Design:

1. Design Loading Dock height to be 36" with stair access.

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2. Design loading dock overhangs to accommodate height of tallest vehicle anticipated.
3. Consider curb-side loading if excavation is required to achieve standard dock height.
4. Consider oil trap to keep oil from leaching into ground.
5. Do not specify or detail dock levelers.
6. Specify dock bumpers as laminated rubber strips bolted to face of dock.
7. Consider using recycled rubber.

Waste Collection:

1. Dumpster container sizes:
 - A. Landfill: 8-10 CY
 - B. Compost: 4-6 CY
 - C. Recyclables: 8 CY
 - D. Confirm single stream recycling for plastics, aluminum, paper, glass, and cardboard with the Owner.
2. Provide accommodations and locations for the following dumpster units. The dumpster container is typically provided by the Owner's waste and recycling provider.
 - A. Elementary schools: 1 recycle, 1 landfill, 1 compost (if required)
 - B. Middle schools: 1 recycle, 2 landfill, 1 compost (if required)
 - C. High schools: 1 recycle, 2 landfill, 1 compost (if required)
3. Locate dumpsters in one gated enclosure ideally located near Food Service receiving area and Cafeteria.
4. Locate 2-3 dumpsters side-by-side if space allows. Stacking of dumpsters in an enclosure is difficult for the service hauler to pick and empty dumpster units.
5. Confirm instances where two dumpster locations may need to be identified.
6. Provide ground-level access from the building facility to the dumpster area. If grade requires, provide an accessible ramp. Stairs along the service path is not allowed.
7. At new schools accommodate space for compactors.
8. Refer to Chapter 04, Section 321313 for pavement standards.

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Emergency Access

Where vehicular drives are not included, provide paved walks or other surfaces suitable to accommodate emergency vehicles.

1. Areas utilized for emergency access shall be clearly marked with pavement striping, signage, and other identification as required by the Philadelphia Fire Department.
2. Review fire vehicle circulation and construction with the Philadelphia Fire Department.
3. Where emergency access path meets vehicular drive, evaluate the use of operable traffic separation features to limit non-emergency vehicle access.

Site Security

Refer to Chapter 03, School Safety and Security for general security overview.

1. Design landscaping to minimize places that are hidden from view.
2. Ensure that parking, drop-off points, play equipment and entrances are easily observable from inside the building and from the street.
3. Design exterior lighting to facilitate nighttime surveillance at 1fc minimum at ground level.

Fences and Gates

Fences and gates are typically provided to delineate the School District of Philadelphia Property from other public and privately owned properties.

1. Refer to Chapter 04 Performance Requirements for technical criteria.
2. Gates shall be manually operated (no powered gates).
3. Where space allows, sliding gates are preferable.
4. Use transom gates where fences exceed 10 ft. in height.
5. Gates shall accommodate locking by padlocks only, no chains.
6. For typical applications, the following fence and gate requirements shall apply:

Fence Type	Location
6' or 8' High Estate Fence	<ul style="list-style-type: none"> • Use on property line fronting streets. • Use on property lines with adjacent properties when school property is landscaped. See Chain Link Fencing for Play Areas
4' High Estate Fence	<ul style="list-style-type: none"> • Use within property between heavy pedestrian traffic areas and planted areas. • May be used at early childhood playgrounds along street frontage.
16' High Chain Link Fence	<ul style="list-style-type: none"> • Use on property line along adjacent properties and streets fronting play areas and at athletic fields. • Use to match existing 16' fences in schools and athletic fields.
8' or 10' high Chain Link Fence	<ul style="list-style-type: none"> • Use on property line along adjacent properties, and paved/planted areas. • Use to segregate parking, containerization areas from school play yard.
4' high Chain Link Fence	<ul style="list-style-type: none"> • Use to match existing.
Chain link fence with 6 gauge 1" Mesh Fabric	<ul style="list-style-type: none"> • Use in areas of high risk of vandalism, on 8', 10' or 16' fences.
3'-6" or 4' High "Bear Claw Fence"	<ul style="list-style-type: none"> • Use on top of low roofs in areas of high risk of vandalism.
8' High "Bear Claw Fence"	<ul style="list-style-type: none"> • At alcoves and areas that are hidden from street to deter vandalism.

Gate Type	Location
12' double leaf swing gate, commercial grade	<ul style="list-style-type: none"> • Use at vehicular ingress / egress
4' single leaf swing gate, commercial grade	<ul style="list-style-type: none"> • Use at pedestrian ingress / egress, low volume traffic
6' single leaf swing gate, commercial grade	<ul style="list-style-type: none"> • Use at pedestrian ingress / egress, high volume traffic, and at other locations to allow for landscaping equipment.

Railings

Exterior guardrails and handrails shall comply with the following:

Railing Type	Location
1 1/2" Diameter	For all exterior pipe railings including barrier rails.
1 1/4" - 1 1/2" Diameter	Gripping surface for all exterior hand railing for steps and /or ramp against wall.

1. Railings to meet ADA requirements.
2. Evaluate using anti-skateboard devices along railings, consider options for raised or depressed skate guards.

Mechanical Barriers

Where mechanical equipment that requires service is located within 10' (ten feet) of an open side of a walking surface and such open side is more than 30" above the grade below, 3'-6" high guards shall be provided in accordance with all applicable Building Codes. Such guard(s) shall extend not less than 30" beyond each end of equipment.

1. Install protective fencing/cage made with chain-link fence and posts around mechanical equipment and generator mounted at grade level and on roofs that are 12 ft above any horizontal surface.
2. Install 8 ft high bear claw estate fencing at concealed areas.

Flagpoles

All school buildings shall have a flagpole. The flagpole may be installed at one of the following locations: (listed in order of preference):

1. A vertical pole at street level in the vicinity of the main entrance to the building.
2. Diagonal pole on the face of the building above or adjacent to the main entrance to the building where vertical pole is not practical.

The height of a vertical flagpole shall be determined based on the height of the building. The flagpole shall be a minimum of 20' high and a maximum of 60' high.

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Appropriate structural foundation shall be provided based on the manufacturer's recommendation for installation of the flagpole and the soil condition.

Non illuminated flags can be displayed only from sunrise to sunset. Unless directed otherwise, the designer shall provide illumination for the flag to allow display after dark. Illumination may be with a pole top solar-powered luminaire (preferred) or an in-ground spotlight.

The size of the flag shall be proportional to the flagpole size and the wind velocity anticipated. The minimum being 3' X 5' and the maximum being 9' X 15'. Typical Pole Heights and Typical Flag Sizes are tabulated below:

Pole Height	Flag Size	Pole Height	Flag Size	Pole Height	Flag Size
60'	9' x 15'	40'	6' x 10'	25'	4' x 6'
50'	8' x 12'	35'	5' x 9'-6"	20'	3' x 5'
45'	6' x 12'	30'	5' x 8'		

Notes:

Flag lengths for poles for typical vertical poles are typically 1/3 the length of the pole.

Flag lengths for poles for typical vertical poles where high wind velocity is anticipated are typically 1/4 the length of the pole.

Bicycle Racks

To promote fitness and health benefits and to support students and staff who seek to commute to the school by bike, bicycle parking facilities shall be provided for school buildings on the outside of the building where outdoor space is available. Bicycle racks shall be used to provide such parking space.

1. Parking facilities shall be provided for students above third grade, part time and full-time staff and transient users (i.e. visitors).
2. Provide secure bicycle racks and/or storage within 200 yards of the building entrance for a minimum of 5% of the staff and students above third grade (measured at peak periods). A higher percentage may be applied for schools where a larger number of students riding bicycles to school is expected.
3. Divide the required bicycle racks in several clusters between the building entrances, playgrounds and athletic fields.

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4. Refer to Chapter 04, Performance Requirements (Section 323300, Site Furnishings) for bicycle rack technical criteria.

Retaining Walls

Site retaining walls should be avoided where possible and should be used only where necessary. Where site retaining walls are required, the following shall apply:

1. If retaining wall is a large element of the site, provide special formliners to provide an architectural finish.
2. The use of modular block masonry retaining wall systems, typically comprised of a reinforced earth system and interlocking loose laid decorative blocks, shall be evaluated on a case by case basis during design.
3. Refer to Chapter 04, Performance Requirements (Section 323200, Retaining Walls) for technical criteria.

Stormwater Management

Stormwater Management Requirements

Stormwater management strategies and systems shall be in compliance with the latest version of PWD's Stormwater Guidance Manual. The stormwater regulations define the specific requirements that need to be met for various types of development in the city. There are four (4) components of PWD's stormwater requirements; Water Quality, Channel Protection, Flood Control and Public Health and Safety. These requirements regulate how stormwater runoff leaves a project site in the post development condition. The development type, watershed and earth disturbance will determine which of these stormwater regulations apply to the specific project. The PWD Stormwater Regulations require on-site stormwater management for development projects with over 15,000 square feet (5,000 in certain watersheds) of earth disturbance. Other types of construction activities will also trigger portions of the Stormwater Regulations, including but not limited to demolition, utility connections, new paving, clearing and grubbing and landscaping.

Often non-structural options such as reducing the amount of impervious cover and designing for disconnected impervious cover are preferred strategies before proposing Stormwater Management Practices (SMP's) on the site. Typical SMP strategies used depends on the site, size and available space but often include but not limited to surface bio infiltration/bioretention basins, subsurface infiltration/detention and green roofs.

Surface Features:

Surface features like bio infiltration and bioretention basins or rain gardens are vegetated depressions that use surface storage, vegetation, planting soil, outlet controls and other components to treat, detain and retain stormwater runoff. These basins shall be designed in accordance with the latest version of PWD's Stormwater Guidance Manual and the following District requirements:

1. These basins shall have a maximum of 4" ponding depth for elementary and K-8 and maximum of 8" ponding depth for middle and high schools.
2. Barriers including but not limited to fences or shrubbery shall be provided where required as directed by SDP.

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3. Educational Signage shall be provided for all components including trees and grasses to assist in the educational and maintenance aspects of these features.
 - A. Other considerations for signage may include information regarding inlets, outlets, overflows to provide educational awareness of the system to students and staff. Trees that are getting tree credit should be identified. A sign is needed to explain appearance, maintenance and function.

Subsurface Features:

Subsurface features like underground Infiltration and detention systems are typically but not limited to stone beds, modular units or storage pipes beneath landscaped or paved surfaces. These basins shall be designed in accordance with the latest version of PWD's Stormwater Guidance Manual and the following District requirements:

1. Where located under paving with vehicle loading, systems shall be designed to H-20 loading as defined by the American Association of State and Highway Transportation Officials (AASHTO) specifications for truck loadings.
2. Systems shall be designed to be easily accessible for maintenance.
3. Educational signage shall be provided for all components including inlets that drain to these systems to assist in the educational and maintenance aspects of these features

Seeding requirements:

1. Seeding: If unique planting areas, such as turf and bio-infiltration beds are directly adjacent to each other, separation is required between planting areas with different seed mixes, where as a structural barrier, such as compost sock, will allow water to pass through but stops seeds and sediment from moving from one planting area to the next. These structural barriers shall be present around the bio-infiltration basin beds, at the top of all slopes entering the basins or turf and within a basin around seeding areas when seeding is used in conjunction with larger planting stock.
2. Slopes of basin at critical locations such as adjoining sides of play areas, entrance or access points of basin, or adjacent to parking or access road, shall not exceed 4:1 ratio. All other slopes within the basin shall not exceed a 3:1 ratio.

Weed maintenance

1. All base soils for topsoil mixes or bio-retention mixes shall be weed seed free or treated with an organic pre-emergent prior to use on site. If timing requires seeding in the fall for cool season grasses for turf, an organic pre-emergent shall be applied in the spring after seeding.
2. All equipment used in construction of turf or basins shall be properly cleaned with documentation before seeding or completing other landscape construction activities on School District landscapes.
3. Seed mixes for bio-retention areas designed as meadows shall be forb dominated systems with grass species comprising 35% or less of the seed mix.
4. Mulch for seeding shall be weed-free straw from small grains, such as oats or grain rye to minimize potential weed issues.

Bio-infiltration meadows post construction maintenance requirements:

1. Provide schedule of estimated maintenance for the first eighteen months of establishment.
2. During first year establishment, whenever canopy height (overall vegetation) reaches 18"-24", use a brush hog mower or string trimmer to trim the meadow to a height of 8". A lawn mower is strictly prohibited as the mower height will be too low and native seedlings will be killed.
3. Mowing height, during the growing season after the 1st establishment year should be no lower than 8" to control weed.
4. Manage all vines and spiny plants in the first growing season, they should be pulled by hand when they are young rather than after they have had two to three months of growth. Examples of invasive vines include bindweed, blackberry, multiflora rose, mile-a-minute, and Japanese hops. Be equally vigilant about controlling other invasive woody species, such as autumn olive and Japanese knotweed.
5. For seeding, use only high quality weed free grass seed mixes.

Definition of Porous Surfaces:

Safety Surface, Block pavers, Grass pavers, Gravel pavers, and Artificial turf.

Vegetative Roofs (Green Roofs):

Green Roofs provide multiple environmental and economic benefits and are becoming increasingly important design tools in dense urban areas. A primary function of green roofs is to collect and manage stormwater on site. Green roofs can be especially useful for buildings located on sites with limited at-grade physical space. Green roof vegetation absorbs, filters, and reduces the quantity of stormwater runoff entering City sewers, helps purify the air, reduces urban heat island effect, provides habitat and biodiversity, and in conjunction with building systems, can provide energy savings for buildings. While not feasible for all buildings and sites, green roofs shall be considered as an option for new school development, especially in tight sites with minimal open space. Green roofs shall only be used upon review and written approval from SDP. Green roof types include the following:

1. Extensive Green Roofs employ a lightweight, shallow growing medium, require no permanent irrigation and typically utilize succulent plants. Extensive Green Roofs are the recommended type.
2. Intensive Green Roofs employ a deeper growing medium and support a wide variety of plant types. Intensive Green Roofs are not recommended, due to increased maintenance requirements, structural loading and high-cost of installation.
3. Systems shall be accessible for maintenance preferably via an indoor access route. Educational signage shall be provided.

Outdoor Learning

General Requirements

The Guidelines in this Section are intended to assist the Landscape Architect in developing an outdoor corollary to the indoor school environment that is specific to the project context, neighborhood, site and community.

Key Objectives:

1. Promote outdoor learning, use of imagination, and healthy social interaction.
2. Provide multiple opportunities for physical and recreational activities.
3. Provide a universally accessible schoolyard and consider needs for students of all ages and abilities.
4. Provide meaningful educational experience for all students.
5. Create opportunities for play and outdoor learning that increase age-appropriate cognitive, social, and physical development for students.

Schoolyard Components:

Schoolyard design shall include all the following components, sized, and located based on the specific site and school population.

1. Areas for active, creative, and passive play.
2. Outdoor classroom(s).
3. Areas for athletics and physical education
4. Areas for gathering and socializing
5. Greening (or planting) – see Planting Narrative for more details
 - A. Greening shall include trees, shrubs, herbaceous perennials and grasses that help clean the air, manage stormwater, provide shade, reduce urban heat island and create native habitat.
 - B. Greening shall include gardens for learning and nature play.
6. Stormwater Management – see Stormwater Management Narrative for more details
 - A. Strategies could include both surface expression and sub-surface management.

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7. Shade
 - A. Shade to be a functional component created by structures and planting and shall correspond to location of benches and other occupiable zones.
8. Site Furnishings – See Chapter 4, Technical Standards for more details.
9. Outdoor Storage structures for landscape and other outdoor equipment shall be secure and sized appropriately for school capacity and needs.
10. Security Measures – see Chapter 3 for more details.
 - A. Security may include lighting, mounted cameras, fencing, a variety of egress and access points, and clear visibility and good site lines across the schoolyard.
 - B. Clear separation between pedestrian and vehicular circulation.

Schoolyard Design:

Schoolyard size shall be determined using a minimum of 50 SF per student. Schoolyard design shall follow the skill objectives developed by the Playful Learning Landscapes Action Network. These skill objectives include collaboration, communication, content, critical thinking, creative innovation, and confidence.

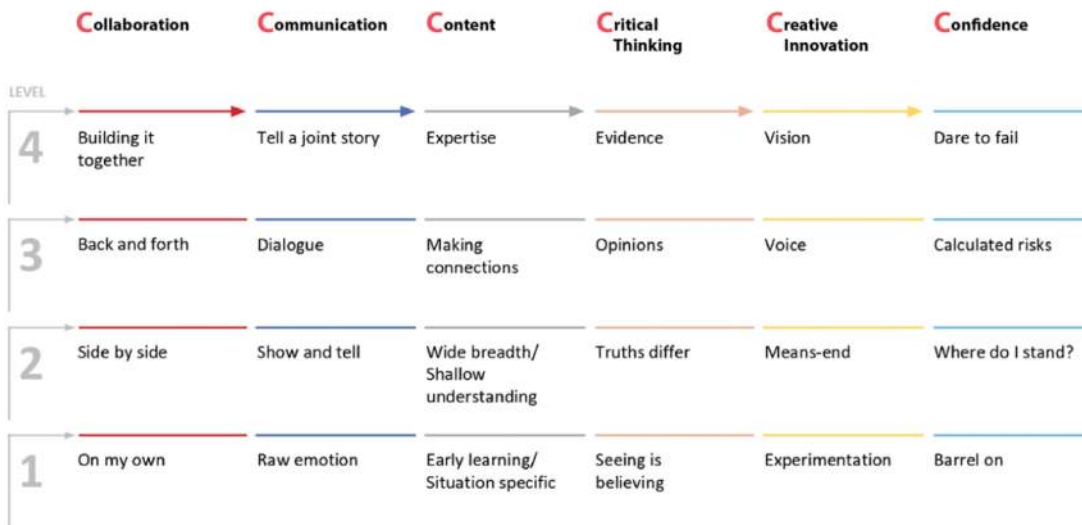


Chart from “Becoming Brilliant” by Roberta Golinkoff and Kathy Hirsh-Pasek

<https://playfullearninglandscapes.com/about/>

Outdoor Classrooms

Outdoor classrooms provide an alternative to traditional learning spaces within the school building. They provide opportunities extend the school curriculum to the exterior environment and to engage students in distinct ways that may not be possible in a traditional indoor classroom setting.

In general, outdoor classrooms shall provide a location for group gathering, incorporate individual or group seating, and provide a location for the instructor to teach with visual access to all students. There is no prescribed size for outdoor classrooms, as they are highly variable depending on the available space and location within each project site. Consideration shall be given for ways to protect users from the elements and minimize distractions. Outdoor classrooms shall be designed to accommodate students with physical disabilities, providing equal learning opportunities within the space. When not being used for instruction, they shall provide opportunities for socialization and play.

1. Quantity: As space allows, Outdoor Classrooms shall be given significant consideration for each schoolyard as they are flexible exterior spaces that can be utilized in many different capacities.
2. Capacity: Number of Outdoor Classrooms shall be determined on a school-by-school basis based on school capacity, available overall site space, and other outdoor program requirements. Large outdoor classrooms shall provide seating for a minimum of four classes. Small outdoor classroom shall accommodate one class. Both large and small outdoor classrooms shall be included in the schoolyard, where possible.
3. Location: Where possible, locate outdoor classrooms in areas with minimal noise from surrounding streets and sidewalks. Vegetated buffers shall be added to further minimize surrounding noise, limit visual distractions, and to be utilized as part of the curriculum. Consider locating near canopy trees to provide overhead cover and shade. Outdoor classrooms shall not be located within GSI systems. Avoid utilizing areas within SWM features.
4. Components: Outdoor classrooms may include, but are not limited to, the following design components:
 - A. Seating – Traditional seating, such as benches or amphitheater-style seat walls, or natural elements such as logs, stumps, or boulders.
 - B. Berms or sculpted topography.
 - C. Worktables or lab stations.
 - D. Storage.
 - E. Landscape plantings.

- F. Green stormwater infrastructure.
- G. Learning Gardens.
- H. Writing surfaces, such as outdoor chalk boards.
- I. At-grade or elevated instruction space/stage.
- J. Grounded electrical outlets.
- K. Freezeproof hose bibb.

Play Equipment

1. Play equipment shall be universally accessible, ADA compliant, and IPEMA certified.
2. Play equipment shall promote physical activity, social-emotional connection, cognitive learning, and creativity for all students.
3. Play equipment shall provide opportunities for students to develop a range of gross motor skills and utilize all parts of the body.
4. Landscape Architect shall coordinate with Physical Education and Athletic instructors, as well as Principal, School Counselors, and Special Education Leadership to select play equipment.
5. Play equipment shall be provided for all age groups that attend the school. Typical age ranges for play equipment include:
 - A. Early Childhood: 2-5 years
 - B. Elementary School: 5-12 years
 - C. Teen: 13+ years
6. Recommended fall height of play equipment for students in Kindergarten and 1st grade is 4'-0". Recommended fall height of play equipment for students in grades 2-5 is 7'-0".
7. Consider inclusion of sensory equipment for students with varying abilities.
8. Traditional swings are not permitted. Basket swings or other non-traditional swings that accommodate more than one student are permitted upon approval by SDP.
9. Safety surfacing shall be provided under and around all play equipment and shall accommodate all designated safety / fall zones. Depths of safety surface shall comply with ASTM fall heights for play equipment. Safety surfacing shall

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be tested on site after installation and prior to installation of play equipment by an independent testing group to confirm compliance with ASTM standards and play equipment manufacturer's recommendations.

10. Sand is prohibited in schoolyards.
11. Signage shall be included in play area that delineates rules of use for play equipment.

Nature Play and Learning Gardens

Nature Play spaces and Learning Gardens provide benefits to the cognitive growth of children and offer important exposure to the natural world, which may otherwise be limited in the urban environment. Nature Play spaces are areas that incorporate natural materials and elements, such as vegetation, trees, logs, branches, rocks and boulders, and water that provide distinct play and learning experiences. Unlike traditional play equipment, which is generally prescriptive in the activities it allows, nature play provides a more open-ended play experience for children to craft their own play adventure, fostering exploration and discovery, creativity, and critical thinking.

Learning Gardens are an example of an outdoor space that provides authentic teaching moments through active engagement in natural processes. There are many practical educational applications associated with Learning Gardens, which include learning about plant and soil biology and ecology, pollinators, the water cycle, and food and nutrition.

1. Create garden environments connected to curriculum, site context and neighborhood history.
2. Design for minimal maintenance which is often carried out by the school community.
3. Design to promote exploration of natural environments, encourage understanding of native ecosystems, and study of ecology, geology, and other natural sciences.
4. Materials may include stumps and logs, engineered wood fiber mulch, and natural boulders. Stumps and logs shall be treated to prevent pests and rot. If stumps and logs cannot be treated, they will be considered on a case-by-case basis.
5. Use plants as teaching tools.
6. Sand is prohibited.

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7. Consider and explore the feasibility of community vegetable, compost, or demonstration gardens to promote stewardship and leverage volunteers or partnerships with parents or community groups to ensure maintenance and garden's success.
8. Provide frost-free hose bibs within 50' of planted areas.
9. Provide interpretive signage for outdoor learning.

Athletic Facilities

General Requirements

New outdoor Athletic Facility requirements will vary by school and will be based on available onsite space and school location.

1. All athletic facilities and fields must meet the Americans with Disability Act (ADA) and meet the National Federation of State High School Associations (NFHS) guidelines (unless specified otherwise).
2. Evaluate site for ideal orientation for varying fields.
3. For fencing criteria, refer to Chapter 04 Performance Requirements for technical criteria.
4. Field illumination standards:
 - A. Minimum of 50 foot-candles for football, baseball, softball, and track and field
 - B. Minimum of 75 foot-candles for soccer and tennis
 - C. Refer to SDP sustainability guidelines under Chapter 02 for other lighting considerations.
5. Provide delegated design specification for the tension netting system for soccer or other play fields to keep balls out of adjacent properties.
6. Provide “Rules of Use” signage for the track and field in coordination with SDP requirements.
7. For track and turf surfacing requirements refer to Chapter 04, Performance Requirements.
8. For natural turf surfacing requirements refer to Chapter 04, Division 32 sections.
9. Incorporate sub-drainage systems below synthetic turf fields.
10. Provide educational signage describing stormwater management systems. Considerations may include at areas that have yard drains draining to subsurface systems and tracks and walkways that drain to trenches and impaired by improper design and management.

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11. Subsurface explorations at field areas shall include evaluation of environmental conditions.

Elementary School Athletic Fields

Elementary School fields shall be provided when requested by SDP and will be based on grades provided at the school (K-5, K-8).

Design Criteria:

1. If available land allows and if specified by SDP, provide grading only for 1 softball field and 1 multipurpose field where import of fill material is not required. Crown grade at center of field. Use of imported fill shall be based on geotechnical recommendations.
 - A. Elementary School softball field radius to outfield fence is to be 180 minimum to 200 feet maximum.
 - B. Elementary School multipurpose field size is to be 195 feet wide and 360 feet long.
2. Design softball infield area according to athletic association standards.
3. Confirm with SDP if playing fields are to be available for community use and if so, design access, security, and accessories accordingly.

Technical Standards:

1. Minimum cross slope is 1.5% to 1.75% for multipurpose fields. Crown is preferred at 1.75%. In addition to designing for drainage, refer to NFHS standards for additional specific slope requirements.
2. Softball backstop shall have a 17-foot, 6-inch overhang height and a 10-foot high by 20-foot wide back panel and 10-foot wide side panels.
3. Backstop shall be located at a minimum of 25 feet and a maximum of 30 feet behind home plate.
4. Provide 20 ft. foul poles (standard yellow) with screening.
5. Provide Safety Release bases that include an attachment system that holds the bases in place during normal play but will dislodge when a runner slides into the base.

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6. For outfield fencing, provide 8 feet high black vinyl-coated chain-link with top rail protective pad (standard yellow fence guard) between foul lines and foul poles at foul lines.
7. Specify Grass Mix for athletic playing fields to be a combination of bluegrass and perennial ryegrass a minimum of 80% endophyte-enhanced turfgrass cultivars designed for playing fields.

Middle / High School Athletic Fields

Design Criteria:

1. If available land allows and if specified by SDP, provide grading only for 1 softball field and 1 multipurpose field where import of fill material is not required.
2. Contingent on school-specific program and site availability, plan athletic fields to be:
 - A. Baseball Field
 - B. Softball Field
 - C. Tennis Courts
 - D. 8-lane, 400 meter running track
 - E. Multi Use - Football/ Soccer/ Field Hockey/ Lacrosse (boys and girls)
 - F. Field Events
3. MS and HS playing fields and courts shall provide for spectator seating. Some will require grandstands, fieldhouse, concessions (i.e. high school football), and restrooms. Other facilities may provide space, away from player bench areas, for spectators to gather and stand or use "lawn chairs". Consult with SDP and Athletic Director regarding level of competition the facilities will be designed for and required amenities.
4. Baseball and softball fields will require a lockable storage box or shed for maintenance equipment, bases, guideline, liner, other. Consult with Athletic Director regarding level of competition the facilities will be designed for and required amenities.
5. Design site grading plan to avoid imported fill to the maximum extent possible. If imported fill is needed, specifications must require proof by submittal documents that only Pennsylvania Department of Environmental Protection "Clean Fill" is used. Use of imported fill shall be based on geotechnical recommendations.

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6. Crown grades at centers of fields.
7. Provide a minimum of two (2) freeze proof hose bibs.

Technical Standards:

1. Minimum cross slope is 1.5% to 1.75% for multipurpose fields. Crown is preferred at 1.75%. In addition to designing for drainage, refer to NFHS standards for additional specific slope requirements.
2. High School Multi-purpose fields are to be 225 feet wide and 360 feet long. Grade to add additional sideline area for player bench area.
3. High School baseball field requirements shall follow NFHS dimension guidelines and include the following:
 - A. Backstop shall be 24 feet high, at a minimum of 60 feet behind home plate.
 - B. Protection fence shall be 12 feet high, chain-link, at 60 feet from baselines.
 - C. Outfield fencing shall be 8 feet high, chain-link, with top rail protective pad between foul lines and foul poles at foul lines.
 - D. Aluminum player benches for each team, set back from protection fence. Inground mount.
4. High School Softball Field requirements shall follow NFHS dimension guidelines for girl's level only and include the following:
 - A. Backstop shall have a 17-foot, 6-inch overhang height, a 10-foot-high by 20 wide back panel, plus 10-foot-wide side panels. Backstop is to be located a minimum of 25 feet and maximum of 30 feet behind home plate.
 - B. 12-foot-high chain-link player protection fences.
 - C. Optional 8-foot high chain-link outfield fence, top rail protective pad, and foul poles.
 - D. Aluminum player benches for each team, set back from side fence line. Inground mount.
5. High School running track requirements:

- A. 8 lane, 400 meter running track.
 - B. Track surfaces to be all weather rated.
 - C. Track radii adequate to accommodate football/soccer field.
 - D. Field to include high jump, long/triple jump, discus, and shot-put following NFHS guidelines.
 - E. 4-foot high chain-link fence surrounding track with gates at center field and as needed for maintenance access.
 - F. Javelin and Discus will use multipurpose fields(s).
 - G. Scoreboards and spectator stands (confirm project specific design capacity).
6. Multipurpose Field / Multi Sport (Regulation)
- A. Provide field striping for football, soccer, field hockey, and lacrosse meeting NFHS guidelines.
7. High School tennis courts
- A. Provide 12' high chain link fence enclosure with transom gates located on both side of enclosure.
8. High School basketball courts
- A. Provide 10' high chain link fence enclosure with transom gates located on both side of enclosure.

Planting

General Requirements

All planting must conform to the American Standard for Nursery Stock put forth by the American National Standards Institute (ANSI Z60.1).

1. Use low maintenance, urban-tolerant species and consider site context when selecting plants. Urban environments are dynamic and may exhibit challenging growing conditions for plants due to stress factors such as compacted soils, pollution (air, water, soil), significant temperature extremes differences due to heat absorption from adjacent site pavements and dramatic sun/shade patterns due to adjacent buildings.
2. Native species are preferred.
3. Provide topsoil sample testing with recommendations provided for admixtures including lime, fertilizer, and organic material. SDP has experienced issues with alkaline soils, weed and invasive seeds and poor microbial communities. Consider microbial biomass test or similar.
4. Specify a diversity of plant species to minimize chance of widespread infection or plant loss from insects or disease.
5. Consider plants that are salt tolerant when located next to areas of pavement due to the use of de-icing salts in winter.
6. Plants with year-round seasonal interest are preferred.
7. Broad monoculture plantings are generally discouraged.
8. Avoid overly complex planting designs that create maintenance challenges for personnel.
9. Limit areas of turfgrass, which require significant resources (ongoing use of chemicals and fertilizers) and routine maintenance.
10. Prioritize plantings that do not require permanent supplemental irrigation. Temporary irrigation may be provided during plant establishment (limited to 2

- years after Project Acceptance by SDP). Exceptions may include Learning Gardens.
11. Invasive species are strictly prohibited. Refer to the Pennsylvania Department of Conservation and Natural Resources most current listing of invasive species. <https://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/InvasivePlantFactSheets/Pages/default.aspx>
 12. Any species (woody or herbaceous) that has been identified as under threat of disease or decimation by pests is prohibited.
 13. Check state resources prior to developing Plant Schedules for updates on local or state insects, diseases or other pests that pose threats to Pennsylvania flora. Reference sites for updates and notices regarding current infestations:
 - https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/Pages/default.aspx
 - <https://www.dcnr.pa.gov/Conservation/ForestsAndTrees/InsectsAndDiseases/Pages/default.aspx>
 - <https://extension.psu.edu/spotted-lanternfly>
 14. Plants known to cause contact allergic reaction or skin irritation are prohibited.
 - A. These include Poison Ivy (*Toxicodendron radicans*), Poison Oak (*Toxicodendron diversilobum*), Poison Sumac (*Toxicodendron vernix*) and Oleander (*Nerium oleander*)
 15. Physically hazardous plants are prohibited.
 16. Plants that contain significant thorns are strictly prohibited. Thornless cultivars or varieties may be permitted.
 17. The following trees are weak-wooded, or have weak branching structures, and therefore are not recommended for planting adjacent to sidewalks, play or classroom areas, or parking lots.
 - A. *Acer saccharinum*, Silver Maple
 - B. *Pyrus calleryana 'Bradford'*, Bradford Pear
 - C. *Populus spp.*, Poplars, Cottonwood & Aspens
 - D. *Salix spp.*, White Willow, Weeping Willow

Tree Plantings

1. Specify Canopy trees to provide shade for paved and play areas.
2. Specify Understory trees to provide habitat and seasonal interest.
3. Plant trees in landscape areas where feasible to increase plant access to water, soil nutrients and larger soil volumes, and air that promote healthier and longer-lived trees.
4. Connected tree trenches with structural soil are recommended for trees planted within areas of pavement. Connected soil volumes encourage healthy root growth and provide better access to water, nutrients, and air.
5. Specify street tree plantings that comply with Approved Street Trees list issued by Philadelphia Parks and Recreation and conform to requirements of the Philadelphia Streets Department and Philadelphia Zoning Code.
6. For trees that are not being planted in raised planters or in curbed areas, finished grade of planting shall be lower than surrounding pavement.
7. Along the building perimeter, trees shall be placed so that the tree canopy does not come into contact with building at full growth.

Shrub Plantings

1. Shrub species shall not exceed a mature height of 3'-0".
2. Native shrubs are preferred.
3. Dwarf species of shrubs are preferred to minimize security risk.
4. Provide a variety of species that provide habitat value for birds, insects, and pollinators.
5. Plant shrubs in groupings to enhance benefits and reduce maintenance.
6. Consider incorporating evergreen shrubs to provide winter interest.

Perennial Plantings

Native perennial species are strongly recommended.

Mulch

Mulch shall be placed over bare, exposed soil to help retain moisture in the soil, suppress weeds and provide valuable nutrients.

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1. A maximum 3” layer of mulch shall be applied to all plant beds.
2. Mulch shall be reapplied each year as needed to protect plant roots and maintain soil moisture.
3. Mulch shall not be mounded around trees, shrubs, or perennials.
4. Mulch shall never touch tree trunks or at base of shrubs.
5. Acceptable Mulches:
 - A. Organic, natural, un-dyed, triple-shredded hardwood
 - B. Composted leaf litter or shredded, dried leaves

Temporary Protection Fencing:

Schoolyards are highly active spaces, and new plantings are sensitive to disturbance during the two-year establishment following installation.

1. Install temporary protection fencing around landscape beds to deter pedestrian access and minimize damage to plants.
2. Install protective fencing next to high-activity spaces (such as basketball courts or playgrounds) to prevent children and equipment from entering the planting areas.
3. Fencing shall not contain sharp surfaces that could injure schoolyard users.
4. Periodic maintenance is required to correct damaged or fallen fencing or posts.

Plant Maintenance

Herbaceous plantings, such as flowering perennials, grasses, and groundcovers shall not be cut back during fall or winter months in order to promote biomass, habitat, and healthy, functioning ecosystems.

Suckers and tree pruning for non-flowering trees should occur after leaf drop and before bud break (late fall/early spring). Trees should never be trimmed or topped. Shrubs pruned preferably and trimmed early spring.

APPENDIX A – FLOOR PLANS

Space Types

PK CR
20

K CR
30

Pre-Kindergarten and Kindergarten Classrooms



Activities: The School District of Philadelphia (SDP) provides Pre-Kindergarten and Kindergarten offerings for children ages 3 to 5 years old. These offerings are provided in the context of a learning center model with flexibility to support direct access to a restroom and an outdoor playground area to the extent this is possible and within compliance with licensing standards. The center model involves ample movement and flexibility in the learning space for a maximum of 20 students in pre-k and 30 students in kindergarten.

Access: The Pre-Kindergarten and Kindergarten classrooms should be situated at a location within the school facility that provides direct access to a playground or play area. There should also be a toilet room within the classroom. Where possible, the early childhood learning suite should have its own arrival and dismissal area. This is especially applicable for pre-kindergarten, which is operated separately from the rest of the school.

Considerations: The SDP Early Childhood Education Program strives to provide flexible furniture in classrooms to support instructional methods and approaches. Ample storage is required for large play components, manipulatives, cots, etc.



Active learning starts in the early years



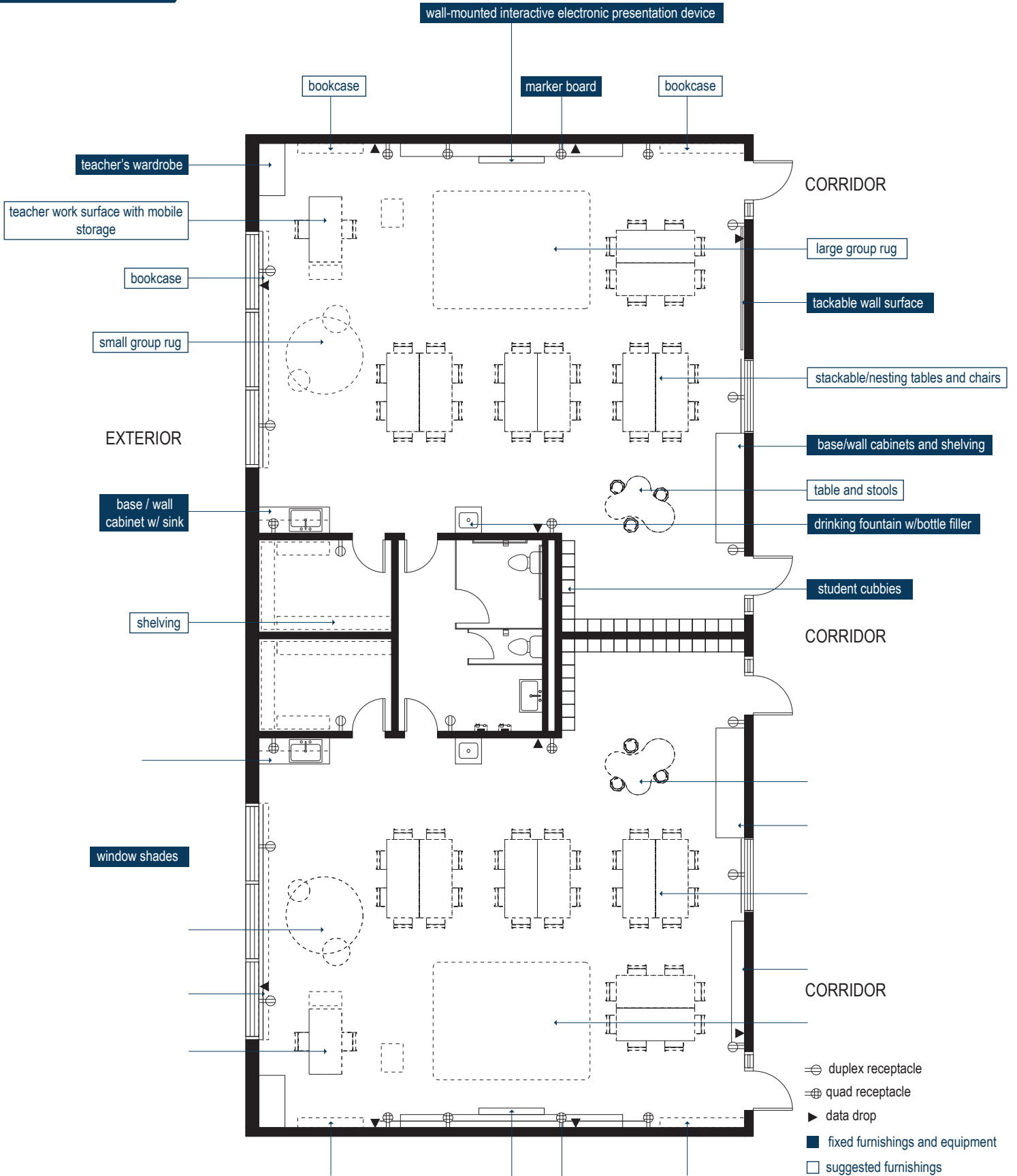
The Pre-Kindergarten program includes a large-motor / indoor recess area

Attention to the scale of elements in this suite of spaces is very important. Every effort should be made to create a comfortable environment for young learners. Adaptive outdoor play equipment should be part of the physical education space and available for use by students with special needs as well as their non-disabled peers.

PRE-K CLASSROOM



K CLASSROOM



General Elementary Classroom



Activities: General classrooms are instructional spaces that provide flexibility to support a variety of educational strategies and approaches. Classrooms are to be large enough to accommodate whole group, small group, and individual instruction. Furniture and equipment should be movable and adjustable to accommodate different instructional space arrangements.

Access: A combination of clustered classrooms dispersed throughout the school building.

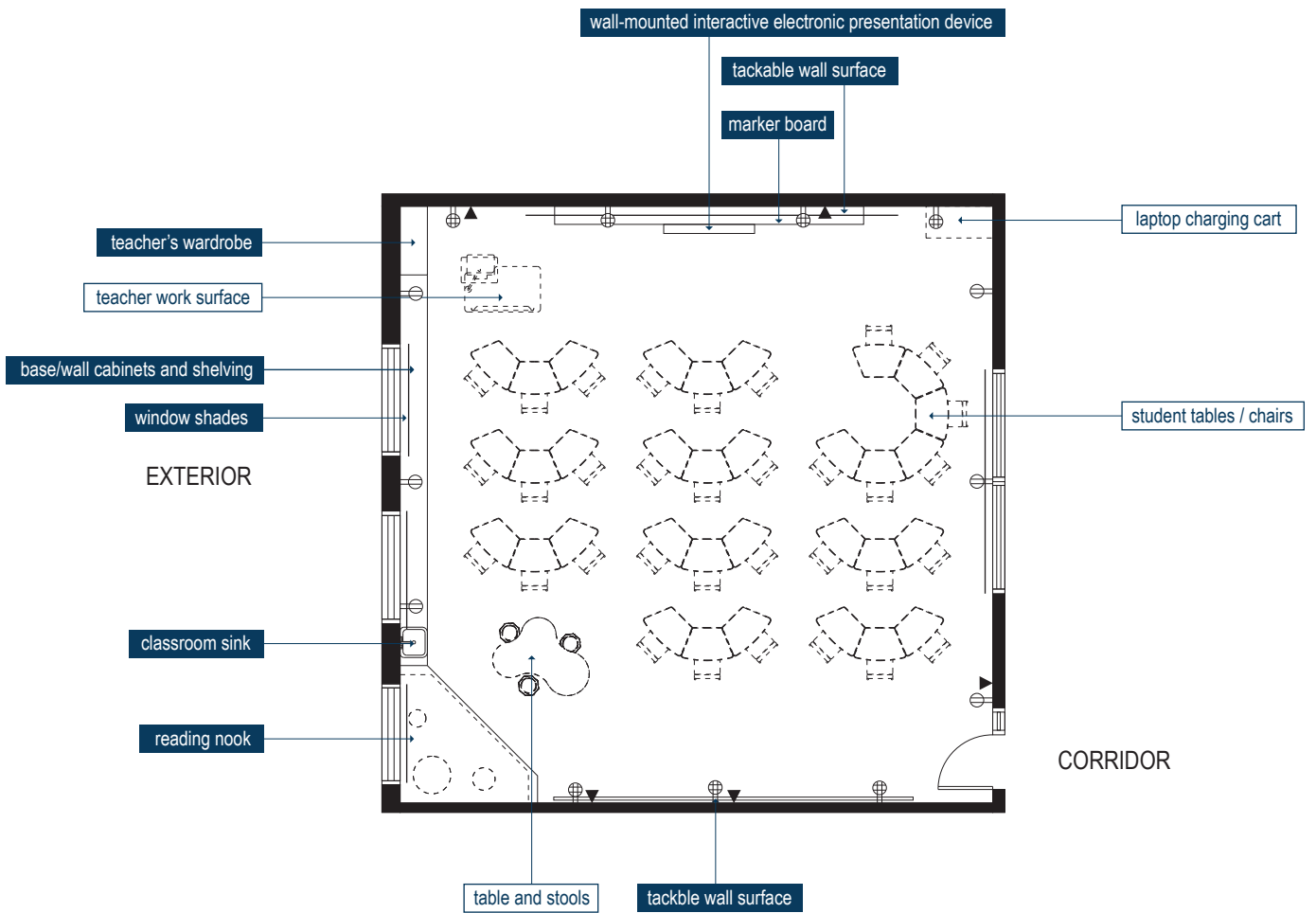
Classrooms are a building block of learning neighborhoods and should have visual access to adjacent commons areas and support spaces.

Classrooms themselves can be locked down in the event of an active threat or a drill. Consider also developing clusters of classrooms that can be locked down as an additional layer of security.

Considerations: Natural light and views with windows to exterior, acoustical conditions adequate for teaching environment that facilitates learning, seating and workspace for students and teachers, and technology. Ample wall space for posting educational material and student work.

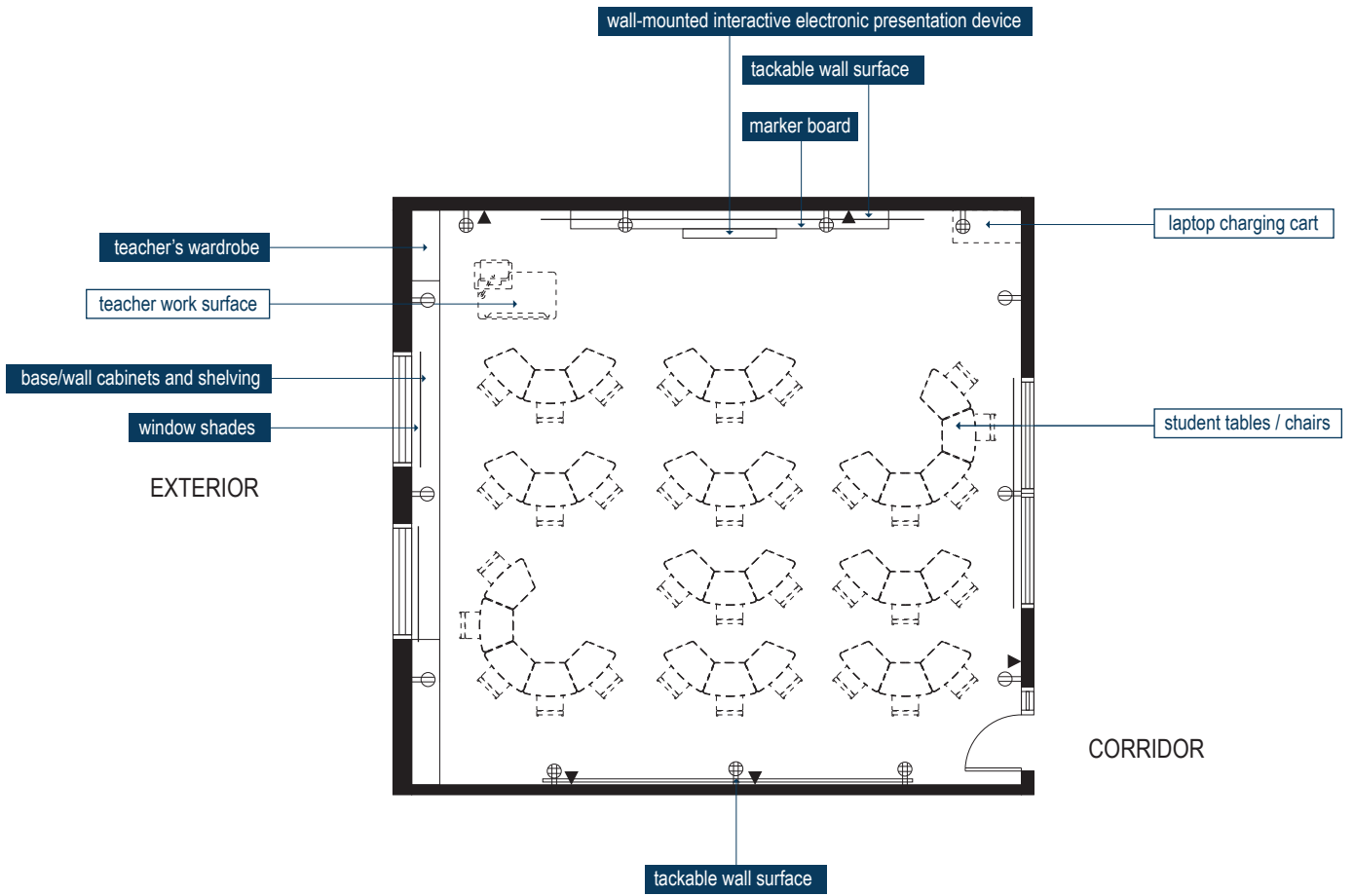


ELEMENTARY CLASSROOM



- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

MS/HS CLASSROOM



- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

Science



Activities: Science education is inherently a hands-on process, from early childhood through 12th grade. Learning to observe, to hypothesize, and to experiment using the tools of science are endeavors that continue as students move through their education. Activities include demonstrations, cooperative learning, hands-on experiments, synthesis, and reporting.

Access: Science spaces should be in or near the Learning Neighborhoods. For more advanced (high school) science classes, there are benefits to pairing two or more science labs together to enhance efficiency in management of materials and equipment; however, this efficiency should be weighed against the potential for interdisciplinary learning that is supported by mixed discipline Learning Communities. Access to the outdoors for learning in the school yard is desirable where feasible.

Considerations: Science classrooms are large to accommodate experiments and their associated materials and equipment. At the high school level, science classrooms will contain two distinct areas: an area with movable tables for demonstration, lecture, and reporting out; and an area with fixed lab stations for experiments. All science

classrooms have storage rooms. Middle school and high school science classrooms also have preparation rooms.

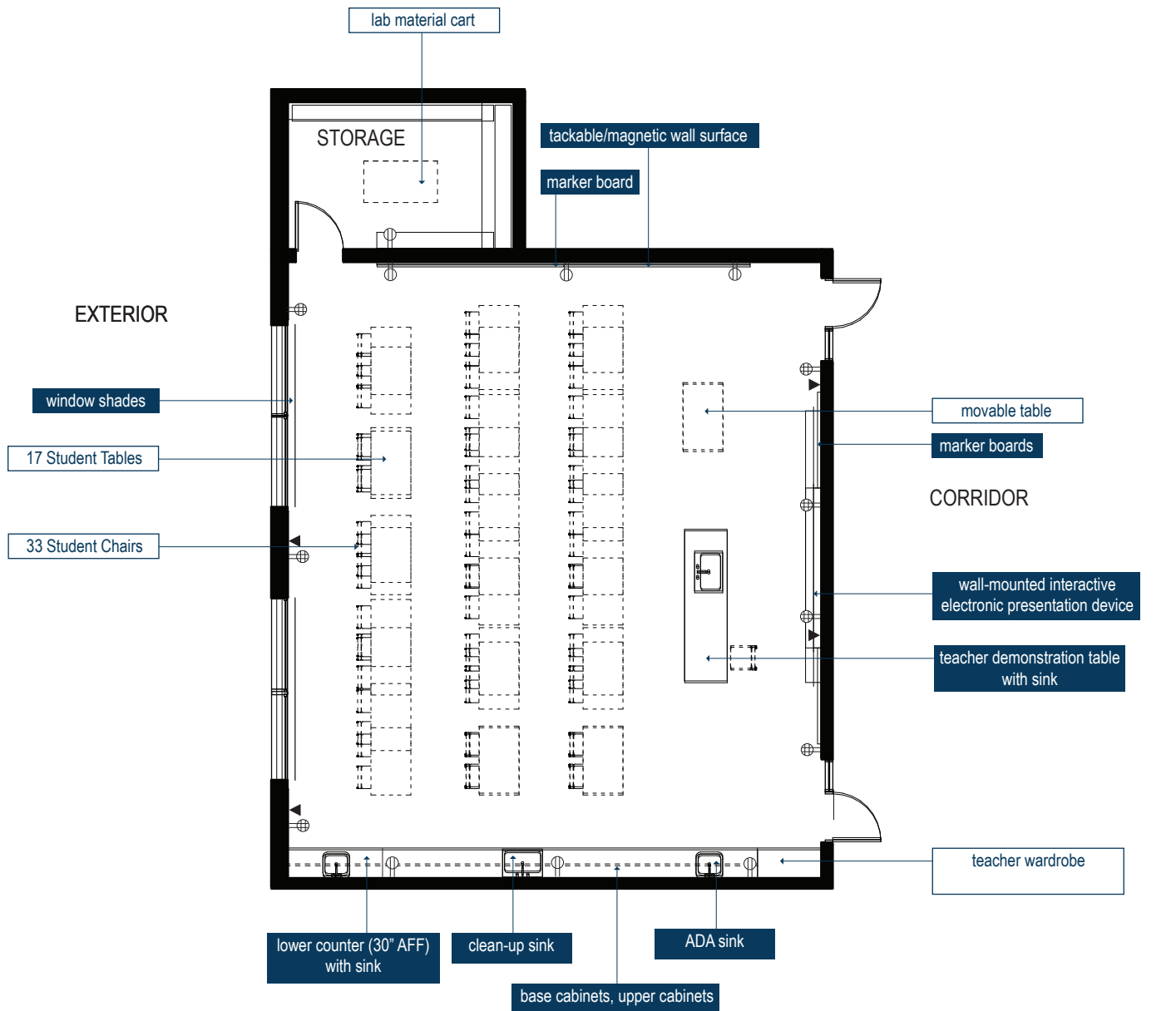


15 Middle School science labs have movable lab tables to allow for both labs and theory in the same space.



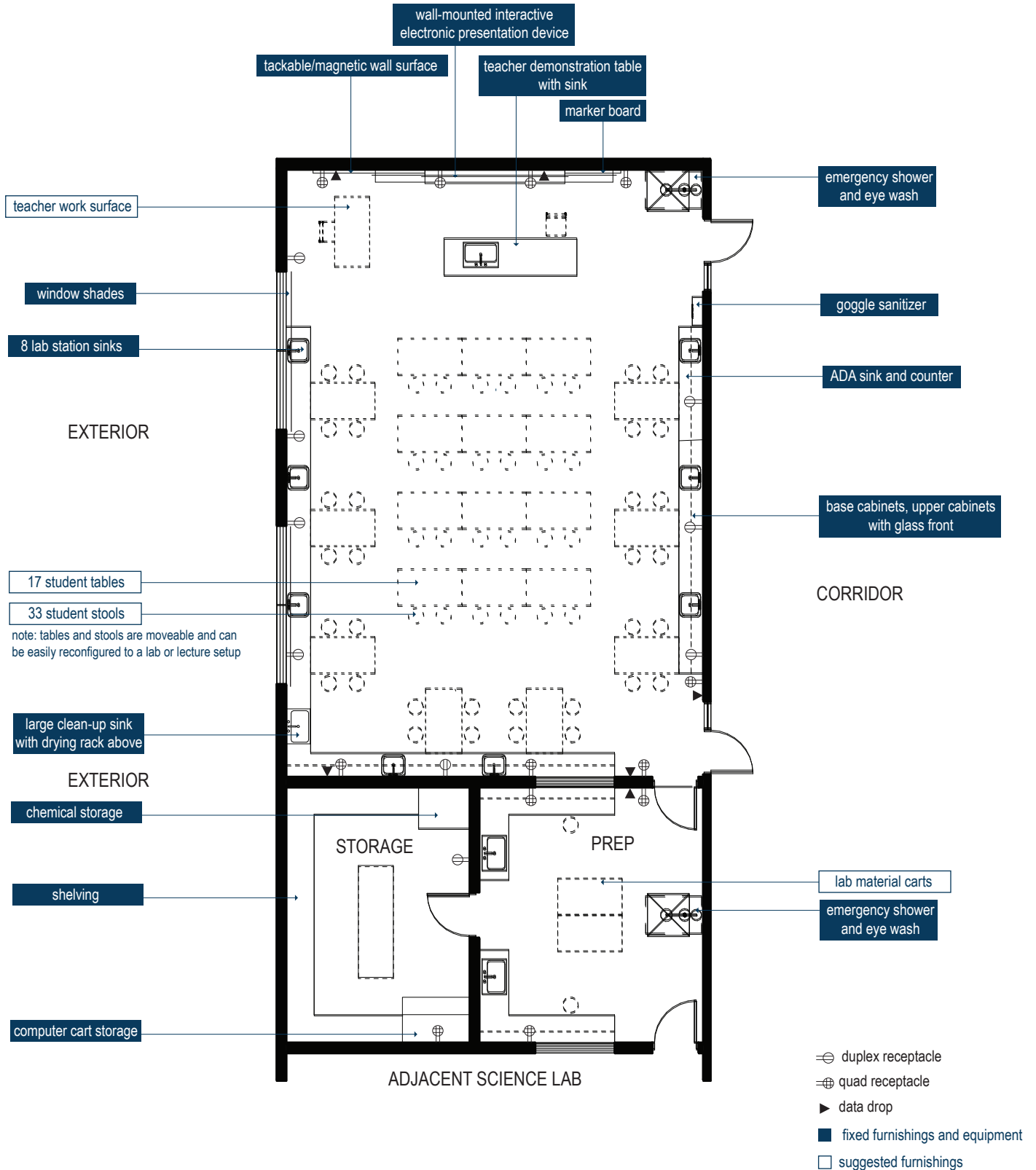
15 High school science labs provide a zone for theory discussions and a zone for experimentation.

ES SCIENCE LAB

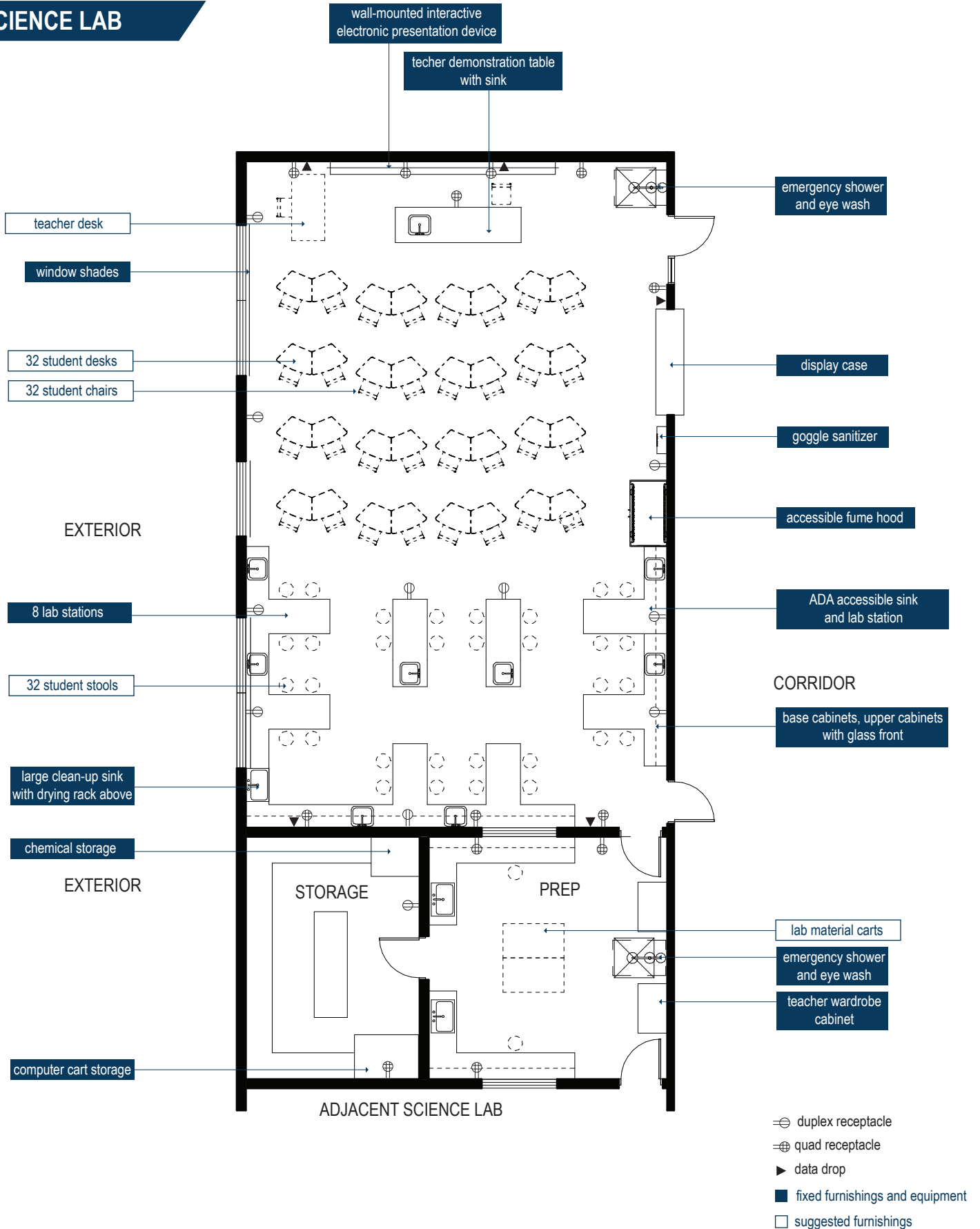


- ⊖ duplex receptacle
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- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

MS SCIENCE LAB



HS SCIENCE LAB



Library / Instructional Media Center



Activities: The Library/IMC is the information hub of the school offering a variety of print and digital resources to students in an atmosphere that is inviting, comfortable, a vibrant, and flexible. Further, the Library/IMC is integrated into all content areas of the school and supports the curriculum while providing an environment for recreational reading. The Library/IMC should have flexible work and social settings for multiple activities that take place simultaneously. It is the core of a suite of spaces that highlight technology in learning. The Library/IMC will be utilized by all students, staff, and teachers and may serve as a large or small group meeting location. It may also be used by the community, usually outside of school hours.

Access: The Library/IMC should be centrally located providing easy access from all locations of the school building while promoting the importance of its function. It is directly connected to the Innovation Center and may also be associated with the Maker Space. Where feasible, it should be conveniently located for after-hours access.

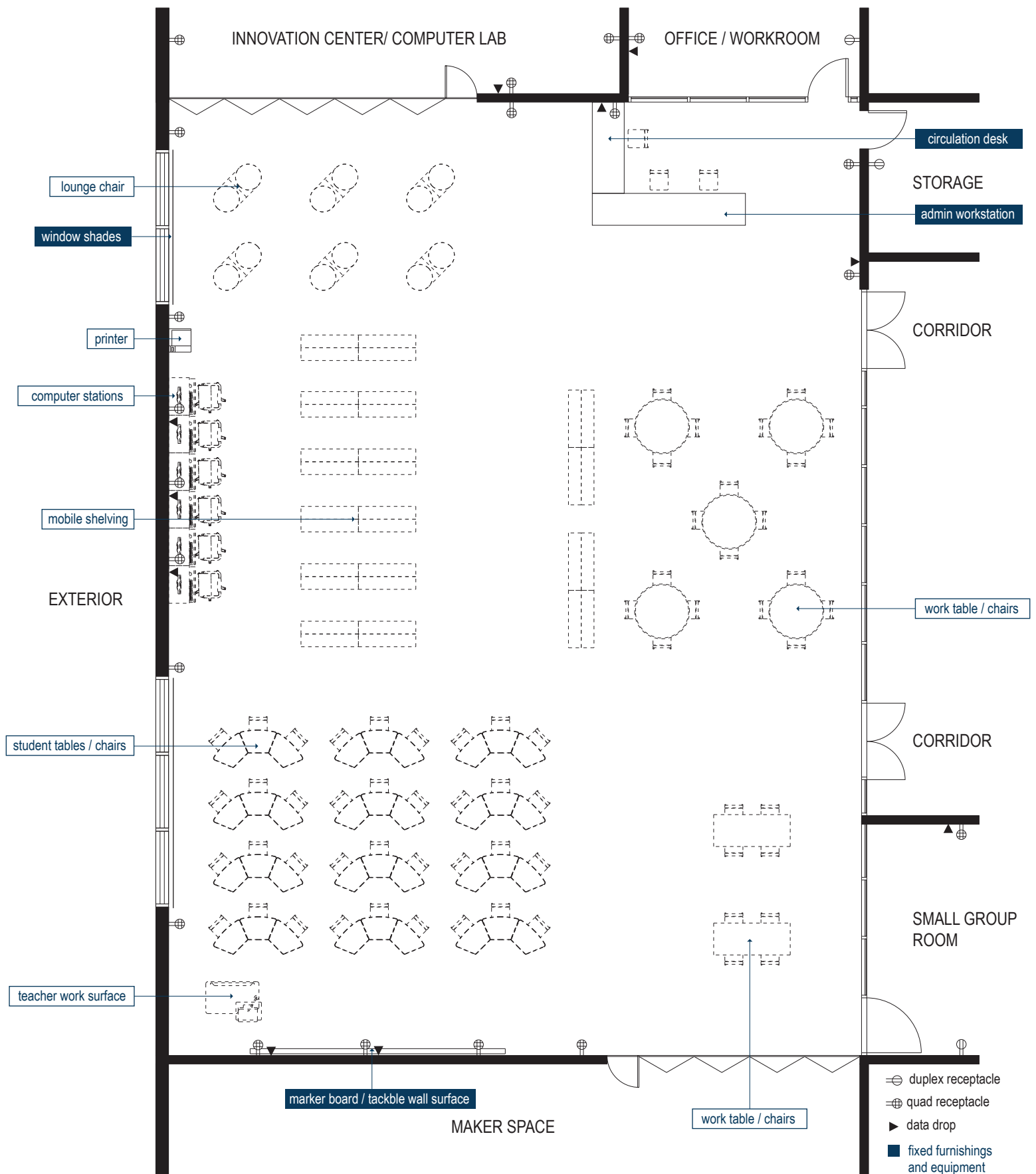
Considerations: At the time of writing these standards, most schools do not have a dedicated full-time librarian. Nevertheless, most schools make productive use of Library/IMC spaces; and there is an expectation that schools will have librarians in the future. Currently, this space may be staffed by teachers or paraprofessionals who may

rotate in and out; therefore, there is an opportunity to customize this space for maximal use by the school. Transparency and ease of supervision are important due to the flexible nature of the space.

Acoustic zones and treatments should support a variety of activities. Furniture will range from comfortable, soft seating to high-top tables and chairs, to mobile team project tables and chairs in order to support a more engaging age-appropriate environment for learners.



INSTRUCTIONAL MEDIA CENTER



- ⊕ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

Music



Activities: Music is offered at the elementary, middle, and high school grade levels. At some smaller elementary schools, there may be no designated music classroom and the teacher may rotate from one school to another. At most other schools, there are between one and three music classrooms for general, instrumental and choral music. In addition, support spaces vary by school but may include individual practice rooms, space to store music, robe storage, etc.

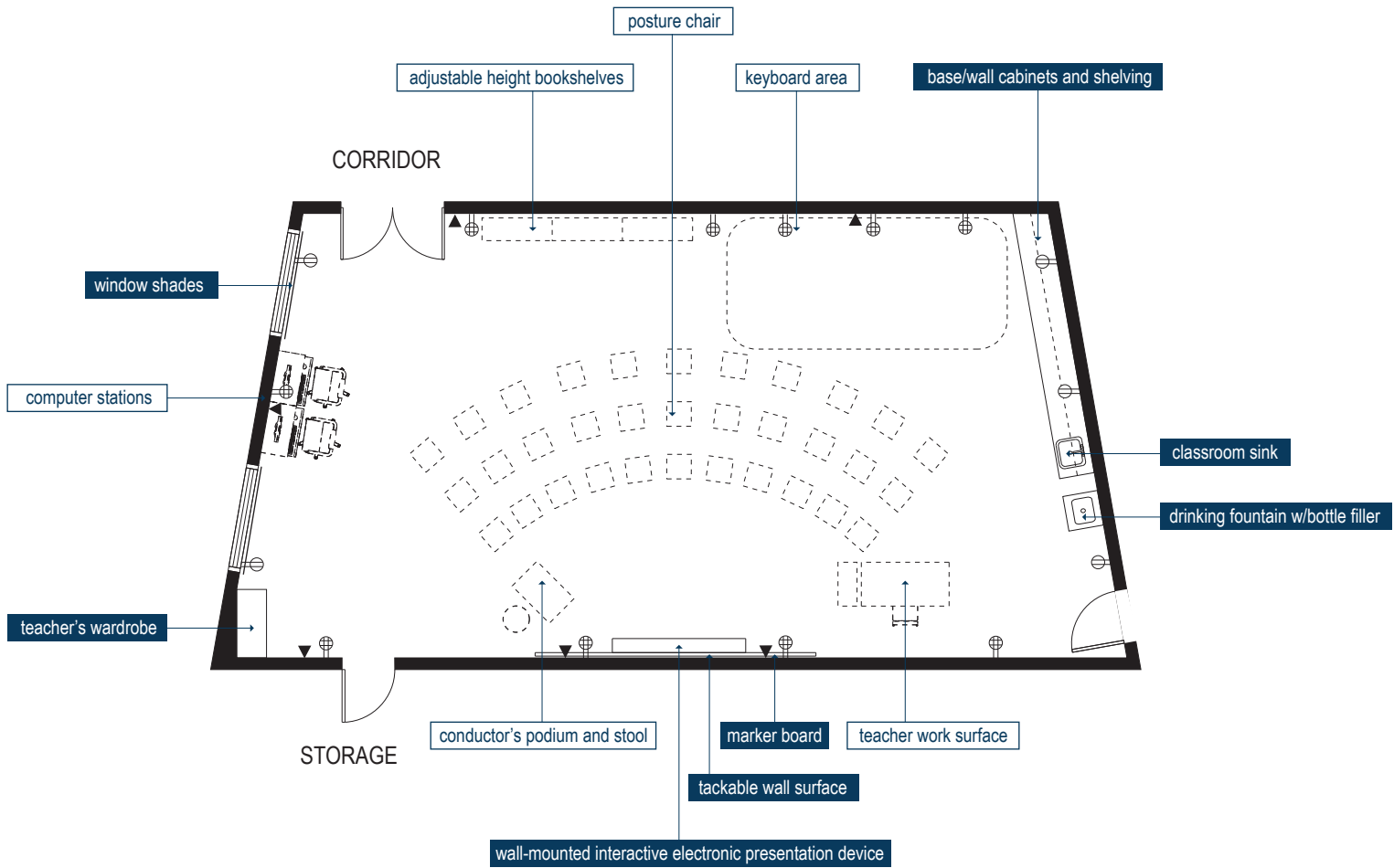
Access: Music spaces should typically be located away from the core academic areas due to acoustical concerns; however, these can be mitigated by appropriate acoustical strategies.

Considerations: Appropriate acoustical treatment, soundproof practice rooms with windows for supervision, portable risers, ergonomic chairs and risers.



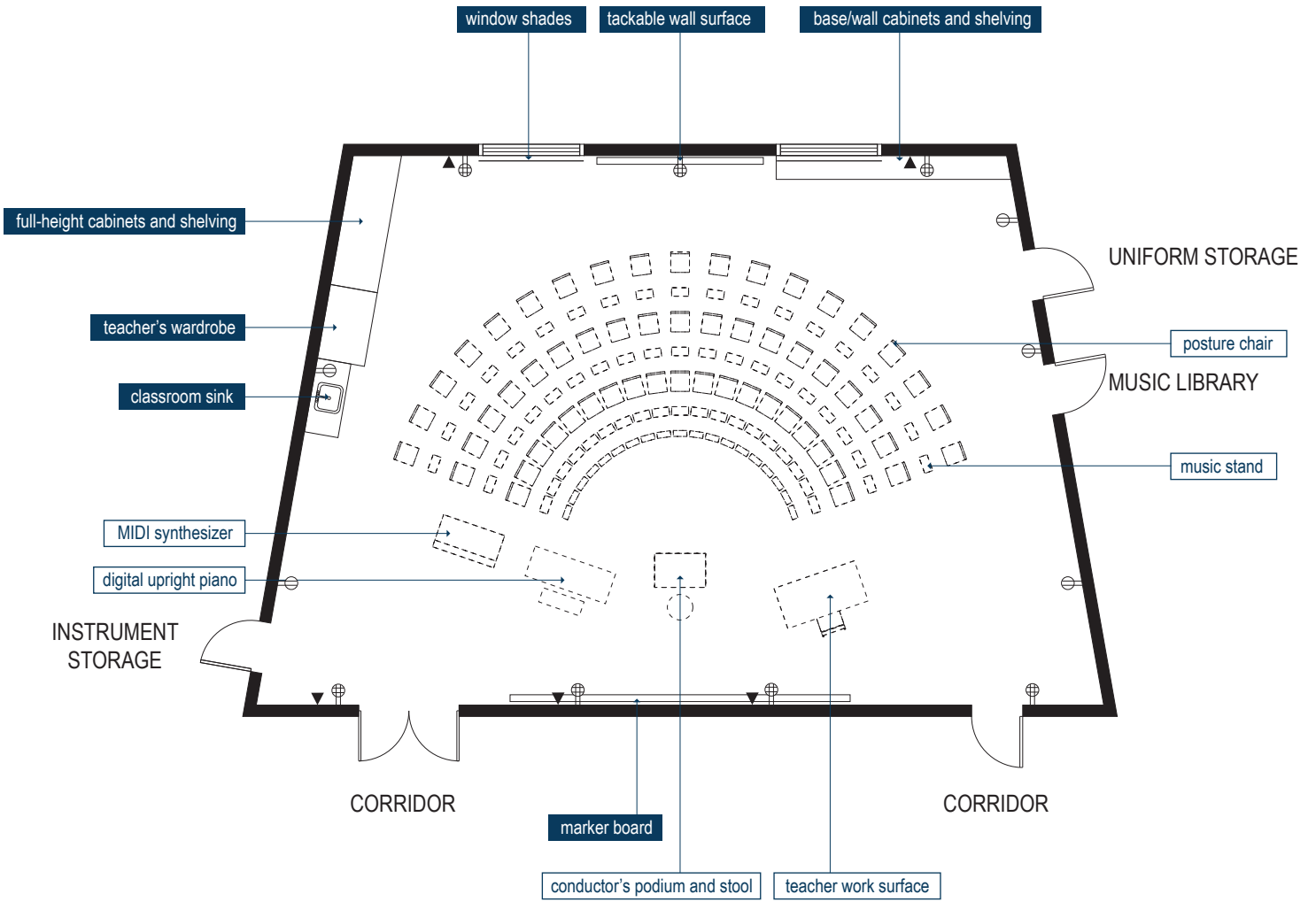
26 Music education is important for all grade levels.

ELEMENTARY GENERAL MUSIC ROOM



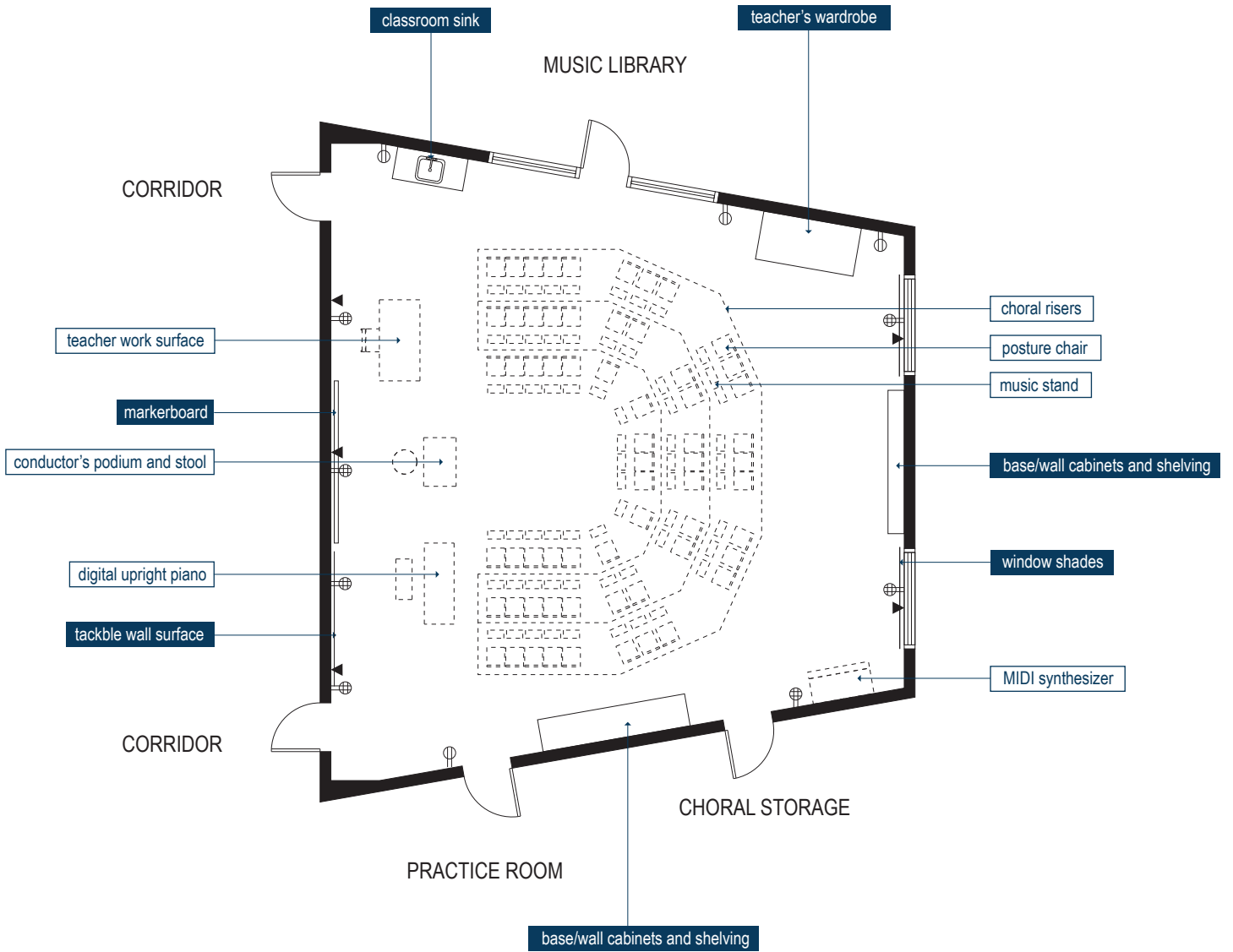
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- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

MS/HS INSTRUMENTAL ROOM



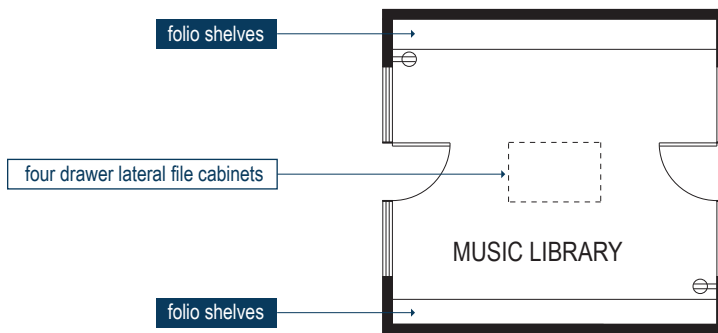
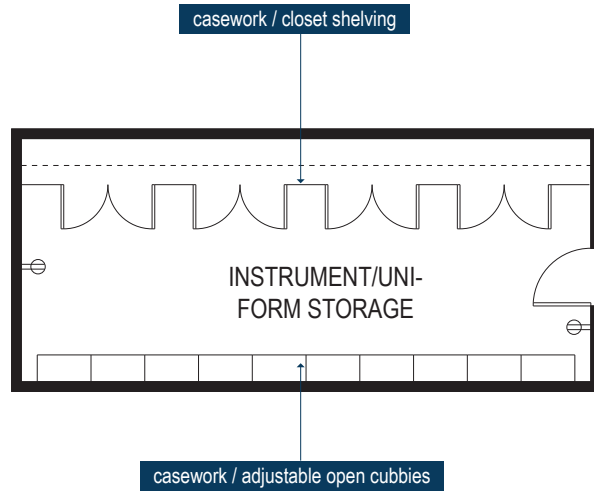
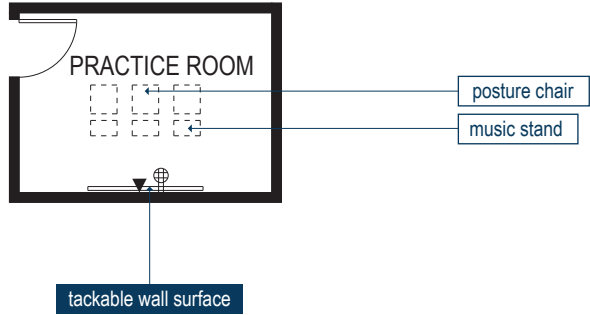
- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

MS/HS CHORAL ROOM



- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

PRACTICE ROOM + MUSIC LIBRARY + INSTRUMENT/UNIFORM STORAGE



- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

Visual Arts



Activities: The School District of Philadelphia provides art offerings at the elementary, middle, and high school grade levels in compliance district guidelines and standards. At the elementary, k-8, and smaller middle schools, visual art classrooms are general in purpose. They will be supported by a storage room and a separate kiln room. At the high school level, art is typically more specialized with various course offerings such as ceramics, 3-D and 2-D classes as well as digital art as separate classes with dedicated space.

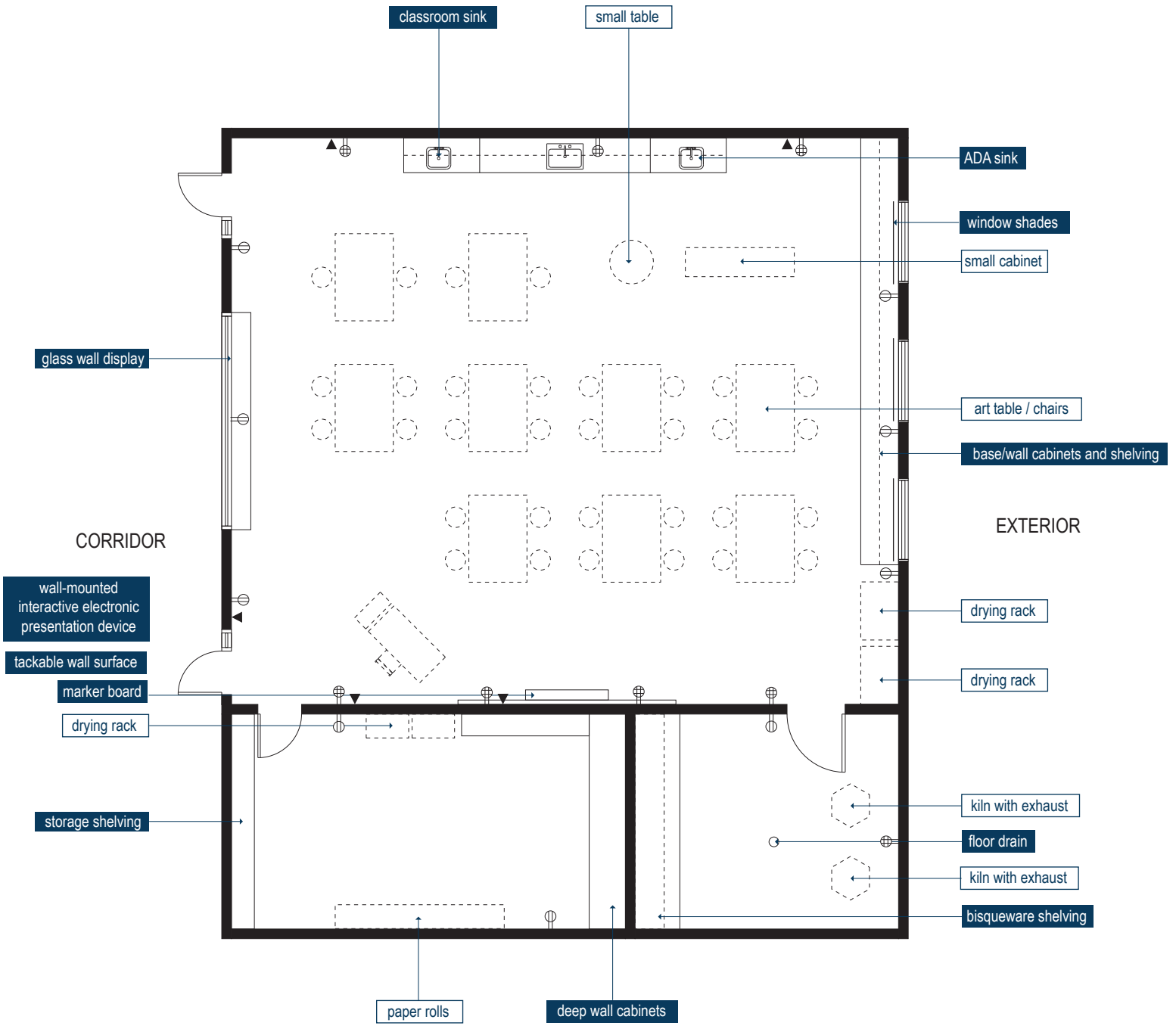
Access: Where possible, direct access to the outdoors is desirable. North light is desirable.

Considerations: Sinks with a plaster trap, direct access to outdoors, areas to display art, ability to block direct light through windows, and ample storage space



27 Art classrooms benefit from ample diffuse (preferably north) daylighting.





- ⊖ duplex receptacle
- ⊕ quad receptacle
- ▶ data drop
- fixed furnishings and equipment
- suggested furnishings

APPENDIX B – PHASES OF SERVICE AND DELIVERABLES SCHEDULE

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
NEW CONSTRUCTION AND MAJOR MODERNIZATIONS / ADDITIONS



SDP Site Review by	<input type="checkbox"/>	PROJECT NAME
SDP Architectural Review by	<input type="checkbox"/>	Design Consultant:
SDP Structural Review by	<input type="checkbox"/>	Date of Submittal:
SDP Interiors Review by	<input type="checkbox"/>	Date of Review:
SDP HVAC Review by	<input type="checkbox"/>	Status following Review:
SDP Plumbing Review by	<input type="checkbox"/>	
SDP Electrical Review by	<input type="checkbox"/>	
SDP Fire Suppression Review by	<input type="checkbox"/>	
SDP Kitchen Equipment Review by	<input type="checkbox"/>	
SDP Technology Review by	<input type="checkbox"/>	

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Pre-Design and Planning Phase				
1.00 Program of Requirements (POR):				
1.01 Meet with School and confirm scope of work				
1.02 Submit variance requests to SDP for approval				
1.03 Submit POR worksheet to SDP for approval				
1.04 Provide narrative of POR detailing the Basis of Design				
1.05 Analysis of Project Schedule and Phasing				
1.06 CM POR sign-off				
1.07 School POR sign-off				
2.00 Code and Standards Review:				
2.01 Perform preliminary Code analysis				
2.02 If building is historic, provide analysis of affect on project of Chapter 10 if International Existing Building Code				
2.03 Analysis of occupancy classifications				
2.04 Analysis of Construction Type(s)				
2.05 Analysis of fire/smoke separations				
2.06 Analysis of accessibility (ADA)				
2.07 Analysis of Life - Safety elements				
2.08 Analysis of egress components				

2.07 Evidence of determining type of Art Commission review will be required (staff sign-off, administrative approval or formal presentation)				
2.08 Evidence of determining if Historic Commission approval will be required				
2.09 Evidence of determining if project will require Zoning Board of Adjustment approval(s)				
2.10 Evidence of determining if project will require Fairmont Park Commission Approval				
3.00 Building Assessment Confirmation:				
3.01 Submit building assessment evaluation to SDP				
3.02 Submit assessment exceptions to SDP				
4.00 Design Concept Confirmation:				
4.01 Narrative of agreement with and/or exceptions taken to Design Concepts				
4.02 Bubble diagrams depicting modifications due to exceptions taken to Design Concepts				
5.00 Utilities Review:				
5.01 Narrative of suitable availability of gas				
5.02 Narrative of suitability of steam				
5.03 Narrative of suitability of water				
5.04 Narrative of suitability of sanitary sewer				
5.05 Narrative of suitability of storm water sewer				
5.06 Narrative of suitability of electric power				
6.00 Sustainability				
6.01 Establish Sustainability Goals and Objectives				
7.00 Estimate:				
7.01 Analysis of Conceptual Estimate				
8.00 Phase Submission Sign-Off:				
8.01 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
NEW CONSTRUCTION AND MAJOR MODERNIZATIONS / ADDITIONS



PROJECT NAME	
SDP Site Review by	Design Consultant:
SDP Architectural Review by	Date of Submittal:
SDP Structural Review by	Date of Review:
SDP Interiors Review by	Status following Review:
SDP HVAC Review by	
SDP Plumbing Review by	
SDP Electrical Review by	
SDP Fire Suppression Review by	
SDP Kitchen Equipment Review by	
SDP Technology Review by	

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Schematic Design Phase				
1.00 Schematic Site Plan (including):				
1.01 Location of building(s)				
1.02 Site development concepts including paving, walks, parking, ramps, stairs and landscape elements				
1.03 Identification of accessible routes in compliance with ADA				
1.04 Concept of traffic patterns				
1.05 Preliminary grading concepts				
1.06 Concept for addressing storm water				
1.07 Site utilities				
1.08 Site demolition				
1.09 Zoning Requirements				
2.00 Schematic Floor Plan(s):				

2.01 Building layout showing each space, location of walls and partitions, doors, windows, and elements of egress				
2.03 Identification of each space, net area and programmed area				
2.04 Dimensioning of all critical elements showing conformance with standards				
3.00 Life Safety Code Compliance:				
3.01 Update Code Analysis				
3.02 If building is alteration of historic structure, apply relevant elements of Chapter 10 of International Existing Building Code				
3.03 Identification of all rated and smoke walls / partitions by				
3.04 Identification of Code designated occupancy classification of each space				
3.05 Identification of occupancy load for each space for egress and ventilation				
3.06 Designation of areas requiring limited area sprinklers				
3.07 Tabulation of existing fire separation and building areas compared to code allowable				
3.08 Identification of required and provided egress loads for major exitways and exits				
3.09 Identification of accessible routes in compliance with ADA				
3.10 Identification of code required plumbing fixtures vs. number of fixtures provided				
4.00 Schematic Building Section(s):				
4.01 Identify roofing system, insulation, deck, drainage technique and provide overall combined heat transfer coefficient				
4.02 Identify exterior wall construction and provide overall combined heat transfer coefficient				
4.03 Provide preliminary data related to roof and floor decks and structural supporting elements				

4.04 Identify ceiling systems & materials				
5.00 Schematic Building Elevations:				
5.01 Show all existing and new exterior shell materials				
5.02 Designate areas of renovation required for existing materials				
5.03 Show all doors, windows, and other openings.				
6.00 Schematic Structural Plan(s):				
6.01 Identify structural system with overall dimensioning and preliminary size of structural elements				
6.02 Identify foundation system(s) with preliminary size of elements				
7.00 HVAC and Plumbing Plan(S):				
7.01 Show all mechanical and plumbing equipment spaces				
7.02 Show all major mechanical equipment and plumbing fixtures				
8.00 Electrical Plan(s):				
8.01 Show conceptual solutions for lighting, power, fire alarms, communications and technology				
8.02 Show all major electrical equipment				
8.03 Preliminary one-line electrical distribution diagrams. Indicate preliminary location of service entry, switchboards, motor control centers, panels, transformers, emergency				
8.04 Provide initial listing of electrical and technology components and systems that will be subject to Commissioning.				
9.00 Systems Narratives and Specifications:				
9.01 Architectural Design Narrative				

9.02 Site Design Narrative (Civil and Landscape)				
9.03 Provide detailed narrative of proposed HVAC, plumbing				
9.04 Provide initial listing of HVAC, plumbing & fire protection components and systems that will be subject to Commissioning.				
9.05 Electrical Narrative				
9.06 Technology Narrative Narrative				
9.07 Outline Specifications				
10.00 Design and Construction Standards:				
10.01 SDP Variance(s) have been granted for any and all deviations from the Design and Construction Standards				
10.02 Design meets all requirements of the SDP Design and Construction Standards				
11.00 Estimate:				
11.01 Design Consultant's Statement of Probable Construction				
11.02 Design Consultant's Analysis of Probable Construction Cost prepared by CM				
11.03 Design Consultant's and CM's sign-off on reconciliation of Statements of Probable Construction Cost.				
12.00 Presentation:				
12.01 Provide color / finish boards showing acceptance by School				
12.02 Rendering depicting the design				
12.03 Scale model of design				
13.00 Regulatory Agency Approval Process:				

13.01 Provide evidence of conference meeting with Art Commission				
13.02 Provide evidence of application for Art Commission approval				
13.03 Provide evidence of conference meeting with City Streets Department				
13.04 Provide evidence of conference meeting with SEPTA				
13.05 Provide evidence of conference meeting with Fairmont Park Commission				
13.06 Provide evidence of conference meeting with City Planning Department				
13.07 Provide evidence of conference meeting with Fire Department				
13.08 Provide evidence of conference meeting with City Health				
13.09 Provide evidence of conference meeting with City License & Inspections				
13.10 Provide evidence of conference meeting with City Historic				
13.11 Obtain Plancon Schematic Approval				
14.00 Sustainability				
14.01 Provide Sustainability Narrative and Scorecards				
15.00 Phase Submission Sign-Off:				
15.01 Construction Manager's Phase Submission Sign-Off				
15.02 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
NEW CONSTRUCTION AND MAJOR MODERNIZATIONS / ADDITIONS



	PROJECT NAME
SDP Site Review by	Design Consultant:
SDP Architectural Review by	Date of Submittal:
SDP Structural Review by	Date of Review:
SDP Interiors Review by	Status following Review:
SDP HVAC Review by	
SDP Plumbing Review by	
SDP Electrical Review by	
SDP Fire Suppression Review by	
SDP Kitchen Equipment Review by	
SDP Technology Review by	

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Design Development Phase:				
1.00 Site Plan(s):				
1.01 Show and dimension lot lines, right-of-ways, easements				
1.02 Show and dimension all existing site elements and buildings scheduled to remain. Include target elevation of building floor with both USGS elevation and Elevation used on building plans				
1.03 Identify existing site elements and buildings scheduled for demolition				
1.04 Show, identify and dimension all site improvements (paving, walks, curbs, storm structures, fencing, etc.)				
1.05 Show, identify and dimension all above and below grade utilities				
1.06 Show bench mark(s)				
1.07 Show and label all proposed contours and tie to existing.				
1.08 Provide spot elevations on pavements, curbs, walks, storm and sanitary structure rims				
1.09 Identify routes of accessibility (ADA) including notation of degree of slope(s)				
1.10 Indicate and dimension all pavement markings				
1.11 Show, identify and dimension stormwater management design				
1.12 Show, identify and dimension landscape design elements				

1.13 Provide references to related details				
2.00 Site Details / Sections / Schedules:				
2.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every site work element				
3.00 Life Safety / Code Compliance:				
3.01 Update Code Analysis				
3.02 If building is alteration of historic structure, apply				
3.03 Identify each building area with allowable vs. actual tabulated areas				
3.04 Identify each type of rated and smoke wall / partition identifying type of construction with UL or other approved code designation				
3.05 Identify occupancy type of each space, occupant load for egress and occupant load for ventilation				
3.06 Identify egress load of every door required for egress, exit access passage / corridor and exit way				
3.07 Identify stair tower construction including all opening assemblies				
3.08 Identify areas of refuge				
3.09 Identify accessible routes of travel				
3.10 Show compliance of ADA required clearances				
3.11 Identify areas of fire suppression systems including limited area sprinklers				
3.12 Show locations of fire extinguishers and stand pipes				
3.13 Identify requirements for exit lights, emergency lights and night lights for each space				
3.14 Show location of fire alarm devices				
3.15 Identify code requirements for toilet fixtures and show compliance including ADA compliance				
4.00 Demolition Plan(s):				
4.01 Identify items scheduled for demolition				
4.02 Provide references to related details				
5.00 Architectural Floor Plan(s):				
5.01 Locate all walls and partitions showing all openings				
5.02 Locate all fixed and loose equipment				

5.03 Show and identify all opening assemblies providing door and window numbers (or types)				
5.04 Show and identify elements of vertical circulation (stairs, elevators & ramps)				
5.05 Fully dimension partitions and walls				
5.06 Provide room numbers and identification of each space including net area for space and programmed area for space (areas may be in schedule format)				
5.07 Provide complete section cuts and detail references to related sections and details				
6.00 Interior Finishes Floor Plan(s):				
6.01 Show, identify and dimension all flooring including patterns				
6.02 Identify and dimension all fixed and loose equipment				
6.03 Locate, identify and dimension marker / tack / chalk boards				
6.04 Provide references to related details				
7.00 Reflected Ceiling Plan(s)				
7.01 Show, identify and dimension all ceiling types. Indicate grid layout.				
7.02 Show location of major ceiling penetration and surface-mount devices (light fixtures, diffusers, grilles, etc.)				
7.03 For ceilings of variable height, provide spot elevations of ceiling				
7.04 Show, identify and dimension bulkheads and soffits				
7.05 Provide references to related details				
8.00 Roof Plan(s):				
8.01 Show, identify and dimension all major roof elements (expansion joints, roof drains, roof mounted equipment, scuttles, etc.)				
8.02 Indicate slope				
8.03 Provide thermal coefficient for each roof area for total roof assembly				
8.04 Provide references to roofing and flashing details.				
9.00 Building Elevations:				
9.01 Provide building elevations of all exterior wall areas requiring work (including referbish work).				

9.02 Show and identify each type of material (identify existing and new)				
9.03 Show all doors, windows, louvers and other openings				
9.04 Show, identify and dimension control joints and expansion joints				
9.05 Detail scope of area for referbish work				
9.06 Provide dimensioning required for a clear understanding of requirements by contractor				
9.07 Provide references to related details				
10.00 Interior Elevation(s):				
10.01 Provide Interior Elevations of all walls or sections of walls that have casework, marker / tack / chalk board, lockers, access hatches or other equipment attached to or set into the walls				
10.02 Identify all elements identified in 10.01 and dimension				
10.03 Provide references to related details				
11.00 Floor Plan Enlargement(s):				
11.01 Provide floor plan enlargement for any area of construction that cannot be properly detailed at smaller scale. This normally would include Toilet Rooms, Stair Towers, Kitchens, etc.				
11.02 Fully dimension				
11.03 Provide references to related details				
12.00 Building Section(s):				
12.01 Provide minimum of 1/8" scale building section(s) necessary for a complete understanding of the three dimensional conditions of construction.				
12.02 Provide targeted elevations of finish floors, structural bearing points, tops of major walls, etc.				
12.03 Provide vertical dimensioning from finish floors to ceilings, bottom and top of openings, etc.				
12.04 Idenify major elements of construction				
12.05 Provide references to related details				
13.00 Wall Section(s):				
13.01 Provide wall section of every condition of wall construction.				
13.02 Provide targeted elevations of finish floors, structural bearing points, tops of wall, etc.				

13.03 Provide full vertical dimensioning				
13.04 For exterior walls provide thermal transfer coefficient				
13.05 For interior walls provide sound transmission coefficient				
13.06 Identify major components of construction				
13.07 Provide references to related details				
14.00 Door and Window Details:				
14.01 Provide dimensioned elevations of all non standard door and window assemblies (standard single leaf doors and stock size windows can be deferred until CD submittal)				
14.02 Provide details of special condition heads, jambs and sills				
14.03 Provide identification in elevations of tempered, wire and fire glazing				
14.04 Provide door schedule including fire rating and hardware requirements (by reference to hardware schedule)				
14.05 Provide references to related details				
15.00 Stair and Ramp Detail(s):				
15.01 Provide details necessary to illustrate construction, railings and guards and head clearances with necessary dimensioning and notations.				
15.02 Provide references to related details				
16.00 Miscellaneous Architectural and Interiors Details / Sections / Schedules:				
16.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every architectural and interiors element				
17.00 Structural Foundation Plan(s):				
17.01 Show, identify and dimension foundation and footing systems (grade beams, caissons, etc.)				
17.02 Indicate dimensioned details of slab on grade including reinforcement, depressed slabs, saw cuts, etc.				
17.03 Provide references to related details				
18.00 Structural Framing Plan(s):				
18.01 Show, identify (by size) and dimension all columns, beams, girders, joists, etc.				
18.02 Identify and dimension decking				

18.03 Provide spot elevations of main structural elements				
18.04 Provide references to related details				
19.00 Miscellaneous Structural Details / Sections / Schedules:				
19.01 Show compliance with code required structural requirements including dead loads, live loads, impact loads, earthquake loads, etc.				
19.02 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every structural element				
20.00 HVAC Plan(s):				
20.01 Identify HVAC items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to the Owner				
20.02 Show, Identify and dimension (dimensions to include required clearances) all HVAC equipment				
20.03 Show and identify (by size) all ductwork (single-line ductwork acceptable for Design Development)				
20.04 Show and identify all diffusers, grilles, dampers, etc.				
20.05 Show and identify (by size and type) all HVAC piping, valves, etc.				
20.06 Show and identify (to extent necessary to illustrate all design work has been completed) temperature control components				
20.07 Provide references to related details				
21.00 Miscellaneous HVAC Details / Sections / Schedules:				
21.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every HVAC element; note all electrical requirements for HVAC equipment shall be designated				
21.02 Provide updated listing of HVAC components and systems that will be subject to Commissioning.				
22.00 Plumbing Plan(s):				

22.01 Identify Plumbing items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to the Owner				
22.02 Show, identify and dimension all plumbing equipment and fixtures				
22.03 Show and identify (by size and type) all plumbing piping, valves, cleanouts, drains, etc.				
22.04 Provide invert elevations of all piping that penetrates exterior foundations at exterior building walls				
22.05 Provide references to related details				
23.00 Miscellaneous Plumbing Details / Sections / Schedules:				
23.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every Plumbing element; note all electrical requirements for Plumbing equipment shall be designated				
23.02 Provide water riser diagrams and sanitary isometric				
23.03 Provide updated listing of Plumbing components and systems that will be subject to Commissioning.				
24.00 Fire Protection Plan(s):				
24.01 Indicate fire protection zones and hazzard classification(s) for design				
24.02 Show, identify and size piping mains with identification of, including dimensions, of PIV including electrical & communication interface requirements				
24.03 Show, identify and size standpipes				
24.04 Show, identify and dimension any required fire pump and/or tanks; include electrical requirements				
24.05 Identify types of sprinkler heads and the spaces each type service				
24.06 Provide updated listing of Fire Protection components and systems that will be subject to Commissioning.				
25.00 Electrical Plan(s):				

25.01 Identify Electrical items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to the Owner				
25.02 Show and identify all electrical equipment including switchgear, distribution panels (include circuit schedule), emergency generator, transfer switches, UPS system, etc.				
25.03 Show and identify all power consuming equipment with a description of load characteristics				
25.04 Show and identify exterior building and site lighting				
25.05 Show and identify interior lighting				
25.06 Show and identify switching				
25.07 Show and identify building power devices				
25.08 Show and identify electrical accessories including building intercom system, speakers, clock system, telecommunications, office automation, security devices, etc.				
25.09 Show and identify electrical accessory cabling				
25.10 Show and identify fire alarm devices and cabling				
25.11 Provide references to related details				
26.00 Miscellaneous Electrical Details / Sections / Schedules:				
26.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every Electrical element				
26.02 Provide electrical riser diagram with notation of major components				
26.03 Provide updated listing of Electrical components and systems that will be subject to Commissioning.				
27.00 Technology Infrastructure Plan(s):				
27.01 Identify Technology Infrastructure items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to the Owner				
27.02 Show and identify all Technology Infrastructure components including cable trays, ATM, data racks, antenna, data ports, CTV system components, monitors, etc.				

27.03 Show, identify and size all Technology Infrastructure cable				
27.04 Provide references to related details				
28.00 Miscellaneous Technology Infrastructure Details / Sections / Schedules:				
28.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every Technology Infrastructure element; note all electrical requirements for Technology Infrastructure equipment shall be designated				
28.02 Provide updated listing of Technology components and systems that will be subject to Commissioning.				
29.00 Specifications:				
29.01 Provide specifications that includes all acceptable Manufacturers for all components that shall be incorporated into the work (Standard shall be based on a specific manufacturer and model and shall be so identified; other acceptable manufacturers shall be designated that truly have equal products)				
30.00 Energy Model:				
30.01 Provide a detailed energy model for the building including building envelope evaluation, electrical and lighting loads, fuel consumption, etc.				
31.00 Design and Construction Standards:				
31.01 SDP Variance(s) have been granted for any and all deviations from the Design and Construction Standards				
31.02 Design meets all requirements of the SDP Design and Construction Standards				
32.00 Estimate / Value Engineering:				
32.01 Provide analysis of value engineering recommendations developed by Construction Manager				
32.02 Design Consultant's Statement of Probable Construction Cost				
32.03 Design Consultant's Analysis of Probable Construction Cost prepared by CM				

32.04 Design Consultant's and CM's sign-off on reconciliation of Statements of Probable Construction Cost.				
33.00 Constructability Review:				
33.01 Provide responses to Constructability Review by Construction Manager				
13.00 Regulatory Agency Approval Process:				
13.01 Provide evidence of Art Commission Approval				
13.03 Provide evidence of City Streets Department approval				
13.04 Provide evidence of SEPTA approval				
13.05 Provide evidence of Fairmont Park Commission approval				
13.06 Provide evidence of City Planning Department approval				
13.07 Provide evidence of Fire Department approval				
13.08 Provide evidence of City Health Department approval				
13.09 Provide evidence of conference meeting with City License & Inspections				
13.10 Provide evidence of City Historic Commission approval				
34.00 Sustainability:				
34.01 Provide Sustainability Narrative and Scorecards				
35.00 Regulatory Agency Approval Process:				
35.01 Provide evidence of Art Commission Approval				
35.03 Provide evidence of City Streets Department approval				
35.04 Provide evidence of SEPTA approval				
35.05 Provide evidence of Fairmont Park Commission approval				
35.06 Provide evidence of City Planning Department approval				
35.07 Provide evidence of Fire Department approval				

35.08 Provide evidence of City Health Department approval				
35.09 Provide evidence of conference meeting with City License & Inspections				
35.10 Provide evidence of City Historic Commission approval				
36.00 Phase Submission Sign-Off:				
36.01 Construction Manager's Phase Submission Sign-Off				
36.02 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
NEW CONSTRUCTION AND MAJOR MODERNIZATIONS / ADDITIONS



SDP Site Review by	<input type="checkbox"/>	PROJECT NAME
SDP Architectural Review by	<input type="checkbox"/>	Design Consultant:
SDP Structural Review by	<input type="checkbox"/>	Date of Submittal:
SDP Interiors Review by	<input type="checkbox"/>	Date of Review:
SDP HVAC Review by	<input type="checkbox"/>	Status following Review:
SDP Plumbing Review by	<input type="checkbox"/>	
SDP Electrical Review by	<input type="checkbox"/>	
SDP Fire Suppression Review by	<input type="checkbox"/>	
SDP Kitchen Equipment Review by	<input type="checkbox"/>	
SDP Technology Review by	<input type="checkbox"/>	

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Construction Documents Phase:				
1.00 Site Plan(s):				
1.01 Show and dimension lot lines, right-of-ways, easements and zoning set-backs				
1.02 Show, identify and dimension of construction erosion control and temporary seeding				
1.03 Show, identify and dimension limit of construction, temporary fencing and barriers, lay-down areas and other elements of site construction logistics as provided to AO by CM				
1.04 Show and dimension all existing site elements and buildings scheduled to remain. Include target elevation of building floor with both USGS elevation and Elevation used on building plans				
1.05 Identify existing site elements and buildings scheduled for demolition including identification of items scheduled for incorporation into new work and items scheduled to be turned over to SDP.				
1.06 Show, identify and dimension all site improvements (paving, walks, curbs, storm structures, fencing, etc.)				
1.07 Show, identify and dimension all above and below grade utilities				
1.08 Show bench mark(s)				

1.09 Show and label all proposed contours and tie to existing.				
1.10 Provide spot elevations on pavements, curbs, walks, storm and sanitary structure rims				
1.11 Identify routes of accessibility (ADA) including notation of degree of slope(s)				
1.12 Indicate and dimension all pavement markings				
1.13 Show, identify and dimension stormwater management design including detention / retention intake and outflow structures				
1.14 Show, identify and dimension landscape design elements				
1.15 Show, identify and dimension site signage and traffic control signage				
1.16 Show, identify and dimension site furnishings				
1.17 Provide references to related details				
2.00 Site Details / Sections / Schedules:				
2.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all elements of design can be estimated by bidders and constructed by contractors				
3.00 Life Safety / Code Compliance:				
3.01 Update Code Analysis				
3.02 If building is alteration of historic structure, apply relevant elements of Chapter 10 of International Existing Building Code				
3.03 Identify each building area with allowable vs. actual tabulated areas				
3.04 Identify each type of rated and smoke wall / partition identifying type of construction with UL or other approved code designation				
3.05 Identify occupancy type of each space, occupant load for egress and occupant load for ventilation				
3.06 Identify egress load of every door required for egress, exit access passage / corridor and exit way				
3.07 Identify areas of refuge				
3.08 Identify accessible routes of travel				
3.09 Show compliance of ADA required clearances				
3.10 Identify areas of fire suppression systems including limited area sprinklers				

3.11 Show locations of fire extinguishers and stand pipes				
3.12 Identify requirements for exit lights, emergency lights and night lights for each space				
3.13 Show location of fire alarm devices				
3.14 Identify code requirements for toilet fixtures (per Philadelphia Plumbing Code) and show compliance including ADA compliance				
3.13 Evidence of Health Department Approval				
3.14 Evidence of Licenses & Inspections Approval				
4.00 Demolition Plan(s):				
4.01 Show, identify and dimension limits of all work requiring demolition				
4.02 Identify items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				
4.03 Provide references to related details				
5.00 Architectural Floor Plan(s):				
5.01 Locate all walls and partitions (referenced by wall / partition types) showing all openings, construction joints, control joints and expansion joints				
5.02 Locate all fixed and loose equipment				
5.03 Show and identify all opening assemblies providing door and window numbers (or types)				
5.04 Show and identify elements of vertical circulation				
5.05 Fully dimension				
5.06 Provide room numbers and identification of each space including net area for space and programmed area for space (areas may be in schedule format)				
5.07 Provide complete section cuts and detail references to related sections and details				
6.00 Interior Finishes Floor Plan(s):				
6.01 Show, identify and dimension all flooring including patterns				
6.02 Identify and dimension all fixed and loose equipment				
6.03 Locate, identify and dimension marker / tack / chalk boards				
6.04 Locate, identify and dimension building signage				

6.05 Provide references to related details				
7.00 Reflected Ceiling Plan(s)				
7.01 Show, identify and dimension all ceiling types. Indicate grid layout.				
7.02 Show location of all ceiling penetration and surface-mount devices (light fixtures, diffusers, grilles, smoke /heat detectors, speakers, motion detectors, etc.)				
7.03 For ceilings of variable height, provide spot elevations of ceiling				
7.04 Show, identify and dimension bulkheads and soffits				
7.05 Provide references to related details				
8.00 Roof Plan(s):				
8.01 Show, identify and dimension all roof elements (expansion joints, roof drains, vents, roof mounted equipment, scuttles, saddles, walking pads, etc.)				
8.02 Indicate slope and ratio of slope.				
8.03 Provide thermal coefficient for each roof area for total roof assembly				
8.04 Provide references to roofing and flashing details.				
9.00 Building Elevations:				
9.01 Provide building elevations of all exterior wall areas requiring work (including referbish work).				
9.02 Show and identify each type of material (identify existing and new)				
9.03 Show all doors, windows, louvers, light fixtures, wall hydrants, receptacle boxes, fire department connections, knox boxes, etc.				
9.04 Show, identify and dimension control joints and expansion joints				
9.05 Detail scope of area for referbish work				
9.06 Provide dimensioning required for a clear understanding of requirements by contractor				
9.07 Provide references to related details				
10.00 Interior Elevation(s):				
10.01 Provide Interior Elevations of all walls or sections of walls that have casework, marker / tack / chalk board, lockers, access hatches or other equipment attached to or set into the walls; elevations shall include all electrical and technology infrastructure devices				

10.02 Identify all elements and dimension				
10.03 Provide references to related details				
11.00 Floor Plan Enlargement(s):				
11.01 Provide floor plan enlargement for any area of construction that cannot be properly detailed at smaller scale. This normally would include Toilet Rooms, Stair Towers, Kitchens, etc.				
11.02 Fully dimension				
11.03 Provide references to related details				
12.00 Building Section(s):				
12.01 Provide minimum of 1/4" scale building section(s) necessary for a complete understanding of the three dimensional conditions of construction.				
12.02 Provide targeted elevations of finish floors, structural bearing points, tops of major walls, etc.				
12.03 Provide vertical dimensioning from finish floors to ceilings, bottom and top of openings, etc.				
12.04 Identify major elements of construction				
12.05 Provide references to related details				
13.00 Wall Section(s):				
13.01 Provide wall section of every condition of wall construction; include all related structural elements with clear dimensioning of relationship to wall				
13.02 Provide clear detail of support of exterior wall veneer support at each location where veneer is added above roof or floor structure penetration of wall				
13.02 Provide targeted elevations of finish floors, structural bearing points, tops of wall, etc.				
13.03 Provide full vertical dimensioning				
13.04 Provide identification of every component of construction on wall section of enlarged details				
13.05 For exterior walls provide thermal transfer coefficient				
13.06 For interior walls provide sound transmission coefficient				
13.07 Provide references to related details				
14.00 Door and Window Details:				
14.01 Provide dimensioned elevations of all door and window assemblies				
14.02 Provide details of all heads, jambs and sills				

14.03 Provide identification in elevations of tempered, wire and fire glazing				
14.04 Provide door schedule including fire rating and hardware requirements (by reference to hardware schedule)				
14.05 Provide references to related details				
15.00 Stair and Ramp Detail(s):				
15.01 Provide complete detailing of stairs and ramps including railings and guards, treads and risers and head clearances with necessary dimensioning and notations.				
15.02 Provide references to related details				
16.00 Miscellaneous Architectural and Interiors Details / Sections / Schedules:				
16.01 Provide detail of all wall / partition types including fire rating information				
16.02 Provide information for fire stopping and fire safeing including firerating information for each type of penetration seal				
16.02 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design can be estimated by bidders and constructed by contractors				
17.00 Foundation Plan(s):				
17.01 Show, identify and dimension foundation and footing systems (grade beams, caissons, etc.); coordinate with all underground utilities located in the foundation area				
17.02 Indicate dimensioned details of slab on grade including reinforcement, depressed slabs, saw cuts, etc.				
17.03 Provide references to related details				
18.00 Framing Plan(s):				
18.01 Show, identify (by size) and dimension all columns, beams, girders, joists, etc.				
18.02 Show, identify and dimension all structural elements bracing, shelf angles, etc.				
18.03 Identify and dimension decking				
18.04 Provide spot elevations of all structural elements to the extent there is no question to requirements				
18.05 Provide references to related details				
19.00 Miscellaneous Structural Details / Sections / Schedules:				

19.01 Show compliance with code required structural requirements including dead loads, live loads, impact loads, earthquake loads, etc.				
19.02 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design can be estimated by bidders and constructed by contractors				
19.03 Provide complete detail of all concrete and masonry reinforcement				
20.00 HVAC Plan(s):				
20.01 Identify HVAC items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				
20.02 Show, identify and dimension (dimensions to include required clearances) all HVAC equipment				
20.03 Show and identify (by size) all ductwork drawn to scale				
20.04 Show extent of thermal insulation				
20.05 Show and identify all diffusers, grilles, dampers, turning vanes, volume extractors, access panels, etc.; indicate volume of air at each device				
20.06 Show and identify (by size and type) all HVAC piping, valves, etc. including method of control of thermal expansion				
20.07 Show and identify (to extent necessary to illustrate all design work has been completed) temperature control components				
20.08 Provide references to related details				
21.00 Miscellaneous HVAC Details / Sections / Schedules:				
21.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all HVAC design can be estimated by bidders and constructed by contractors; note all electrical requirements for HVAC equipment shall be designated				
22.00 Plumbing Plan(s):				
22.01 Identify Plumbing items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP; floor drains and floor clean outs shall be dimensioned from adjacent walls and partitions to assure the walls or partitions are not constructed on top of them				

22.02 Show, identify and dimension all plumbing equipment and fixtures; indicate method of control of thermal expansion				
22.03 Show and identify (by size and type) all plumbing piping, valves, cleanouts, drains, etc. including method of control of thermal expansion				
22.04 Show scope of thermal insulation				
22.05 Provide invert elevations of all piping that penetrates exterior foundations at exterior building walls				
22.06 Provide references to related details				
23.00 Miscellaneous Plumbing Details / Sections / Schedules:				
23.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all Plumbing design can be estimated by bidders and constructed by contractors; note all electrical requirements for Plumbing equipment shall be designated				
23.02 Provide water riser diagrams and sanitary isometric				
24.00 Fire Protection Plan(s):				
24.01 Indicate fire protection zones and hazard classification(s) for design				
24.02 Show, identify and size piping mains with identification of, including dimensions, of PIV including electrical & communication interface requirements				
24.03 Show, identify and size standpipes				
24.04 Show, identify and dimension any required fire pump and/or tanks; include electrical requirements				
24.05 Identify types of sprinkler heads and the spaces each type service				
24.06 Provide complete basis of design				
25.00 Electrical Plan(s):				
25.01 Identify Electrical items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				

25.02 Show, identify and dimension all electrical equipment including switchgear, distribution panels (include circuit identification and connected loads), emergency generator, transfer switches, UPS system, etc.				
25.03 Show, identify and dimension all power consuming equipment with a description of load characteristics				
25.04 Show, identify and dimension exterior building and site lighting				
25.05 Show, identify and dimension interior lighting				
25.06 Show, identify and size lighting circuits and switching				
25.07 Show, identify and dimension building power devices				
25.08 Show, identify and size power circuits				
25.09 Show, identify and dimension electrical accessories including building intercom system, speakers, clock system, telecommunications, office automation, security devices, etc.				
25.10 Show, identify and dimension electrical accessory cabling				
25.11 Show, identify and dimension fire alarm devices and cabling				
25.12 Provide references to related details				
26.00 Miscellaneous Electrical Details / Sections / Schedules:				
26.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all Electrical design can be estimated by bidders and constructed by contractors				
26.02 Provide detailed electrical riser diagram				
26.03 Provide details of grounding of building and electrical system				
27.00 Technology Infrastructure Plan(s):				
27.01 Identify Technology Infrastructure items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				
27.02 Show, identify and dimension all Technology Infrastructure components including cable trays, ATM, data racks, antenna, data ports, CTV system components, monitors, etc.				

27.03 Show, identify and size all Technology Infrastructure cabel				
27.04 Provide references to related details				
28.00 Miscellaneous Technology Infrastructure Details / Sections / Schedules:				
28.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all Electrical design can be estimated by bidders and constructed by contractors; note all electrical requirements for Technology Infrastructure equipment shall be designated				
29.00 Specifications:				
29.01 Verify that all contractor scope of work responsibilities are detailed in Division 1 "Summary of Work" or "Scope of Work" section. Drawings and other spec sections shall not include comments such as "By Electrical", etc.				
29.02 Verify that responsibility for training of SDP's forces is detailed in the Scope of Work section of Division 1.				
29.03 Verify that responsibility for operations & maintenance manuals is detailed in the Scope of Work section of Division 1.				
29.04 Verify that all HVAC components and systems applicable to commissioning have been included in the tehcnical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).				

<p>29.05 Verify that all Plumbing components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).</p>				
<p>29.06 Verify that all Fire Protection components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).</p>				
<p>29.07 Verify that all Electrical components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).</p>				
<p>29.08 Verify that all Electrical components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).</p>				

29.09 Verify that all Technology components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).				
30.00 Design and Construction Standards:				
30.01 SDP Variance(s) have been granted for any and all deviations from the Design and Construction Standards				
30.02 Design meets all requirements of the SDP Design and Construction Standards				
30.03 Provide evidence that design professional has administered a detailed review of documents or has had an outside agency (such as Redi-Check) perform a detailed review. Review of this check- list by the SDP shall not relieve the design professional from their due diligence to administer quality check of their work.				
31.00 Estimate / Value Engineering:				
31.01 Provide analysis value engineering recommendations developed by Construction Manager				
31.02 Design Consultant's Statement of Probable Construction Cost				
31.03 Design Consultant's Analysis of Probable Construction Cost prepared by CM				
31.04 Design Consultant's and CM's sign-off on reconciliation of Statements of Probable Construction Cost.				
32.00 Sustainability				
32.01 Provide Sustainability Narrative and Scorecards				
33.00 Constructability Review:				
33.01 Provide responses to Constructability Review by Construction Manager				
34.00 Phase Submission Sign-Off:				

34.01 Construction Manager's Phase Submission Sign-Off				
34.02 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
MAJOR SYSTEMS PROJECTS - HVAC REPLACEMENT



PROJECT NAME
 SDP Architectural Review by Design Consultant:
 SDP HVAC Review by Date of Submittal:
 SDP Electrical Review by Date of Review:
 Status following Review:

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Pre-Design Phase				
1.00 Scope of Work				
1.01 Meet with School and confirm scope of work				
1.02 Submit variance requests to SDP for approval				
1.03 CM POR sign-off				
1.04 School POR sign-off				
2.00 Code and Standards Review:				
2.01 Perform preliminary Code analysis.				
3.00 Building Assessment Confirmation:				
3.01 Submit assessment report				
3.02 Submit assessment exceptions to SDP				
4.00 Utilities Review:				
4.01 Narrative of suitable availability of gas				
4.02 Narrative of suitability of steam				
4.03 Narrative of suitability of water				
4.04 Narrative of suitability of sanitary sewer				
4.05 Narrative of suitability of storm water sewer				
4.06 Narrative of suitability of electric power				
5.00 Sustainability				
5.01 Establish Sustainability Goals and Objectives				
6.00 Estimate:				
6.01 Analysis of Conceptual Estimate				
7.00 Phase Submission Sign-Off:				
7.01 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
MAJOR SYSTEMS PROJECTS - HVAC REPLACEMENT



PROJECT NAME
 SDP Architectural Review by Design Consultant:
 SDP HVAC Review by Date of Submittal:
 SDP Electrical Review by Date of Review:
 Status following Review:

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Design Development and Constructions Documents:				
1.00 Site Plan(s):				
1.01 Show, identify and dimension all above and below grade utilities				
2.00 Life Safety / Code Compliance:				
2.01 Provide notes on Drawings addressing permitted code allowances (differences from building code requirements for new buildings) that apply to this project through the International Existing Building Code.				
3.00 Architectural Plan(s):				
3.01 Identify items scheduled for demolition				
3.02 Provide references to related details				
3.03 Show, identify and dimension all ceiling types. Indicate grid layout.				
3.04 Show location of major ceiling penetration and surface-mount devices (light fixtures, diffusers, grilles, etc.)				
3.05 Show, identify and dimension all major roof elements (expansion joints, roof drains, roof mounted equipment, scuttles, etc.)				
4.00 HVAC Plan(s):				
4.01 Identify HVAC items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				

4.02 Show, Identify and dimension (dimensions to include required clearances) all HVAC equipment				
4.03 Show and identify (by size) all ductwork (single-line ductwork acceptable for Design Development)				
4.04 Show and identify all diffusers, grilles, dampers, etc.				
4.05 Show extent of thermal insulation.				
4.06 Show and identify (by size and type) all HVAC piping, valves, etc.				
4.07 Show and identify (to extent necessary to illustrate all design work has been completed) temperature control components				
4.08 Provide references to related details				
5.00 Miscellaneous HVAC Details / Sections / Schedules:				
5.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every HVAC element; note all electrical requirements for HVAC equipment shall be designated				
5.02 Provide updated listing of HVAC components and systems that will be subject to Commissioning.				
6.00 Electrical Plan(s):				
6.01 Identify Electrical items scheduled for demolition, and identify items that shall be re-installed into the work or furnished to SDP.				
6.02 Show and identify all electrical equipment including switchgear, distribution panels (include circuit schedule), emergency generator, transfer switches, UPS system, etc.				
6.03 Show and identify all power consuming equipment with a description of load characteristics				
6.04 Show and identify electrical accessory cabling				
6.05 Show and identify fire alarm devices and cabling				

6.06 Provide references to related details				
7.00 Miscellaneous Electrical Details / Sections / Schedules:				
7.01 Provide associated details, sections and schedules, developed to the extent necessary, to illustrate that all design work has been completed for every Electrical element				
7.02 Provide electrical riser diagram with notation of major components				
7.03 Provide updated listing of Electrical components and systems that will be subject to Commissioning.				
8.00 Specifications:				
8.01 Design Development - Provide specifications that includes all acceptable Manufacturers for all components that shall be incorporated into the work (Standard shall be based on a specific manufacturer and model and shall be so identified; other acceptable manufacturers shall be designated that truly have equal products)				
8.02 Construction Documents- Verify that all contractor scope of work responsibilities are detailed in Division 1 "Summary of Work" or "Scope of Work" section. Drawings and other spec sections shall not include comments such as "By Electrical", etc.				
8.03 Construction Documents - Verify that responsibility for training of SDP's forces is detailed in the Scope of Work section of Division 1.				
8.04 Construction Documents - Verify that responsibility for operations & maintenance manuals is detailed in the Scope of Work section of Division 1.				

8.05 Construction Documents - Verify that all HVAC components and systems applicable to commissioning have been included in the technical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).				
9.00 Design and Construction Standards:				
9.01 SDP Variance(s) have been granted for any and all deviations from the Design and Construction Standards				
9.02 Design meets all requirements of the SDP Design and Construction Standards				
10.00 Estimate / Value Engineering:				
10.01 Provide analysis of value engineering recommendations developed by Construction Manager				
10.02 Design Consultant's Statement of Probable Construction Cost				
10.03 Design Consultant's Analysis of Probable Construction Cost prepared by CM				
10.04 Design Consultant's and CM's sign-off on reconciliation of Statements of Probable Construction Cost.				
11.00 Constructability Review:				
11.01 Provide responses to Constructability Review by Construction Manager				
12.00 Phase Submission Sign-Off:				
12.01 Construction Manager's Phase Submission Sign-Off				
12.02 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
MAJOR SYSTEMS PROJECTS - ROOF REPLACEMENT



SDP Architectural Review by **PROJECT NAME**
 Design Consultant:
 Date of Submittal:
 Date of Review:
 Status following Review:

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Pre-Design Phase				
1.00 Scope of Work				
1.01 Meet with School and confirm scope of work				
1.02 Submit variance requests to SDP for approval				
1.03 CM POR sign-off				
1.04 School POR sign-off				
2.00 Code and Standards Review:				
2.01 Perform preliminary Code analysis.				
3.00 Building Assessment Confirmation:				
3.01 Submit roof assessment report				
3.02 Submit roof assessment exceptions to SDP				
4.00 Estimate:				
4.01 Analysis of Conceptual Estimate				
5.00 Phase Submission Sign-Off:				
5.01 School Phase Submission Sign-Off				

PHASES OF SERVICES AND DELIVERABLES SCHEDULE
MAJOR SYSTEMS PROJECTS - ROOF REPLACEMENT



SDP Architectural Review by **PROJECT NAME**
 Design Consultant:
 Date of Submittal:
 Date of Review:
 Status following Review:

Required Elements of Phase Submission	Y, N NA	SDP Reviewer's Comments	Design Consultant's Response	Approval by SDP
Design Development and Constructions Documents:				
1.00 Life Safety / Code Compliance:				
1.01 Provide notes on Drawings addressing permitted code allowances (differences from building code requirements for new buildings) that apply to this project through the International Existing Building Code.				
2.00 Roof Plan(s):				
2.01 Provide demolition roof plan indicating extent of roofing removal, flashing, and coping. Identify existing substrate.				
2.02 Show, identify and dimension all roof elements (expansion joints, roof drains, vents, roof mounted equipment, scuttles, saddles, walking pads, etc.)				
2.03 Indicate slope and ratio of slope.				
2.04 Provide thermal coefficient for each roof area for total roof assembly				
2.05 Provide references to roofing and flashing details.				
3.00 Specifications:				

<p>3.01 Design Development - Provide specifications that includes all acceptable Manufacturers for all components that shall be incorporated into the work (Standard shall be based on a specific manufacturer and model and shall be so identified; other acceptable manufacturers shall be designated that truly have equal products)</p>				
<p>3.02 Construction Documents- Verify that all contractor scope of work responsibilities are detailed in Division 1 "Summary of Work" or "Scope of Work" section. Drawings and other spec sections shall not include comments such as "By Electrical", etc.</p>				
<p>3.03 Construction Documents - Verify that responsibility for training of SDP's forces is detailed in the Scope of Work section of Division 1.</p>				
<p>3.04 Construction Documents - Verify that responsibility for operations & maintenance manuals is detailed in the Scope of Work section of Division 1.</p>				
<p>3.05 Construction Documents - Verify that all roof components and systems applicable to commissioning have been included in the tehcnical sections requirements to include submittals; pre-installation conferences; start-up procedures, tests & documentation; functional testing & documentation; demonstration and training; operations & maintenance manuals; and project close-out data (bonds, warranties, spare parts, record documents & maintenance service agreements).</p>				
<p>4.00 Design and Construction Standards:</p>				
<p>4.01 SDP Variance(s) have been granted for any and all deviations from the Design and Construction Standards</p>				
<p>4.02 Design meets all requirements of the SDP Design and Construction Standards</p>				
<p>5.00 Estimate / Value Engineering:</p>				
<p>5.01 Provide analysis of value engineering recommendations developed by Construction Manager</p>				

5.02 Design Consultant's Statement of Probable Construction Cost				
5.03 Design Consultant's Analysis of Probable Construction Cost prepared by CM				
5.04 Design Consultant's and CM's sign-off on reconciliation of Statements of Probable Construction Cost.				
6.00 Constructability Review:				
6.01 Provide responses to Constructability Review by Construction Manager				
7.00 Phase Submission Sign-Off:				
7.01 Construction Manager's Phase Submission Sign-Off				
7.02 School Phase Submission Sign-Off				

APPENDIX C –
VARIANCE REQUEST FORM

DESIGN / TECHNICAL STANDARDS VARIANCE REQUEST FORM

Project:

Design Consultant:
Contact:
Address:
Phone:
E-Mail:

Date:

Standard Requirement:

Requested Variance:

Cost Implications:
(attach detailed estimates, sources of pricing, value engineering worksheets, etc.)

Affect on Schedule:

DESIGN / TECHNICAL STANDARDS VARIANCE REQUEST FORM

**Detailed Reason for
Variance Request:**

(Attach any support
documentation that is
relevant)

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**Variance Review
Committee
Recommendation:**

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**Variance Review
Committee Members:**

Decision on Request:

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Decision By:

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APPENDIX D – COST ESTIMATE SAMPLE

Appendix "D"
Cost Estimate Requirements and Cover Sheet

Construction Cost Estimate Requirements for the Design Consultant at all Design Phases

1. Heading
 - A. Project # and Title
 - B. Date of estimate
 - C. Estimate Phase
 - D. Phone number of Estimator
2. Line Item Scope Delineation
 - A. Line Item description of scope
 - B. Quantity of Item Required
 - C. Line Item Labor hours and labor amount total (multiplied times the wage rate including benefits)
 - D. Line item material cost per unit and total material cost for item
3. Subtotals
 - A. Subtotal for Labor
 - B. Subtotal for material
 - C. Subtotal for equipment
 - D. Subtotal for tax on materials if applicable
4. Summary Page
 - A. Subtotal Material, Equipment and Labor into separate columns by trade
 - B. General Conditions markup of 10% for each trade
 - C. Estimate Contingency for each trade at a markup of 10% for Schematic Design, 5% for Design Development and 0% for Construction Design Documents.
 - D. Overhead and Profit markup of 15% for each trade
 - E. Bond markup of 2% for each trade
 - F. Subtotal of Construction Cost for each trade
 - G. Add the environmental estimate of cost plus 15% as one amount under the appropriate trade. (Environmental estimate to be made available to the consultant estimator)
 - H. Add the columns to total each trade and the construction grand total including Environmental costs.

Note: Escalation cost will be addressed at Construction Document Phase

Note: Soft costs do not apply to a construction estimate

Project:
 Contract Number:
 School:
 Address:

Construction Estimate

Estimated By:
 Date:
 Drawing Status:

Scope of Work :

Description	GC Contract	MC Contract	PC Contract	EC Contract	Total
Total Material					
Total Equipment					
Total Labor					
Total Material, Equipment & Labor	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
General Conditions: 10%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Estimate Contingency 10%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
15% OH & Profit	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Subtotal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2% bond:	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Subtotal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
3% Escalation	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Subtotal Construction Cost	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Environmental estimate from OEM \$ XXXXX plus 15% OH&P	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Construction Cost	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00